

WIN-62-0060-08



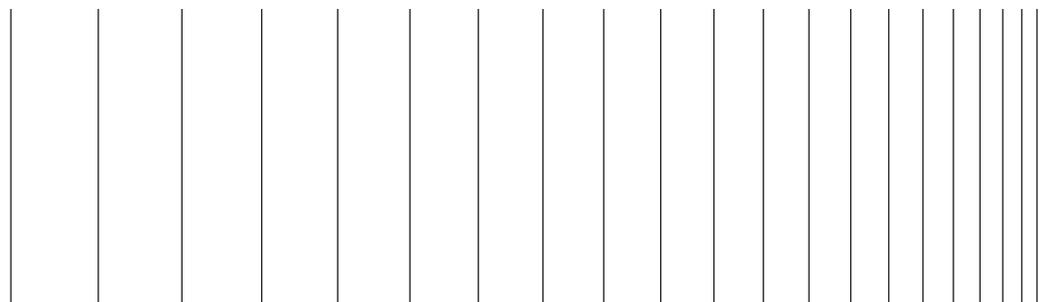
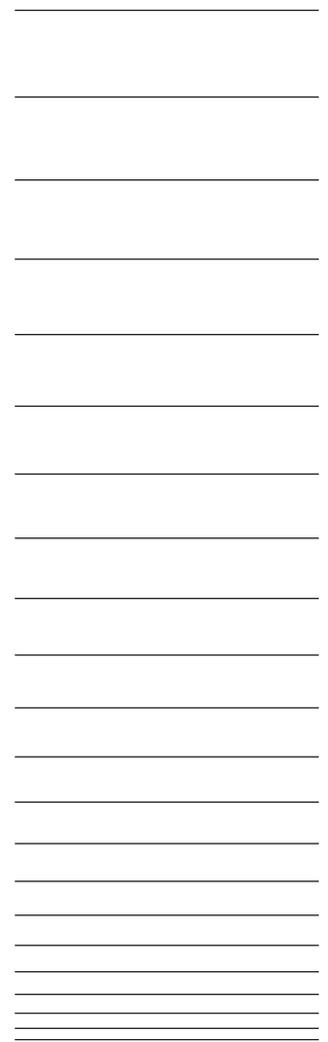
W I N - 6 2 - 0 0 6 0

HITACHI

HITACHI FA COMPUTER

HF-W2000 Model 35/30

INSTRUCTION MANUAL



**USER'S
MANUAL**

Trademarks:

- Microsoft® Windows® XP, Microsoft® Windows® 7, and Microsoft® Internet Explorer® are registered trademarks of Microsoft Corporation in the United States and/or other countries.
- Intel®, Intel® Celeron®, and Intel® Core™ i7 are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and/or other countries.
- Wake on LAN® is a trademark or registered trademark of IBM Corporation in the United States and/or other countries.
- Magic Packet™ is a trademark or registered trademark of Advanced Micro Devices, Inc.
- Other product names (software, hardware) used in this manual are registered trademarks, trademarks, or product names of their respective owners.
- Compression/decompression engine of certain software included in this product uses Zlib, which is copyrighted as follows:
Zlib ver 1.2.3 Copyright © 1995-2005 Jean-loup Gailly and Mark Alder

First Edition, July 2011, WIN-62-0060 (obsolete)

Second Edition, September 2011, WIN-62-0060-01 (obsolete)

Third Edition, March 2012, WIN-62-0060-02 (obsolete)

Fourth Edition, July 2012, WIN-62-0060-03 (obsolete)

Fifth Edition, February 2013, WIN-62-0060-04 (obsolete)

Sixth Edition, April 2013, WIN-62-0060-05 (obsolete)

Seventh Edition, April 2015, WIN-62-0060-06 (obsolete)

Eighth Edition, May 2015, WIN-62-0060-07 (obsolete)

Ninth Edition, February 2017, WIN-62-0060-08

All Rights Reserved, Copyright © 2011, 2017, Hitachi Industry & Control Solutions, Ltd.

The contents of this publication may be revised without prior notice.

No part of this publication may be reproduced in any form or by any means without permission in writing from the publisher.

Printed in Japan.

SAFETY SUMMARY

1. General Safety Guidelines

Before installing and using the Equipment, read the following instructions carefully:

- Read and understand the content of this manual before you start your operation. Follow all the operating procedures provided in this manual.
- Pay special attention to and follow all the hazard warnings on the machine and in the manual. Failure to do so can cause injury to yourself or damage to the properties including the Equipment.
- The hazard warnings which appear on the warning labels on the Equipment or in the manual have one of the following alert headings consisting of an alert symbol and a signal word, DANGER, WARNING, CAUTION, or NOTICE.



The alert symbol shown left precedes every signal word except NOTICE. This alert symbol indicates personal hazard warnings, and appears in safety related descriptions in the manual. To avoid death or injury, follow safety instructions preceded by this symbol.

 **DANGER:** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

 **WARNING:** Indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.

 **CAUTION:** Indicates a potentially hazardous situation which, if not avoided, will or can result in minor or moderate injury.

NOTICE: Indicates a potentially hazardous situation which, if not avoided, can result in serious damage of the Equipment (including data loss) or damage to any property near the Equipment. This signal word may also present relevant usage advisory.

“NOTE” is used to indicate warnings which are not directly related to personal injury hazards.

- Do not perform operation or action other than as stated in this manual. When in doubt, call the designated field engineer.
- Before operation, read this manual and understand fully all following precaution for safety.
- Keep this manual at hand for reference.
- Keep in mind that the hazard warnings in this manual or on the Equipment cannot cover every possible case, as it is impossible to predict and evaluate all circumstances beforehand. Be alert and use your common sense.

 SAFETY SUMMARY (Continued)

2.  IMPORTANT PRECAUTIONS ON USING THE EQUIPMENT

Read and understand fully all the following precautions for safety.

2.1 Precautions Comparable to  WARNING

- This Equipment has not been manufactured for conformance to the system requiring the safety directly associated with human life. When you have a potentiality of using this Equipment in any application requiring such conformance, consult the relevant sales representative.
- In case of smoke or nasty smell, shut off power at the source, disconnect the power cord plug from the outlet, and then contact your distributor or maintenance personnel. Using the faulty Equipment without repair may lead to fire or an electric shock.
- Do not apply any strong impact or vibration to the Equipment because it contains a hard disk drive. If the Equipment is dropped or its enclosure is damaged, disconnect the power cord plug from the outlet and then contact your distributor or maintenance personnel. Using the Equipment without inspection and, if necessary, repair may lead to fire or an electric shock. In addition, do not give any strong shock to the Equipment when unpacking or moving it. Failure to observe this rule may result in a failure.
- Do not modify the Equipment. Failure to observe this rule may lead to fire or an electric shock. The Manufacturer's responsibility is exempted from any result arising out of the user's modification of the Equipment.

2.2 Precautions Comparable to  CAUTION

- Dropping or turning over of this Equipment may cause injury. Take care when you move or transport the Equipment.
- When you unpack or carry this Equipment, pay attention to avoid injury from getting your fingers pinched or getting your body hit.

 SAFETY SUMMARY (Continued)

2.3 Precautions Comparable to NOTICE

- This Equipment alone cannot fully ensure the system safety. Implement appropriate safety means on the system including the Equipment to ensure sufficient protection against personal injury and serious accidents. Provide the system with external protection/safety circuits so that they fully ensure the system safety even when a hardware failure, malfunction, or software defect occurs on the Equipment.
- To avoid failure due to static electricity discharge, wear an ESD wrist strap when upgrading options or replacing components.
- When tightening or loosening a screw, be careful not to crush the screw head. Use a tool suited to the size and type of the screw head. When tightening a screw, be careful not to apply excessive force for preventing destruction of the screw mount. Tighten the screw straight into the screw hole.
- 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.
- Avoid using the Equipment in a dusty or corrosive environment. Otherwise, a machine failure may result.
- Do not apply shock when unpacking or carrying the Equipment. Otherwise, a machine failure may result.
- Be sure to provide sufficient clearances for the ventilation openings in the front and rear areas of the Equipment. Otherwise, an excessive temperature rise could cause a failure, or shortening of the service life, of this Equipment. Also provide a sufficient area for maintenance work.
- Permit operation of this Equipment only to those who received training for operation of this Equipment.

Note: Those who received training for operation of this Equipment are any of the following persons:

1. Those who attended the maintenance training course on this Equipment offered by the Manufacturer.
2. Those who attended the training course on this Equipment offered at its delivery by the designated service representative.
3. Those who have mastered operation of this Equipment through the training course offered by those who attended either of the training courses mentioned above.

 SAFETY SUMMARY (Continued)

3.  Hazard Warning Statements

3.1  WARNING Statements

- Please use the power cable attached to the Equipment to avoid some failure, an electric shock or fire.
- To avoid electric shock or fire, always connect the power cord plug to the mains power outlet that has grounded neutral connection and further protection with an earth leakage breaker.
- Do not use a 2-pole, 2-wire power cord with no ground.
(See Section 1.2 on page 1-6.)
- Hazardous voltage. Be sure to disconnect the power cord plug from the outlet before detaching the cover of the Equipment. Otherwise, death or serious injury due to electric shock may result.
- Hazardous voltage. Do not remove the power supply unit. Otherwise, death or serious injury due to electric shock may result.
- Hazardous voltage. Do not open the cover of the power supply unit. Otherwise, death or serious injury due to electric shock may result.
(See Chapter 2 on page 2-1.)
- Ensure required installation clearance around the Equipment. If the airway of the Equipment is blocked, the internal temperature rises and the Equipment may burn out or fail. (See Subsection 1.2.2, “Installation conditions”).
(See Section 3.1 on page 3-1.)
- In case of smoke or nasty smell, disconnect the power cord plug from the outlet and contact your distributor or customer engineer. Using the faulty Equipment without repair may lead to an electric shock or fire.
(See Section 3.5 on page 3-4.)
(See Section 6.1 on page 6-1.)
- Hazardous voltage. Before you replace an extended board, shut down the OS, and disconnect the power cord plug from the outlet. Make sure you wait at least one minute before detaching the cover of the Equipment. Otherwise, you may get an electric shock or a fire may occur.
(See Section 5.4 on page 5-5.)

 SAFETY SUMMARY (Continued)

- Hazardous voltage. Before you replace an main memory, shut down the OS, and disconnect the power cord plug from the outlet. Make sure you wait at least one minute before detaching the cover of the Equipment. Otherwise, you may get an electric shock or a fire may occur.
- Hazardous voltage. Do not remove the power supply unit. Otherwise, death or serious injury due to electric shock may result.
- Hazardous voltage. Do not open the cover of the power supply unit. Otherwise, death or serious injury due to electric shock may result.
(See Section 5.4 on page 5-18.)
- Hazardous voltage. Be sure to shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute before detaching the cover of the Equipment. Otherwise, you may get an electric shock or a fire may occur.
(See Section 5.5 on page 5-25.)
(See Section 5.6 on page 5-27.)

3.2  CAUTION Statements

- 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.
(See Section 1.4 on page 1-9.)
- Hazardous rotating object. Persons other than customer engineers must not detach any fan or fan guard. Never put a finger or any object in the rotary. Otherwise, injury due to entrapment may result.
(See Chapter 2 on page 2-1.)
- During work, do not touch the internal parts directly with bare hands. Otherwise, you may get burned because the parts are hot. In addition, such action may cause damage to the internal parts.
(See Section 5.4 on page 5-5.)
- Do not insert your fingers inside the cover of the Equipment when you reattach it. Otherwise, you may pinch your fingers.
- Pay attention not to get your fingers injured by protrusions in the back of the Equipment.
(See Section 5.4 on page 5-9.)
(See Section 5.4 on page 5-14.)
- If you happened to bend the blade of slot earthing leaf spring while extracting an extended board, carefully restore the shape of the blade, paying attention not to hurt your hand or fingers on the sharp blade of the leaf spring.
(See Section 5.4 on page 5-14.)
(See Section 5.4 on page 5-17.)

 SAFETY SUMMARY (Continued)

- During work, do not touch the internal parts directly with bare hands. Otherwise, you may get burned because the parts are hot. In addition, such action may cause damage to the internal parts.
- Do not insert your fingers inside the cover of the Equipment when you reattach it. Otherwise, you may pinch your fingers.
(See Section 5.4 on page 5-18.)
(See Section 5.6 on page 5-27.)
- Be sure to shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute before you detach or attach an HDD on D Model (if you intend replacement while the Equipment power is off) or A Model. Failure to do so may cause an electric shock or a machine failure.
- To avoid finger injury while detaching/attaching an HDD, pay attention not to get your fingers caught by any protrusion.
- When detaching/attaching an HDD, check out the target drive bay number. If you attach a new HDD to a wrong drive bay, the Equipment may not start or the data may be lost because of inconsistency of the configuration information.
(See Section 5.4 on page 5-21.)
- Be sure to shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute before you detach or attach the vertical stand.
- Falling or dropping of the Equipment vertically placed on the desktop may cause injury. Be sure to attach the vertical stand accompanying the Equipment and place the Equipment with the vertical stand on a level surface.
(See Section 5.4 on page 5-24.)
- This Equipment uses a lithium battery. When replacing the battery, be sure to replace with the type specified by the Manufacturer. Replacement with a wrong type may cause the battery to explode, catch fire, rupture, generate heat, leak electrolyte, or produce gas.
- During work, do not touch the internal parts directly with bare hands. Otherwise, you may get burned because the parts are hot. In addition, such action may cause damage to the internal parts.
- Do not insert your fingers inside the cover of the Equipment when you reattach it. Otherwise, you may pinch your fingers.
(See Section 5.5 on page 5-25.)

 SAFETY SUMMARY (Continued)

3.3 NOTICE Statements

- A machine error, an unexpected power failure, or an operation error on the Equipment may cause files to be lost permanently. To prevent such loss of data, implement scheduled backup in daily operation.
(See Preface on page i.)
(See Section 8.1 on page 8-1.)
- When you intend to move the Equipment, first shut down the OS, then disconnect the power cord plug from the outlet, and wait at least one minute. Otherwise, failure of hardware such as HDD may result.
- When transporting or carrying the Equipment, repack it using the packing materials that came with it and are not broken or dented. Transporting or carrying the Equipment either packed by other packing materials or repacked by broken or dented packing materials may damage the Equipment.
(See Section 1.2 on page 1-3.)
(See Section 5.1 on page 5-1.)
- Be sure to route power cords away from interface cables, as well as from power cords and interface cables of any third-party devices such as PCs. Otherwise, a machine failure or malfunction may result.
- Before connecting or disconnecting an interface cable, shut down the OS both on the Equipment and on the target device, as well as disconnect both the Equipment power supply cord from the outlet and the power supply cord of the target device from the outlet. Otherwise, a machine failure due to a short circuit may result.
- If an interface cable gets disconnected while the Equipment is powered, first shut down the OS and then disconnect the Equipment power supply cord from the outlet. Sudden power disconnection without shutting down the OS may corrupt file.
- If there is a cable for external contact point, ensure that it is connected to the EXT (external control). Because a maximum voltage of 40 V dc may be applied to this cable through the relay load, erroneous connection of this cable to a wrong connector may cause a failure.
(See Section 1.3 on page 1-7.)

 SAFETY SUMMARY (Continued)

- When replacing an HDD on D Model of HJ-2035, follow the procedure in Subsection 9.5.3, “Performing periodical HDD replacement”. In addition, when replacing an HDD on B Model of HJ-2030, follow the procedure in Subsection 10.5.3, “Performing periodical HDD replacement”.
- When replacing an HDD on A Model of HJ-2035 or HJ-2030, do not hot-plug an HDD. Otherwise, a machine failure or HDD failure may result. Be sure to shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute before replacing an HDD.
- When using the USB interface connector, ensure the mating direction and insert the plug slowly into the receptacle. Erroneous insertion may cause damage to the USB interface connector.
- Do not plug or unplug a USB device while the Equipment is running online (during system operation). Such action may affect the running application.
(See Chapter 2 on page 2-1.)

- When using the USB interface connector, ensure the mating direction and insert the plug slowly into the receptacle. Erroneous insertion may cause damage to the USB interface connector.
- Do not plug or unplug a USB device while the Equipment is running online (during system operation). Such action may affect the running application.
(See Section 2.3 on page 2-8.)

- If an emergency power-off (abrupt disconnection of power cord plug from the outlet or turning off of mains power breaker without shutting down the OS) is done, reloading of certain system programs may be necessitated because the journal information is lost. For this reason, never execute emergency power-off except when power must be disconnected urgently because of malfunction.
- If power is disconnected at the source, the Equipment may not be recovered automatically.
(See Section 3.5 on page 3-4.)

- When you finish accessing a DVD disk, remove it from the DVD drive. Leaving a DVD disk in the DVD drive may cause a failure.
- If the disk tray is left opened, a failure may be caused. When the DVD drive is not used, store the disk tray in the DVD drive.
- Do not use DVD disks having eccentricity of the center of gravity (e.g., due to labels), cracks, scratches, bends, or extraordinary shapes. Otherwise, abnormal noise, vibration, or machine failure may result.
(See Section 3.6 on page 3-5.)

 SAFETY SUMMARY (Continued)

- When you have washed the dust filter, wait until the dust filter is completely dried and then put it back to the Equipment. Operating the Equipment with a wet dust filter may cause a failure.
(See Section 5.1 on page 5-1.)
- You may wash the dust filter with detergent diluted with water, in which case be sure to use neutral detergent and cleanse it until the residue detergent is completely washed away. Otherwise, the performance of the dust filter may be lost.
(See Section 5.3 on page 5-3.)
- Do not use consumable parts beyond the recommended interval. Deterioration of parts may cause failure.
(See Section 5.4 on page 5-5.)
- Be sure to disconnect the external cables connected to the Equipment before you insert or extract an extended board. Failure to do so may cause damage to the Equipment.
(See Section 5.4 on page 5-14.)
(See Section 5.4 on page 5-17.)
- Be sure to reattach a stopping panel to an unused slot from which an extended board is extracted. If the Equipment is used with an exposed unused slot, a machine failure may result.
(See Section 5.4 on page 5-14.)
(See Section 5.4 on page 5-17.)
- Be sure to disconnect the external cables connected to the Equipment before you insert or extract main memory. Failure to do so may cause damage to the Equipment.
- Main memory and memory sockets have directivity. Be sure to engage them in the right direction. Otherwise, a failure may result.
- This Equipment accepts a main memory board in Slot A only or main memory boards of the same capacity in Slot A and Slot B. Insert a main memory board to comply with this rule, or main memory may become unrecognizable.
(See Section 5.4 on page 5-18.)

