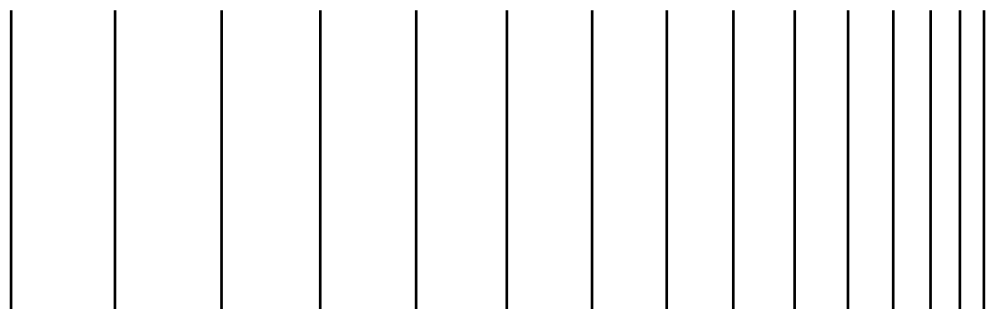
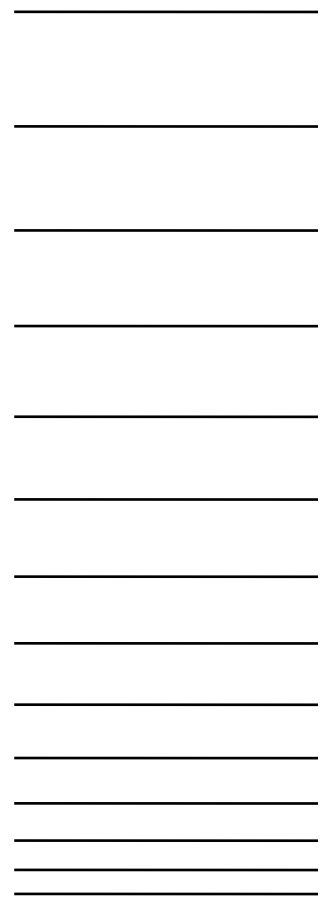




HITACHI INDUSTRIAL COMPUTER

HF-W7500 Model 40

INSTRUCTION MANUAL

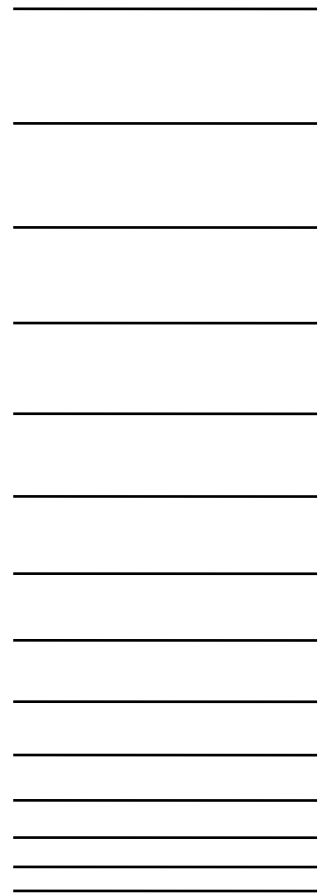


**USER'S
MANUAL**

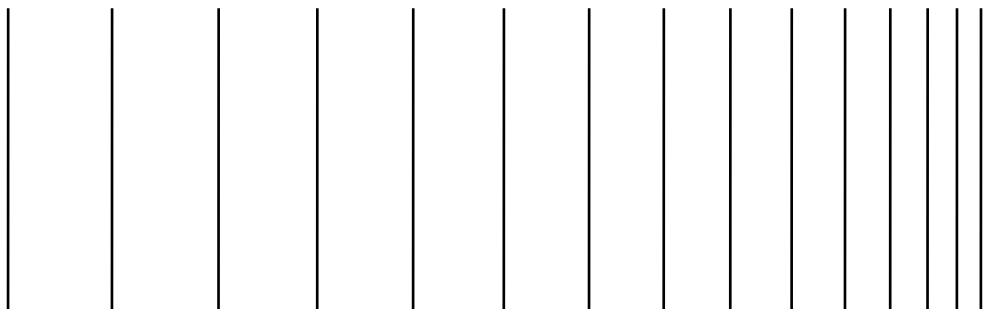
HITACHI INDUSTRIAL COMPUTER

HF-W7500 Model 40

INSTRUCTION MANUAL



Read and keep this manual.
<ul style="list-style-type: none">• Read safety instructions carefully and understand them before starting your operation.• Keep this manual at hand for reference.



**USER'S
MANUAL**

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TP<IC> (FL-MW2007)



SAFETY INSTRUCTIONS

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.
- Pay attention especially to safety precautions displayed on the equipment or in this manual. Make sure you follow them. Otherwise, personal injury and property damage including damage to the equipment may result.
- A safety precaution is indicated by a heading as shown below. A heading is either a safety alert symbol; a word such as “DANGER”, “WARNING”, “CAUTION”, or “NOTICE”; or a combination of both.



This is a safety alert symbol. This symbol is used to signify potential hazards that may result in personal injury or death. Make sure you follow the safety message that follows this symbol in order to avoid possible injury or death.



DANGER: This symbol is used to indicate imminent hazards that will highly likely result in serious personal injury or death.



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



CAUTION: This symbol is used to indicate potential hazards that may result in minor or moderate personal injury.

NOTICE: This symbol is used to indicate hazards that may result in equipment or property damage but not personal injury.

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

- Do not attempt to perform any operation that is not described in this manual. If there is any problem with the equipment, call your maintenance personnel.
- Read this manual carefully and fully understand the directions and precautions written in this manual before operating the equipment.
- Keep this manual nearby so that you can reference the manual anytime you need it.
- Every effort has been made to specify the best precautions on the equipment and in the manual. Nevertheless, unexpected incidents may occur. When you use the equipment, you are asked not only to follow the instructions but also to use your own judgment on safety.



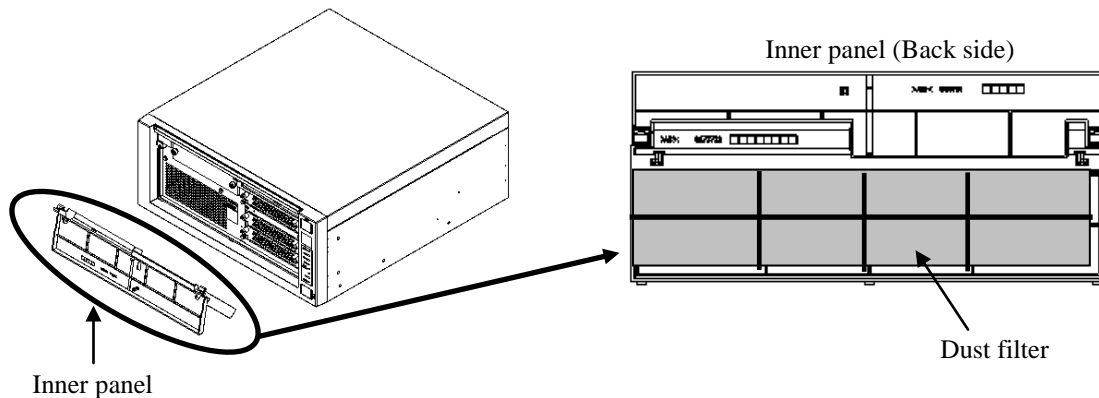
SAFETY INSTRUCTIONS (Continued)

1. COMMON SAFETY PRECAUTIONS

Carefully read and fully understand the following safety precautions.

1.1 WARNING

- This equipment is not designed and manufactured to be used for a life-critical system that requires extreme safety. If there is a possibility that the equipment may be used for this purpose, contact relevant sales representatives.
- In case of smoke, a burning smell, or the like, turn off the power to the equipment, disconnect the power cord from the outlet, and contact your supplier or maintenance personnel. Using the faulty equipment without repair may result in a fire or an electric shock.
- This equipment has built-in hard disk drives. Do not hit the equipment or give a shock or vibration to the equipment because that may cause the equipment to fail. Should you drop the equipment or damage its chassis, disconnect the power cord from the outlet and contact your maintenance personnel. Using the faulty equipment without repair may result in a fire or an electric shock. Do not give a shock to the equipment when unpacking or carrying the equipment.
- Do not modify this equipment because that may result in a fire or an electric shock. The Manufacturer's responsibility is exempted from any result arising out of the user's modification of the Equipment.
- Do not operate this equipment without the dust filter because that may cause of a fire. In addition, make sure you use the Hitachi brand dust filter.





SAFETY INSTRUCTIONS (Continued)

1.2 CAUTION

- If the equipment drops or is tipped over, personal injury may result. Pay full attention when transporting the equipment.
- Make sure you do not catch or hit your fingers to cause personal injury when unpacking or carrying the equipment.
- Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.



SAFETY INSTRUCTIONS (Continued)

1.3 NOTICE

- This equipment alone cannot guarantee the system safety. In order to ensure sufficient safety of your system even when this equipment should fail, malfunction, or have program bugs, you must add systemic protections such as building external protective/safety circuits to facilitate safety measures to prevent personal injury and serious accidents.
- When you work on installation or replacement of hardware, wear an antistatic wrist strap to prevent the buildup of static electricity.
- When you tighten or remove a screw, use a screwdriver that fits the size and type of the head of the screw to avoid stripping the head.
When you tighten a screw, drive a screw along the axis of a tapped hole without adding too much torque in order to avoid damaging the thread.
- This equipment is evaluated with the hardware specified in this manual. Accordingly, use only the specified hardware when upgrading options or replacing components. If any other hardware is used for such upgrade or replacement, correct operation of the equipment will not be guaranteed.
- Do not use the equipment in the environment full of dust or with corrosive gas because that may cause the equipment to fail.
- Do not give a shock to the equipment when unpacking or carrying the equipment. If you do, that may cause the equipment to fail.
- Make sure sufficient clearance is provided for air intake and exhaust in front of and behind the equipment. Otherwise, the temperature inside the equipment may rise and that may cause a failure or short life span of the equipment. In addition, you need to ensure sufficient clearance for maintenance work.



SAFETY INSTRUCTIONS (Continued)

2. SAFETY WARNINGS IN THIS MANUAL

2.1 Safety Warning Indicated as “ WARNING”

- The power cord that comes with the equipment is rated at the input voltage of 125 VAC. When using this equipment at over 125 VAC, prepare the power cord fitting input voltage and inspect the safeness of this equipment enough.
- When you connect the plug of the power cord to an outlet, make sure you 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. If you do not take these measures, that may result in a fire or an electric shock.
- Do not use a two-prong plug without a ground pole because that may result in an electric shock or failure of the equipment.

(Page 1-3)

- Warning about the power supply unit (hazardous voltage)
Do not remove, disassemble, or modify the power supply unit. If you do, serious personal injury or death may result due to an electric shock.

(Page 2-1)

- If any of the air intake and exhaust holes of the equipment is blocked, the temperature inside the equipment may rise and that may cause a fire or failure of the equipment. Make sure sufficient clearance is provided around the equipment when you install. (See “1.2.2 Installation”.)

(Page 3-1)

- In case of smoke, a burning smell, or the like, unplug the power cord from the outlet, and contact your dealer or maintenance personnel. Using faulty equipment without repair may result in a fire or an electric shock.

(Page 3-4)

- Make sure to install a dust filter to equipment. If you do not, dusts enter into the equipment and the short circuit fire may occur as a result.

(Page 5-1) (Page 5-27)



SAFETY INSTRUCTIONS (Continued)

- Before you install or remove an extension board, make sure you shut down the OS, turn off the main power to the equipment, and wait for at least one minute. If you install or remove an extension board without shutting down the power, an electric shock or a fire may result.

(Page 5-7)

- Before you install or remove main memory, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute. If you install or remove main memory without shutting down the power, an electric shock or a fire may result.

(Page 5-12)

- In case of smoke, a burning smell, or the like, unplug the power cord from the outlet, and contact your dealer or maintenance personnel. Using faulty equipment without repair may result in a fire or an electric shock.

(Page 6-1)



SAFETY INSTRUCTIONS (Continued)

2.2 Safety Warning Indicated as “ CAUTION”

- If you keep at high temperature this equipment, do not touch bare hands. Otherwise you may result burns.
(Page 1-2)

- When you install the equipment vertically, install fixing bracket attached and the status display lamps must come at the upper side and make sure the equipment is placed so it does not fall. If you do not, may result of injury. The mounting metal fitting for vertical installation must be secured to a mounting chassis or rack with casters using set screws at both the upper and lower positions.
When you install the equipment on a mounting metal fitting for vertical installation, do not use the set screws for the cover to secure the equipment.
If you use the set screws for the cover, the equipment may fall and personal Injury may result.
(Page 1-8)

- When procuring an AC power cord, make sure that the cord has proper rating and meets local safety requirements whatever applicable. Otherwise, an electric shock or machine failure may result.
(Page 1-12)

- Cautions about the fans (rotating objects)
Only maintenance personnel are allowed to remove a fan. If you remove a fan yourself, your hand or objects may be caught by the rotating part of the operating fan and personal injury may result.
(Page 2-1)

- Before you clean or replace the dust filter or the case fan of this equipment, make sure you shut down the OS, disconnect the plug of the power cord from the outlet, and wait for at least one minute. Otherwise, the injury of hands and fingers may result.
(Page 5-1)

- When you install the cover of the equipment, do not put your fingers inside the cover. If you do, your fingers may get caught and injured.
(Page 5-6)



SAFETY INSTRUCTIONS (Continued)

- Do not directly touch the parts inside the equipment with your hand when you install or remove an extension board. Those parts are hot and if you touch them, you may get burned. In addition, if you touch them, they may get damaged and that may result in failure of the equipment.

(Page 5-7) (Page 5-12)

- If you bend the tab of the grounding spring at the slot by mistake when you remove an extension board, be careful not to cut your fingers when you fix the bend because the tab has a sharp edge.

(Page 5-11)

- While you are installing an Inner panel, do not put your fingers inside the Inner panel. If you do, your fingers may get caught and injured.

(Page 5-17)

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute. Otherwise, an electric shock or failure of the equipment may result.
- When you install or remove a hard disk, make sure you do not cut your fingers on the protrusions.

(Page 5-18)

- When you install or remove an HDD, make sure the drive bay number is correct. If you remove an HDD and install it in a different bay, a configuration information mismatch occurs and the equipment may not start or the data stored on the HDD may be lost.

(Page 5-20)

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute. Otherwise, an electric shock or failure of the equipment may result.
- Do not directly touch the parts inside the equipment with your hand when you install or remove an extension board. Those parts are hot and if you touch them, you may get burned. In addition, if you touch them, they may get damaged and that may result in failure of the equipment.
- When you install or remove a DVD drive, make sure you do not cut your fingers on the protrusions.

(Page 5-21)



SAFETY INSTRUCTIONS (Continued)

- When you install the equipment on the mounting metal fitting for vertical installation, do not use set screws for the cover to secure the equipment. If you use the set screws for the cover, the equipment may fall and personal injury may result.

(Page 5-26)

- Rack-mounting metal fittings are designed to be used for pulling out the equipment toward the front by hooking your fingers on the handles. Do not grip the handles to lift up or carry the equipment. If you do, the equipment may fall and personal injury may result.
- Thoroughly check if the rack-mounting metal fittings are attached properly. If they are not attached properly or the screws are loose, the equipment may fall and personal injury may result.

(Page 5-28)

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute. Otherwise, an electric shock or failure of the equipment may result.
- Do not directly touch the parts inside the equipment with your hand when you install or remove an extension board. Those parts are hot and if you touch them, you may get burned. In addition, if you touch them, they may get damaged and that may result in failure of the equipment.

(Page 5-34)

- This equipment uses a lithium battery. When you replace the lithium battery, make sure you replace it with one specified by the Manufacture. Otherwise, an explosion, a fire, a burst battery, heat generation, a liquid spill, or gas generation may result.
- Install the battery in correct polarity. Installing it in wrong polarity may cause abnormal reaction such as charging or shorting, resulting in a liquid spill, heat generation or a burst battery.
- When you replace a lithium battery, you must follow the procedures described in this section. If you do not, BIOS might become corrupted.

(Page 5-39)

- Before you start the work, make sure you shut down the OS, turn off the main power to the equipment, and wait for at least one minute. Otherwise, an electric shock or failure of the equipment may result.
- Do not directly touch the parts inside the equipment with your hand when you install or remove a jumper socket. Those parts are hot and if you touch them, you may get burned. In addition, if you touch them, they may get damaged and that may result in failure of the equipment.

(Page 5-41)



SAFETY INSTRUCTIONS (Continued)

2.3 Safety Warning Indicated as “NOTICE”

- Before you move this equipment, make sure you shut down the OS, disconnect the plug of the power cord from the outlet, and wait for at least one minute. If you do not, the HDDs and other devices may fail.
- When you transport or carry the equipment, pack it in a dedicated container (the container and packing materials used when the equipment was delivered). If you use other container or packing materials, that may damage the equipment.
- Do not use damaged or broken dedicated container when you transport or carry the equipment. If you do, that may damage the equipment.
- Due to the property of inrush current restraint method with this equipment, inrush currents may increase than usual if the power is turned on before the power supply unit has sufficiently cooled off naturally after the power has been turned off. Before you turn on the power again, wait at least one minute after you have turned off the power. Otherwise, the inrush currents may affect the breaker connected to the equipment and also the life span of the equipment itself.

(Page C-1)

- Depending on the type of failure, important files may be lost when you use this equipment. Files can be lost by power failure and human mistakes during operation in addition to the failure of the equipment. If such a situation occurs, the files cannot be recovered. In order to prevent data loss, make it a routine to save your files and establish a systematic schedule for backing up files.

(Page C-7) (Page i)



SAFETY INSTRUCTIONS (Continued)

- Before you move this equipment, make sure you shut down the OS, disconnect the plug of the power cord from the outlet, and wait for at least one minute. If you do not, the HDDs and other devices may fail.
- When you transport or carry the equipment, pack it in the dedicated container (container and packing materials used when the equipment was delivered). If you use other container or packing materials, that may damage the equipment.
- Do not use damaged or broken dedicated container when you transport or carry the equipment. If you do, that may damage the equipment.
- If you install the equipment in a mounting chassis or rack with casters, the equipment may be subjected to excessive vibration or shock when it is transported or moved and that may cause the equipment to fail. In order to avoid failure, you must select or design a chassis or rack that satisfies the installation environment requirements of the equipment and be cautious about vibration and shock when you move, transport, or carry the installed equipment.

(Page 1-3) (Page 5-1)

- Do not route the interface cables, etc. (including cables for other devices such as a PC) near the power cord. If you do, a failure or malfunction of the equipment may result.
- Do not connect or disconnect an interface cable while the power for this equipment or for the remote device is on. If you do, failure of the equipment may result due to a short circuit between the power supply and the ground. When an interface cable comes off while the power for the equipment is on, shut down the OS and disconnect the power cord from the outlet. Disconnecting the power cord from the outlet without shutting down the OS might destroy the internal files.
- When you connect a cable for external contacts, make sure you connect the cable to a connector for the external contacts (EXT). It is possible that a voltage as high as 40 VDC can be applied to the cable through a relay load. If you connect the cable to the wrong connector, that may cause failure of the equipment.

(Page 1-9)



SAFETY INSTRUCTIONS (Continued)

- Never hot-swap HDDs because that may cause failure of the equipment and HDDs. Before you replace an HDD, make sure you shut down the OS, disconnect the plug of the power cord from the outlet, and wait for at least one minute.
- When using a USB port, check the orientation of the USB connector, and then insert the connector slowly. Otherwise, the USB port may be damaged.
- Do not remove or insert a USB device during online operation (system operation) because that may affect currently running applications.
- If you insert or access a CD or DVD, the system load may increase and running applications may be affected. Do not insert or access an optical disc during online operation (system operation).

(Page 2-1)

- Performing emergency shutdown (that is, unplugging the power cord from the outlet or shutting off the breaker without proper shutdown of the OS) may cause the OS or applications not to work properly or may cause saved data to be corrupted. Do not perform emergency shutdown unless you must stop the system immediately due to some kind of error.
- If you turn off the power at the source of AC the power, the system may not be able to recover automatically.

(Page 3-4)

- If you insert or access a CD or DVD, the system load may increase and running applications may be affected. Do not insert or access an optical disc during online operation (system operation).
- When you finish accessing a CD or DVD, eject the disc from the DVD drive. If you leave the disc in the DVD drive, failure may result.
- If you keep the disc tray open, failure may result. When you do not intend to use the DVD drive, keep the disc tray inside the DVD drive.
- Do not use an unbalanced CD or DVD due to attached labels and so on; a disc with cracks, scratches, or vertical deviation; or a disc with a non-standard shape. If you do, an abnormal sound or vibration may be generated and failure of the equipment may result.

(Page 3-5)



SAFETY INSTRUCTIONS (Continued)

- If you wash a dust filter, dry it completely before re-attaching it to the equipment. If you use the equipment while its dust filter is not completely dry, the equipment may fail. When you use a detergent to clean a dust filter, make sure you use a neutral detergent. If you use other types of detergent, the dust filter may lose its function.

(Page 5-2)
- Make sure you disconnect all external cables connected to the equipment before you install or remove an extension board. Otherwise, failure of the equipment may result.

(Page 5-7)
- Always attach a slot cover to each unused slot and attach a connector cover to each unused connector. Otherwise, failure of the equipment may result.

(Page 5-11)
- Make sure you disconnect all external cables connected to the equipment before you install or remove main memory. Otherwise, failure of the equipment may result.

(Page 5-12)
- The orientation of a main memory module on a connector is fixed. When you install a main memory module, make sure the orientation is correct. Otherwise, failure of the equipment may result.
- Do not install main memory modules with different capacities on slot A1 (or A2) and slot B1 (or B2). If you do, the modules may not be recognized.

(Page 5-13)
- When you install or remove a CPU fan, make sure you hold the CPU fan with your hand during the process lest the CPU fan falls and the components inside the equipment get damaged.

(Page 5-14)
- After you remove main memory, make sure you attach a memory cover on each vacant slot. If you do not, a failure of the equipment may result.

(Page 5-16)



SAFETY INSTRUCTIONS (Continued)

- Put the HDD on a shock-absorbing material such as an antistatic cushion even for a temporary task. If you put an HDD directly on a hard surface such as a desktop, a failure or a shorter life span of the unit or loss of data may result due to possible jarring or shock.
- Never remove the screws on an HDD while the power to the unit is on. Never hot-swap HDDs. If you do either of these, failure of the equipment or the drive may result.
- Before you replace an HDD, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute.
- Install or remove an HDD only if necessary, for example, when you need to replace an HDD due to failure. If you do it frequently, failure of the equipment may result.
- Fully insert an HDD. Loose contact and missing screws may result in failure.
- Do not give a shock to an installing HDD and the already mounted hard disks during installing. If you give a shock to an HDD, failure of the drive may result.

(Page 5-18)

- The DVD cover is prone to bending or warping. Make sure you do not apply too much force to the cover.
- Make sure you do not apply too much force to the connector of the DVD drive. If you do so, failure of the DVD drive may result.
- Make sure you do not apply too much force to the top of the DVD drive. If you do so, failure of the DVD drive may result.

(Page 5-21)

- The orientation of a rack-mounting metal fitting is fixed if it is to be attached to the equipment. Make sure the orientation is correct.

(Page 5-28)

- The rack mounting metal fittings alone cannot hold the mass of the equipment in the rack. Procure and use an appropriate rack tray or slide rails when rack-mounting the equipment with the rack mounting metal fittings.
- No rack tray, slide rails, or slide rail fixing screws are included in the equipment.
- Slide rails must be of such a type that attaches to the sides of the equipment instead of the front and rear ends of the equipment. Otherwise, the installed rack mounting metal fittings may interfere with the slide rail fixing brackets. Consult the vendor before purchase.

(Page 5-31)



SAFETY INSTRUCTIONS (Continued)

- Never remove screws while the main power to the equipment is on. Never hot-swap a device. If you do either of these, failure of the built-in equipment may result.

(Page 5-34)

- Although this Equipment featuring RAID1 is more reliable than general systems, it is still prone to the loss of data in the HDDs. Not only a machine failure but also an unexpected power failure or an operation error may cause data to be lost for good. To prevent such loss of data, implement scheduled data backup in daily operation. Also, protect the power source from undesirable interruptions by such means as UPS.
- This Equipment is evaluated based on the specific HDD models authorized by the Manufacturer. Replace only with specific HDD models authorized by the Manufacturer. Otherwise, the existing data in the HDD may be lost. Also, always observe the recommended replacement interval for HDDs (Section 5.3, "Replacement of Consumable Parts").
- Since each Equipment has its own RAID1 configuration information (e.g., serial number), you cannot swap HDDs even between two units of this Equipment. If you dare, the stored data in the newly installed HDD will be erased with automatic RAID1 rebuilding process due to inconsistency of the RAID1 configuration information. If you own multiple units of this Equipment, manage use and inventory of HDDs so that they are not inadvertently mixed.
- Use a brand-new HDD (an unused HDD) or an HDD to which "Initialize Drives" has been applied (see "8.2.2 Building RAID1") as a replacement HDD.
- Do not reverse the mounting locations of two HDDs. If you do, rebuild may not start automatically when a replacement HDD is mounted to recover from a failure in one HDD.
- Maintenance of a RAID1 system requires a high level of expertise. Should any mistakes be made during the work, the data stored on the HDDs may be lost.
- When HDD1 and HDD2 are installed, their capacities must be the same.

(Page 8-1)

- As a replacement HDD, do not use an HDD previously used in the A model or the D model. If you do, this equipment may not operate properly or the data on the HDDs may be lost because of configuration information mismatches or other reasons.

(Page 8-1)(Page 8-20) (Page 8-39)



SAFETY INSTRUCTIONS (Continued)

- When a RAID1 system is newly built, the RAID1 configuration information is recorded on the HDDs. This configuration information can only be used by the piece of equipment that uses this individual RAID1 system. An HDD with this configuration information cannot be used by other pieces of equipment. If a user uses multiple pieces of equipment, regardless of whether they are A models or D models, the user needs to be cautious when handling and storing the HDDs in order not to mix them up. If HDDs are mixed up, a RAID1 configuration information mismatch occurs. The equipment may not operate properly, and the data on the HDDs may be lost.
- When you build a RAID1 system from scratch, prepare two new HDDs selected from the models specified and tested by HITACHI. Otherwise, the data stored on the HDDs may be lost.
- When you build a RAID1 system from scratch, use the recovery DVD and install the OS from scratch.
- Care must be taken when you build a new RAID 1 system on an existing RAID1 system. The setup process will completely overwrite the existing RAID configuration information and you will no longer be able to use the existing RAID 1 system.

(Page 8-8)

- Never remove an HDD when the HDD status lamp of the HDD is OFF. If you do, the data stored in the HDD gets corrupted.
- Mount an HDD securely. Loose contacts and missing screws may result in a failure.
- Do not subject an HDD you are mounting and the already mounted HDDs to shock while replacing an HDD. Otherwise, failure of the equipment may result.
- Until the rebuild is complete, avoid shutting off the power for this equipment or attaching and detaching HDDs. Otherwise, the data on the HDDs may be lost or a failure may result.

(Page 8-20)

- Wear cotton gloves when replacing an HDD in order to prevent problems caused by static electricity. If you do not, the data stored on the HDD may get corrupted.
- Make sure you check the correct procedure before you start the work. If you do not follow the correct procedure, the data stored on the HDD may be lost.

(Page 8-20) (Page 8-35) (Page 8-37) (Page 8-39)



SAFETY INSTRUCTIONS (Continued)

- If you apply the recovery method for an offline HDD to an HDD that was set to offline by something other than the RAS software, the HDD may not be recovered, or even if it is recovered, the HDD may not work properly.
- Use the recovery method for an offline HDD only for the purpose of evaluating the equipment. If you apply the recovery method for an offline HDD to equipment actually used in the field, for example, a system in normal operation, malfunctions may result, including data loss.
- If an HDD is automatically set to offline by the equipment, the HDD may possibly be out of order. Do not apply the recovery method for an offline HDD to such an HDD.
- An HDD recovered by the recovery method for an offline HDD must not be used for equipment actually used in the field. If used, malfunctions may result, including data loss.

(Page 8-32)

- Do not replace the two HDDs at the same time. If you do, the data gets corrupted.
- When you replace an HDD, make sure that you set the HDD into the offline mode in the **Hardware status** window, and then remove that HDD and mount the replacement HDD. If you mount or remove an HDD when the hardware status cannot be checked, for example, immediately after the OS starts, a failure may result.

(Page 8-39)

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




(Page A-1)

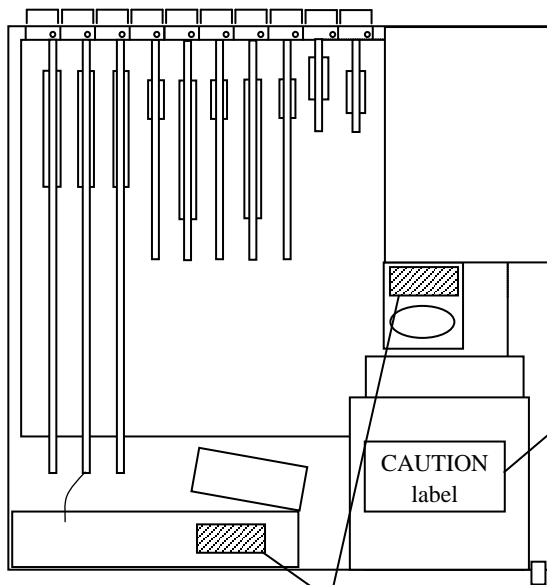
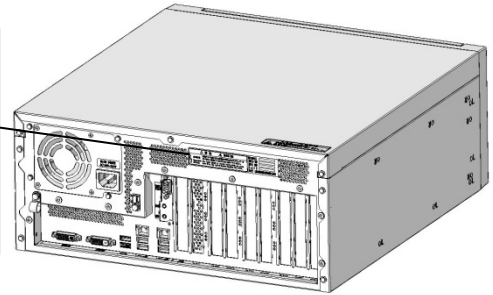


SAFETY INSTRUCTIONS (Continued)

3. WARNING LABELS


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

 警告  WARNING	
	<p>危険電圧 Hazardous voltage.</p> <p>感電による死亡または重傷の恐れがあります。カバーを外す前に、電源ケーブルをコンセントから抜いてください。Can cause death or severe injury. Pull out power cord from the outlet before opening the cover.</p>



The CAUTION label^{*1} is attached to the upper side of the DVD drive. For more details, see “4. PRECAUTIONS WHEN YOU USE THE LASER”

*1: Depending on a DVD drive, May not see CAUTION label behind a DVD cover

 警告  WARNING  AVERTISSEMENT	
	<p>危険な可動部 Hazardous moving parts. Pièces mobiles dangereuses.</p> <p>可動部位に人体の一部を近づけないでください。 Keep body parts out of the motion path. Éloignez vos doigts et toutes les autres parties de votre corps.</p>

 **SAFETY INSTRUCTIONS (Continued)**

4. **PRECAUTIONS WHEN YOU USE THE LASER**

The DVD drive uses a laser.

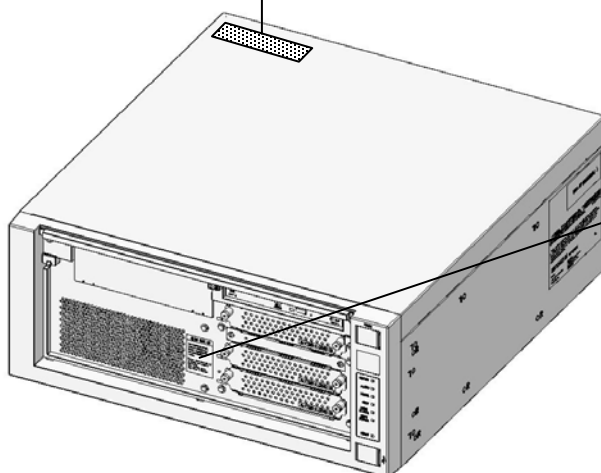
Do not look into the laser beam, whether directly or indirectly, because that may cause a visual impairment.

 **注意**  **CAUTION**



指をはさんでケガをする恐れがあります。
カバーを取付ける際に内側に指を入れないでください。

Can cause injury. Do not put your fingers inside the cover
when you install.



通知 NOTICE

ドライブの挿抜手順を誤ると、
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。

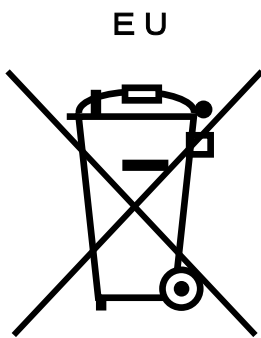
Drive replacement by
a wrong procedure
corrupts
the system data.
See User' s Manual.

 SAFETY INSTRUCTIONS (Continued)

5.  DISPOSING THE EQUIPMENT

This Equipment contains materials potentially harmful to environment if improperly abandoned. When you dispose of this Equipment, observe local laws and regulations whatever applicable.

6. EU BATTERY DIRECTIVE (2006/66/EC)



This symbol mark is valid in countries inside the European Union. This symbol mark is specified in Article 20 “Information for end-users” and Annex II of the EU directive 2006/66/EC.

This equipment is equipped with a lithium battery. When you remove the battery, follow the instructions in the “HF-W7500 Model 40 INSTRUCTION MANUAL”.

In the European Union, a separate collection system for used battery and accumulator has been in place. Process batteries and accumulators appropriately at a local collection/recycle center.

PRECAUTIONS

1. PRECAUTIONS ABOUT THE EQUIPMENT

NOTICE

- Before you move this equipment, make sure you shut down the OS, disconnect the plug of the power cord from the outlet, and wait for at least one minute. If you do not, the HDDs and other devices may fail.
- When you transport or carry the equipment, pack it in a dedicated container (the container and packing materials used when the equipment was delivered). If you use other container or packing materials, that may damage the equipment.
- Do not use damaged or broken dedicated container when you transport or carry the equipment. If you do, that may damage the equipment.
- Due to the property of inrush current restraint method with this equipment, inrush currents may increase than usual if the power is turned on before the power supply unit has sufficiently cooled off naturally after the power has been turned off. Before you turn on the power again, wait at least one minute after you have turned off the power. Otherwise, the inrush currents may affect the breaker connected to the equipment and also the life span of the equipment itself.

(1) TRANSPORTING THE EQUIPMENT

<Required actions>

- When you transport or carry the equipment, pack it in a dedicated container (the container or packing materials used when the equipment was delivered). When you transport or carry the equipment in a chassis, protect the equipment so that any vibration and shock the equipment is subjected to is within the specifications provided.
- Keep a dedicated container (the container or packing materials used when the equipment was delivered). You can then use them later when the equipment is transported or carried.

(2) INTERFACE CABLES

<Precautions>

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

<Required actions>

- Route the cables in a neat and orderly manner alongside the device so that those cables do not catch on hands or feet. If the power cord is disconnected during operation of the equipment and the power is lost, crucial data stored on the hard disk may be break.

(3) CONNECTOR

<Precautions>

- In order to connect a connector properly, you need to insert it with the proper orientation and at the proper angle. If a connector is not inserted properly, the connection may fail or malfunction.
- Make sure there are no loose I/O cable connectors on the equipment.
- Connector covers have been installed for internal connectors (main memory slots, expansion slots, SATA ports, general-purpose 5-in bay power connectors, and other connectors). Leave those connector covers on any unused connectors or slots when you use the equipment. Otherwise, a malfunction or failure of the equipment may result.
- When you use an internal connector, remove the connector cover before using the connector. Save the connector cover, and store it in a safe place for later use.

(4) POWER SUPPLY

1. Power Voltage

<Required actions>

- Confirm that the voltage of the power input to the equipment is within the specified range (100V to 240VAC). If the voltage of the power input is close to the upper or lower limit of the specified range, you should treat it as you would a setting error of the input voltage and ask the manager of the power facility to inspect the voltage output by the facility

2. Power Cord

<Precautions>

- The power cord that comes with the equipment is rated at the input voltage of 125 VAC. When using this equipment at over 125 VAC, prepare the power cord fitting input voltage and inspect the safeness of this equipment enough.
- Install D class grounding (previously known as third class grounding) defined in the Technical Standard for Electrical Facilities of Japan in order to maintain normal operation of electronic circuits containing highly integrated LSIs and protect device from abnormal voltage caused by lightning or the like.
- Use a power cord with a 2-prong plug and a grounding pole. (See“1.2.3 Hardware connection”.)
- When you connect the plug of the power cord to an outlet, make sure you use an outlet with a neutral pole that is properly grounded. In addition, you must install and use an earth leakage circuit breaker.
- If you use a power cord clamp to prevent accidental disconnection, give an extra length to the power cord when you fix the cord, in order to allow the cord to be disconnected in an emergency. Alternatively, install an emergency circuit breaker at the outlet side.
- Do not put any object on the power cord. In addition, do not install signal lines near the power cord.

3. Turning the Power On and Off

<Precautions>

- When you turn off the power, disconnect the plug of the power cord from the outlet. (See“1.2.3 Hardware connection”.)
- Wait for at least one minute before turning the power on again after turning it off. If you wait for less than one minute, the equipment may not operate as specified by the BIOS power setting. (Refer to the “4.6 BIOS Setup”.)
- Do not turn off the power to the equipment or press the reset switch during communication or while a CD or DVD or an HDD is being accessed.

<Required actions>

- When you connect or disconnect a peripheral, make sure both the equipment and the peripheral have been turned off. Otherwise, a malfunction or failure may result.
- When you turn on the power, turn on the peripherals first and then turn on the equipment. When you turn 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 a long time, unplug the power cord from the outlet.
- Depending on the material, a rug, a lap blanket, or the like may cause static buildup and consequently cause a malfunction of the equipment. Use a conductive rug or lap blanket resistant to static buildup.
- Instantaneous power failure or brownout may occur during operation and the screen may black out when lightning strikes nearby or the AC power supply is not stable. When this situation happens, turn off the power to the equipment and then turn it back on.

(5) INSTALLATION ENVIRONMENT

<Precautions>

- When you install a commercially available device in a general purpose 5-in bay or extension slot, the specifications for the required environment for both the commercially available device and this equipment must be met. (See “1.2.1 Environment”.)
- When you install a device in a general purpose 5-in bay or extension slot, make sure the power consumption does not exceed the maximum current rating. (See “4.1(10) Maximum current specifications”.)
- In order to use this equipment without failure for a long period of time, you must use it with proper care and in the proper environment. Do not use the equipment in the locations described below. If you do, the life span of the equipment may be reduced and failure of the equipment may result.

- In a place subject to exposure to direct sunlight.....Too close to a window
- In a place subject to rapid temperature or humidity change.....Too close to an air conditioner
- In a place close to device that generates electrical noise.....Too close to electric motors and generators
- In a place close to device that generates a strong magnetic field.....Too close to magnets or the like
- In an environment full of dust
- In a place subject to vibration
- In an environment with corrosive gasses present
- In a place with vibration caused by loud sounds.....Too close to 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, make sure that the Equipment can be moved easily; if fixed, ensure that the Equipment can be removed easily.
- It is reported that zinc whiskers can cause a problem with the device. Do not use electro-galvanized material near or at the place where the equipment is installed.

(A quote from the 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, aseismatic flat steel, and the like.

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 find because the symptom differs depending on the location of the short circuit, and often, it is mistaken for a temporary issue.

(*) JEITA : Japan Electronics and Information Technology Industries Association

<Required action>

- If you mount the equipment in a chassis or on a desk, the temperature increase around the equipment needs to be taken into consideration.
- The system clock and the like inside the equipment always operates 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 may need to reconfigure system BIOS settings including the clock settings, when you start using the equipment again. When you reconfigure system BIOS settings, follow the instructions in “4.6 BIOS Setup”.

(6) OPERATING CONDITION

<Precautions>

- Before you move the equipment, be sure to disconnect the plug of the power cord from the outlet and wait at least one minute.
- In order to prevent moisture condensation, when you move the equipment from outside the building to inside, wait for at least four hours before using the equipment.
- The equipment is made of precision electronics components. Do not subject the equipment to any vibration or shock.
- Do not sit on the equipment nor place anything heavier 20 kg on the equipment.
- During normal operation, do not turn off the display. Set it into the standby mode instead.
- During normal operation, do not touch the keyboard or mouse until the logon screen is displayed when you turn on the equipment.

<Required action>

- We recommend that you remove the dust built up in the neighborhood of the device (in particular, below the device), in the vents on the device, and on the front of the device itself.

(7) ABNORMAL SOUNDS

<Specifications>

- When the power is turned on, you may hear a low-frequency humming noise. This is caused by transient low-frequency vibrations of the chokes for suppressing high-frequency noise or other components and does not affect the characteristics and life span of the equipment.

(8) WARRANTY

<Specifications>

- The Manufacturer cannot guarantee for damage to data or application software caused by hardware damage to the equipment.
- Use an operating system specified by the Manufacturer. The Manufacturer cannot guarantee proper operation of the equipment if you use an operating system not specified by the Manufacturer.
- This equipment is evaluated under the assumption that the hardware specified by the Manufacturer is used. Therefore, when you install or replace hardware, use the hardware specified by the Manufacturer. The manufacturer cannot guarantee proper operation of the equipment if you use other hardware.

2. NETWORK

<Precautions>

- When you send a Magic Packet™ frame, make sure the standby lamp of the equipment is on. If you send a Magic Packet™ frame when the power is about to be turned off after an OS shutdown, the equipment may restart without being turned off or wake on lan (WOL) may not function at all. (See “3.7.2 Turning on the power using the LAN”.)

<Specifications>

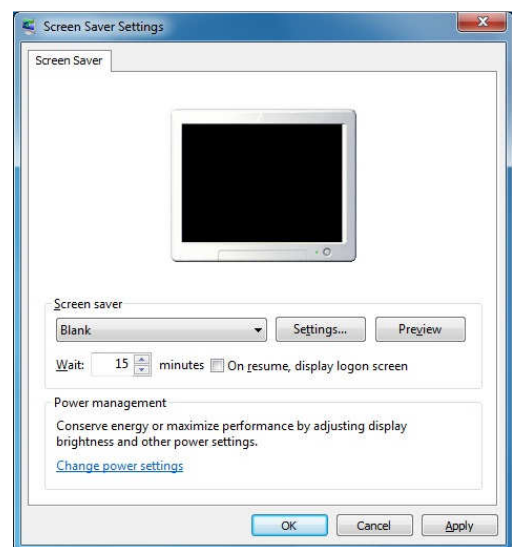
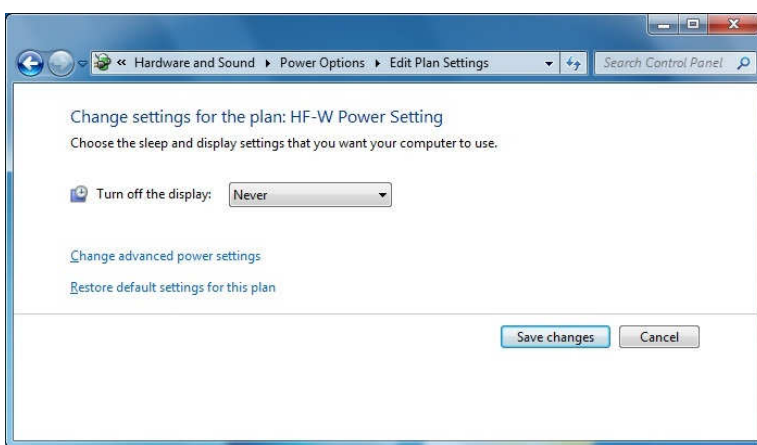
- Depending on the status of the network, Magic Packet™ frames can be lost. In order to avoid this, set up the system so that Magic Packet™ frames can be propagated without loss. (See “3.7.2 Turning on the power using the LAN”.)
- Even though a network drive may be configured to be reconnected at logon, sometimes the reconnection may fail. If this happens, log on again or use the net_use command to establish the connection.
For information about the net use command, see the Windows® help.
- If the settings of the hub and the network adapter do not match, the performance of the network adapter may be compromised or the network adapter may not work properly. (See “3.8 Setting Up the LAN Interface”.)
- The electric potential difference between units can generate heat. Therefore, do not use twisted-pair Ethernet cables (such as category 5 or STP cables) for network connections other than the ones specified in “4.8.1 Connector specifications (1) Motherboard (Standard)”.

3. DISPLAY SCREEN

<Specifications>

- Before you set up the screen, terminate all running application software.
- When you change connections to switch between single- and multi- display configurations, turn off the power to the equipment, change the connection of 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 application software, the screen may flicker and video playback may not be smooth.

(The display image assumes Windows® 7 but it is similar under Windows Server® 2008 R2 and Windows Server® 2012 R2.)



<Required action>

- If you want to enable "Collage" for multiple displays, use displays that support Display Data Channel (DDC). When you use displays that do not support DDC, you cannot enable "Collage".

4. HARD DISKS DRIVES (HDDs)

NOTICE

Depending on the type of failure, important files may be lost when you use this equipment. Files can be lost by power failure and human mistakes during operation in addition to the failure of the equipment. If such a situation occurs, the files cannot be recovered. In order to prevent data loss, make it a routine to save your files and establish a systematic schedule for backing up files.

(1) Handling the Hard Disk Drives

<Precautions>

- The access performance of the HDDs differs depending on the equipment. Also note that the performance of an HDD is lower at high or low temperatures. When you use HDDs, confirm that the access performance of the HDDs at normal temperatures and their degraded performance at high or low temperatures do not cause any problems to the user application.

<Required actions>

- Do not subject HDDs to vibration or shock.
- Take preventive action against static electricity due to human contact, and due to other activities in the work place.
- Hold the bracket or sides of an HDD. Do not touch the printed circuit board.
- When you store an HDD for a long time, put the HDD into an anti-static bag and then store it in a dedicated HDD box.

<Specifications>

- When you modify existing partitions, delete the partitions first and then re-create them.
- The capacity and performance of an HDD may be changed when you replace an HDD as a component.

(2) Backing Up Files

<Required actions>

- Make sure the contents of all HDDs are backed up periodically.
- When you delete a partition, all files in the partition will be deleted. Before you delete a partition, back up important files you need.

(3) **Media Error**

This item applies to D model only. If you are not using D model, skip this item.

The media error is a status where there is a problem in data healthiness while the RAID status (see "CHAPTER 8 RAID1") is normal. If a read error occurs on the copy source drive during a rebuild process, the rebuild process will finish, but the sector data where a read error occurred is already lost, indicating a data healthiness problem. For details about the media error, refer to the *RAS FEATURES MANUAL*.

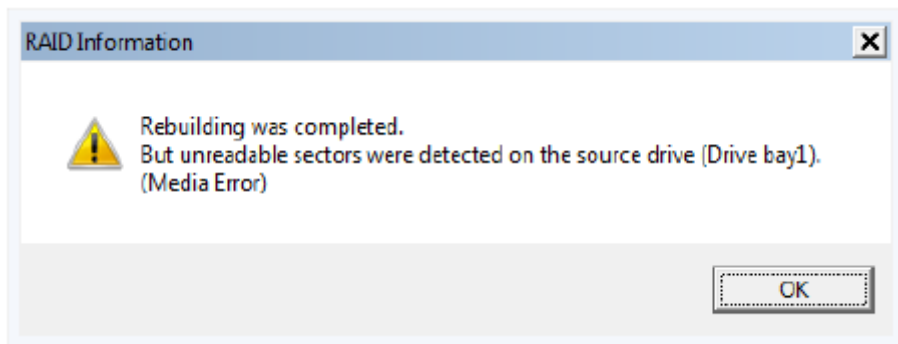
<Media error notification>

When a media error occurs, we recommend that you back up the data first, and then replace the copy source HDD with a new HDD. Because you lose only a part of data due to a media error, it is also possible to continue to use the equipment as is. But even if the equipment works normally, a failure may occur later on. If you decide to continue to use the equipment as is, take extra cautions.

Note that this equipment allows you to select, depending on the system operation, whether a media error is handled as a failure. By default, a media error is not recognized as a failure. For information about changing how to notify media error, refer to the *RAS FEATURES MANUAL*.

When a media error is handled as a failure, a media error is notified as the "fail" status of the RAID in the following methods:

- Event notification
- Outputs on the Digital LEDs for Status indication
- Remote notification
- Alarm indicator
- MCALL contact of the RAS external contacts interface
- Message box



Example of a Message Box When a Media Error Occurs

5. DVDs

(1) Handling the DVD Drive

<Precautions>

- The DVD drive is subject to damage by dust. Install the equipment in a place with minimum dust and clean up around the equipment regularly.
When you use insecticide sprays, or the like, cover the equipment with a protective sheet or covering beforehand.
- Do not subject the equipment to a strong shock while the DVD drive is in use.
- Do not open the tray except when you insert or eject a CD or DVD. Do not put foreign objects into the tray. If you do, the DVD drive may be damaged or fail.
- When you put a CD or DVD on the disc tray, make sure that the disc is properly set on the disc tray. If not, the disc may be forced out of the tray while the tray is loaded.
- Do not put foreign objects in the tray (tray type) or disk slot (slot-in type). If you do, the DVD drive may be damaged or fail.
- If you mount a CD or DVD disc on the tray type drive, make sure the disc is loaded correctly. If not, the disc might protrude.
- When inserting a CD or DVD disc into a slot-in type drive, make sure you do not insert it between the DVD drive and front panel as the disc might be damaged.

<Specifications>

- Depending on the type of CD or DVD used, you may not be able to read or write to the disc. In this case, use another CD or DVD.
- Depending on the condition of a CD or DVD (whether it has scratches, dust, is deformed, has copy protection enabled, and so on) , you may not be able to read or write to the CD or DVD properly.

(2) Handling CD or DVD

<Precautions>

- Do not apply benzene, thinners, water, record cleaner, anti-static liquids, or use a silicone cloth on a CD or DVD.
- Do not use a dryer when you remove dust or moisture from a CD or DVD.
- Do not store CD or DVD in a location with high temperature and humidity.
- Do not store CD or DVD in a location not subject to direct sunlight, strong artificial light, and the like.
- Do not fold or bend a CD or DVD.
- Do not write on the recording surface of a CD or DVD.
- Do not scratches on the recording or label surface of a CD or DVD.
- Do not insert a stick into a center hole of a CD or DVD and spin the CD or DVD.
- Do not put stickers, labels, or decals on a CD or DVD.

<Required actions>

- If a CD or DVD is dirty, wipe it with a soft dry cloth in the direction from the center to the rim.

6. USB DEVICE

<Precautions>

- When you start using a USB device, test the device before using it. Never use a USB device for mission critical use.
- Do not connect a USB device during the OS startup because the OS may not start normally.
- If you switch screens during OS startup when you use a CPU/USB KVM switch, the OS may not start normally depending on the type of the CPU/USB KVM switch. When you use a CPU/USB KVM switch, make sure you test its operation thoroughly.
- For USB2.0 and USB3.0, the length of the cable used must be less than or equal to the length specified in the specifications. Otherwise, the transfer speed may be compromised. Use a USB2.0 or USB3.0 cable that matches the device you use. Otherwise, the actual transfer speed of the device may not be as high as it should be, or communication errors may result. For information about the cable specifications, ask the manufacturer of the cable. (For information about the cable length, see “4.8.3 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 in order not to damage the USB port.
- When a USB device is inserted, removed, or accessed, the system load may be increased. 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 connector of the keyboard. A loose connection may cause the keyboard to be recognized incorrectly or prevent the system from starting normally.

<Specifications>

- It is not guaranteed that all USB devices can be connected.
- Some USB devices do not conform to the USB specifications. If you turn off the main power while a non-compliant USB device is connected, the equipment may not start properly and the clock setting may be corrupted. When you select a USB device, make sure you test its operation thoroughly.

7. EXTENSION BOARDS

<Required actions>

- If an extension board (PCI Express/PCI board) is supplied by a user, the user must take responsibility for confirming that each component on the board meets the operating temperature specification when those parts heat up.
- After you install an extension board, make sure you save the dummy bracket, and store it in a safe place.
- Save the connector cover, and store it in a safe place for later use.

8. RACK-MOUNTING METAL FITTINGS

<Precautions>

- When the equipment is mounted on a rack with rack-mounting metal fittings, do not put anything on the equipment. In addition, do not put a load (for example, an object) on the cover of the equipment.
- When you mount the equipment on a rack mount, for safety reasons, we recommend you use a combination of rack-mounting metal fittings, a shelf board for a rack mount, and slide rails. (See “1.2.2 Installation”.)

9. LITHIUM BATTERIES

<Required actions>

- This equipment uses a lithium battery. When you dispose of the battery, observe local laws and regulations whatever applicable.

10. THE OPTICAL MOUSE

<Required actions>

- Due to the nature of the optical sensor, an optical mouse may not work on transparent materials or light-reflecting materials (glass, mirrors, and the like). Avoid using an optical mouse on those materials or purchase an optical mouse pad available on the market.
- If the optical sensor is smeared with condensation or oil mist, the optical mouse may not work properly. If you use an optical mouse in an environment subject to those kinds of smears, take appropriate measures to protect the equipment.

11. SERIAL PORT

<Required actions>

- If the OS starts while a serial port is receiving data, a USB mouse and serial ports may not work properly. Make sure that data reception at the serial port starts after the OS starts.

12. BIOS SETTINGS

<Specifications>

- When the main power is OFF while the power from the backup battery is not available or the battery is not connected, the “After AC Power ON” setting is switched to “Stay Off”. After pressing the power switch and starting the system, you can configure the “After AC Power ON” setting but because the power from the backup battery is not available, the setting is automatically switched back to “Stay Off” when you turn off the main switch. (See “4.6 BIOS Setup”.)
- The purpose of the clock displayed on the BIOS setup menu screen is not to show the correct time and date but to configure the time and date. Because of this, the date displayed on the screen does not change when the actual date changes. If the actual date changes during setup, you must update the date setting. (See “4.6 BIOS Setup”.)
- When the setup menu is used, the clock display may sometimes show a delay. After you finish the setup menu, make sure you confirm the clock is correct. (See “4.6 BIOS Setup”.)

13. MAINTENANCE SERVICES

<Specifications>

- Microsoft® Windows®, device drivers, and commercially available application software may not be able to be modified directly as a counter measure for a particular failure. Instead, the Manufacturer may offer a work-around as a counter measure.
- If you add new commercially available hardware to the equipment without notice to the Manufacturer, the equipment as a whole will lose eligibility for warranty.
- Some components used in the equipment (such as LSIs from Intel corporation) can not be disassembled for failure analysis because the Manufacturer does not have the right to do so.
- The price of this equipment does not cover maintenance and support. When you order the equipment, you must clarify the desired maintenance support level in the maintenance contract and make the required payment for the maintenance fee defined by the maintenance support level.

14. WINDOWS® SETTINGS

(1) Applying a Hotfix and Other Updates

<Specification>

- If you need to apply a hotfix, Windows Update, or the latest service pack, do it on your own responsibility. You must thoroughly check the system operation and evaluate how the system is affected by applying the hotfix, Windows Update, or service pack.

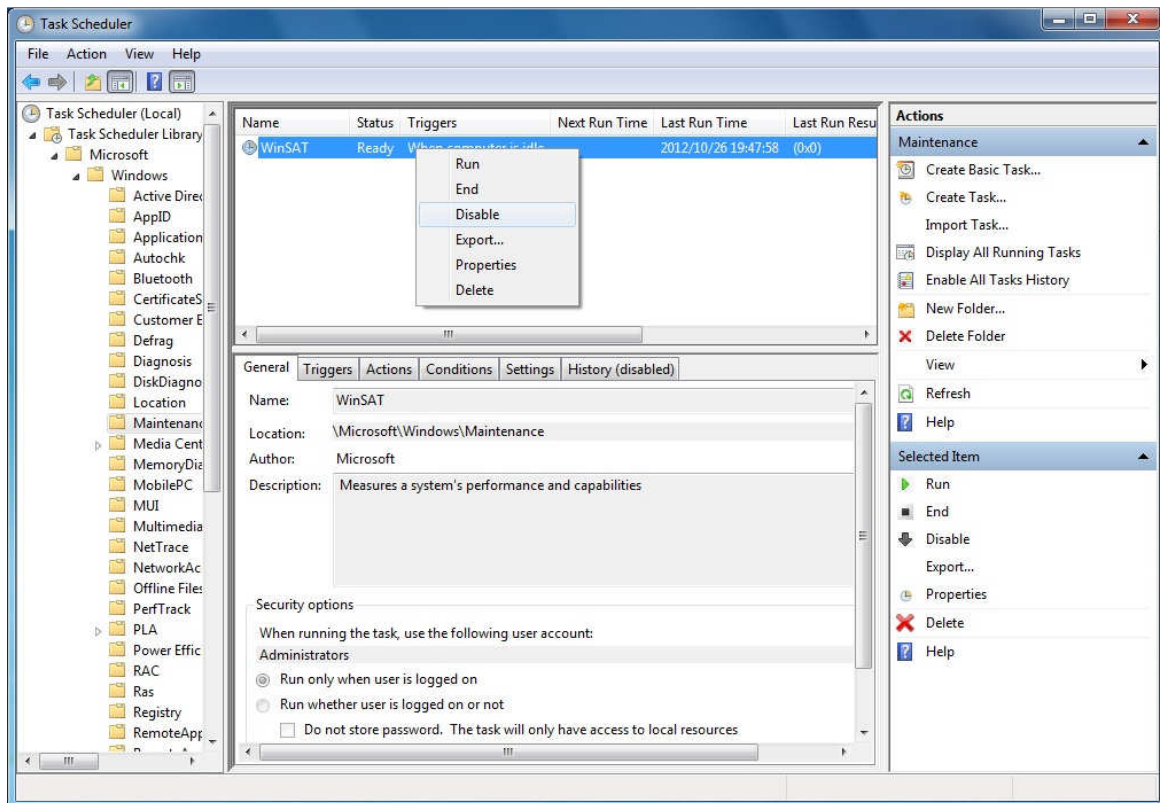
(2) Power Options

<Specification>

- Even if you configured the system such that the power for the display is not to be turned off in the Power Options (Never is specified for “Turn off the display”), the power plan can be temporarily switched to **High performance** when the Windows Experience Index is triggered automatically and the power for the display can be turned off. To prevent the power for the display from being turned off, go through the following steps 1 to 6 to disable automatic execution of the Windows Experience Index. (This is not necessary for Windows Server® 2012 R2 because the Windows Experience Index is not supported in Windows Server® 2012 R2.)

- Procedure to change the settings of the Windows Experience Index
 1. Click **Start > Control Panel**.
 2. Click **System and Security**.
 3. Click **Administrative Tools**.
 4. Double-click **Task Scheduler**.
 5. From the tree in the left pane of the Task Scheduler window, select **Task Scheduler Library > Microsoft > Windows > Maintenance**.
 6. Right-click **WinSAT** displayed in the center of the window and select **Disable**.

(The display image assumes Windows® 7 but it is similar under Windows Server® 2008 R2.)



- If you follow the procedure above to disable automatic execution of the Windows Experience Index, the Windows Experience Index may not be triggered at all or may not be triggered even after a device driver is updated or a hardware configuration is changed. If the Windows Experience Index is not triggered, Windows® may not operate in the optimum manner and the performance can be compromised. Because of this, you may need to trigger the Windows Experience Index manually. Follow the procedure below to trigger the Windows Experience Index manually:

- Procedure required to trigger the Windows Experience Index manually
 1. Click **Start > Control Panel**.
 2. Click **System and Security**.
 3. Click **Check the Windows Experience Index**.
 4. Click **Rate this computer**. (For the second time and later, click **Re-run the assessment**.) When you see the **User Account Control** window, click **Yes**.

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PREFACE

This manual is intended for operators of the HITACHI INDUSTRIAL COMPUTER HF-W7500 MODEL 40 (hereafter called as this equipment) and contains information about the operation and maintenance of various devices necessary for their routine work.

This manual consists of the following:

CHAPTER 1	GETTING STARTED
CHAPTER 2	PHYSICAL CONFIGURATION
CHAPTER 3	OPERATION
CHAPTER 4	SPECIFICATIONS
CHAPTER 5	CHECKUP AND MAINTENANCE
CHAPTER 6	TROUBLESHOOTING
CHAPTER 7	MAINTENANCE OPERATIONS
CHAPTER 8	RAID1
APPENDIX	HANDLING REPLACEABLE COMPONENTS

NOTICE

Depending on the type of failure, important files may be lost when you use this equipment. Files can be lost by power failure and human mistakes during operation in addition to the failure of the equipment. If such a situation occurs, the files cannot be recovered. In order to prevent data loss, make it a routine to save your files and establish a systematic schedule for backing up files.

- Harmonic Current Standards

This equipment is compliant 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 domestic environment, radio noise disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

<Note for storage capacity calculations>

- Memory capacities and requirements, file sizes and storage requirements, etc. must be calculated according to the formula 2^n . The following examples show the results of such calculations by 2^n (to the right of the equals signs).

1 KB (kilobyte) = 1,024 bytes

1 MB (megabyte) = 1,048,576 bytes

1 GB (gigabyte) = 1,073,741,824 bytes

1 TB (terabyte) = 1,099,511,627,776 bytes

- As for disk capacities, they must be calculated using the formula 10^n . Listed below are the results of calculating the above example capacities using 10^n in place of 2^n .

1 KB (kilobyte) = 1,000 bytes

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

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

1 TB (terabyte) = $1,000^4$ bytes

- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.


- 이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라 며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

This equipment conforms to the electromagnetic wave for Industrial use (Class A). Vender or user should take notice and use the purpose except for household use.

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CHAPTER 1 GETTING STARTED

1.1 Scope

This manual is intended for operators of the HITACHI INDUSTRIAL COMPUTER HF-W7500 MODEL 40 and contains information about the operation and maintenance of various devices necessary for their routine use.

After you unpack, go through the “delivered items list” to confirm all the items have been delivered and no items are missing or damaged. If there are missing or damaged items, contact our sales representative.

For information about software, refer to the following manuals.

- *HF-W7500 MODEL 40 SETUP GUIDE* (manual number WIN-63-0091)
- *HF-W7500 MODEL 40 RAS FEATURES MANUAL* (manual number WIN-63-0090)

The terms, "log on" and "log off", are used in Windows® 7 and Windows Server® 2008 R2. But these terms are renamed in Windows Server® 2012 R2 as follows. If the OS you use is Windows Server® 2012 R2, replace these terms as necessary.

<Windows® 7 and Windows Server® 2008 R2>		<Windows Server® 2012 R2>
"Log on"	⇒	"Sign in"
"Log off"	⇒	"Sign out"

1. GETTING STARTED

1.2 Installation Environment

1.2.1 Environment



CAUTION

If you keep at high temperature this equipment, do not touch bare hands.
Otherwise you may result burns.

When this equipment is used, it must be used in the following environment.