 SAFETY SUMMARY (Continued)

- Pay attention not to apply shock to the replacing HDD and the replaced HDD during work, whether installed or not installed on the Equipment. When not installed, place each HDD on a shock-absorbing material such as antistatic cushion, even temporarily. Direct placement on a hard surface such as desktop may cause damage, data corruption, or shortening of service life due to shock.
- Insert the HDD firmly and precisely. A loose contact or a missing screw will cause a failure.
- While the HDD is powered, never attempt to unscrew and hot-plug the HDD. Otherwise, a machine failure or HDD failure may result.
- The HDD detachment/attachment must be limited to the least, e.g., replacement in the event of a failure. Frequent detachment/attachment may cause damage to the Equipment.
- On D Model, also observe the following:
 - Do not altogether replace the two HDDs in RAID1 configuration.
 - Since each D Model has its own RAID1 configuration information (e.g., serial number), you cannot swap HDDs even between D Models. 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 D Models, manage use and inventory of HDDs so that they are not inadvertently mixed.
 - Never remove the HDD if the corresponding HDD status lamp is off. Otherwise, the stored data will be destroyed.
 - When you replace an HDD while the Equipment power is on, first stop the power supply to the target HDD by placing the HDD into OFFLINE state in the “Hardware status” window. Never attempt HDD replacement before this window is ready (e.g., immediately after the OS startup). Otherwise, a machine failure or HDD failure may result.
- When you intend to move the Equipment, first shut down the OS, then disconnect the power cord plug from the outlet, and wait at least one minute. Otherwise, failure of hardware such as HDD may result.
- When transporting or carrying the Equipment, repack it using the packing materials that came with it and are not broken or dented. Transporting or carrying the Equipment either packed by other packing materials or repacked by broken or dented packing materials may damage the Equipment.
- By the characteristics of rush current suppression circuit on this Equipment, a larger rush current than usual may flow when power is supplied before the power supply unit is naturally cooled after the last power-off. To avoid possible adverse effects on the connected electronic devices such as fuse-free breakers and on the service life of this Equipment, wait at least one minute of the last power-off before you supply power to the Equipment.

(See Section 8.2 on page 8-2.)

 SAFETY SUMMARY (Continued)

- 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.
- Each Equipment contains uniquely assigned HDD serial numbers in its own RAID1 configuration information. Accordingly, if you create a copy of the existing HDD without using the RAID1 rebuilding process, the copy will be recognized new and invalid. This new HDD, if installed in the drive bay, will not start up the Equipment.
- Maintenance of a disk array system requires in-depth knowledge. In case of an operation error, data in the HDD may be lost.

(See Section 9.1 on page 9-1.)

- When you newly build a RAID1 system on the Equipment, the setup process writes the RAID1 configuration information, which only applies to this specific serial numbered Equipment. Since these HDDs containing such RAID1 configuration information are not usable on any other Equipment with a different serial number, manage handling and inventory of HDDs so that they are not inadvertently mixed if you own multiple units of this Equipment. Should a wrong HDD be installed, the Equipment may not start up or you may lose data stored in the HDD due to inconsistency of the RAID1 configuration information.
- When you newly build a RAID1 system on the Equipment, prepare two new units of specific HDD models authorized by the Manufacturer. If you use an unauthorized HDD, you may lose data stored in the HDD.

(See Section 9.2 on page 9-2.)

 SAFETY SUMMARY (Continued)

- Never remove the HDD if the corresponding HDD status lamp is off. Otherwise, the stored data will be destroyed.
- To prevent damage due to static electricity discharge, wear cotton gloves when you replace an HDD. Otherwise, the stored data may be destroyed.
- Before you ensure “Not Connected” status in the “Hardware status” window, never mount a new HDD.
- Insert a new HDD firmly and precisely. A loose contact or a missing screw will cause a failure.
- Pay attention not to apply shock to the replacing HDD and the replaced HDD during work, whether installed or not installed on the Equipment. Otherwise, a failure may result.
- Never shut down the OS or perform the HDD detachment/attachment work before the RAID1 rebuilding process is complete. Otherwise, the stored data in the HDD may be lost or a failure may result.

(See Section 9.4 on page 9-5.)

- To prevent damage due to static electricity discharge, wear cotton gloves when you replace an HDD. Otherwise, the stored data may be destroyed.
- Observe the work order and follow the given instructions. Otherwise, the stored data may be lost.

(See Section 9.5 on page 9-11.)

(See Section 9.5 on page 9-12.)

- Do not replace with an HDD previously used in any RAID level. Otherwise, the Equipment may not start up or you may lose data stored in the HDD due to inconsistency of the RAID1 configuration information or similar cause.
- Selecting a wrong HDD as the target will erase the data stored in the HDD. Fully ensure the drive bay number for the target HDD on the Equipment at the user’s responsibility.
- Do not altogether replace the two HDDs in RAID1 configuration.
- To prevent damage due to static electricity discharge, wear cotton gloves when you replace an HDD. Otherwise, the stored data may be destroyed.
- When you replace an HDD while the Equipment power is on, first stop the power supply to the target HDD by placing the HDD into OFFLINE state in the “Hardware status” window. Never attempt HDD replacement before this window is ready (e.g., immediately after the OS startup). Otherwise, a machine failure or HDD failure may result.

(See Section 9.5 on page 9-13.)

 SAFETY SUMMARY (Continued)

- The Equipment features RAID1 and is highly reliable compared to a system with a conventional configuration. Nonetheless, the data stored on the HDDs may be lost depending on the type of the failure. In addition to equipment failure data can also be lost by power failure and human mistakes during operation. Should such situation occur, the data cannot be recovered. In order to prevent data loss, make it a routine to save your data and establish a systematic way of backup. In addition, increase the reliability of power supply by, for example, using a UPS.
- The Equipment is evaluated under the assumption that the HDD models specified by HITACHI are used. When you replace an HDD, use the HDD models specified by HITACHI. Otherwise, the data stored in the HDDs may be lost. Stick to the recommended replacement cycle when you replace an HDD. (See Section 5.3, “Replacement of Consumable Parts”.)
- The Equipment manages the unique serial number of each HDD (each HDD has a different serial number) as part of RAID1 configuration information. Therefore, if you copy the contents of an HDD to another HDD without using the rebuild function of the software RAID1 construction utility, the HDD with the copied contents is recognized as an invalid medium. Even if you mount the HDD to a drive bay, the Equipment will not start.
- Maintenance of a disk array system requires a high level of expertise. Should any mistakes be made during the maintenance work, data stored in the HDDs may be lost.

(See Section 10.1 on page 10-1.)

- When you build software RAID1 from scratch, the unique serial number of each HDD (each HDD has a different serial number) is stored in the HDDs as part of RAID1 configuration information. If you use multiple sets of Equipment, pay attention when you handle and store the HDDs so that the HDDs are not mixed up. Otherwise, RAID1 configuration information mismatch occurs, and the Equipment may not start up, and the data in the HDDs may be lost.
- When you build software RAID1 from scratch, prepare two new HDDs selected from the models specified and tested by HITACHI. Otherwise, the data stored in the HDDs may be lost.

(See Section 10.2 on page 10-3.)

 SAFETY SUMMARY (Continued)

- Wear cotton gloves when replacing an HDD in order to prevent failure caused by static electricity. Otherwise, the data in the HDDs may be corrupted.
 - (See Section 10.4 on page 10-9.)
 - (See Section 10.5 on page 10-16.)
 - (See Section 10.5 on page 10-18.)
- Mount an HDD steadily. Loose contact and missing screws may result in failure.
- Do not shake the installing HDD and the already mounted HDDs while replacing an HDD. If you do so, the device may fail.
- When you use the software RAID1 construction utility, disconnect all the external storage devices connected to the Equipment beforehand. Otherwise, the Equipment may not start up, or the data in the HDDs may be lost.
 - (See Section 10.4 on page 10-9.)
 - (See Section 10.4 on page 10-12.)
 - (See Section 10.6 on page 10-23.)
- Until rebuild is complete, avoid shutting off the power for the Equipment or attaching and detaching HDDs. Otherwise, the data in the HDDs may be lost or failure may result.
 - (See Section 10.4 on page 10-9.)
 - (See Section 10.4 on page 10-12.)
- Do not use an HDD previously used for software RAID1 in place of a new HDD. Otherwise, the Equipment may not start up or the data in the HDDs may be lost because of RAID1 configuration information mismatch or other reasons.
 - (See Section 10.5 on page 10-16.)
 - (See Section 10.5 on page 10-18.)
 - (See Section 10.5 on page 10-20.)
- Do not create a backup HDD by mounting a new HDD and then rebuilding RAID1. The RAID1 configuration information stored in each HDD is updated after RAID1 is rebuilt. Therefore, even if the previous HDD is reinstalled after the rebuild is complete, the Equipment may not start up or the data in the HDDs may be lost due to RAID1 configuration information mismatch or other reasons.
 - (See Section 10.5 on page 10-16.)
- During the work, make sure you follow the correct procedure. Should any mistakes be made, the data stored in the HDDs may be lost.
 - (See Section 10.5 on page 10-16.)
 - (See Section 10.5 on page 10-18.)
 - (See Section 10.5 on page 10-20.)

 SAFETY SUMMARY (Continued)

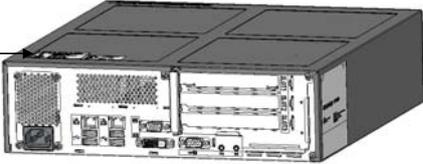
- Do not use an HDD previously used for software RAID1 in place of a new HDD for replacement. Otherwise, the Equipment may not start up or the data in the HDDs may be lost because of RAID1 configuration information mismatch or other reasons.
- If you pick up a wrong HDD when selecting the HDD to be replaced, the data in the HDDs will be lost. Make sure the drive bay number of the HDD to be replaced is correct, and replace the HDD at your own risk.
- When software RAID1 is used, you cannot replace an HDD while the power is on. When you replace an HDD, make sure the power is off.
(See Section 10.5 on page 10-20.)
- If you manually select the direction of rebuild during a rebuild process, make sure you select the right direction. Otherwise, the data stored in the HDDs may be lost.
- Until rebuild is complete, avoid shutting off the power for the Equipment or attaching and detaching HDDs. Otherwise, the data may be corrupted or failure may result.
- If read or write error occurred during rebuild, it may take about one minute after an error message is displayed until next input is allowed.
(See Section 10.6 on page 10-28.)

⚠ SAFETY SUMMARY (Continued)

4. **⚠ Warning Labels**

Warning labels are provided on the Equipment as illustrated below.

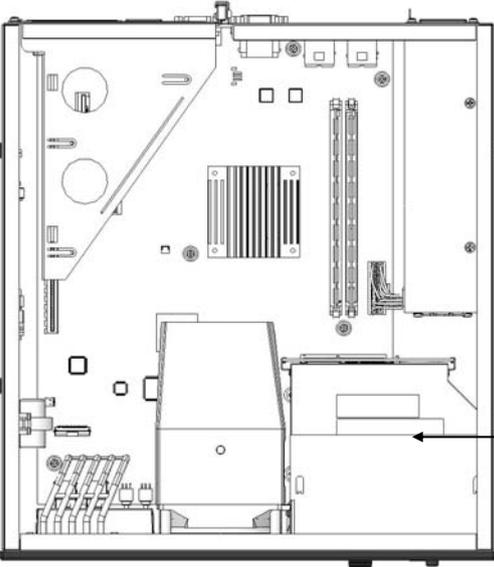
⚠ 警告
⚠ WARNING

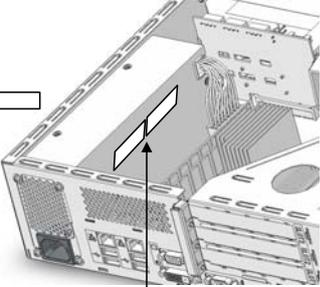


⚡

危険電圧
Hazardous voltage.

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.





⚠ CAUTION

#HAZARDOUS VOLTAGE INSIDE. DO NOT REMOVE THIS COVER.
#AIR OPENING SHOULD NOT BE COVERED.

⚠ ACHTUNG

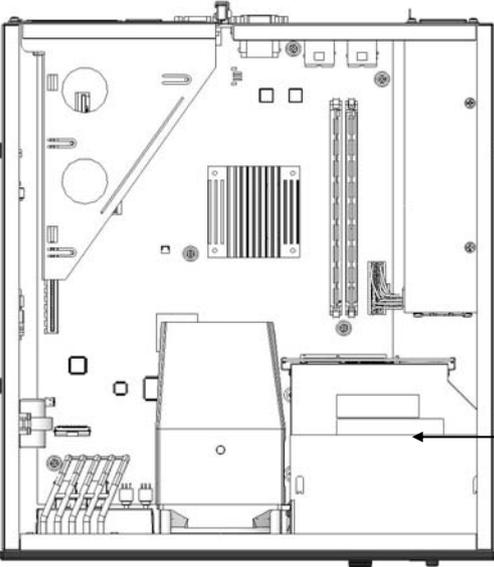
#GEFÄHRLICHE SPANNUNG. GEHÄUSE NICHT ÖFFNEN.
#LÜFTUNGSÖFFNUNG NICHT ABDECKEN.

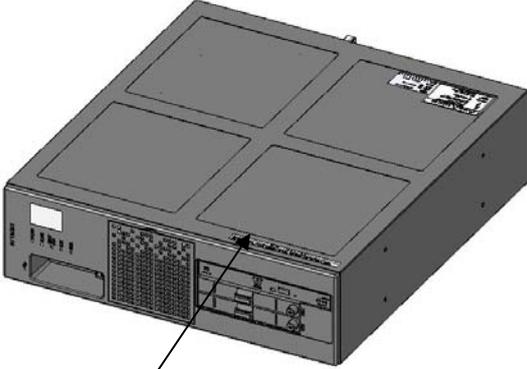
CAUTION CLASS 3B VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS AVOID EXPOSURE TO THE BEAM

ATTENTION RADIATIONS LASER VISIBLES ET INVISIBLES DE CLASSE 3B EN CAS D'OUVERTURE. EVITER TOUTE EXPOSITION DIRECTE AU FAISCEAU.

VORSICHT KLASSE 3B SICHTBARE UNO UNSICHTBARE LASERSTRAHLUNG WENN GEOFFNET. DIREKTEN KONTAKT MIT DEM STRAHL VERMEIDEN.

WARNING KLASS 3B SYNUG OCH OSYNLIG LASERSTRALNING NAR DENNA DEL AR ÖPPNAD. UNDVIK ATT DIREKT EXPONERA DIG FOR STRALNINGEN.





通知 NOTICE

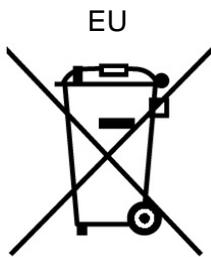
ドライブの挿抜手順を誤ると、システムデータ破壊にいたりますので、取扱説明書に従いドライブの交換を実施してください。
Drive replacement by a wrong procedure corrupts the system data. See User's Manual

 SAFETY SUMMARY (Continued)

5.  Disposing of the Equipment as Industrial Waste

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.  Disposing of Lithium Battery



Note: The symbol shown left is applicable only within the European Union pursuant to Article 20 “Information for end-users” and Annex II of Directive 2006/66/EC.

The Equipment uses a lithium battery. When detaching the lithium battery, observe the instructions in Section 5.5, “Replacing Lithium Battery”. When disposing of the lithium battery, observe local laws and regulations whatever applicable.

This Page Intentionally Left Blank

PREFACE

This manual describes the operation and adjustment procedures required in the operator's daily operation of the Hitachi FA Computer HF-W2000 Model 35/30 (hereafter, the "Equipment"). This manual consists of the following chapters:

CHAPTER 1	GETTING STARTED
CHAPTER 2	CONSTRUCTION
CHAPTER 3	OPERATION
CHAPTER 4	SPECIFICATIONS
CHAPTER 5	INSPECTION AND MAINTENANCE
CHAPTER 6	TROUBLESHOOTING
CHAPTER 7	MAINTENANCE ACTIONS
CHAPTER 8	USAGE NOTES
CHAPTER 9	RAID1
CHAPTER 10	SOFTWARE RAID1

NOTICE

A machine error, an unexpected power failure, or an operation error on the Equipment may cause files to be lost permanently. To prevent such loss of data, implement scheduled backup in daily operation.

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):
1KB (kilobyte) = 1024 bytes
1MB (megabyte) = 1,048,576 bytes
1GB (gigabyte) = 1,073,741,824 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 :
1KB (kilobyte) = 1000 bytes
1MB (megabyte) = 1000^2 bytes
1GB (gigabyte) = 1000^3 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.

CONTENTS

 SAFETY SUMMARY	S-1
CHAPTER 1 GETTING STARTED	1-1
1.1 Scope.....	1-1
1.2 Installation Environment	1-1
1.2.1 Environmental conditions	1-1
1.2.2 Installation conditions	1-3
1.2.3 Power source conditions	1-6
1.3 Hardware Connection	1-7
1.4 Power Supply Cord.....	1-9
1.5 Installation of Extended Boards.....	1-10
1.6 Roles of the Operator.....	1-10
CHAPTER 2 CONSTRUCTION	2-1
2.1 External Views of Operator Access Areas	2-1
2.2 Internal Construction	2-4
2.3 Functions of Elements in Operator Access Areas	2-6
CHAPTER 3 OPERATION	3-1
3.1 Before Turning On the Power.....	3-1
3.2 Starting Up the Equipment	3-1
3.3 Stopping the Equipment	3-3
3.4 Turning Off the Power.....	3-4
3.5 Emergency Power-off.....	3-4
3.6 DVD Drive.....	3-5
3.6.1 Inserting DVD disk	3-5
3.6.2 Removing DVD disk.....	3-5
3.6.3 Using DVD drive in vertical position	3-6
3.6.4 Operation at trouble occurrence.....	3-6
3.7 Power Control over LAN.....	3-7
3.7.1 How to enable WOL	3-7
3.7.2 How to perform power ON over LAN.....	3-8
3.7.3 Magic Packet™ frame format.....	3-9
3.8 Serial Port Setting	3-9
3.9 Built-in LAN Interface (1000BASE-T/100BASE-TX/10BASE-T).....	3-9
3.10 Notes on LAN Interfaces	3-10
3.10.1 Requirements for twisted pair Ethernet cable.....	3-10
3.10.2 Autonegotiation for link speed and duplex mode	3-10
3.10.3 How to set up link speed and duplex mode	3-10
3.10.4 Steps to find auto assignment result of LAN adapters to LAN ports under Windows® 7	3-15
3.10.5 Possible solutions to unstable 1000Mbps links	3-17
3.10.6 Precautions for use of multiple optional LAN adapters installed in addition.....	3-19
3.10.7 Precautions for link disconnection event logs collected at OS startup	3-23

3.11	Screen Display Settings	3-24
3.11.1	How to set up single-display environment.....	3-24
3.11.2	How to set up multi-display environment.....	3-26
CHAPTER 4 SPECIFICATIONS.....		4-1
4.1	Product Specifications	4-1
4.2	Memory Space	4-4
4.3	I/O Space.....	4-5
4.4	Interrupt List	4-6
4.5	Setup of BIOS	4-7
4.6	POST Code Indication	4-11
4.7	Timer.....	4-12
4.8	Interface Specifications.....	4-13
4.8.1	Connector specifications	4-13
4.8.2	External control interface specifications	4-16
4.9	Miscellaneous Requirements	4-20
CHAPTER 5 INSPECTION AND MAINTENANCE.....		5-1
5.1	Periodical Maintenance.....	5-1
5.2	Periodical Checkout	5-3
5.3	Replacement of Consumable Parts	5-3
5.4	Parts Replacement.....	5-5
5.4.1	Inserting/extracting extended board	5-5
5.4.1.1	Before inserting/extracting extended board	5-5
5.4.1.2	Extended board types	5-6
5.4.1.3	Inserting/extracting extended board on HJ-2035	5-10
5.4.1.4	Inserting/extracting extended board on HJ-2030	5-15
5.4.2	Inserting/extracting main memory	5-19
5.4.2.1	Before inserting/extracting main memory	5-20
5.4.2.2	Inserting/extracting main memory	5-20
5.4.2.3	After inserting/extracting main memory	5-21
5.4.3	Detaching/attaching hard disk drive (HDD)	5-22
5.4.3.1	Before detaching/attaching HDD.....	5-23
5.4.3.2	Detaching/attaching HDD.....	5-23
5.4.4	Detaching/attaching vertical stand	5-25
5.5	Replacing Lithium Battery.....	5-26
5.5.1	Preparation	5-26
5.5.2	Replacing lithium battery	5-27
5.6	Setup for Enabling Remote Power-on Function	5-28
5.6.1	Preparation	5-28
5.6.2	Enabling remote power-on function.....	5-28
CHAPTER 6 TROUBLESHOOTING		6-1
6.1	Interview Sheet	6-1
6.2	STOP Error Code.....	6-4
6.3	Event Logs	6-5
6.4	System Load Monitoring with Windows® Performance Monitor Utility.....	6-7

CHAPTER 7 MAINTENANCE ACTIONS	7-1
7.1 Overview of RAS Features	7-1
7.2 Memory Dump Collecting Feature	7-6
7.3 Operating Procedures Relating to Memory Dump Collection	7-9
7.3.1 Required storage sizes for memory dump	7-9
7.3.2 Recommended memory dump types.....	7-10
7.3.3 Flow of actions on shortage of memory dump file size.....	7-11
7.3.4 Flow of actions on altered settings for saving memory dump	7-12
7.3.5 Various setup procedures relating to memory dump	7-13
7.4 Startup Suppression on Serious Failure Detection	7-17
7.5 Maintenance Support Commands.....	7-18
7.5.1 Log information save command—logsave	7-19
7.5.2 Copy command for memory dump file—mdump.....	7-21
7.5.3 Disk area allocation command for saving memory dump file—createdmp	7-23
7.5.4 RAS information acquisition command—getrasinfo.....	7-24
 CHAPTER 8 USAGE NOTES	 8-1
8.1 Backing Up Files	8-1
8.2 Restrictions	8-2
8.3 Limitations on Maintenance Services.....	8-6
8.4 Notes on Power Options of Windows® 7	8-7
 CHAPTER 9 RAID1	 9-1
9.1 What Is RAID1?	9-1
9.2 Setup	9-2
9.2.1 Outline of setup.....	9-2
9.2.2 Procedure of new setup.....	9-2
9.3 Monitoring of RAID1 Status	9-3
9.3.1 Status monitoring via HDD status lamps.....	9-3
9.3.2 Status monitoring via the “Hardware status” window	9-4
9.4 Recovery from Failure	9-5
9.4.1 Detecting a failure.....	9-5
9.4.2 Recovering from HDD failure in one side.....	9-5
9.4.3 Acting against read error during RAID1 rebuilding process	9-10
9.4.4 Recovering from HDD failure in both sides	9-10
9.5 Preventive Maintenance.....	9-11
9.5.1 Creating backup HDD.....	9-11
9.5.2 Performing restoration from backup HDD	9-12
9.5.3 Performing periodical HDD replacement	9-13
9.5.3.1 Replacing an HDD in RAID1 while the Equipment power is off.....	9-14
9.5.3.2 Replacing an HDD in RAID1 while the Equipment power is on.....	9-15
 CHAPTER 10 SOFTWARE RAID1	 10-1
10.1 Overview of Software RAID1	10-1
10.2 Setup	10-3
10.2.1 Overview of setup	10-3
10.2.2 Setting up from scratch	10-3
10.3 Checking the Status of the Software RAID1	10-4

10.3.1	Status indicator lamps	10-4
10.3.2	Hardware status window	10-5
10.3.3	Software RAID1 construction utility	10-6
10.4	Recovering from failure	10-7
10.4.1	Detecting a failure	10-7
10.4.2	Checking the status of failure.....	10-7
10.4.3	Recovering from HDD failure in one side	10-9
10.4.4	Recovering from power failure during system operation.....	10-12
10.4.5	When a trouble occurs during recovery	10-14
10.4.6	Recovering from HDD failure in both sides	10-15
10.5	Preventive Maintenance	10-16
10.5.1	Creating backup HDD	10-16
10.5.2	Performing restoration from backup HDD.....	10-18
10.5.3	Performing periodical HDD replacement	10-20
10.5.4	Check and restoration of error areas on an HDD	10-22
10.6	Software RAID1 construction utility	10-23
10.6.1	Overview of software RAID1 construction utility	10-23
10.6.2	Starting and exiting the utility	10-24
10.6.3	Status display function for RAID1	10-26
10.6.4	Rebuild function of RAID1	10-28
10.6.5	Consistency check function.....	10-31
10.6.6	Backup restoration preparation function	10-32
10.6.7	Error Message	10-34
10.7	Backing Up under the Offline Situation	10-36

FIGURES

Figure 1-1	Clearance for Operation and Service (Top View)	1-4
Figure 1-2	Installation Clearance	1-4
Figure 1-3	Horizontal Placement on Desktop	1-5
Figure 1-4	Vertical Placement on Desktop.....	1-5
Figure 1-5	Hardware Connection	1-8
Figure 2-1	Elements in Operator Access Areas—Front View	2-2
Figure 2-2	Elements in Operator Access Areas—Rear View on HJ-2035	2-3
Figure 2-3	Elements in Operator Access Areas—Rear View on HJ-2030	2-3
Figure 2-4	Internal Construction—Internal View on D Model of HJ-2035.....	2-4
Figure 2-5	Internal Construction—Internal View on A Model of HJ-2035.....	2-5
Figure 2-6	Internal Construction—Internal View on A Model of HJ-2030.....	2-5
Figure 3-1	Front View of DVD Drive in the Equipment	3-5
Figure 5-1	Extended Board Types and Mounting Positions on HJ-2035.....	5-8
Figure 5-2	Extended Board Types and Mounting Positions on HJ-2030.....	5-9
Figure 5-3	Unmounting the Cover of the Equipment.....	5-10
Figure 5-4	Removing the Screw Fixing the Riser Unit on HJ-2035	5-11
Figure 5-5	Detaching the Riser Unit on HJ-2035.....	5-11
Figure 5-6	Reattaching the Riser Unit on HJ-2035	5-12
Figure 5-7	Detaching the Stopping Panel from the Target Slot on HJ-2035	5-13
Figure 5-8	Inserting an Extended Board on HJ-2035.....	5-14
Figure 5-9	Detaching the Low-profile Bracket on HJ-2030.....	5-16
Figure 5-10	Detaching the Stopping Panel from the Target Slot on HJ-2030	5-16
Figure 5-11	Inserting an Extended Board on HJ-2030.....	5-17
Figure 5-12	Inserting Main Memory	5-20
Figure 5-13	Detaching/Attaching HDD on D or A Model While Main Power Is Off.....	5-24
Figure 5-14	Detaching/Attaching Vertical Stand	5-25
Figure 5-15	Replacing Lithium Battery.....	5-27
Figure 5-16	Removing JP Socket	5-29
Figure 9-1	HDD Status Lamps	9-3
Figure 10-1	Alarm Lamp.....	10-4

TABLES

Table 1-1	Equipment Dimensions, Service Clearance, and Installation Clearance	1-4
Table 1-2	Power Cord and Plug Identification	1-9
Table 2-1	Function of Elements in Operator Access Areas	2-6
Table 4-1	POST Codes at Error Stops, Possible Error Causes, and Actions To Be Taken.	4-12
Table 4-2	Timer Specifications	4-12
Table 6-1	List of STOP Error Codes	6-4
Table 6-2	Event Logs Unique to the Equipment	6-5
Table 6-3	Performance Monitor Counters Useful in System Load Monitoring.....	6-7
Table 7-1	Triggers for Collecting Memory Dump	7-6
Table 7-2	Maintenance Support Commands	7-18
Table 7-3	Log Information Saved by logsave Command.....	7-20
Table 7-4	Error Message with logsave Command	7-20
Table 7-5	Completion Messages with mdump Command	7-22
Table 7-6	Error Messages with mdump Command.....	7-22
Table 7-7	Error Messages with createdmp Command	7-24
Table 7-8	Types of Information Subject to Acquisition with getrasinfo Command	7-25
Table 7-9	Error Messages with getrasinfo Command	7-31
Table 10-1	Error Messages from the Software RAID1 construction utility.....	10-34

This Page Intentionally Left Blank

CHAPTER 1 GETTING STARTED

1.1 Scope

This manual describes the operation and adjustment procedures required in the operator's daily operation of the Hitachi FA Computer HF-W2000 Model 35/30 (the "Equipment"). After opening the product package, make sure that all items are supplied and free of damage. Check carefully to see if all components are delivered, according to the Packing List. Contact your distributor in the event of any shortage or damage.

Please refer to the following manuals for software:

- *HF-W2000 Model 35/30 Setup Guide* (Manual No. WIN-63-0086)
- *HF-W2000 Model 35/30 RAS Features Manual* (Manual No. WIN-63-0085)

1.2 Installation Environment

1.2.1 Environmental conditions

When no commercial device is mounted in the extended slots of the Equipment, use the Equipment under the environmental conditions shown in the following table. When a commercial device is mounted in any of the said extended slots, follow the environmental specifications for such a device.

<i>Item</i>		<i>Specifications</i>
Ambient temperature	Operating or idle	5 to 40 °C for altitudes up to 1000 m 5 to 35 °C for altitudes more than 1000 m up to 2000 m
	Inventory	-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		0.3 mg/m ³ or less (JEITA IT-1004A class B), non-conductive*
Corrosive gas		JEITA IT-1004A class A (at temperature 25 °C, humidity 50 % RH)*
Vibration		5.9 m/s ² (10 Hz, 5 s, excluding DVD)
Physical shock	Operating or idle	19.6 m/s ²
	Not powered	98 m/s ²
Power supply voltage		AC 100 to 240 V with tolerance of ±10 % (input waveform supports only a sine wave)
Power supply frequency		50/60 Hz with tolerance of ±3 Hz
Power supply noise		2.0 kV (fast transient/burst waveform)
Electrostatic discharge	Contact	4 kV
	Air	8 kV
Insulation resistance		DC 500 V, 20 MΩ
Dielectric strength		AC 1.5 kV, 1 minute
Momentary power outage		20 ms or less
Altitude		2000 m or less

*JEITA : Japan Electronics and Information Technology Industries Association

1. GETTING STARTED

To make the most of the Equipment functions, proper environmental conditions and correct handling are required. Do not install the Equipment in the following places. Otherwise, the life of the Equipment may be shortened or failures may be caused.

- Places exposed to the direct sunlight, e.g., near a window
- Places where temperature and humidity extremely change, e.g., near an airconditioner
- Near a device or instrument generating electrical noise, e.g., motor or generator
- Near a device or instrument generating a strong magnetic field, e.g., a magnet
- Dusty places
- Places with vibration
- Places where there is corrosive gas
- Places where there is vibration due to sound pressure, e.g., near a device or instrument generating beeps or alarm tones

< NOTE >

Even when the power supply is disconnected, the Equipment has components such as timer continuously running on battery backup. If the Equipment is stored in a place not complying with the ambient temperature limits for operating, you may have to redo system BIOS setup such as date and time before using the Equipment again. See Section 4.5, “Setup of BIOS” when you redo system BIOS setup.

1.2.2 Installation conditions

NOTICE

- When you intend to move the Equipment, first shut down the OS, then disconnect the power cord plug from the outlet, and wait at least one minute. Otherwise, failure of hardware such as HDD may result.
- When transporting or carrying the Equipment, repack it using the packing materials that came with it and are not broken or dented. Transporting or carrying the Equipment either packed by other packing materials or repacked by broken or dented packing materials may damage the Equipment.

Installation of the Equipment must meet the following conditions:

- Do not block the ventilation inlet (on the front end of chassis) and the ventilation outlets (on the rear end of chassis) shown in Section 2.1, “External Views of Operator Access Areas”.
- Do not sit on the Equipment or place any object on the Equipment.
- Reserve clearances for operation, service, and installation according to Table 1-1 and relevant figures (Figure 1-1 through Figure 1-4).
- For the vertical stand, see Subsection 5.4.4, “Detaching/attaching vertical stand”.
- The Equipment is air-cooled by a fan. As air is sucked in from the front and out from the rear, be careful not to block the airway. In particular, do not place obstacles within 50 mm from the front and 80 mm from the rear (including cable connection clearance in the rear).
- When mounting the Equipment inside a cubicle or desk, take the internal temperature rise into consideration.
- Beware of the following on the top, bottom, left, and right surfaces:
 - Do not attach any heat-generating unit to the surface.
 - For ease of maintenance work, make sure that the Equipment can be moved easily; if fixed, ensure that the Equipment can be removed easily.

1. GETTING STARTED

Table 1-1 Equipment Dimensions, Service Clearance, and Installation Clearance

<i>Dimensions (mm)</i>			<i>Clearance for operation and service (mm)</i>				<i>Installation clearance (mm)</i>			
<i>Height</i>	<i>Width</i>	<i>Depth</i>	<i>Front</i>	<i>Rear</i>	<i>Left</i>	<i>Right</i>	<i>Front</i>	<i>Rear</i>	<i>Left</i>	<i>Right</i>
93	325	356	500	600	200	200	50	80	10	10

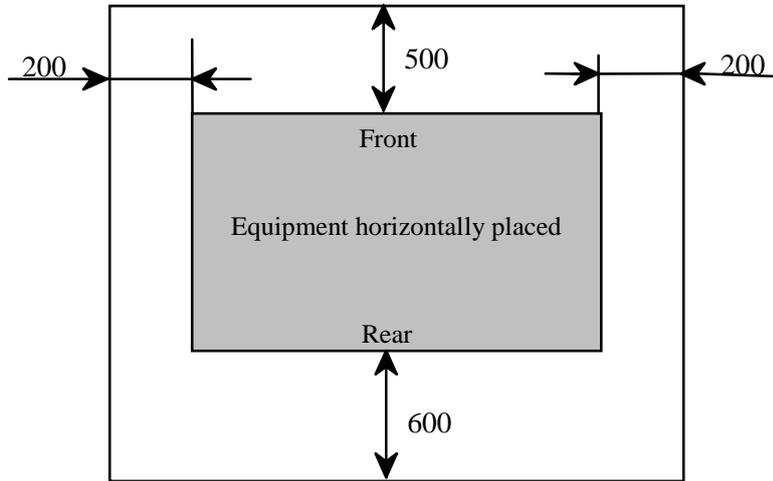


Figure 1-1 Clearance for Operation and Service (Top View)

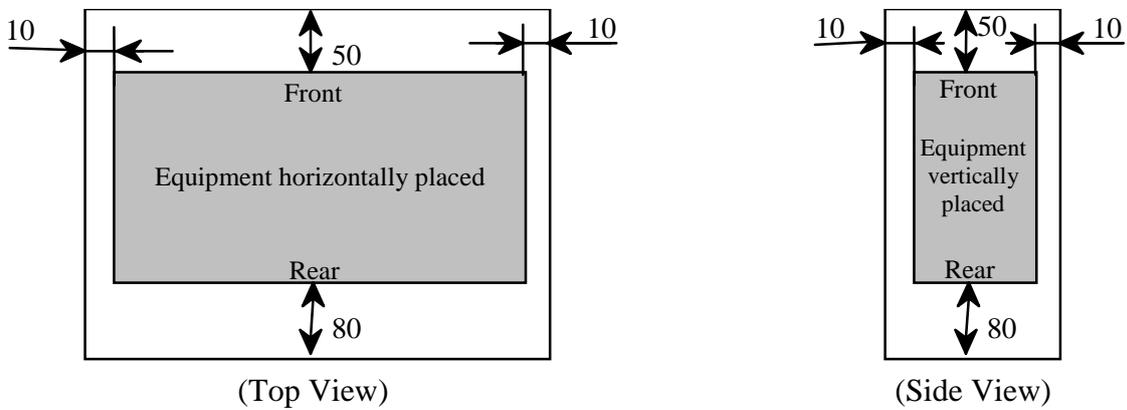


Figure 1-2 Installation Clearance

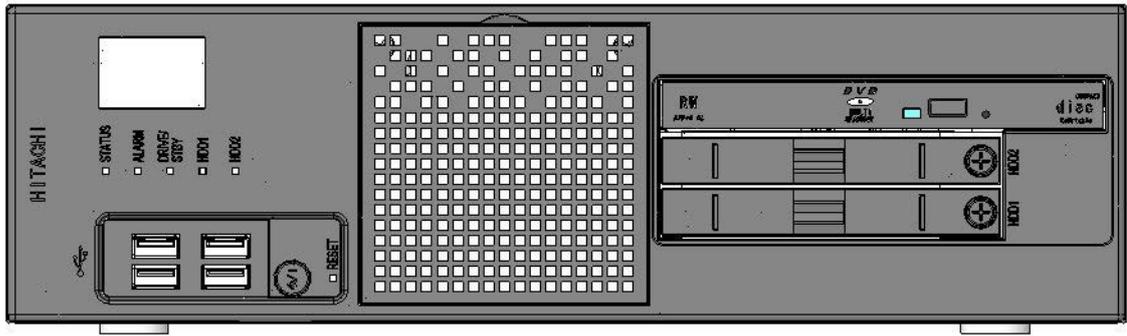


Figure 1-3 Horizontal Placement on Desktop

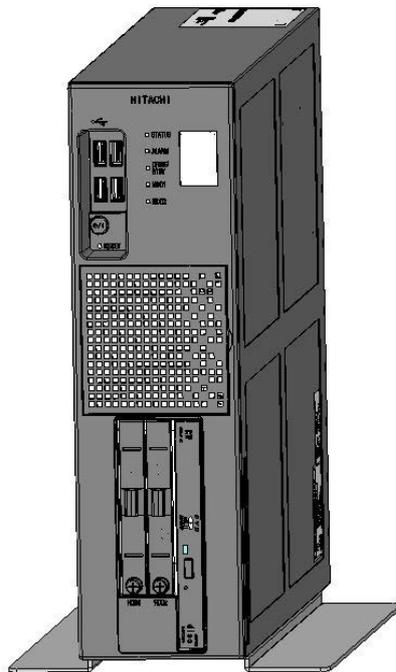


Figure 1-4 Vertical Placement on Desktop

1. GETTING STARTED

1.2.3 Power source conditions

WARNING

- Please use the power cable attached to the Equipment to avoid some failure, an electric shock or fire.
- To avoid electric shock or fire, always connect the power cord plug to the mains power outlet that has grounded neutral connection and further protection with an earth leakage breaker.
- Do not use a 2-pole, 2-wire power cord with no ground.