Item	Requirement
Ambient temperature	Operation: 5 to 40°C 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 (*1)	No heavy dust (0.3 mg/m ³ or less (JEITA IT-1004A classB))
Corrosive gas	None JEITA IT-1004A class A (Temperature 25°C, Humidity 50% RH)(*2)
Vibration resistance	5.9 m/s ² (10 Hz, 5 s, except the DVD drive)
Shock resistance	Operation: 19.6 m/s ² (while not powered on: 98 m/s ²)
Power voltage	100 to 240 VAC ± 10%
Power frequency	50/60 Hz ± 3 Hz
Power supply noise	2.0 kV (fast transient / burst wave)
Electrostatic noise contact discharge	4 kV (Air: 8 kV)
Insulation resistance	500 VDC, 20 MΩ
Dielectric strength	1.5 kVAC, one minute
Transient power fault	20 ms or less
Altitude	Less than 1000 m.

(*1) This equipment cannot be used in the environment where conductive dust or the like is floating.

(*2) JEITA : Japan Electronics and Information Technology Industries Association

< NOTE >

- For information about the precautions for the environment, see “PRECAUTIONS 1. PRECAUTIONS ABOUT THE EQUIPMENT (5) INSTALLATION ENVIRONMENT”.

1.2.2 Installation



WARNING

- The power cord that comes with the equipment is rated at the input voltage of 125 VAC. When using this equipment at over 125 VAC, prepare the power cord fitting input voltage and inspect the safeness of this equipment enough.
- When you connect the plug of the power cord to an outlet, make sure you 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.
If you do not take these measures, that may result in a fire or an electric shock.
- Do not use a two-prong plug without a ground pole because that may result in an electric shock or failure of the equipment.

NOTICE

- Before you move this equipment, make sure you shut down the OS, disconnect the plug of the power cord from the outlet, and wait for at least one minute.
If you do not, the HDDs and other devices may fail.
- When you transport or carry the equipment, pack it in the dedicated container (container and packing materials used when the equipment was delivered). If you use other container or packing materials, that may damage the equipment.
- Do not use damaged or broken dedicated container when you transport or carry the equipment. If you do, that may damage the equipment.
- If you install the equipment in a mounting chassis or rack with casters, the equipment may be subjected to excessive vibration or shock when it is transported or moved and that may cause the equipment to fail. In order to avoid failure, you must select or design a chassis or rack that satisfies the installation environment requirements of the equipment and be cautious about vibration and shock when you move, transport, or carry the installed equipment.

< NOTE >

- For information about the precautions for concerning installation requirements, see “PRECAUTIONS 1. PRECAUTIONS ABOUT THE EQUIPMENT (5) INSTALLATION ENVIRONMENT”.

1. GETTING STARTED

Table 1-1 Dimension, Service Clearance, and Installation Clearance

Dimension (mm)			Operation and service clearance (mm)				Installation clearance (mm)			
Height	Width	Depth	Front	Rear	Left	Right	Front	Rear	Left	Right
176	420	450	500	600	200	200	50	100	10	10

- When you operate the equipment or do maintenance work, provide sufficient clearance as shown in Figure 1-1.
- The equipment is air-cooled by fans. The intake holes are on the front and the exhaust holes are on the rear. See “2.1 Display and User Input Sections” and make sure the air flow is not blocked. Especially, leave sufficient clearance in the front (50 mm) and in the rear (100mm). (This includes clearance required for routing cable connectors for the rear side.)

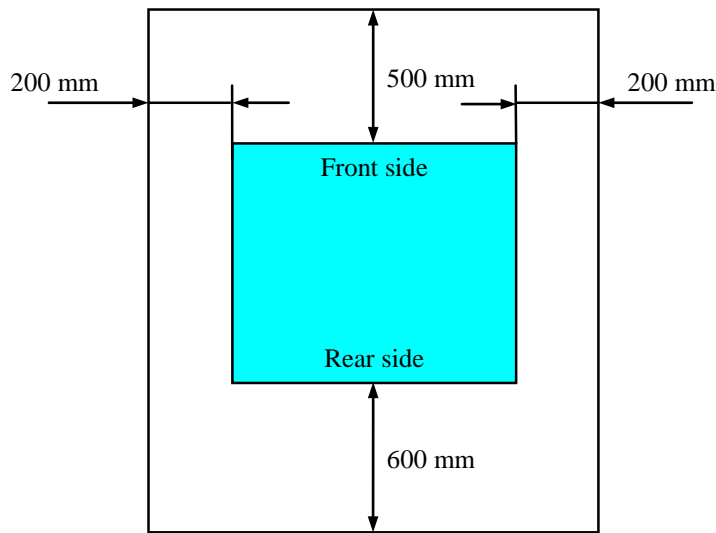


Figure 1-1 Operation and Service Clearance (Top View)

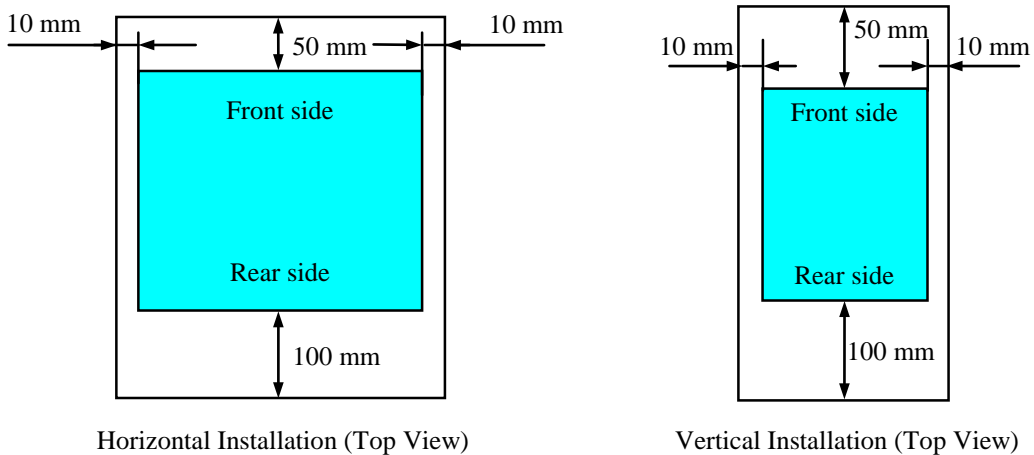


Figure 1-2 Installation Clearance

(a) Desktop

Place a non-slip mat between the equipment and the desktop to secure the equipment.

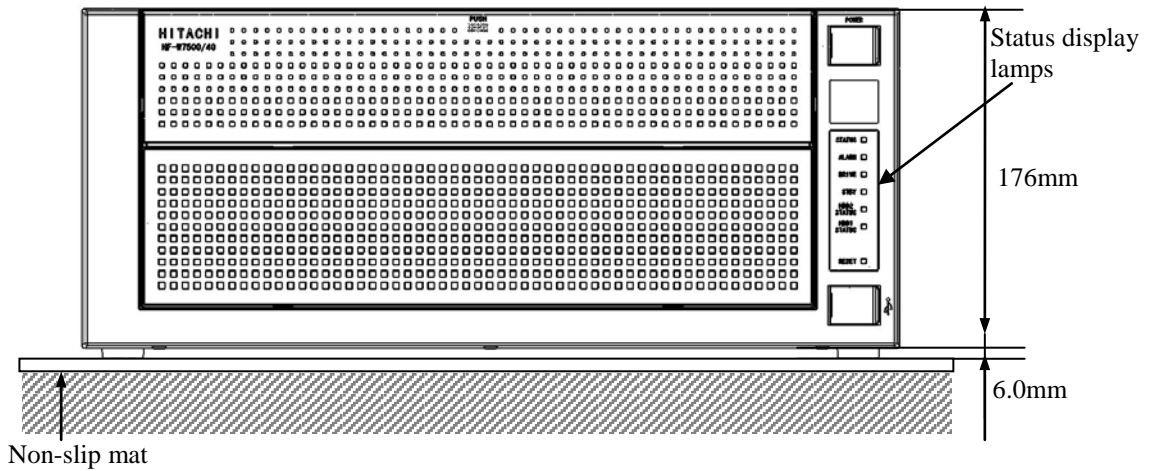
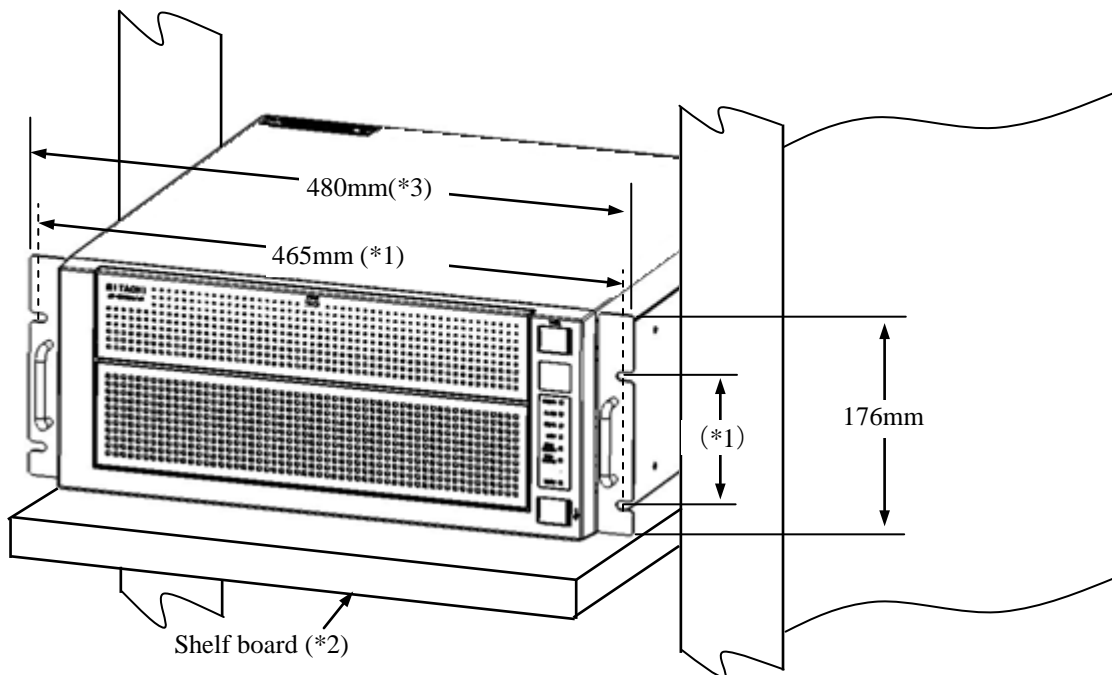


Figure 1-3 Exterior View (Horizontal Installation on the Desktop)

(b) Rack mount

- For information about how to attach and remove rack-mounting metal fittings, see “5.3.11 Attaching and removing rack-mounting metal fittings (option)”.
- For information about how to remove rubber feet, see “5.3.8 Attaching and removing rubber feet”.



(*1) Distance between the hole centers. Refer to the Figure 1-5.

(*2) When you mount the equipment on the rack mount, for safety reasons, we recommend you use a combination of the rack-mounting metal fitting, a shelf board for the rack mount, and slide rails.

(*3) This size applies to a JIS standard type. The size for an IEC standard type is 482.6mm.

Figure 1-4 Installation Requirements (Rack Mount)

1. GETTING STARTED

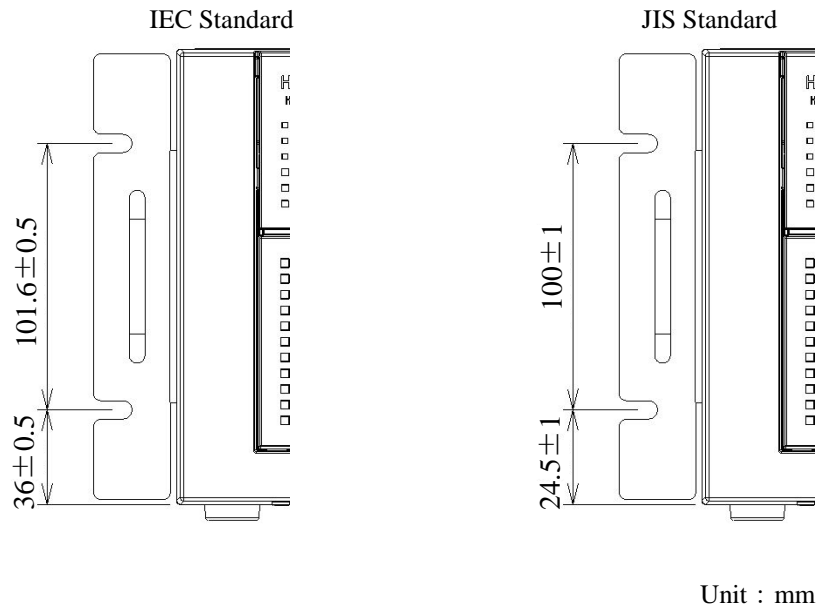


Figure 1-5 Installation Condition (Rack Mount Size for the JIS and IEC Standard Types)

When mounting the equipment inside a rack, fully address the concerns below. For the rack mounting metal fittings, see Subsection 1.2.2 Installation (b), “Rack mount.”

- **Elevated Operating Ambient:** If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration must be given to installing the equipment in an environment compatible with the maximum ambient temperature specified in Subsection 1.2.1 Environment.
- **Reduced Air Flow:** Installation of the equipment in a rack must be such that the amount of air flow required for safe operation of the equipment is not compromised.
- **Mechanical Loading:** Mounting of the equipment in the rack must be such that a hazardous condition is not achieved due to uneven mechanical loading.
- **Circuit Overloading:** Consideration must be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings must be used when addressing this concern.
- **Reliable Earthing:** Reliable earthing of rack-mounted equipment must be maintained. Particular attention must be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

[Français]

Les instructions de montage en rack suivantes ou similaires à celles-ci sont fournies avec les instructions d'installation :

- **Température ambiante de fonctionnement élevée :** en cas d'installation dans un châssis fermé ou contenant plusieurs appareils, la température ambiante de fonctionnement au niveau du rack peut être supérieure à la température ambiante de la pièce.
En conséquence, il convient de veiller à installer le matériel dans un environnement compatible avec la température ambiante maximale (T_{ma}), spécifiée par le fabricant.
- **Débit d'air réduit :** l'installation du matériel dans un rack doit être effectuée de façon à ne pas compromettre le débit d'air nécessaire pour un fonctionnement sûr de ce matériel.
- **Charge mécanique :** le montage de l'équipement en rack doit être réalisé de manière à éviter toute situation dangereuse résultant d'une charge déséquilibrée.
- **Surcharge de circuit :** il convient de prendre les précautions nécessaires pour la connexion du matériel au circuit d'alimentation et de réfléchir aux conséquences d'une éventuelle surcharge des circuits sur la protection de surintensité et sur le câblage d'alimentation. En l'occurrence, les valeurs nominales de la plaque signalétique du matériel doivent être prises en compte.
- **Mise à la terre fiable :** une mise à la terre fiable du matériel monté en rack doit être assurée. Une attention toute particulière est requise pour les raccordements d'alimentation autres que ceux effectués directement sur le circuit principal (par exemple, en cas d'utilisation de blocs multiprises).

(c) Vertical installation



CAUTION

When you install the equipment vertically, install fixing bracket attached and the status display lamps must come at the upper side and make sure the equipment is placed so it does not fall. If you do not, may result of injury.

The mounting metal fitting for vertical installation must be secured to a mounting chassis or rack with casters using set screws at both the upper and lower positions.

When you install the equipment on a mounting metal fitting for vertical installation, do not use the set screws for the cover to secure the equipment. If you use the set screws for the cover, the equipment may fall and personal injury may result.

- For information about how to remove rubber feet, see “5.3.8 Attaching and removing rubber feet”.

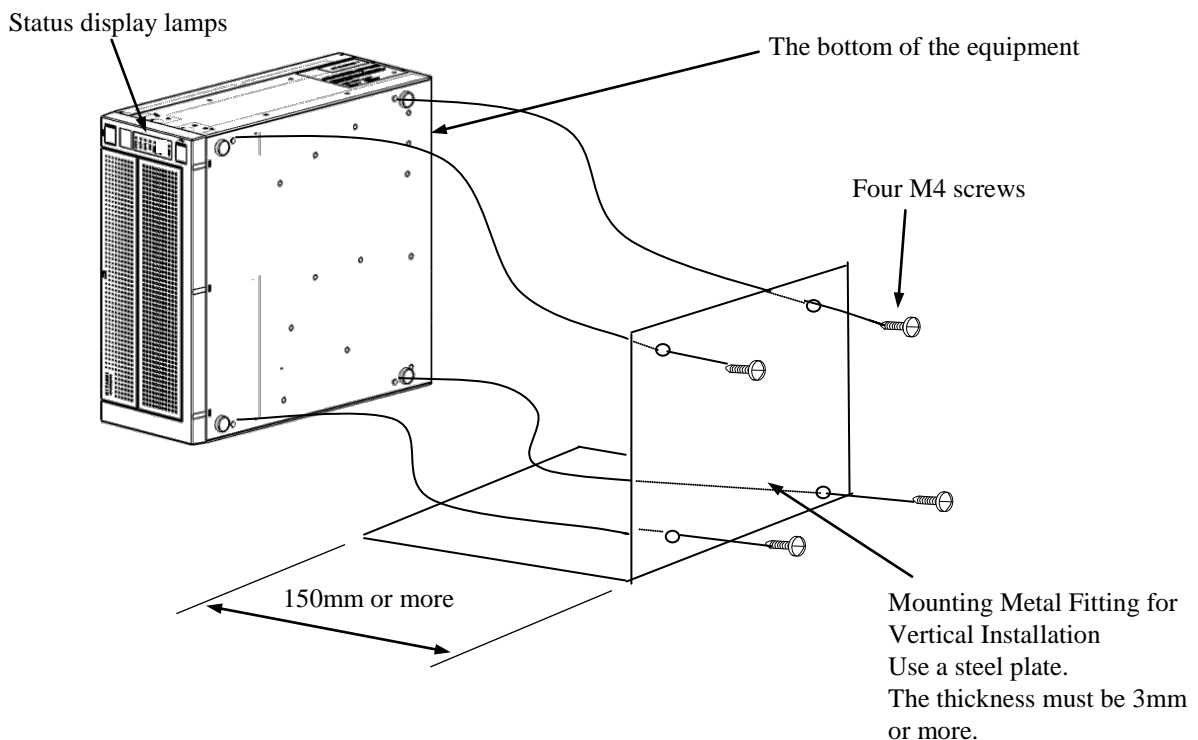


Figure 1-6 Installation Requirements (Vertical Installation on the Desktop)

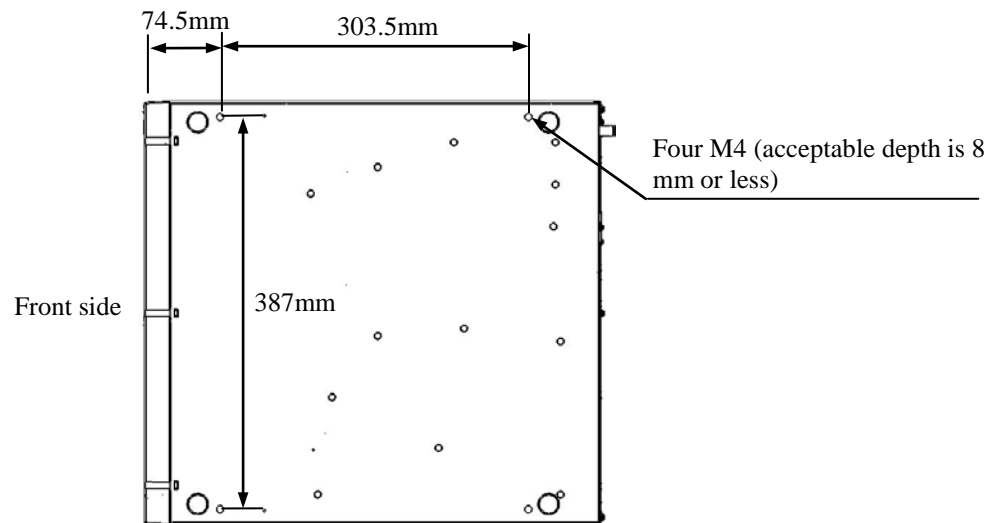


Figure 1-7 Installation Requirements (Dimensions of Screw Holes for Fixing the Bottom Plate)

1.2.3 Hardware connection

NOTICE

- Do not route the interface cables, etc. (including cables for other devices such as a PC) near the power cord. If you do, a failure or malfunction of the equipment may result.
- Do not connect or disconnect an interface cable while the power for this equipment or for the remote device is on. If you do, failure of the equipment may result due to a short circuit between the power supply and the ground. When an interface cable comes off while the power for the equipment is on, shut down the OS and disconnect the power cord from the outlet. Disconnecting the power cord from the outlet without shutting down the OS might destroy the internal files.
- When you connect a cable for external contacts, make sure you connect the cable to a connector for the external contacts (EXT). It is possible that a voltage as high as 40 VDC can be applied to the cable through a relay load. If you connect the cable to the wrong connector, that may cause failure of the equipment.

Before you connect hardware, carefully read SAFETY INSTRUCTIONS in this document and fully understand the contents.

1. GETTING STARTED

Connect hardware based on the connection example shown in the figure below.

Connect the display, keyboard, and mouse to this equipment and then insert the plug of the power cord into an outlet.

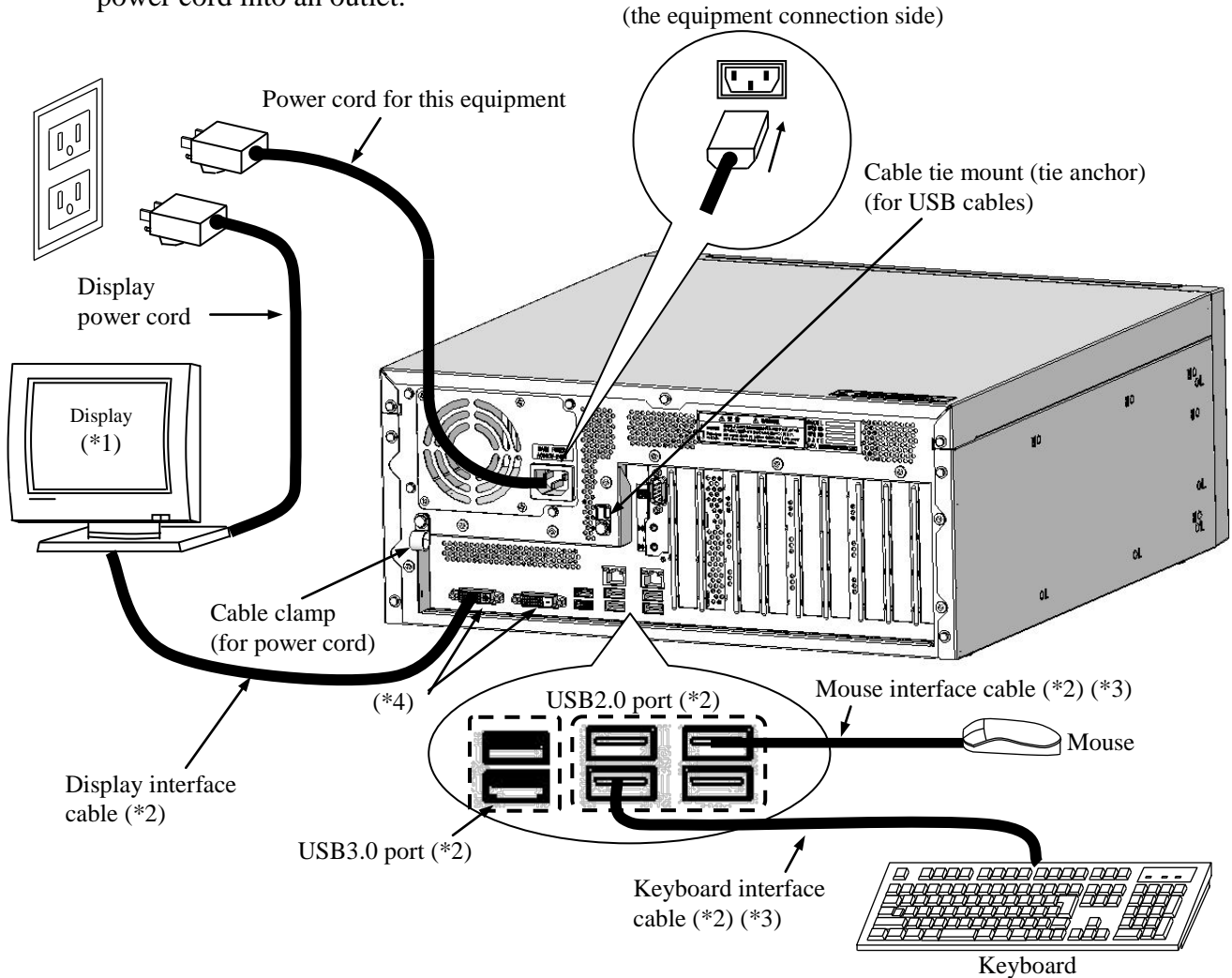


Figure 1-8 Hardware Connection

(*1) For information about the naming of the user input module and how to operate and adjust the device, refer to the user's manual that comes with the device.

(*2) For information about the length of each connection cable, see "4.8.3 External interface cable length".

The mouse and keyboard connection cables must be directly connected to this equipment. Do not use extension cables for them. If you use extension cables, the mouse or keyboard may not work properly.

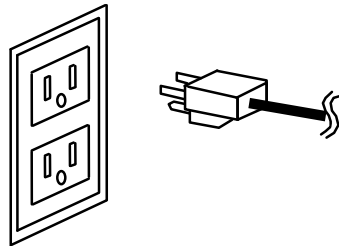
(*3) When you connect a connector, pay attention to the orientation of the connector. For a USB mouse and USB keyboard, you can use both front USB ports and rear USB ports. In addition, in the USB port, a connector may fall out by the unprepared contact to a USB cable in a standard because there is not the locking mechanism of the connector. When how to use that USB cables fall out during operation, and inconvenience produces is done, please use rear USB ports.

(*4) These connectors cannot be used if the mounted video board is provided not by Hitachi but by a customer.

(*) In order to conform to the EMC standards (VCCI, FCC, CE), use shielded cables for the interface cables (display interface cable, keyboard interface cable, and mouse interface cable) connected to the equipment.

● Connecting to an outlet

Fully and securely insert the plug of the power cord of this equipment into an outlet with a grounding pole that is properly grounded. (*1)



Make sure you use a power cable with a 2-pole plug with a grounding pole.


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

< NOTE >

- The power cord that comes with the equipment is rated at the input voltage of 125 VAC. When using this equipment at over 125 VAC, prepare the power cord fitting input voltage.
- If you use a power cord clamp for preventing accidental disconnection, add an extra length to 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 side.
- In order to prevent accidental disconnection of USB 3.0 cables, put a cable tie through the cable fixing component (tie anchor) and secure the USB 3.0 cables using the cable tie.

1. GETTING STARTED

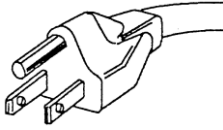
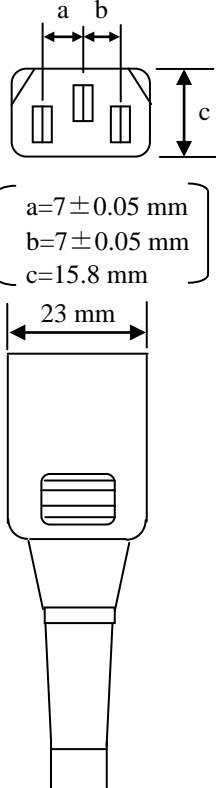
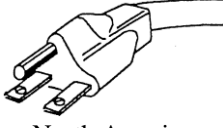
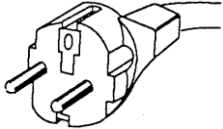
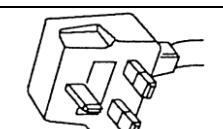
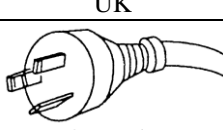
1.2.4 Power cord

 CAUTION
<p>When procuring an AC power cord, make sure that the cord has proper rating and meets local safety requirements whatever applicable. Otherwise, an electric shock or machine failure may result.</p>

The power cord that comes with the equipment is rated at the input voltage of 125VAC. When using this equipment at over 125VAC, prepare the power cord fitting input voltage and inspect the safeness of this equipment enough. Common power cords are shown in Table 1-2.

- 1 ANSI: American National Standards Institute
- 2 NEMA: National Electrical Manufacture’s Association
- 3 IEC: International Electrotechnical Commission
- 4 CEE: International Commission on Rules for the Approval of Electrical Equipment
- 5 BS: British Standard Institution
- 6 AS: Standards Association of Australia

Table 1-2 Power and Plug Identification

Input rating	Plug configuration	Reference standards	Cord and connector
100V - 120V	 North America	1 ANSI C73.11 2 NEMA 5-15P 3 IEC 83	 <p style="text-align: right; margin-top: 10px;">Three-wire power cord with a two-pole three-terminal grounding-type connector.</p>
200V - 240V	 North America	1 ANSI C73.11 2 NEMA 6-15P 3 IEC 83	
	 Universal Euro	4 CEE (7) II, IV, VII 3 IEC 83	
	 UK	5 BS 1365 3 IEC 83	
	 Australia	6 AS C112	

< NOTE >

- As an option, this equipment offers a cable clamp used for fixing a power cord to the equipment. Use that cable clamp as required.

1.3 Installing an Extension Board

You can install an extension board supplied by the user in this equipment.

For information about the installation procedure and the limitations of an extension board, see “5.3.3 Installing and removing an extension board”.

1.4 Role of an Operator

In order to use this equipment in good working order for a long period of time, an operator must take care of the following items.

(1) Setting up consumable items

- (a) When you set up a consumable item (such as an HDD, or a dust filter), follow the device operating procedure shown in the respective chapters.

(2) Consideration for the characteristics of the equipment

- (a) See “PRECAUTIONS 1. PRECAUTIONS ABOUT THE EQUIPMENT” and take necessary actions considering the characteristics of the equipment.
- (b) The instructions described in this manual are the basics of the procedures you need to follow when you use the equipment. Make sure you follow these instructions.
- (c) For information about how to use the equipment, how to clean the equipment, and so on, see the respective chapters.

(3) Keep this equipment in good condition

When you use this equipment, an operator must take care of the following items.

- (a) Backing up files

See “PRECAUTIONS 4. HARD DISKS DRIVES (HDDs) (2) Backing Up Files”.

- (b) Power cord and shutting down the power

See “PRECAUTIONS 1. PRECAUTIONS ABOUT THE EQUIPMENT (4) POWER SUPPLY”.

(4) Maintenance of this equipment

- (a) For information about maintenance, see “5.1 Daily Checkup” and “5.2 Periodic Checkup”.

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CHAPTER 2 PHYSICAL CONFIGURATION

**WARNING**

Warning about the power supply unit (hazardous voltage)

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

**CAUTION**

Cautions about the fans (rotating objects)

Only maintenance personnel are allowed to remove a fan. If you remove a fan yourself, your hand or objects may be caught by the rotating part of the operating fan and personal injury may result.

NOTICE

- Never hot-swap HDDs because that may cause failure of the equipment and HDDs. Before you replace an HDD, make sure you shut down the OS, disconnect the plug of the power cord from the outlet, and wait for at least one minute.
- When using a USB port, check the orientation of the USB connector, and then insert the connector slowly. Otherwise, the USB port may be damaged.
- Do not remove or insert a USB device during online operation (system operation) because that may affect currently running applications.
- If you insert or access a CD or DVD, the system load may increase and running applications may be affected. Do not insert or access an optical disc during online operation (system operation).

2.1 Display and User Input Sections

(1) Front view

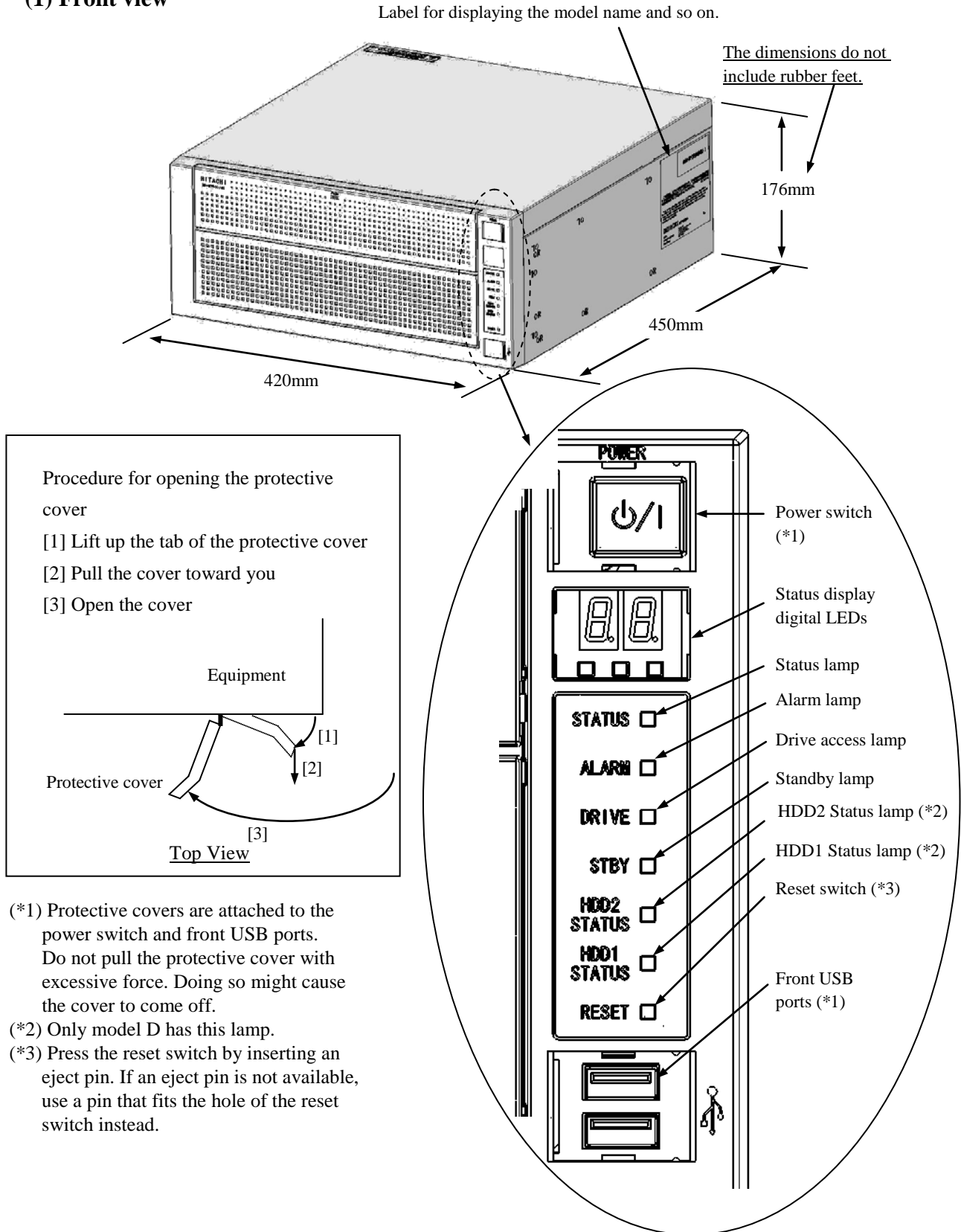


Figure 2-1 Name of Each Part (Front View)

(2) Rear view

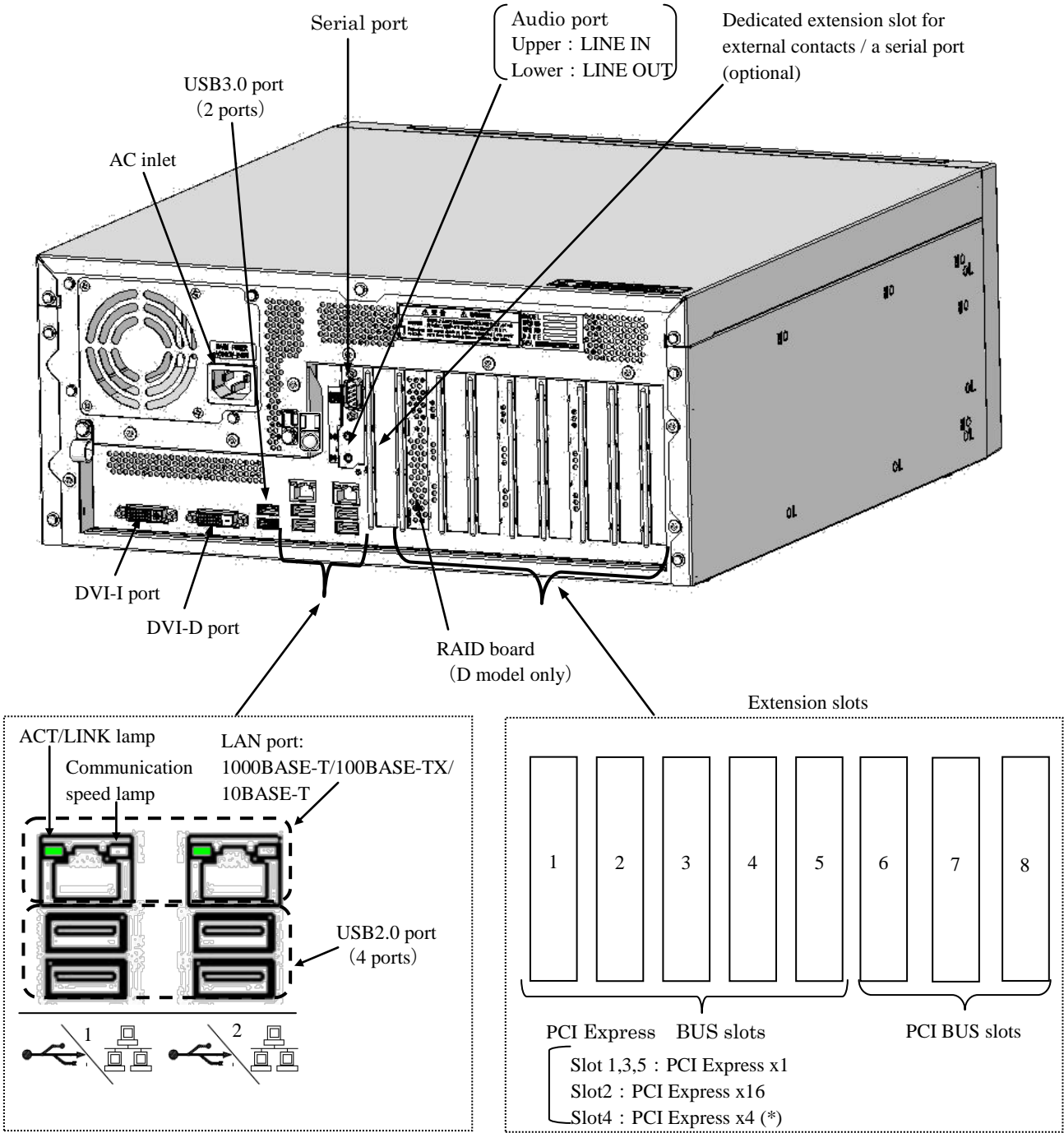


Figure 2-2 Name of Each Part (Rear View)

2. PHYSICAL CONFIGURATION

(3) Physical configuration inside the equipment

A model :

* The figure below shows mounting components and their locations. The actual appearance might differ from the figure.

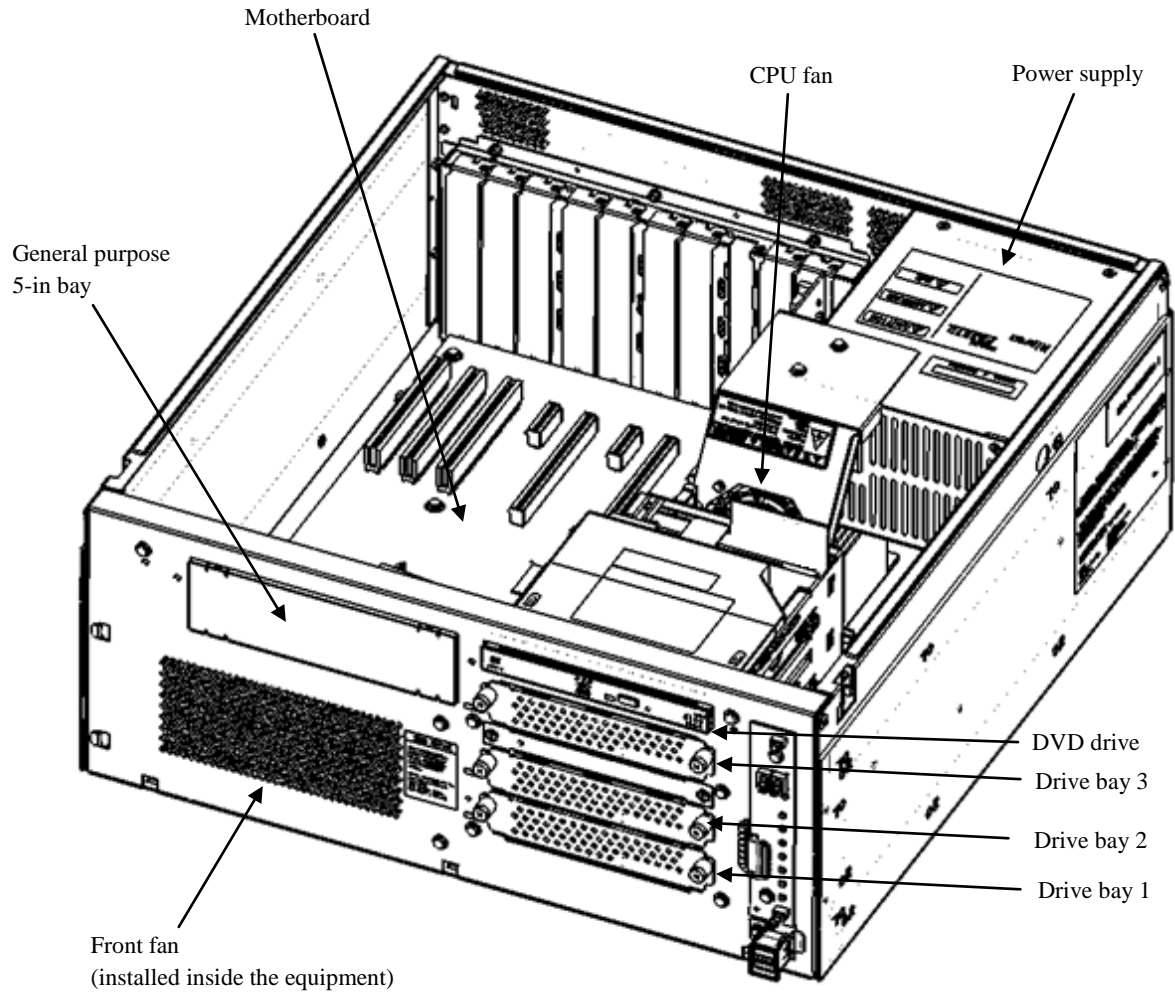


Figure 2-3 (1) Physical Configuration Inside Equipment (A model)

D model :

* The figure below shows mounting components and their locations. The actual appearance might differ from the figure.

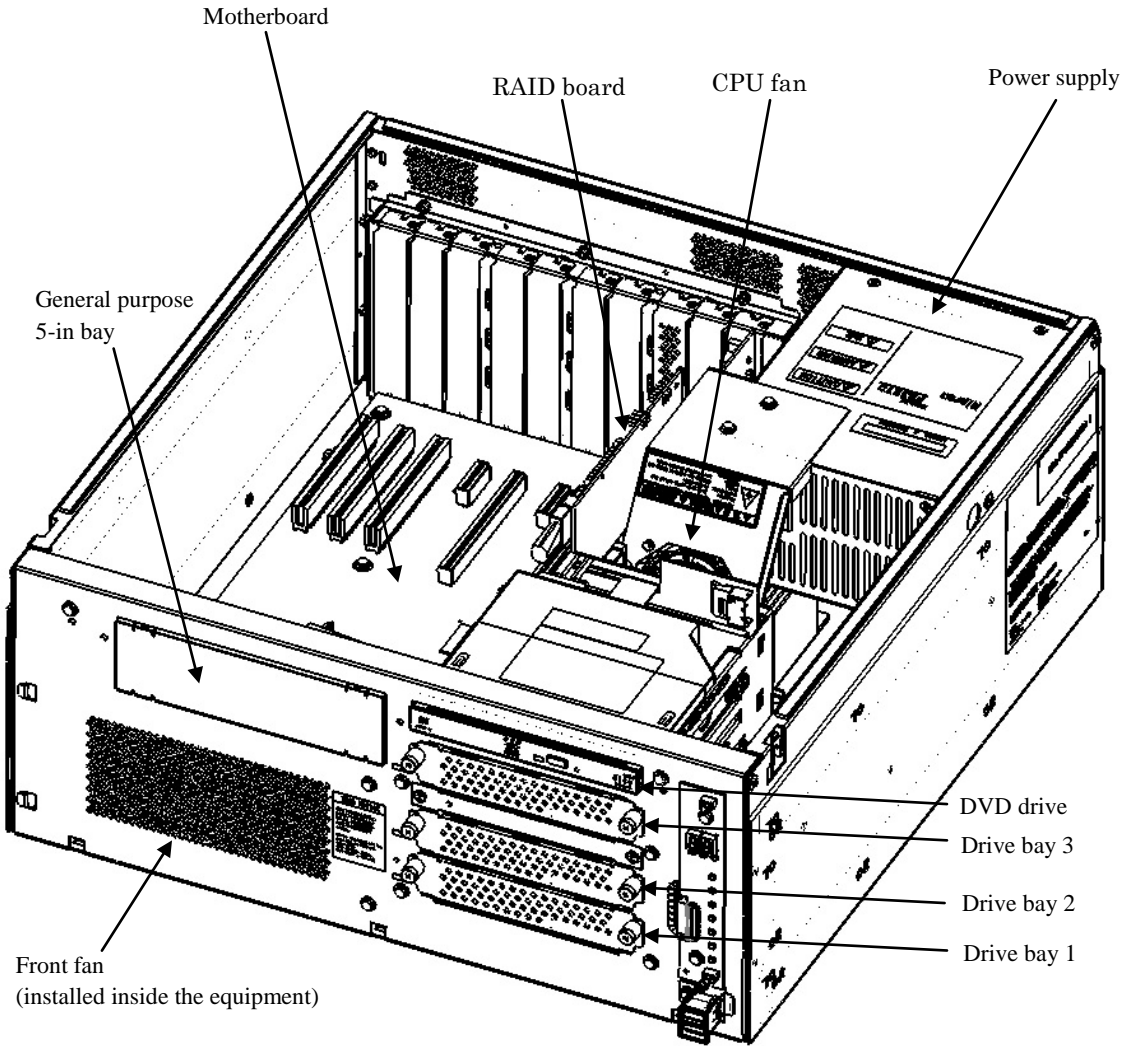


Figure 2-3 (2) Physical Configuration Inside Equipment (D model)

2. PHYSICAL CONFIGURATION

Table 2-1 Function of Each Part (1/5)

Name	Function										
Power switch (POWER)	When you press this switch, the power is turned on. When you press the switch for four seconds or more, the power is turned off and the system goes into standby mode (for emergencies only).										
Reset switch (RESET)	Use this switch to perform a hardware reset (restarting the equipment). If you press the switch while the OS is running, a memory dump is performed. If you press the switch again after the memory dump is performed, a hardware reset is carried out.										
Status lamp (STATUS)	<table border="1"> <thead> <tr> <th>Lamp</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Lit in green</td> <td>The equipment is in operation (RUN status)</td> </tr> <tr> <td>Lit in red</td> <td>The equipment is not in operation (STOP status) <ul style="list-style-type: none"> • The equipment is in the middle of startup. • After the shutdown starts or during error stop. • The equipment has stopped abnormally due to an error • RAS software is not installed. </td> </tr> <tr> <td>Off</td> <td>The main power is off / The system is in standby mode.</td> </tr> </tbody> </table>	Lamp	Status	Lit in green	The equipment is in operation (RUN status)	Lit in red	The equipment is not in operation (STOP status) <ul style="list-style-type: none"> • The equipment is in the middle of startup. • After the shutdown starts or during error stop. • The equipment has stopped abnormally due to an error • RAS software is not installed. 	Off	The main power is off / The system is in standby mode.		
Lamp	Status										
Lit in green	The equipment is in operation (RUN status)										
Lit in red	The equipment is not in operation (STOP status) <ul style="list-style-type: none"> • The equipment is in the middle of startup. • After the shutdown starts or during error stop. • The equipment has stopped abnormally due to an error • RAS software is not installed. 										
Off	The main power is off / The system is in standby mode.										
Alarm lamp (ALARM)	This lamp is lit in red if one of the following abnormalities is detected. <ul style="list-style-type: none"> • A fan inside the equipment stops. • Abnormal temperature inside the equipment. • Failure in one of the mirrored disks. (D model only) 										
Drive access lamp (DRIVE)	This lamp is lit in green while an HDD or DVD drive is being accessed.										
Standby lamp (STBY)	<table border="1"> <thead> <tr> <th>Lamp</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Lit in orange</td> <td>The equipment is in standby mode. (Only the auxiliary power is on.)</td> </tr> <tr> <td>Off</td> <td>The power is shut down or the equipment is in operation.</td> </tr> </tbody> </table>	Lamp	Status	Lit in orange	The equipment is in standby mode. (Only the auxiliary power is on.)	Off	The power is shut down or the equipment is in operation.				
Lamp	Status										
Lit in orange	The equipment is in standby mode. (Only the auxiliary power is on.)										
Off	The power is shut down or the equipment is in operation.										
HDD status lamp { <div style="display: inline-block; vertical-align: middle; margin-left: 10px;"> HDD1 STATUS : For drive bay 1 HDD2 STATUS : For drive bay 2 </div> }	<table border="1"> <thead> <tr> <th>Lamp</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Off</td> <td>One HDD are working properly.</td> </tr> <tr> <td>Lit in red</td> <td>One HDD has an error. (The power of the HDD with an error is Off.)</td> </tr> <tr> <td>Flashed in red (Either one)</td> <td>Rebuild (copy) is ongoing. Only the lamp of the copy destination HDD flashes.</td> </tr> <tr> <td>Flashed in red (Both)</td> <td>Both HDDs have errors.</td> </tr> </tbody> </table>	Lamp	Status	Off	One HDD are working properly.	Lit in red	One HDD has an error. (The power of the HDD with an error is Off.)	Flashed in red (Either one)	Rebuild (copy) is ongoing. Only the lamp of the copy destination HDD flashes.	Flashed in red (Both)	Both HDDs have errors.
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Lit in red	One HDD has an error. (The power of the HDD with an error is Off.)										
Flashed in red (Either one)	Rebuild (copy) is ongoing. Only the lamp of the copy destination HDD flashes.										
Flashed in red (Both)	Both HDDs have errors.										

Table 2-1 Function of Each Part (2/5)

Name	Function
AC inlet	Used for connecting a power cord.
Power supply	A power supply module with a wide-range input voltage (100 to 240 VAC).
Audio port (LINE IN)	An audio line input.
Audio port (LINE OUT)	An audio line output.
Serial port (COM1) (9 pins: RS-232C-A)	You can use this connector to connect a device such as a modem that uses a serial interface. (See “4.8.1 Connector specifications”.)
RAS external contact port (25 pins: EXT) (optional)	A connector for connecting external contacts. (See “4.8.1 Connector specifications”.)
Serial port (COM2) (9 pins: RS-232C-A) (optional)	Connects a device such as a modem that uses a serial interface. (See “4.8.1 Connector specifications”.)
DVI-I port (*1)	Connects the cable from the digital interface of a display. (See “4.8.1 Connector specifications”.)
DVI-D port	Connects the cable from the digital interface of a display. (See “4.8.1 Connector specifications”.)
PCI bus slot	Used as a slot to insert a PCI board.
PCI Express x16 bus slot	Used as a slot to insert a PCI Express x16 board.
PCI Express x4 bus slot	Used as a slot to insert a PCI Express x4 board. But the connector is a PCI Express x16 connector.
PCI Express x1 bus slot	Used as a slot to insert a PCI Express x1 board.
USB port (USB2.0/USB3.0)	Used to connect a device that uses a USB interface.

(*1) By using a conversion connector or DVI-A cable, you can output an analog VGA signal. The conversion connector or DVI-A cable must be provided by the user.

2. PHYSICAL CONFIGURATION

Table 2-1 Function of Each Part (3/5)

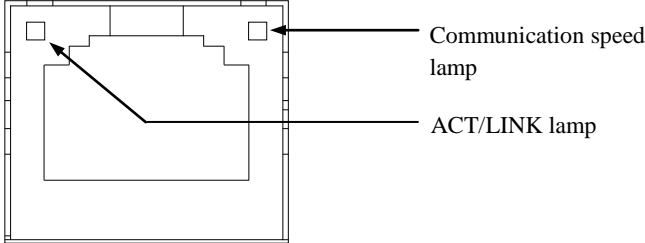
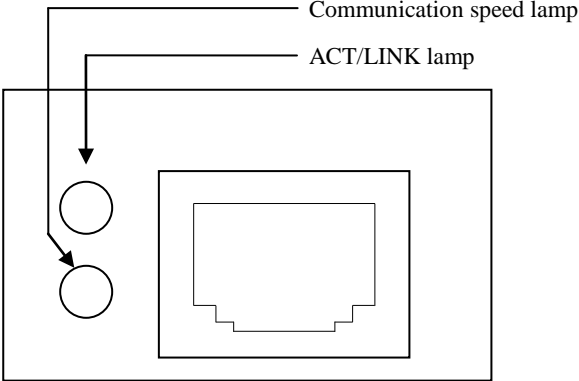
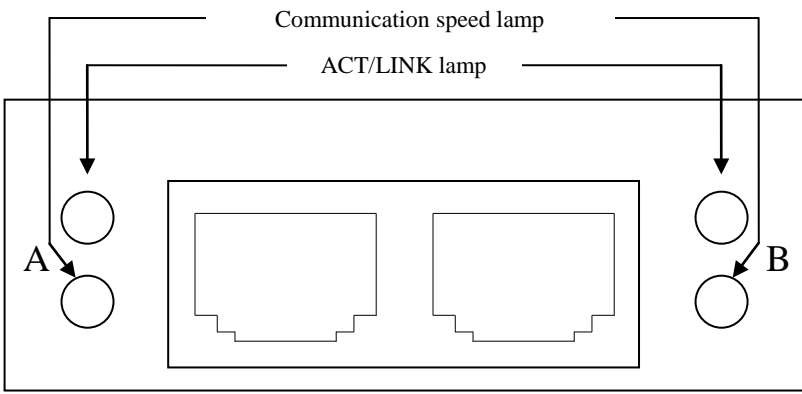
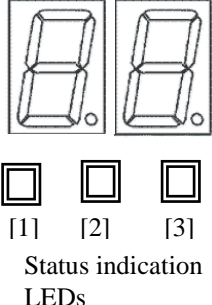
Name	Function																				
<p>LAN port (1000BASE-T/100BASE-TX/ 10BASE-T)</p>	<p>You can connect a LAN cable to a LAN port. (See “4.8.1 Connector specification”.)</p> <ul style="list-style-type: none"> ● Onboard LAN  <ul style="list-style-type: none"> ● Optional LAN adapter (1 channel) (HJ-7617-61)  <table border="1" data-bbox="555 1205 1417 1747"> <thead> <tr> <th colspan="2">ACT/LINK lamp</th> </tr> <tr> <th>Lamp</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Lit in green</td> <td>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.</td> </tr> <tr> <td>Off</td> <td>No link is established. <ul style="list-style-type: none"> • 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 have some errors. </td> </tr> <tr> <td>Blinking in green</td> <td>Network data is being transmitted or received. The blink interval changes depending on the traffic on the network.</td> </tr> </tbody> </table> <table border="1" data-bbox="555 1776 1417 2024"> <thead> <tr> <th colspan="2">Communication speed lamp</th> </tr> <tr> <th>Lamp</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Lit in green</td> <td>The link is established at 1000 Mbps.</td> </tr> <tr> <td>Lit in yellow</td> <td>The link is established at 100 Mbps.</td> </tr> <tr> <td>Off</td> <td>The link is established at 10 Mbps. Or no link is established.</td> </tr> </tbody> </table>	ACT/LINK lamp		Lamp	Status	Lit in 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. <ul style="list-style-type: none"> • 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 have some errors. 	Blinking in green	Network data is being transmitted or received. The blink interval changes depending on the traffic on the network.	Communication speed lamp		Lamp	Status	Lit in green	The link is established at 1000 Mbps.	Lit in yellow	The link is established at 100 Mbps.	Off	The link is established at 10 Mbps. Or no link is established.
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Lit in yellow	The link is established at 100 Mbps.																				
Off	The link is established at 10 Mbps. Or no link is established.																				

Table 2-1 Function of Each Part (4/5)

Name	Function										
LAN port (1000BASE-T/100BASE-TX/ 10BASE-T)	<p>● Optional LAN adapter (2 channels) (HJ-7617-55)</p> 										
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACT/LINK lamp</th> </tr> <tr> <th style="width: 20%;">Lamp</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Lit in green</td> <td>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.</td> </tr> <tr> <td>Off</td> <td>No link is established. <ul style="list-style-type: none"> • 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 have some errors. </td> </tr> <tr> <td>Blinking in green</td> <td>Network data is being transmitted or received. The blink interval changes depending on the traffic on the network.</td> </tr> </tbody> </table>	ACT/LINK lamp		Lamp	Status	Lit in 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. <ul style="list-style-type: none"> • 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 have some errors. 	Blinking in green	Network data is being transmitted or received. The blink interval changes depending on the traffic on the network.
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Communication speed lamp											
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Lit in green	The link is established at 1000 Mbps.										
Lit in yellow	The link is established at 100 Mbps.										
Off	The link is established at 10 Mbps. Or no link is established.										

2. PHYSICAL CONFIGURATION

Table 2-1 Function of Each Part (5/5)

Name	Function
<p data-bbox="220 331 461 394">Digital LED for Status indication</p>  <p data-bbox="225 568 437 712">[1] [2] [3] Status indication LEDs</p>	<p data-bbox="539 331 1428 501">Various states of this equipment are indicated as a two-digit code in hexadecimal and the states of the status indication LEDs. The Digital LED for Status indication and the status indication LEDs may remain lit even after the equipment is shut down or put into standby mode. This condition remains until the power is turned on again.</p> <p data-bbox="539 539 898 674">Status indication LEDs [1] Hardware status (Red) [2] Application status (Green) [3] BIOS status (Orange)</p> <p data-bbox="539 712 1428 808">(For information about how to display arbitrary status data on the Digital LED for Status indication from a user application, refer to the “<i>HF-W7500 Model 40 RAS FEATURES MANUAL</i>”.)</p>

< NOTE >

- For information about the precautions for USB devices, see “PRECAUTIONS 6. USB DEVICES”.

CHAPTER 3 OPERATION

3.1 Before Turning On the Power



WARNING

If any of the air intake and exhaust holes of the equipment is blocked, the temperature inside the equipment may rise and that may cause a fire or failure of the equipment. Make sure sufficient clearance is provided around the equipment when you install. (See “1.2.2 Installation”.)

< NOTE >

When you turn on the power, see the following:

- “PRECAUTIONS 1. PRECAUTIONS ABOUT THE EQUIPMENT
(2) INTERFACE CABLES
- “PRECAUTIONS 1. PRECAUTIONS ABOUT THE EQUIPMENT
(4) POWER SUPPLY”
- “PRECAUTIONS 1. PRECAUTIONS ABOUT THE EQUIPMENT
(5) INSTALLATION ENVIRONMENT”

3. OPERATION

3.2 Starting the Equipment

For information about how to start the equipment for the first time after you purchase it or you recover the equipment from failure, refer to the “HF-W7500 MODEL 40 GETTING STARTED” or the “HF-W7500 MODEL 40 SETUP GUIDE”.

For other cases, follow the procedure below to start the equipment:

1. Confirm that the plug of the power cord is connected to the outlet.
2. When the plug of the power cord is connected to the outlet, the standby lamp (STBY) will be turned on.
3. Turn on the power to the display.
4. Open the protective cover on the right upper part of the front panel and press the power switch. (See “2.1 Display and User Input Sections”.)
5. When the power is turned on, the standby lamp (STBY) is turned off and the status lamp (STATUS) will light. The status lamp turns “red” when the power is turned on and turns “green” when the OS starts and the equipment is in operation.

< NOTE >

- When the RAS software is not installed or during the recovery process, the status lamp does not turn green and stays red.

After the above steps are complete, the equipment automatically goes through the startup process until the logon screen appears.

For information about how to control the power using the LAN, see “3.7 Controlling the Power Using the LAN”.

3.3 Shutting Down the Equipment

When you shut down the equipment, first confirm that no other users are using the equipment and no background programs are running. Then follow the procedure below:

- Stop application programs.
- Shut down the OS.

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

<If the OS is Windows® 7 Professional>

To shut down the OS, click the **Start** button at the left bottom corner of the screen and click **Shut down**. After the OS is shut down, the power is automatically turned off and only the auxiliary power supply is on (standby mode). (In this mode, the status lamp (STATUS) is off and the standby lamp (STBY) is on.)

<If the OS is Windows Server® 2008 R2 Standard Edition>

To shut down the OS, click the **Start** button on the left bottom corner of the screen, point to the arrow next to the **Log off** button, and then click **Shut down**. Then the **Shut Down Windows** window appears. In the **Option** list, select the reason for the shutdown. If you select **Others** as the reason for the shutdown, in the **Comment** box, fill in the specific reason. If you click **OK**, after the OS is shut down, the power is automatically turned off and only the auxiliary power supply is on (standby mode). (In this mode, the status lamp (STATUS) is off and the standby lamp (STBY) is on.)

<If the OS is Windows Server® 2012 R2 Standard>

To shut down the OS, move the mouse cursor to the lower-right (or upper-right) corner of the desktop to display charms. Click **Settings** to show the **Settings** charm. In the **Settings** charm, click **Power** and then **Shut down**. When a pull-down menu is displayed, select an option that best describes why you want to shut down the computer. If you click **Continue**, after the OS is shut down, the power is automatically turned off and only the auxiliary power supply is 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 executed (for example, a shutdown request cannot be accepted due to system deadlock), open the protective cover on the right upper part of the front panel and press the power switch for at least four seconds. The power is turned off and the equipment goes into the standby mode. If you turn off the power by pressing the power switch for at least four seconds, you cannot turn on the power by way of the LAN next time. Do not turn off the power this way except for emergencies. (See “3.7 Controlling the Power Using the LAN”.) For information about how to collect a memory dump, see “7.2 Collecting a Memory Dump”.

3. OPERATION

3.4 Power Shutdown

1. Confirm that the equipment is shut down. (See “3.3 Shutting Down the Equipment”.)
2. Remove the plug of the power cord of this equipment from the outlet.
3. When the main power is turned off, the standby lamp (STBY) is turned off.

3.5 Emergency Shutdown



WARNING

In case of smoke, a burning smell, or the like, unplug the power cord from the outlet, and contact your dealer or maintenance personnel. Using faulty equipment without repair may result in a fire or an electric shock.

NOTICE

- Performing emergency shutdown (that is, unplugging the power cord from the outlet or shutting off the breaker without proper shutdown of the OS) may cause the OS or applications not to work properly or may cause saved data to be corrupted. Do not perform emergency shutdown unless you must stop the system immediately due to some kind of error.
- If you turn off the power at the source of AC the power, the system may not be able to recover automatically.

In the following cases, turn off the power at the source of the AC power.

- When the equipment shows an error condition and you have to shut down the power immediately (for example, when a burning smell is detected).
- When you cannot shut down the equipment due to some error.
- When the power is turned off repeatedly or only the auxiliary power supply is on due to excess current or overheating.

In the following cases, remove the plug of power cord of this equipment from the outlet or turn off the power at the source of the AC power.

- If the fan is stopped and the temperature gets too high or too low and consequently the power is automatically turned off to protect the equipment and only the auxiliary power supply is on. (For information about actions recommended after the power shutdown, see “6.2.2 (1)”.)

Before the OS starts, the BIOS can detect a stopped fan during BIOS start up and if detected, the power is automatically turned off.

After the OS starts, when a stopped fan is detected, the OS is automatically shut down and then the power is turned off.

3.6 DVD drive

NOTICE

- If you insert or access a CD or DVD, the system load may increase and running applications may be affected. Do not insert or access an optical disc during online operation (system operation).
- When you finish accessing a CD or DVD, eject the disc from the DVD drive. If you leave the disc in the DVD drive, failure may result.
- If you keep the disc tray open, failure may result. When you do not intend to use the DVD drive, keep the disc tray inside the DVD drive.
- Do not use an unbalanced CD or DVD due to attached labels and so on; a disc with cracks, scratches, or vertical deviation; or a disc with a non-standard shape. If you do, an abnormal sound or vibration may be generated and failure of the equipment may result.

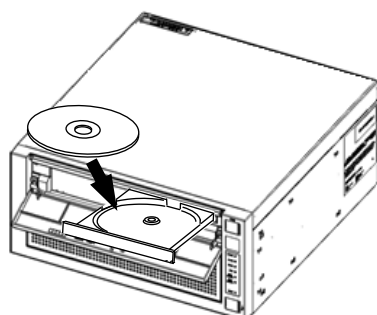
3.6.1 Inserting a CD or DVD

• Tray type DVD drive

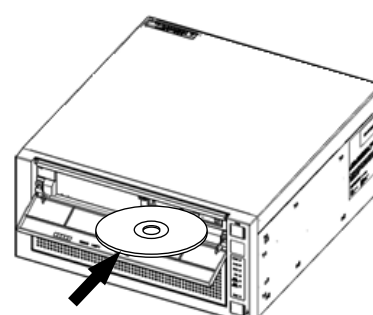
- ① When you gently press the eject button, the disc tray comes out.
- ② Place a CD or DVD disc on the disc tray with the face up (side where a label is attached)
- ③ Push and insert the disc tray into the DVD drive.

• Slot-in type DVD drive

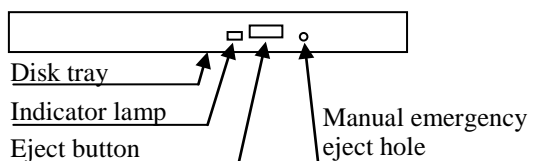
- ① Place a CD or DVD disc (label side up) into the DVD drive slot. When about three quarters of the disc is inserted, it will be pulled into the drive.



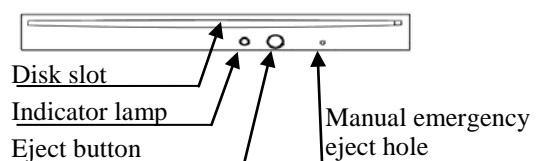
Tray type (Horizontal placement)



Slot-in type (Horizontal placement)



Front view of the tray-type DVD drive



Front view of the slot-in type DVD drive

Figure 3-1 Tray type and Slot-in type DVD Drive (Horizontal placement)

3. OPERATION

< NOTE >

- For information about the precautions for the DVD drive, see “PRECAUTIONS 5. DVDs”.

3.6.2 Ejecting a CD or DVD

- Tray type DVD drive

- ① Make sure the indicator lamp is neither turned on nor flashing.
- ② Gently press the eject button to eject the disc tray.
- ③ Remove the disc.

- Slot-in type DVD drive

- ① Make sure the indicator lamp is neither turned on nor flashing.
- ② Gently press the eject button to eject the disc.
- ③ Remove the disc

< NOTE >

- When you are writing to a CD or DVD, use the OS to eject the disc. If you press the eject button, writing to the disc may fail.

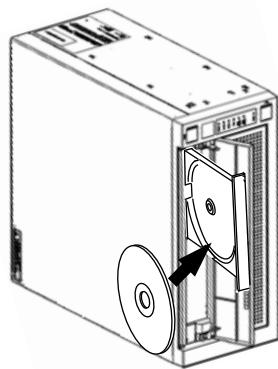
3.6.3 Using the DVD drive when the equipment is installed vertically

- Tray type DVD drive

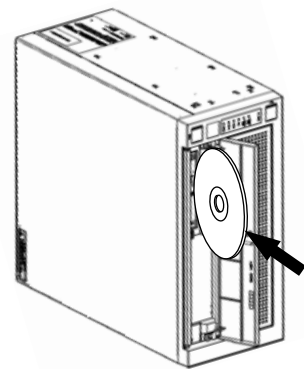
- ① Press the eject button to open the disc tray.
- ② Holding the disc tray, place a CD or DVD disc (label side facing the top panel, as shown below) in the disc tray.
- ③ Gently push the disk tray to mount the disc in the DVD drive.
- ④ When removing the disc, do not use excessive force.

- Slot-in type DVD drive

- ① Gently insert the disc (label side facing the top panel, as shown below) into the DVD drive slot. When about three quarters of the disc is inserted, it will be pulled into the drive automatically.



Tray type (Vertical placement)



Slot-in type (Vertical placement)

Figure 3-2 Tray type and Slot-in type DVD Drive (Vertical Placement)

3.7 Controlling the Power Using the LAN

The power for this equipment can be turned on from a remote device by way of the LAN.

This section explains WOL (Wake ON LAN™), which is used for turning on the power for the equipment through the LAN. When the power is turned on by using WOL, the equipment is started by sending a Magic Packet™ frame to the LAN interface when the standby lamp (STBY) is on.

In the initial factory settings, this function is disabled. If you want to use this function, follow steps 1 through 3 described in “3.7.1 Enabling the WOL (Wake ON LAN™) function” to enable the WOL function and then follow the steps below.

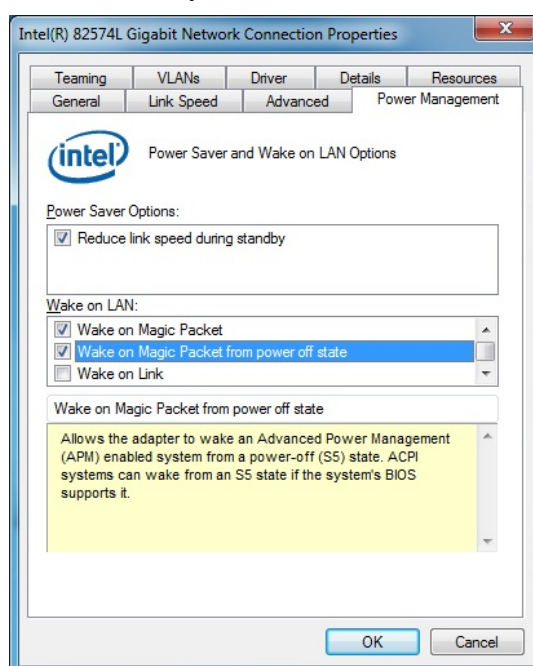
< NOTE >

- For information about the precautions for the network, see “PRECAUTIONS 2. NETWORK”.

3.7.1 Enabling the WOL (Wake ON LAN™) function

By following the procedure below, you can set up whether to start WOL when a Magic Packet™ frame is received. In the initial factory settings, the WOL function is disabled. (The display image assumes Windows® 7 but it is similar under Windows Server® 2008 R2. Note that the WOL function is not available in Windows Server® 2012 R2 due to its specifications.)

1. Execute steps 1 through 7 in “● Setting up the network transfer speed” in “3.8 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** :
3. Click **OK** and restart the system.



3.7.2 Turning on the power using the LAN

1. Insert the plug of the power cord into an outlet and turn on the main power. The standby lamp (STBY) will be lit.
2. Send a Magic Packet™ frame to the built-in LAN adapter in the equipment. When the built-in LAN adapter receives a Magic Packet™ frame, the power for the equipment is turned on.

You must turn on the standby lamp (STBY) in order to start the equipment through the LAN (using WOL). If you start the equipment and you want to continue to use WOL at the next startup, go through the shutdown process when you turn off the power.

The built-in LAN adapter in the equipment is compliant with WfM 2.0 (*1) to support the Magic Packet™ technology. Because of this, the power for the equipment can be turned on when a special data packet called a “Magic Packet™ frame” (*2) is received at the built-in LAN adapter.

A program for transmitting a Magic Packet™ frame does not come with the equipment. Use a commercially available program for to transmit the Magic Packet™ frame.

(*1) Wired for Management (WfM) is a guideline regarding the hardware specifications proposed by Intel Corporation for managing PCs on a network.

(*2) The Magic Packet™ technology has been proposed by AMD Japan, Ltd. and can be starting a PC on a network from a remote device.

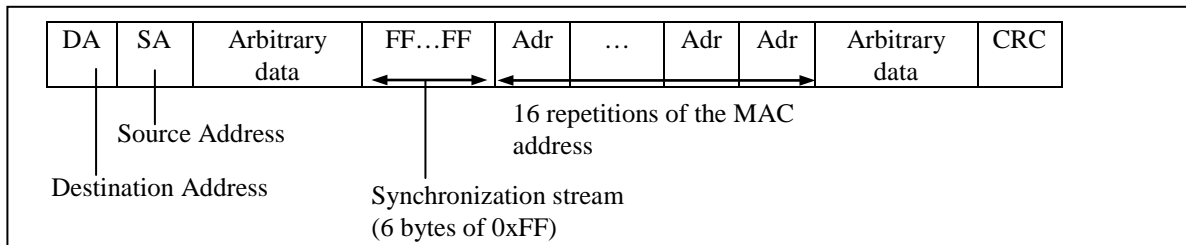
< NOTE >

- When you send a Magic Packet™ frame to the equipment, make sure you send it to the built-in LAN adapter in the equipment. (For information about the location of the connector, see “2.1 Display and User Input Sections”.) You cannot use WOL if you send a Magic Packet™ frame to an optional LAN adapter.
- If you turn off the power by pressing the power switch for at least four seconds, you cannot use WOL the next time. When you turn off the power by pressing the power switch for at least four seconds, turn on the equipment by pressing the power switch and go through the shutdown process to turn off the power.

< About the Magic Packet™ frame >

In a Magic Packet™ 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™ 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.

A Magic Packet™ frame is shown in the following figure.



3.8 Setting Up the LAN Interface

This equipment has one built-in 1000BASE-T/100BASE-TX/10BASE-T LAN port. For information about the location of the LAN port connector (1000BASE-T/100BASE-TX/10BASE-T), see “2.1 Display and User Input Sections”.

< NOTE >

- For information about the precautions for the network, see “PRECAUTIONS 2. NETWORK”.

- Automatic recognition of the network transfer speed or transfer mode

The LAN port has an auto-negotiation function to automatically recognize the network transfer speed or transfer mode. For normal use, enable the auto-negotiation function. (Especially when you use the WOL function. If the speed is fixed to 1000Mbps (auto-negotiation), the WOL function cannot be used.)

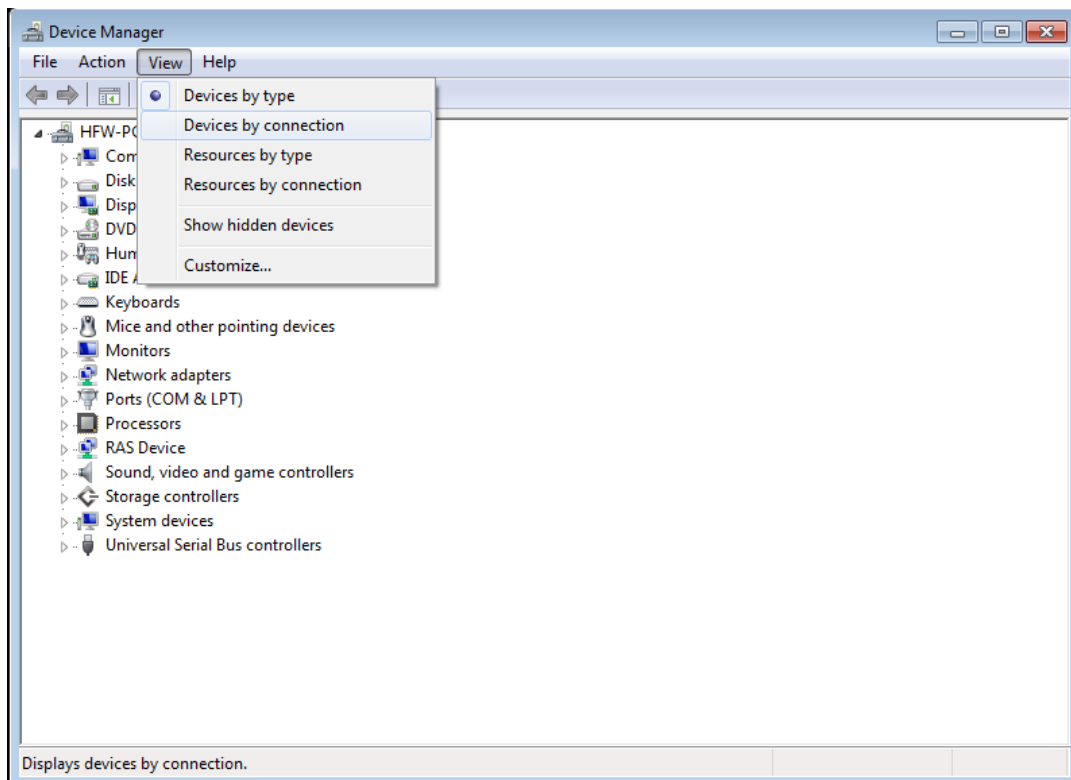
If there is a compatibility issue with the connected hub, the auto-negotiation function may not work properly and that may affect the communication with other terminals.

If the auto-negotiation function does not work properly, configure the LAN interface as follows.

Specification of the hub	Specification of the LAN setting (*)	
	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)	Auto Negotiation or Full Duplex

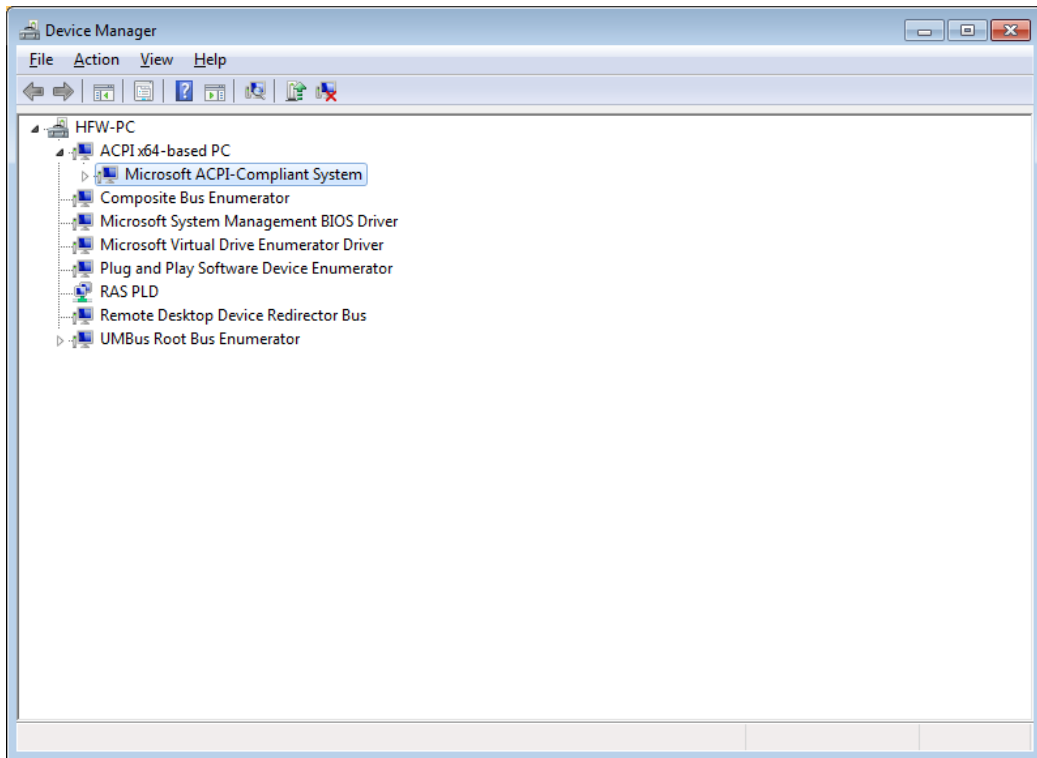
(*) How the setting is displayed is different depending on the OS and the LAN port (including the optional LAN adapter) in use.

- Setting the network transfer speed
(The display image assumes Windows® 7 but it is similar under Windows Server® 2008 R2.)
 1. Log on to the computer using an administrator's account.
 2. Click **Start > Control Panel > System and Security**.
(In Windows Server® 2012 R2, right-click **Start**. Then a menu appears. On the menu, click **Control Panel > Device Manager**. Then go to step 4.)
 3. Click the **System** icon. Then click **Device Manager**.
 4. The Device Manager window appears. Click the **View** menu and select **Devices by connection**.

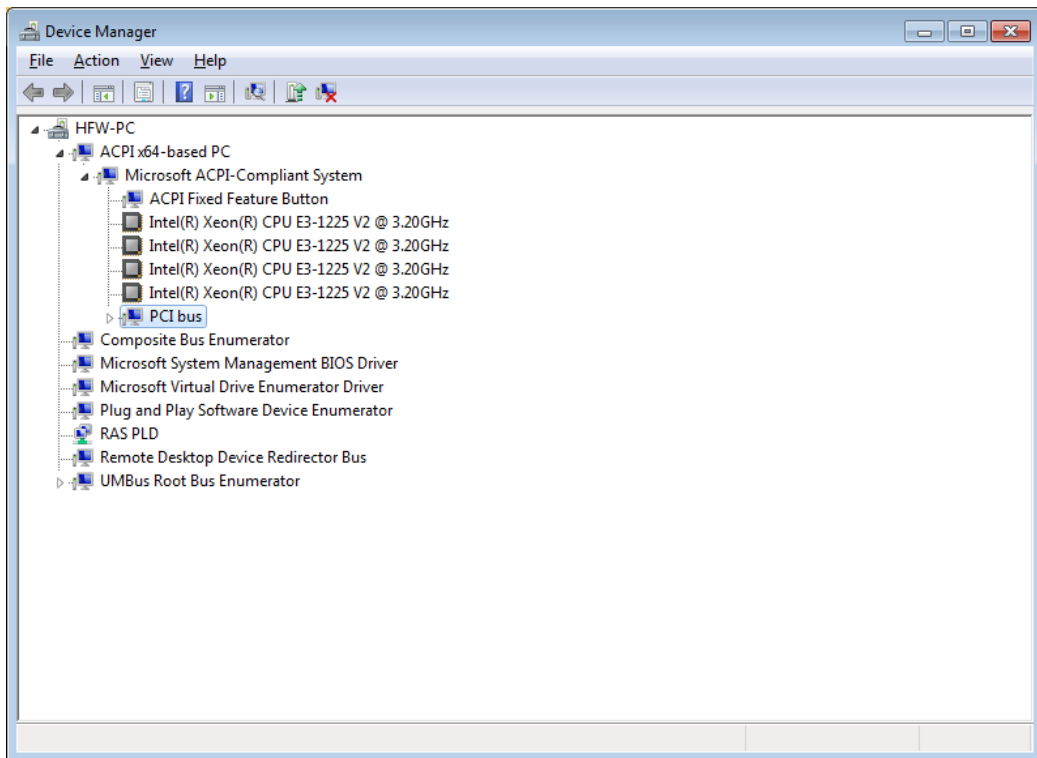


3. OPERATION

5. Click **ACPI x64-based PC**. Then click **Microsoft ACPI-Compliant System**.



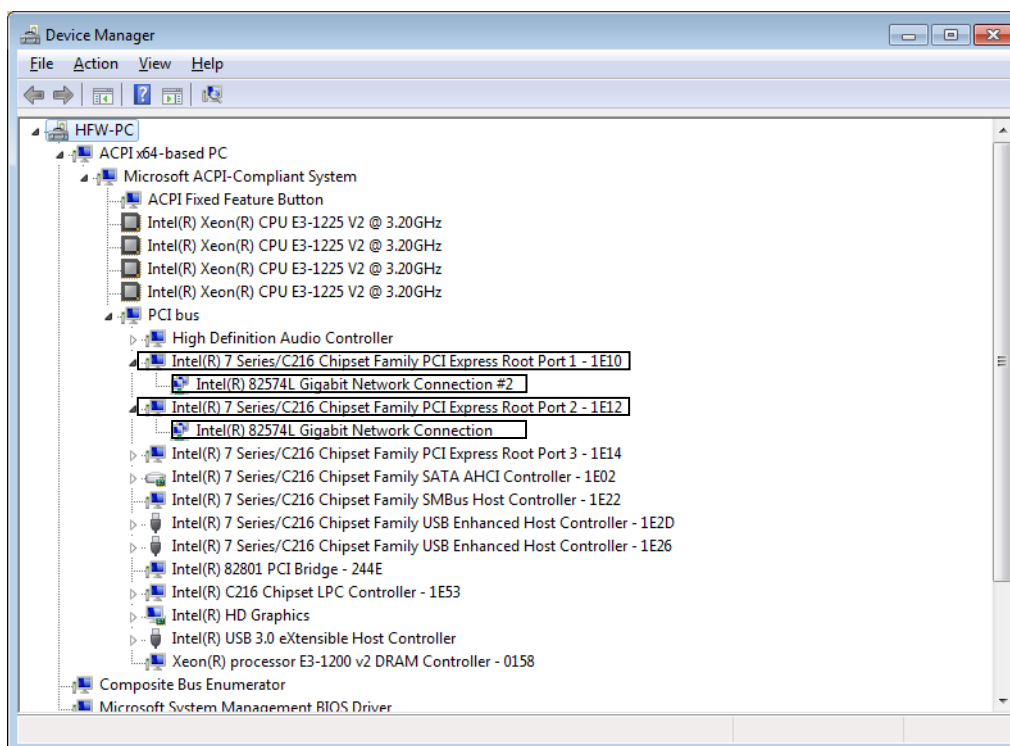
6. Click **PCI bus (*1)**.



(*1) Displayed as "PCI Express Root Complex" in Windows Server® 2012 R2.

7. See the following and double-click the network adapter you want to configure (*).
 - When you configure the built-in LAN (LAN1):
Click **Intel(R) 7 Series/C216 Chipset Family PCI Express Root Port 1 – 1E10**. Then double-click the network adapter under it (in the example in the figure below, **Intel(R) 82574L Gigabit Network Connection#2**).
 - When you configure the built-in LAN (LAN2):
Click **Intel(R) 7 Series/C216 Chipset Family PCI Express Root Port 2 – 1E12**. Then double-click the network adapter under it (in the example in the figure below, **Intel(R) 82574L Gigabit Network Connection**).

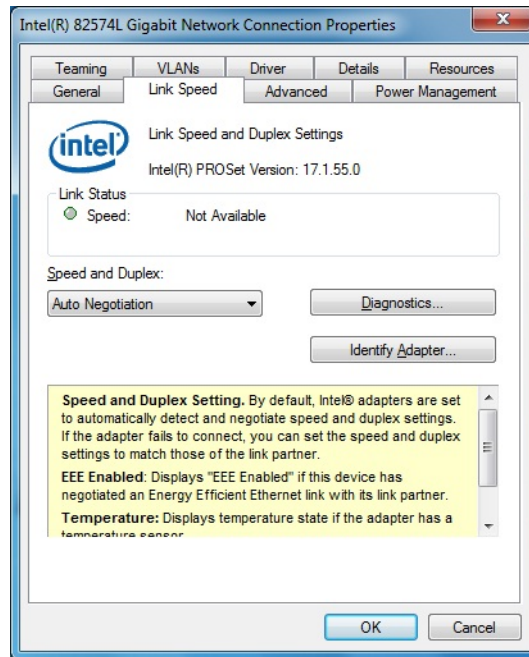
Follow a similar procedure when you update the setting for the network adapter mounted on an extension slot.



3. OPERATION

8. Click the **Link Speed** tab.

(In Windows Server® 2012 R2, click the **Advanced** tab.)

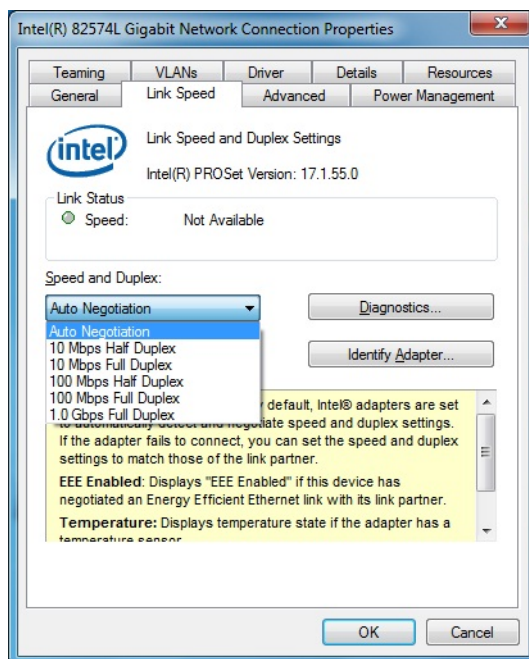


9. Select the transfer speed and the transfer mode you want to choose from the **Speed and Duplex** list.

(In Windows Server® 2012 R2, under **Property**, select **Speed & Duplex**. In the pull down menu, select the transfer speed and the transfer mode.)

- 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 have to configure the transfer speed and the transfer mode, select **Auto Negotiation** at the top of the list to choose the auto-negotiation setting.



10. Click **OK**.
11. Close the **Device Manager** window.
12. Close the **Control Panel** window.

< NOTE >

- For information about the precautions for the network, see “PRECAUTIONS 2. NETWORK”.

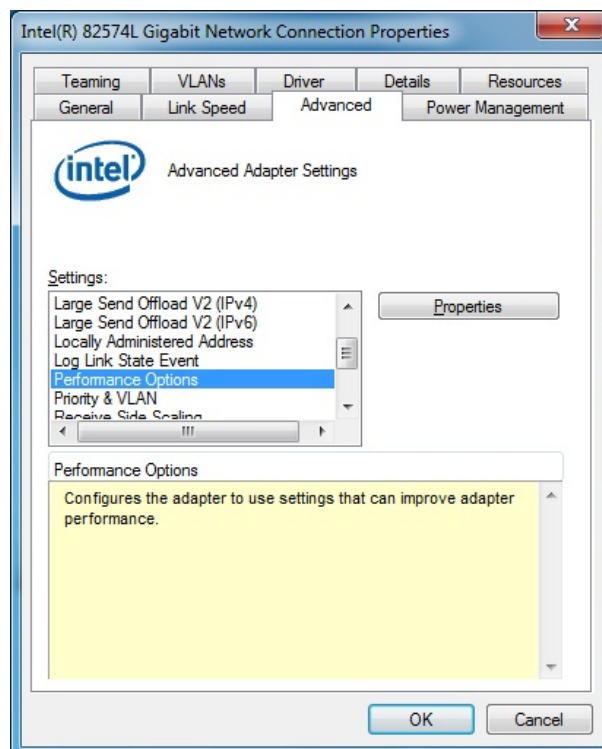
3. OPERATION

- Precautions for mounting and using multiple LAN adapters

If multiple LAN adapters are mounted and there are frequent interrupt requests from either of the adapters or the amount of processed data is too large, the performance of the adapters may not be as high as expected. (This is because an interrupt request from a LAN adapter requires a higher CPU load compared to the amount of processed data and if multiple LAN adapters are mounted and used, it takes a very long time for the CPU to process all interrupt requests from the LAN adapters.)

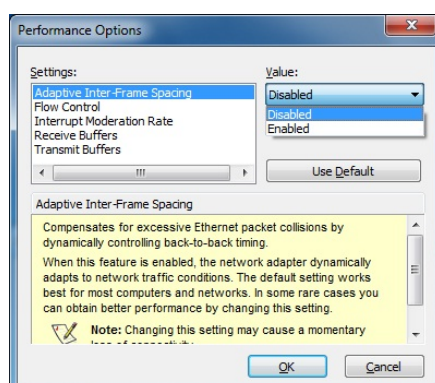
If you mount and use multiple LAN adapters, confirm that each built-in LAN adapter and optional adapter can perform as expected. If they do not, adjust the network load or change the LAN adapter settings by following the procedure below. For details about each configuration item, see the description at the bottom of the corresponding setup window. (The display image assumes Windows® 7 but it is similar under Windows Server® 2008 R2.)

1. Execute steps 1 through 7 in “● Setting the network transfer speed” in “3.8 Setting Up the LAN Interface”.
2. Click the **Advanced** tab. Select **Performance Options** and click **Properties**. The **Performance Options** dialog box is displayed.
(In Windows Server® 2012 R2, click the **Advanced** tab. Then under **Property**, select the items described in the following.)



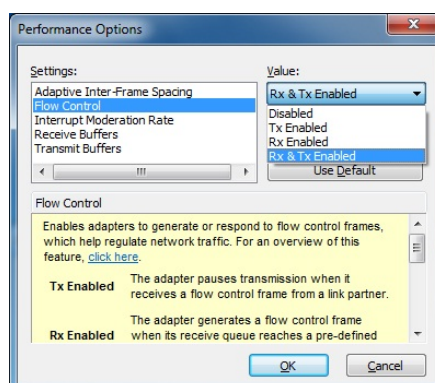
- Adaptive Inter-Frame Spacing

This compensates for excessive Ethernet packet collisions by dynamically controlling back-to-back timing.



- Flow Control

This enables adapters to generate or respond to flow control frames, which help regulate network traffic. The default setting of the flow control is different depending on the OS and the type of LAN adapter in use. You must configure the flow control setting according to the network you are using.



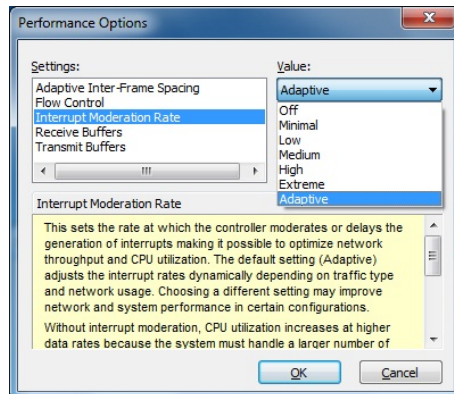
< NOTE >

- If the LAN driver stops due to a system failure such as an OS deadlock, broadcast frames from other devices may not be able to be processed and the receive queue may get full.
If **Rx Enabled** or **Rx & Tx Enabled** is specified for **Flow Control**, flow control frames are continuously sent from this equipment under such a condition. If this happens, that may affect the whole network connected to the equipment. Specify **Disabled** for **Flow Control** at this equipment or at the connected hub as required.
- If **Disabled** is specified for **Flow Control** and if the device receives frames quicker than it can process, the device gets overloaded, and the frames receive will be discarded until the device recovers from the overload condition. You have to design the network appropriately to avoid such an overload condition.

3. OPERATION

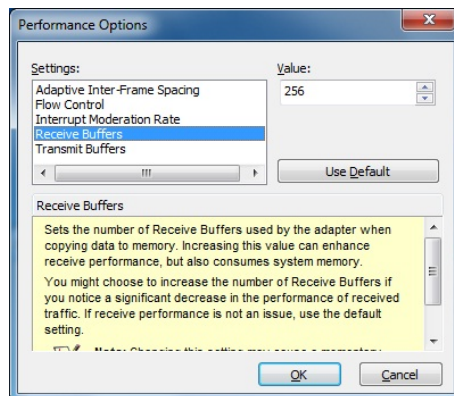
- **Interrupt Moderation Rate**

This sets the rate at which the controller moderates or delays the generation of interrupts.



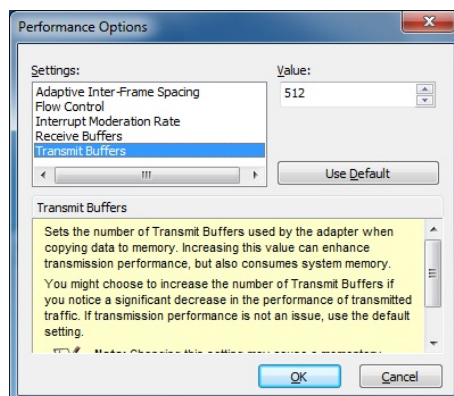
- **Receive Buffers**

This sets the number of Receive Buffers used by the driver when copying data to protocol memory.



- **Transmit Buffers**

This sets the number of Transmit Buffers, data segments used by the adapter when recording transmission packets in system memory.



- Notes about the case when link down is recorded in the log during OS startup.

While Windows® is starting, the following warnings may be displayed in the event log. These warnings are recorded by the initialization process of the LAN driver at the startup of Windows® and will not cause any problems in the system operation.

Event ID	Source	Type	Category	Description(*1)
27	e1qexpress or eliexpress	Warning	None	Intel(R) 82574L Gigabit Network Connection (*2) A network link has been lost. (*3)

(*1) If you add a LAN adapter as an option in Windows Server® 2012 R2, the message “The description for Event ID 27 from source eliexpress cannot be found.” is displayed, but there is no problem in operation.

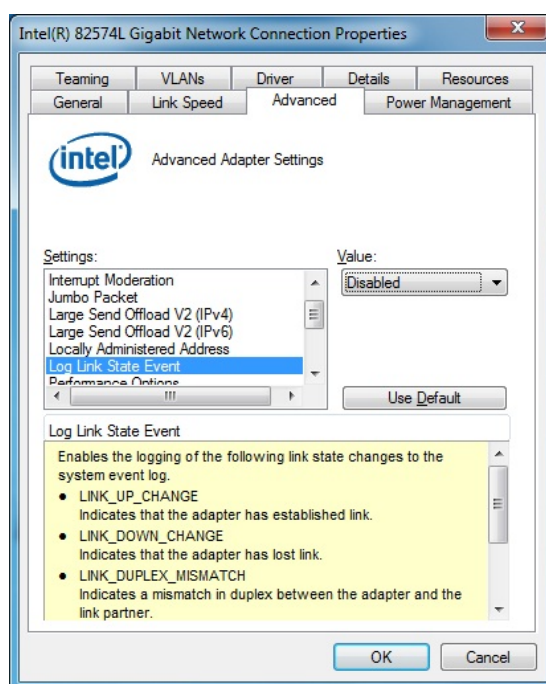
(*2) How the name is displayed differs depending on the LAN adapter.

(*3) Displayed as "Network link is disconnected." in Windows Server® 2012 R2.

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

Note that if you change the settings shown below, log entries such as LAN connection and disconnection during system operation are also not recorded and that may make failure analysis difficult when a problem occurs. (The display image assumes Windows® 7 but it is similar under Windows Server® 2008 R2.)

1. Execute steps 1 through 7 in “• Setting the network transfer speed” in “3.8 Setting Up the LAN Interface”.
2. Click the **Advanced** tab. Select **Log Link State Event**. Select **Disabled** from the **Value** list.
(In Windows Server® 2012 R2, click the **Advanced** tab. Under **Property**, select **Log Link State Event**. Then select **Disabled**.)



3.9 Setting Up the Screen

- For screen settings, you can configure the color depth (the number of colors that can be displayed on the screen simultaneously), resolution (the number of dots that constitutes the screen), refresh rate (the number of screen refreshes per second), and the single-display and multiple-display settings.

(The display image assumes Windows® 7 but it is similar under Windows Server® 2008 R2 and Windows Server® 2012 R2.)

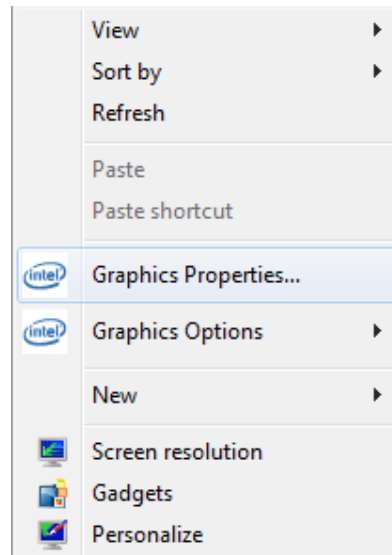
< NOTE >

- For information about the precautions for the screen, see “PRECAUTIONS 3. DISPLAY SCREEN”.
- When you want to change screen settings, use "Intel® HD Graphics Control Panel" and change the screen settings.

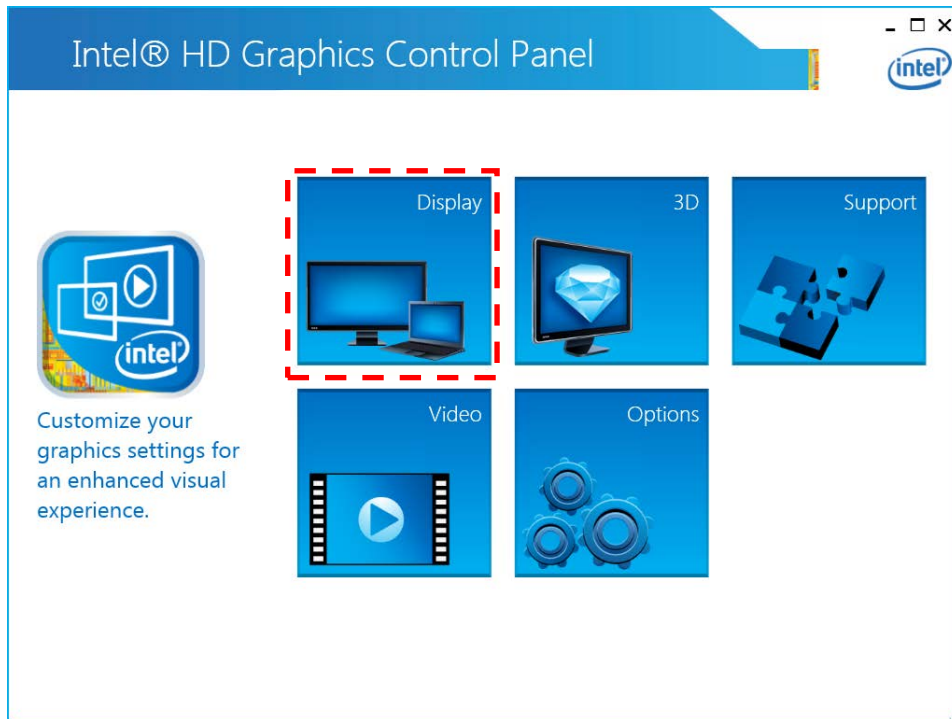
(1) Configuring screen settings for a single display

When one display is connected, follow the procedure below to configure the screen settings.

1. Right-click on the desktop to display a menu. From the menu, click **Graphics Properties** to start **HD Graphics Control Panel**.

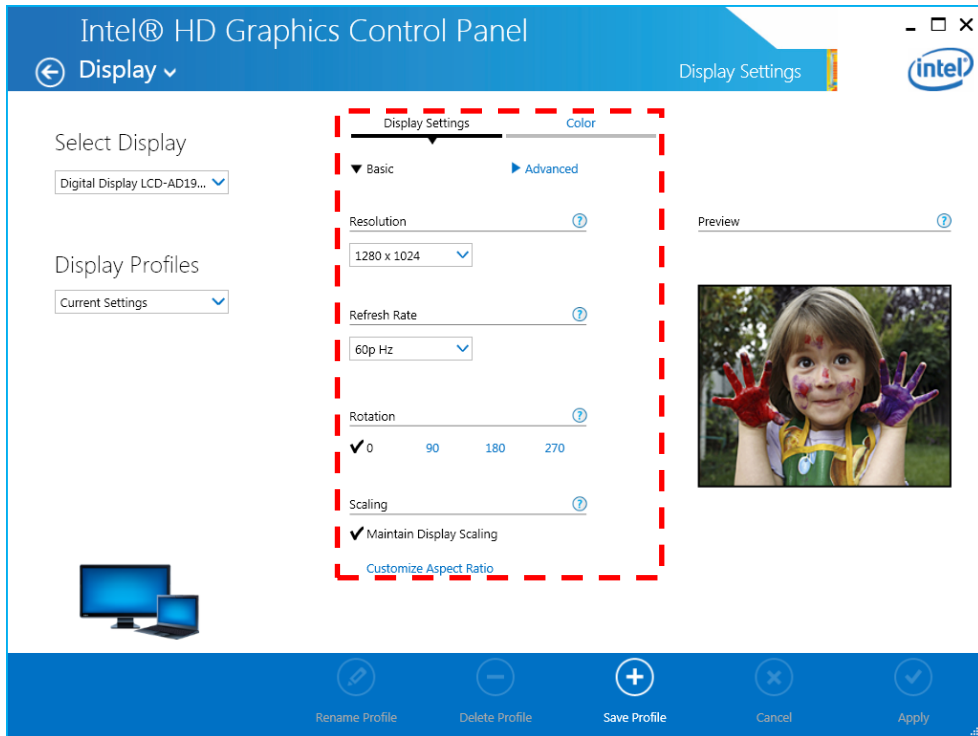


2. In the **HD Graphics Control Panel** window, click **Display**.



3. OPERATION

3. Configure the screen setting items displayed on the middle of the window.

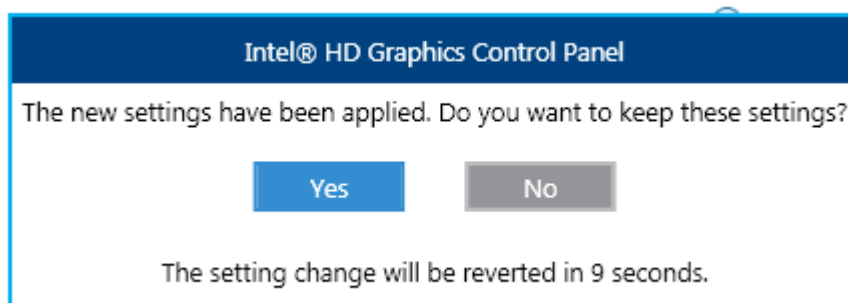


Setting Item	Description
Resolution	This allows you to select the resolution.
Color Depth	This allows you to select the number of colors.
Refresh Rate	This allows you to select the refresh rate.

< NOTE >

- Do not change the Rotation and Scaling settings.
- When you configure the resolution, color depth, and refresh rate, you must choose from the options described in “4.1 Equipment Specification (7) Supported resolutions”.

4. When you finish configuring the setting items, click **Apply**. If you change the resolution or refresh rate, the following confirmation screen for the configuration change will be displayed. Click **Yes**.



< NOTE >

The resolution options may 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.

When the driver is installed, the resolution is automatically set to the maximum resolution supported by the connected display. When you change the resolution, select a resolution smaller than that.

3. OPERATION

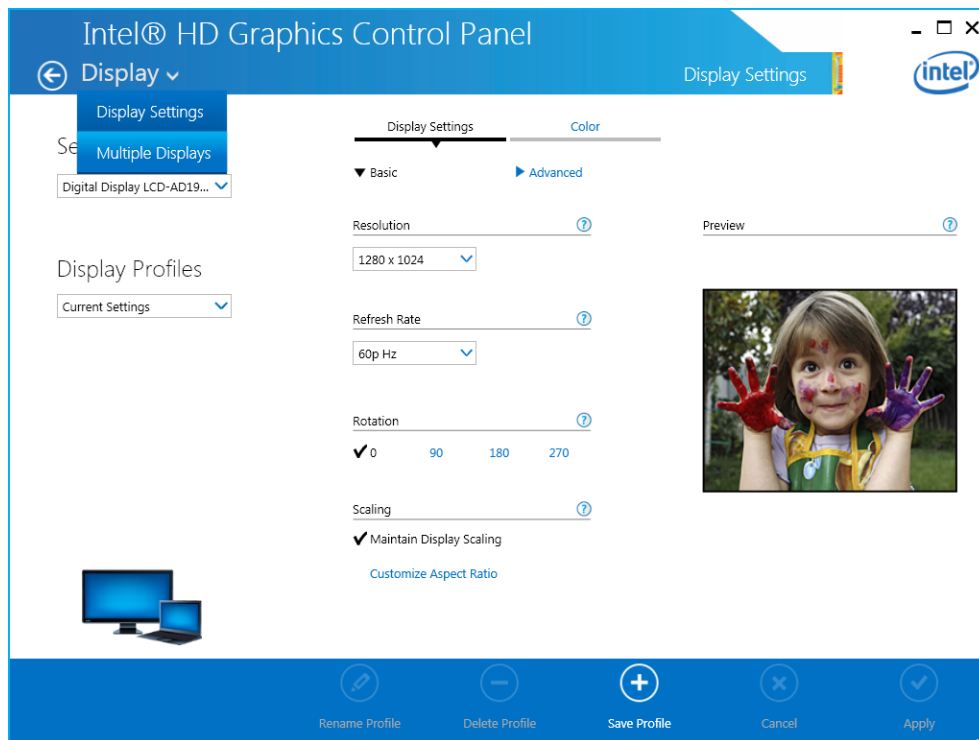
(2) Configuring screen settings for two (multiple) displays

This equipment supports multiple display output. If you connect two displays, the two displays can be used simultaneously.

The following shows how to set up the multiple display output.

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

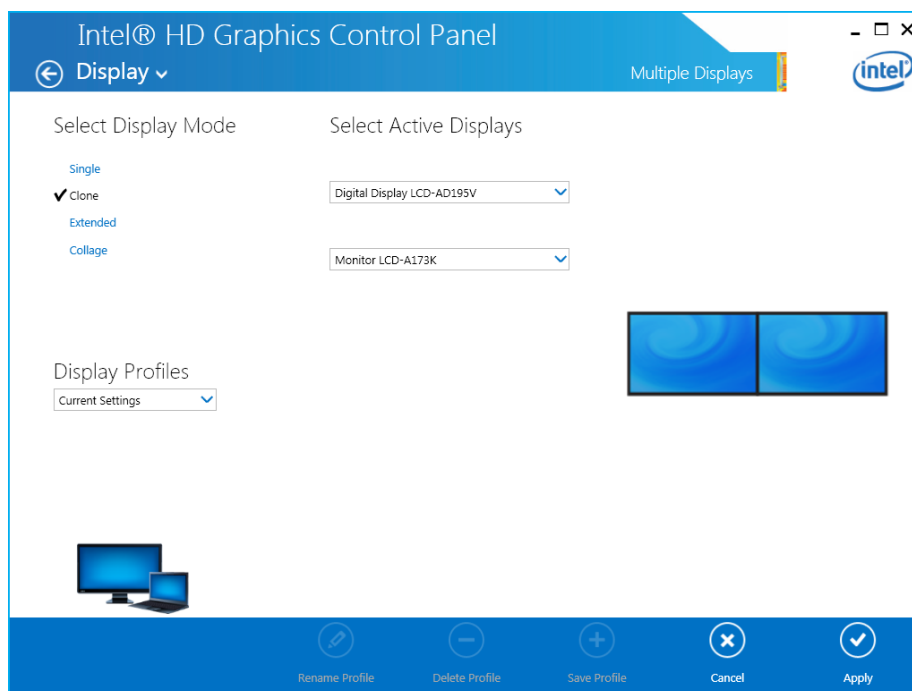
The following shows how to set up “Clone”, “Extended” and “Collage”.



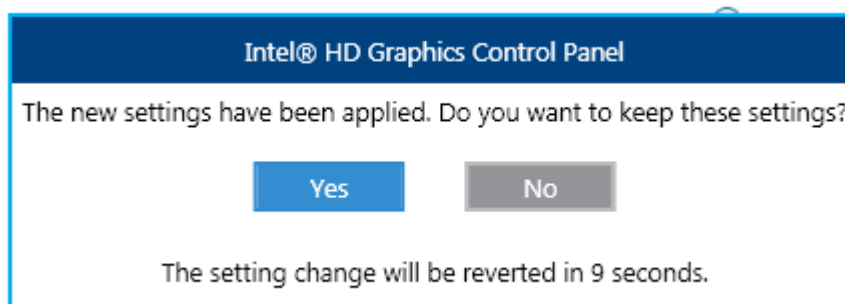
(a) Clone

If you select this mode, both displays show the same screen and have the same resolution, color depth, and refresh rate. Before connecting displays, check the capabilities of the displays (maximum resolution, highest refresh rate, and so on).

1. Select **HD Graphics Control Panel > Display > Multiple Displays**.
2. Select **Select Display Mode > Clone**



3. When you finish configuring the settings, click **Apply**. If you change the resolution or refresh rate, the following confirmation screen for the setting change will be displayed. Click **Yes**.

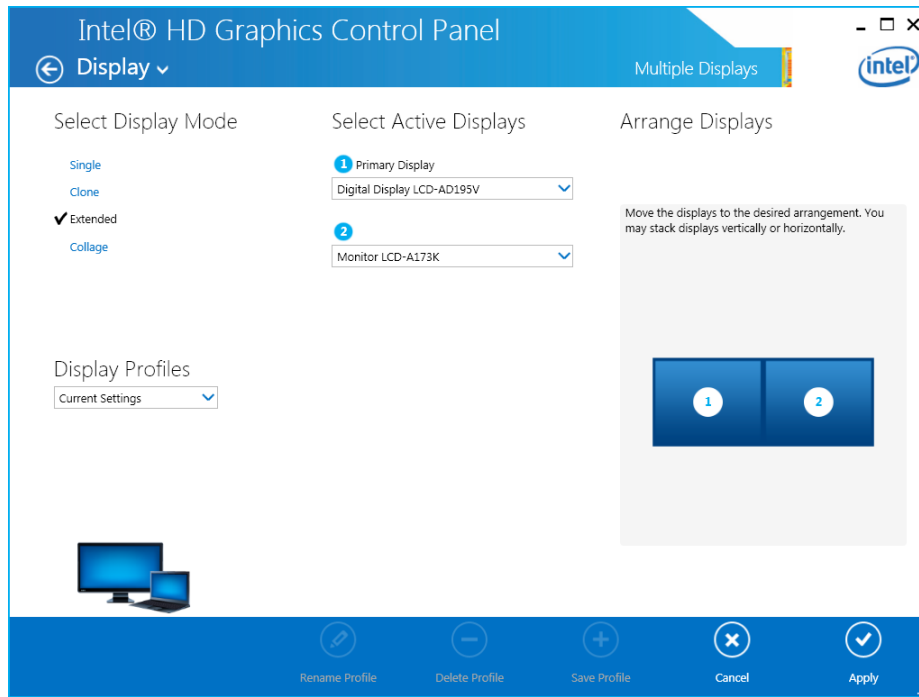


3. OPERATION

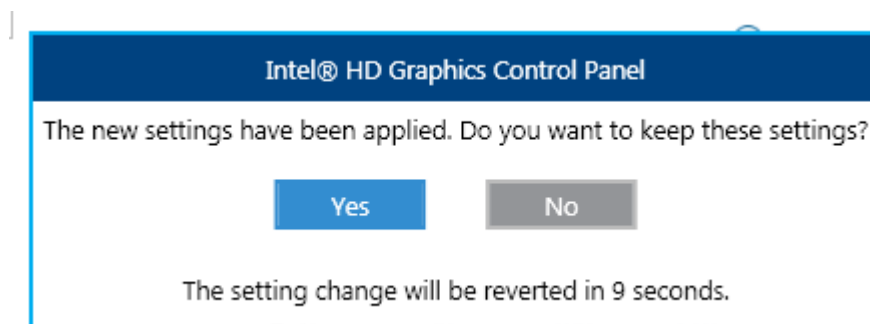
(b) Extended

If you select this mode, one screen is divided into two and displayed on two displays. The resolution, color depth, and refresh rate can be configured independently. The task bar is not displayed in display 2. Which resolution, color depth, and refresh rate can be selected depends on the capabilities of the display connected.

1. Select **HD Graphics Control Panel > Display > Multiple Displays**.
2. Select **Select Display Mode > Extended**



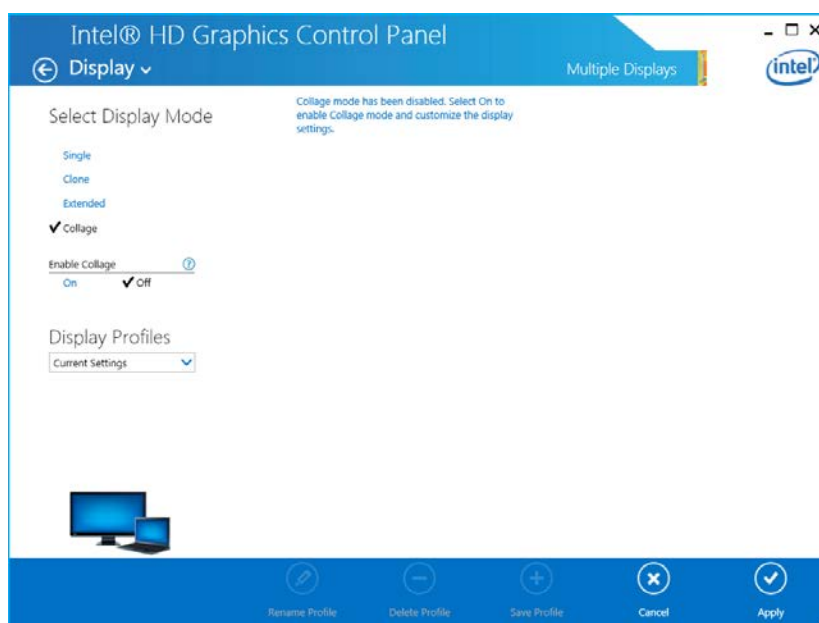
3. When you finish configuring the settings, click **OK**. If you change the resolution or refresh rate, the following confirmation screen for the setting change will be displayed. Click **OK**.



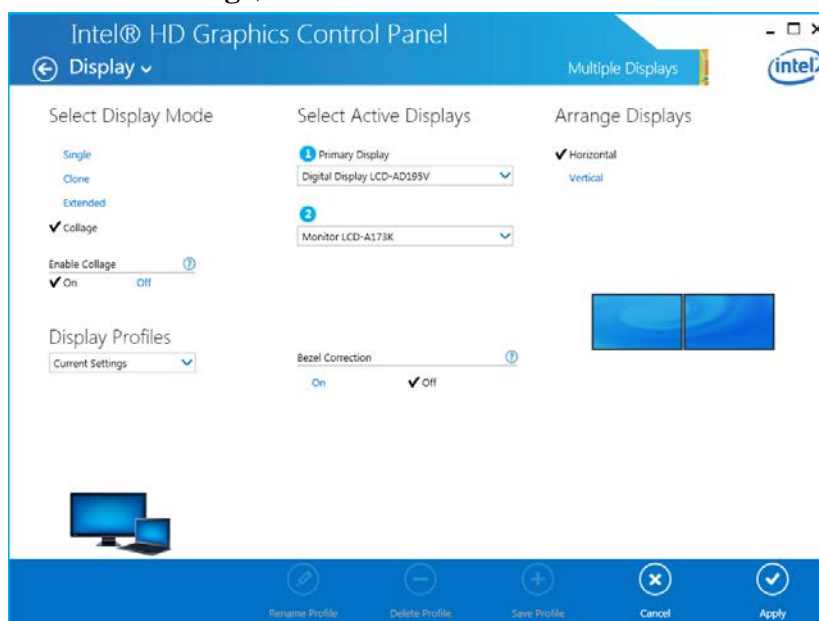
(c) Collage

This feature allows one screen to be divided and displayed on 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 is displayed only in the main display. Which resolution, color depth, and refresh rate can be selected depends on the capabilities of the connected displays.

1. Start **HD Graphics Control Panel > Display > Multiple Displays**.
2. Under **Select Display Mode**, select **Collage**.

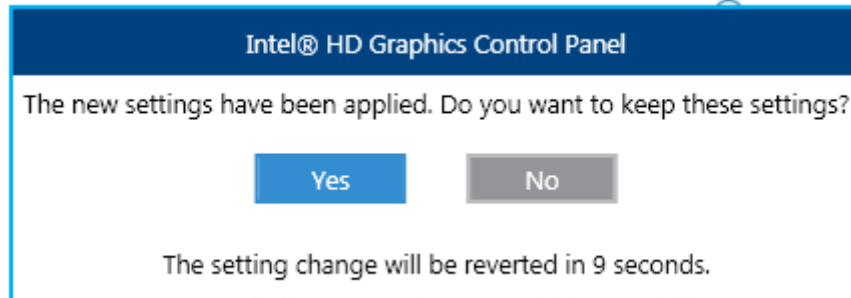


3. Under **Enable Collage**, select **On**.



3. OPERATION

4. When you finish configuring the settings, click **OK**. If you change the resolution or refresh rate, the following confirmation screen for the setting change will be displayed. Click **OK**.



CHAPTER 4 SPECIFICATIONS

4.1 Equipment Specifications

(1) Common specifications

Item		Specifications
Model		See “(2) Individual specifications”.
Processor		See “(2) Individual specifications”.
Main memory		4GB / 8GB / 16GB / 32GB (*8)
Display resolution and color depth		See “(7) Supported resolutions”.
Built-in file device	DVD	DVD-Multi drive (*1)
	HDD	See “(2) Individual specifications”.
Extended slot	PCI	See “(2) Individual specifications”.
	PCI Express	See “(2) Individual specifications”.
General purpose 5-in bay		Option
Interface	Display	Digital (DVI-I 29 pins) (*2)
		Digital (DVI-D 24 pins)
	USB	USB2.0/1.1 × 6 (front × 2, rear × 4)
		USB3.0/2.0/1.1 × 2 (rear × 2)
	Serial	RS-232C (D-sub 9 pins) × 1, Option × 1 (dedicated slot)
	LAN	1000BASE-T/100BASE-TX/10BASE-T by auto-negotiation × 2 (RJ45, Wake on LAN™ supported) (*9)
	Audio	LINE IN × 1, LINE OUT × 1
External control	Option × 1 (dedicated slot)	
External Dimensions (Width × Depth × Height)		420 × 450 × 176 mm (rubber feet not included)
RAS features		Hardware status monitoring (fan failure, temperature failure, SMART, drive operating time, and others), OS deadlock monitoring, watchdog monitoring, alarm notification when failure is detected (pop up notification, Digital LEDs for Status indication, remote notification, and others), memory dump collection, maintenance operation support commands, and simulation function
Weight		See “(2) Individual specifications”.
Values in accordance with the Energy Saving Law		See “(2) Individual specifications”.
Inrush current		35 A or less (100 VAC), 50A or less (240 VAC)
Leakage current		1 mA or less
Power rating		540 VA
Power	Voltage	100 - 240 VAC ± 10% (wide range input)
	Frequency	50/60 Hz ± 3 Hz
Keyboard and mouse		Option

4. SPECIFICATIONS

(2) Individual specification

Item		Specifications	
Model (*3)		A model HJ-7540xxxYA	D model HJ-7540xxxYD
Processor		Intel® Xeon® E3-1225 v2 (3.2GHz)	
Built-in file device (*4) (*5)	HDD1	SATA 1TB / 2TB	
	HDD2	SATA 1TB / 2TB (Option) (*6)	
	HDD3	SATA 1TB / 2TB (Option)	
Extension slot	PCI	Long size × 3 (When the general purpose 5-in bay is used, long size × 2)	
	PCI Express	Half size PCI Express x16 × 1 Half size PCI Express x4 × 1(*7) Half size PCI Express x1 × 3	Half size PCI Express x16 × 1 Half size PCI Express x4 × 1(*7) Half size PCI Express x1 × 2
Weight		About 15 kg	About 16 kg

(*1) The support media of the DVD drive maker largely decreases by market reduction of the DVD-RAM media, and the DVD-Multi drive of this equipment does not support the DVD-RAM media, too.

(*2) By using a conversion connector or DVI-A cable, you can output an analog VGA signal. The conversion connector or DVI-A cable must be provided by the users.

(*3) The “xxx” denotes the OS type. For details about OS types, see “ (3) Pre-installed OS model specifications”.

If “xxx” is “NOS”, an OS is not installed.

Depending on the language of the OS, “y” is either “J” (Japanese) or “E” (MUI (Multilingual User Interface)). A language supporting in MUI is English, Chinese (China), Chinese (Hong Kong special administrative region), Chinese (Taiwan), Korean, Thai, Portuguese.

The alphabet at the end denotes the model: A: HDD model (A model), D: RAID1 model (D model).

(*4) For information about the precautions for hard disks, see “PRECAUTION 4. HARD DISK DRIVES (HDDs)”.

(*5) When HDD1, HDD2 and HDD3 are installed, their capacities must be the same.

(*6) HDD2 is optional item in the A model, but it becomes essential item in the D model.

(*7) A PCI Express x16 connector is used but the internal connection is equivalent to PCI Express x4.

(*8) Due to the requirements of the OS, the maximum usable memory size is about 3GB in Windows® 7 (32bit).

(*9) Note that the Wake on LAN™ is not available in Windows Server® 2012 R2 due to its specifications

(3) Pre-installed OS model

OS type	Pre-installed OS
7ES	Microsoft® Windows Server® 2008 R2 Standard (64bit) (Embedded licensing version)
8EW	Microsoft® Windows® 7 Professional (64bit) (Embedded licensing version)
9EW	Microsoft® Windows® 7 Professional (32bit) (Embedded licensing version)
AES	Microsoft® Windows Server® 2012 R2 Standard (64bit) (Embedded licensing version)

(4) Accessories

Item	Specifications
Power cord	7 A 125 V two-prong plug with ground pole
Manual	“GETTING STARTED” (manual number WIN-6A-0005)

(5) Option specifications

Item	Specifications
LAN adapter	1000BASE-T/100BASE-TX/10BASE-T by auto-negotiation × 2 (For details, see “(8) Optional LAN adapter specifications (HJ-7617-55)”.)
	1000BASE-T/100BASE-TX/10BASE-T by auto-negotiation × 1 (For details, see “(9) Optional LAN adapter specifications (HJ-7617-61)”.)
External contact port (*1)	B contact, including RS232C × 1 port (D-sub 9 pins) (For details, see “4.8.2 External control specifications”.)
	A contact, including RS232C × 1 port (D-sub 9 pins) (For details, see “4.8.2 External control specifications”.)
Extended serial port (*1)	RS232C × 1 port (D-sub 9 pins) (For details, see “4.8.1 Connector specifications”.)
General purpose 5-in bay	General purpose 5-in bay device mounting metal fitting General purpose 5-in bay base mounting metal fitting (For details, see “5.3.13 Mounting and removing an optional device for the general purpose 5-in bay”.)
Signal and power harness	Signal and power harness for the general purpose 5-in bay (SATA) (For details, see “4.8.1 Connector specifications”.)
Mounting metal fitting for a rack mount	Mounting metal fitting for a JIS standard 19 inch rack
	Mounting metal fitting for an EIA standard 19 inch rack
Service menu	General Q and A service (10 incidents per year)
	Failure analysis support service (5 incidents per year)
	Failure analysis support service (1 incident)
Optional tool	System failure monitoring tool “RunWatcher”
	Backup tool for use between hard disks

(*1) Can be mounted in the dedicated slot. You cannot use both at the same time.