Mains power supply to the Equipment must meet the following conditions:

- Voltage range: 100 to 240 V ac with the tolerance of $\pm 10\%$, sinusoidal waveform only.
- Frequency: 50/60 Hz with the tolerance of ± 3 Hz.
- Momentary power outage: 20 ms or less.
- Outlet with grounded neutral connection, further protected with earth leakage breaker.
- Grounding of Class D* (formerly Class 3) in compliance with Electric Apparatus Engineering Regulation, thereby sustaining normal operation of high-density LSI circuits and protecting abnormal voltage in the Equipment as caused by lightning.

* Class D grounding is defined in the Technical Standard for Electrical Facilities of Japan. This standard states that the grounding resistance must be 100 ohms or less for equipment operating on 300 VAC or less, and 500 ohms or less for devices that shut down automatically within 0.5 second when shorting occurs in low tension lines.

1.3 Hardware Connection

NOTICE

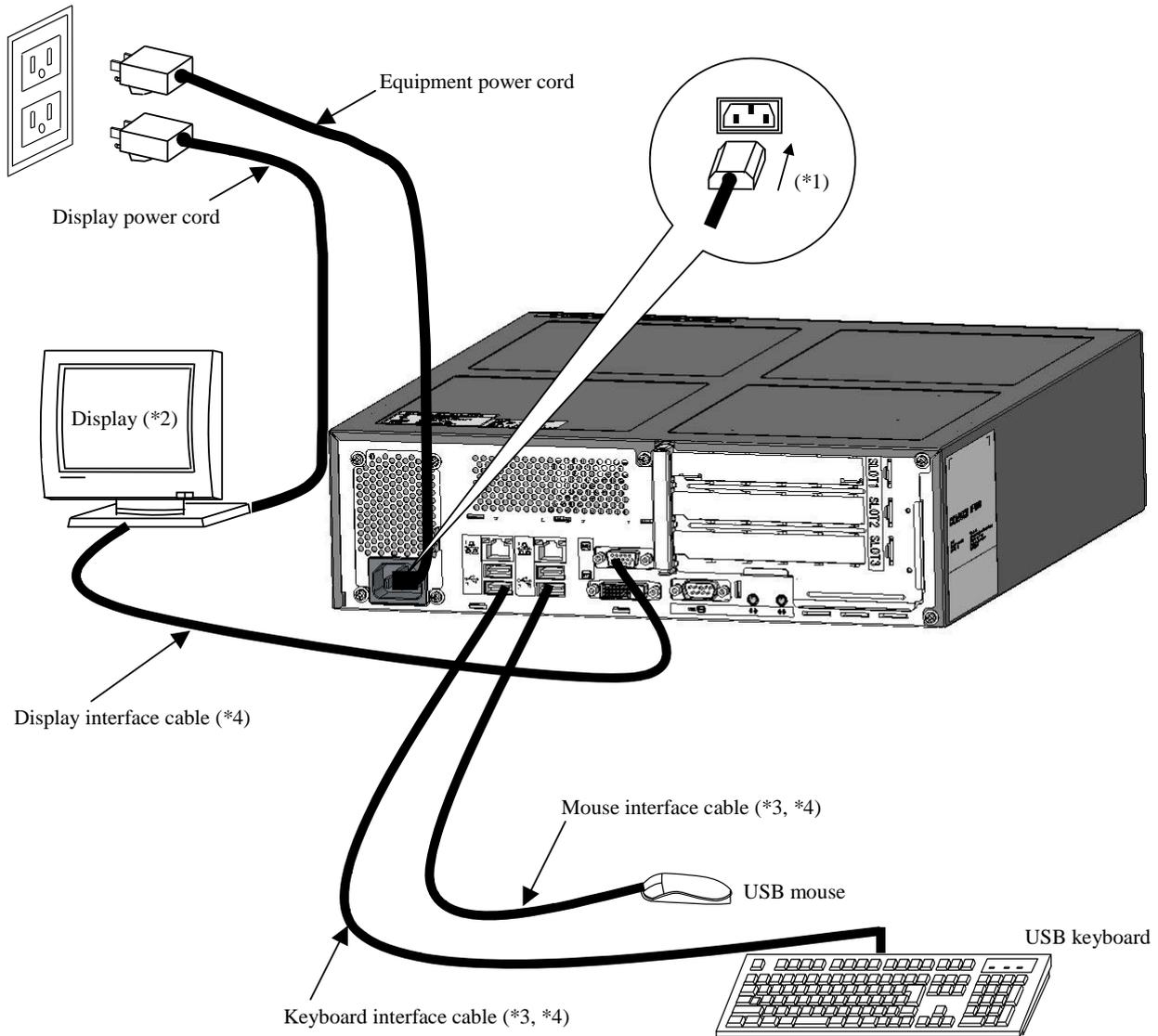
- Be sure to route power cords away from interface cables, as well as from power cords and interface cables of any third-party devices such as PCs. Otherwise, a machine failure or malfunction may result.
- Before connecting or disconnecting an interface cable, shut down the OS both on the Equipment and on the target device, as well as disconnect both the Equipment power supply cord from the outlet and the power supply cord of the target device from the outlet. Otherwise, a machine failure due to a short circuit may result.
- If an interface cable gets disconnected while the Equipment is powered, first shut down the OS and then disconnect the Equipment power supply cord from the outlet. Sudden power disconnection without shutting down the OS may corrupt file.
- If there is a cable for external contact point, ensure that it is connected to the EXT (external control). Because a maximum voltage of 40 V dc may be applied to this cable through the relay load, erroneous connection of this cable to a wrong connector may cause a failure.

< NOTE >

- Procure a power cord with a 2-pole 3-wire plug with ground for the Equipment as defined in Section 1.4, “Power supply cord”. Fully insert the plug of the procured power cord into a suitable AC mains power outlet as illustrated in Figure 1-5.
- The Equipment ships with an optional cable clamp to fix the power cord to the chassis. Attach this cable clamp on an as necessary basis.

After connecting the display unit, the keyboard, and the mouse to the Equipment, insert the power cord plug into the outlet as illustrated in Figure 1-5. For cable lengths, see Section 4.9, “Miscellaneous Requirements”.

1. GETTING STARTED



*1: Shape of the power cord plug on the Equipment side is shown below.



- *2: For names, operating procedures and adjustment methods, see machine-shipped instruction manuals.
- *3: Connect the mouse cable connector and the keyboard cable connector in the correct orientation. The USB mouse and the USB keyboard are each connectable to any of front USB ports and rear USB ports.
- *4: FCC NOTICE: To comply with FCC regulations, all interface cables (display interface, keyboard interface and mouse interface) must be properly shielded.

Figure 1-5 Hardware Connection

1.4 Power Supply Cord

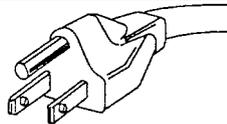
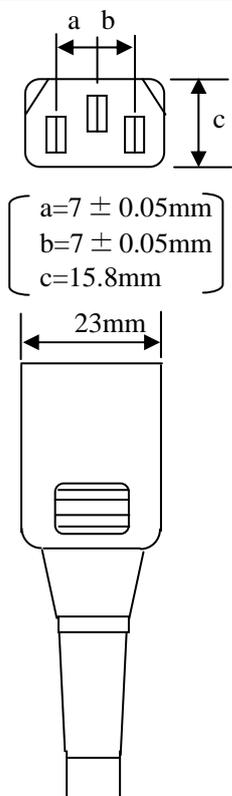
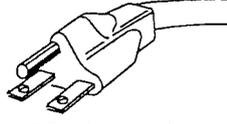
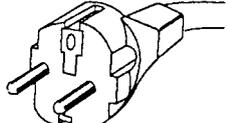
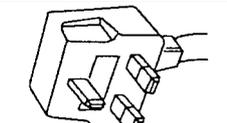
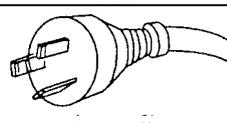
⚠ CAUTION

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.

The Equipment ships with no AC input power cord. It is the customer’s responsibility to procure one that has proper rating and meets local safety requirements whatever applicable. 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 Cord 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>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	

1. GETTING STARTED

1.5 Installation of Extended Boards

This equipment allows installation of externally-procured Extended boards. For installation procedures and restrictions for use of such extended boards, see Subsection 5.4.1, “Inserting/extracting extended board”.

1.6 Roles of the Operator

The operator should observe the following to reliably use the Equipment for a long time.

(1) Setting up the consumables

When setting up a consumable (recording medium such as a DVD), follow the operation procedure described later in this manual.

(2) Consideration for hardware characteristics

- (a) Apply cleaning, maintenance and inspection periodically.
 - The hard disk drive (HDD) and the DVD drive can be damaged by dust. Clean the Equipment mainly the front area.
 - Once in a while, remove dust from the peripheries (especially the lower part) and grooves in the cabinet with a vacuum cleaner or some sort.
- (b) Observe instructions in this manual, which are the basics of handling the Equipment.
- (c) For details of handling, cleaning, and so on, see applicable chapters.

(3) Maintenance of the Equipment

In performing the maintenance actions on the Equipment, note the following:

- (a) File backup: Back up your files in the course of daily jobs so that you can quickly recover your files (in particular the hard disk drives) in the event of any trouble.
- (b) Power cord plug: For connection to the AC mains power outlet, use a 2-pole 3-wire plug with ground.
- (c) Disconnecting power: To disconnect the power of the Equipment, disconnect the power cord plug from the outlet. (Also see Section 1.3, “Hardware Connection”.)

CHAPTER 2 CONSTRUCTION

WARNING

- Hazardous voltage. Be sure to disconnect the power cord plug from the outlet before detaching the cover of the Equipment. Otherwise, death or serious injury due to electric shock may result.
- Hazardous voltage. Do not remove the power supply unit. Otherwise, death or serious injury due to electric shock may result.
- Hazardous voltage. Do not open the cover of the power supply unit. Otherwise, death or serious injury due to electric shock may result.

CAUTION

Hazardous rotating object. Persons other than customer engineers must not detach any fan or fan guard. Never put a finger or any object in the rotary. Otherwise, injury due to entrapment may result.

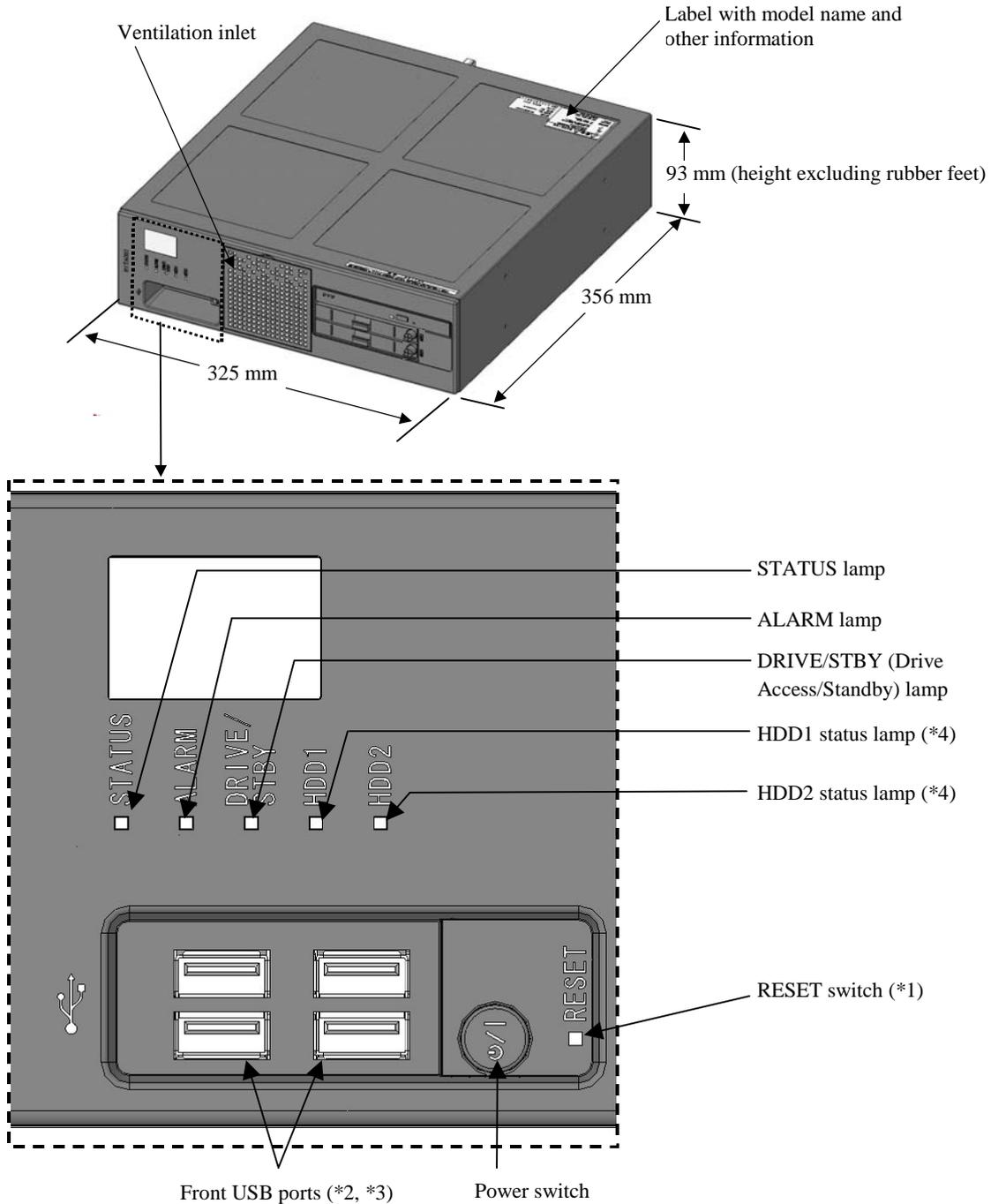
NOTICE

- When replacing an HDD on D Model of HJ-2035, follow the procedure in Subsection 9.5.3, “Performing periodical HDD replacement”. In addition, when replacing an HDD on B Model of HJ-2030, follow the procedure in Subsection 10.5.3, “Performing periodical HDD replacement”.
- When replacing an HDD on A Model of HJ-2035 or HJ-2030, do not hot-plug an HDD. Otherwise, a machine failure or HDD failure may result. Be sure to shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute before replacing an HDD.
- When using the USB interface connector, ensure the mating direction and insert the plug slowly into the receptacle. Erroneous insertion may cause damage to the USB interface connector.
- Do not plug or unplug a USB device while the Equipment is running online (during system operation). Such action may affect the running application.

2.1 External Views of Operator Access Areas

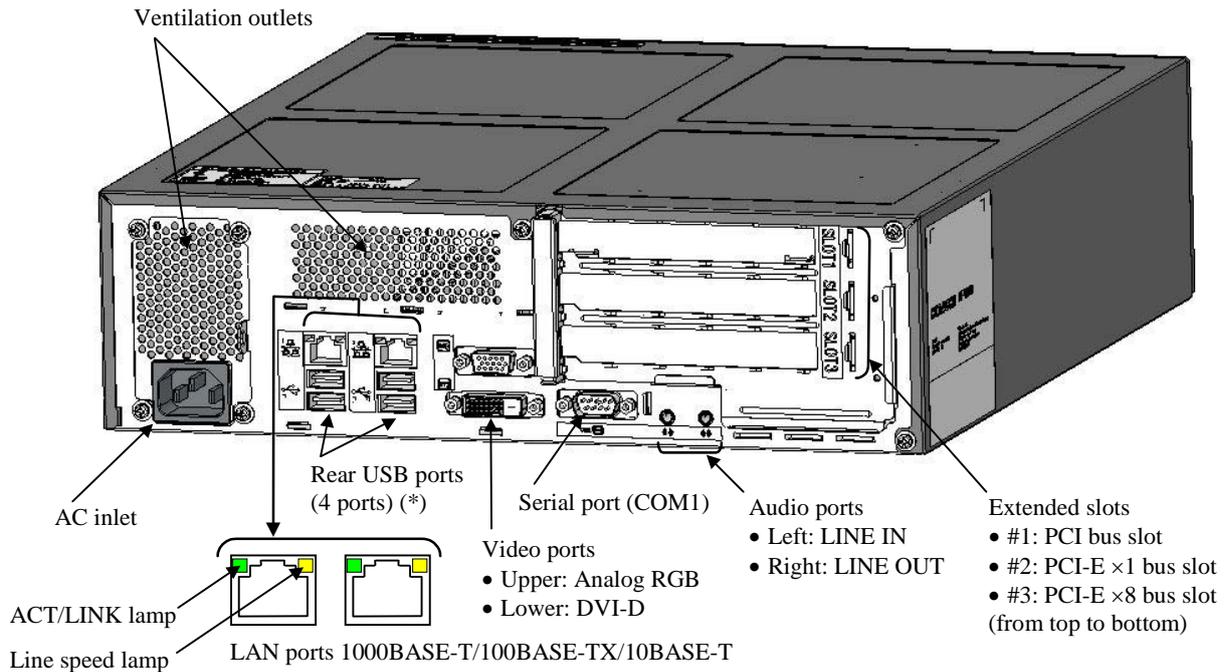
See Figures 2-1 through 2-3.

2. CONSTRUCTION



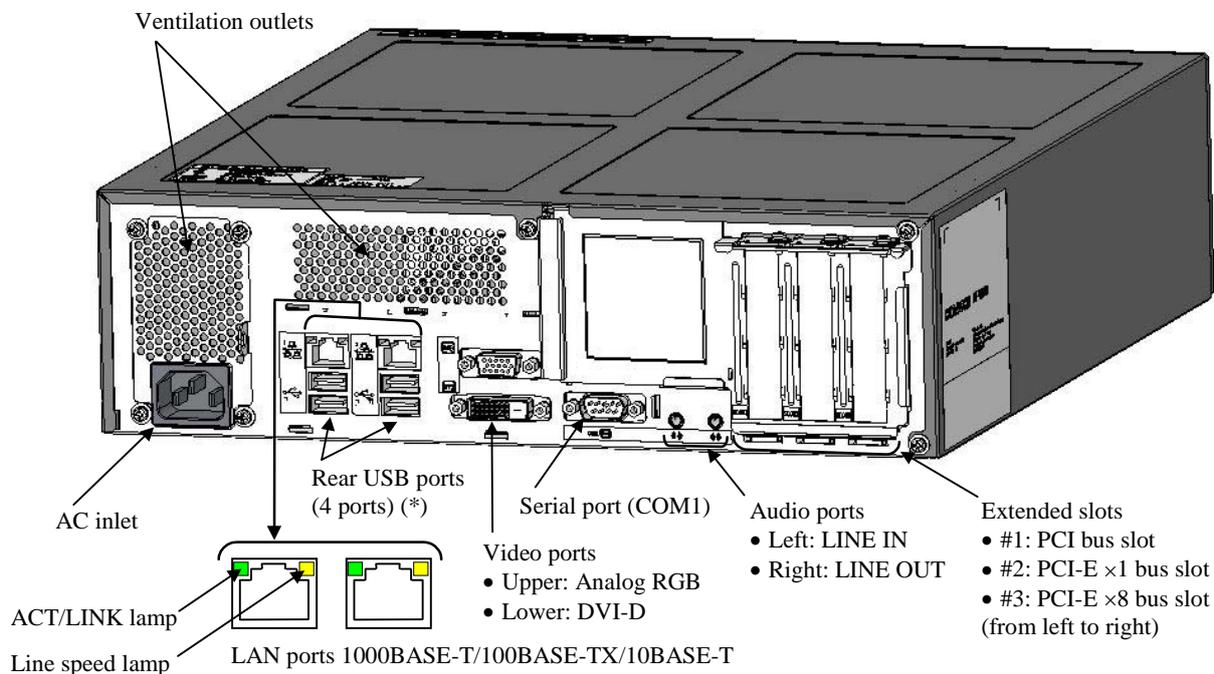
- *1: To activate the RESET switch, it is the best practice to use an eject pin. If you cannot procure one, use a pin that is strong enough and fits into the hole on the front panel.
- *2: When using the USB port, ensure the mating direction of the USB connector and insert it slowly into the port.
- *3: When using the front USB ports, pay attention to your insertion/extraction of the USB connector so as not to cause damage.
- *4: Used only on D Model of HJ-2035.