4. SPECIFICATIONS

(6) Supported resolutions

- Onboard video (DVI -I 29 pins) (*1)

Screen settings		
Resolution	Refresh rate (*2)	
	For analog output	For digital output
800 × 600	60Hz	60Hz
1024×768	60Hz	60Hz
1152×864	60Hz	60Hz
1280×1024	60Hz	60Hz
1366×768	60Hz	60Hz
1400×1050	60Hz	60Hz
1440×900	60Hz	60Hz
1600×900	60Hz	60Hz
1600×1200	60Hz	60Hz
1680×1050	60Hz	60Hz
1920×1080	60Hz	60Hz
1920×1200	60Hz	60Hz

(*1) By using a conversion connector or DVI-A cable, you can output an analog VGA signal.
The conversion connector or DVI-A cable must be provided by users.

(*2) It has been confirmed that all refresh rate settings indicated in the table actually work in the test environment provided by Hitachi. It should be noted that supported resolutions and refresh rates are different depending on the display. Consequently, some settings may not be used for a specific display.

- Onboard video (DVI -D 24 pins)

Screen settings	
Resolution	Refresh rate (*)
	For digital output
800×600	60Hz
1024×768	60Hz
1152×864	60Hz
1280×1024	60Hz
1366×768	60Hz
1400×1050	60Hz
1440×900	60Hz
1600×900	60Hz
1600×1200	60Hz
1680×1050	60Hz
1920×1080	60Hz
1920×1200	60Hz

(*) It has been confirmed that all refresh rate settings indicated in the table actually work in the test environment provided by Hitachi. It should be noted that supported resolutions and refresh rates are different depending on the display. Consequently, some settings may not be used for a specific display.

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(7) Main memory specifications

Only the following combinations can be used for the configuration of the main memory of this equipment.

Slot A1	Slot A2	Slot B1	Slot B2	Total capacity
—	4GB	—	—	4 GB
—	4GB	—	4GB	8 GB
—	8GB	—	8GB	16 GB
8GB	8GB	8GB	8GB	32 GB

(8) Optional LAN adapter specifications (HJ-7617-55)

Item	Specifications
Interface	1000BASE-T/100BASE-TX/10BASE-T by auto-negotiation × 2 (RJ45, Wake on LAN™ not supported)
Installed slot	PCI Express x1
Dimensions	168 × 67.5 mm (board only, protrusions excluded)
Weight	About 100 g

(9) Optional LAN adapter specifications (HJ-7617-61)

Item	Specifications
Interface	1000BASE-T/100BASE-TX/10BASE-T by auto-negotiation × 1 (RJ45, Wake on LAN™ not supported)
Installed slot	PCI Express x1
Dimensions	130 × 67.5 mm (board only, protrusions excluded)
Weight	About 50 g

(10) Maximum current specifications**(USB port, Extension board, general purpose 5-in bay)**

The following table shows the maximum total current consumption for the USB ports, extension slots (PCI Express / PCI) and general purpose 5-in bay.

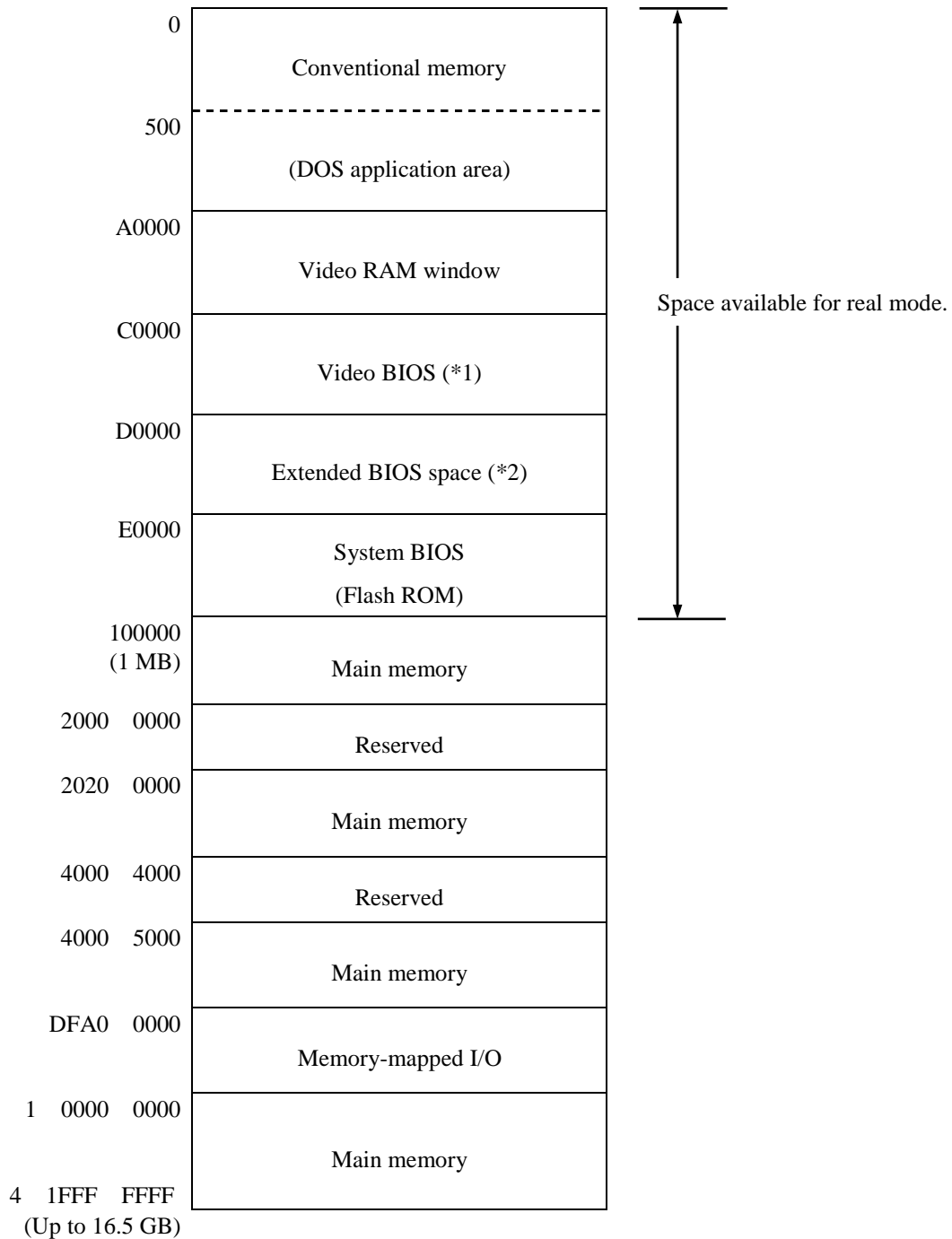
DC output	Maximum total current consumption for USB port / extension board total 8 slots/ general purpose 5-in bay
3.3V	6.0 A
5 V	6.0 A
12 V	6.0 A
-12 V	0.2 A

The following table shows the maximum current consumption for each of the USB ports, extension slots (PCI Express / PCI) and the general purpose 5-in bay. 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 may be activated and the connected device may not be recognized.

Item	Voltage	Maximum current
USB2.0/1.1 port	5 V	0.5 A/port
USB3.0/2.0/1.1 port	5V	0.9A/port
PCI Express x16 slot	3.3 V	3.0 A/slot
	12 V	5.5 A/slot
PCI Express x1 slot	3.3 V	3.0 A/slot
	12 V	2.1A/slot
PCI slot	3.3 V	6.0 A/slot
	5 V	5.0 A/slot
	12 V	0.5 A/slot
	-12 V	0.1 A/slot
General purpose 5-in bay	3.3 V	3.0 A
	5 V	3.0 A
	12 V	3.0 A

4. SPECIFICATIONS

4.2 Memory Space



(*1) The size of the video BIOS may change in future versions.

(*2) The extended BIOS space is a narrow space between D0000 and DFFFF and may already be in use by other devices. In addition, the size of the BIOS of standard built-in adapters may change in future versions. It is advisable that you do not use the extended BIOS space if at all possible when you design a new device. If you do, a contention may occur between devices and malfunctions of the devices may result.

4.3 I/O Space

I/O address	Device name
0000–001F	DMA controller
0020–002D	Interrupt controller 1
002E–002F	Super I/O configuration
0030–003D	Interrupt controller 1
0040–0043	System timer 1
004E–004F	Super I/O configuration
0050–0053	System timer 2
0060, 0062, 0064, 0066	Keyboard controller
0061	NMI controller
0070–0077	RTC controller
0080	DMA & post code
0081–0091	DMA page register
0092	Reset controller
0093–009F	DMA controller
00A0–00B1	Interrupt controller 2
00B2–00B3	Power management controller
00B4–00BD	Interrupt controller 2
00C0–00DF	DMA controller 2
00F0	Coprocessor
0240–025F	RAS LSI register
0290–029F	Super I/O
02F8–02FF	Serial port 2 (COM2)
03F8–03FF	Serial port 1 (COM1)
0400–043F	ACPI controller
0460–047F	TCO timer controller
04D0–04D1	Interrupt controller
0500–057F	GPIO controller
0CF8	PCI configuration (address)
0CF9	Reset controller
0CFC	PCI configuration (data)
4060–407F	SATA controller
4080–4087	SATA controller
4088–408F	SATA controller
4098–409B	SATA controller
409C–409F	SATA controller
EFA0–EFBF	SMBus controller

4.4 List of Interrupts

Interrupt pin	Description
IRQ0	Cascade (from 8259 #1)
IRQ1	Reserved
IRQ2	Timer
IRQ3	Serial port 2 (COM2)
IRQ4	Serial port 1 (COM1)
IRQ5	Not used
IRQ6	Not used
IRQ7	Not used
IRQ8	Real-time clock
IRQ9	SCI
IRQ10	Not used
IRQ11	Not used
IRQ12	Reserved
IRQ13	Coprocessor
IRQ14	Not used
IRQ15	Not used
IRQ16	PCI Express slot 2, slot 4, slot 5, Onboard LAN1, onboard video,
IRQ17	Onboard LAN2
IRQ18	PCI Express slot 1
IRQ19	PCI Express slot 3
IRQ20	xHCI, PCI slot 6
IRQ21	EHCI2, HD Audio, SMBus, PCI slot 7
IRQ22	SATA1(IDE), SATA1(AHCI), SATA2(IDE), PCI slot8
IRQ23	EHCI1

< NOTE >

- The above list is valid when the APIC is enabled (default settings).
- The IRQ numbers of PCI slots are valid when the INT A terminal is used.
- The IRQ numbers are fixed and you cannot change the settings shown above.
- Even under APIC-capable OS, APIC-enabled IRQ numbers are assigned only while the corresponding device is active. In other cases, APIC-disabled IRQ numbers are assigned instead(see the next page).

IRQ assignment when the APIC is disabled

Interrupt pin	Description
IRQ0	Timer
IRQ1	Reserved
IRQ2	Cascade
IRQ3	Serial port 2 (COM2): B
IRQ4	Serial port 1 (COM1): A
IRQ5	Reserved
IRQ6	Not used
IRQ7	Not used
IRQ8	Real-time clock
IRQ9	SATA, SCI, All PCI devices
IRQ10	Not used
IRQ11	Not used
IRQ12	Reserved
IRQ13	Coprocessor
IRQ14	Not used
IRQ15	Not used

4.5 Serial Port Settings

The factory default settings for the serial ports are as follows. Do not change those settings. If you do, the equipment may 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
Serial port B	2F8h	IRQ 3	COM2	Option

(*) Automatically assigned by the BIOS.

4.6 BIOS Setup

The BIOS stores the system configuration information in the SPI-ROM. When the system configuration is modified, it may be necessary to change the BIOS settings.

< NOTE >

When the equipment is shipped, the BIOS is configured in accordance with the system configuration.

If the BIOS settings are changed, the system may not operate stably or may not start properly. Pay sufficient attention when you change the BIOS settings.

(1) Starting the setup menu

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

Turn on the power switch (see “2.1 Display and User Input Sections”). Messages related system initialization will be displayed. Press the F2 key to launch the setup menu.

(2) Maneuvering through the setup menu

Use the following keys to maneuver through the menu.

Key name	Description
Esc	Used for exiting the setup or returning from a lower menu to a higher menu.
← or →	Used for selecting a menu or selecting a menu group displayed at the top of the screen.
↑ or ↓	Used for selecting an item or selecting a sub-item under a menu group.
+ or -	Used for selecting a value for the setting. By pressing those keys, the setting switches among the available options.
Space	Used for selecting a value for the setting. If there are only two available options, the setting toggles when you press the key.
Tab	When you configure the date and time, by pressing this key, the focus moves between setting items, for example, from month to day and from hour to minute.
Enter	Used for moving from a higher menu to a lower menu, exiting the setup (saving data to the SPI-ROM), or 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 date and time.

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

Power: You can configure the automatic power shutdown at failure detection, the operating mode for when the power is turned on, and others settings.

Boot: You can configure the priority order of the devices from which an OS is booted.

Exit: You can save modified configuration information to the SPI-ROM, reset configuration information back 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 up in each menu.

(1/3)

Top menu	Setting item		Default value	Note	
Main	System Date			When you set the system up for the first time, be sure to configure these two items.	
	System Time				
	DRIVE1		(Automatically recognized)	(*1)	
	DRIVE2		(Automatically recognized)		
	DRIVE3		(Automatically recognized)		
	DRIVE4		(Automatically recognized)		
	OPTION PORT		(Automatically recognized)		
	OPTION PORT		(Automatically recognized)		
	Boot Options	Beep on boot		Disabled	This setting only turns the beep sound on and off at startup. The beep sound for indicating failure is not affected by this setting and is always on.
		Reset button function		Reset	Configures the function of the reset switch. If you change the setting to NMI (Non-Maskable Interrupt), you can change the reset switch to an NMI switch. (*2)
		QuickBoot Mode		Disabled	If you change the setting to Enabled, you can skip the memory check and the startup time will be shortened. In normal operation, specify Disabled for the setting.
		Correctable ECC Error		Pass	Specifies whether to display a message and pause the startup or to ignore the error and proceed with the startup when a Correctable ECC Error is detected.
	System Memory		(Automatically recognized)		
Extended Memory		(Automatically recognized)			

(*1) The DRIVE1 through 4 and OPTION PORT are assigned as indicated in the table below.

(*2) A setting change to "NMI" gives you more chances of non-maskable interrupt, thereby increasing the possibility of successful memory dump initiated by the reset button at an error occurrence during OS startup/shutdown.

For information about a memory dump, see "7.2 Collecting a Memory Dump".

• Model: HJ-754*****A (A model)

Name recognized by the BIOS	DRIVE1	DRIVE2	DRIVE3	DRIVE4	OPTION PORT
Connected device	Drive bay 1	Drive bay 2	Drive bay 3	DVD drive	General purpose 5-in bay device

• Model: HJ-754*****D (D model)

Name recognized by the BIOS	DRIVE1	DRIVE2	DRIVE3	DRIVE4	OPTION PORT
Connected device	Not Installed	Not Installed	Drive bay 3	DVD drive	General purpose 5-in bay device

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(2/3)

Top menu	Setting item		Default value	Note	
Advanced	PCI Configuration	PCI Express Device Slots #1 through 5	Enable Master	Enabled	
			Option ROM Scan	Enabled	Specifies whether to execute the extension ROM. If you specify Disabled for this setting, the extension ROM will not be executed.
			Link Speed	Auto	
		PCI Device Slots #6 through 8	Enable Master	Enabled	
			Latency Timer	0040h	
			Option ROM Scan	Enabled	Specifies whether to execute the extension ROM. If you specify Disabled for this setting, the extension ROM will not be executed.
		PCI Parity Error Detection		Enabled	
	I/O Device Configuration	Serial port A		Enabled	Do not change this setting.
		Base I/O address		3F8h	
		Interrupt		IRQ4	
		Serial port B		Enabled	
		Base I/O address		2F8h	
		Interrupt		IRQ3	
	Core Multi Processing			Enabled	
	EIST			Enabled	
	Turbo Boost			Disabled	
	No Execute Mode Mem Protection			Enabled	
	SATA Mode			AHCI	
	Above 4GB MMIO BIOS Assignment			Disabled	
	MMIO Range			Dynamic	
Legacy USB Support			Enabled	Specifies whether to activate USB devices. If you specify Disable for this setting, you can use a USB keyboard only for the setup menu and after Windows® starts.	
Front USB Port			Enabled	You can change the setting of the front USB port to enable or disable.	
UEFI Boot			Disabled	Do not change this setting.	
Enter BIOS Update Mode			No	When you update the system BIOS, you must specify Yes for this item. Use the default setting except when you update the system BIOS.	

Top menu	Setting item	Default value	Note
Power	After AC Power ON	Auto	<p>Specifies the action when the power to the equipment is turned on.</p> <p>Stay Off: When the power is turned on, the system goes into the soft power off mode.</p> <p>Power On: When the power is turned on, the OS is started automatically.</p> <p>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.</p> <p>For information about the precautions to be observed when the power from the backup battery is not available, see "PRECAUTION 11. PRECAUTIONS ABOUT THE BIOS SETTINGS".</p>
	FAN failure detection	Enabled	<p>Specifies whether the until will detect a fan failure when the power is turned on.</p> <p>Do not change this setting.</p>
	Power saving mode	Disabled	<p>Specifies whether to launch the OS in the power saving mode.</p> <p>Do not change this setting.</p>
Boot	Boot Priority Order	<ol style="list-style-type: none"> 1. USB FDD 2. SATA CD /DVD 3. USB CD 4. DRIVE1 5. DRIVE2 ! 6. DRIVE3 7. PCI SCSI ! 8. OPTION PORT ! 9. USB HDD 10. Internal Shell 	<p>Configures the priority order of the devices from which an OS is booted.</p> <p>Do not change this setting.</p>
Exit	Exit Saving Changes		Saves the changes you made in the setup into the SPI-ROM and reboots the system.
	Exit Discarding Changes		Discards the changes you made in the setup and reboots the system with the configuration you saved in the SPI-ROM last time.
	Load Setup Defaults		<p>Loads the BIOS default settings.</p> <p>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".</p>

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(5) Restoring the default settings

When you want to restore all items in the setup menu back to the default settings, follow the procedure below:

1. Start the setup menu. (See “(1) Starting the setup menu”.)
2. Open **Exit** in the top menu. Move the cursor to **Load Setup Defaults** and press **Enter**.
3. The message, “Load default Configuration now?” is displayed. Press **Enter**.
4. Open **Exit** in the top menu again. Move the cursor to **Exit Saving Changes**. Press **Enter**.
5. The message “Save configuration changes and exit now?” is displayed. Press **Enter**. This completes the procedure.

4.7 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 using a backup battery even when the system power is off.

Table 4-1 Hardware System Clock Specification

Item	Specifications
Time function	Hour/Minute/Second (24-hours clock)
Date function	Year/Month/Date
Precision	± 4 seconds per day (*)
Battery backup	Lithium battery

(*) Rough estimates when the ambient temperature is 25°C.

For your information, the system program normally 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.

4. SPECIFICATIONS

4.8 Interface Specifications

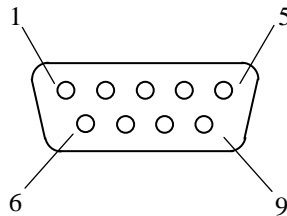
4.8.1 Connector specifications

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

For information about the location of the ports, see “2.1 Display and User Input Sections”.

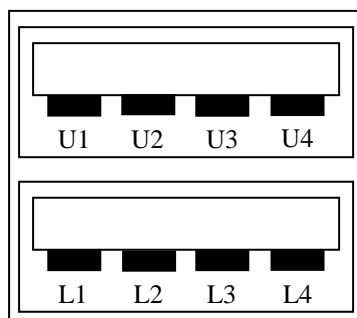
(1) Motherboard (Standard)

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



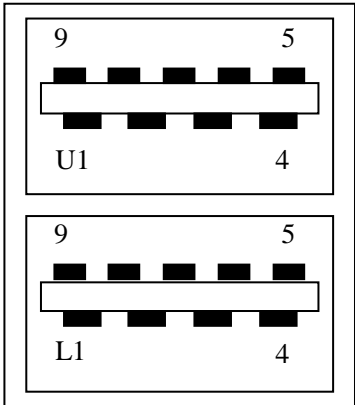
Pin No.	Signal name	Pin No.	Signal name
1	CD	6	DSR
2	RD	7	RTS
3	TD	8	CTS
4	DTR	9	RI
5	GND		

- USB2.0/1.1 port (front and rear)



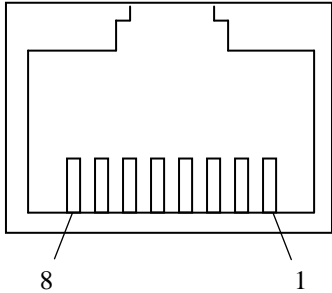
Pin No.	Signal name
U1	+5V
U2	USBD1-
U3	USBD1+
U4	GND
L1	+5V
L2	USBD0-
L3	USBD0+
L4	GND

- USB3.0/2.0/1.1 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+

- Built-in LAN port (RJ-45 modular port 8 pins)



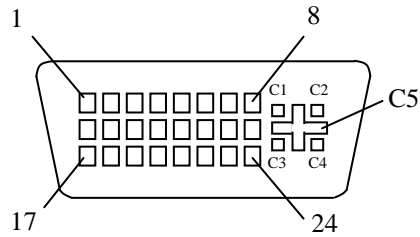
Pin No.	Signal name
1	TRD0+
2	TRD0-
3	TRD1+
4	TRD2+
5	TRD2-
6	TRD1-
7	TRD3+
8	TRD3-

For network connection, use a cable specified as follows.

Cable specification: UTP cable (twisted-pair cable without shield) category 5e or 6

4. SPECIFICATIONS

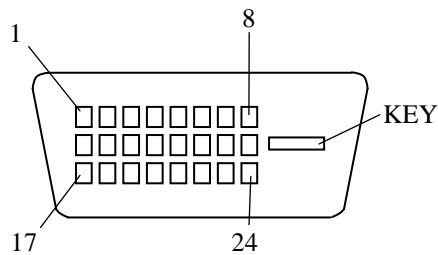
- Video port (DVI-I 29 pins, inch screws)



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(TX3M)	20	NC(TX5M)
5	NC(TX4P)	13	NC(TX3P)	21	NC(TX5P)
6	DDCCLK2	14	P5DFP	22	SGND
7	DDCDAT2	15	PGND	23	TXCP
8	V-Sync	16	NC(SENSE)	24	TXCM

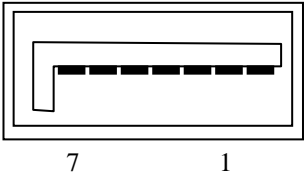
Pin No.	Signal name
C1	R
C2	G
C3	B
C4	H-Sync
C5	RGB-GND

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



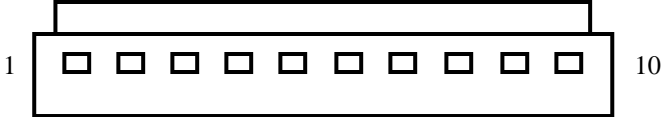
Pin No.	Signal name	Pin No.	Signal name	Pin No.	Signal name
1	TX2M	9	TX1M	17	TX0M
2	TX2P	10	TX1P	18	TX0P
3	SGND	11	SGND	19	SGND
4	NC(TX4M)	12	NC(TX3M)	20	NC(TX5M)
5	NC(TX4P)	13	NC(TX3P)	21	NC(TX5P)
6	DDCCLK2	14	P5DFP	22	SGND
7	DDCDAT2	15	PGND	23	TXCP
8	V-Sync	16	NC(SENSE)	24	TXCM

- Internal SATA (connected by using an optional harness connector for the general purpose 3.5-in bay)



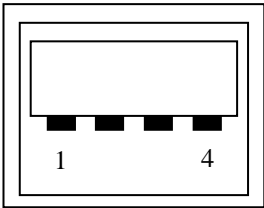
Pin No.	Signal name
1	GND
2	SATA_TXP
3	SATA_TXN
4	GND
5	SATA_RXN
6	SATA_RXP
7	GND

- Internal power connector (connected by using an optional harness connector for the general purpose 5-in bay)



Pin No.	Signal name	Pin No.	Signal name
1	GND	6	GND
2	+12V	7	+5V
3	+12V	8	GND
4	+12V	9	+3.3V
5	+12V	10	GND

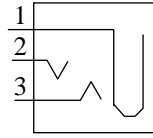
- Internal USB port



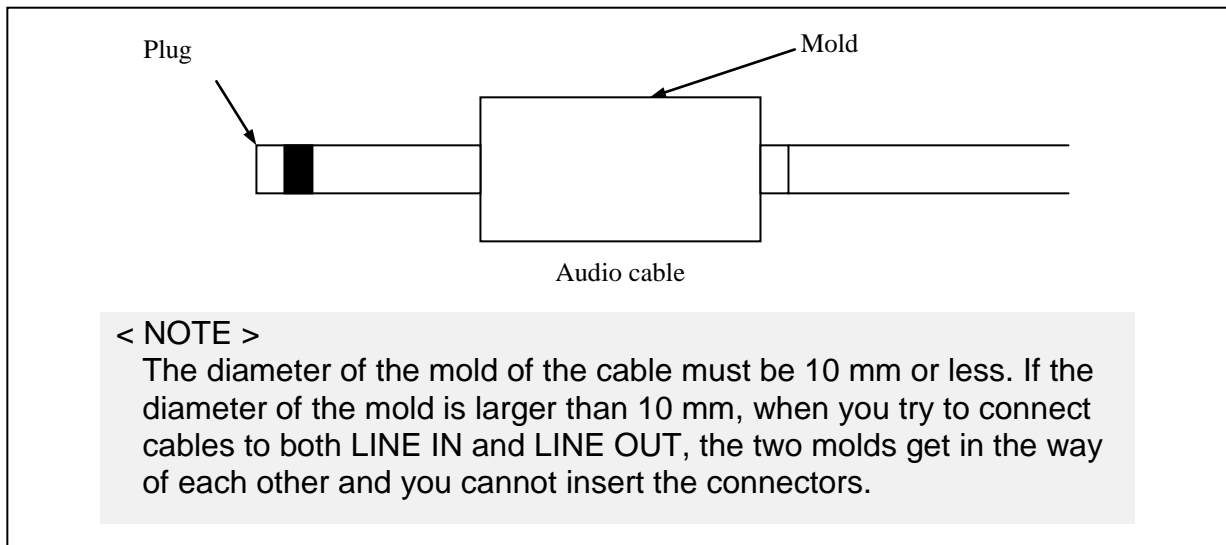
Pin No.	Signal name
1	+5V
2	USB-
3	USB+
4	GND

4. SPECIFICATIONS

- Audio port: LIN and LOU (3.5φ stereo audio port)



LIN		LOUT	
Pin No.	Signal name	Pin No.	Signal name
1	AGND	1	AGND
2	LIN_L	2	LOUT_L
3	LIN_R	3	LOUT_R



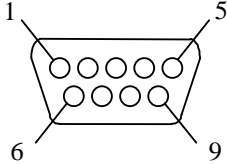
(2) Extended serial port (HJ-7806-11) (optional) Note: Serial port only

External control I/O port (HJ-7805-21, HJ-7805-22) (optional)

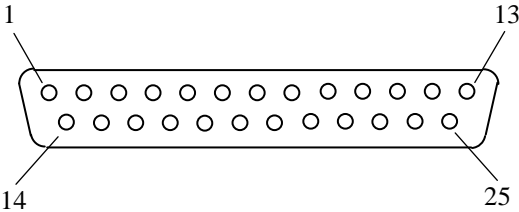
Note: Serial port and RAS external control I/O port

- Serial port (male connector, inch screws)

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		



- External control I/O port (male connector, inch screws)



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	RMTPWON_2 /GENDI2_2
7	RMTSTDN_1 /GENDI_1	20	RMTSTDN_2 /GENDI_2
8	RMTRESET_2	21	GENDI1_2
9	CPUSTOP_2	22	GENDI0_2
10	GENDO2_2	23	CPUSTOP_1
11	RMTRESET_1	24	GENDO2_1
12	GENDI1_1	25	GND
13	GENDI2_1		

4. SPECIFICATIONS

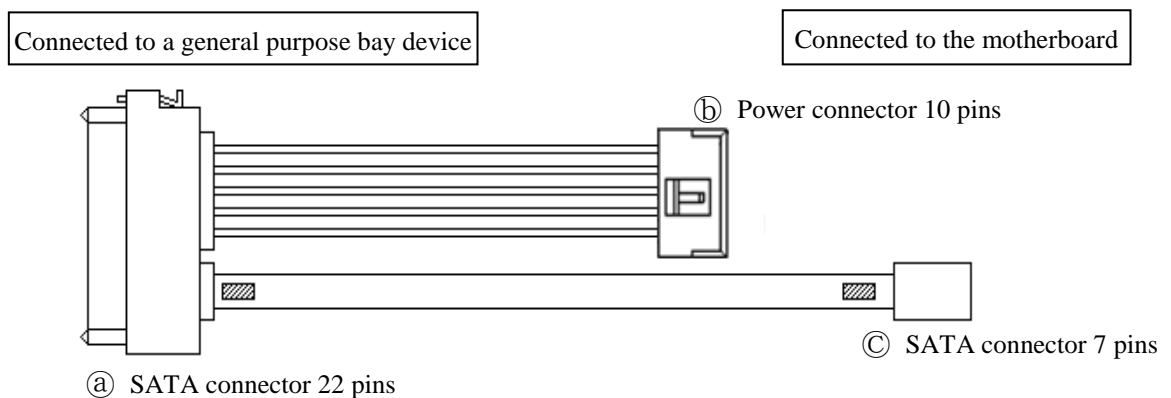
(3) Signal and power harness specifications

The general purpose 5-in bay harness set (HJ-7969-15) consists of the following parts.

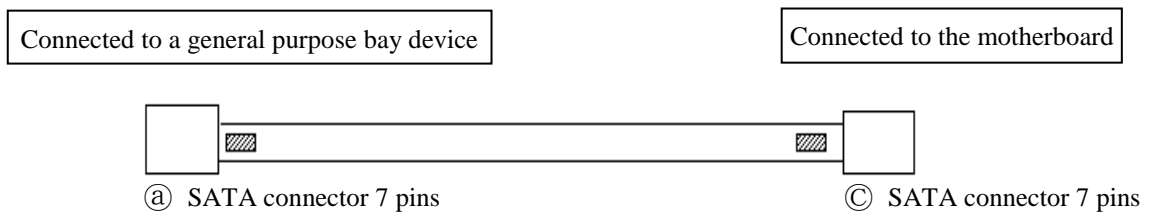
No.	Product name	Specification
[1]	SATA harness (signal and power)	Combination of SATA signal and power cables
[2]	SATA harness (signal)	SATA signal
[3]	Power harness	Provides +3.3 V, +5 V and +12 V, 10-pin peripheral connector

Exterior view

[1] SATA harness (signal and power)

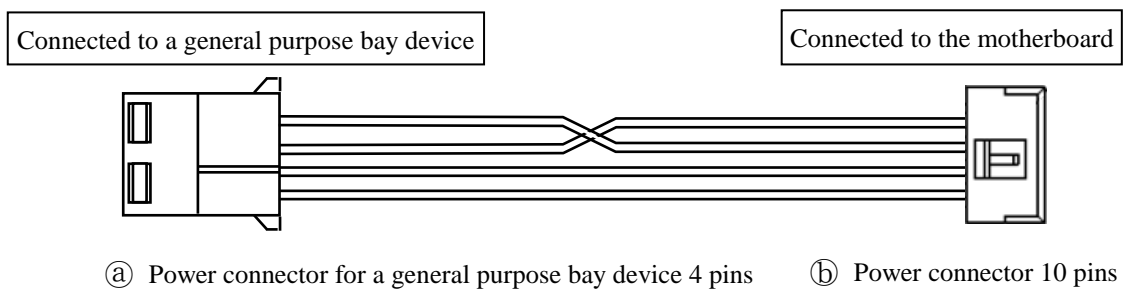


[2] SATA harness (signal)



(Note) The same connector is used for both ends.

[3] Power harness



4.8.2 External control specifications

(1) External control I/O port (EXT) specifications

Item	Subitem		Specification
External control input	Usage		RMTRESET, RMTSHTDN (GENDI), GENDI0, GENDI1, and GENDI2 (RMTPWRON) (*1) (*2)
	Electrical interface	Interface	Non-voltage transistor contact
		Contact current	1 mA/point
		Applicable load	<ul style="list-style-type: none"> • Relay (gold-plated twin contact) • Switch • Isolated open collector
External control output	Usage		CPUSTOP, WDTTO, PSDOWN, MCALL, GENDO0, GENDO1, and GENDO2
	Electrical interface	Interface	PhotoMOS relay contact
		Load voltage	Up to 40 VDC (external power supply required)
		Load current	Steady-state: Up to 0.1 A/point Inrush: Up to 0.6 A/point, 100 ms
		Dielectric strength	250 VAC, one minute
		Applicable load	<ul style="list-style-type: none"> • Relay (clamp diode required) • Buzzer • Indicator • Semiconductor device

(*1) 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 “5.5 Enabling the Remote Power On Function”.

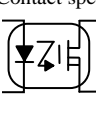
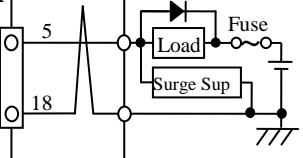
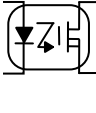
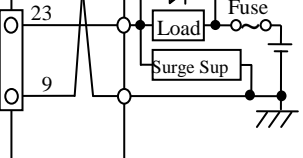

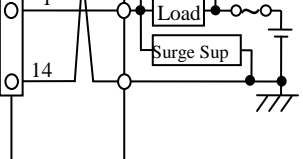

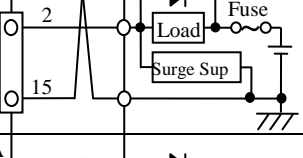
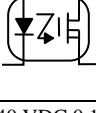
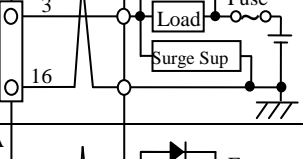

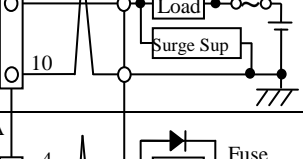
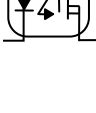
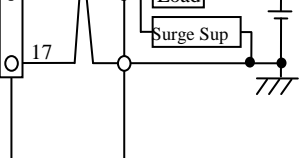
(*2) When you use an RMTPWRON function, make sure no noise is added to the external contact.

If the contact is closed for 15 ms or more during the soft power off mode due to noise or other reasons, the power may be turned on unexpectedly. As a side note, while the OS or BIOS is running after power on, the RMTPWRON function is disabled and the contact can be used as a GENDI2 input.

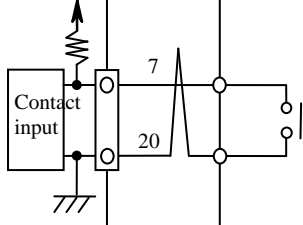
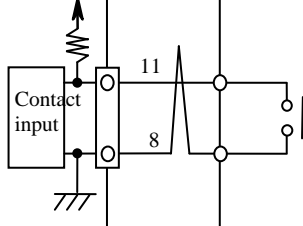
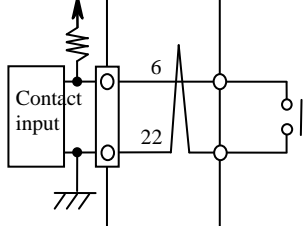
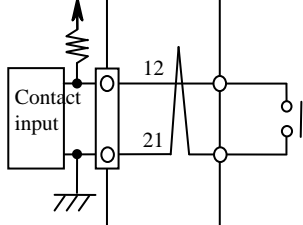
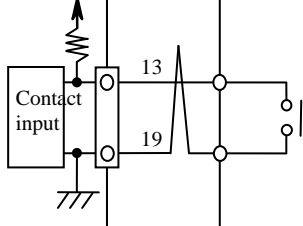
4. SPECIFICATIONS

(2) List of external contact I/O signals

(1/2)

Signal name	Connection diagram			Meaning	HJ-7805-21 B contact specifications	HJ-7805-22 A contact specifications
	CPU side	Terminal No.	User side			
PSDOWN_1 PSDOWN_2	40 VDC 0.1A Contact spec 	5 18		Activated when the OS is shut down (standby or the main power is off) or when power is not supplied to the equipment.	When the power is off Contact closed (B contact)	When the power is off Contact open (A contact)
CPUSTOP_1 CPUSTOP_2	40 VDC 0.1A Contact spec 	23 9		Activated when the OS, application, device driver, or the like cannot run properly due to an abnormally high system load or has crashed.	When the power is off Contact closed (B contact)	When the power is off Contact open (A contact)
MCALL_1 MCALL_2	40 VDC 0.1A Contact spec 	1 14		This is a maintenance request signal. This contact is activated when the temperature, the fan status or one side of mirrored disks (D model only) is abnormal.	When the power is off Contact open (A contact)	When the power is off Contact open (A contact)
GENDO0_1 GENDO0_2	40 VDC 0.1A Contact spec 	2 15		These are general-purpose contact output signals. A user can assign a function to each one of the contacts GENDO0 through GENDO2.	User-defined	User-defined
GENDO1_1 GENDO1_2	40 VDC 0.1A Contact spec 	3 16			When the power is off Contact open (A contact)	When the power is off Contact open (A contact)
GENDO2_1 GENDO2_2	40 VDC 0.1A Contact spec 	24 10			User-defined	User-defined
WDTTO_1 WDTTO_2	40 VDC 0.1A Contact spec 	4 17		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.	When the power is off Contact Closed (B contact)	When the power is off Contact open (A contact)
					When watchdog timer timeout occurs or when CPU power is off Contact closed	When watchdog timer timeout occurs or when CPU power is off Contact open

(2/2)

Signal name	Connection diagram			Meaning	HJ-7805-21 B contact specifications	HJ-7805-22 A contact specifications
	CPU side	Terminal No.	User side			
RMTSHTDN_1 (GENDI_1) RMTSHTDN_2 (GENDI_2)	5V(VCC) 	7 20		This is a shutdown request signal or a general purpose input signal. When this contact is closed, the OS will be shut down. A user can select which signal to use. (*1)		-
RMTRESET_1 RMTRESET_2	5V(VCC) 	11 8		This is a reset request signal. When this contact is closed, the equipment is hard-reset. (*1)		-
GENDIO_1 GENGIO_2	5V(VCC) 	6 22		These are general purpose input signals. A user can assign a task to each one of the inputs GENDIO and GENDI1.		-
GENDI1_1 GENDI1_2	5V(VCC) 	12 21				-
GENDI2_1 (RMPWRON_1) GENDI2_2 (RMPWRON_2)	5V(VCC) 	13 19		This is a general purpose input signal. A user can assign a task to contact GENDI2. This input can also be used for the remote power on function. (*2)		-

(*1) You can use a pulse input for the RMTSHTDN contact and the RMTRESET contact. When you use a pulse, the contact must be closed for at least 500 ms. Note that these two signals should not be closed at the same time.

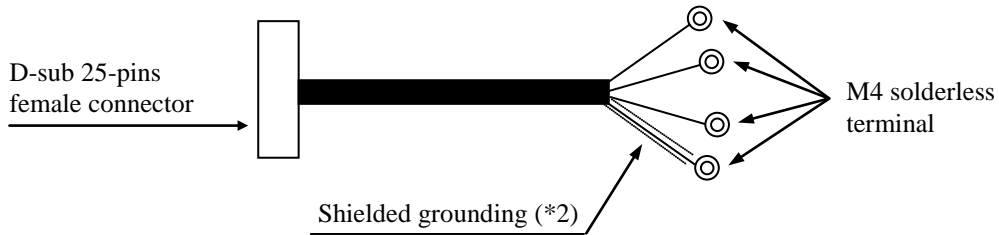
(*2) Use a pulse input for the RMPWRON contact. Close the contact for at least 100 ms and open it after about 4 seconds or less. If you shut down the system with this contact closed, the system will start as soon as the system goes into the soft power off mode. For information about the location of JP2 pin, see “5.5 Enabling the Remote Power On Function”.

4. SPECIFICATIONS

(3) Recommended EXT cable specifications

1. For connection, the following cable is required.

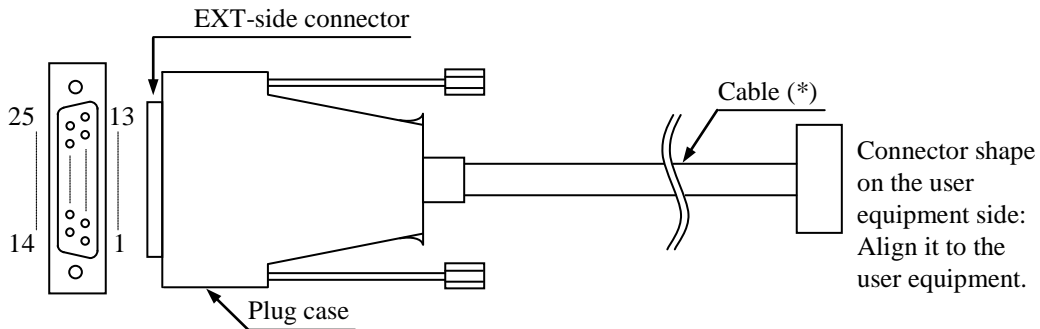
Model: HJ-7805-C1-XX, where the XX part shows the length. (*1)



(*1) The maximum cable length is 30 m.

(*2) To connect a cable shield, beside the cable, you must provide a shielded grounding bar dedicated for a shielded wire connection.

2. When a user makes a cable, the user must follow the specifications below.



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 may malfunction.)

- Cable specification (recommended cable)

Item	Specifications	Note
Maximum cable length	30 m	
Electric shield of the cable	Required	Connected to the frame ground

4.8.3 External interface cable length specifications

(1) External interface cable length specifications

The recommended maximum cable length for each interface of this equipment is as follows.

No.	Connector name	Cable length (m)	Remarks
1	Digital video DVI-I port	2	
2	Digital video DVI-D port	2	
3	LAN port	100	UTP Category 5e or better
4	External control I/O port (optional)	30	For information about the cable specifications, see “4.8.2 (3)”.
5	Serial port (COM1)	15	Use a shielded cable.
6	Serial port 2 (COM2) (optional)		
7	Front USB2.0/1.1 ports (2 ports)	1	Use a USB 2.0 compliant shielded cable. If you use an extension cable, connected USB devices may not work properly.
8	Rear USB2.0/1.1 ports (4 ports)	3	
9	Rear USB3.0/2.0/1.1 ports (2 ports)	2	Depending on a device to connect, 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 may not work properly.
10	Audio (LINE IN/LINE OUT)	2	

A connected device may not work properly depending on the device. Check proper operation of the device before you use it.

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CHAPTER 5 CHECKUP AND MAINTENANCE

5.1 Daily Checkup



WARNING

Make sure to install a dust filter to equipment. If you do not, dusts enter into the equipment and the short circuit fire may occur as a result.



CAUTION

Before you clean or replace the dust filter or the case fan of this equipment, make sure you shut down the OS, disconnect the plug of the power cord from the outlet, and wait for at least one minute. Otherwise, the injury of hands and fingers may result.

NOTICE

- Before you move this equipment, make sure you shut down the OS, disconnect the plug of the power cord from the outlet, and wait for at least one minute. If you do not, the HDDs and other devices may fail.
- When you transport or carry the equipment, pack it in the dedicated container (container and packing materials used when the equipment was delivered). If you use other container or packing materials, that may damage the equipment.
- Do not use damaged or broken dedicated container when you transport or carry the equipment. If you do, that may damage the equipment.
- If you install the equipment in a mounting chassis or rack with casters, the equipment may be subjected to excessive vibration or shock when it is transported or moved and that may cause the equipment to fail. In order to avoid failure, you must select or design a chassis or rack that satisfies the installation environment requirements of the equipment and be cautious about vibration and shock when you move, transport, or carry the installed equipment.

(1) Cleaning a dust filter

NOTICE

If you wash a dust filter, dry it completely before re-attaching it to the equipment. If you use the equipment while its dust filter is not completely dry, the equipment may fail. When you use a detergent to clean a dust filter, make sure you use a neutral detergent. If you use other types of detergent, the dust filter may lose its function.

- **Frequency**

Clean a dust filter between once per month and once per three months depending on the amount of dust in the environment.

- **Procedure**

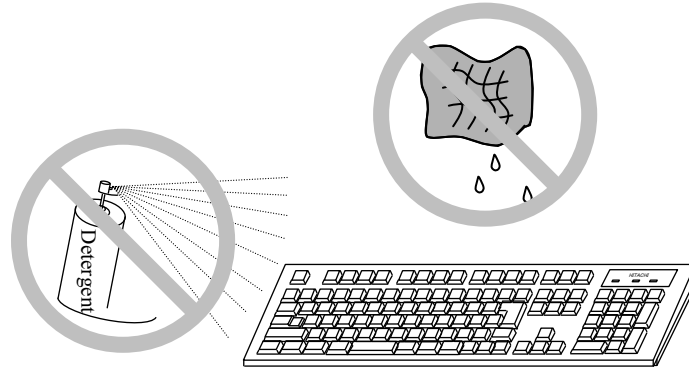
1. Shut down the OS.
2. Unplug the power cord from the outlet. Wait for at least one minute before you start cleaning.
3. Take out the dust filter located on the front panel. Then dust or wash the filter. If you wash the filter, wait until the filter is completely dry. Then re-attach it to the equipment.

For how to install and remove a dust filter, see “5.4.10 Installing and removing a dust filter”.

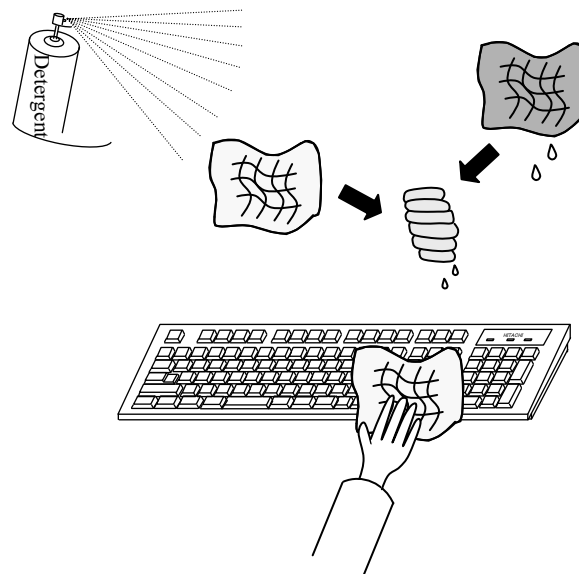
(2) Cleaning a keyboard (optional)

When you clean a keyboard, make sure you follow the instructions below:

- Do not spray detergent directly on to the keyboard or spill liquid detergent on it.
- Do not wipe the keyboard with a wet cloth. If you do, the equipment may fail.



- When you use 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 use of the detergent.
- Cover the whole keyboard with gauze, spray detergent all over it, leave it for a couple of minutes, and wipe off the keyboard.

**< NOTE >**

- For information about the precautions for USB devices, see “PRECAUTIONS 6. USB DEVICE”.

5. CHECKUP AND MAINTENANCE

5.2 Periodic Checkup

The table below shows how to check up the Equipment periodically. A qualified maintenance personnel must conduct this periodical checkout. Include the checkout time in the system operation schedule.

Checkup item	Frequency	Note
Collection of logging information	Once per year	
Inspection and cleaning for the components <ul style="list-style-type: none"> • Inspection and cleaning for inside and outside of the equipment • Inspection of fan rotation, dust removal • Removal of foreign objects that have entered the equipment • Other general inspection items 	Once per year	
Replacing dust filters	Once per year	
Measuring the power voltage	Once per year	
Operation check <ul style="list-style-type: none"> • Operation check of switches and indicators • Operation check by using test programs 	Once per year	
Periodic replacement of replacement components (*)	As required	
Routine checkup <ul style="list-style-type: none"> • Cleaning the keyboard • Cleaning dust filters 	Between once per month and once per three months	For details, see section “5.1 Daily Checkup”.

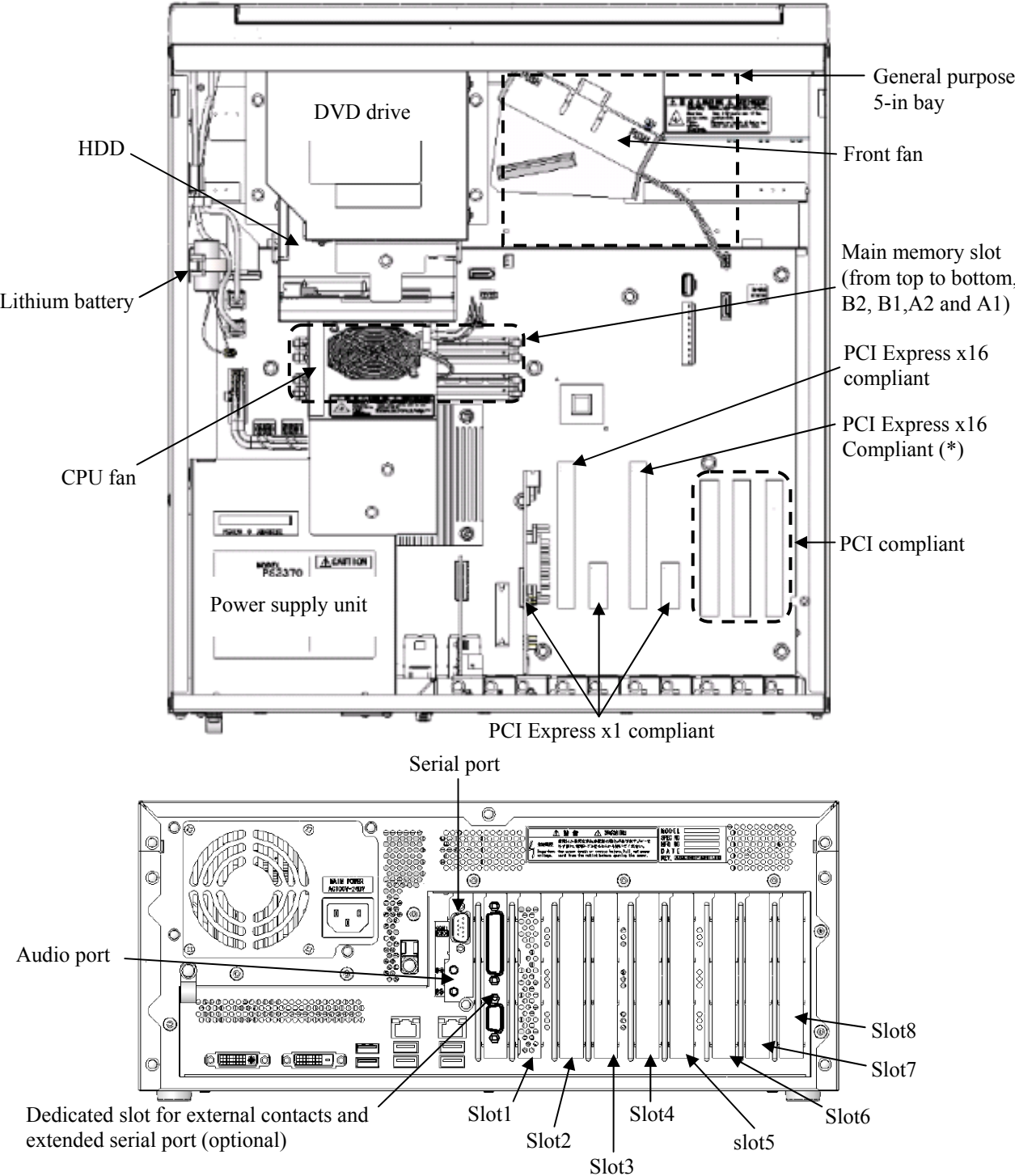
(*) For details about how to handle replaceable components, see “APPENDIX HANDLING REPLACEABLE COMPONENTS”.

5.3 Replacing a Component

* The figure in this section shows the installation location and work procedure at the time of replacement, and although the actual appearance might differ from the figure, the location and work procedure do not change.

5.3.1 Types and locations of installed components

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



(*) A PCI Express x16 connector is used but the internal connection is equivalent to PCI Express x4.

Figure 5-1 Types and Locations of Installed Components

5.3.2 Installing and removing the cover of the equipment



CAUTION

When you install the cover of the equipment, do not put your fingers inside the cover. If you do, your fingers may get caught and injured.

(1) Removing the cover of the equipment

[1] Remove the three screws on the rear of the equipment.

[2] Slide the cover to the rear of the equipment.

[3] Slightly pull the sides of the cover apart from the body of the equipment and then lift the cover up and away.

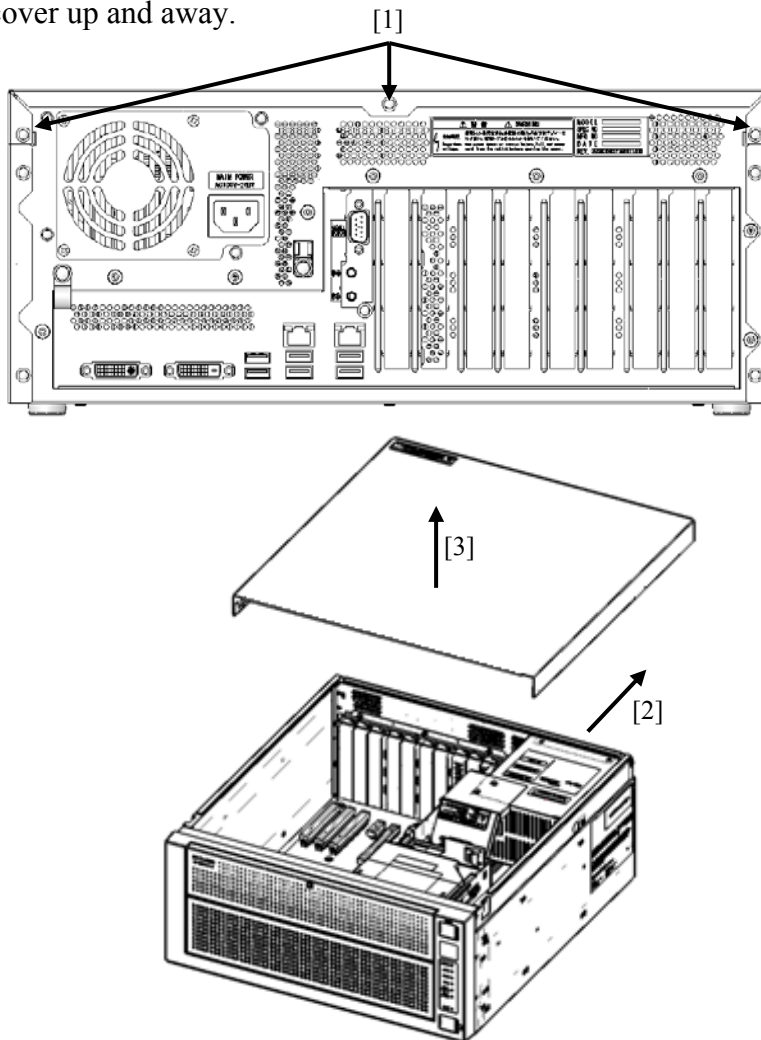


Figure 5-2 Removing the Cover of the Equipment

(2) Installing the cover of the equipment

When installing the cover of the equipment, reverse the procedure described in “(1) Removing the cover of the equipment.”

5.3.3 Installing and removing an extension board



WARNING

Before you install or remove an extension board, make sure you shut down the OS, turn off the main power to the equipment, and wait for at least one minute. If you install or remove an extension board without shutting down the power, an electric shock or a fire may result.



CAUTION

Do not directly touch the parts inside the equipment with your hand when you install or remove an extension board. Those parts are hot and if you touch them, you may get burned. In addition, if you touch them, they may get damaged and that may result in failure of the equipment.

NOTICE

Make sure you disconnect all external cables connected to the equipment before you install or remove an extension board. Otherwise, failure of the equipment may result.

(1) Before installing or removing an extension board

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute.
- Allocate sufficient clearance for maintenance work. Carry out the work on a flat surface. (See “1.2.2 Installation”.)
- Wear cotton gloves when you install or remove an extension board.
- When you tighten or remove a screw, use a Phillips screwdriver (JIS #2) to avoid stripping the head.
- When you tighten a screw, drive the screw along the axis of the tapped hole without adding too much torque in order to avoid damaging the thread.
- For information about the location of the extension boards, see “Figure 5-1 Types and Locations of Installed Components”.
- Before installing or after removing the extension board, place the tip of the vacuum cleaner nozzle on the top of a connector where the extension board is (was) installed and clean the connector three times along the connection part.

< NOTE >

- For information about the precautions for extension boards, see “PRECAUTIONS 7. EXTENSION BOARDS”.

(2) Information about extension boards

1. Types of extension boards

The equipment has a total of eight extension slots (five PCI Express slots and three PCI slots).

- The PCI Express slots are compliant with PCI EXPRESS BASE SPECIFICATION REVISION 2.0.
- The PCI slots are compliant with PCI LOCAL BUS SPECIFICATION REVISION 2.1.

A back plate is required for a long-size PCI board. The user must provide the back plate.

Extension slot	Supported extension board
Slot 1	PCI Express x1 / full-height / half-size
Slot 2	PCI Express x16 / full-height / half-size
Slot 3	PCI Express x1 / full-height / half-size
Slot 4	PCI Express x16 / full-height / half-size (*1)
Slot 5	PCI Express x1 / full-height / half-size
Slot 6	PCI long-size / short-size (*2)
Slot 7	PCI long-size / short-size (*2)
Slot 8	PCI long-size / short-size (*2)

(*1) A PCI Express x16 connector is used but the internal connection is equivalent to PCI Express x4.

(*2) If the general purpose 5-in bay is used, depending on the size of the device, you may not be able to install an extension board if the device gets in the way.

2. Size of extension boards

The board sizes (length × height) in the PCI Express / PCI specifications are as follows (the height includes the connector):

- PCI Express specification
 - Half size: 167.65 × 111.15 (mm)
- PCI specification (not including a back plate)
 - Long size: 312.00 × 106.68 (mm)
 - Short size: 174.63 × 106.68 (mm)

(3) Installing an extension board**(a) Removing the cover of the equipment**

Follow the instructions in “5.3.2 Installing and removing the cover of the equipment” to remove the cover of the equipment.

(b) Removing a slot cover

Remove the screw on the slot cover of the slot you want to install the extension board in. Then remove the slot cover.

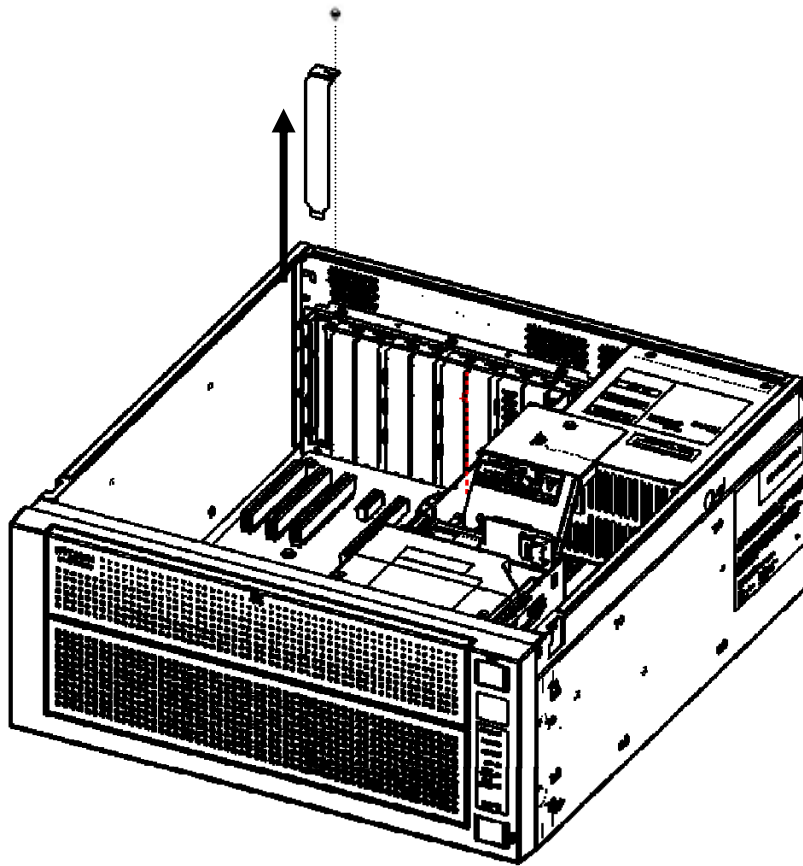


Figure 5-3 Removing a Slot Cover

5. CHECKUP AND MAINTENANCE

(c) Installing an extension board

- [1] Insert the extension board straight down into the extension board connector of the slot you want to use, pressing down on both side edges of the extension board.
- [2] Press down on the board at the position right above the connector of the board to insert the board completely.
- [3] Use a screw to secure the board to the equipment.
- [4] After that, follow the procedure for removing the cover of the equipment in reverse to re-install the cover.

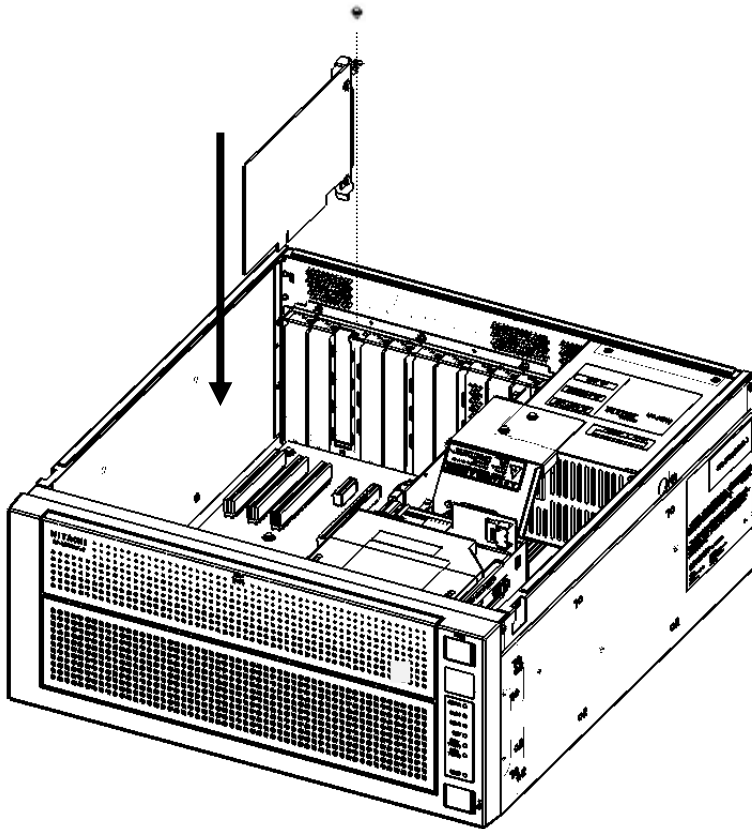


Figure 5-4 Installing an Extension Board

< NOTE >

- When you install an extension board, the boards next to it may get knocked loose. Check that those boards are inserted properly just to be sure.