Figure 2-1 Elements in Operator Access Areas—Front View



* When using the USB port, ensure the mating direction of the USB connector and insert it slowly into the port.

Figure 2-2 Elements in Operator Access Areas—Rear View on HJ-2035



* When using the USB port, ensure the mating direction of the USB connector and insert it slowly into the port.

Figure 2-3 Elements in Operator Access Areas—Rear View on HJ-2030

2. CONSTRUCTION

2.2 Internal Construction

See Figures 2-4 through 2-6.

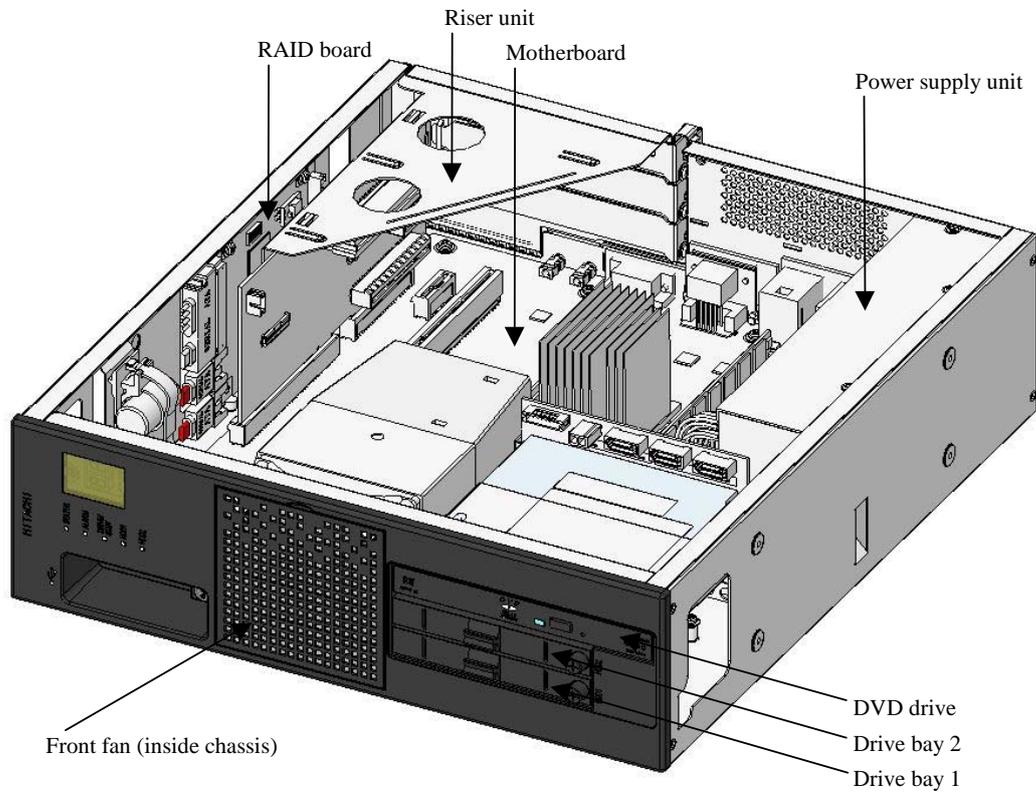


Figure 2-4 Internal Construction—Internal View on D Model of HJ-2035

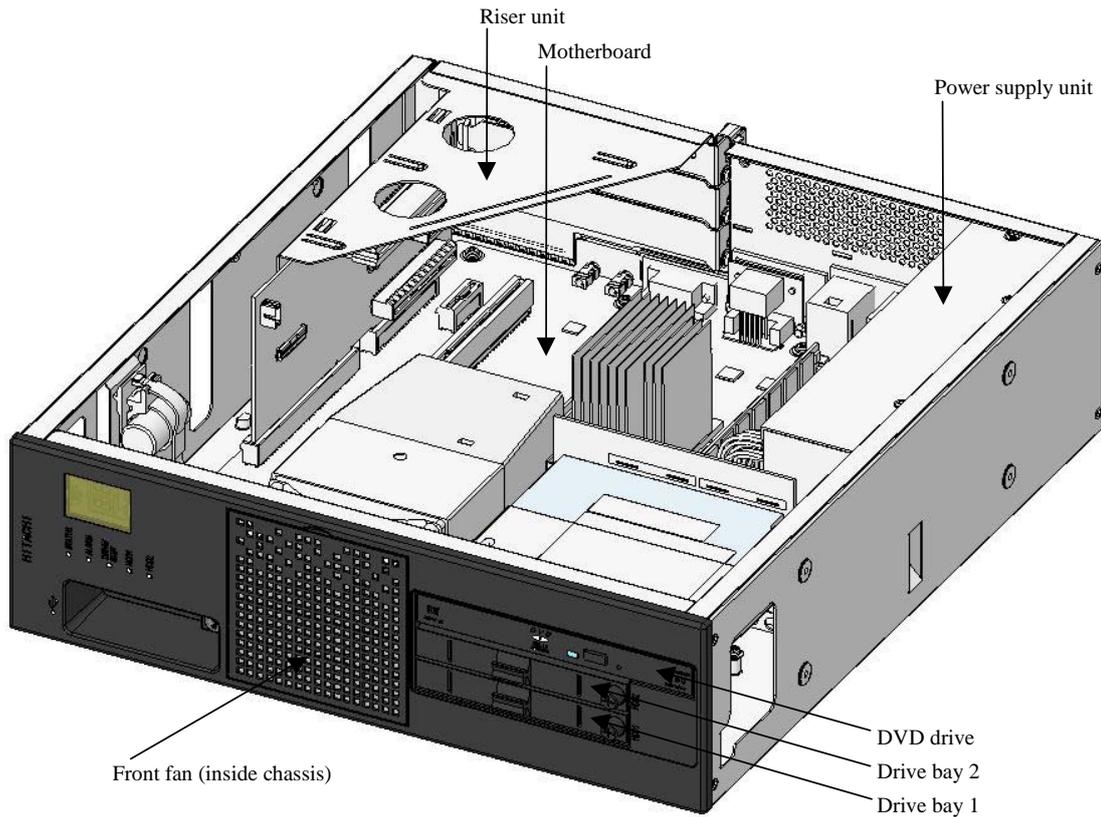


Figure 2-5 Internal Construction—Internal View on A Model of HJ-2035

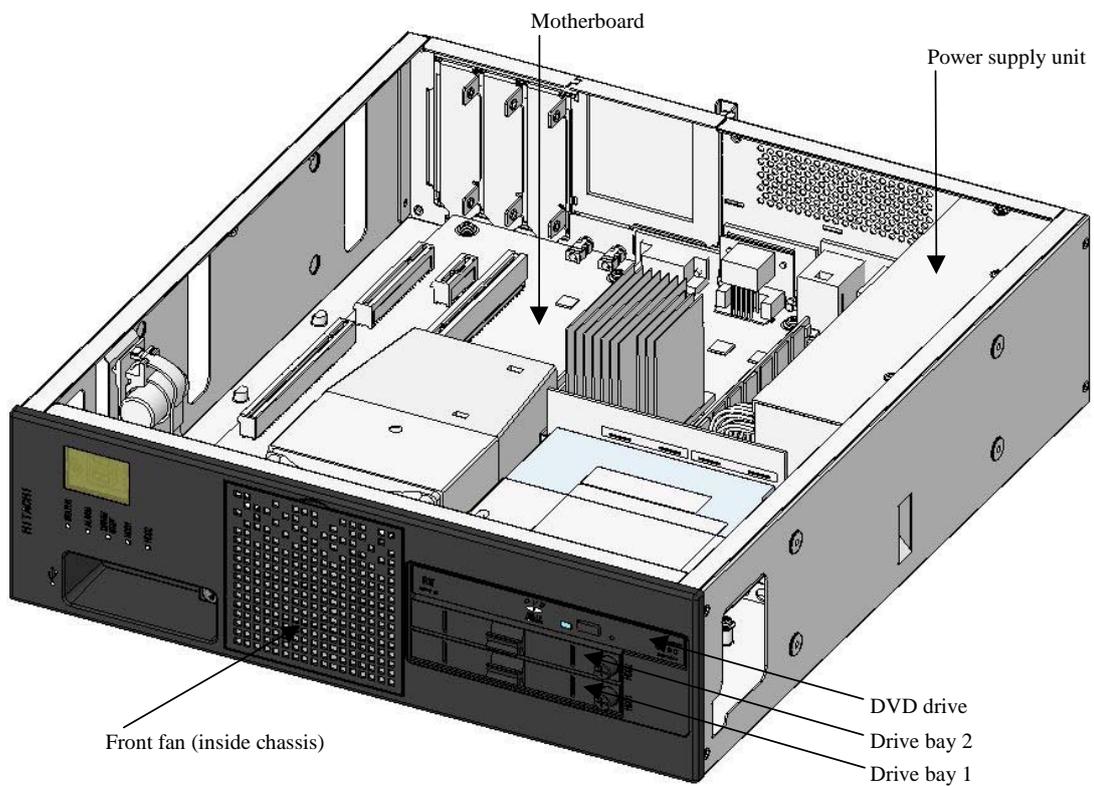


Figure 2-6 Internal Construction—Internal View on A Model of HJ-2030

2. CONSTRUCTION

2.3 Functions of Elements in Operator Access Areas

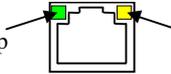
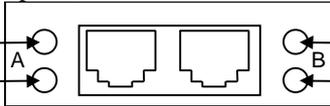
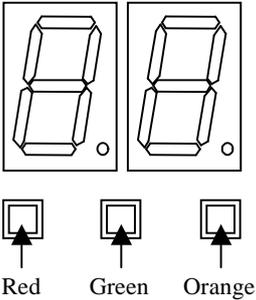
See Table 2-1.

Table 2-1 Function of Elements in Operator Access Areas

<i>Name</i>	<i>Description</i>										
Power switch	Keep pressing this switch for 4 seconds or more to turn off the primary power and place the Equipment into the standby status (for emergency).										
Status lamp (STATUS)	<table border="1"> <thead> <tr> <th data-bbox="571 528 756 562"><i>Lamp indicator</i></th> <th data-bbox="756 528 1412 562"><i>Status</i></th> </tr> </thead> <tbody> <tr> <td data-bbox="571 562 756 595">On (green)</td> <td data-bbox="756 562 1412 595">The Equipment is operating (RUN state).</td> </tr> <tr> <td data-bbox="571 595 756 759">On (red)</td> <td data-bbox="756 595 1412 759">The Equipment is not operating (STOP state). <ul style="list-style-type: none"> • during start-up of the Equipment • in a error stop during shutdown • in a deadlock of the Equipment caused by an error • when RAS software is not installed </td> </tr> <tr> <td data-bbox="571 759 756 831">Off</td> <td data-bbox="756 759 1412 831">The Equipment is in the main-power-off state or in the standby state.</td> </tr> </tbody> </table>	<i>Lamp indicator</i>	<i>Status</i>	On (green)	The Equipment is operating (RUN state).	On (red)	The Equipment is not operating (STOP state). <ul style="list-style-type: none"> • during start-up of the Equipment • in a error stop during shutdown • in a deadlock of the Equipment caused by an error • when RAS software is not installed 	Off	The Equipment is in the main-power-off state or in the standby state.		
	<i>Lamp indicator</i>	<i>Status</i>									
	On (green)	The Equipment is operating (RUN state).									
	On (red)	The Equipment is not operating (STOP state). <ul style="list-style-type: none"> • during start-up of the Equipment • in a error stop during shutdown • in a deadlock of the Equipment caused by an error • when RAS software is not installed 									
Off	The Equipment is in the main-power-off state or in the standby state.										
On (green)	The Equipment is operating (RUN state).										
On (red)	The Equipment is not operating (STOP state). <ul style="list-style-type: none"> • during start-up of the Equipment • in a error stop during shutdown • in a deadlock of the Equipment caused by an error • when RAS software is not installed 										
Off	The Equipment is in the main-power-off state or in the standby state.										
Alarm lamp (ALARM)	Turned on (red) when the following abnormality is detected: <ul style="list-style-type: none"> • Stop of fan in the Equipment • Temperature abnormality in the Equipment • Failure in one of the mirrored disks (on D model) 										
Drive Access/Standby lamp (DRIVE/STBY)	<table border="1"> <thead> <tr> <th data-bbox="571 965 756 999"><i>Lamp indicator</i></th> <th data-bbox="756 965 1412 999"><i>Status</i></th> </tr> </thead> <tbody> <tr> <td data-bbox="571 999 756 1032">On (green)</td> <td data-bbox="756 999 1412 1032">HDD or DVD is being accessed.</td> </tr> <tr> <td data-bbox="571 1032 756 1088">On (orange)</td> <td data-bbox="756 1032 1412 1088">The Equipment is in the standby status (when only auxiliary power is on).</td> </tr> <tr> <td data-bbox="571 1088 756 1155">Off</td> <td data-bbox="756 1088 1412 1155">Power supply is disconnected or the Equipment is operating.</td> </tr> </tbody> </table>	<i>Lamp indicator</i>	<i>Status</i>	On (green)	HDD or DVD is being accessed.	On (orange)	The Equipment is in the standby status (when only auxiliary power is on).	Off	Power supply is disconnected or the Equipment is operating.		
	<i>Lamp indicator</i>	<i>Status</i>									
	On (green)	HDD or DVD is being accessed.									
	On (orange)	The Equipment is in the standby status (when only auxiliary power is on).									
Off	Power supply is disconnected or the Equipment is operating.										
On (green)	HDD or DVD is being accessed.										
On (orange)	The Equipment is in the standby status (when only auxiliary power is on).										
Off	Power supply is disconnected or the Equipment is operating.										
HDD1 status lamp and HDD2 status lamp on D Model (HDD1 status lamp for drive bay 1 and HDD2 status lamp for drive bay 2)	<table border="1"> <thead> <tr> <th data-bbox="571 1155 756 1189"><i>Lamp indicator</i></th> <th data-bbox="756 1155 1412 1189"><i>Status</i></th> </tr> </thead> <tbody> <tr> <td data-bbox="571 1189 756 1234">Off</td> <td data-bbox="756 1189 1412 1234">Subject HDD is online (no error).</td> </tr> <tr> <td data-bbox="571 1234 756 1267">On (red)</td> <td data-bbox="756 1234 1412 1267">Subject HDD is offline (HDD power down).</td> </tr> <tr> <td data-bbox="571 1267 756 1323">Blinking (red) in one side</td> <td data-bbox="756 1267 1412 1323">Rebuilding (copy) is in progress. Only the indicator for the destination HDD blinks.</td> </tr> <tr> <td data-bbox="571 1323 756 1402">Blinking (red) in both sides</td> <td data-bbox="756 1323 1412 1402"> <ul style="list-style-type: none"> • No HDD is installed in drive bay 1 or drive bay 2. • Combination of HDD and RAID board is in error. </td> </tr> </tbody> </table>	<i>Lamp indicator</i>	<i>Status</i>	Off	Subject HDD is online (no error).	On (red)	Subject HDD is offline (HDD power down).	Blinking (red) in one side	Rebuilding (copy) is in progress. Only the indicator for the destination HDD blinks.	Blinking (red) in both sides	<ul style="list-style-type: none"> • No HDD is installed in drive bay 1 or drive bay 2. • Combination of HDD and RAID board is in error.
	<i>Lamp indicator</i>	<i>Status</i>									
	Off	Subject HDD is online (no error).									
	On (red)	Subject HDD is offline (HDD power down).									
	Blinking (red) in one side	Rebuilding (copy) is in progress. Only the indicator for the destination HDD blinks.									
Blinking (red) in both sides	<ul style="list-style-type: none"> • No HDD is installed in drive bay 1 or drive bay 2. • Combination of HDD and RAID board is in error. 										
Off	Subject HDD is online (no error).										
On (red)	Subject HDD is offline (HDD power down).										
Blinking (red) in one side	Rebuilding (copy) is in progress. Only the indicator for the destination HDD blinks.										
Blinking (red) in both sides	<ul style="list-style-type: none"> • No HDD is installed in drive bay 1 or drive bay 2. • Combination of HDD and RAID board is in error. 										
Reset switch (RESET)	Press this switch to restart the Equipment (hardware reset). Also press this switch during the OS startup to collect memory dump. Pressing after completion of memory dump collection causes hardware reset.										
AC inlet	Connects the AC power cord.										
Power supply unit	Accepts the AC input voltage ranging from 100 to 240 V.										
Audio port (LINE IN)	Audio line input.										
Audio port (LINE OUT)	Audio line output.										
Serial port (COM1) (9 pins: RS-232C-A)	Connects a device that uses the serial interface (modem etc). (See Subsection 4.8.1, "Connector specifications".)										
RAS external contact interface (25 pins: EXT) (option)	Provides an external control interface. (See Subsection 4.8.1, "Connector specifications".)										
Video port (analog RGB)	Connects the analog display interface cable. (See Subsection 4.8.1, "Connector specifications".)										
Video port (DVI-D)	Connects the digital display interface cable. (See Subsection 4.8.1, "Connector specifications".)										
PCI slot	PCI board is inserted into this slot.										
PCI-E slot	PCI-Express board is inserted into this slot.										