(4) Removing an extension board

Follow the procedure described in “(3) Installing an extension board” in reverse to remove the extension board.

**CAUTION**

If you bend the tab of the grounding spring at the slot by mistake when you remove an extension board, be careful not to cut your fingers when you fix the bend because the tab has a sharp edge.

NOTICE

Always attach a slot cover to each unused slot and attach a connector cover to each unused connector. Otherwise, failure of the equipment may result.

< NOTE >

When you remove an extension board, its panel may get caught in the tab of the grounding spring at the slot and you may have difficulty removing the board. Even if this happens, do not pull the board forcibly.

5.3.4 Installing and removing main memory

 **WARNING**

Before you install or remove main memory, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute. If you install or remove main memory without shutting down the power, an electric shock or a fire may result.

 **CAUTION**

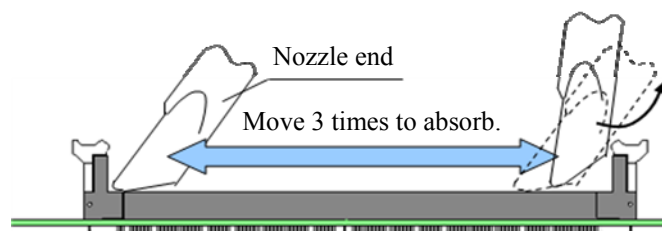
Do not directly touch the parts inside the equipment with your hand when you install or remove an extension board. Those parts are hot and if you touch them, you may get burned. In addition, if you touch them, they may get damaged and that may result in failure of the equipment.

NOTICE

Make sure you disconnect all external cables connected to the equipment before you install or remove main memory. Otherwise, failure of the equipment may result.

(1) Before installing or removing main memory

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute.
- Allocate sufficient clearance for maintenance work. Carry out the work on a flat surface. (See “1.2.2 Installation”.)
- Wear cotton gloves when you install or remove main memory.
- When you tighten or remove a screw, use a Phillips screwdriver (JIS #2) to avoid stripping the head.
- When you tighten a screw, drive the screw along the axis of the tapped hole without adding too much torque in order to avoid damaging the thread.
- For information about the location of the main memory slots, see “Figure 5-8 Types and Locations of Installed Components”.
- Before installing or after removing the main memory module, place the tip of the vacuum cleaner nozzle on the top of the connector where the main memory module is (was) installed and clean the connector three times along the connection part.



(2) Installing main memory

NOTICE
<ul style="list-style-type: none">• The orientation of a main memory module on a connector is fixed. When you install a main memory module, make sure the orientation is correct. Otherwise, failure of the equipment may result.• Do not install main memory modules with different capacities on slot A1 (or A2) and slot B1 (or B2). If you do, the modules may not be recognized.

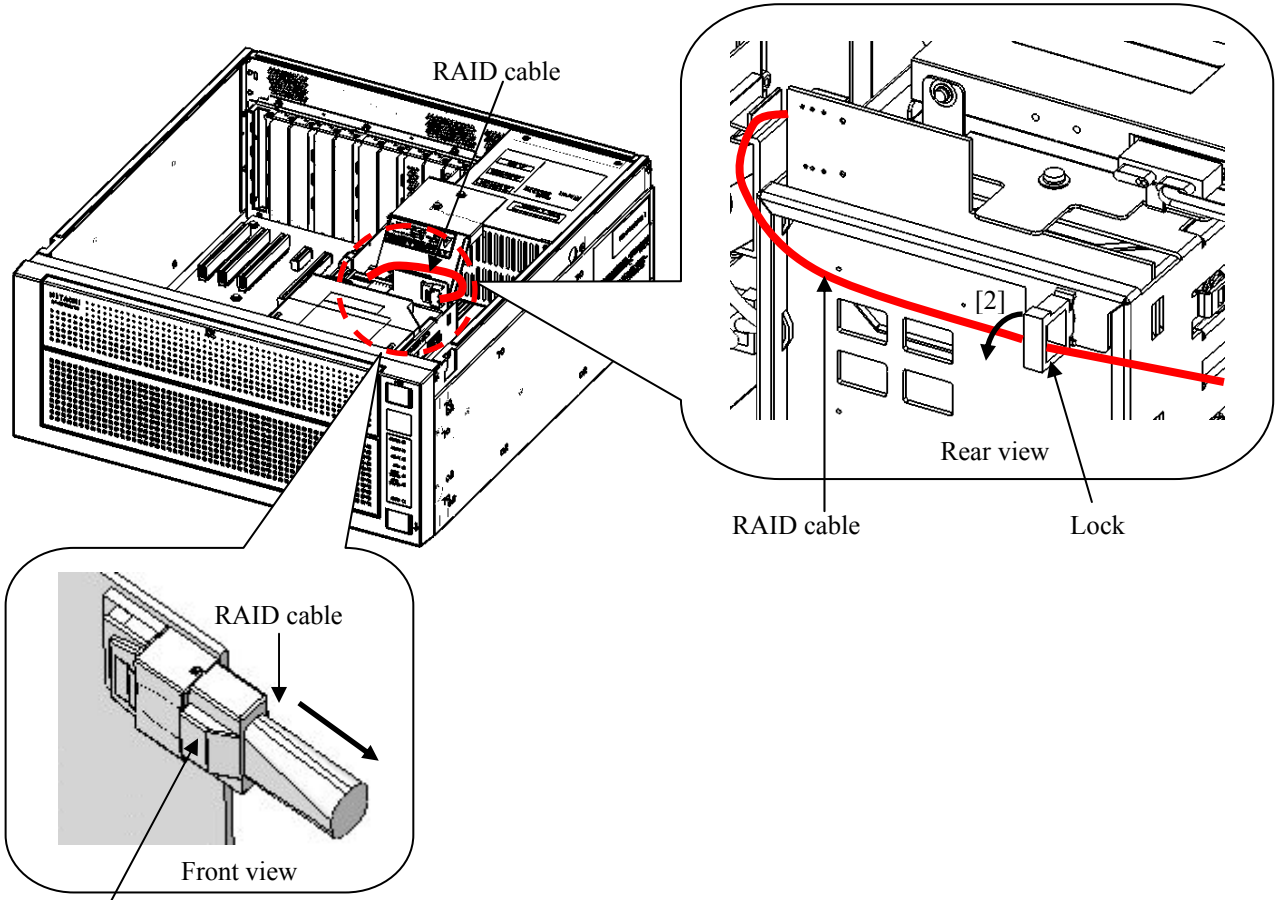
(a) Removing a cover of the equipment

Follow the instructions in “5.3.2 Installing and removing the cover of the equipment” to remove the cover of the equipment.

(b) Removing a RAID cable

On the D model, remove the RAID cable in the following procedure.

- [1] Remove the RAID cable from the connector while pressing and holding the connector lock.
- [2] Remove the RAID cable from the cable holder.



[1] Connector lock

Figure 5-5 Removing a RAID cable

NOTICE

When you install or remove a CPU fan, make sure you hold the CPU fan with your hand during the process lest the CPU fan falls and the components inside the equipment get damaged.

(c) Removing a CPU fan

- [1] Remove the power supply cable for the CPU fan from the motherboard.
- [2] Remove the two fixing screws for the CPU fan, and then remove the CPU fan itself.

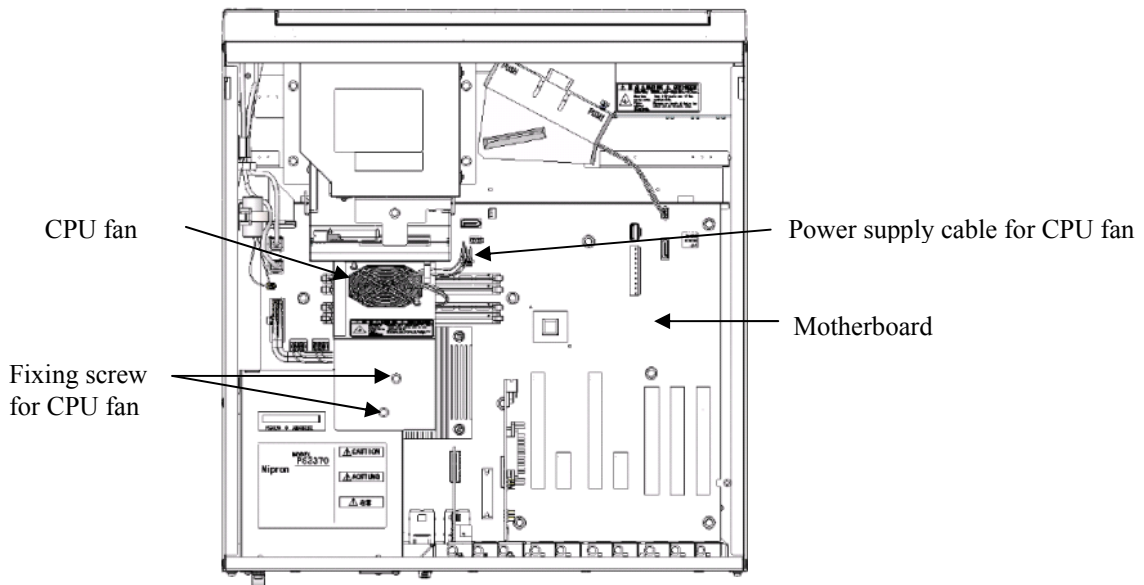


Figure 5-6 Removing a CPU fan

(d) Removing a memory cover

Open the connector levers in both sides of the target memory socket simultaneously, and extract the memory cover upward.

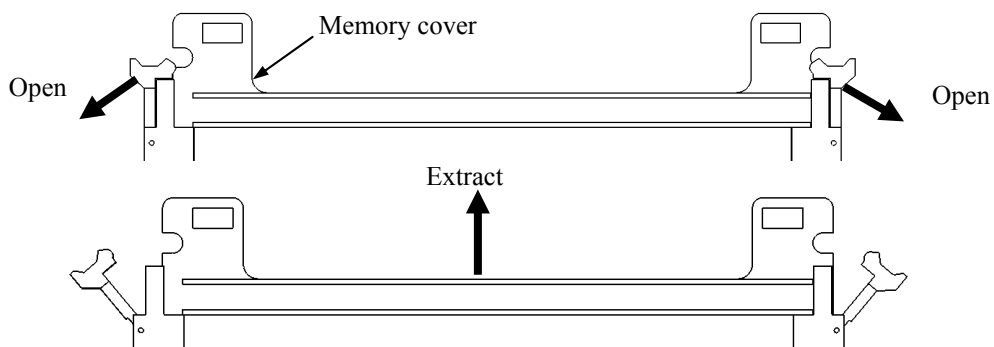


Figure 5-7 Removing a memory cover

< NOTE >

Keep the detached memory cover for future use.

(e) Installing a main memory

Insert the main memory module into the connector from right above the connector. When the module is fully inserted, you will hear a click.

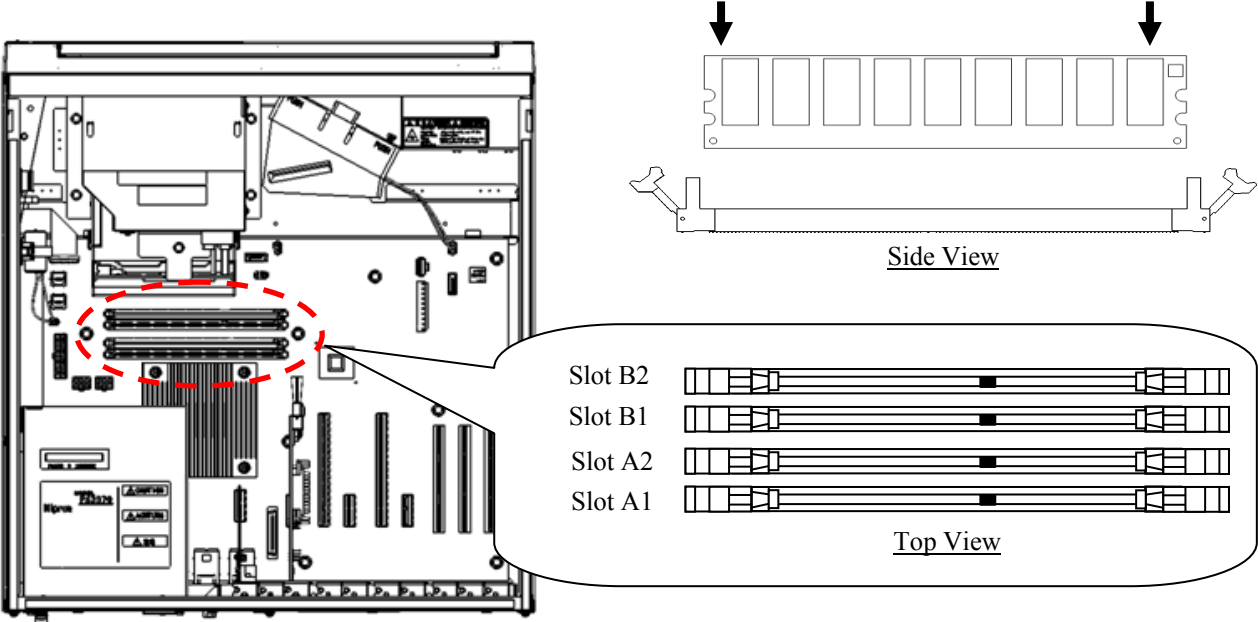


Figure 5-8 Installing a main memory

On this Equipment, only the following combinations are allowed.

The number of main memory	Slot A1	Slot A2	Slot B1	Slot B2	Total capacity
1	—	4GB	—	—	4GB
2	—	4GB	—	4GB	8GB
2	—	8GB	—	8GB	16GB
4	8GB	8GB	8GB	8GB	32GB

(f) Installing a cover of the equipment

Follow the instructions in “5.3.2 Installing and removing the cover of the equipment” to install the cover of the equipment.

(3) Removing main memory

NOTICE

After you remove main memory, make sure you attach a memory cover on each vacant slot. If you do not, a failure of the equipment may result.
--

Follow the procedure described in “(2) Installing main memory” in reverse to remove main memory.

(4) After installing or removing main memory

Reconfiguring the memory dump file settings

When you change the capacity of main memory, you must reconfigure the memory dump collection settings.

When you reconfigure the memory dump collection setting, see “7.3 When the Saving Memory Dump Confirmation Message is Displayed” for details.

5.3.5 Installing and removing an Inner panel



CAUTION

While you are installing an Inner panel, do not put your fingers inside the Inner panel. If you do, your fingers may get caught and injured.

(1) Removing an Inner panel

[1] Press the upper center of the front panel to open the cover.

[2] Pull and remove the Inner panel toward you while pressing and holding the two tabs on the lower part of the cover you opened in step [1].

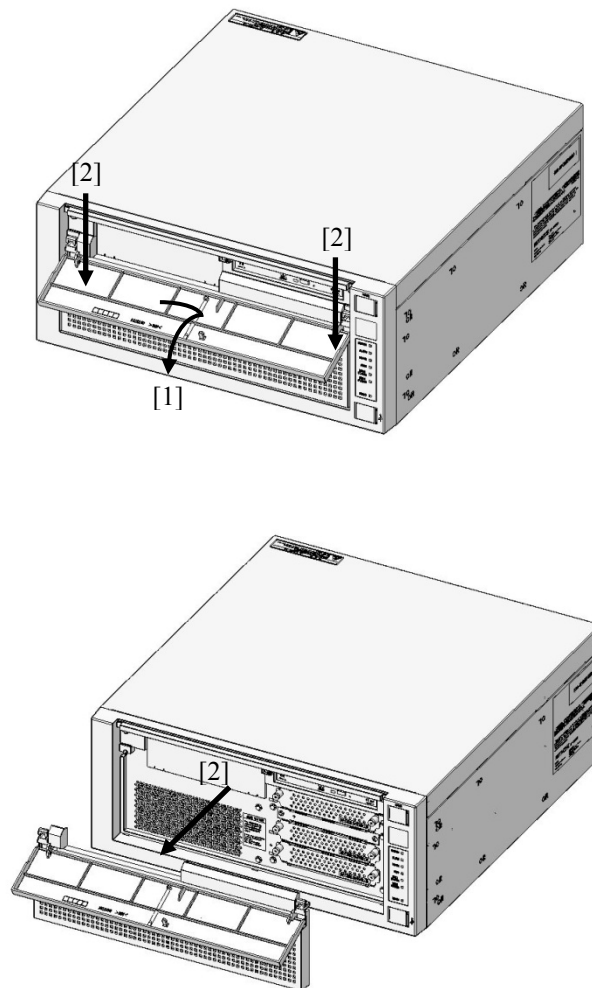


Figure 5-9 Removing an Inner panel

(2) Installing an Inner panel

Follow the procedure described in “(1) Removing an Inner panel” in reverse to installing an Inner panel.

5.3.6 Installing and removing an HDD



CAUTION

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute. Otherwise, an electric shock or failure of the equipment may result.
- When you install or remove a hard disk, make sure you do not cut your fingers on the protrusions.

NOTICE

- Put the HDD on a shock-absorbing material such as an antistatic cushion even for a temporary task. If you put an HDD directly on a hard surface such as a desktop, a failure or a shorter life span of the unit or loss of data may result due to possible jarring or shock.
- Never remove the screws on an HDD while the power to the unit is on. Never hot-swap HDDs. If you do either of these, failure of the equipment or the drive may result.
- Before you replace an HDD, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute.
- Install or remove an HDD only if necessary, for example, when you need to replace an HDD due to failure. If you do it frequently, failure of the equipment may result.
- Fully insert an HDD. Loose contact and missing screws may result in failure.
- Do not give a shock to an installing HDD and the already mounted hard disks during installing. If you give a shock to an HDD, failure of the drive may result

(1) Before installing or removing an HDD

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute.
- Allocate sufficient clearance for maintenance work. Carry out the work on a flat surface. (See “1.2.2 Installation”.)
- Wear cotton gloves when you install or remove an HDD.
- When you tighten or remove a screw, use a Phillips screwdriver (JIS #2) to avoid stripping the head. (When you use tamper-resistant screws, use a dedicated screwdriver for tightening and removing the screws.)
- When you tighten a screw, drive the screw along the axis of the tapped hole without adding too much torque in order to avoid damaging the thread.

< NOTE >

- For information about the precautions for hard disk drives, see “PRECAUTIONS 4. HARD DISK DRIVES (HDD)s”.

(2) Removing an HDD

- [1] Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute.
- [2] Follow the instructions in “5.3.5 Installing and removing an Inner panel” to remove an inner panel.
- [3] Release two set screws for the HDD case.
- [4] Hold two set screws for the HDD case and pull out the case.

< NOTE >

- When you pull out an HDD, make sure you do not apply too much force to the connector. Slowly pull out the hard disk in order not to subject the hard disk.
- When you connect an HDD to a connector, do not subject the HDD to shock or jarring.
- Make sure you mount a system disk in drive bay 1. Even if you mount a system disk in drive bay 2 by mistake, the OS may start, but other problems may arise, so you have to exercise extra caution for the mounting location of the HDD.
- When HDD1, HDD2 and HDD3 are installed, their capacities must be the same.

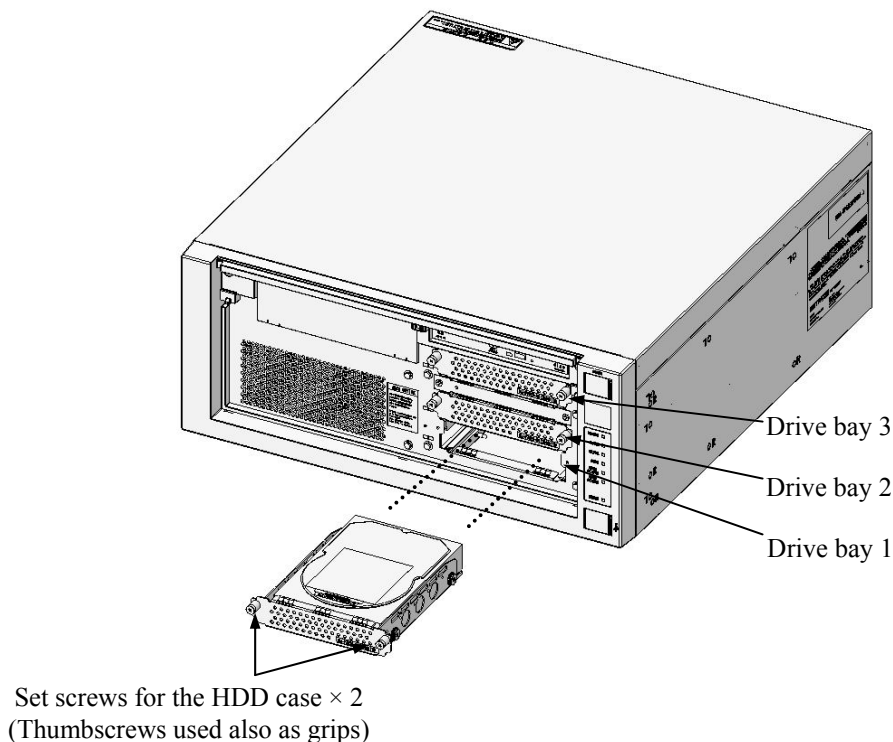


Figure 5-10 Removing an HDD



CAUTION

When you install or remove an HDD, make sure the drive bay number is correct. If you remove an HDD and install it in a different bay, a configuration information mismatch occurs and the equipment may not start or the data stored on the HDD may be lost.

(3) Installing an HDD

Follow the procedure described in “(2) Removing an HDD” in reverse to installing an HDD.

5.3.7 Installing and removing a DVD drive



CAUTION

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute. Otherwise, an electric shock or failure of the equipment may result.
- Do not directly touch the parts inside the equipment with your hand when you install or remove an extension board. Those parts are hot and if you touch them, you may get burned. In addition, if you touch them, they may get damaged and that may result in failure of the equipment.
- When you install or remove a DVD drive, make sure you do not cut your fingers on the protrusions.

NOTICE

- The DVD cover is prone to bending or warping. Make sure you do not apply too much force to the cover.
- Make sure you do not apply too much force to the connector of the DVD drive. If you do so, failure of the DVD drive may result.
- Make sure you do not apply too much force to the top of the DVD drive. If you do so, failure of the DVD drive may result.

(1) Before installing or removing a DVD drive

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute.
- Allocate sufficient clearance for maintenance work. Carry out the work on a flat surface. (See “1.2.2 Installation”.)
- When you tighten or remove a screw, use a Phillips screwdriver (JIS #2) to avoid stripping the head.
- When you tighten a screw, drive the screw along the axis of the tapped hole without adding too much torque in order to avoid damaging the thread.

(2) Removing a DVD drive

[1] Press the upper front panel and open the cover.

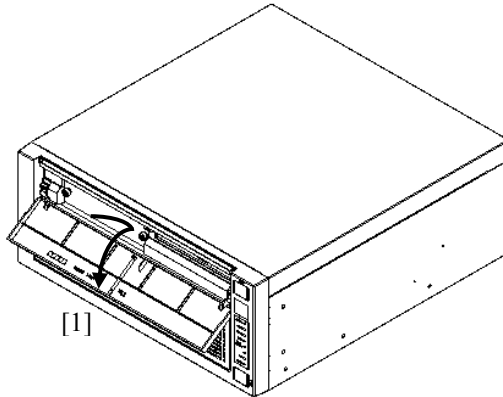


Figure 5-11 Opening the Front Panel

[2] Follow the instructions in “5.3.2 Installing and removing the cover of the equipment” to remove the cover of the equipment.

[3] Disconnect the SATA cable and power cord for the DVD drive from the connectors on the motherboard.

(The model shown in the figure below is the D model, but the same work procedure applies to both the A and D models.)

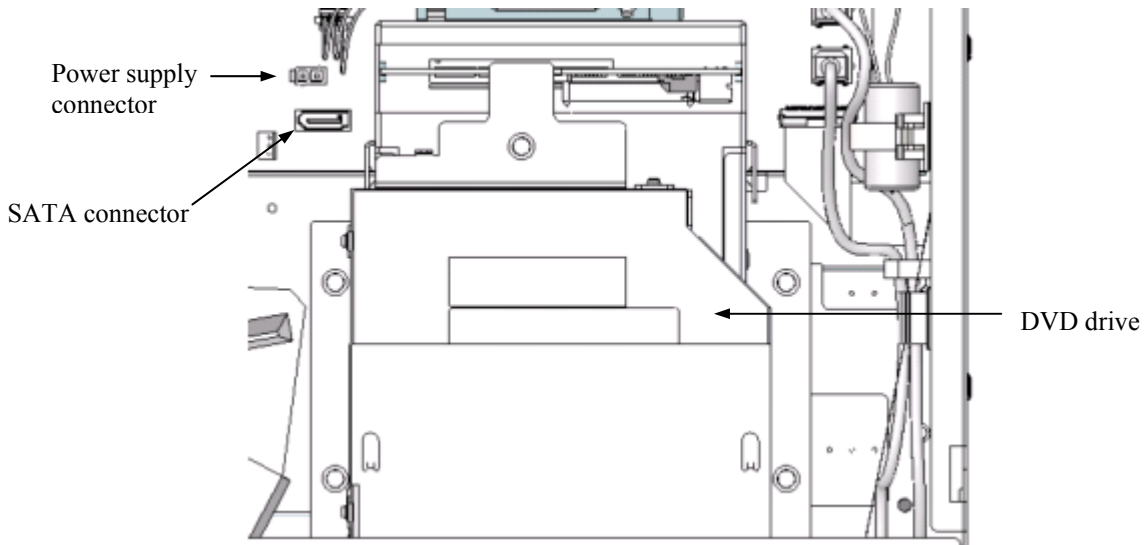


Figure 5-12 Removing Internal Connections

- [4] Release the securing tab for the DVD cover.
- [5] Slide the DVD cover in the direction shown by the arrow.
- [6] Slightly pull the sides of the DVD cover apart from the DVD drive and then lift the cover up and away.

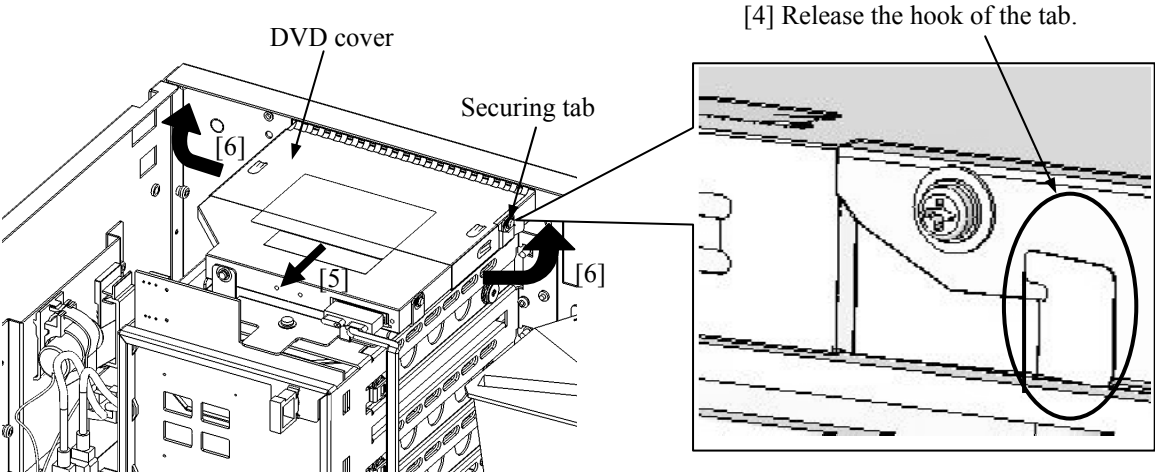


Figure 5-13 Removing the DVD Cover

- [7] Remove one fixing screw for the DVD drive.
(Phillips screwdriver JIS standard No.2)

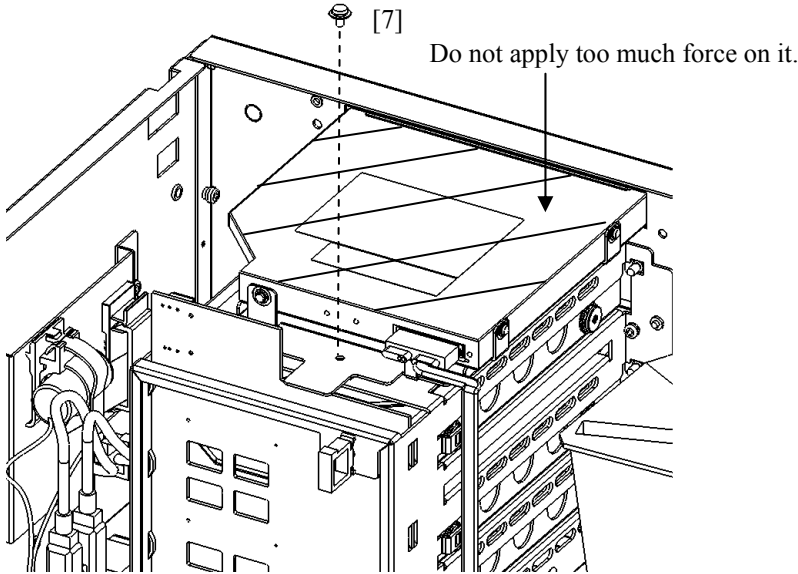


Figure 5-14 Removing the fixing screw for DVD drive

[8] Slide the DVD drive toward the front of the equipment to remove the DVD drive from the HDD frame.

[9] Tilt the DVD drive and pull out the drive upward as shown in the figure below.

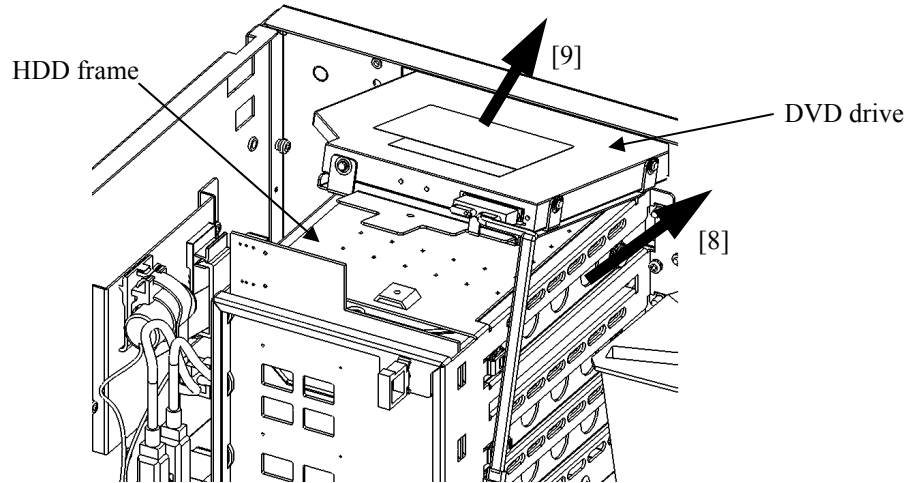


Figure 5-15 Removing the DVD drive

[10] Remove three fixing screws that secure the DVD drive to the metal fitting.
(Phillips screwdriver JIS standard No.1)

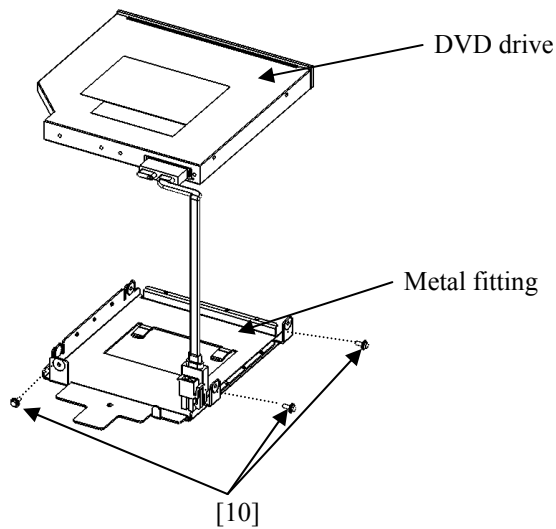


Figure 5-16 Removing the metal fitting for DVD drive

[11] Remove the SATA cable from the DVD drive.

(3) Installing a DVD drive

Follow the procedure described in “(2) Removing a DVD drive” in reverse to installing a DVD drive.

5.3.8 Attaching and removing rubber feet

(1) Before attaching and removing rubber feet

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute.
- Disconnect all outside cables which are connected to this equipment.
- Save the rubber feet in a safe place for later use.
- Allocate sufficient clearance for maintenance work. Carry out the work on a flat surface. (See “1.2.2 Installation”.)
- Do not subject the equipment to unnecessary jostling or shock.

(2) Removing rubber feet

- [1] Insert the blade of a slotted screwdriver into the center part of a mounted rubber foot.
- [2] Gradually pry up the cap at the center of the rubber foot by gently pushing the handle of the driver toward the bottom plate of the equipment.

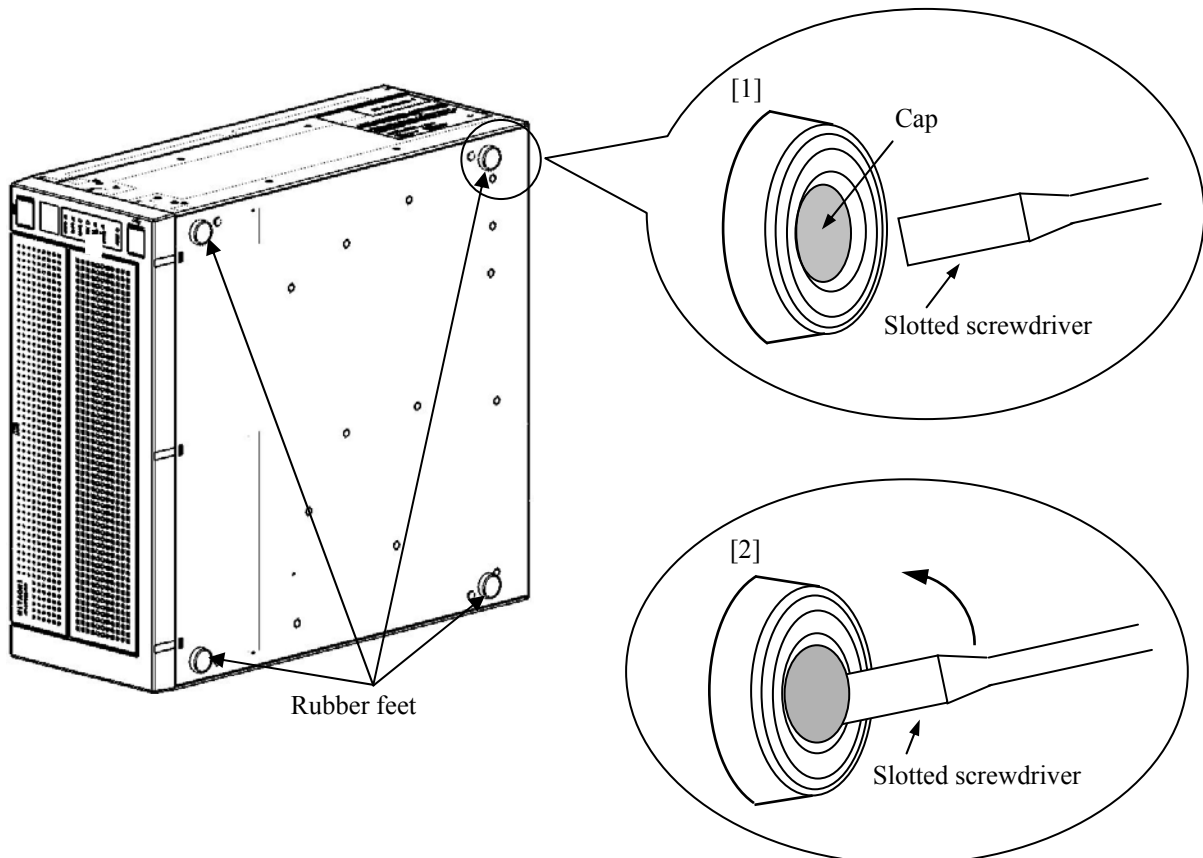


Figure 5-17 Removing a Rubber Foot

(3) Installing rubber feet

Put a rubber foot on each fixing hole on the bottom of the equipment, and push down a cap onto the center of the rubber foot.

5.3.9 Attaching and removing cover screws



When you install the equipment on the mounting metal fitting for vertical installation, do not use set screws for the cover to secure the equipment. If you use the set screws for the cover, the equipment may fall and personal injury may result.

(1) Before attaching and removing cover screws

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute.
- Disconnect all outside cables which are connected to this equipment.
- Allocate sufficient clearance for maintenance work. Carry out the work on a flat surface. (See “1.2.2 Installation”.)
- Do not subject the equipment to unnecessary jostling or shock.
- When you tighten or remove a screw, use a Phillips screwdriver (JIS #2) to avoid stripping the head.
- When you tighten a screw, drive the screw along the axis of the tapped hole without adding too much torque in order to avoid damaging the thread.

(2) Removing cover screws

[1] Remove the four cover screws using a Phillips screwdriver.

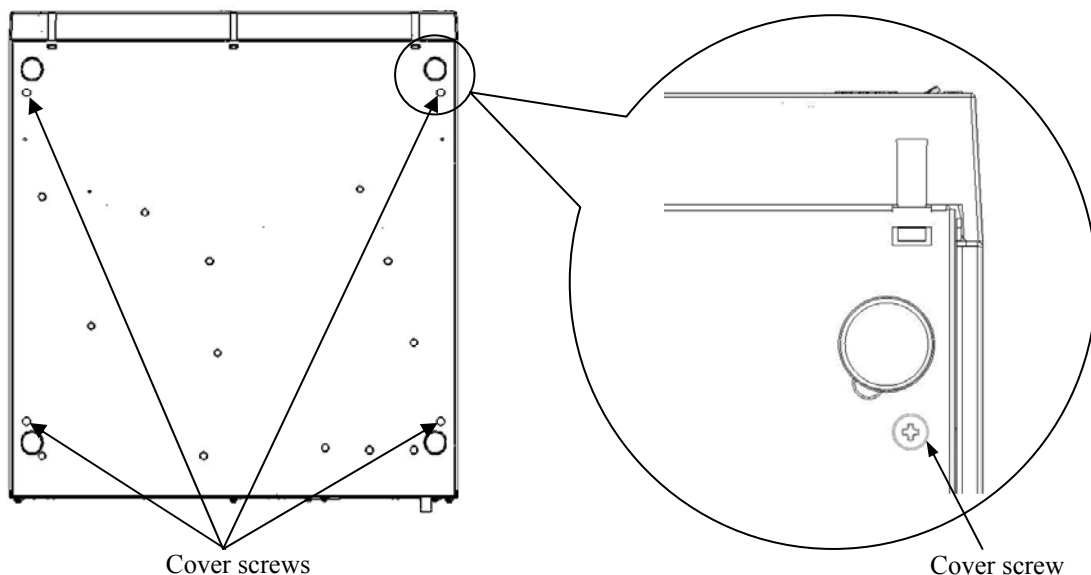


Figure 5-18 Removing Cover Screws

(3) Attaching cover screws

Follow the procedure described in “(2) Removing cover screws” in reverse to attaching cover screws.

5.3.10 Installing and removing a dust filter

 WARNING
Make sure to install a dust filter to equipment. If you do not, dusts enter into the equipment and the short circuit fire may occur as a result.

(1) Before installing and removing a dust filter

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute.
- Allocate sufficient clearance for maintenance work. Carry out the work on a flat surface. (See “1.2.2 Installation”.)

(2) Removing a dust filter

- [1] Follow the instructions in “5.3.5 Installing and removing an Inner panel” to remove an inner panel.
- [2] Remove a cover on the back of the Inner panel, and remove a dust filter from the Inner panel.

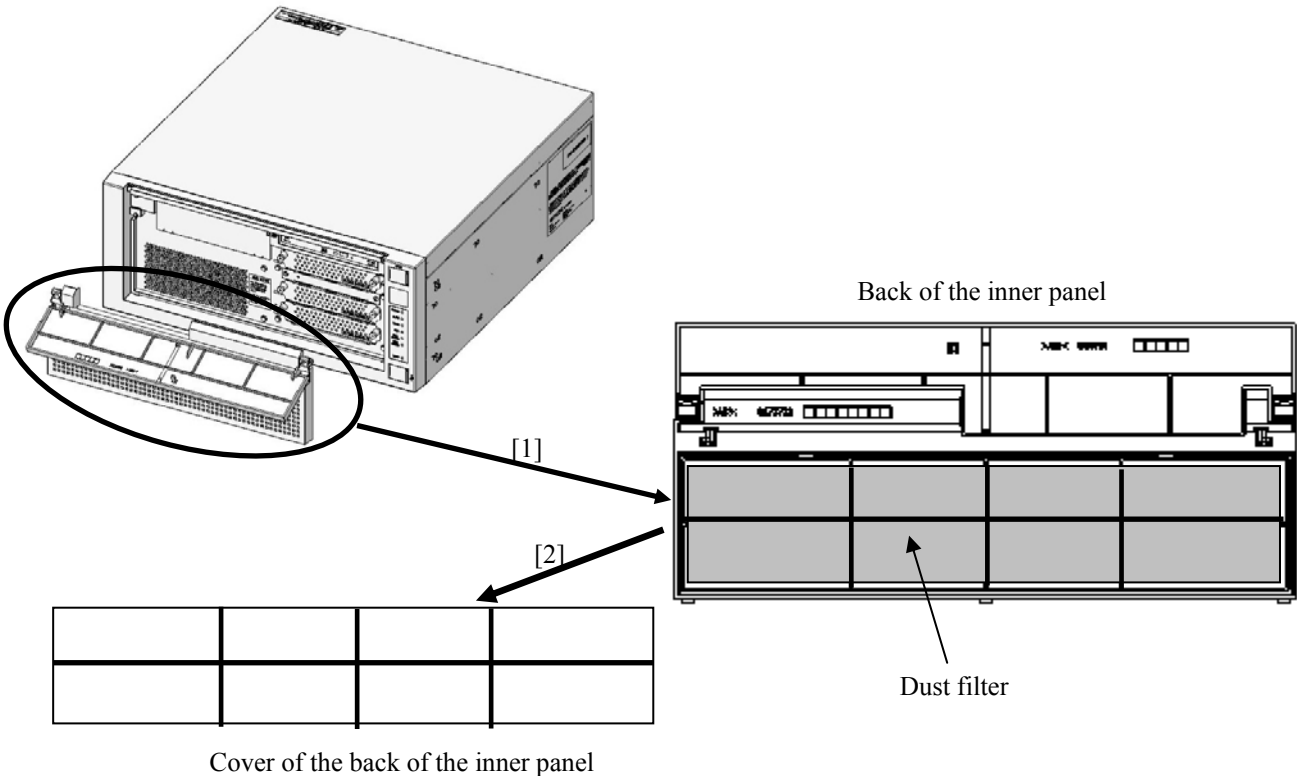


Figure 5-19 Installing and removing a dust filter

(3) Installing a dust filter

Follow the procedure described in “(2) Removing a dust filter” in reverse to installing a dust filter.

5.3.11 Attaching and removing rack-mounting metal fittings (option)



CAUTION

- Rack-mounting metal fittings are designed to be used for pulling out the equipment toward the front by hooking your fingers on the handles. Do not grip the handles to lift up or carry the equipment. If you do, the equipment may fall and personal injury may result.
- Thoroughly check if the rack-mounting metal fittings are attached properly. If they are not attached properly or the screws are loose, the equipment may fall and personal injury may result.

NOTICE

The orientation of a rack-mounting metal fitting is fixed if it is to be attached to the equipment. Make sure the orientation is correct.

(1) Before attaching or removing rack-mounting metal fittings

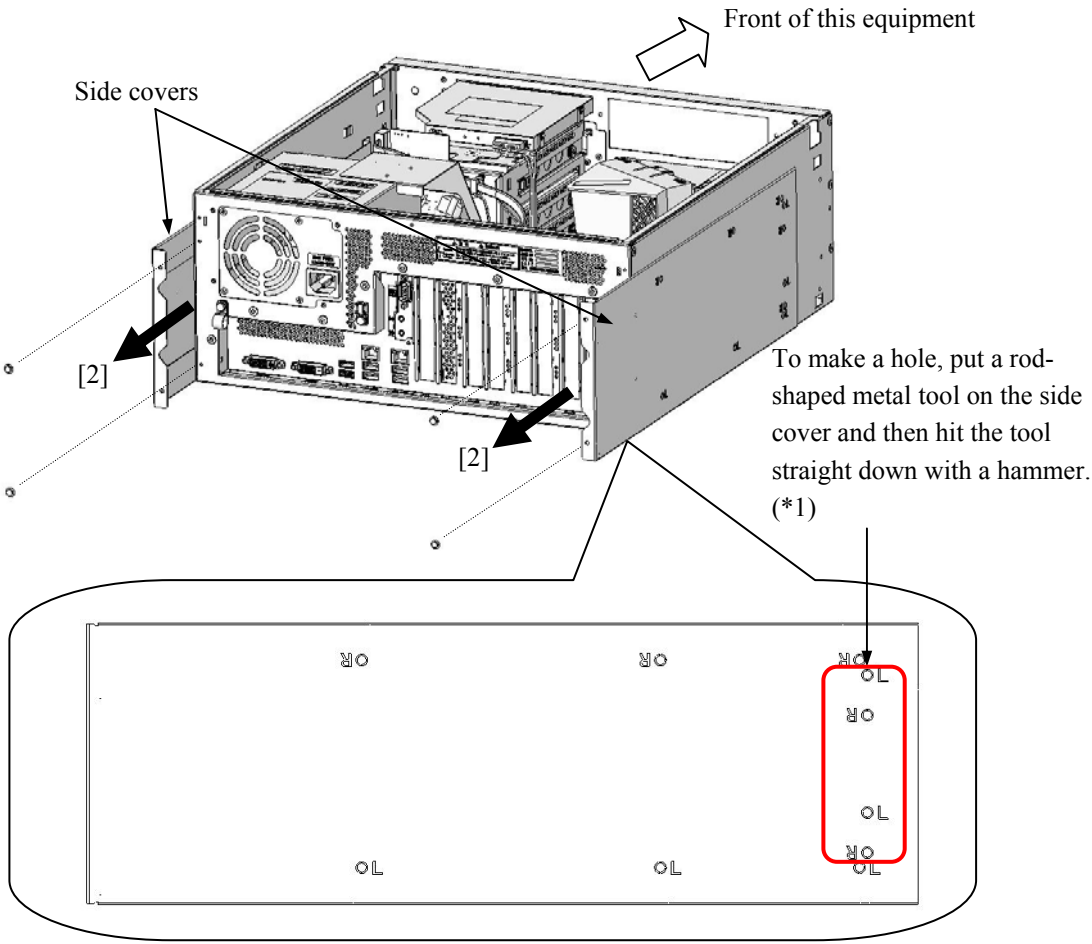
- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute.
- Allocate sufficient clearance for maintenance work. Carry out the work on a flat surface. (See “1.2.2 Installation conditions”.)
- When you tighten or remove a screw, use a Phillips screwdriver (JIS #2) to avoid stripping the head.
- When you tighten a screw, drive the screw along the axis of the tapped hole without adding too much torque in order to avoid damaging the thread.

< NOTE >

- For information about the precautions for rack-mounting metal fittings, see “PRECAUTIONS 8. RACK-MOUNTING METAL FITTINGS”.

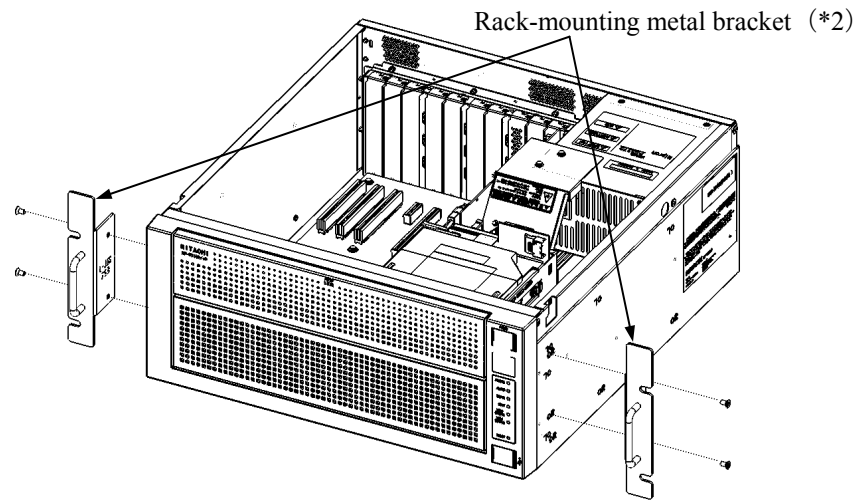
(2) Attaching rack-mounting metal fittings

- [1] Follow the instructions in “5.3.2 Installing and removing the cover of the equipment” to remove the cover of the equipment.
- [2] Remove the four screws to remove both side covers.
- [3] Through the both side covers you just removed, make four holes (two holes through the left side cover as seen from the front of the equipment and two holes through the right side cover) at the specified locations (see the figure below) using a tool.
- [4] Install the side covers and the cover of the equipment in the reverse order of steps [1] and [2].
- [5] Put the rack-mounting metal bracket that came with the equipment on the side covers and secure the rack-mounting metal bracket tightly using the screws that also came with the equipment.



(*1) When you make holes through the left side cover as seen from front of the equipment, make holes at the locations marked as "L". For the right side cover, make holes at the locations marked as "R".

Figure 5-20 Removing Side Covers



(*2) L or R is marked on the outer side of rack-mounting metal fittings.

Attach the one marked with L on the left side of the equipment as seen from the front of the equipment, and the one marked with R on the right side.

Figure 5-21 Attaching Rack-Mounting Metal Fittings

(3) Removing rack-mounting metal fittings

Follow the procedure described in “(2) Attaching rack-mounting metal fittings” in reverse to remove rack-mounting metal fittings.

5.3.12 Rack-mounting the Equipment using externally-procured slide rails

NOTICE

- The rack mounting metal fittings alone cannot hold the mass of the equipment in the rack. Procure and use an appropriate rack tray or slide rails when rack-mounting the equipment with the rack mounting metal fittings.
- No rack tray, slide rails, or slide rail fixing screws are included in the equipment.
- Slide rails must be of such a type that attaches to the sides of the equipment instead of the front and rear ends of the equipment. Otherwise, the installed rack mounting metal fittings may interfere with the slide rail fixing brackets. Consult the vendor before purchase.

The rack mounting metal fittings are provided as an option for mounting the Equipment onto a 19-inch rack of JIS or EIA standard. However, the rack mounting metal fittings alone cannot hold the mass of the Equipment in the rack. Procure and use an appropriate rack tray or slide rails (user responsibility) when rack-mounting the Equipment with the rack mounting metal fittings.

If you select to use slide rails, procure ones that meet all the requirements below.

- Fixing screw positions meet the three distances (25.4 mm, 101.6 mm, 254 mm) in Figure 5-22.
- The slide stroke meets 406 mm as shown in Figure 5-22.
- The pair of slide rails bears a rated load of 200 N or greater.
- The size of the fixing screws is M4.
- The pair of slide rails is of such a type that attaches to the sides of the Equipment instead of the front and rear ends of the Equipment. This avoids possible interference between the installed rack mounting metal fittings and the slide rail fixing brackets exemplified in Figure 5-23.

In the case above, the fixing screws for the slide rails must meet all the requirements below.

- The screw type is bind screw or small knurled head screw.
- The screw size is M4.
- The screw thread length is 8–10 mm on condition that the metal plate thickness of the slide rail is 1.6 mm.

5. CHECKUP AND MAINTENANCE

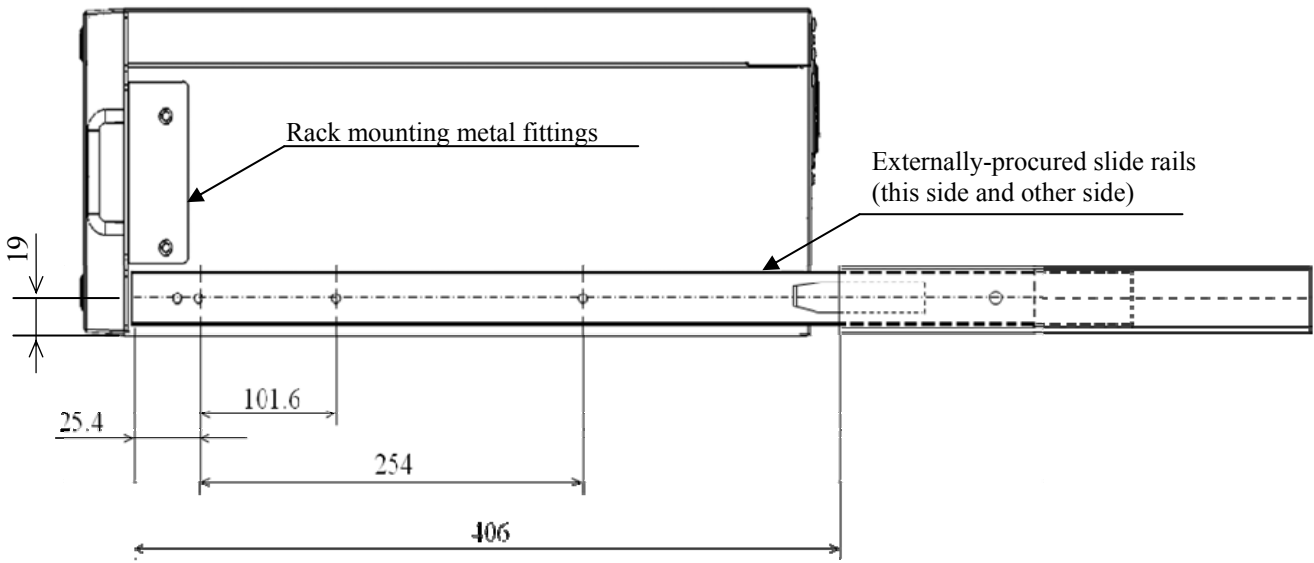


Figure 5-22 Distances Required for Slide Rails

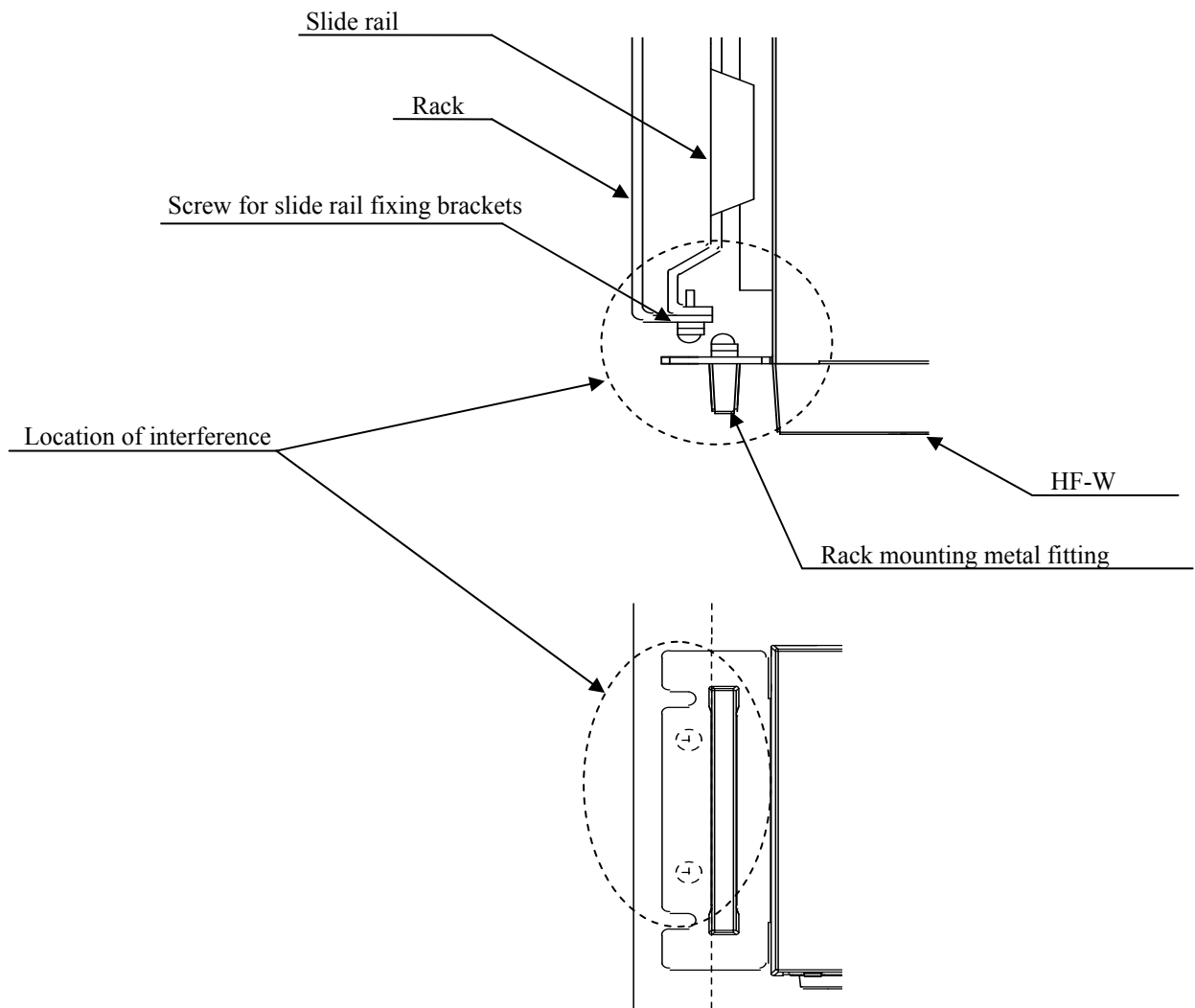
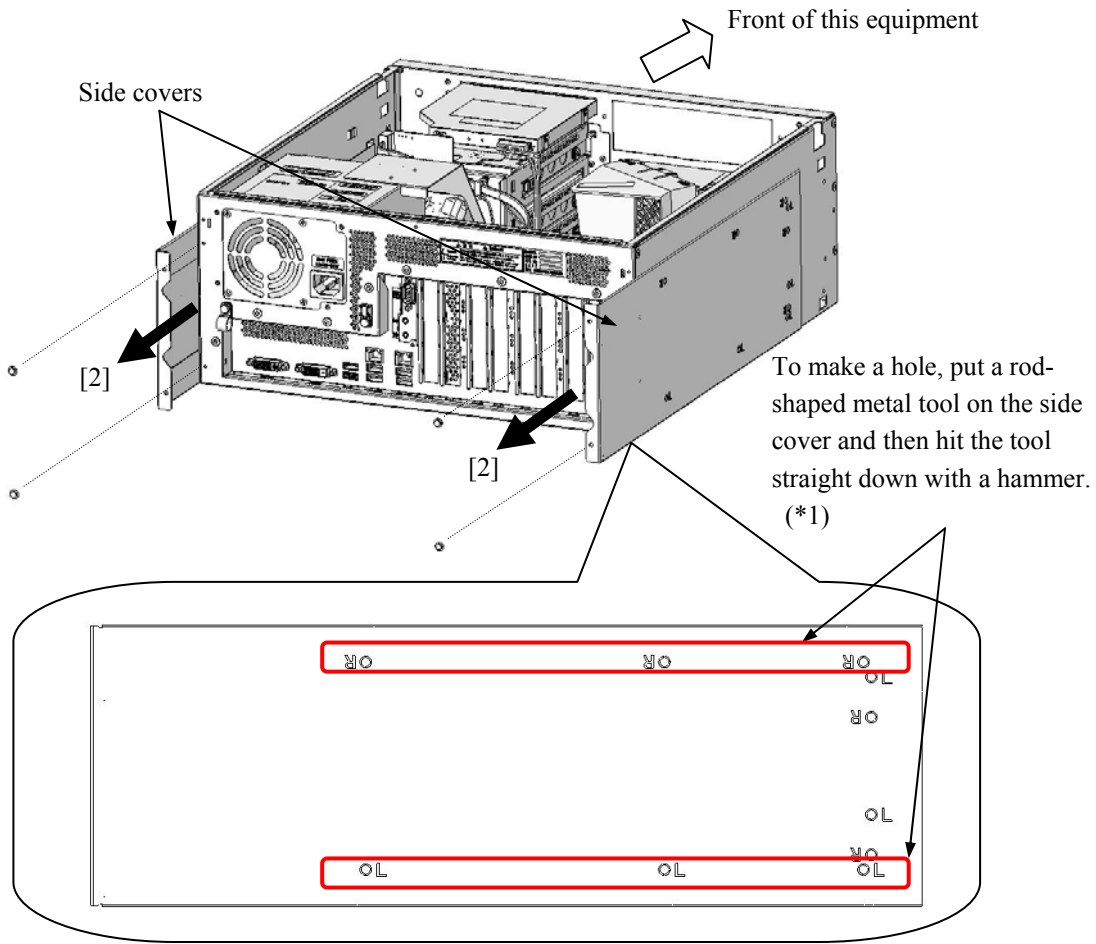


Figure 5-23 Interference between Rack Mounting Metal Fittings and Slide Rail Fixing Brackets

(1) Attaching slide rails

- [1] Turn off the main power switch in the back of the Equipment and disconnect the power cord plug from the outlet.
- [2] Unmount the top cover from the Equipment according to “(1) (a) Unmounting the top cover” in Subsection 5.4.1.3, “Inserting/extracting extended board.”
- [3] Referring to Figure 5-22, unscrew the four screws fixing the side covers from the rear end of the Equipment and then unmount the side covers.
- [4] Using a metal rod or the like and a hammer, punch out the lower three knockout holes in each side cover.
- [5] Remount the side covers and the top cover in the reverse order of Steps 2 and 3.
- [6] Attach the slide rails referring to the instruction manual of the slide rails.



(*1) When you make holes through the left side cover as seen from the front of the equipment, make holes at the locations marked as an "L". For the right side cover, make holes at the locations marked as an "R".

Figure 5-24 Removing Slide Covers

(2) Removing slide rails

Follow the procedure described in “(1) Attaching slide rails” in reverse to remove slide rails.

5.3.13 Mounting and removing an optional general-purpose 5-in bay



CAUTION

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute. Otherwise, an electric shock or failure of the equipment may result.
- Do not directly touch the parts inside the equipment with your hand when you install or remove an extension board. Those parts are hot and if you touch them, you may get burned. In addition, if you touch them, they may get damaged and that may result in failure of the equipment.

NOTICE

Never remove screws while the main power to the equipment is on. Never hot-swap a device. If you do either of these, failure of the built-in equipment may result.

(1) Before installing or removing a general purpose 5-in bay device

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute.
- Allocate sufficient clearance for maintenance work. Carry out the work on a flat surface. (See “1.2.2 Installation”.)
- Wear cotton gloves when you install or remove a general purpose 5-in bay device.
- When you tighten or remove a screw, use a Phillips screwdriver (JIS #2) to avoid stripping the head.
- When you tighten a screw, drive the screw along the axis of the tapped hole without adding too much torque in order to avoid damaging the thread.

< NOTE >

If you mount a SATA device in the general purpose 5-in bay, the transfer speed for the SATA device may be reduced while the DVD drive is being accessed.

(2) Example of using the general purpose 5-in bay

- [1] Remove the two screws fixing the support metal bracket for general purpose bay device.
- [2] Remove the support metal bracket for general purpose bay device from claws of the base metal bracket for general purpose bay.
- [3] If you need to remove a cover for the general purpose 5-in bay, push down the two tabs on the top of the cover and remove the cover toward the inside.

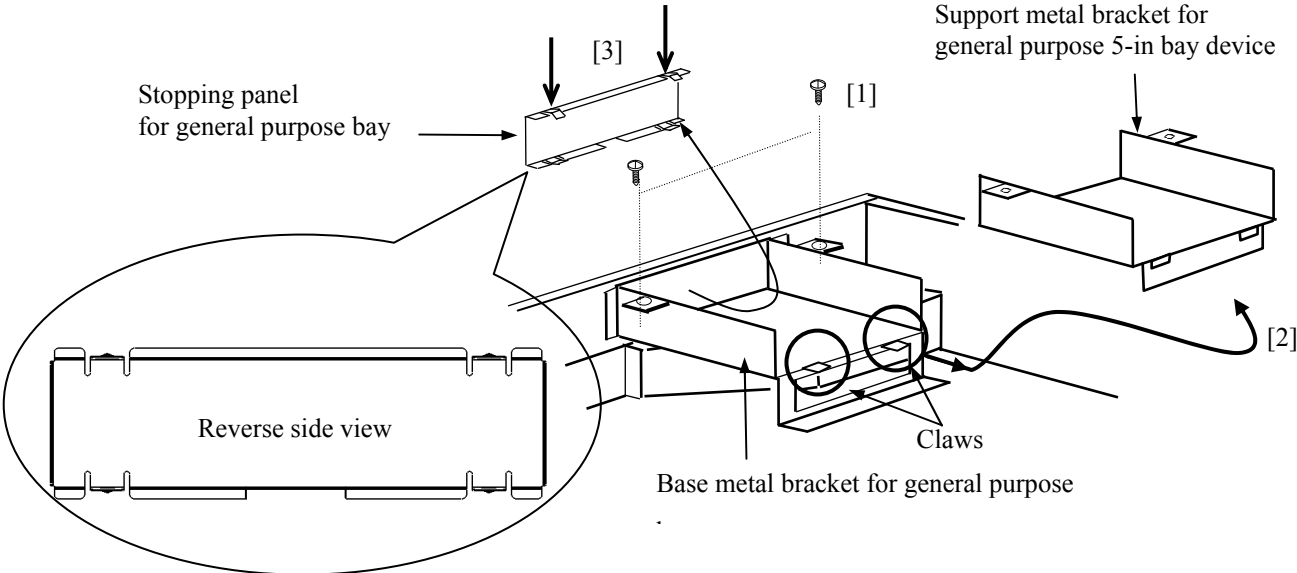


Figure 5-25 Removing Support metal bracket for general purpose bay device

< NOTE >
Keep the removed 5-in bay stopping panel in a safe place for later use.

- [4] Mount the general purpose bay device onto the support metal bracket for general purpose bay device and fix them with four screws (customer’s responsibility) so that all of them form an assembly.

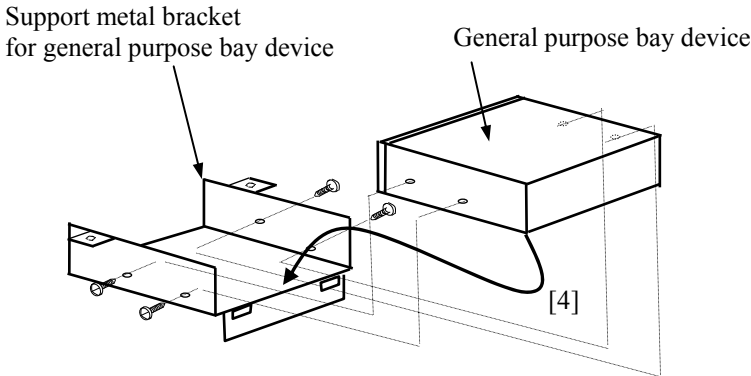


Figure 5-26 Mounting the general purpose bay device

< NOTE >
A customer must provide four screws used for fixing a 5-in bay device and also a screwdriver for them.

5. CHECKUP AND MAINTENANCE

[5] Mount the assembly formed in Step 4 onto the general purpose bay in such a manner that the two slots in the skirt of the support metal bracket for general purpose bay device engage with the claws of the base metal bracket for general purpose bay. Then, fix the assembly with the two screws demounted in step 1.

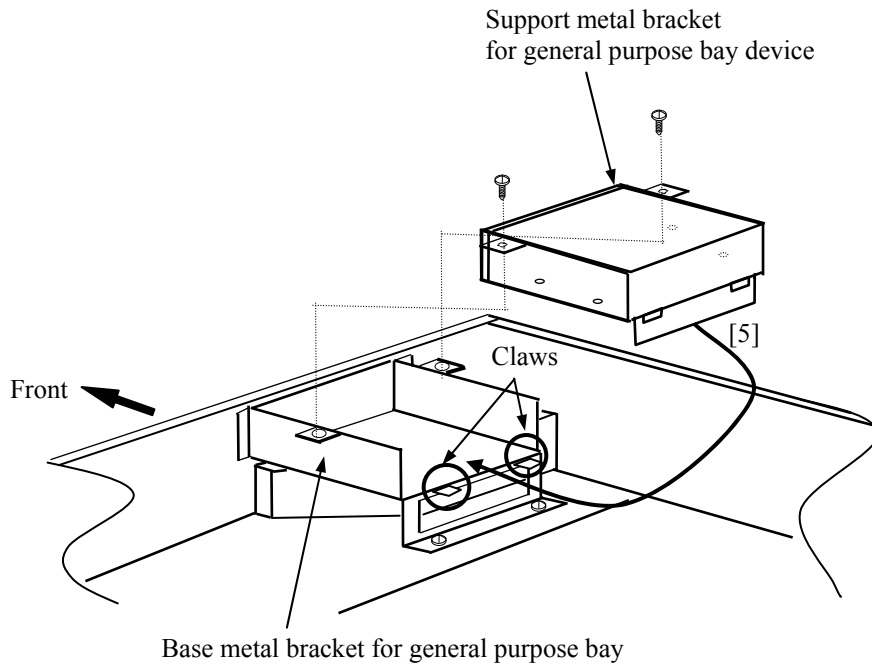


Figure 5-27 Mounting the Support metal bracket for general purpose bay device

[6] If you went through step 3, mounting Stopping panel for general purpose bay.

(3) Connecting or removing a general purpose 5-in bay harness set

For information about the general purpose 5-in bay harness set, see “4.8.1 Connector specifications (3) Signal and power harness specification”.

- [1] Remove the connector covers for the connectors on the motherboard.
- [2] Connect the connectors of the cables to the connectors on the motherboard.
- [3] Connect the cables to the connectors on the general purpose 5-in bay device.

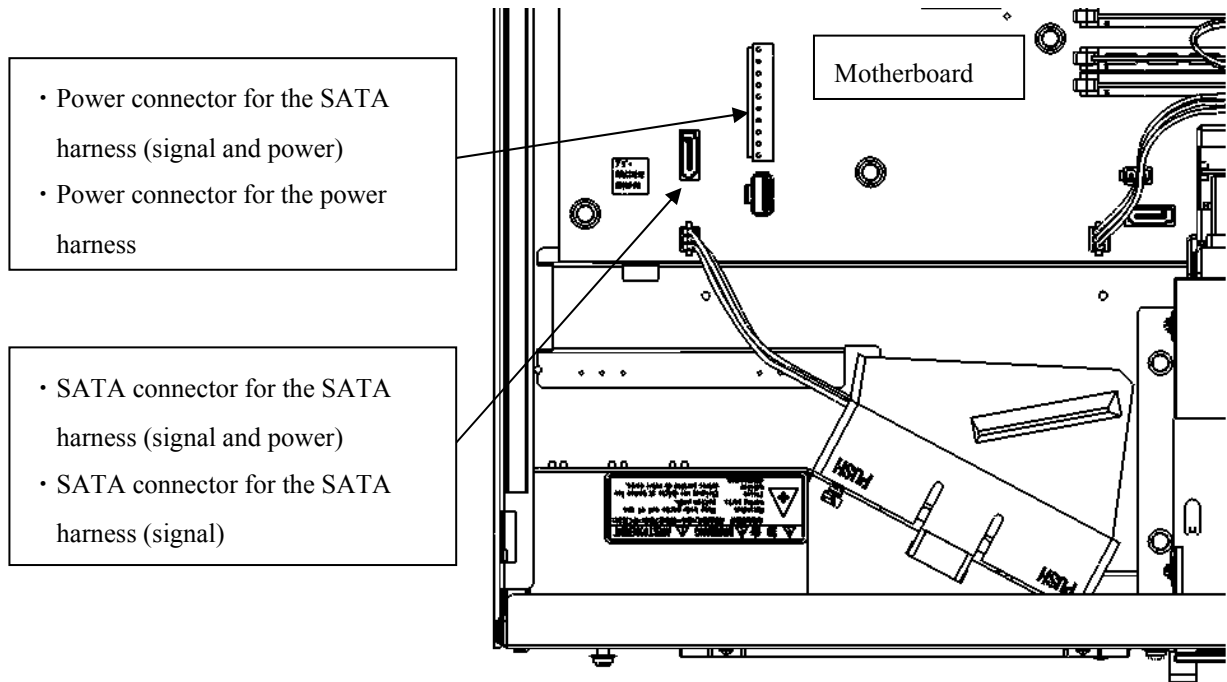


Figure 5-28 Connecting a Harness

< NOTE >

- When you connect a cable, make sure the orientation of the cable is correct and insert the connector without applying too much force on the connectors.
- Save the connector covers in a safe place for later use.

(4) Removing a harness

Follow the procedure for connecting a harness in reverse to remove the harness.

5.3.14 Extending the number of long-sized PCI slots to three

If you want to increase the number of long-sized PCI slots to three, you cannot keep a 5-in bay base metal bracket mounted. You must remove a 5-in bay base metal bracket by following the procedure below.

- [1] Follow the instructions in “5.3.13 Mounting and removing an optional general-purpose 5-in bay” to remove the support metal bracket for general purpose bay device.
- [2] Demount the two screws fixing the base metal bracket for general purpose bay in front of the equipment chassis.
- [3] Demount the two screws fixing the base metal bracket for general purpose bay inside the equipment chassis.
- [4] Press down the two upper claws in the stopping panel for general purpose bay so that the stopping panel comes off inward. Then, detach the stopping panel completely.
- [5] Pull up the base metal bracket for general purpose bay toward you and remove it.
- [6] Reattach the stopping panel detached in Step 4.

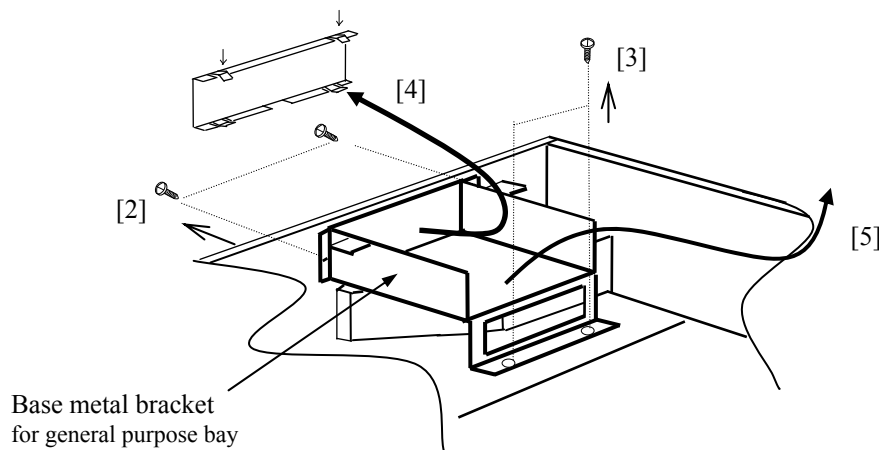


Figure 5-29 Extending the number of long-sized PCI slots to three

< NOTE >

Keep the removed base metal bracket for general purpose bay and screws for future use in restoring the base metal bracket for general purpose bay.

5.4 Mounting and removing a lithium battery



CAUTION

- This equipment uses a lithium battery. When you replace the lithium battery, make sure you replace it with one specified by the Manufacture. Otherwise, an explosion, a fire, a burst battery, heat generation, a liquid spill, or gas generation may result.
- Install the battery in correct polarity. Installing it in wrong polarity may cause abnormal reaction such as charging or shorting, resulting in a liquid spill, heat generation or a burst battery.
- When you replace a lithium battery, you must follow the procedures described in this section. If you do not, BIOS might become corrupted.

(1) Before mounting or removing the lithium battery

- Before you start the work, make sure you shut down the OS, unplug the power cord from the outlet, and wait for at least one minute.
- Allocate sufficient clearance for maintenance work. Carry out the work on a flat surface. (See “1.2.2 Installation”.)
- Before replacing the battery, make sure you record the BIOS settings. Restore the BIOS settings after you replace the battery. It should be noted that the system clock is initialized when you replace the battery. Configure the system clock after the replacement.

(2) Removing the lithium battery

- [1] Remove two USB cables from the motherboard.
- [2] Remove the lithium battery from the battery holder as shown in the figure below.
- [3] Remove the lithium battery from the BAT connector on the motherboard.

< NOTE >

- When you install a lithium battery, check the code numbers of the USB cables and also the connector silk on the motherboard, and connect the cables as shown in the figure below.
- When you remove a lithium battery, make sure you release the lock of the BAT connector and remove the battery at the right orientation and right angle.

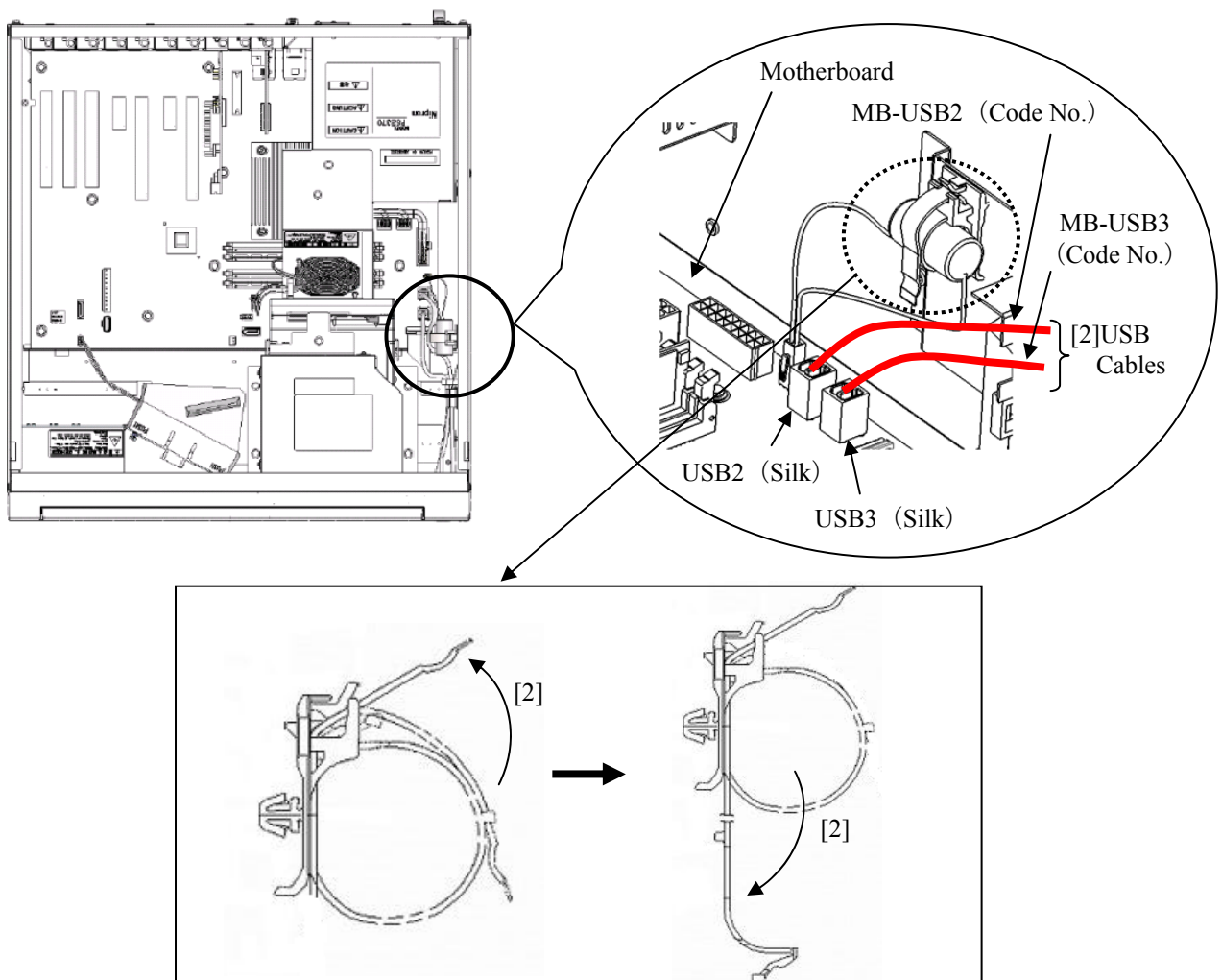


Figure 5-30 Removing the Lithium Battery


(3) Mounting the lithium battery

Follow the procedure described in “(2) Removing the lithium battery” in reverse to mount a new lithium battery.

< NOTE >

- When you connect a cable, make sure the orientation of the cable is correct and insert the connector without applying too much force on the connectors.
- Save the connector cover in a safe place for later use.

5.5 Enabling the Remote Power On Function

 CAUTION
<ul style="list-style-type: none">• Before you start the work, make sure you shut down the OS, turn off the main power to the equipment, and wait for at least one minute. Otherwise, an electric shock or failure of the equipment may result.• Do not directly touch the parts inside the equipment with your hand when you install or remove a jumper socket. Those parts are hot and if you touch them, you may get burned. In addition, if you touch them, they may get damaged and that may result in failure of the equipment.

When you use the remote power on function of the optional RAS external contact port, remove the jumper socket attached to the JP2 pins on the motherboard. Whether a jumper socket is attached determines whether the function of the external contact GENDI2 is a general-purpose digital input signal or the remote power on signal. (See “4.8.2 External control specification”.)

Whether a jumper socket is attached	GENDI2 setting
Attached	General-purpose digital input signal
Not attached	Remote power on signal

5. CHECKUP AND MAINTENANCE

(a) Removing the cover of the equipment

Follow the instructions in “5.3.2 Installing and removing the cover of the equipment” to remove the cover of the equipment.

(b) Removing the jumper socket

Remove the jumper socket from the JP2 pins.

< NOTE >

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

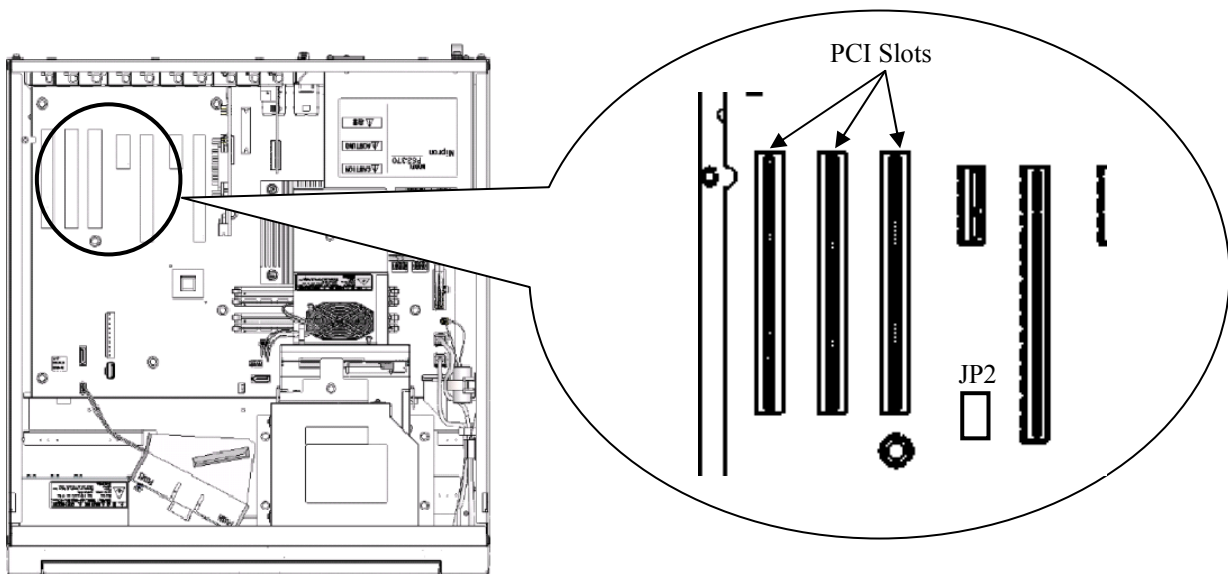


Figure 5-31 Removing a Jumper Socket

CHAPTER 6 TROUBLESHOOTING

This chapter explains the possible causes of common problems and the actions to be taken to address those problems. Select an applicable symptom from the list in “6.1 List of Problems”. Follow the link (“6.2 Countermeasures” through “6.6 Digital LED for Status indication”) and take actions according to the instruction. If following the instruction in “6.2 Countermeasures” does not resolve the symptom, contact the system administrator or maintenance personnel. Refer to "Chapter 8 RAID1" for the trouble about the RAID.



WARNING

In case of smoke, a burning smell, or the like, unplug the power cord from the outlet, and contact your dealer or maintenance personnel. Using faulty equipment without repair may result in a fire or an electric shock.

6.1 List of Problems

The following is a list of problems that can occur in the equipment. Search for an applicable item in the list below, perform root cause analysis, and take an appropriate action.

6.1.1 Problems that occur before the OS startup

The following is a list of problems that occur before the desktop is displayed (before the OS startup). For information about the names of the lamps on the front panel, see “2.1 Display and User Input Sections”.

(1) The equipment does not start.

Check the operation of the equipment after the plug of the power cord is connected to the outlet in the order of the following steps 1 through 7. If there is an applicable item, follow the link. (If there are multiple applicable items, the first one has precedence.)

1. When the plug of the power cord is connected to the outlet, the standby lamp is not turned on. (See page 6-3.)
2. When the power switch is turned on, fans rotate and the status lamp is lit, but the status indication LEDs and the Digital LEDs for Status indication do not display anything. (See page 6-3.)
3. The Digital LEDs for Status indication show alphanumeric characters and the system stops. (See page 6-4.)
4. The screen is blank. (See page 6-4.)
5. The screen shows an error message and the system stops. (See page 6-4.)
6. The system stops when the Windows® logo is displayed. (See page 6-5.)
7. The system stops when a blue screen is displayed. (See page 6-5.)

(2) Beep sounds are generated. (See page 6-5.)

(3) The BIOS setup menu cannot be opened. (See page 6-6.)

(4) The remote power on function cannot be activated through the RAS external contact. (See page 6-6.)

(5) WOL cannot be used. (See page 6-6.)

(6) If an extension board is installed, the equipment does not start. (See page 6-6.)

6.1.2 Problems that occur after the OS startup

The following is a list of problems that occur after the desktop is displayed (after the OS startup).

- (1) The alarm lamp is lit and the Digital LEDs for Status indication show alphanumeric characters. Alternately, just the Digital LEDs for Status indication show alphanumeric characters. (See page 6-7.)
- (2) The processing speed of the equipment is slow. (See page 6-9.)
- (3) The equipment does not respond. (See page 6-9.)
- (4) The equipment automatically goes into the standby mode, or restarts. (See page 6-10.)
- (5) The screen flickers or blacks out. (See page 6-11.)
- (6) A blue screen is/was displayed. (See page 6-11.)
- (7) The equipment cannot connect to the network. (See page 6-12.)
- (8) The network connection is unstable, or the connection speed is slow. (See page 6-12.)
- (9) A CD or DVD cannot be recognized or cannot be read or written to. (See page 6-13.)
- (10) Writing to a CD or DVD fails. (See page 6-13.)
- (11) A CD or DVD cannot be ejected. (See page 6-14.)
- (12) Keyboard input is not accepted. (See page 6-14.)
- (13) Mouse input is not accepted, or a cursor /button does not work normally. (See page 6-15.)
- (14) A USB device (other than a keyboard and a mouse) cannot be recognized or does not work. (See page 6-15.)
- (15) No sound is generated, or the sound is extremely faint. (See page 6-16.)
- (16) A serial port or a parallel port does not work properly. (See page 6-16.)
- (17) The RAS external contact port does not work properly. (See page 6-16.)
- (18) The equipment cannot be shut down. (See page 6-17.)
- (19) In the screen resolution setting, an unconnected display is shown. (See page 6-17.)

6.2 Countermeasures

6.2.1 Problems that occur before the OS startup

(1) The equipment does not start.

1. When the plug of the power cord is connected to the outlet, the standby lamp is not turned on.

<Possible cause>

Power is not supplied to the equipment.

<Action>

1. Make sure that the plug of the power cord is connected to the outlet.
2. Make sure that the circuit breaker on the power distribution panel is on.
3. If the standby lamp is turned on after steps 1 and 2, turn on the power switch.
-> When the equipment starts, fans rotate and the status lamp is turned on.

2. When the power switch is turned on, fans rotate and the status lamp is lit, but the status indication LEDs and the Digital LEDs for Status indication 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 indication show alphanumeric characters and the system stops.

<Possible cause>

An error was detected during POST.

<Action>

1. See “6.6.1 POST messages” and take an appropriate action.
 - > When the equipment has recovered, the alphanumeric characters on the Digital LEDs for Status indication 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 plug of the power cord for the display is connected to the outlet.
3. Make sure that the equipment and the display are connected through a display interface cable.
4. Re-examine the display settings. For information about the display settings, refer to the manual of the display.

5. The screen shows an error message and the system stops.

<Possible cause>

The battery is dead, HDDs are not mounted, the OS is corrupted, or there is an error in the boot loader (the program used for starting the OS).

<Action>

1. If one of the following error messages is displayed, take a corresponding action.
 - “Real Time Clock Error – Check Date and Time setting”
 - > 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 HDD or the OS. Check the following items:
 - i) Check if 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) Check if an HDD is fully inserted into drive bay 1 and secured by screws.
 - > If the HDD is OK, the HDD is recognized on the BIOS screen.
(See “4.6 BIOS Setup”.)
 - iii) If you have a recovery DVD, restore the system drive back to the factory default by using the recovery DVD.
 - “NTLDR is Missing”
 - > There may be an error in the boot loader (the OS is corrupted). If you have a recovery DVD, restore the system drive back to the factory default by using the recovery DVD.

6. The system stops when the Windows® logo is displayed.**<Possible cause>**

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

<Action>

1. Unplug the plug of the power cord from the outlet and remove all USB devices except a keyboard and mouse as well as all extension boards. Then start the equipment.
2. If the symptom persists after step 1, the OS may be corrupted. If you have a recovery DVD, restore the system drive back to the factory default using the recovery DVD.

< NOTE >

- Do not connect a USB device during the OS startup because the OS may not start normally.
- When you change screens during the OS startup, the OS does not start normally in some CPU switching devices. If you use a CPU switching device, perform sufficient operation verification.

7. The system stops when a blue screen is displayed.**<Possible cause>**

The equipment has received an active remote shutdown signal.

<Action>

1. Take appropriate action according to “7.4 Startup Suppression on Serious Failure Detection” and “6.3 STOP Error Codes”.

(2) Beep sounds are generated.**a) One beep is generated.****<Possible cause>**

This is just a beep for power-on. This is not an error.

b) Two or more beeps are generated.**<Possible cause>**

A hardware error was detected.

<Action>

1. Check the information displayed on the Digital LEDs for Status indication and take an appropriate action according to “6.6.1 POST messages”.

(3) The BIOS setup menu cannot be opened.

<Possible cause>

Keyboard input is not accepted.

<Action>

1. Disconnect the keyboard cable and securely reconnect it to ensure 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 function is not enabled.

<Action>

1. Enable the remote power on function according to “5.5 Enabling the Remote Power On Function”.

(5) WOL cannot be used.

<Possible cause>

The WOL function is not enabled.

<Action>

1. Check which OS is used. If you are using Windows Server® 2012 R2, the WOL function is not available according to the OS's specifications.
2. Enable the WOL function according to “3.7.1 Enabling the WOL (Wake ON LAN™) function”.

(6) If an extension board is installed, the equipment does not start.

<Possible cause>

The connection failure of an extension board or an address space conflict with an onboard device is considered.

<Action>

1. Remove the extension board with the power turned off and reinstall it.
2. If the problem cannot be resolved by performing step 1, changing [MMIO Range] to [2GB] on the [Advance] tab in the BIOS settings might resolve it.
3. If the problem cannot be resolved even by performing steps 1 and 2, a failure on the extension board is suspected. In that case, take action using the document that comes with the extension board.

6.2.2 Problems that occur after the OS startup

(1) The alarm lamp is lit and the Digital LEDs for Status indication show alphanumeric characters. Alternately, just the Digital LEDs for Status indication show alphanumeric characters.

<Possible cause>

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

<Action>

1. If one of the status indication LEDs is lit in red, this is a hardware error notification from the RAS software. Check the characters displayed on the Digital LEDs for Status indication.
 - When 11, 12, or 13 is displayed on the Digital LEDs for Status indication.
 - > Rotation of a fan is abnormal. (11 indicates a power supply fan failure, 12 indicates a front fan failure, and 13 indicates a CPU fan failure.)
 - Check the following items.
 - i) Make sure that no foreign objects are attached to the fan.
 - > If any foreign objects are attached, the efficiency of cooling inside the equipment becomes is reduced. Remove the foreign objects.
 - ii) Make sure that the power cord for the fan is connected to a power connector.
 - > A loose connection may have caused the symptom. Remove the power cord for the fan from the power connector and then reconnect them.
 - When 21 is displayed on the Digital LEDs for Status indication.
 - > The temperature is abnormal. Check the following items.
 - 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 “1.2.2 Installation”.)
 - > If not, provide sufficient clearance around the equipment.
 - iii) Make sure that the temperature of the installation environment (ambient temperature) is less than 40°C.
 - > Remove obstacles to air flow or use air-conditioning to keep the ambient temperature less than 40°C.
 - When 31, 32 or 33 is displayed on the Digital LEDs for Status indication.
 - > Failure is predicted for the drive in drive bay.(31 indicates the drive bay 1, 32 indicates the drive bay 2, and 33 indicates the drive bay 3) We recommend you back up the data and replace the drive.

<Action>

The following is displayed when the equipment is the D model.

- When 41 or 42 is displayed on the Digital LEDs for Status indication.
 - > HDD is abnormal. (41 indicates the drive bay1, 42 indicates the drive bay 2.)
Read the description of “8.4.2 Recovering from HDD failure in one side” and replace an HDD.
- When 4A is displayed on the Digital LEDs for Status indication.
 - > RAID array configuration is abnormal.
Read the description of “8.4.3 (1)” and take action accordingly.
- When 4B is displayed on the Digital LEDs for Status indication.
 - > RAID array is failure. (HDD failure in both sides.) Contact your system administrator or maintenance personnel.
- When 4C is displayed on the Digital LEDs for Status indication.
 - > RAID status is unknown. (RAS software cannot get RAID status.) Contact your system administrator or maintenance personnel.
- When 4D is displayed on the Digital LEDs for Status indication (*).
 - > Media error is occurred on RAID.
Read the description of RAS FEATURES MANUAL “2.8.2” and take action accordingly.

(*) This code is not displayed in default setting. Read the description of RAS FEATURES MANUAL “2.8.2” when you want to display this code.

< NOTE >

If one of the status indication LEDs is lit in green, a user application is using the LEDs to display characters. Contact your system administrator or maintenance personnel.

(2) The processing speed of the equipment is slow.**<Possible cause>**

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

<Action>

1. Terminate unnecessary applications to increase available memory.
 - > When you want to check the usage of the CPU and memory, follow the instructions in “6.5 Checking the System Load by Using Performance Monitor”.
2. Delete unnecessary files to increase free clearance on the HDDs.

(3) The equipment does not respond.**<Possible cause>**

There is an error in hardware or software.

<Action>

1. The screen can seem to be frozen when an application freezes. If the equipment responds by pressing **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**. The **Windows Security** window will open. Click **Task Manager**.
 - iii) Restart the equipment.
2. Press the reset switch to collect a memory dump. Then restart the equipment. When you request an analysis of the memory dump (a service provided for a fee), save the log after you restart the equipment (see “7.5 Maintenance Operation Commands”) and contact our sales representatives.
3. If you cannot restart the equipment at step 2, turn off the power of the equipment according to <Forcibly terminating the equipment> below.
4. If executing steps 1 and 2 does not resolve the symptom, remove all USB devices except a keyboard and mouse as well as all extension boards when the power is off and then start the equipment.

<Forcibly terminating the equipment>

If the shutdown fails, press the power switch for at least four seconds. The power is turned off and the equipment goes into the standby mode.

After the equipment goes into the standby mode, turn off the main power switch on the rear of the equipment to shut down the power.

(4) The equipment automatically goes into the standby mode, or restarts.

a) The Digital LEDs for Status indication show alphanumeric characters and the system goes into the standby mode.

<Possible cause>

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

<Action>

1. Check the characters displayed on the Digital LEDs for Status indication.
 - If one of the status indication LEDs is lit in red, this is a hardware error notification from the RAS software. See “6.6.1 POST messages” and take appropriate action.
 - If one of the status indication LEDs is lit in 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 an error in hardware or software.

<Action>

1. Check the description of the messages in the “System” or “Application” category in the event log and take actions accordingly. (See Section 6.4, “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 AC power supply is unstable.

<Action>

1. Make sure that the plug of the power cord is securely connected to the outlet.
2. If the symptom persists after step 1, the AC power supply may be unstable. Confirm that the AC power voltage is appropriate.

(5) The screen flickers or blacks out.**<Possible cause>**

There is an error in the display or in the video board.

<Action>

1. Make sure that the plug of the power cord for the display is connected to the outlet.
2. Make sure that the equipment and the display are connected through a display interface cable.
(Check if the connection of the cable is not loose.)
3. Replace the display interface cable with a new one. (Check that the cable is broken.)
4. Re-examine the display settings. For information about how to adjust the display, refer to the manual of the display.
5. When you use a video card, check the following items.
 - i) Make sure that the settings of the video card are correct.
(For information about how to set up the video card, refer to the manual of the video card.)
 - ii) Turn off the main power switch. Replace the video card with another one and check whether it works.

(6) A blue screen is/was displayed.**<Possible cause>**

There is an error in the OS or in the equipment.

<Action>

1. If the blue screen is still displayed, record the STOP error code (0x00000080 and so on) or distinguished name (NMI_HARDWARE_FAILURE and so on).
2. If you cannot record the STOP error code, search the “System” category in the event log for the STOP error code.
3. Check the description in “6.3 STOP Error Codes” to determine what caused the memory dump to be collected.
4. When you request an analysis of the memory dump (a service provided for a fee), save the log after you restart the equipment (see “7.5 Maintenance Operation Commands”) and contact our sales representatives.

(7) The equipment cannot connect to the network.

<Possible cause>

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

<Action>

1. Re-examine the network settings according to the instructions in “3.8 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. When you use network device, check the following items.
 - i) Make sure that the power of the network device is on.
 - ii) Turn on the power of the network device first and then turn on the power of this equipment.
 - iii) Replace the network device with other one to check whether the latter works.

(8) The network connection is unstable, 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.

<Action>

1. Re-examine the network settings according to the instructions in “3.8 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. When you use network equipment, check the following items.
 - i) Turn on the power of the network device first and then turn on the power of this equipment.
 - ii) Replace the network device with other one to check whether the latter works.

(9) A CD or DVD cannot be recognized or cannot be read or written to.**<Possible cause>**

An unsupported or bad CD or DVD is used.

<Action>

1. Check the CD or DVD. The DVD-Multi drive of this equipment does not support the DVD-RAM media.
2. Check that there are no scratches or dirt on the CD or DVD. If the disc is dirty, clean the disc.
3. Select **Start > Computer** and check if the DVD drive is recognized.
(In Windows Server® 2012 R2, right-click **Start**. Then a menu appears. On the menu, click **File Explorer** and check if the DVD drive is recognized.)
-> If the DVD drive is not recognized, restart the equipment.
4. Use another CD or DVD.

< NOTE >

If you use a USB DVD drive, depending on the DVD drive, it may take around 10 minutes to read a disc (CD or DVD) at the startup of the equipment.

If this situation occurs, you may be able to resolve this problem by selecting **disable** for **Legacy USB Support** on the **Advance** tab in the BIOS settings.

(10) Writing to a CD or DVD fails.**<Possible cause>**

The capacity of the HDDs is not sufficient, or a bad CD or DVD is used.

<Action>

1. Check that the CD or DVD is writable.
2. If enough free space is not available for the work area on an HDD, clean up files and increase free space on the HDD.
3. Check that there are no scratches or dirt on the CD or DVD. If the disc is dirty, clean the disc.
4. Use another CD or DVD.

(11) A CD or DVD cannot be ejected.

<Possible cause>

Writing to a disc is ongoing, or there is an error in the DVD drive.

<Action>

1. Check if writing to a disc is ongoing (the drive access lamp is on or flashing). You cannot eject a disc during the write to the disc.
2. Press the eject button a couple of times (at least five times).
3. • Tray type DVD drive
Insert an eject pin into the manual emergency eject hole. When the disc tray opens slightly, hold and pull it out by hand.
- Slot-in type DVD drive
Insert an eject pin into the manual emergency eject hole. When the disc ejects from Disk slot, remove the disc.

< NOTE >

- Turn off the main power of the equipment before you eject a disc by using the manual emergency eject hole. Do not insert an eject pin at an angle or apply too much force.
- An eject pin does not come with the equipment. If an eject pin is not available, use instead a pin that fits the hole of the eject hole.

(12) 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 may 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 **Alt+Ctrl+Delete**. The **Windows Security** window will open. 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. Replace the keyboard with another keyboard to check whether the latter works.
5. Reboot the equipment.

(13) Mouse input is not accepted, or a cursor /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. When you use an optical mouse, check the following items.
 - i) Check if 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 a glass, mirror, or shiny material. (We recommend using a mouse pad designed for use with an optical mouse.)
2. If you use a mouse that is not an optional component provided by the Manufacturer, refer to the manual of 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. Replace the mouse with another mouse to check whether the latter works.
5. When you use a USB KVM switch, read the user's manual that comes with the USB KVM switch.

The problem may 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 see whether the problem goes away.

(14) A USB device (other than a keyboard and a mouse) cannot be recognized or does not work.**<Possible cause>**

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

<Action>

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 requires installing a device driver, install the device driver according to the manual of the USB device and restart the equipment.
4. If the USB device requires an external power supply, make sure that the plug of the power cord of the USB device is connected to the outlet.
5. If the USB device uses USB 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 "4.1(10) Maximum current specifications".) If the USB device can accept an external power supply, connect the device to an external power supply.
6. If the above steps 1 through 5 do not resolve the symptom, a failure of the USB device may be the cause.

Take action according to the manual of the USB device.

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

<Possible cause>

There is an error in the settings of the equipment and 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 a volume>.)
2. When you use speakers, check the following items.
 - i) Make sure that the speakers have built-in amplifiers.
(If the speakers do not have amplifiers, you cannot hear sound.)
 - ii) Make sure that the plug of the power cord of the speakers is connected to the 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.
 - 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 as a MIC input.)
 - vii) Disconnect the cable from the speakers and securely reconnect it to ensure a stable connection.
 - viii) Use another pair of speakers.

<Setting a volume>

1. Click **Start > Control Panel**.
2. Click **Hardware and Sound** and then click **Adjust system volume** to adjust the volume.

(16) A Serial port or a parallel port does not work properly.

<Possible cause>

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

<Action>

1. Disconnect the cable and securely reconnect it to ensure a stable connection.
2. Check to see if the target device has failed.
3. If the OS starts while a serial port is receiving data, use the serial port after the OS starts instead and see whether the problem goes away.

(17) The RAS external contact port does not work properly.

<Possible cause>

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

<Action>

1. Disconnect the cable and securely reconnect it to ensure a stable connection.
2. See "4.8.2 External control specifications" and confirm that the external control specifications are met.

(18) The equipment cannot be shut down.**a) The drive access lamp is on or flashing.****<Possible cause>**

The shutdown process is simply taking a long time.

<Action>

1. Wait until the shutdown process finishes.

b) other than a)**<Possible cause>**

The OS has frozen.

<Action>

1. Press the reset switch to collect a memory dump. Then restart the equipment. When you request an analysis of the memory dump (a service provided for a fee), save the log after you restart the equipment (see “7.5 Maintenance Operation Commands”) and contact our sales representatives.
2. If you cannot restart the equipment at step 1, turn off the power of the equipment according to the instructions in <Forcibly terminating the equipment> below.
3. If executing step 1 does not resolve the problem, remove all USB devices except a keyboard and mouse as well as all extension boards when the power is off and then start the equipment.

<Forcibly terminating the equipment>

If the shutdown fails, press the power switch for at least four seconds. The power is turned off and the product goes into the standby mode.

After the equipment goes into the standby mode, turn off the main power switch on the rear of the equipment to shut down the power.

(19) In the screen resolution setting, an unconnected display is shown.**<Possible cause>**

It is possible that an unconnected display is shown due to the specifications of the OS.

<Action>

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

6.3 STOP Error Codes

A STOP error code provides a summary of an error cause. STOP error codes are displayed on a blue screen as well as embedded in a memory dump file.

<If the OS is Windows® 7 or Windows Server® 2008 R2 >

Table 6-1 shows the error cause corresponding to a STOP error code and a message displayed along with the STOP error code. "Forced recovery from CPU lock" and "Hardware NMI" share the same STOP error code, but if you look at the detailed information displayed under the STOP error code, you can determine what caused the memory dump to be collected. The detailed information can be also checked in the event log (Event ID:800, Source:HFWRAS_SYS). (See "6.4 Event Log".)

If the action suggested in the following table does not resolve the problem, contact the system administrator or maintenance personnel.

Table 6-1 STOP Error Codes

No.	STOP Error code	Contents of the STOP message screen	Error Cause	Action
1	0x00000080	Hardware malfunction. == Detailed Information == 0x9201: IOCHK Error.	Forced recovery from CPU lock	Check if the reset switch was pressed before the STOP message was displayed.
2		Hardware malfunction. == Detailed Information == 0x9202 : PCI Bus Parity Error.	Hardware NMI	Replace an extension board with another board and check again whether the equipment works. Read the description of "5.3 Replacing a Component."
3		Hardware malfunction. == Detailed Information == 0x???: xxxxxxxxxxxxxxxxxxxxxxxxx (*)	Uncorrectable memory error	Check if the main memory is mounted properly. If the error persists even when the main memory is properly mounted, failure of the main memory may be the cause. Contact your system administrator or maintenance personnel.
4	0x00009221	Remote shutdown contact is closed at startup. Check remote shutdown contact.	The remote shutdown input signal was detected during Windows® startup.	For information about the cause of the remote shutdown, ask the system administrator or maintenance personnel.
5	Other than the above (a code that indicates the error cause in more detail)	(A short message that explains the STOP error)	Windows® STOP error	For information about a Windows® STOP error, refer to the Microsoft Knowledge Base.

(*) The corresponding line shows one of the following depending on the error cause.

- 0x9217 : Uncorrectable Error at DIMM B1.
- 0x9217 : Uncorrectable Error at DIMM B2.
- 0x9218 : Uncorrectable Error at DIMM A1.
- 0x9218 : Uncorrectable Error at DIMM A2.

<If the OS is Windows Server® 2012 R2 >

In Windows Server ® 2012 R2, only a Distinguished Name (or STOP error code) is displayed, and the detailed information is not displayed. The detailed information can be also checked in the event log (Event ID:800, Source:HFWRAS_SYS). (See “6.4 Event Log”.)

If the action suggested in the following table does not resolve the problem, contact the system administrator or maintenance personnel.

Table 6-2 Distinguished Names

No.	Distinguished Names (or STOP Error codes)	Contents which recorded in the Event Log	Error Cause	Action
1	NMI_HARDWARE_FAILURE	Reset signal was input. Detailed code = 0x9201.	Forced recovery from CPU lock	Check if the reset switch was pressed before the STOP message was displayed.
2		Reset signal was input. Detailed code = 0x9202.	Hardware NMI	Replace an extension board with another board and check again whether the equipment works. Read the description of “5.3 Replacing a Component.”
3		%1 Detailed code = %2. (*)	Uncorrectable memory error	Check if the main memory is mounted properly. If the error persists even when the main memory is properly mounted, failure of the main memory may be the cause. Contact your system administrator or maintenance personnel.
4	0x00009221	—	The remote shutdown input signal was detected during Windows® startup.	For information about the cause of the remote shutdown, ask the system administrator or maintenance personnel.
5	Other than the above	—	Windows® STOP error	For information about a Windows® STOP error, refer to the Microsoft Knowledge Base.

(*) The corresponding line shows one of the following depending on the error cause.

%1	%2
Uncorrectable Error at DIMM B1.	0x9217
Uncorrectable Error at DIMM B2.	
Uncorrectable Error at DIMM A1.	0x9218
Uncorrectable Error at DIMM A2.	

6.4 Event Log

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

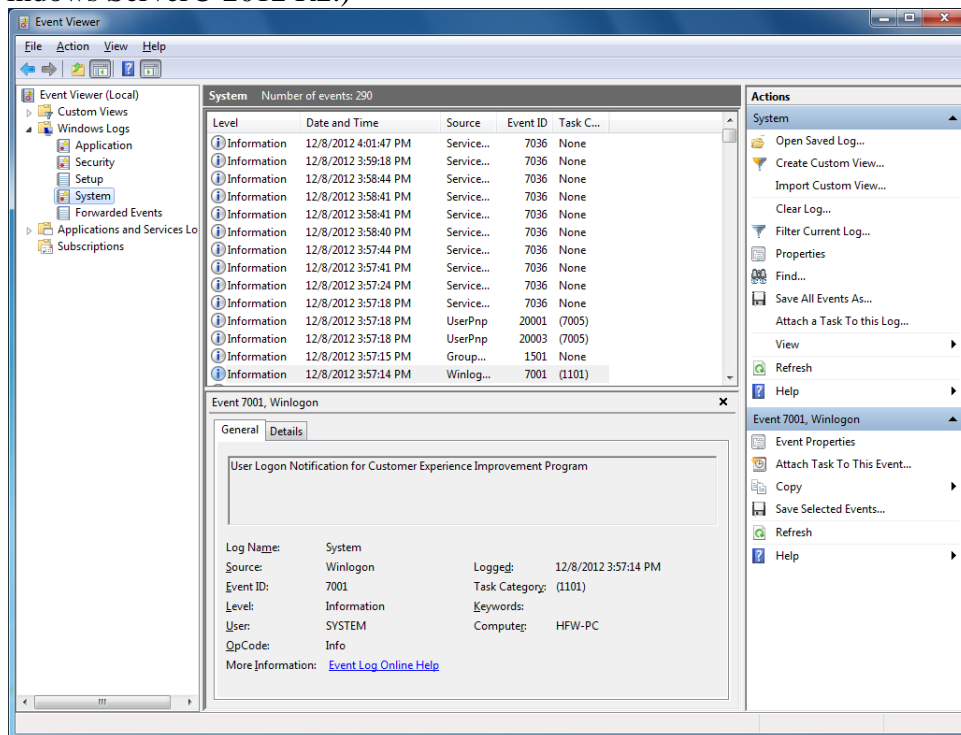
The following procedure shows how to check the event log.

1. Click **Start > Control Panel > System and Security > View event logs**.

(In Windows Server® 2012 R2, right-click **Start**. Then a menu appears. On the menu, click **Control Panel > Administrative Tools**. Then double-click **Event Viewer**.)

2. The **Event Viewer** window opens. Select **Windows Logs** and then select **System** or **Application** to check the system log or application log.

(The display image assumes Windows® 7 but it is similar under Windows Server® 2008 R2 and Windows Server® 2012 R2.)



< NOTE >

- The system log may contain an error log entry of the event “ID7034”. The entry may show a message “The audio service terminated unexpectedly.”, but as long as you can play back audio, there is no problem with the function of the audio ports (LINE IN/LINE OUT).
- The system log may contain an error log entry of the event “ID51”. The entry may show a message “An error was detected on the CD-ROM during the paging operation.”, but as long as you can access the DVD drive, there is no problem.

Table 6-3 lists event log entries unique to the equipment. No.1 through 15 and No.18 through 33 are collected in the system log, and Nos.16 and 17 are collected in the application log.

Table 6-3 Event Log Entries Unique to the Equipment (1/4)

No.	Event ID	Source	Type	Category	Description	Action
1	257	HFWRAS_SYS	Error	HFWRAS	Revolutions of fan at power supply deteriorated remarkably.	Read the description of fan failure in “6.2.2 (1)” and take an action accordingly.
2	258	HFWRAS_SYS	Error	HFWRAS	Revolution of front fan deteriorated remarkably.	Read the description of fan failure in “6.2.2 (1)” and take an action accordingly.
3	259	HFWRAS_SYS	Warning	HFWRAS	The temperature exceeded prescribed value.	Read the description of abnormal temperature in “6.2.2 (1)” and take action accordingly.
4	260	HFWRAS_SYS	Information	HFWRAS	Remote shutdown request occurred.	No handling.
5	261	HFWRAS_SYS	Information	HFWRAS	Revolutions of fan at power supply returned to normal value.	No handling.
6	262	HFWRAS_SYS	Information	HFWRAS	Revolutions of front fan returned to normal value.	No handling
7	263	HFWRAS_SYS	Information	HFWRAS	Temperature returned to prescribed value.	No handling
8	265	HFWRAS_SYS	Warning	HFWRAS	Immediately back up your data and replace drive. A failure may be imminent on the drive of the drive bay%1 (%2).	We recommend you back up the data and replace the drive.
9	266	HFWRAS_SYS	Error	HFWRAS	Revolutions of cpu fan deteriorated remarkably.	Read the description of fan failure in “6.2.2 (1)” and take action accordingly.
10	267	HFWRAS_SYS	Information	HFWRAS	Revolutions of cpu fan returned to normal value.	No handling.
11	268	HFWRAS_SYS	Error	HFWRAS	The computer was shut down because temperature became dangerous.	Read the description of abnormal temperature in “6.2.2 (1)” and take action accordingly.

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Table 6-3 Event Log Entries Unique to the Equipment (2/4)

No.	Event ID	Source	Type	Category	Description	Action
12	270	HFWRAS_SYS	Information	HFWRAS	Used hours on the drive of the drive bay%1 exceeded prescribed value.	We recommend you back up the data and replace the drive.
13	524	HFWRAS_SYS	Information	HFWRAS	In the current settings, memory dump file won't be saved.	Change the setting according to "7.3 When the Saving Memory Dump Confirmation Message is Displayed".
14	525	HFWRAS_SYS	Information	HFWRAS	In the DIMM %1, error correctings have occurred with high frequency.	The DIMM may be out of order. Contact your system administrator or maintenance personnel.
15	539	HFWRAS_SYS	Error	HFWRAS	The "%1" was 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.
16	769	HFWRAS_APP	Error	HFWRAS	An error occurred in %1. errorcode = %2.	An error was generated by the RAS software while the software was running. If restarting the equipment does not resolve the error, contact the system administrator or maintenance personnel.
17	771	HFWRAS_APP	Error	HFWRAS	Because a wrong value is set up in registry value "%1", default value %2 is set up.	If restarting the equipment does not resolve the error, contact the system administrator or maintenance personnel.
18	800	HFWRAS_SYS	Information	HFWRAS	%1 Detailed code = %2.	A STOP error has occurred. Check the error and contact your system administrator or maintenance personnel.
19	900	HFWRAS_SYS	Information	HFWRAS	Power shutdown factor code is %1.	A power shutdown occurred. Contact your system administrator or maintenance personnel.

Table 6-3 Event Log Entries Unique to the Equipment (3/4)

No.	Event ID	Source	Type	Category	Description	Action
20	2001	HFWRAS_SYS	Error	HFWRAS	The drive on the drive bay%1 is OFFLINE because of failure.	Read the description of abnormal temperature in “8.3.2” and take action accordingly.
21	2002	HFWRAS_SYS	Information	HFWRAS	RAID status is OPTIMAL.	No handling.
22	2003	HFWRAS_SYS	Error	HFWRAS	RAS could not get the RAID status. RAID status is UNKNOWN.	Contact the system administrator or maintenance personnel.
23	2004	HFWRAS_SYS	Information	HFWRAS	RAID status was revealed.	No handling.
24	2009	HFWRAS_SYS	Information	HFWRAS	The drive on the drive bay%1 is OFFLINE because of manual operation.	No handling.
25	2011	HFWRAS_SYS	Information	HFWRAS	Rebuilding was completed. But unreadable sectors were detected on the source drive (Drive bay%1). (Media error)	Read the description of abnormal temperature in “8.3.2” and take action accordingly.
26	2012	HFWRAS_SYS	Error	HFWRAS	Rebuilding failed due to error on the destination drive (Drive bay%1).	Read the description of abnormal temperature in “8.2.2” and build a RAID.
27	2013	HFWRAS_SYS	Information	HFWRAS	Consistency check of RAID was started.	No handling.
28	2014	HFWRAS_SYS	Information	HFWRAS	Consistency check of RAID was finished.	No handling.
29	2016	HFWRAS_SYS	Information	HFWRAS	Drive bay%1 has a capacity different from the source disk. Rebuilding was not started. The drive on the drive bay%1 is OFFLINE.	Read the description of abnormal temperature in “5.4.4” and replace the destination drive for the capacity same as the source disk.

6. TROUBLESHOOTING

Table 6-3 Event Log Entries Unique to the Equipment (4/4)

No.	Event ID	Source	Type	Category	Description	Action
30	2019	HFWRAS_SYS	Information	HFWRAS	Media error is occurred on RAID.	Read the description of RAS FEATURES MANUAL "2.8.2" and take action accordingly.
31	2020	HFWRAS_SYS	Error	HFWRAS	RAID status is FAIL.	Contact the system administrator or maintenance personnel.
32	2029	HFWRAS_SYS	Error	HFWRAS	The array is not configured correctly.	Read the description in "8.2.2" and rebuild the RAID.
33	2042	HFWRAS_SYS	Error	HFWRAS	Multiple arrays were detected. The drive which used in the other device might be attached on the drive bay %1.	Read the description in "8.4.3 (1)" and take an action accordingly.

No.8: %1 denotes the drive bay number. %2 denotes the manufacturer and the model name of the drive.

No.12: %1 denotes the drive bay number.

No.14: %1 denotes the slot number of the DIMM.

No.15: %1 records one of the following:

FAN, TEMP, RMTSTDN, MEM, CPU, TEMPLOG, WDT, RAID1, RAID_SMART, SMART, USETIME, RASLOG, INTERNAL - LOGD

No.16: %1 denotes the function terminated with an error. %2 denotes the error code.

No.17: %1 denotes the registry key that has an illegal value. %2 denotes the default value of the registry key.

No.18: %1 and %2 record one of the following combinations:

%1	%2
Reset signal was input.	0x9201
PCI Bus Parity Error	0x9202
Uncorrectable Error at DIMM B1.	0x9217
Uncorrectable Error at DIMM B2.	
Uncorrectable Error at DIMM A1.	0x9218
Uncorrectable Error at DIMM A2	


No.19: %1 denotes the power shutdown reason code.

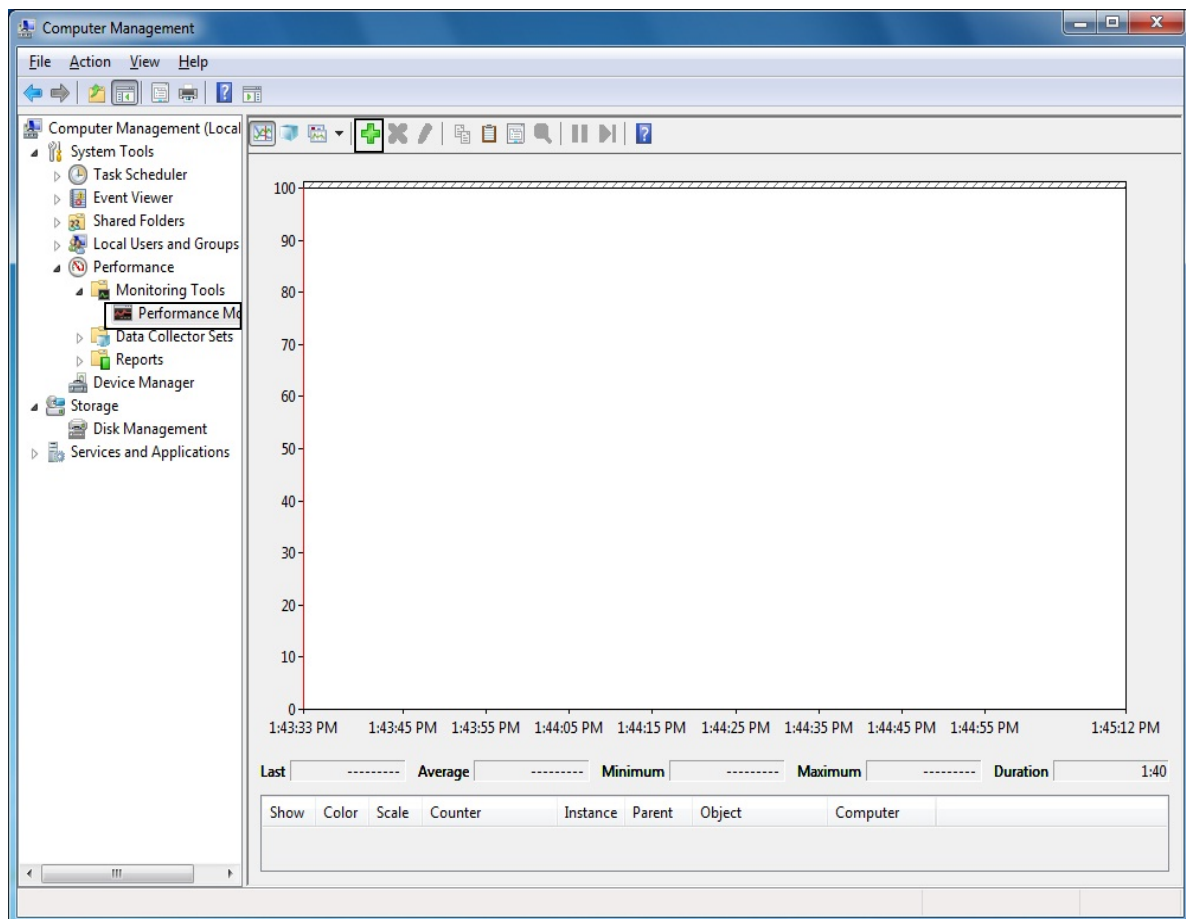
No.20, No.24, No.25, No.26, No.29, No.33 : %1 denotes the Drive bay No.

6.5 Checking the System Load by Using Performance Monitor

Performance Monitor that comes with Windows® is used for monitoring the usage of the CPU and memory. Use this tool, for example, when you analyze the system load. (The display image assumes Windows® 7 but it is similar under Windows Server® 2008 R2 and Windows Server® 2012 R2.)

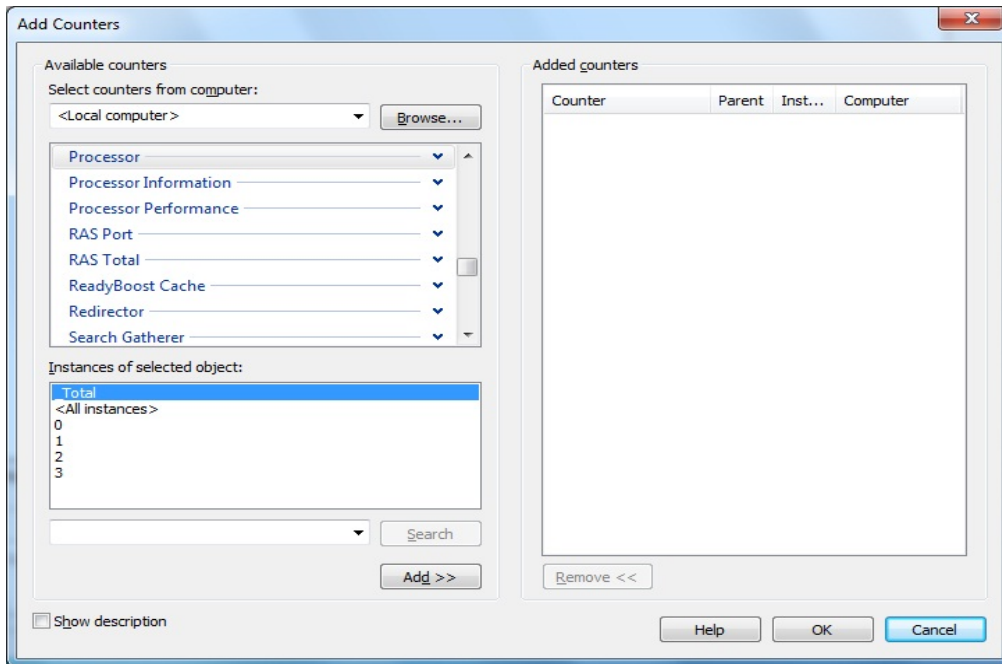
The following shows how to start the performance monitor:

1. Click **Start > Control Panel > System and Security > Administrative Tools**.
(In Windows Server® 2012 R2, right-click **Start**. Then a menu appears. On the menu, click **Control Panel > Administrative Tools**.)
2. Double-click **Performance Monitor**.
3. The **Performance Monitor** window opens. Click **Performance Monitor** and then click  .