(Continued on next page)

Table 2-1 Function of Elements in Operator Access Areas (Continued)

Name	Description																				
USB port	Connects a device that uses the USB interface.																				
LAN port (1000BASE-T/ 100BASE-TX/10BASE-T)	<p>Connects the LAN cable. (See Subsection 4.8.1, “Connector specifications”.)</p> <ul style="list-style-type: none"> Onboard LAN  <ul style="list-style-type: none"> Optional LAN adapter (HJ-7617-55/HJ-7617-50)  <table border="1" data-bbox="612 667 1417 1173"> <thead> <tr> <th colspan="2">ACT/LINK lamp</th> </tr> <tr> <th>Lamp indicator</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>On (green)</td> <td>The link is established. Power is supplied to both the Equipment and the connection target, and the twisted pair Ethernet cable connection is good.</td> </tr> <tr> <td>Off</td> <td>The link is not established, as in the following examples: <ul style="list-style-type: none"> The Equipment is not physically connected to the network. The switching hub is not powered. The twisted pair Ethernet cable connection is not good. The driver is not properly set. </td> </tr> <tr> <td>Blinking (green)</td> <td>Data is being sent or received over the network. The blink frequency varies with the amount of network traffic.</td> </tr> </tbody> </table> <table border="1" data-bbox="612 1205 1417 1400"> <thead> <tr> <th colspan="2">Line speed lamp</th> </tr> <tr> <th>Lamp indicator</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>On (green)</td> <td>The interface is running at 1000Mbps.</td> </tr> <tr> <td>On (yellow)</td> <td>The interface is running at 100Mbps.</td> </tr> <tr> <td>Off</td> <td>The interface is running at 10Mbps, or the link is not established.</td> </tr> </tbody> </table>	ACT/LINK lamp		Lamp indicator	Status	On (green)	The link is established. Power is supplied to both the Equipment and the connection target, and the twisted pair Ethernet cable connection is good.	Off	The link is not established, as in the following examples: <ul style="list-style-type: none"> The Equipment is not physically connected to the network. The switching hub is not powered. The twisted pair Ethernet cable connection is not good. The driver is not properly set. 	Blinking (green)	Data is being sent or received over the network. The blink frequency varies with the amount of network traffic.	Line speed lamp		Lamp indicator	Status	On (green)	The interface is running at 1000Mbps.	On (yellow)	The interface is running at 100Mbps.	Off	The interface is running at 10Mbps, or the link is not established.
ACT/LINK lamp																					
Lamp indicator	Status																				
On (green)	The link is established. Power is supplied to both the Equipment and the connection target, and the twisted pair Ethernet cable connection is good.																				
Off	The link is not established, as in the following examples: <ul style="list-style-type: none"> The Equipment is not physically connected to the network. The switching hub is not powered. The twisted pair Ethernet cable connection is not good. The driver is not properly set. 																				
Blinking (green)	Data is being sent or received over the network. The blink frequency varies with the amount of network traffic.																				
Line speed lamp																					
Lamp indicator	Status																				
On (green)	The interface is running at 1000Mbps.																				
On (yellow)	The interface is running at 100Mbps.																				
Off	The interface is running at 10Mbps, or the link is not established.																				
Digital LED for status indication 	<p>Indicates various statuses of the Equipment by two-digit hexadecimal codes through 7-segment panels and status target identification LEDs thereunder. These 7-segment panels and status target identification LEDs may carry over their display content even in the standby state after the shutdown, until the mains power is disconnected or recycled.</p> <table border="1" data-bbox="612 1597 1289 1727"> <thead> <tr> <th>Color of status target identification LED</th> <th>Status target</th> </tr> </thead> <tbody> <tr> <td>Red</td> <td>RAS status</td> </tr> <tr> <td>Green</td> <td>Application status</td> </tr> <tr> <td>Orange</td> <td>BIOS status</td> </tr> </tbody> </table> <p>For how to cause the digital LED for status indication to display user-defined statuses from a user application program, refer to <i>HF-W2000 Model 35/30 RAS Features Manual</i>.</p>	Color of status target identification LED	Status target	Red	RAS status	Green	Application status	Orange	BIOS status												
Color of status target identification LED	Status target																				
Red	RAS status																				
Green	Application status																				
Orange	BIOS status																				

NOTICE

- When using the USB interface connector, ensure the mating direction and insert the plug slowly into the receptacle. Erroneous insertion may cause damage to the USB interface connector.
- Do not plug or unplug a USB device while the Equipment is running online (during system operation). Such action may affect the running application.

< NOTE >

- When introducing a USB device, evaluate it in advance and avoid its use for any mission-critical application.
- Connectivity with all USB devices is not guaranteed.
- Plugging/unplugging/accessing a USB device may increase system load. Ensure yourself that the running application will not be affected by the USB device you desire to use online (during system operation).
- USB 2.0 is an ultrahigh-speed data transfer bus. Use the shortest possible cable because the length may affect the transfer performance. It should also be noted that a communication error may result from not using a USB 2.0 compatible cable. Consult cable vendors for the cable specifications. (See Section 4.9, “Miscellaneous Specifications” for the cable length.)
- Certain USB devices deviate from the USB standards. Once the Equipment main power is turned off with such a USB device connected, the Equipment may fail to start or the system clock setting may go out of sync. Verify proper device operation before selecting a USB device.
- When using the front USB ports, pay attention to your insertion/extraction of the USB connector so as not to cause damage.

CHAPTER 3 OPERATION

3.1 Before Turning On the Power

WARNING

Ensure required installation clearance around the Equipment. If the airway of the Equipment is blocked, the internal temperature rises and the Equipment may burn out or fail. (See Subsection 1.2.2, “Installation conditions”.)

- Confirm that the input power voltage of the Equipment is within the rated range. When an actual input voltage is found close to the upper or lower limit of the rated range, the input power setting may be abnormal. In this case, ask the management person in charge of power facility to inspect it.
- Confirm that the airway at the air inlet (front) and the air outlet (rear) of the Equipment is not blocked.
- Confirm that the I/O cable connectors on the Equipment are not loose.

3.2 Starting Up the Equipment

The Equipment can be started up by the following operation.

1. Confirm that the power cord plug is connected to the outlet.
2. In the status above, confirm that the DRIVE/STBY (Drive Access/Standby) lamp is lit.
3. Turn on the externally-procured display unit (customer’s responsibility).
4. Press the Power switch (see Section 2.1, “External Views of Operator Access Areas”).
5. When the power-on sequence is completed, the DRIVE/STBY lamp turns off and the STATUS lamp turns on. On HF-W2000 Model 35, the STATUS lamp turns on red when powered and changes to green when the OS is started up and the system starts running. On HF-W2000 Model 30, the STATUS lamp turns on green while powered.
6. After the OS is started up, set up the Equipment according to Chapter 1, “Initial Setup of the Equipment” in *HF-W2000 Model 35/30 Setup Guide*. (This step is necessary only once when you first start up the Equipment after purchase.)

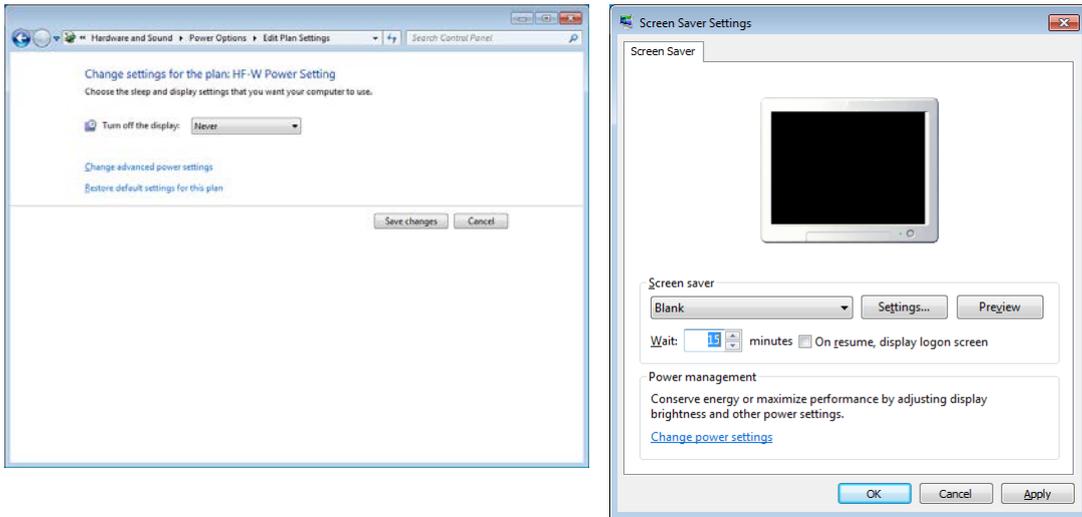
After the above operation, the Equipment automatically performs the start-up operation up to the logon screen display.

For details of power control over LAN, when enabled, see Section 3.7, “Power Control over LAN”.

3. OPERATION

< NOTE >

- In ordinary use, keep the display unit turned on (standby state).
- During the startup in ordinary use, do not operate the keyboard and the mouse until the logon screen is displayed.
- If the Equipment is set to turn off the display under Windows® 7, the monitor on resume may sometimes show stripe noises in the upper area, which will disappear when you redraw the display (e.g., by dragging a window). Such noises do not adversely affect the processing of the running application programs. If you wish to make the monitor screen go blank (sleep) in a specified amount of no-operation time instead of turning off the monitor, set **Turn off the display** to “Never” and set **Screen Saver** to “Blank” as illustrated below.



3.3 Stopping the Equipment

Before stopping the Equipment, confirm that there are no users using the Equipment and there are no programs running in the background. Then, perform the following operation, which is called shutdown.

- Stop the application programs.
- Stop the OS.

The method of stopping the application programs differs depending on the software. Refer to the manual of the relevant software.

How to stop the OS—Windows® XP Professional:

To stop the OS, click **Start** menu in the lower left corner of the screen display, and click **Turn off computer** in the menu. In the “Turn off computer” dialog box opened, click **Turn Off** icon. This automatically shuts down the OS and turns off the primary power, thus leaving the Equipment only supplied with the auxiliary power. At this point the STATUS lamp turns off and the DRIVE/STBY (Drive Access/Standby) lamp turns on.

How to stop the OS—Windows® 7 Professional:

To stop the OS, click **Start** menu in the lower left corner of the screen display, and click **Shut Down** button in the menu. This automatically shuts down the OS and turns off the primary power, thus leaving the Equipment only supplied with the auxiliary power. At this point the STATUS lamp turns off and the DRIVE/STBY (Drive Access/Standby) lamp turns on.

When either of the above-mentioned normal power-off operation is unavailable (when the shutdown request is somehow rejected, e.g., because of a system lock-up), keep pressing the Power switch in the lower left of the Equipment front panel for four seconds or longer. Then, the primary power turns off and only the auxiliary power remains supplied. This method, however, disables next power-on over the LAN and hence should only be used in an emergency. (See Section 3.7, “Power Control over LAN”.)

3. OPERATION

3.4 Turning Off the Power

1. Confirm that the Equipment is stopped (See Section 3.3, “Stopping the Equipment”).
2. Unplug the Equipment power cord plug from the outlet.
3. When the power supply is disconnected, the DRIVE/STBY (Drive Access/Standby) lamp turns off.

3.5 Emergency Power-off

WARNING

In case of smoke or nasty smell, disconnect the power cord plug from the outlet and contact your distributor or customer engineer. Using the faulty Equipment without repair may lead to an electric shock or fire.

NOTICE

- If an emergency power-off (abrupt disconnection of power cord plug from the outlet or turning off of mains power breaker without shutting down the OS) is done, reloading of certain system programs may be necessitated because the journal information is lost. For this reason, never execute emergency power-off except when power must be disconnected urgently because of malfunction.
- If power is disconnected at the source, the Equipment may not be recovered automatically.

In a situation where the Equipment power has to be disconnected urgently or in the following emergency cases, disconnect power at the source:

- When the Equipment itself seems abnormal (e.g., when a nasty smell occurs);
- When the Equipment cannot be stopped due to anomaly in the Equipment;
- When the Equipment automatically shuts down and turns off the primary power to remain on auxiliary power only, because the protecting mechanism has detected fan stop or abnormal temperature.
 - Before the OS startup, the Equipment checks out for fan stop at setting up BIOS and, if such status is detected, automatically turns off the primary power.
 - After the OS startup, the Equipment automatically shuts down the OS and turns off the primary power.

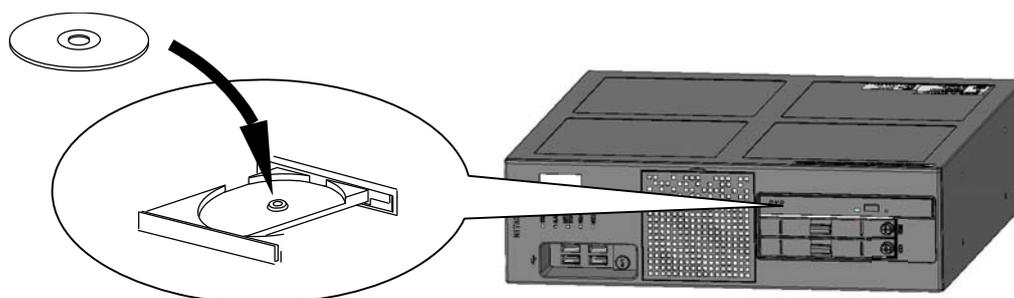
3.6 DVD Drive

NOTICE

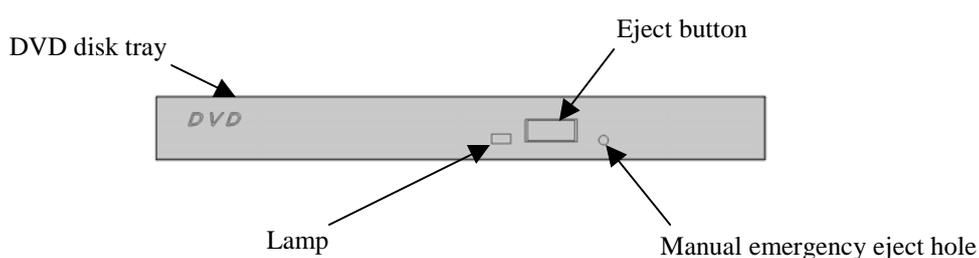
- When you finish accessing a DVD disk, remove it from the DVD drive. Leaving a DVD disk in the DVD drive may cause a failure.
- If the disk tray is left opened, a failure may be caused. When the DVD drive is not used, store the disk tray in the DVD drive.
- Do not use DVD disks having eccentricity of the center of gravity (e.g., due to labels), cracks, scratches, bends, or extraordinary shapes. Otherwise, abnormal noise, vibration, or machine failure may result.

3.6.1 Inserting DVD disk

1. Press the eject button gently to open the disk tray.
2. Set a DVD disk with label facing up onto the disk tray.
3. Push the disk tray in, and the disk tray enters into the DVD drive.



Front view of the Equipment (disk tray opened)



Front view of DVD drive

Figure 3-1 Front View of DVD Drive in the Equipment

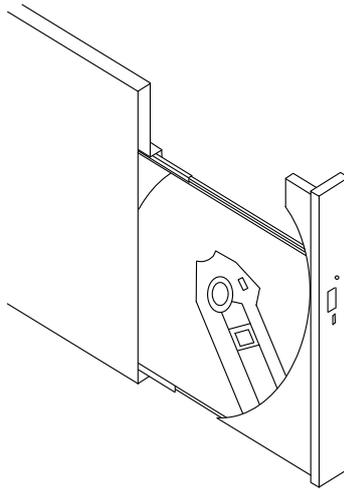
3.6.2 Removing DVD disk

1. Confirm that the lamp is not on or blinking (operating).
2. Press the eject button gently to open the disk tray.
3. Take out the DVD disk from the disk tray.
4. Push the disk tray in.

3. OPERATION

3.6.3 Using DVD drive in vertical position

1. Press the eject button and pull out the disk tray until it stops.
2. While holding the disk tray by the right hand, set the DVD disk with label facing left onto the disk tray by the left hand.
3. Release the disk tray from the right hand.
4. Press the disk tray until it fits in the DVD drive.
5. When taking out the DVD disk, pay attention not to apply excessive force to the DVD disk.



3.6.4 Operation at trouble occurrence

When you cannot take out a DVD disk because of any abnormality, perform the following operation:

1. Press the eject button several (about five) times.
2. Insert the eject pin into the manual emergency eject hole and push it carefully. When the disk tray slightly comes out, draw out the disk tray by hand.

When a DVD drive encounters an error while writing data to the DVD disk, the DVD drive becomes unable to complete the ongoing write operation and eventually becomes unusable. (Under Windows® XP, the DVD drive disappears from the OS elements such as My Computer.) In such a case, perform the following operation. In addition, prohibit the use of the error-encountered DVD disk because a permanent disk failure is likely.

1. Stop the Equipment according to Section 3.3, “Stopping the Equipment”.
2. Start up the Equipment according to Steps 1 to 5 in Section 3.2, “Starting Up the Equipment.”

< NOTE >

- Depending on the status of the DVD disk (e.g., scratch, dust, deformation or copy protection), it may be unable to play or write the DVD disk normally.
- When taking out a DVD disk using the manual emergency eject hole, shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute in advance. Do not push in the eject pin obliquely nor apply excessive force.
- The Equipment ships with no eject pin. If you cannot prepare one, substitute it with a pin that fits into the eject hole.

3.7 Power Control over LAN

You can turn on the Equipment remotely over LAN (so-called “Wake-On-LAN™” abbreviated to WOL). This section explains how to use such capability with the following definition of the term “power ON”:

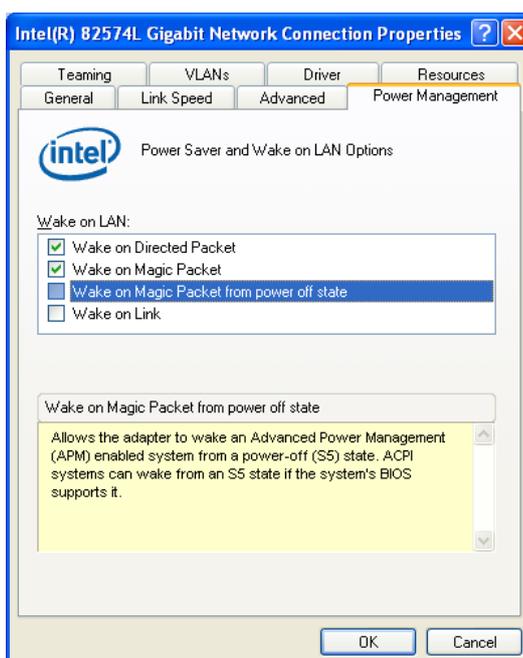
“Power ON” means an action to activate the Equipment in the standby status by pressing the Power switch in the front panel or transmitting the Magic Packet™ frame on the LAN interface.

To use WOL, first enable it according to the procedure in Subsection 3.7.1, “How to enable WOL” and then perform the procedure in Subsection 3.7.2, “How to perform power ON over LAN”. For details of the Magic Packet™ frame, see Subsection 3.7.3, “Magic Packet™ frame format”. (Even if you don’t enable WOL, you might be able to use WOL. But when you want to use WOL certainly, you must follow the procedure in 3.7.1, “How to enable WOL”.)

3.7.1 How to enable WOL

By following the procedure below, you can set up WOL. (The display image assumes Windows® XP but it is similar under Windows® 7.)

1. Do steps 1 through 4 in Subsection 3.10.3, “How to set up link speed and duplex mode”.
2. Click Power Management tab and check Wake On Magic Packet from power off state checkbox in Wake on LAN section.
3. Click **OK** button. Then, restart the Equipment to cause the new setting to take effect.