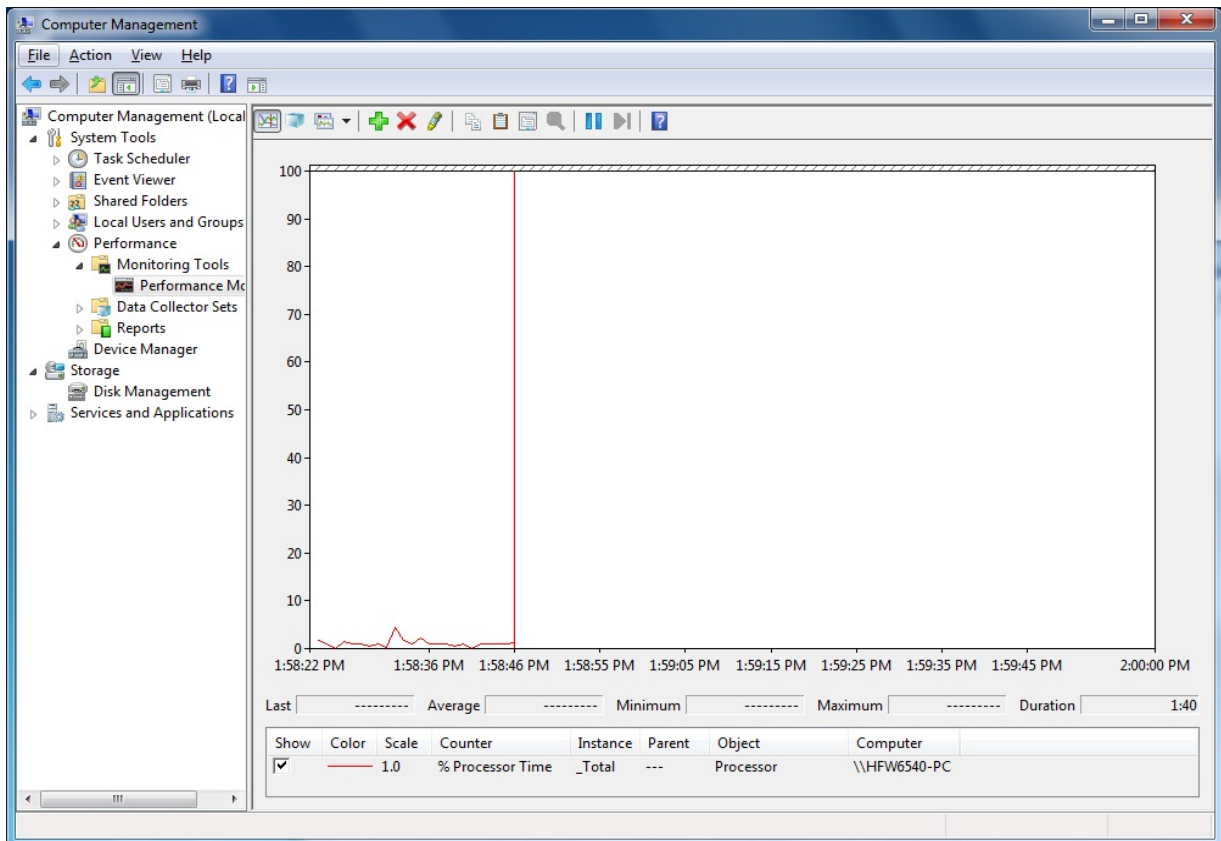


6. TROUBLESHOOTING

- The **Add Counters** window opens. If you select items such as Processor, Memory, Physical Disc, or Network Interface and click **Add>>**, the performance of those items will be monitored. Click **OK**.



- In the **Performance Monitor** window, you can check the performance of the items you selected.



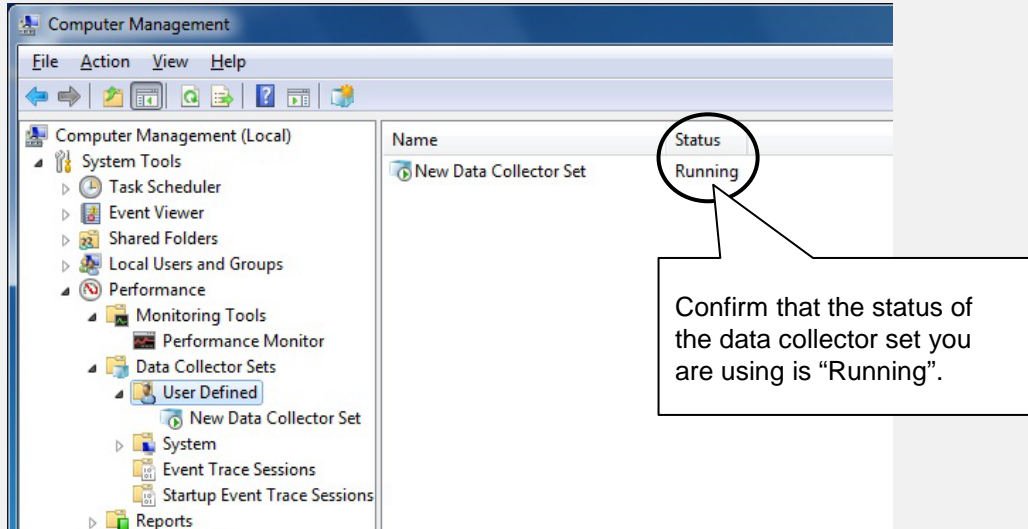
The following table shows a list of performance counters most closely related to the performance of the equipment.

Table 6-4 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, the CPU processing power is likely to be a bottleneck.
2	Memory	Pages/sec	Indicates the number of pages per second that are read from or write to the disk in order to resolve page faults. If this value is high, it is likely that the amount of memory is not sufficient. The closer this value is to 0, the better.
3		Available Bytes	Indicates the size of physical memory available for processes. If this value indicates 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 never be paged out to the disk and stays in the physical memory as long as it is allocated. If this value indicates an increasing trend, it is likely that there is a memory leak.
5	PhysicalDisk	%Disk Time	Indicates the percentage of time that the disk is busy reading and writing. If this value is continuously high, the disk performance is likely to be a bottleneck.
6	Network Interface	Bytes Total/sec	Indicates the number of bytes per second that are sent and received by the network adapter. If this value is continuously high compared to the value of No.7, the network is likely to be a bottleneck.
7		CurrentBandwidth	Shows the network bandwidth.

< NOTE >

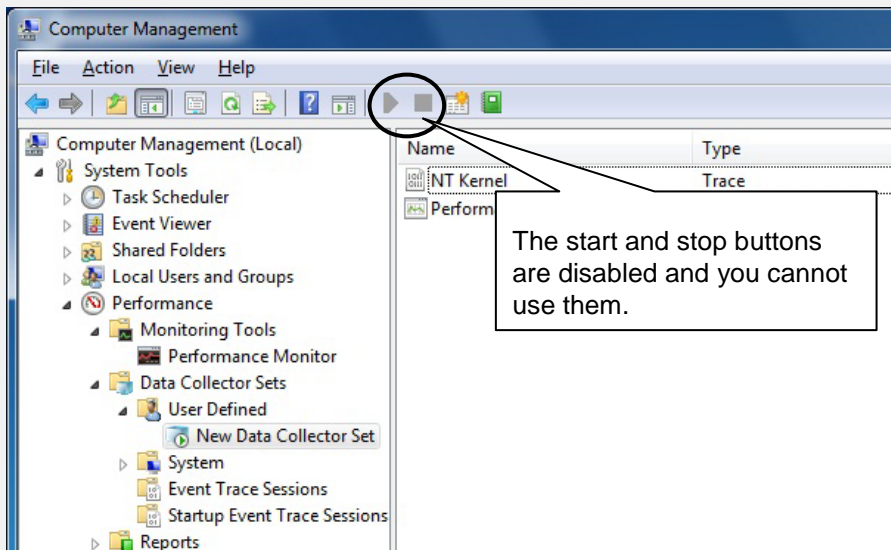
You may not be able to start collecting performance counter data when the system load is high. After you start collecting performance counter data, confirm that the status of the data collector set you are using is “Running”.



Confirm that the Performance Counter data collection has started properly.

In addition, if the system load is high or if you repeatedly start and stop collecting performance counter data, sometimes you cannot 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 the data.



Performance Counter data cannot be collected.

If you cannot start collecting performance counter data even after you have restarted Performance Monitor, restart the system.

6.6 Digital LED for Status indication

The Digital LED for Status indication is used for displaying a POST code at system startup. They are also used for displaying a hardware status code when an error occurs in the hardware during system operation.

The Digital LED for Status indication and the status indication LEDs may remain lit even after the equipment is shut down and put into the standby mode. They remain lit until the main power is shut down or the power is turned on again.

It should be noted that the Digital LED for Status indication may display a code even when there is no error.

(Example: when the BIOS screen is displayed:1F, when the POST code is displayed from turning on the power supply unit to OS boot)

As shown below, the numerical value lamp shows the digits from 0 to F hexadecimally.



6.6.1 POST messages

Power On Self Test (POST) is a function whereby the system BIOS makes routine checks for hardware failure 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 indication situated on the front of the equipment.

When a POST code is displayed, the BIOS status lamp (orange) in the status indication LEDs is lit.

The following table shows the POST codes indicated when the system stops during startup and the respective actions for resolving them.

Table 6-5 POST Codes and Stop Factor/Action (1/2)

POST code	Stop factor/Action	POST code	Stop factor/Action
C7 F8 FB	There may be a problem with the main memory or CPU. Check if the main memory is mounted properly.	57 C0	There may be a problem with the main memory. Check if the main memory is mounted properly.
81 83	There may be a problem with the keyboard or mouse. Check if the cables are connected correctly and the keyboard and mouse work properly.		

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Table 6-5 POST Codes and Stop Factor/Action (2/2)

POST code	Stop factor/Action	POST code	Stop factor/Action
39	The video function is not working properly. When a video board is mounted on an extension slot, make sure the board is mounted properly.	C5 C6 C8	The CPU may not be working properly.
1E 5E B0 C8 CF F8	There may be a problem with an extension board. Remove the extension board from the slot and mount the board on another slot. Then check if the extension board works.	25 38 4B 4D 69	There may be a problem with the boot device. Check if the HDDs and the DVD drive are mounted properly. If they are mounted properly, the boot device may not be working properly.
53 B2	There may be a problem with the keyboard, mouse, or a serial device. Check if the cables are connected correctly and the connected devices work properly.	5C 82	There may be a problem with a storage medium (HDD, USB memory, or the like). Check if they are installed properly. If they are mounted properly, the storage medium may be out of order.
26 34 82	There may be a problem with a USB device. Check if USB devices are connected correctly and the connected devices work properly.	E0 E1 E2 F2	Rotation of the power supply fan is abnormal. Read the description of fan failure in “6.2.2 (1)” and take action accordingly. Rotation of the front fan is abnormal. Read the description of fan failure in “6.2.2 (1)” and take action accordingly. Rotation of the CPU fan is abnormal. Read the description of fan failure in “6.2.2 (1)” and take action accordingly. A backup drive (HDD) is mounted. Shut down the power and remove the backup drive.

6.6.2 Displaying a hardware status code

A hardware status code is displayed when an error occurs in the hardware during system operation.

When the hardware status code is displayed, the RAS status lamp (red) in the status indication LEDs is lit.

Table 6-6 Hardware Status Code and Cause/Action

Status code	Cause	Action
11	Rotation of the power supply fan is abnormal.	Read the description in subsection 6.2.2 (1) and take action accordingly.
12	Rotation of the front fan is abnormal.	
13	Rotation of the CPU fan is abnormal.	
21	The temperature is abnormal.	Read the description in subsection 6.2.2 (1) and take an action accordingly.
31	Failure is predicted for the drive in drive bay 1.	We recommend you back up the data and replace the drive.
32	Failure is predicted for the drive in drive bay 2.	
33	Failure is predicted for the drive in drive bay 3.	
41	The drive bay1 is abnormal.	Read the description of "8.4.2 Recovering from HDD failure in one side" and replace an HDD.
42	The drive bay2 is abnormal.	
4A	RAID array configuration is abnormal.	Read the description of "8.4.3 (1)" and take action accordingly.
4B	RAID array is failure (HDD failure in both sides.)	Contact your system administrator or maintenance personnel.
4C	RAID status is unknown (RAS software could not get the RAID status.)	Contact your system administrator or maintenance personnel.
4D (*)	Media error is occurred on RAID.	Read the description of RAS FEATURES MANUAL "2.8.2" and take action accordingly.

(*) This code is not displayed in default setting. Read the description of RAS FEATURES MANUAL "2.8.2" when you want to display this code.

< NOTE >

- If a code other than one of the above is displayed, contact the system administrator or maintenance personnel.

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CHAPTER 7 MAINTENANCE OPERATIONS

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

The screen images shown in this chapter are the ones for Windows® 7, but the displayed contents are basically the same for Windows Server® 2008 R2 and Windows Server® 2012 R2.

7.1 Overview

RAS features are designed to achieve highly reliable features of the equipment. The following table shows an overview of the RAS features of this equipment.

Category		Item
Monitoring		Hardware status monitoring
		OS hangs monitoring
		Watchdog timer monitoring
GUI features setting		RAS features setting window
Status check	GUI display	Hardware status window
	Notification	Event notification
		Pop-up notification
		Digital LEDs for Status indication
		Remote notification
		Status acquisition by using library functions
Control	Shutdown /Startup suppression	Automatic shutdown
		Shutdown by Library functions
		Startup suppression when severe failure occurs
		Controlling general purpose external contacts
		Controlling the Digital LEDs for Status indication
Library functions		RAS library
Maintenance/ Failure analysis	Memory dump related	Memory dump collection
		Error cause notification with STOP error code
		Log information collection window
		Maintenance operation support commands
		Logging the trend of the temperature inside the chassis
Simulation		Hardware status simulation

<Monitoring>

(1) **Hardware status monitoring**

This function monitors the hardware status of this equipment including the status of the fans and drives as well as the temperature inside the chassis.

(2) **OS hangs monitoring**

This function monitors the operational state of the OS by using a dedicated timer implemented on this equipment. As long as a process with the highest priority (real-time priority class) can run properly, the status lamp on the front of this equipment is lit in green.

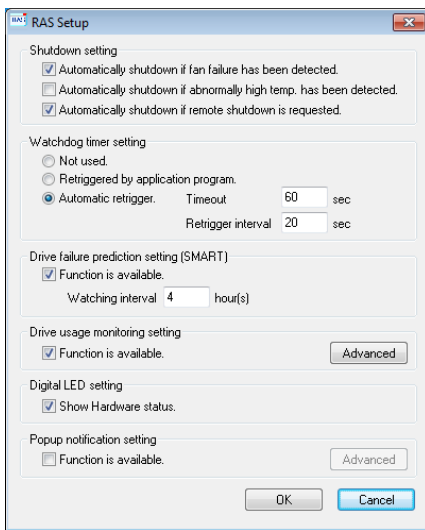
(3) **Watchdog timer monitoring**

This feature monitors whether processes are scheduled properly, using the watchdog timer implemented on this equipment. This feature also offers a library to use the watchdog timer.

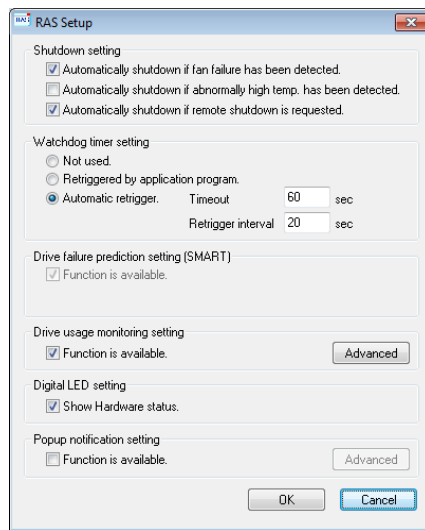
<GUI feature setting>

(4) **RAS setting window**

This window provides a graphical user interface for configuring RAS feature settings including the condition of automatic shutdown and the setting of the watchdog timer,



Other than D model

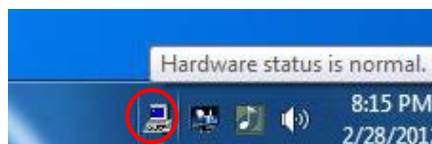


D model

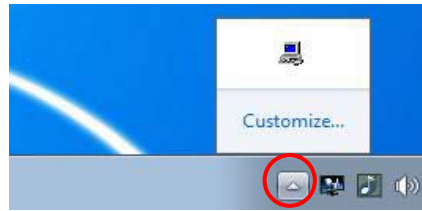
<Status check>

(5) **Hardware status window**

This window displays the hardware status of this equipment by using a graphical interface. There is always an icon in the notification area of the taskbar to display the hardware status.



This icon is not shown in the notification area of the taskbar by default, but if you click the arrow at the side of the notification area, the icon will appear. Furthermore, if you click **Customize**, you can set this icon to be displayed in the notification area of the taskbar.



(6) Event notification

This feature enables a user application to check the hardware status of this equipment by monitoring the status of event objects.

(7) Pop-up notification

This feature notifies a user that an error has occurred in the hardware of this equipment by displaying pop-up messages.

(8) Digital LEDs for Status indication

The Digital LEDs for Status indication are on the front of this equipment and notify a user that an error occurred in the hardware of this equipment. These LEDs can be used by a user application in order to, for example, notify the a failure of the application.

(9) Remote notification

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 function enables a user application to get the hardware status of this equipment by using the RAS library.

<Control>

(11) Automatic shutdown

This feature automatically shuts down the equipment when a fan failure, abnormal temperature inside the chassis, or a remote shutdown signal input is detected. Use “(4) RAS feature setting window” to enable or disable the automatic shutdown feature.

(12) Shutdown using library functions

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

(13) Startup suppression when severe failure occurs

This feature suppresses startup of this equipment when a failure, such as a fan failure is detected during OS startup in order to protect the hardware.

(14) Control of general purpose external contacts and Digital LEDs for Status indication

This feature enables a user to control the general purpose external contacts and the status display digital LEDs with the RAS library.

Four input and three output general purpose external contacts are available. If you use those contacts, signals can be input from an external device to this equipment, and signals can be output from this equipment to an external device.

<Library functions>

(15) RAS library interface

This interface offers library functions for recording log information in addition to the library functions offered by items (10), (12) and (14).

<Maintenance / Failure analysis>

(16) Memory dump collection

This feature records the contents of the system memory in a file (memory dump file) when the reset switch is pressed after a failure has occurred, for example, after the equipment stops unexpectedly. By analyzing the data in this memory dump, you can investigate the cause of the failure.

(17) Error cause notification with a STOP error code

This feature detects a blue screen caused by an error with the STOP error code 0x80 and records the cause of the blue screen in the event log.

(18) Log information collection window

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

(19) Maintenance operation support commands

These commands include a command used for saving failure information such as memory dump files and event log files to an external medium.

(20) Trend logging 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>

(21) Hardware status simulation

This feature simulates the hardware status of this equipment including the status of the fans and drives as well as the temperature inside the chassis. By using this feature, you can test a user application without an actual hardware failure.

This manual explains the features in (13), (16), and (19). For details about other features, refer to “HF-W7500 Model 40 RAS FEATURES MANUAL”. For information in (8) POST messages, see “6.6.1 POST messages”.

7.2 Collecting a Memory Dump

When one of the errors in Table 7-1 occurs, this equipment records the contents of the system memory in a file (memory dump file). Then a blue screen appears and a STOP error code is displayed. By analyzing the data in this memory dump file, you can investigate the cause of the failure.

Table 7-1 Error That Trigger a Memory Dump

Cause	Description
Forced recovery from OS hang	When the OS hangs, press the reset switch or input a remote reset signal to the external contact RMTRESET (*1). Then a memory dump is collected.
Hardware NMI	When a severe failure (such as uncorrectable memory error or a PIC bus parity check error) occurs in the hardware of this equipment, a non-maskable interrupt (NMI) is generated and a memory dump is collected.
Microsoft® Windows® STOP error	When a fatal error occurs in the Microsoft® Windows® kernel, a memory dump is collected.

(*1) Do not input a remote reset signal continuously to the RMTRESET external contact. If you do, this equipment cannot collect a memory dump.

For details about the displayed STOP error code, see “6.3 STOP Error Codes”.

To select the memory dump file type, open System in Control Panel. You can select from the following three types defined below (four types in Windows Server 2012 R2). Because the memory dump file type determines how far you can analyze the failure by using the dump file, we recommend selecting “Complete memory dump” whenever you can. The factory default is “Complete memory dump”.

- Complete memory dump The entire contents of system memory is 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 (*2) must have enough free space to hold a paging file about one third the size of the physical memory.
- Minimum memory dump The minimum information necessary for identifying what caused the equipment to stop is recorded. The boot volume (*2) must have enough free space to hold a paging file of more than 2 MB.
- Automatic memory dump (*3) Similarly to the kernel memory dump, the kernel memory is recorded. The difference from the kernel memory dump is that the Auto memory dump can make the initial paging file small from the physical memory size.

(*2) The boot volume is a volume that contains Windows® files and Windows® support files.

(*3) Available only in Windows Server 2012 R2.

In order 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 recommended for this equipment (*4).

(*4) This means the settings in the **Advanced system settings** in the Control Panel are as follows. These settings are preset in this equipment when the equipment is shipped from the factory.

- In the **Startup and Recovery**, **Complete memory dump** is selected as memory dump type.
- In the **Startup and Recovery**, **Overwrite any existing file** is selected.
- In the **Performance**, the **Initial size** and **Maximum size** of the virtual memory is the physical memory size plus 300MB.

<Examples of blue screens>

The following shows examples of screens displayed after an incident occurs that triggers a memory dump or after the reset switch is pressed. "Forced recovery from OS hang" and "Hardware NMI" share the same STOP error code, but if you look at the detailed information displayed under the STOP error code, you can determine what caused the memory dump to be collected.

(a) Forced recovery from OS hang

```
Hardware malfunction.
***STOP :0x00000080(0x004F4454,0x00000000,0x00000000,0x00000000)

== Detailed Information ==
0x9201:   IOCHK Error.
Beginning dump of physical memory
Physical memory dump complete. (when the dump is finished)
Contact your system administrator or technical support group.
```

(b) Hardware NMI

```
Hardware malfunction.
***STOP :0x00000080
(0x00000080,0x00003000,0x00000000,0x00000000)

== Detailed Information ==
0x9217:   Uncorrectable Error at DIMM B.
Beginning dump of physical memory
Physical memory dump complete. (when the dump is finished)
Contact your system administrator or technical support group.
```


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(c) Windows® STOP error

```
***STOP :0x0000001e
(0x0000009a,0x80123f36,0x02000000,0x00000246)
Unhandled Kernel exception c000009a from 80123f 36
Address 80123f 36 has base at 80100000-ntoskml.exe

(A list of drivers and a list of stacks are displayed below.)
Beginning dump of physical memory
Physical memory dump complete. (After the dump is finished)
```

< NOTE >

- In Windows Server ® 2012 R2, only a Distinguished Name (or STOP error code) is displayed, and the detailed information is not displayed. The detailed information can be also checked in the event log

Your PC ran into a problem and needs to restart. We're just collecting some error info, and then we'll restart for you. (40% complete)

If you'd like to know more, you can search online later for this error :
NMI_HARDWARE_FAILURE

< NOTE >

- The time required for collecting a memory dump depends on the type of dump file collected, the configuration of the mounted drives, and the memory capacity. It should be noted that if you keep the factory setting, “Complete memory dump”, for the memory dump file type, the time required may be extremely long. In the D model, memory dump takes about two minutes before it is started.
- After “Beginning dump of physical memory” is displayed on the blue screen, the count on the screen that shows the progress of the memory dump sometimes stops being updated. This is because collection of the memory dump failed due to an error of the file system or a hard disk.

If this happens, record the first five lines of the STOP message screen. Then press the reset switch or turn the power off and then back on to restart the equipment. For example, if a hardware NMI occurs, the screen in (b) is displayed, so the following information must be recorded.

```
Hardware malfunction.
***STOP :0x00000080 (0x00000080, 0x00003000, 0x00000000, 0x00000000)

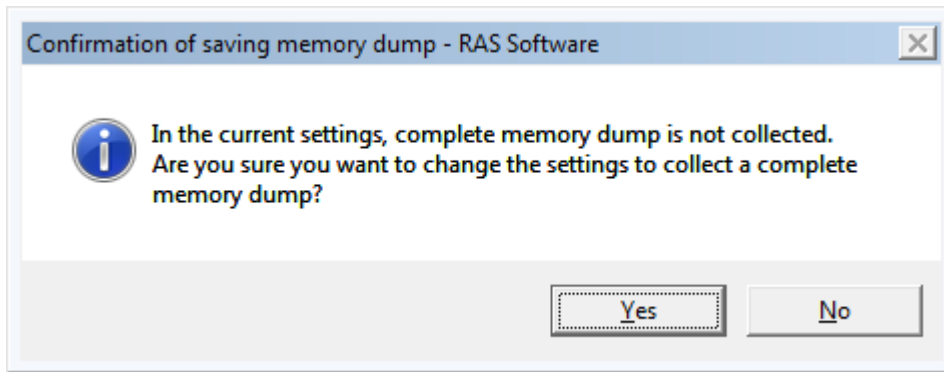
== Detailed Information ==
0x9217:   Uncorrectable Error at DIMM B1.
```

As an exception, in the case of a Windows® STOP error, only the first two lines of the STOP message screen are needed. For example, if the screen in (c) above is displayed, the following information must be recorded.

```
***STOP. 0x0000001e (0x0000009a, 0x80123f36, 0x02000000, 0x00000246)
Unhandled Kernel exception c000009a from 80123f 36
```

7.2.1 Memory Dump Confirmation Messages

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, or if a complete memory dump cannot be collected because the memory dump setting has changed, this equipment displays the following message and records an event in the event log.

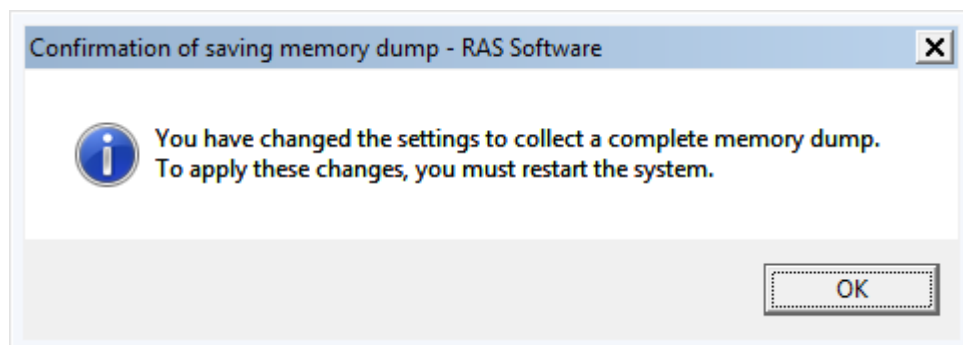


If you want to use the system with the memory dump setting recommended for this equipment, click **Yes** to close the message box. The memory dump and virtual memory settings are updated and the area for saving a memory dump is allocated automatically as required.

< NOTE >

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

If the following message is displayed afterward to prompt you to restart the system, click **OK** to close the message box, and then restart the system.



7.2.2 Configuring the settings related to a memory dump

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

Use the following procedure when you want change the memory dump setting to the one recommended for this equipment. You do not have to follow this procedure if you are already using the memory dump setting recommended for this equipment, for example, immediately after the equipment is shipped from the factory, or if you click **Yes** in "**7.2.1 Memory Dump Confirmation Messages** "

< NOTE >

Before starting a procedure in this subsection, you must log on to the local computer by using an administrator account registered on the computer (as a member of the Administrators group).

(1) Configuring virtual memory

1. Click **Start > Control Panel > System and Security**. Then click **System**.
(In Windows Server® 2012 R2, right-click **Start**. Then a menu appears. On the menu, click **Control Panel > System and Security**. Then click **System**.)
 2. Under **Task** on the left side of the window, click **Advanced system settings**.
 3. If you see **User Account Control window**, click **Yes**.
 4. On the **Advanced** tab page, click **Settings** under **Performance**.
 5. In the **Performance Options** window, click the **Advanced** tab. 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 that stores the paging file you want to change. For the sake of explanation, assume C: (system drive) is clicked here.
 8. Select **Custom size**. In the **Initial size (MB)** or **Maximum size (MB)** box, type 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 4GB: "4267"
 - If the physical memory size is 8GB: "8363"
 - If the physical memory size is 16GB: "16555"
 - If the physical memory size is 32GB: "32939"
- You can check the physical memory size using the following procedure.
- a) Click **Start > Control Panel > System and Security**.
 - b) Click **System**. Then check the value of "Memory (RAM) :

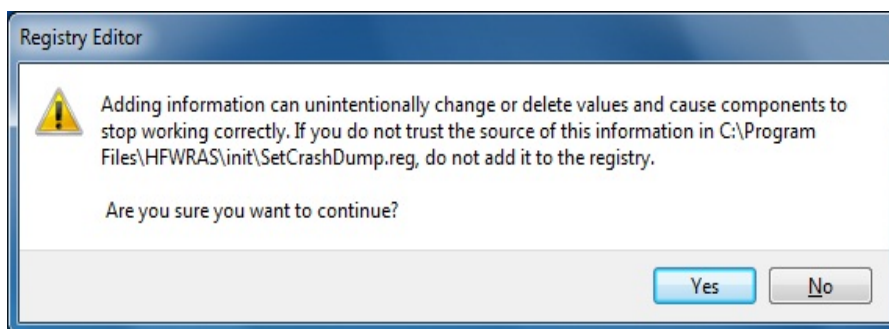
9. Click **OK**.

(2) Specifying a memory dump file

1. Click **Start > Control Panel > System and Security**. Then click **System**.
(In Windows Server® 2012 R2, right-click **Start**. Then a menu appears. On the menu, click **Control Panel > System and Security**. Then click **System**.)
2. Under **Task** on the left side of the window, click **Advanced system settings**.
3. If you see the **User Account Control** window, click **Yes**.
4. In the **Advanced** tab page, click **Settings** under **Startup and Recovery**.
5. In the **Dump file** box, type a memory dump file name.
By default, “%SystemRoot%\MEMORY.DMP” is specified for this box.
Unless it is necessary, you do not have to enter a name.
6. Select the **Overwrite any existing file** check box.
7. Click **OK**.

In order to enable a Complete memory dump as recommended for this equipment, follow the procedure below.

1. Click **Start > All Programs**. Then click **Accessories > Run**.
(In Windows Server® 2012 R2, right-click **Start**. Then a menu appears. On the menu, click **RUN**.)
2. In the **Open** box, type the following characters and click **OK**.
C:\Program Files\HFWRAS\init\SetCrashDump.reg
(Alternately, double-click the SetCrashDump.reg file under C:\Program Files\HFWRAS\init.)
3. If you see the **User Account Control** window, click **Yes**.
4. The following message box will open. Click **Yes**.



5. A message box will appear indicating that information has been added successfully. Click **OK**.

(3) Reserve the area for saving a memory dump

Reserve the area used for saving a memory dump using the createdmp command. For details, see "7.4 Maintenance Operation Commands".

7.3 Startup Suppression on Serious Failure Detection

This equipment suppresses startup of the equipment when one of the following incidents is detected during Windows® startup in order to protect the hardware.

1. Fan failure
2. Remote shutdown signal input

< NOTE >

- In the case of a remote shutdown signal input, startup is suppressed only when “Enable automatic shutdown at remote shutdown input” is selected in the RAS setting window. If a automatic shutdown is not selected, startup is not suppressed. For information about how to use the RAS setting window, refer to “HF-W7500 Model 40 RAS FEATURES MANUAL”. When a remote shutdown signal input is detected, the equipment displays a blue screen and then stops. (In Windows Server 2012 R2, a message, "... and then we'll restart for you." is displayed, but actually the equipment will not restart automatically.) For information about the STOP error code of this case, see “6.3 STOP Error Codes”.

7.4 Maintenance Operation Commands

This section explains how to use maintenance operation commands. These commands are used when problems occur in the equipment and during preventive maintenance. All these commands are started at the command prompt when they are used.

Table 7-2 shows a list of maintenance operation commands.

Table 7-2 Maintenance Operation Commands

Command name	Feature
logsave	Used for collecting data for preventive maintenance or data for post-failure analysis during preventive maintenance or when problems occur.
mdump	Used for copying a memory dump file to a portable medium when a memory dump is collected due to a STOP error.
createdmp	Used for reserving a disc area for a memory dump file when a message is displayed indicating the capacity of 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 charged services to analyze the data collected by these maintenance operation commands, such as memory dump files and data for failure analysis.

To start the command prompt, follow the procedure below.

(1) Starting the command prompt

<In the case of Windows® 7 and Windows Server® 2008 R2>

1. Log on to the computer by using an administrator account.
2. Click **Start**.
3. Click **All Programs**.
4. Click **Accessories**.
5. Right-click **Command Prompt** and click **Run as administrator**.

(If the administrator account you used for logon is a built-in administrator account, simply click **Command Prompt**.)

If you see the **User Account Control** window, click **Yes**.

<In the case of Windows Server® 2012 R2>

1. Sign in to the computer using an administrator account.
2. Right-click **Start**. Then a menu appears. On the menu, click **Command Prompt (Admin)** to start the command prompt.

(If the administrator account you used for sign-in is a built-in administrator account, simply click **Command Prompt**.)

If you see the **User Account Control** window, click **Yes**.

7.4.1 Log information collection command (logsave)

<Name>

logsave - Collecting log information

<Syntax>

logsave [-e file name][Directory]

<Feature>

The logsave command saves the data used for preventive maintenance and post-failure analysis of problems. The data is compressed and recorded as one file (File name: logsave.zip).

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

-e File name: The data previously saved by the logsave command will be decompressed. For the file name, specify the absolute path of the file you want to decompress. If this option is not used, the logsave command will save the data.

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

When the -e option is used, specify the directory where you want to store the decompressed data. If this option is not used, the data is decompressed under the current directory.

Table 7-3 shows the information collected by the logsave command.

Table 7-3 Information Saved by logsave

Item	Description
Windows® event log file	Backup of the event log file
RAS software log data	RAS software operation log
RAS software user setting information	User setting definition file for pop-up notification
Windows® version information	Version information of the Windows® system files and driver files
Minimum memory dump	Files under the directory used for storing a minimum memory dump
System information	System information including hardware resources and 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 and configuration information of the RAS software
Output of the ipconfig command	Network that sets information
RAID log data	RAID operational log (D Model only)

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<Diagnosis>

When this command is terminated with an error, the following error message is displayed. If a directory for saving data does not exist, an error message from the Windows® xcopy command is displayed.

Table 7-4 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. Log on to the computer by using an administrator account and run the command again. If User Account Control (UAC) is enabled, start the command prompt with administrator privileges and run the command.

< NOTE >

- When you run the logsave command, log on to the computer by using an administrator account registered on computer (as a member of the Administrators group). You cannot run multiple instances of the logsave command simultaneously.
- If User Account Control (UAC) is enabled, start the command prompt with administrator privileges according to “7.4 (1) Starting a command prompt” and run the command.
- The log information can also be collected by using a program in the start menu (In Windows Server® 2012 R2, **Apps** view). For details, refer to “HF-W7500 Model 40 RAS FEATURES MANUAL”.

7.4.2 Memory dump file copy command (mdump)

<Name>

mdump - Copying a memory dump file

<Syntax>

mdump [-n | -e file name] <Copy (Decompress) destination path name>

<Feature>

The mdump command compresses a memory dump file collected by Microsoft® Windows® when the equipment stops unexpectedly. Then the command copies the compressed memory dump file to a portable medium. The dump file, which is specified in the **Startup and Recovery** window displayed by selecting **Control Panel > System and Security > System > Advanced system settings** and clicking **Settings** under **Startup and Recovery**, and all the files under the minimum dump directory will be saved. The memory dump file is compressed and stored as a file (File name: memory.mcf).

As an option, if you use the -e option, the compressed file will be decompressed.

The following options are available for this command:

-n: Files will be copied without compression.

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

Copy destination path name: When the -e option is not specified, specify the drive name of the copy destination. If you want to copy files to a directory, specify a full path including the directory name.

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

- A memory dump file is copied to the copy (decompress) destination specified by this command.
- If a file with the same name as the copy (decompress) destination already exists at the same location, the file is 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 will be displayed to show how to use the command.

< NOTE >

- When you run the mdump command, log on to the computer by using an administrator account registered on the computer (as a member of the Administrators group). You cannot run multiple instances of the mdump command simultaneously.
- If User Account Control (UAC) is enabled, start the command prompt with administrator privileges according to “7.4 (1) Starting a command prompt” and run the command.

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<Diagnosis>

When the mdump command finishes, exit code 0 is returned after copying (decompressing) a memory dump file is complete. Then some of the following messages may be displayed.

Table 7-5 Messages of the mdump Command

Message	Description
Warning: Memory dump file was not copied.	The memory dump file could not be copied.
Warning: Minidump files were not copied.	Some minimum memory dump files could not be copied.

(Note) If these messages are displayed, to show the cause of these messages, one of the following error messages may be displayed depending on the way the command was executed.

When this command is terminated with an error, one of the following error messages is displayed and exit code 1 is returned.

Table 7-6 Error Messages of the mdump Command

Message	Description
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 has 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. Log on to the computer by using an administrator account and run the command again. If User Account Control (UAC) is enabled, start the command prompt with administrator privileges and run the command.

7.4.3 Disk area allocation command for saving a memory dump (createdmp)

<Name>

createdmp - Reserving a disk area for a memory dump file

<Syntax>

createdmp

<Feature>

The createdmp command creates a vacant memory dump file beforehand and reserves the disk area for a memory dump in order to prevent the situation where collecting a memory dump fails because the disk capacity is insufficient. By using this command, you can avoid a failure in collecting a memory dump caused by a lack of disk capacity.

The createdmp command reserves a disk area if the following conditions are met. If those conditions are not met, the command terminates with an error. Make sure that the memory dump settings are appropriate and then retry this command. For information about how to set up the memory dump settings, see “7.2.2 Configuring settings related to a memory dump”.

- A “Complete memory dump” is specified to be collected.
- The file name of the memory dump must be correctly input.
- The memory dump file must be able to be overwritten.
- After the area for the memory dump file is allocated, the partition used for allocation still

has free space of at least 10 % of the disk capacity:

The size of the disk area to be allocated is as follows.

- The size of the physical memory size plus 10 MB.

< NOTE >

- When you run the createdmp command, log on to the computer by using an administrator account registered on the computer (as a member of the Administrators group). You cannot run multiple instances of the createdmp command simultaneously.
- If User Account Control (UAC) is enabled, start the command prompt with administrator privileges according to “7.4 (1) Starting a command prompt” and

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<Diagnosis>

When this command finishes normally, the command exits without output in the command prompt window. When this command is terminated with an error, the following error message is displayed.

Table 7-7 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 with the current setting. In the memory dump settings, select a "Complete memory dump" option.
Error: Free disk space is too low.	The free space on the disk is too low. Increase the free space on the disk and retry.
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 has 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. Log on to the computer by using an administrator account and run the command again. If User Account Control (UAC) is enabled, start the command prompt with administrator privileges and run the command.

7.4.4 RAS information display command (getrasinfo)

<Name>

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

<Syntax>

getrasinfo [/status | /setting] [/e file name]

<Feature>

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

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

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

/setting: The command displays the configuration information of the RAS software.

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

Table 7-8 shows the information displayed by the getrasinfo command.

Table 7-8 Information Displayed by the getrasinfo Command

Item	Description
Status of the equipment	<ul style="list-style-type: none"> • Fan status • Temperature status • RAID status (D model only) • Drive status • Memory status
RAS software settings	<ul style="list-style-type: none"> • Automatic shutdown setting • Watchdog timer setting • Self-Monitoring, Analysis and Reporting Technology (SMART) setting • Drive power-on hours monitoring setting • Digital LEDs for Status indication setting • Pop-up display setting

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<Display output>

The following is an example of display output when the `getrasinfo` command is executed without options.

```
<<getrasinfo result>>
Date: 2014/07/30 17:28:30
Computer Name: HF-W7500 Model140 * Model

[Hardware Status]
[Fan condition]
PS fan status:          Normal
Front fan status:      Normal
CPU fan status:        Normal

[Temperature condition]
Internal temperature status: Normal
Internal temperature value:  28 deg C

[RAID condition] (*2)
Array1
Status:                 Optimal
RAID level:             1

[Drive condition]
Drive bay1
Status:                 Healthy
Used hours:             2000 hours
Drive bay2
Status:                 Smart Detected
Used hours:             5 hours
Drive bay3
Status:                 Healthy
Used hours:             10000 hours

[Memory condition]
DIMM A1 status:         Normal
DIMM A2 status:         Not Mounted
DIMM B1 status:         Error
DIMM B2 status:         Not Mounted
```

Header (*1)

Hardware Status section
(Status of the equipment)

Continues on the next page.

[RAS Setting]		
[Automatic shutdown setting]		
Fan:	ON	
Temperature:	OFF	
Remote shutdown:	ON	
[Watchdog timer setting]		
Retrigger type:	Automatic	
Timeout:	60 sec	
Interval:	20 sec	
[Drive failure prediction setting]		
Function is available:	Enable	
Interval:	4 hours	(*3)
[Drive used hours monitoring setting]		
Function is available:	Enable	
[Advanced]		
Time limit of drive bay1:	20000 hours	
Time limit of drive bay2:	20000 hours	
Time limit of drive bay3:	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	
RAID:	Enable	(*2)
Memory:	Disable	

} RAS Setting section
(RAS software settings)

(*1) The “Computer Name” shown in the header depends on the model of the equipment.

(*2) These are displayed only in the D model.

(*3) These are displayed other than D model.

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<Explanation of the display output>

■ Header:

This section shows the date and time when the getrasinfo command is executed and the computer name.

The following is the format of the header.

```

<<getrasinfo result>>
Date:   YYYY/MM/DD hh:mm:ss
Computer Name:  XX
    
```

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

■ [Hardware Status] section:

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

• [Fan condition] section:

Shows the status of fans. The following table shows the list of items in this subsection and their respective descriptions.

Output item	Description	
<u>xx</u> fan status: <u>yy</u>	xx	Shows the name of the fan. PS: Power fan Front: Front fan CPU: CPU fan
	yy	Shows the status. Normal: The fan is operating normally. Error: The fan is not operating normally.

• [Temperature condition] section:

Shows the various statuses related to temperature. The following table shows the list of items in this subsection and their respective descriptions.

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

- [RAID condition] section :

Shows the RAID status. The following table shows the list of items in this subsection and their respective descriptions. This subsection is available in the D model.

Output item	Description	
Array <u>xx</u>	xx	Shows the number of the RAID array.
Status: <u>yy</u> (<u>zz</u> <u>ww</u> , <u>Media Error</u>)	yy	Shows the RAID status Optimal : Normal status Degrade : Abnormal status) Unknown : Unknown status Fail : Failing status
	zz	Task in progress in the representation below. Shown only when the task has started. Rebuild : Rebuilding
	ww	Completion rate of task in progress. Shown only when the task has started.
	Media Error	Shown only when a media error is detected during the task.
RAID level: <u>vv</u>	vv	RAID level in the representation below.k. 1 : RAID1

■ [RAS Setting] section:

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

• [Automatic shutdown setting] section:

Shows the automatic shutdown setting. The following table shows the list of items in this subsection and their respective descriptions.

Output item	Description	
Fan: <u>xx</u>	xx	Shows whether the system is automatically shut down when a fan failure occurs. ON: Automatically shut down. OFF: Not automatically shut down.
Temperature: <u>yy</u>	yy	Shows whether the system is automatically shut down when the temperature is abnormal. ON: Automatically shut down. OFF: Not automatically shut down.
Remote shutdown: <u>zz</u>	zz	Shows whether the system is automatically shut down when the remote shutdown signal is input to the contact. ON: Automatically shut down. OFF: Not automatically shut down.

• [Watchdog timer setting] section:

Shows the watchdog timer setting. The following table shows the list of items in this subsection and their respective descriptions.

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

7. MAINTENANCE OPERATIONS

- [Drive failure prediction setting] section:

Shows the Self-Monitoring, Analysis and Reporting Technology (SMART) setting. The following table shows the list of items in this subsection and their respective descriptions.

Output item	Description	
Function is available: <u>xx</u>	xx	Shows whether the Self-Monitoring, Analysis and Reporting Technology (SMART) is enabled or disabled. Enable: Enabled Disable: Disabled
Interval: <u>yy</u> (Other than the D model)	yy	Shows the monitoring interval.

- [Drive used hours monitoring setting] section:

Shows the drive power-on (used) hours monitoring setting. The following table shows the list of items in this subsection and their respective descriptions.

Output item	Description	
Function is available: <u>xx</u>	xx	Shows whether the drive power-on (used) hours monitoring function is enabled or disabled. Enable: Enabled Disable: Disabled
[Advanced]	-	Shows the advanced settings.
Time limit of drive bay <u>yy</u> : <u>zz</u>	yy	Shows the drive bay number.
	zz	Shows the threshold used for the drive power-on (used) hours monitoring function.

- [Digital LED setting] section:

Shows the setting of the Digital LEDs for Status indication. The following table shows the list of items in this subsection and their respective descriptions.

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

- [Popup setting] section:

Shows the pop-up notification setting. The following table shows the list of items in this subsection and their respective descriptions.

Output item	Description	
Function is available: <u>xx</u>	xx	Shows whether the pop-up notification function is enabled or disabled. Enable: Enabled Disable: Disabled
[Advanced]	-	Shows the advanced settings.
Fan: <u>yy</u>	yy	Shows whether a pop-up is displayed for a fan failure. Enable: Displayed Disable: Not displayed
Temperature: <u>zz</u>	zz	Shows whether a pop-up is displayed when the temperature is abnormal. Enable: Displayed Disable: Not displayed
SMART: <u>aa</u>	aa	Shows whether a pop-up is displayed when SMART is detected. Enable: Displayed Disable: Not displayed
Used hours: <u>bb</u>	bb	Shows whether a pop-up is displayed when the drive power-on (=used) hours exceeds the threshold. Enable: Displayed Disable: Not displayed
RAID: <u>cc</u> (D model only)	cc	Shows whether a pop-up is displayed when abnormal RAID status is detected. Enable: Displayed Disable: Not displayed
Memory: <u>dd</u>	dd	Shows whether a pop-up is displayed when frequent memory error correction is detected. Enable: Displayed Disable: Not displayed

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<Diagnosis>

When this command finishes normally, the getrasinfo command returns exit code 0. When this command is terminated with an error, one of the following error messages is displayed and exit code 1 is returned.

Table 7-9 Error Messages of the getrasinfo Command

Error message	Meaning
Usage: getrasinfo [/status /setting] [/e File]	There is an error in the specified options. Specify correct options.
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 has occurred. Re-execute 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. Log on to the computer by using an administrator account and run the command again. If User Account Control (UAC) is enabled, start the command prompt with administrator privileges and run the command.

< NOTE >

- When you run the getrasinfo command, log on to the computer by using an administrator account registered on the computer (as a member of the Administrators group). You cannot run multiple instances of the getrasinfo command simultaneously.
- If User Account Control (UAC) is enabled, start the command prompt with administrator privileges according to “7.4 (1) Starting a command prompt” and run the command.
- When the /e option is used, if a file with the same name as the output file already exists at the same output location, the file is overwritten.
- If the command fails to acquire some of the information required for the output, it is possible that only the section name is displayed in a section or a part of the information is replaced with “---”. If this situation happens, re-execute the command.

CHAPTER 8 RAID1

8.1 What Is RAID1 ?

This chapter describes how to manage the RAID1 feature of the D model.

In this chapter, "this equipment" denotes the D model. Note that only HDDs (hard disk drives) are used as a drive for this equipment. A drive is denoted simply as "HDD" in the following explanation.

The screen images shown in this chapter are the ones for Windows® 7, but the displayed contents are basically the same for Windows Server® 2008 R2 and Windows Server® 2012 R2.

NOTICE

- Although this Equipment featuring RAID1 is more reliable than general systems, it is still prone to the loss of data in the HDDs. Not only a machine failure but also an unexpected power failure or an operation error may cause data to be lost for good. To prevent such loss of data, implement scheduled data backup in daily operation. Also, protect the power source from undesirable interruptions by such means as UPS.
- This Equipment is evaluated based on the specific HDD models authorized by the Manufacturer. Replace only with specific HDD models authorized by the Manufacturer. Otherwise, the existing data in the HDD may be lost. Also, always observe the recommended replacement interval for HDDs (Section 5.3, "Replacement of Consumable Parts").
- Since each Equipment has its own RAID1 configuration information (e.g., serial number), you cannot swap HDDs even between two units of this Equipment. If you dare, the stored data in the newly installed HDD will be erased with automatic RAID1 rebuilding process due to inconsistency of the RAID1 configuration information. If you own multiple units of this Equipment, manage use and inventory of HDDs so that they are not inadvertently mixed.
- As a replacement HDD, do not use an HDD previously used in the A model or the D model. If you do, this equipment may not operate properly or the data on the HDDs may be lost because of configuration information mismatches or other reasons.
- Use a brand-new HDD (an unused HDD) or an HDD to which "Initialize Drives" has been applied (see "8.2.2 Building RAID1") as a replacement HDD.
- Do not reverse the mounting locations of two HDDs. If you do, rebuild may not start automatically when a replacement HDD is mounted to recover from a failure in one HDD.
- Maintenance of a RAID1 system requires a high level of expertise. Should any mistakes be made during the work, the data stored on the HDDs may be lost.
- When HDD1 and HDD2 are installed, their capacities must be the same.

8. RAID1

RAID1 (Redundant Array of Independent Disks Level 1) is a technology generally referred to as "Disk mirroring". Two HDDs are combined and managed as one RAID1 system (array). In a RAID1 system, the same data is written to the two HDDs. When reading data, both HDDs are accessed. Should one HDD fail, you can read correct data from the other HDD. RAID1 uses two HDDs but the capacity available is only equal to the capacity of one HDD.

This equipment shows the status of HDDs used for RAID1 graphically, using the RAS software. For information about how to use the RAS software, refer to "Section 2.8" in the *HF-W7500 Model 40 RAS FEATURES MANUAL* (Manual Number WIN-63-0090). Note that screenshots used in this chapter are shown only as examples. The model name, capacity, and other information about an HDD shown here may be different than those shown in an actual working system.

< NOTICE >

- If you replace an HDD after the "Adaptec RAID Configuration Utility" (see "8.2.1 RAID BIOS Menu") starts, the new HDD is displayed as "Ex00: Phy255..." in the "Select Hotspare drives" item. Nevertheless, rebuild will not be affected by this error in the display. When the equipment is restarted, this error in the display will be corrected.
- In the case of Windows Server®2012 R2, "ADAPTEC Virtual SGPIO 0 SCSI Enclosure Device " is displayed on a Device Manager of Windows by the section of "Other devices", but there is no problem with the RAID function.

8.2 Setup

8.2.1 RAID BIOS Menu

(1) Starting the Adaptec RAID Configuration Utility

Turn on the power of the equipment. When "Adaptec RAID BIOS" is displayed on the monitor, press **Ctrl+A**. The RAID board recognizes the HDDs, and then the "Adaptec RAID Configuration Utility" starts. The following screenshot is just an example. The model name, capacity, and other information about the HDDs shown may be different than those shown in an actual working system.

```
Adaptec RAID BIOS V5.2-0 [Build xxxxx (*1)]
(c) 1998-2012 PMC-Sierra, Inc. All Rights Reserved.

<<< Press <Ctrl><A> for Adaptec RAID Configuration Utility! >>>

Booting the Controller Kernel.....-
```

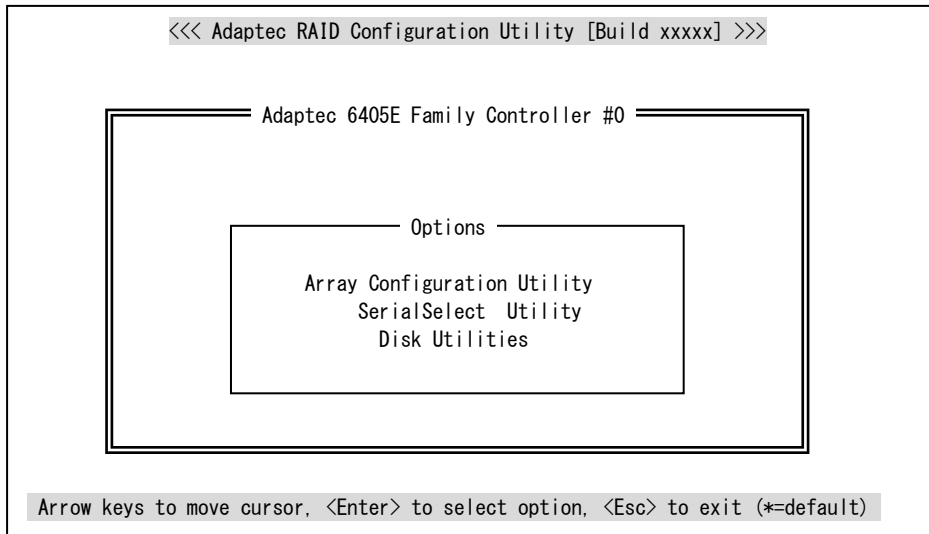
(*1) The letters xxxxx indicate the revision number of the F/W (firmware).

Note: If you replace an HDD when the power is turn off, the following message may be displayed when you go through the procedure described above. To start the "Adaptec RAID Configuration Utility", press **Ctrl+A**.

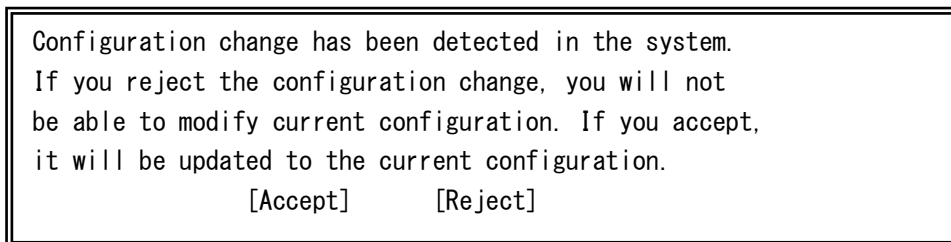
```
Press <Enter> to accept the current configuration
Press <Ctrl - A> to enter Adaptec RAID Configuration Utility
Press <Ctrl - H> to pause configuration Message
(Default is <Enter> if no valid key pressed in 30 seconds)
```

(2) Menu screen

The menu screen is as follows. The keys you can use for each menu are displayed at the bottom of the screen.



If the following message is displayed when moving between menus, select **Accept** and press **Enter**.



(3) Organization of the Adaptec RAID Configuration Utility menu

The Adaptec RAID Configuration Utility menu is divided into the following submenus.

Adaptec RAID Configuration Utility	
Array Configuration Utility	Used for building a RAID array or for other purposes.
SerialSelect Utility	Used for configuring the RAID board.
Disk Utilities	Used for formatting an HDD connected to the RAID board or for other purposes.

(4) Details about the Adaptec RAID Configuration Utility menu

The following shows the details of each submenu.

Array Configuration Utility		
Upper menu	Lower menu	Description
Manage Arrays	List of Arrays	Shows the status of the existing arrays.
Create Array	Select drives to create Array	You can select initialized HDDs and build an array on them. When you build an array, make sure that all mounted HDDs are used in the array.
Initialize Drives	Select drives for Initialization	You can select HDDs and initialize them.
Rescan Drives	—	Not supported by this equipment. Do not use these items.
Secure Erase Drives	Select drives for secure erase	
Global Hotspares	—	
Manage JBOD	List of JBOD	
Create JBOD	Select drives to create JBOD	

SerialSelect Utility

Controller Configuration			
Menu	Item	Value to be set	Description
Controller Configuration	Drives Write Cache	Enable All	Enables the write cache of the HDDs.
	Runtime BIOS	Enabled	Enables a boot from the array.
	Automatic Failover	Enabled	Rebuilds the array automatically when an HDD is replaced.
	Array Background Consistency Check	Enabled	You can configure whether to perform a Consistency Check in the background.
	Array based BBS Support	Disabled	Not supported by this equipment. Do not use this item.
	SATA Native Command Queuing	Enabled	You can configure whether to enable Native Command Queuing (NCQ).
	Physical Drives Display during POST	Disabled	You can configure whether to display the HDD model numbers during RAID BIOS initialization.
	DVD/CD-ROM Boot Support	Disabled	You can configure whether to enable a boot from a DVD.
	Removable Media Devices Boot Support	Disabled	You can configure whether to enable a boot from removable media devices such as the DVD drive.
	Alarm Control	Disabled	Not supported by this equipment. Do not use this item.
	Default Background Task Priority	High	Configures the background task priority.
	LED Indication Mode	Fault Only	Configures the indication mode of the HDD status lamp.
	Backplane Mode	SGPIO	Configures the communication method used between the backplane and the RAID board.
	Selectable Performance Mode	Dynamic	Configures the performance adjustment method.
Advanced Configuration			
Menu	Item	Value to be set	Description
Advanced Configuration	Power Management	-	If enabled, the system is switched to the power saving mode according to the specified setting.

Note: All settings under Controller Configuration and Advanced Configuration are configured to the appropriate settings when the product is shipped from the factory. Do not change those default settings. If you change the default settings, operation of this array may become unstable.

Power Management

Item	Value	Description
Time zone (GMT +/- HH:MM)	00:00	Configures the time zone of the system location. The valid range is from -12:00 to +12:00.
Stay Awake Start (HH:MM)	00:00	Configures the start time of the full power mode. The valid range is from 00:00 to 23:59.
Stay Awake End (HH:MM)	00:00	Configures the end time of the full power mode. The valid range is from 00:00 to 23:59.
Spinup Limit (Internal)	00	Configures the number of internal drives that spin up at the specified time.
Spinup Limit (External)	00	Configures the number of external drives that spin up at the specified time.

Disk Utilities

Menu	Item	Description
Select Disk and press Enter	Format Disk	Formats the selected HDDs.
	Verify Disk Media	Verifies the selected HDDs.
	Identify Drive	Flashes the LED of the selected HDD.

Note: None of the items under Disk Utilities are supported by this equipment. Do not use them.

8.2.2 Building RAID1

NOTICE

- When a RAID1 system is newly built, the RAID1 configuration information is recorded on the HDDs. This configuration information can only be used by the piece of equipment that uses this individual RAID1 system. An HDD with this configuration information cannot be used by other pieces of equipment. If a user uses multiple pieces of equipment, regardless of whether they are A models or D models, the user needs to be cautious when handling and storing the HDDs in order not to mix them up. If HDDs are mixed up, a RAID1 configuration information mismatch occurs. The equipment may not operate properly, and the data on the HDDs may be lost.
- When you build a RAID1 system from scratch, prepare two new HDDs selected from the models specified and tested by HITACHI. Otherwise, the data stored on the HDDs may be lost.
- When you build a RAID1 system from scratch, use the recovery DVD and install the OS from scratch.
- Care must be taken when you build a new RAID 1 system on an existing RAID1 system. The setup process will completely overwrite the existing RAID configuration information and you will no longer be able to use the existing RAID 1 system.

To build a RAID1 system, follow the procedure below.

Note that, when the product is shipped, a RAID1 system has been already built, and the following procedure is not necessary.

The screenshots used in the following explanation are just examples. The model name, capacity, and other information about an HDD shown here may be different than those shown in an actual working system.

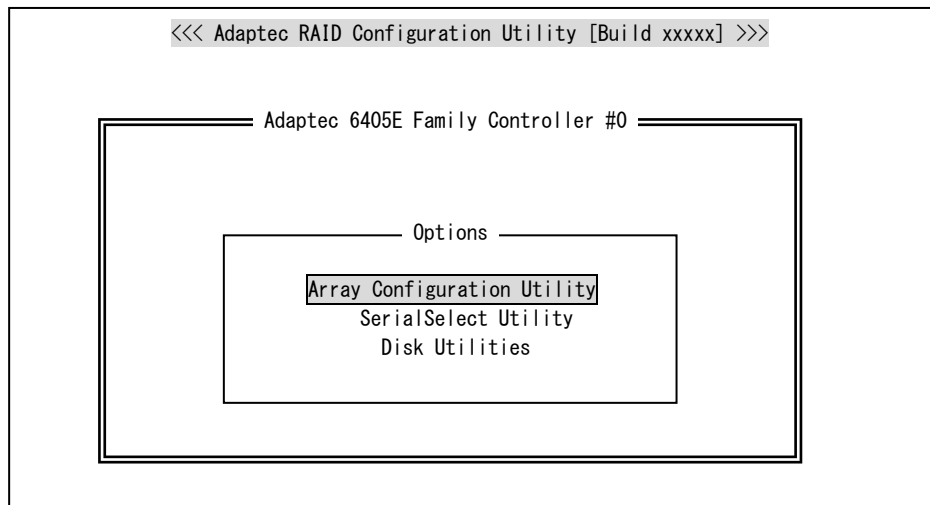
1. Prepare two new HDDs.
2. Shut down the OS. Turn off the main power to the equipment, and wait for at least one minute. And then mount the HDDs on drive bays 1 and 2. (See Figure 5.4.4 Installing and Removing an Hard Disk.)
3. Turn on the power for the equipment. When "Adaptec RAID BIOS" is displayed on the monitor, press Ctrl+A to start the "Adaptec RAID Configuration Utility".

```
Adaptec RAID BIOS V5.2-0 [Build xxxxx]
(c) 1998-2012 PMC-Sierra, Inc. All Rights Reserved.

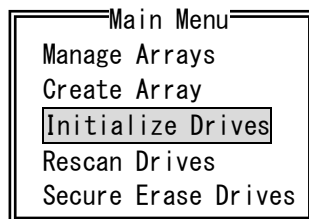
<<< Press <Ctrl><A> for Adaptec RAID Configuration Utility! >>>

Booting the Controller Kernel.....-
```

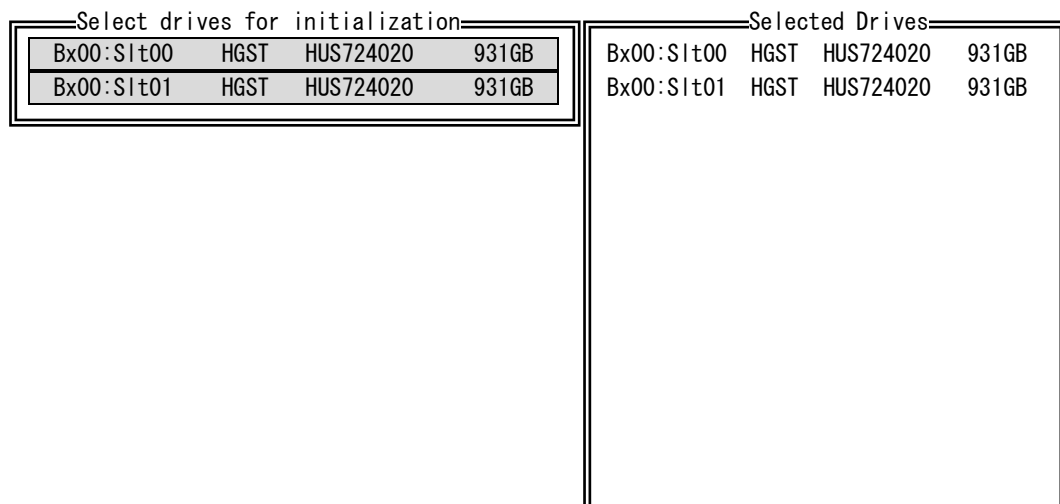
4. When the "Adaptec RAID Configuration Utility" starts, select "Array Configuration Utility" and press **Enter**. The "Main Menu" is displayed.