3. OPERATION

3.7.2 How to perform power ON over LAN

In order to make use of WOL, the Drive Access/Standby (DRIVE/STBY) lamp must be lit (on). In addition, to keep WOL effective, the Equipment must always be placed in the standby status by the shutdown operation. Once the standby status is entered by pressing the Power switch for four seconds or longer, WOL will not take effect. If you entered the standby status by pressing the Power switch for four seconds or longer, power ON the Equipment by pressing the Power switch and then place the Equipment in the standby status by performing the shutdown operation.

The built-in LAN interface in the Equipment complies with WfM 2.0 (Note 1) and supports Magic Packet™ technology (Note 2). Based on this technology, receipt of a specific information packet called “Magic Packet™ frame” arriving at the built-in LAN interface performs power ON of the Equipment. Since no program to transmit the Magic Packet™ frame is attached to the Equipment, procure commercially available program for transmitting the Magic Packet™ frame.

Note 1: Wired for Management (WfM) is the hardware specifications guideline proposed by Intel Corporation for managing internetworked PCs.

Note 2: Magic Packet™ technology is the technology developed by AMD Corporation for remotely waking up internetworked computers.

Specifically, follow the steps below to perform power ON of the Equipment over LAN.

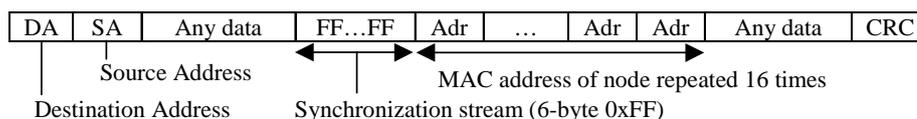
1. Connect the power supply to the Equipment by connecting the input power cord to the outlet. Ensure that the Drive Access/Standby (DRIVE/STBY) lamp turns on and stays lit.
2. Transmit the Magic Packet™ frame to the built-in LAN interface of the Equipment. Ensure power ON of the Equipment when the built-in LAN interface receives the Magic Packet™ frame.

< NOTE >

- Be sure to transmit the Magic Packet™ frame to the built-in LAN interface of the Equipment. See Section 2.1, “External Views of Operator Access Areas” for the physical connection. WOL does not take effect if the Magic Packet frame is received on an optional Ether adapter.
- Certain status of the network may cause the Magic Packet™ frame to be lost. Hence, implement proper measures so that the Magic Packet™ frame surely arrives despite such status when the Magic Packet™ frame is lost.

3.7.3 Magic Packet™ frame format

The format of the Magic Packet™ frame is illustrated below. The Magic Packet™ frame must meet the basic requirements of the LAN being used, such as source address, destination address (recipient's MAC address or multicast address including broadcast address), and CRC. The data sequence in the Magic Packet™ frame is formed by repeating the MAC address of the node 16 times. This sequence may be positioned at any place in the packet as long as it is immediately preceded by the synchronization stream defined as 6-byte 0xFF. If the MAC address of the node matches that of the target PC subject to main power control, the PC also receives a broadcast frame.



< NOTE >

Possible error due to timing of Magic Packet™ frame transmission:

Implement proper measures so that the Magic Packet™ frame transmission always takes place while the primary power of the Equipment is off. If the transmission of Magic Packet™ frame takes place during actual turning off of the primary power after the completion of OS shutdown process, the Equipment may restart without turning off the primary power or become incapable of WOL.

3.8 Serial Port Setting

The Equipment is shipped with the default serial port settings shown below. Do not change the default settings.

<i>I/O address*</i>	<i>IRQ assignment*</i>	<i>Name on OS</i>	<i>Remarks</i>
3F8h	IRQ4	COM1	Standard
2F8h	IRQ3	COM2	Option

* Automatically assigned by BIOS.

3.9 Built-in LAN Interface (1000BASE-T/100BASE-TX/10BASE-T)

The Equipment provides two ports of 1000BASE-T/100BASE-TX/10BASE-T built-in LAN interface. See Section 2.1, "External Views of Operator Access Areas" for the physical location of the LAN interface connectors.

< NOTE >

Setting of "Reconnect at logon" sometimes fails to take effect. If such failure happens, manually log on to the network drive or connect the network drive with the "net use" command. See Windows® Help for the "net use" command.

3. OPERATION

3.10 Notes on LAN Interfaces

3.10.1 Requirements for twisted pair Ethernet cable

The twisted pair Ethernet cable for connection to the network must comply with the following specifications. No operation with any other cable type, e.g., category 5 or STP (shielded twisted pair), will be guaranteed.

LAN cable specifications: Category 5e or 6 of UTP (unshielded twisted pair)

3.10.2 Autonegotiation for link speed and duplex mode

Each LAN interface is equipped with the autonegotiation function that automatically detects and adapts to the link speed and duplex mode of the connected hub. Have this autonegotiation function enabled in normal use. (Autonegotiation is required for use with the WOL function. If “Auto-negotiate 1000Mbps” is selected for the link speed and duplex mode, the WOL function becomes unusable.)

Certain combinations with connected hubs may cause the autonegotiation function to fail and adversely affect communications with other devices. When the autonegotiation function does not operate properly, set up the LAN interface as shown below.

<i>Specifications of Hub</i>	<i>Specifications of LAN Interface*</i>	
	<i>Speed</i>	<i>Duplex</i>
10Mbps/half-duplex	10Mbps	Half-duplex
10Mbps/full-duplex	10Mbps	Full-duplex
100Mbps/half-duplex	100Mbps	Half-duplex
100Mbps/full-duplex	100Mbps	Full-duplex
1000Mbps	1000Mbps (1.0Gbps)	Auto-negotiate or Full-duplex

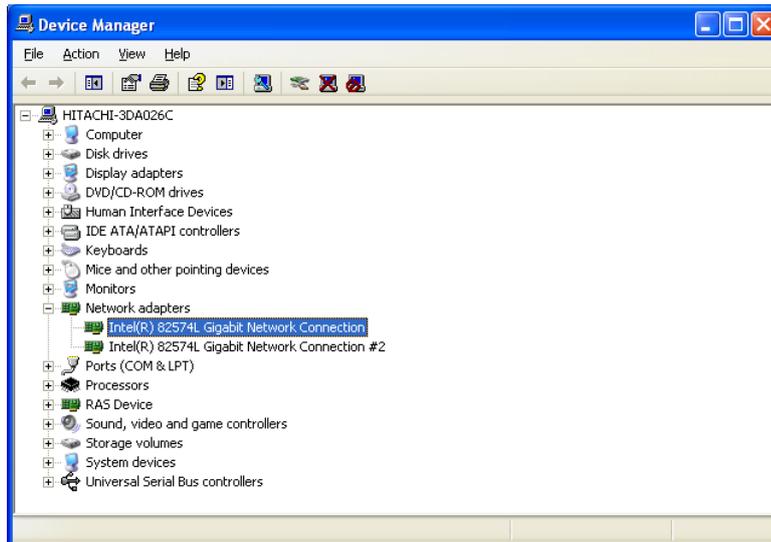
* Display may differ depending on the OS and LAN port (including optional LAN adapter ports).

3.10.3 How to set up link speed and duplex mode

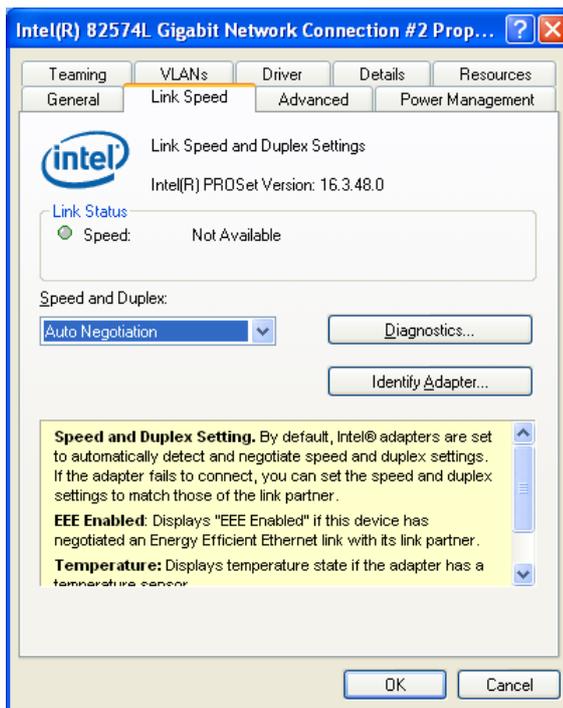
(1) Steps for Windows® XP

1. At the OS startup, log on to the local computer as a member of the Administrators group.
2. Click **Start**, click **Control Panel**, click **Performance and Maintenance**, and click **System**.
3. In the “System Properties” window opened, select **Hardware** tab and click **Device Manager** button.

4. In the “Device Manager” window opened, click **Network adapters** node to expand.

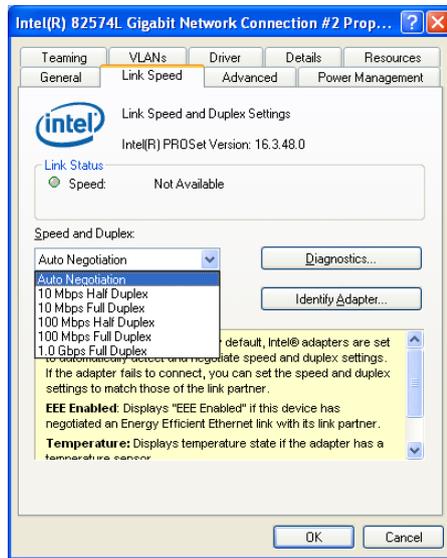


5. Click **Link Speed** tab.



3. OPERATION

6. Click **Speed and Duplex** drop-down list and select an appropriate combination of speed and duplex in the list. If you need not specify such a combination, select **Auto Negotiation**(uppermost in the list) to enable the autonegotiation function.



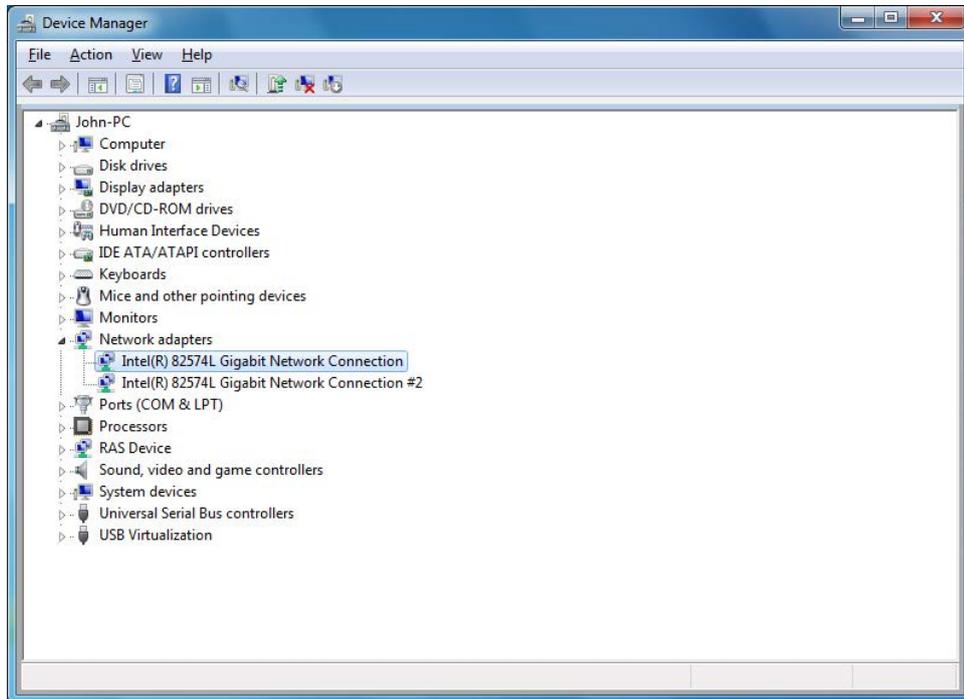
7. Click **OK** button to close the properties window.
8. Close the “Device Manager” window.
9. In the “System Properties” window, click **OK** button to close the window.
10. Close the “Control Panel” window.

Note: In the event that you set up the LAN interface to full duplex and the connected hub does not accept the fixed setting of full duplex, a communication error such as packet loss may result. Be sure to set up the LAN interface and the connected hub so that their duplex settings are compatible with each other.

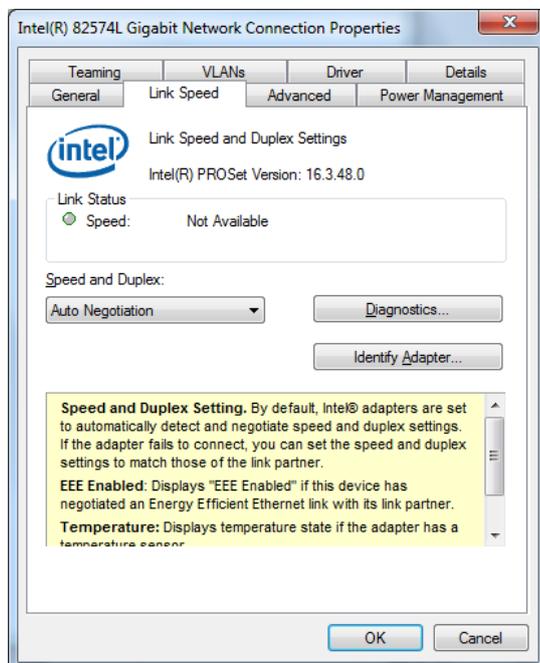
(2) Steps for Windows® 7

1. At the OS startup, log on to the local computer as a member of the Administrators group.
2. Click **Start**, click **Control Panel**, click **System and Security**, and click **System**.
3. In the “System Properties” window opened, click **Device Manager** button.

- In the “Device Manager” window opened, click **Network adapters** node to expand. Then, double-click the target adapter icon to open its properties window. The adapter icons represent the LAN interface types.

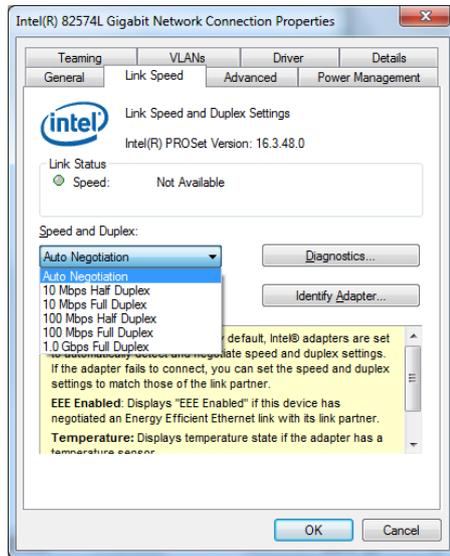


- Click **Link Speed** tab.



3. OPERATION

6. Click **Speed and Duplex** drop-down list and select an appropriate combination of speed and duplex in the list. If you need not specify such a combination, select **Auto Negotiation** (uppermost in the list) to enable the autonegotiation function.



7. Click **OK** button to close the properties window.
8. Close the “Device Manager” window.
9. In the “System Properties” window, click **OK** button to close the window.
10. Close the “Control Panel” window.

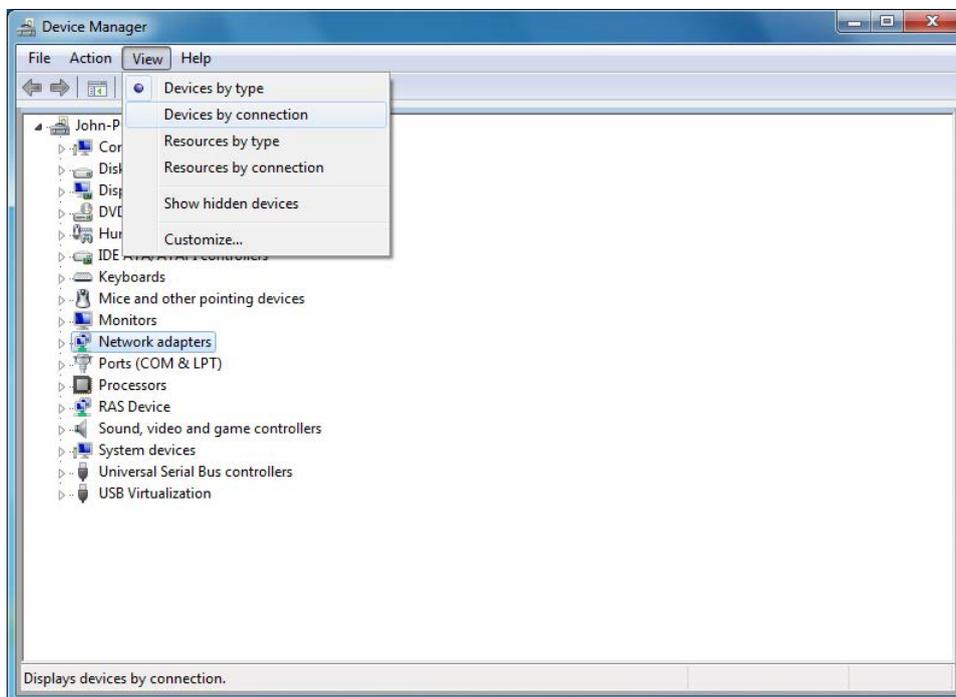
Note: In the event that you set up the LAN interface to full duplex and the connected hub does not accept the fixed setting of full duplex, a communication error such as packet loss may result. Be sure to set up the LAN interface and the connected hub so that their duplex settings are compatible with each other.

3.10.4 Steps to find auto assignment result of LAN adapters to LAN ports under Windows® 7

Under Windows® 7, there may be cases of auto assignment result for LAN adapters where “Intel(R) 82574L Gigabit Network Connection” is assigned to LAN Port 2 and “Intel(R) 82574L Gigabit Network Connection #2” is assigned to LAN Port 1.

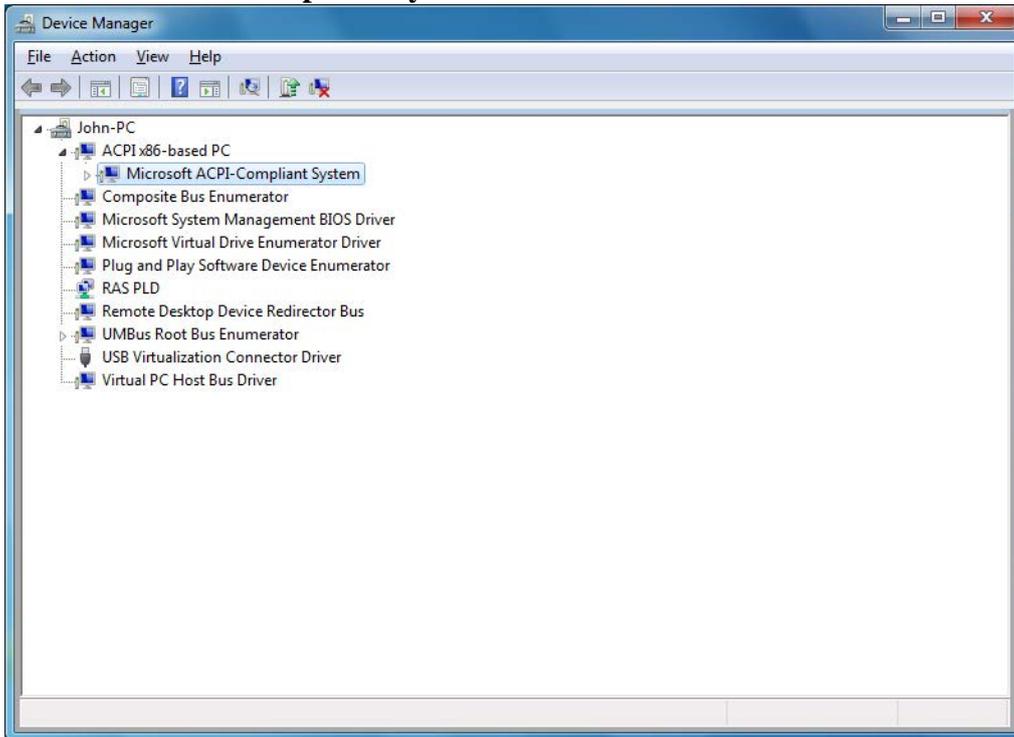
To find the auto assignment result of LAN adapters to LAN ports under Windows® 7, follow the steps below.