5. Select "Initialize Drives" and press **Enter**.



6. Select all HDDs displayed in "Select drives for initialization" using **Space** (When HDDs are selected, the selected HDDs are displayed in "Selected Drives"), and then press **Enter**.



8. RAID1

7. A message is displayed to confirm whether to continue. Press **Y** to continue the initialization.

Warning!! Initialization will erase all Array information from the selected drives. Any Array using any of these drives as members will be affected. Continue?(Yes/No):

Note: The following message may be displayed before the above confirmation message. For this message also, press **Y** and continue the initialization.

Warning!! One or more drives you have selected belong to one or more arrays. Initializing any of these drives may cause you lose the array(s). Continue?(Yes/No):

8. When the initialization finishes, the following confirmation message appears. Press any key to go back to the main menu.

Initializing drives...Done

9. Select "Create Array" using the cursor keys, and press **Enter**.

Main Menu
Manage Arrays
Create Array
Initialize Drives
Rescan Drives
Secure Erase Drives

10. Select all HDDs displayed in "Select drives to create Array" using **Space** (When HDDs are selected, the selected HDDs are displayed in "Selected Drives"), and press **Enter**.

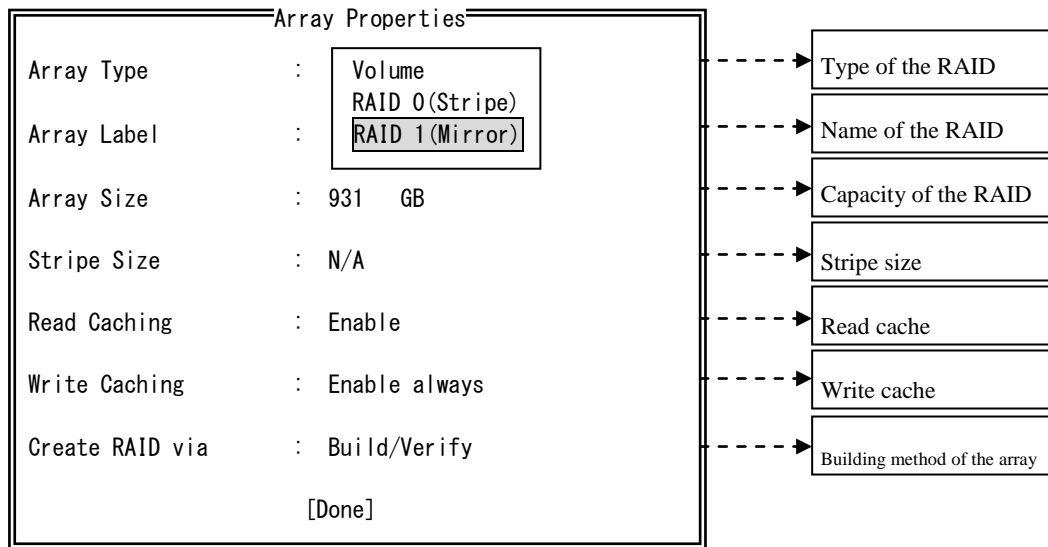
Select drives to create Array

Bx00:S1t00	HGST	HUS724020	931GB
Bx00:S1t01	HGST	HUS724020	931GB

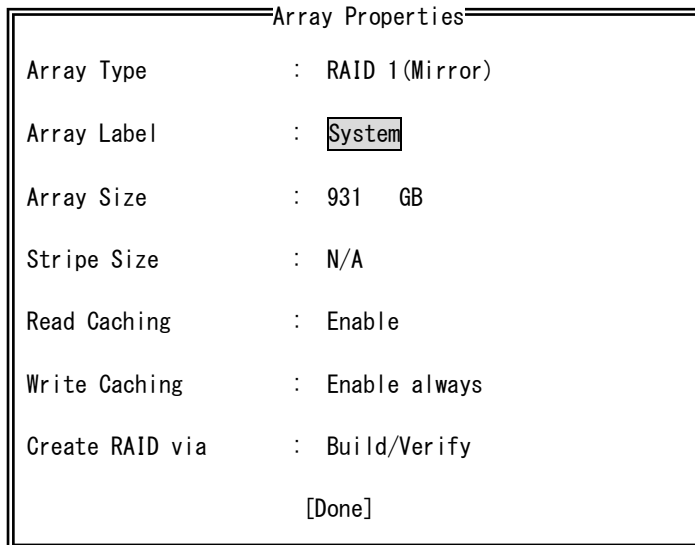
Selected Drives

Bx00:S1t00	HGST	HUS724020	931GB
Bx00:S1t01	HGST	HUS724020	931GB

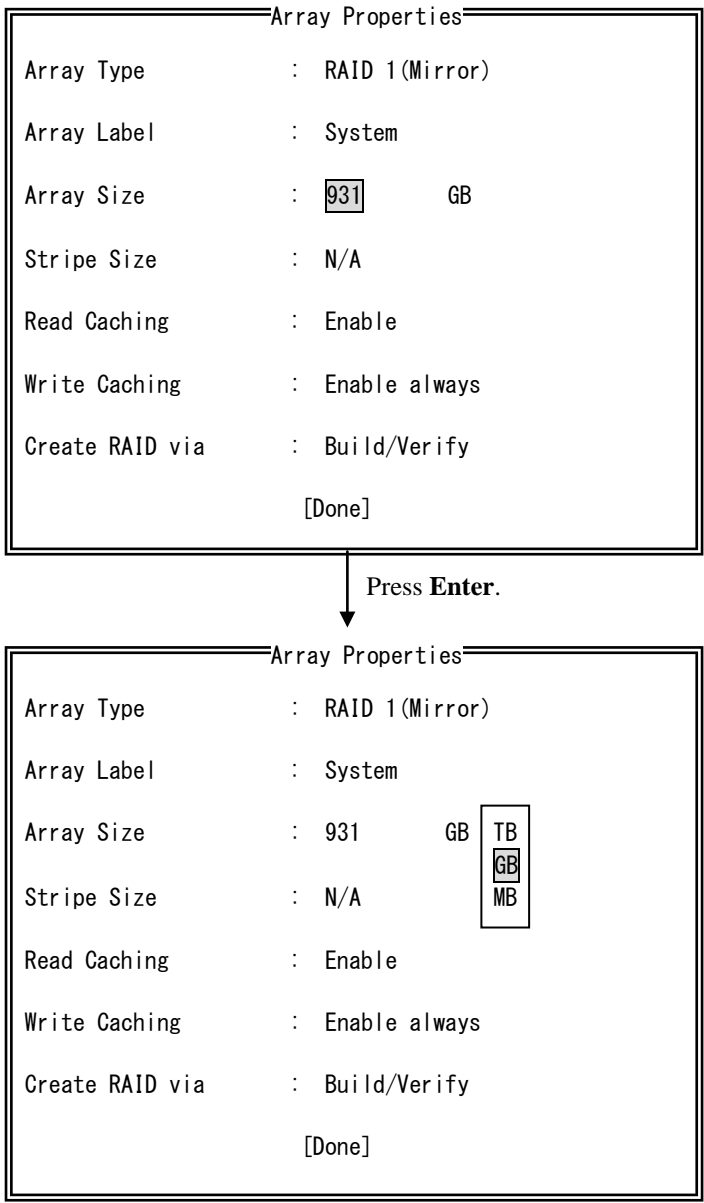
11. Select "RAID 1(Mirror)" for "Array Type" under "Array Properties", and press **Enter**.



12. Enter "System" for "Array Label", and press **Enter**.



13. Do not change the setting for "Array Size" and keep the maximum capacity. Just press **Enter**. Then select "GB" for the unit used for capacity. Press **Enter**.



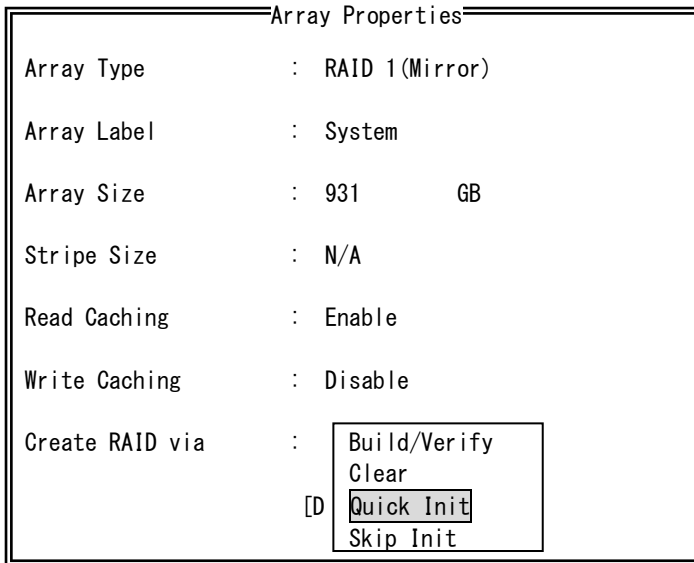
14. Select "Enable" for "Read Caching", and then press **Enter**.

```
Array Properties
Array Type      : RAID 1(Mirror)
Array Label     : System
Array Size      : 931      GB
Stripe Size     : N/A
Read Caching    :  Disable
                  Enable
Write Caching   :
Create RAID via : Build/Verify
                [Done]
```

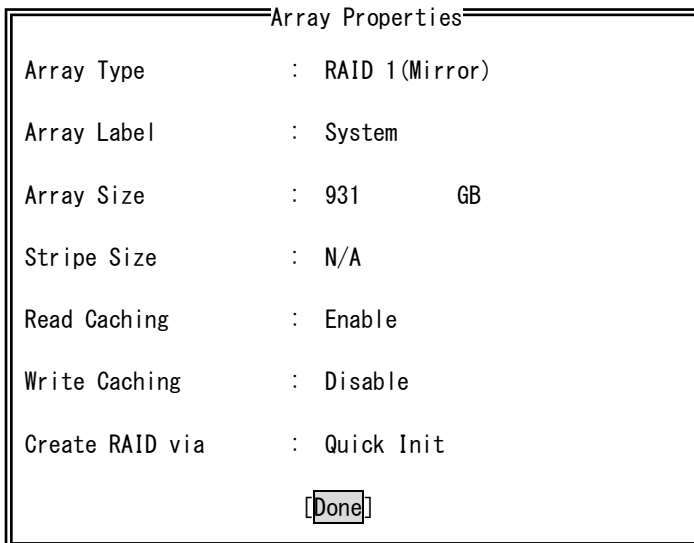
15. Select "Disable" for "Write Caching", and then press **Enter**.

```
Array Properties
Array Type      : RAID 1(Mirror)
Array Label     : System
Array Size      : 931      GB
Stripe Size     : N/A
Read Caching    : Enable
Write Caching   :  Enable always
                  Disable
Create RAID via :
                [Done]
```

16. Select "Quick Init" for "Create RAID via", and then press **Enter**.



17. When all settings are finished, move the cursor to "Done" and press **Enter**.
If there are any mistakes in the settings, press **Esc** and go back to the item with a mistake.



18. The following message is then displayed. Press **Enter**.

```

Leaving a drive's cache on for improving the performance may
allow conditions beyond the control of the RAID controller
whereby inconsistent data is written to the array or volume.
If the drive's stability is in question, use the Controller
Configuration menu to turn off the drive's write cache settings.

```

19. Select "Manage Arrays" in "Main Menu", and press **Enter**.

```

Main Menu
Manage Arrays
Create Array
Initialize Drives
Rescan Drives
Secure Erase Drives

```

20. In the "List of Arrays", select an array you want to check the construction status of, and then press **Enter**.

```

List of Arrays
00 System          RAID 1    931GB

```

21. The status of the array is displayed in "Array Status". Confirm that "OPTIMAL" is displayed.

At this point, the building a RAID1 system is complete.

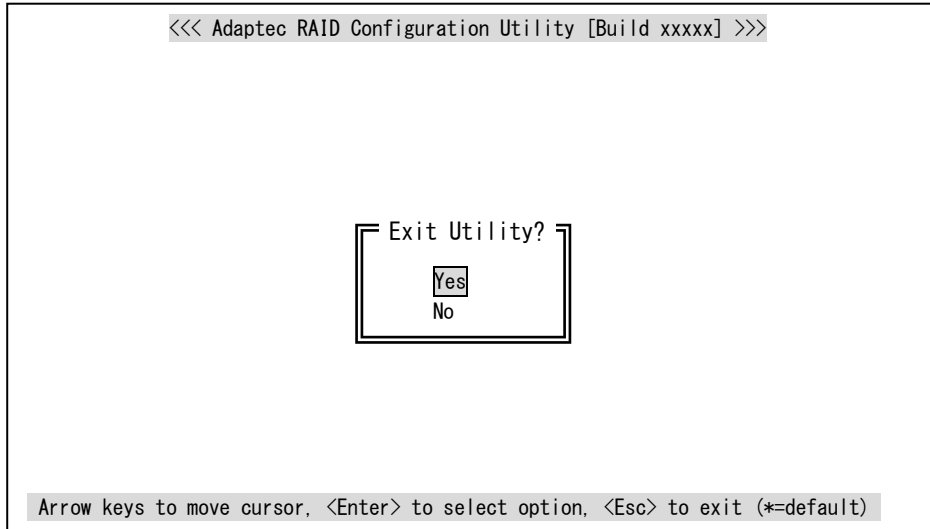
```

Array Properties
Array #00      : System          Type      : RAID 1
Array Size     : 931GB
Array Status   : OPTIMAL

Array Members
Bx00:Sl00  HGST  HUS724020ALE  931GB
Bx00:Sl01  HGST  HUS724020ALE  931GB

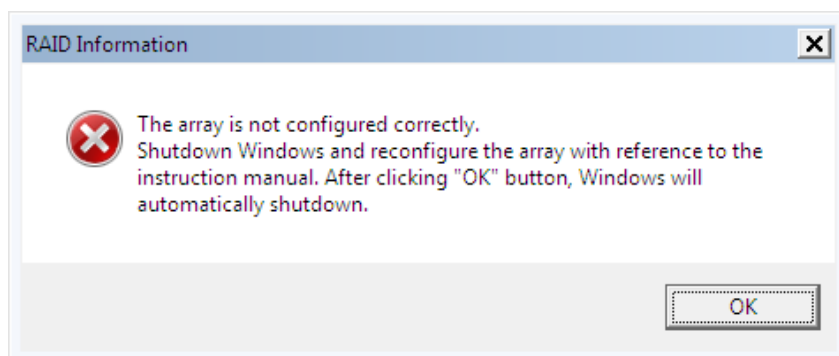
```

22. When building the RAID1 system is complete, press **Esc** four times on the screen at step 21. The "Exit Utility?" dialog box is displayed. Select **Yes** and Press **Enter**. The "Adaptec RAID Configuration Utility" terminates, and the equipment restarts.



23. After the equipment restarts, use the recovery DVD and install the OS. (Refer to the *HF-W7500 Model 40 SETUP GUIDE*.)

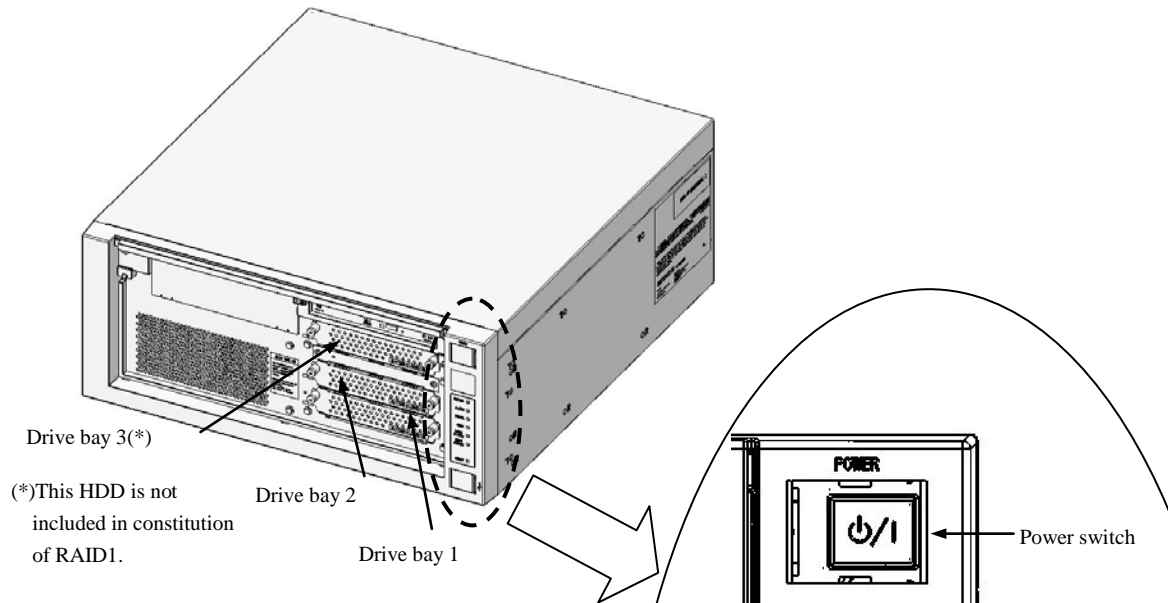
Note: If you newly build an array other than a RAID1 array (for example, a RAID0 array), the following message is displayed when the OS starts. If this message is displayed, click OK, shut down the OS, and then newly build an array.



8.3 Checking the RAID1 Status

8.3.1 Status Lamp

This equipment has HDD status lamps (an HDD1 status lamp and an HDD2 status lamp) as shown in the figure below. These lamps show the status of each HDD in the RAID1 system.



Correspondence between HDD status lamps and drive bays.

Lamp name	Corresponding drive bay number
HDD1 STATUS	1
HDD2 STATUS	2

Meaning of the HDD status lamps

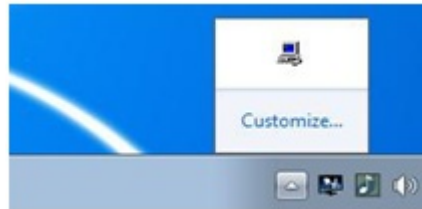
HDD status Lamp status (Red)	Status of the HDDs
OFF (Both)	Both HDDs are working properly.
ON (Either one)	One HDD has an error. (The power of the HDD with an error is OFF.)
Flashing (Either one)	Rebuild (copy) is ongoing. (Only the lamp of the copy destination HDD flashes.)
Flashing (Both)	Both HDDs have errors. (Including errors in the configuration information)

8.3.2 Hardware status window

This equipment allows you to check the status of HDDs in the RAID1 system in the **Hardware status** window. To display the **Hardware status** window, double-click the hardware status icon on the notification area of the taskbar.

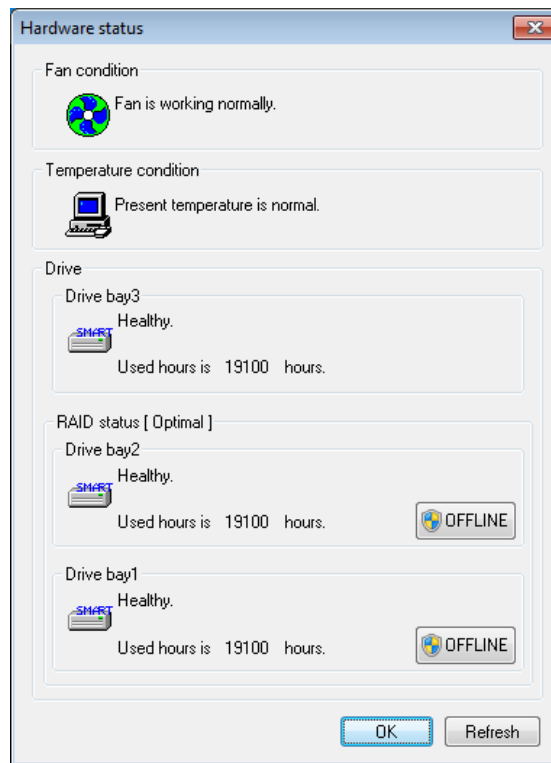


Note: By default, the icon is not shown in the notification area of the taskbar. If you click the arrow at the side of the notification area, the icon will appear. Furthermore, if you click **Customize**, you can set this icon to be displayed in the notification area of the taskbar.



If both HDDs are working properly, the **Hardware status** window is displayed as follows.

Hardware status window



Note: In the RAS software, an auxiliary memory unit in general, such as an HDD, is denoted as a "drive".

8.4 Recovering from Failure

8.4.1 Detection of Failure

When a failure is detected in the RAID1 system, the following actions are executed by this equipment.

No.	Action	Cause
1	The HDD status lamp (Red) turns on.	HDD failure (Either one or both HDDs)
2	The Digital LEDs for Status indication indicate an output message. (See "6.6.1 POST messages" and refer to the <i>HF-W7500 Model 40 RAS FEATURES MANUAL</i> .)	
3	The alarm lamp (Red) turns on.	HDD failure (Either drive)
4	MCALL external contact (maintenance personnel call signal) is closed. (See "4.8.2 External control specifications".)	
5	Data is recorded using the event log. (See Section 6.4, "Event Log".)	
6	The HDD status of the RAID1 system is displayed in the Hardware status window. (Refer to the <i>HF-W7500 Model 40 RAS FEATURES MANUAL</i> .)	

The following part of this section describes how to recover from each type of failure and how to handle the situation when a problem occurs during recovery work.

8.4.2 Recovery from a failure in one HDD

NOTICE

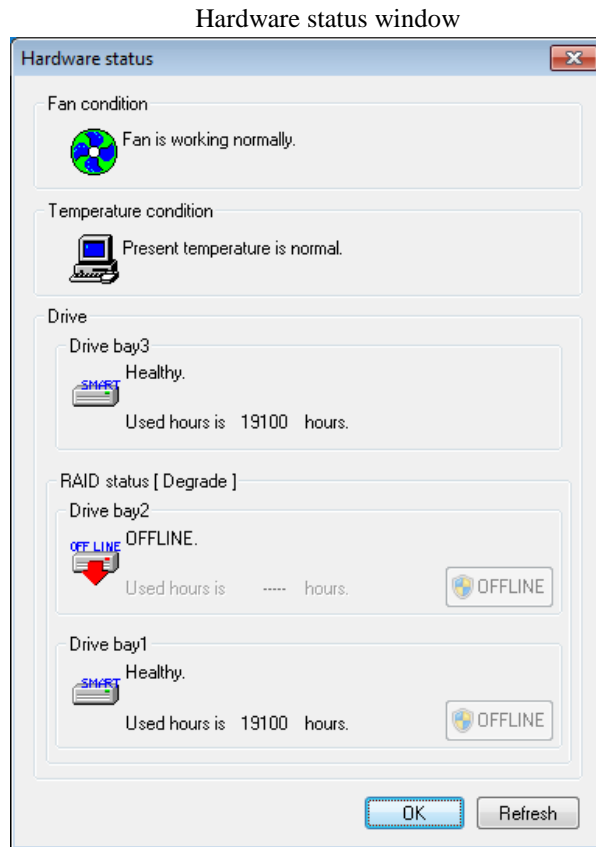
- Never remove an HDD when the HDD status lamp of the HDD is OFF. If you do, the data stored in the HDD gets corrupted.
- Wear cotton gloves when replacing an HDD in order to prevent problems caused by static electricity. If you do not, the data stored on the HDD may get corrupted.
- Make sure you check the correct procedure before you start the work. If you do not follow the correct procedure, the data stored on the HDD may be lost.
- As a replacement HDD, do not use an HDD previously used in the A model or the D model. If you do, this equipment may not operate properly or the data on the HDDs may be lost because of configuration information mismatches or other reasons.
- Mount an HDD securely. Loose contacts and missing screws may result in a failure.
- Do not subject an HDD you are mounting and the already mounted HDDs to shock while replacing an HDD. Otherwise, failure of the equipment may result.
- Until the rebuild is complete, avoid shutting off the power for this equipment or attaching and detaching HDDs. Otherwise, the data on the HDDs may be lost or a failure may result.

To recover from a failure in one HDD, follow the procedure below.

For information about how to recover using a backup HDD, see "8.5.2 Recovery Using a Backup HDD".

(1) If you replace an HDD while the power to the equipment is on

1. Back up the data.
(See "PRECAUTIONS 4. (2) Backing Up Files.")
2. Terminate all running applications.
3. Double-click the hardware status icon on the notification area of the taskbar.
The **Hardware status** window appears. In the **Hardware status** window, check which HDD has failed.



Note: The screen above shows the case where the HDD mounted in drive bay 2 has failed.

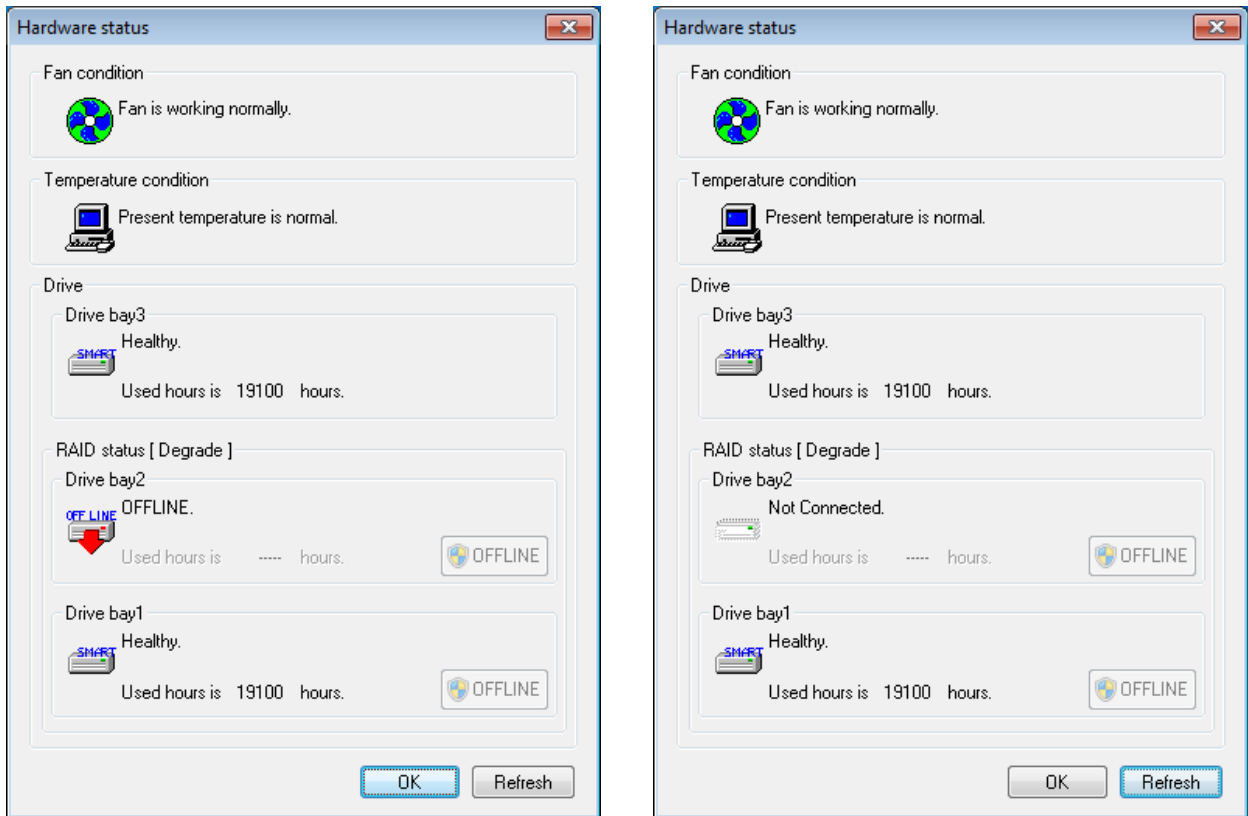
4. Remove the failed HDD from the equipment. (See "5.3.6 Installing and Removing an HDD".)

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5. In the Hardware status window, click **Refresh**.

Confirm that "Not connected" is displayed as the HDD status of the drive bay you just removed the HDD from. If "Not connected" is not displayed, wait for a while, and then click **Refresh** again. Repeat this process until "Not connected" is displayed.

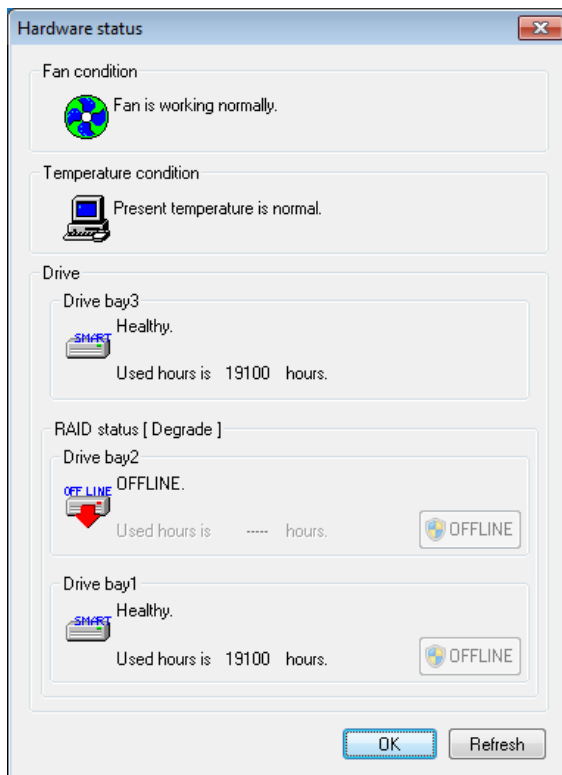
Hardware status window



Click **Refresh**.

6. Mount a replacement HDD. (See "5.3.6 Installing and Removing an HDD".) The HDD status lamp starts flashing eventually and rebuilding of the RAID1 system starts. The rebuild process takes about 120 minutes in the case of a 1 TB HDD without a load. The rebuild process takes about 280 minutes in the case of a 2 TB HDD without a load.

- Notes: 1. If the rebuild process does not start within 3 minutes, restart the equipment. If the rebuild process still does not start, the HDD or the equipment may have failed. Ask for a send-back repair or contact maintenance personnel, depending on the type of maintenance contract you have.
2. From after an HDD is mounted in the equipment until the rebuild process is complete, the drive bay status in the **Hardware status** window is as follows.
Note that "OFFLINE" may not be displayed, even immediately after an HDD is mounted.



Immediately after an HDD is mounted

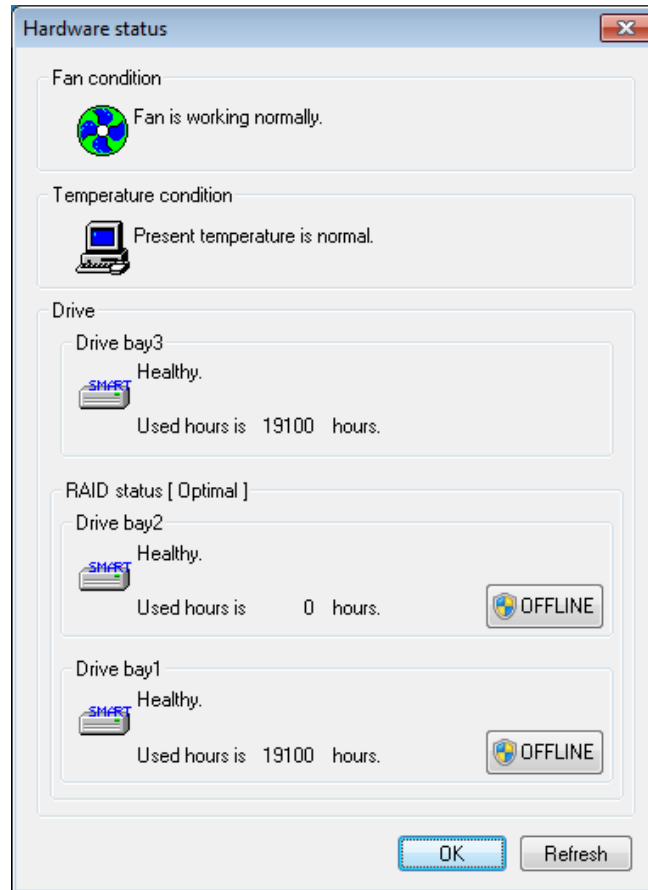


During the rebuild process

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- When the rebuild process is complete, the status lamp of the HDD is turned off, and the RAID1 system is recovered. In the **Hardware status** window, click **Refresh**, and confirm that the HDD status of the drive bay where you replaced the HDD is displayed as "Healthy".

Hardware status window (Normal case)



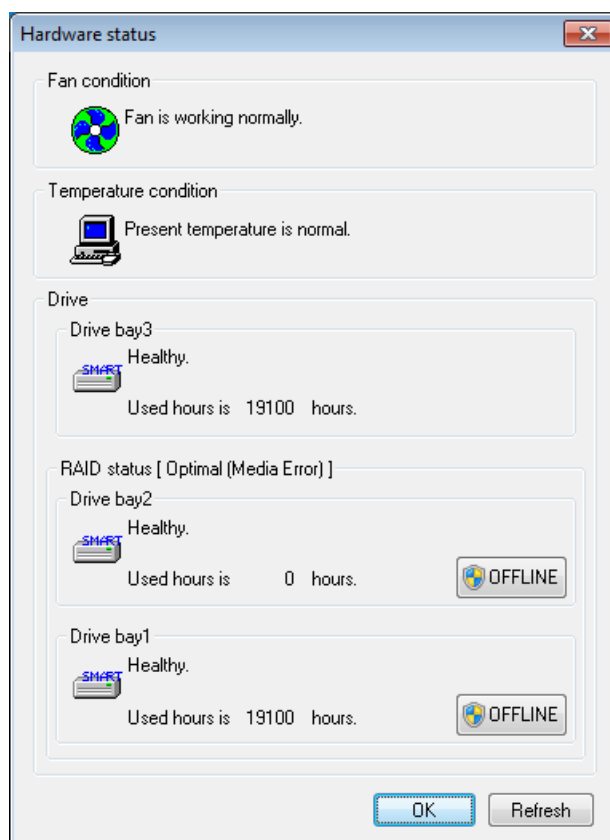
Note: If the RAID1 status is displayed as "Optimal (Media Error)" after the rebuild process is complete, we recommend that you also replace the copy source HDD with a new HDD after backing up the data.

(For information about how to replace an HDD, see "5.3.4 Installing and Removing an HDD".)

After you replace both HDDs, set up the equipment again and recover the data from the backup files. (For information about how to set up the equipment again, see "8.2.2 Building a RAID1 System".)

Alternatively, recover the equipment using a backup HDD. (See "8.5.2 Recovery Using a Backup HDD".)

Hardware status window (When a media error occurs)



(2) If you replace an HDD while the power to the equipment is turn off

1. Back up the data.
2. Shut down the OS. Unplug the plug of the power cord from the outlet, and wait for at least one minute. Then replace the failed HDD with a replacement HDD. (See "5.3.6 Installing and Removing an HDD".)
3. Turn on the power to the equipment. Then the RAID board automatically detects that the replacement HDD is mounted and starts the rebuild process. Confirm that the HDD status lamp of the replacement HDD is flashing.
4. The OS starts while the rebuild process continues. The time required for the rebuild process depends on what applications are executed during this period. Therefore, minimize the number of running applications during the rebuild process. The rebuild process takes about 120 minutes in the case of a 1 TB HDD without a load. The rebuild process takes about 280 minutes in the case of a 2 TB HDD without a load.

If you do not want to start the OS, while the messages for system initialization are displayed (during BIOS memory check), or while the Digital LEDs for Status indication output "C0" after the equipment turns on, press **F2** to launch the BIOS setup menu.

5. When the HDD status lamp turns off, the rebuild process is complete. In the **Hardware status** window, confirm that both HDDs are healthy.
If the BIOS setup menu is started at step 4, open the upper menu "Exit", move the cursor to "Exit Saving Changes", and press **Enter**.
A message "Save configuration changes and exit now?" is displayed.
Press **Enter** to restart the equipment.
6. Double-click the hardware status icon on the notification area of the taskbar.
The **Hardware status** window appears. In the **Hardware status** window, confirm that the RAID status is "Optimal".

Notes 1. If the RAID1 status is displayed as "Optimal (Media Error)" after the rebuild process is complete, we recommend that you also replace the copy source HDD with a new HDD after the data is backed up.

(For information about how to replace an HDD, see "5.3.6 Installing and Removing an HDD".)

After you replace both HDDs, set up the equipment again and recover the data from the backup files. (For information about how to set up the equipment again, see "8.2.2 Building a RAID1 System".)

Alternatively, recover the equipment using a backup HDD. (See "8.5.2 Recovery Using a Backup HDD".)

2. If in the above procedure, you try to rebuild without starting the OS but the rebuild process does not start within 1 minute, see "8.4.3 (2) If the rebuild process does not start". If the rebuild process still does not start, the HDD or the equipment may have failed. Ask for a send-back repair or contact maintenance personnel, depending on the type of maintenance contract you have.

8.4.3 When a Problem Occurs during Recovery Work

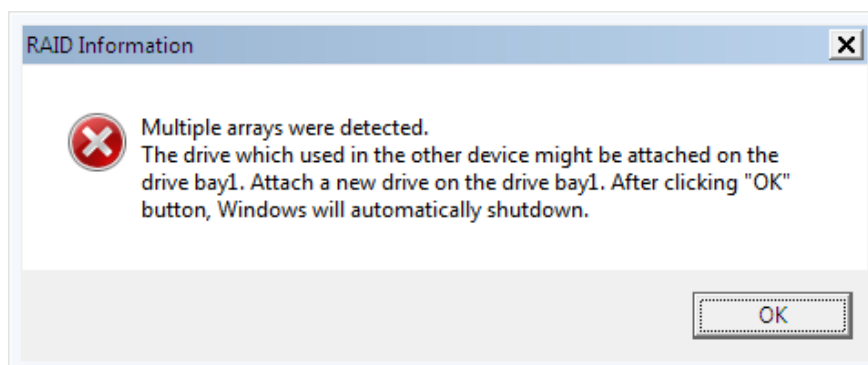
(1) If multiple RAID1 arrays exist

If you replace an HDD with an HDD that has been used in a RAID1 array of another piece of equipment, the rebuild process does not start, and the following message is displayed. (The following message is displayed only when the error is detected immediately after the OS starts.)

< NOTICE >

If the error is detected while the OS is running, the misplaced HDD will be initialized. Be careful when you mount an HDD.

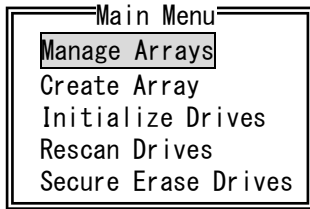
If the following message is displayed, shut down the OS, replace the misplaced HDD with a new HDD, and restart the equipment. After the equipment restarts, the array is automatically rebuilt.



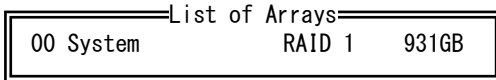
(2) If the rebuild process does not start

If you start a rebuild process using the "Adaptec RAID Configuration Utility" but the rebuild process does not actually start, do the following.

1. Follow the instruction in "8.2.1 RAID BIOS Menu" to start the "Adaptec RAID Configuration Utility".
2. After the "Adaptec RAID Configuration Utility" starts, select "Array Configuration Utility", and press **Enter**. The "Main Menu" is displayed.
3. Select "Manage Arrays" in the "Main Menu", and press **Enter**. The "List of Arrays" is displayed.



4. If the rebuild process does not start one minute after the "List of Arrays" is displayed, continue to the following procedure.
5. From the "List of Arrays", select the array you want to recover, and press Ctrl+S. The "Select Hotspare drives" is displayed.



6. In the "Select Hotspare drives", select only the HDD that was used to replace the failed HDD.



- Note: If you cannot select the replacement HDD at this point, do the following:
- (a) Follow step 1 through 4 described in "8.5.2 Recovery Using a Backup HDD".
 - (b) Install the HDD you previously removed in its original location.
 - (c) Turn on the power to the equipment, and restart the procedure described in "(3) If the rebuild process does not start" from step 1.
- At Step step 6, select the new HDD using the **Space** key.

7. Confirm that the selected HDD is displayed in the "Selected Drives", and then press **Enter**.

Select Hotspare drives				Selected Drives			
Bx00:Sl00	HGST	HUS724020	931GB	Bx00:Sl00	HGST	HUS724020	931GB
Bx00:Sl01	HGST	HUS724020	931GB				

8. The following confirmation message is displayed. Press **Y**. The "List of Arrays" is displayed.

Do you want to submit the changes made ?

Note: If the rebuild process has already started, the following message is displayed. Press the **Enter** key to go back to the List of Arrays".

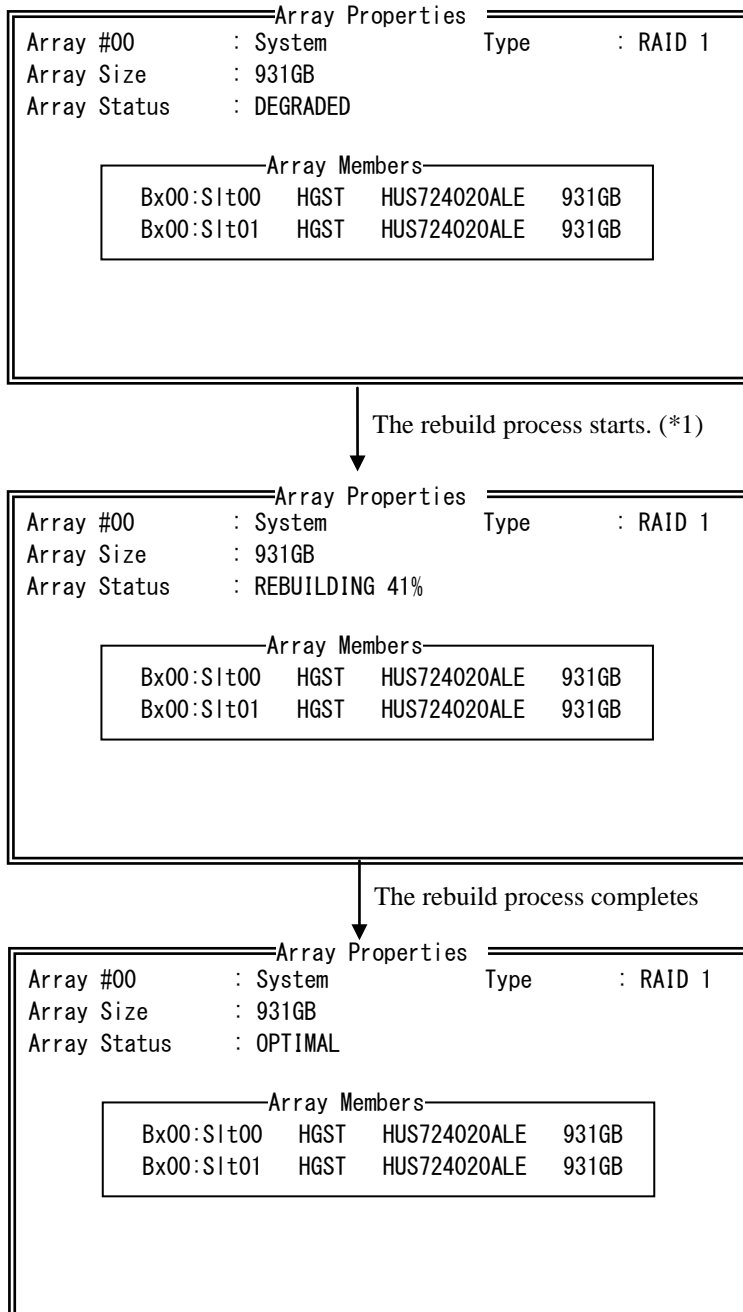
Error occurred while assigning Hotspare drive Bx00:Sl00
To Array 00 - System

9. In the "List of Arrays", select an array you want to check the status of, and then press **Enter**. The "Array Status" is displayed.

List of Arrays		
00 System	RAID 1	931GB

10. The "Array Status" shows the current progress of the rebuild process. If "OPTIMAL" is displayed, the rebuild process is complete.

(*1) Before the rebuild process starts, "DEGRADED" or "IMPACTED" is displayed in the "Array Status" item.



8.4.4 Recovery from Failure in Both HDDs

After you replace both HDDs, set up the equipment again (see "8.2.2 Building a RAID1 System") and recover the data from the backup file.

Alternatively, recover the equipment using a backup HDD. (See "8.5.2 Recovery Using a Backup HDD".)

8.4.5 Recovering a Normal HDD That Has Been Set to Offline by Mistake

On this equipment, the RAID board keeps track of all HDDs that have been set to offline (hereinafter referred to as an "offline HDD") for any reason.

Therefore, an offline HDD cannot be used in the equipment that sets the HDD to offline.

But as an exception, if a normal HDD is set to offline by mistake or if an HDD is set to offline by the RAS software for evaluation of the equipment, the following action can restore the offline HDD, and allow it to be used as a new HDD again.

NOTICE

- If you apply the recovery method for an offline HDD to an HDD that was set to offline by something other than the RAS software, the HDD may not be recovered, or even if it is recovered, the HDD may not work properly.
- Use the recovery method for an offline HDD only for the purpose of evaluating the equipment. If you apply the recovery method for an offline HDD to equipment actually used in the field, for example, a system in normal operation, malfunctions may result, including data loss.
- If an HDD is automatically set to offline by the equipment, the HDD may possibly be out of order. Do not apply the recovery method for an offline HDD to such an HDD.
- An HDD recovered by the recovery method for an offline HDD must not be used for equipment actually used in the field. If used, malfunctions may result, including data loss.

< NOTICE >

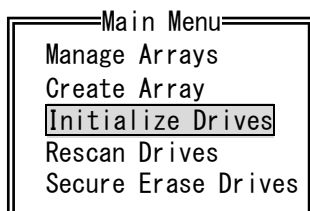
When step 7 is complete, the status LED of the offline HDD turns off, but the LED will start flashing red again after about 30 seconds. Make sure you finish all steps up to step 10 before the LED starts flashing. If the LED starts flashing red again, executing "Initialize Drives" fails, then you need to go back to step 5 and retry.

1. Shut down the OS. Turn off the main power to the equipment, wait for at least one minute, and remove the normal HDD. Record the drive bay number of the removed HDD.
2. Turn on the power to the equipment while only the offline HDD is connected.
3. When "Adaptec RAID BIOS" is displayed on the monitor, press Ctrl+A. The "Adaptec RAID Configuration Utility" starts.
4. When the "Adaptec RAID Configuration Utility" starts, select "Array Configuration Utility", and press **Enter**. The "Main Menu" is displayed.
5. Confirm that the status LEDs for HDD1 and HDD2 are flashing red while the "Main Menu" is displayed. (It may take about 30 seconds until the status LEDs starts flashing red after the "Main Menu" is displayed.) Then remove the offline HDD from the HDD drive bay.
6. Wait for about one minute, and then insert the offline HDD back into the original HDD drive bay.

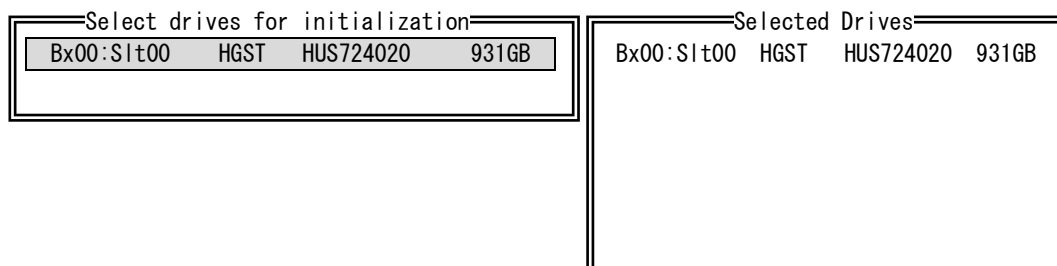
7. Confirm that the status LED of the offline HDD is turned off. Wait for 7 to 8 seconds, and then select "Initialize Drives" in "Main Menu", and press **Enter**.

If "No drives detected" is displayed when you press **Enter**, press **Esc**, select "Initialize Drives" again, and then press **Enter**.

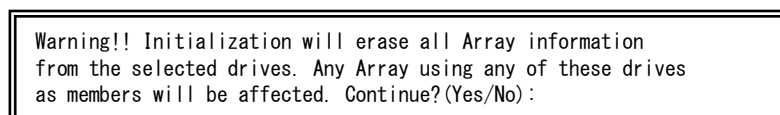
(Repeat this procedure until "No drives detected" is not displayed any more.)



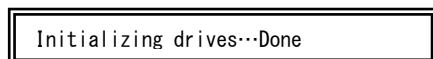
8. Select the offline HDD displayed in "Select drives for initialization" using **Space**, and press **Enter**. When the HDD is selected, the selected HDD is displayed in "Selected Drives".



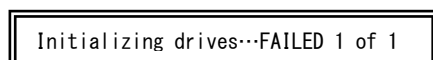
9. A message is displayed to confirm whether to continue because all data will be deleted. Press **Y**.



10. When execution of "Initialize Drives" is complete, the following confirmation message is displayed. Press **Esc** to go back to "Main Menu".



If execution of "Initialize Drives" fails, the following confirmation message is displayed. Press **Esc** to go back to "Main Menu", and restart the procedure from step 5.



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11. Turn off the main power to the equipment, and remove the HDD.
12. Install the normal HDD removed at step 1 back into the original drive bay.
(Check the recorded drive bay number and make sure that the mount location is correct.)

Now, the offline HDD can be used as a new HDD again.

8.5 Preventive Maintenance

8.5.1 Creating a Backup HDD

NOTICE

- Wear cotton gloves when replacing an HDD in order to prevent failure caused by static electricity. If you do not, the data stored on the HDD may get corrupted.
- Make sure you check the correct procedure before you start the work. If you do not follow the correct procedure, the data stored on the HDD may be lost.

RAID1 is more reliable compared to a system with a conventional configuration.

Nevertheless, the data stored on the HDDs may be lost due to human error or other reasons.

If you create a backup HDD, you can recover from such data loss.

(Note that you can only restore to the point of backup.) We recommend that you prepare a brand-new HDD or another properly prepared HDD for backup and use it to back up the data periodically. Follow the procedure below, and create a backup HDD.

< NOTICE >

- Make sure you create the backup HDD in drive bay 2.
- If you want to reuse a previously used backup HDD as a replacement HDD, you must apply "Initialize Drives" to the used backup HDD. (See steps 3 to 8 described in "8.2.2 Building a RAID1 System".)
- When a replacement HDD is installed, its capacity must be the same as the capacity of the HDD1.

1. Shut down the OS. Unplug the plug of the power cord from the outlet, and wait for at least one minute. Then replace the HDD mounted in drive bay 2 with a brand-new HDD. (See "5.3.6 Installing and Removing an HDD".)
Make sure you record the drive bay number of the removed HDD.
2. Store the removed HDD in a safety place as a backup HDD.
3. Turn on the power to the equipment. Then the RAID board automatically detects that a brand-new HDD is mounted and starts the rebuild process. Confirm that the HDD2 status lamp is flashing.
4. The OS starts while the rebuild process is continuing. The time required for the rebuild process depends on what applications are executed during this period. Therefore, minimize the number of running applications during the rebuild process. If you do not want to start the OS, while the messages for system initialization are displayed (during the BIOS memory check), or while the Digital LEDs for Status indication output "C0" after the equipment turns on, press **F2** to launch the BIOS setup menu.
The rebuild process takes about 120 minutes in the case of a 1 TB HDD without a load.
The rebuild process takes about 280 minutes in the case of a 2 TB HDD without a load.

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5. When the HDD2 status lamp turns off, the rebuild process is complete. Also in the **Hardware status** window, confirm that both HDDs are healthy.

If the BIOS setup menu is started at step 4, open the upper menu "Exit", move the cursor to "Exit Saving Changes", and press **Enter**. A message "Save configuration changes and exit now?" is displayed. Press **Enter** to restart the equipment.

8.5.2 Recovery Using a Backup HDD

NOTICE

- Wear cotton gloves when replacing an HDD in order to prevent failure caused by static electricity. If you do not, the data stored on the HDD may get corrupted.
- Make sure you check the correct procedure before you start the work. If you do not follow the correct procedure, the data stored on the HDD may be lost.

Prepare a backup HDD as well as a brand-new HDD, or HDD to which "Initialize Drives" has been applied (see "8.2.2 Building RAID1"). Then recover the array by following the procedure below. When you install and remove an HDD, see "5.3.6 Installing and Removing an HDD" for the procedure.

< NOTICE >

- Make sure you mount the backup HDD in drive bay 2. If you mount a backup HDD in the wrong drive bay, rebuild may not start automatically.
- When a brand-new HDD or an appropriately prepared HDD is installed, its capacity must be the same as the capacity of the backup HDD.

1. Shut down the OS, and unplug the plug of the power cord from the outlet. If HDDs are mounted, remove both HDDs.
2. Mount a brand-new HDD or an appropriately prepared HDD in drive bay 1.
3. Follow steps 3 to 8 described in "8.2.2 Building a RAID1 System" (to execute "Initialize Drives").

If the following message is displayed at step 4 in "8.2.2 Building a RAID1 System", choose **Accept** and press **Enter**.

Configuration change has been detected in the system.
 If you reject the configuration change, you will not be able to modify current configuration. If you accept, it will be updated to the current configuration.

[Accept] [Reject]

4. After execution of "Initialize Drives" is complete, press the power switch for at least four seconds to put the equipment into the standby mode, and turn off the main power to the equipment.
5. Wait at least one minute after the plug of the power cord is unplugged from the outlet and then mount a backup HDD in drive bay 2.
6. Turn on the power to the equipment. The RAID board automatically detects a brand-new HDD or another appropriately prepared HDD and starts to rebuild the system. When the rebuild starts, the HDD1 status lamp flashes.

7. The OS starts while the rebuild process is continuing. The time required for the rebuild process depends on what applications are executed during this period. Therefore, minimize the number of running applications during the rebuild process. The rebuild process takes about 120 minutes in the case of a 1 TB HDD without a load. The rebuild process takes about 280 minutes in the case of a 2 TB HDD without a load.

If you do not want to start the OS, while the messages for system initialization are displayed (during the BIOS memory check), or while the Digital LEDs for Status indication output "C0" after the equipment turns on, press **F2** to launch the BIOS setup menu.

Note: If you try to rebuild without starting the OS but the rebuild process does not start within one minute, see "8.4.3 (2) If the rebuild process does not start".

8. When the HDD1 status lamp turns off, the rebuild process is complete. Also, in the **Hardware status** window, confirm that both HDDs are healthy. If the BIOS setup menu is started at step 7, open the upper menu "Exit", move the cursor to "Exit Saving Changes", and press **Enter**. A message "Save configuration changes and exit now?" is displayed. Press **Enter** to restart the equipment.

8.5.3 Performing Periodical HDD Replacement

NOTICE

- Wear cotton gloves when replacing an HDD in order to prevent failure caused by static electricity. If you do not, the data stored on the HDD may get corrupted.
- Make sure you check the correct procedure before you start the work. If you do not follow the correct procedure, the data stored on the HDD may be lost.
- As a replacement HDD, do not use an HDD previously used in the A model or the D model. If you do, this equipment may not operate properly or the data on the HDDs may be lost because of configuration information mismatches, or other reasons.
- Do not replace the two HDDs at the same time. If you do, the data gets corrupted.
- When you replace an HDD, make sure that you set the HDD into the offline mode in the **Hardware status** window, and then remove that HDD and mount the replacement HDD. If you mount or remove an HDD when the hardware status cannot be checked, for example, immediately after the OS starts, a failure may result.

An HDD is a replacement component that must be replaced periodically. (For information about the recommended replacement cycle, see "APPENDIX HANDLING REPLACEABLE COMPONENTS".)

Follow the procedure below for periodic replacement.

Note: The following is the procedure for replacing the HDD mounted in drive bay 1. When you replace the HDD mounted in drive bay 2, interpret drive bay 1 as drive bay 2 and the HDD1 status lamp as the HDD2 status lamp when following the procedure.

(1) If you replace the HDD while the power to the equipment is turn off

1. Back up the data.
2. Shut down the OS. Unplug the plug of the power cord from the outlet, and wait for at least one minute. Then replace the HDD mounted in drive bay 1 with a replacement HDD. (See "5.3.6 Installing and Removing an HDD".)
3. Turn on the power to the equipment. Then the RAID board automatically detects that the replacement HDD is mounted and starts the rebuild process. Confirm that the HDD1 status lamp is flashing.

4. The OS starts while the rebuild process is continuing. The time required for the rebuild process depends on what applications are executed during this period. Therefore, minimize the number of running applications during the rebuild process. The rebuild process takes about 120 minutes in the case of a 1 TB HDD without a load. The rebuild process takes about 280 minutes in the case of a 2 TB HDD without a load.
If you do not want to start the OS, while the messages for system initialization are displayed (during the BIOS memory check), or while the Digital LEDs for Status indication output "C0" after the equipment turns on, press **F2** to launch the BIOS setup menu.
5. When the HDD1 status lamp turns off, the rebuild process is complete. Also, in the **Hardware status** window, confirm that both HDDs are healthy. If the BIOS setup menu is started at step 4, open the upper menu "Exit", move the cursor to "Exit Saving Changes", and press **Enter**. A message "Save configuration changes and exit now?" is displayed. Press **Enter** to restart the equipment.

(2) If you replace the HDD while the power to the equipment is turn on

< NOTICE >

You need to have administrator privileges to execute step 3. Log on to the computer using an administrator account and click **OFFLINE**. If "User Account Control" (UAC) is enabled, in a confirmation message, click **Yes**. The **User Account Control** window is displayed. Then click **Continue**.

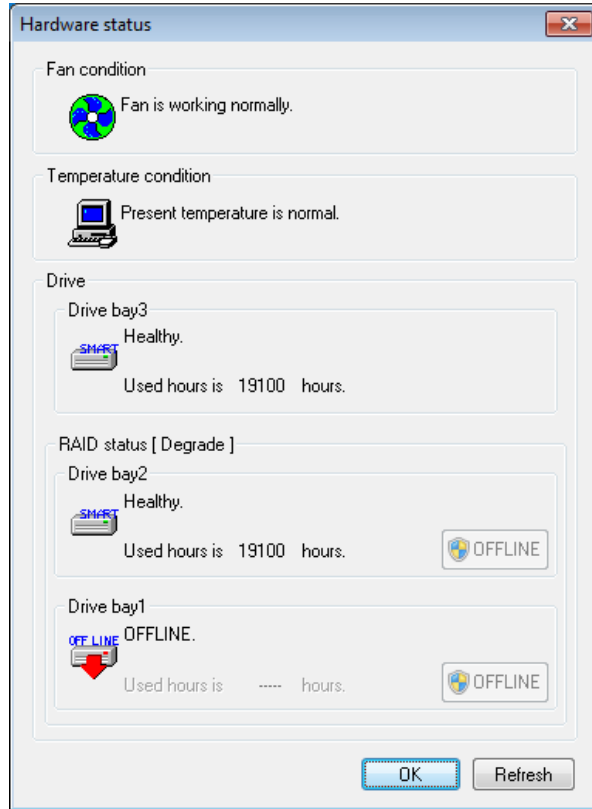
Note that if "User Account Control" (UAC) is disabled and a user without administrator privileges clicks the **OFFLINE** button, the HDD is not disconnected.

1. Back up the data.
2. Terminate all running applications.
3. Double-click the hardware status icon on the notification area of the taskbar.

The **Hardware status** window appears. In the **Hardware status** window, under **Drive bay1**, click **OFFLINE** to set the HDD into the offline mode.



Hardware status window



Confirm that the HDD1 status lamp is on. It may take a few tens of seconds for the HDD1 status lamp to turn on.

4. Execute steps 4 to 7 described in "8.4.2 (1) If you replace a HDD while the power to the equipment is on" to rebuild the array.

8.5.4 Consistency Check for the Mirror Disk

Follow the procedure below for a consistency check of the data on the HDD. For details about the consistency check, refer to the *HF-W7500 Model 40 RAS FEATURES MANUAL (WIN-63-0090)*.

< NOTICE >

- You can execute a consistency check only when both HDDs are in the normal condition.
- Note that a consistency check takes an extremely long time. (It takes about two hours when the load is minimal.)
- During a consistency check, there are a lot of accesses to the HDD. Consequently, the system load may increase, and applications may become slow. Do not execute a consistency check when business applications are running.
- You must have administrator privileges to use the /START option. Execute it using an administrator account of the computer. If "User Account Control" (UAC) is enabled, start the command prompt by clicking **Run as administrator**, and then execute this command.

1. Start the system, and log on to the system as a member of the Administrators group.
2. Start the command prompt, and execute the following command. When the command is executed, a confirmation message is displayed to confirm whether to start a consistency check. Press **Y** to start a consistency check.

```
C:\>raidcheck /START
The consistency check process causes high system load.
Applications should be stopped.
Are you sure you want to continue with this process ? [y/n] : y

A start request of consistency check was sent.

C:\>
```

3. If you want to check the progress of the consistency check, execute the following command.

```
C:\>raidcheck
Consistency check xx%

C:\>
```

Note: If you check the progress of the consistency check after the consistency check finishes, the output of the command is as follows.

```
C:\>raidcheck
Consistency check is not running.

C:\>
```

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APPENDIX HANDLING REPLACEABLE COMPONENTS

NOTICE

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

- As you use a component, it gradually deteriorates and becomes subject to wear and tear. The following components must be replaced at fixed intervals.
- Replacement of these components is not free of charge.
- The recommended replacement cycle in the following table assumes that the average ambient temperature of the system unit is 25°C or less.

Note that when the average ambient temperature exceeds 25°C, the replacement cycle may be shortened in some cases.

Replaceable component	Recommended replacement cycle	Note
HDD	2 years	If the equipment is running 24 hours/7 days a week, the replacement cycle is two years. If the equipment is not running 24 hours/7 days a week, the HDD should be replaced every four years or when the power-on hours count exceeds 20000 hours, whichever comes first. In order to ensure quick recovery of corrupted files, routinely back up your files.
DVD drive	4 years	
Dust filter	1 year	If you do not replace a filter regularly, failure or shorter life span of the equipment may result.
Keyboard (Option)	4 years	
Mouse (Option)	4 years	

< NOTE >

- When you replace a component in order to, for example, repair equipment, you may need to replace the component with a functionally compatible one.
- If you repair a component in a manner not recommended by the Manufacturer, proper operation of the component is not guaranteed.

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