1. Click Start, click Control Panel, click System and Security, and click System.
2. In the “System Properties” window opened, click **Device Manager** button.
3. In the “Device Manager” window opened, click **View** menu and select **Devices by connection**.

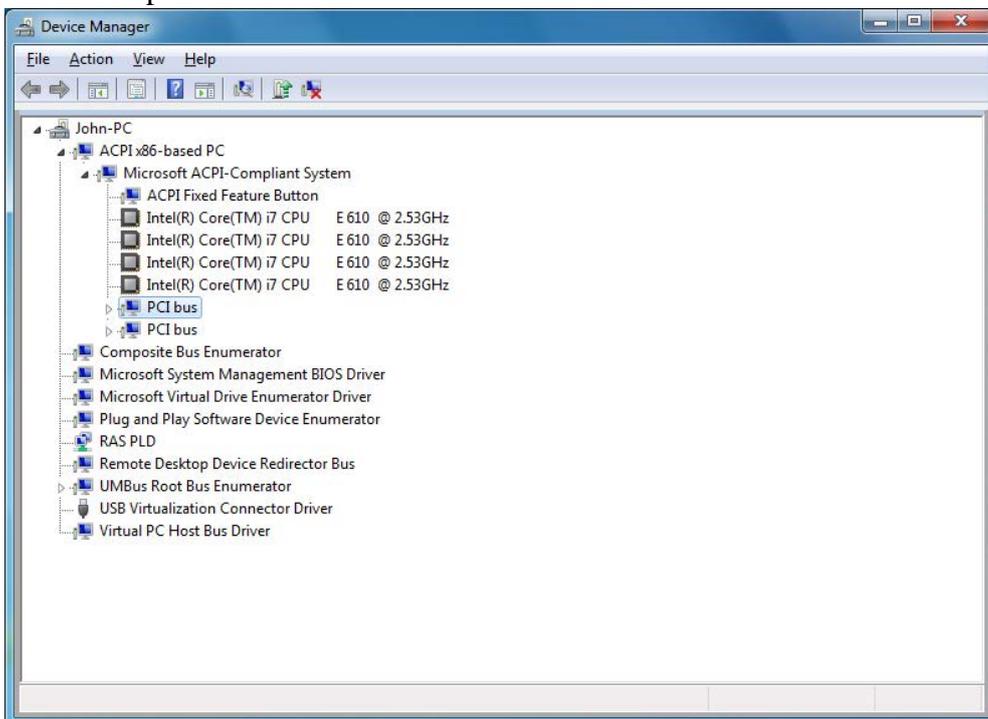


3. OPERATION

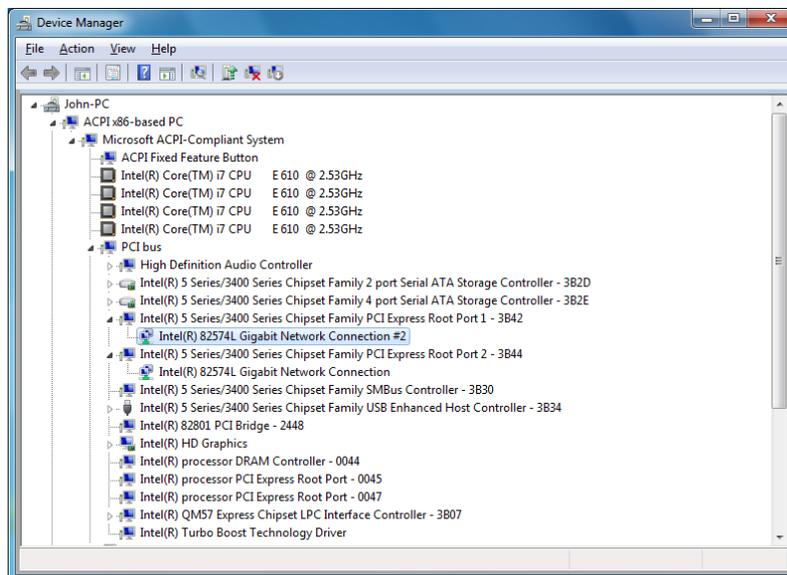
4. In the tree view, click to expand **ACPI x86-based PC** node and then click to expand **Microsoft ACPI-Compliant System** node.



5. Click to expand **PCI bus** node.



6. Click to expand Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 1 node and Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 2 node to find the network adapters assigned to them. In the example below, “Intel(R) 82574L Gigabit Network Connection” is assigned to LAN Port 2 and “Intel(R) 82574L Gigabit Network Connection #2” is assigned to LAN Port 1.



3.10.5 Possible solutions to unstable 1000Mbps links

Certain combinations with connected hubs may cause 1000Mbps links to go unstable. When you plan to use networks at a 1000Mbps speed, it is required that you verify connection with the target hub in advance.

When the 1000Mbps link goes unstable, one of the following actions may recover the stability of the link:

- Use an appropriate LAN cable with the length of 20 m or longer to less than 100 m. (Be sure to use a UTP cable of category 5e or higher.)
- Change the value of **Gigabit Master Slave Mode** to **Force Master Mode** (only effective with the link speed setting of 1000Mbps).

Steps to perform the latter action are shown below. Should such action with your connected hub cause 1000Mbps link to be lost, however, restore the setting to **Auto Detect**.

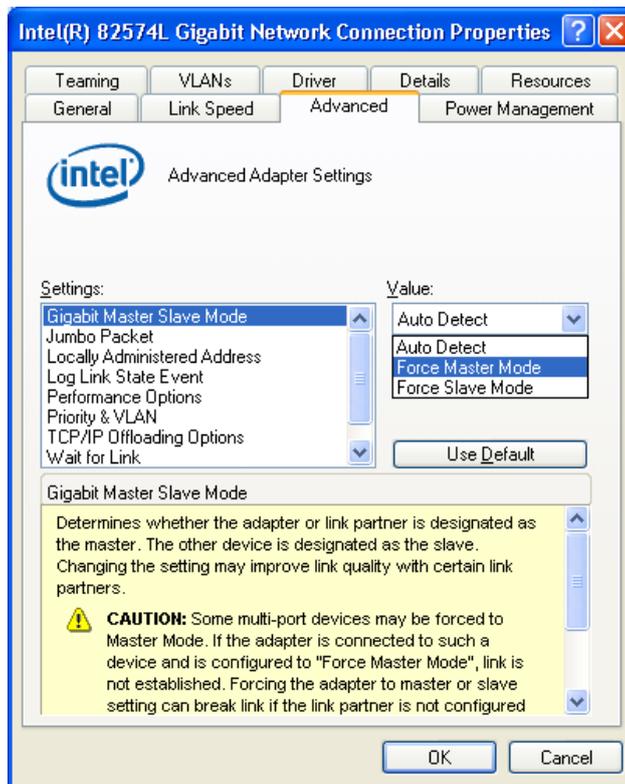
(1) Steps for Windows® XP

Follow the steps below.

1. Do steps 1 through 4 in Subsection 3.10.3, “How to set up link speed and duplex mode.”

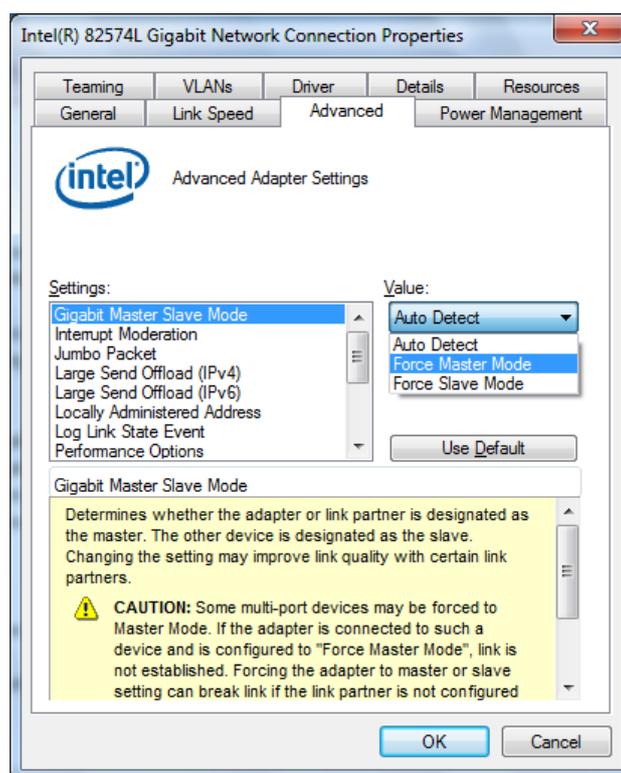
3. OPERATION

2. Click **Advanced** tab and select **Gigabit Master Slave Mode** in **Settings** list box.
3. Click **Value** drop-down list and change selection to **Force Master Mode**.
4. Click **OK** button. Then, restart the Equipment to cause the new setting to take effect.



(2) Steps for Windows® 7

1. Do steps 1 through 4 in Subsection 3.10.3, "How to set up link speed and duplex mode."
2. Click **Advanced** tab and select **Gigabit Master Slave Mode** in **Settings** list box.
3. Click **Value** drop-down list and change selection to **Force Master Mode**.
4. Click **OK** button. Then, restart the Equipment to cause the new setting to take effect.



3.10.6 Precautions for use of multiple optional LAN adapters installed in addition

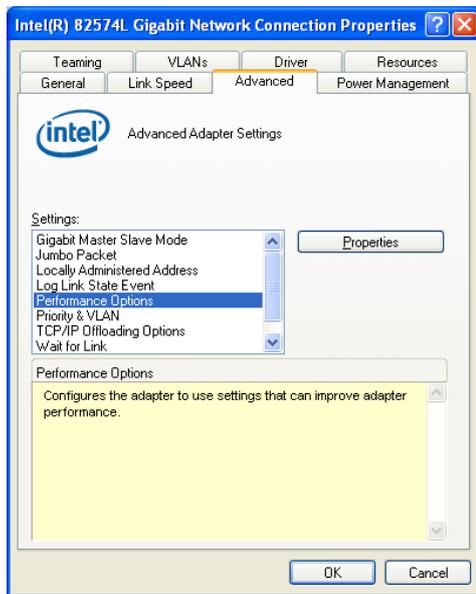
In an environment where multiple optional LAN adapters are installed in addition, there may be cases when the expected performance is not reached on each LAN adapter due to frequent interrupt requests from each LAN adapter or an excessive amount of data to be processed. (Interrupt requests from LAN adapters require high CPU load relative to the amount of data to be processed. When multiple LAN adapters are installed and used, it requires a very long time for the CPU to complete processing of all the interrupt requests from multiple LAN adapters.)

Where multiple LAN adapters are installed and used, check if the expected performance is reached on each built-in LAN adapter and additionally installed LAN adapter. If not, either adjust the load imposed by the network or change the LAN adapter settings according to the procedure below. Refer details of each setting parameter to the help text in the relevant display image.

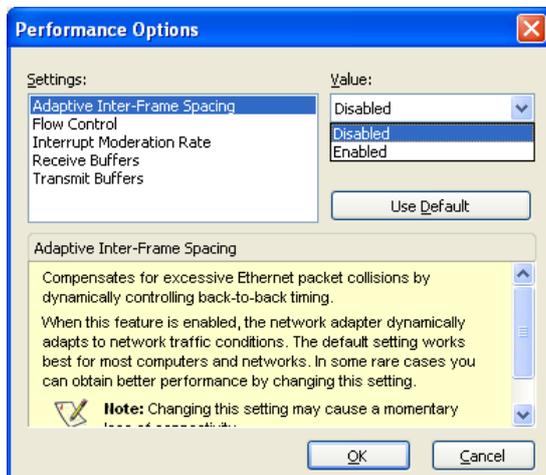
1. Do steps 1 through 4 in Subsection 3.10.3, "How to set up link speed and duplex mode".

3. OPERATION

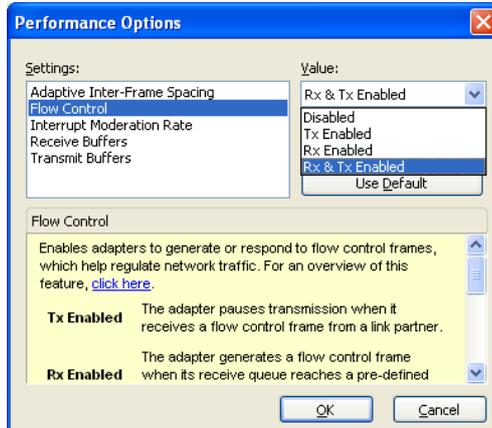
2. Click **Advanced** tab, select **Performance Options** in **Settings** list box, and click **Properties** button (illustrated below).



3. The “Performance Options” dialog box opens. Click each parameter in **Settings** list box and confirm the current **Value** setting for the selected parameter. If you wish to change the currently selected value, click **Value** drop-down list and change selection to a new value. These actions are exemplified by lefthand screenshots following the substeps a. through e. below.
 - a. Adaptive Inter-Frame Spacing: Compensates for excessive Ethernet packet collisions by dynamically controlling back-to-back timing.



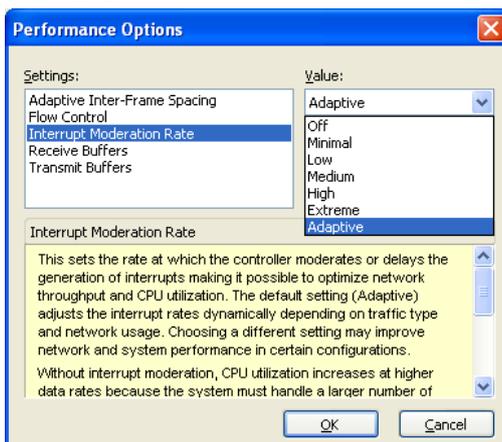
- b. Flow Control: Enables adapters to generate or respond to flow control frames, which help regulate network traffic. Since the default setting varies depending on the combination of the OS and LAN adapter interface, change the setting according



< NOTE >

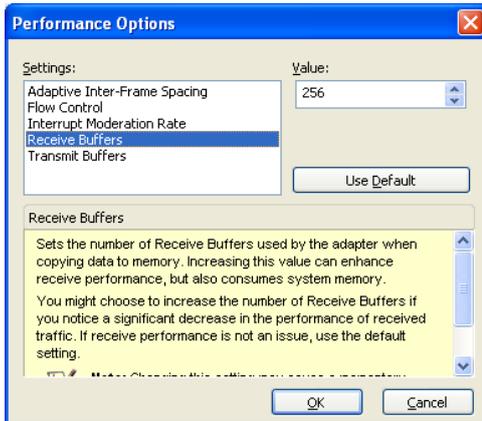
In the event that the LAN driver is placed in the stopped state due to a system failure such as OS lock-up, the receive queue may reach a pre-defined limit due to unprocessed broadcast frames and the like received from the other machines. In this situation, the Equipment would continuously transmit flow control frames and affect the entire networks to which the Equipment connects if “Generate” or “Generate & Respond” is selected for the flow control value. When necessary, disable the flow control by this Equipment or disable the flow control by the hub to which the Equipment connects. Furthermore, apply an appropriate network design to avoid possible overload, because receipt of excessive frames beyond the predefined limit without flow control will cause overload and excessive frames will be continuously discarded until resolution of such overload.

- c. Interrupt Moderation Rate: Sets the rate at which the controller moderates or delays the generation of interrupts making it possible to minimize network throughput and CPU utilization.

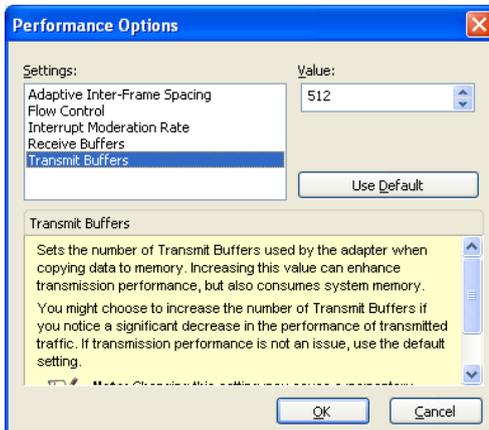


3. OPERATION

- d. Receive Buffers (previously called Receive Descriptors): Sets the number of Receive Buffers used by the driver when copying data to the protocol memory.



- e. Transmit Buffers (previously called Transmit Descriptors): Defines the number of Transmit Buffers, which are data segments that enable the adapter to track transmit packets in the system memory.



4. When you finish the setting changes, click **OK** button.

3.10.7 Precautions for link disconnection event logs collected at OS startup

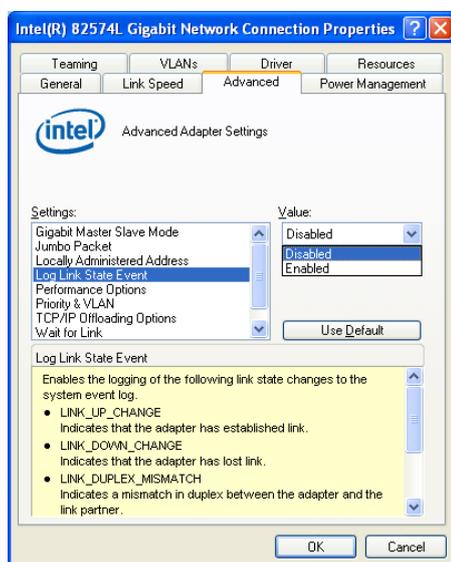
Depending on the settings, the link disconnection event logs shown in the table below may be collected at the OS startup. These link state event logs are collected by the initialization processing for the LAN driver at the OS startup, which does not cause any adverse effect on the system operation.

Event ID	Source	Type	Classification	Meaning
27	e1qexpress	Warning	none	Network link to “Intel(R) 82574L Gigabit Network Connection” (*) has been disconnected.
27	e1rexpress	Warning	none	Network link to “Intel(R) Ethernet Server Adapter I340-T2” (*) has been disconnected.

* Display of the link target name may differ depending on the installed LAN adapter.

The said collecting action for the link state event logs can be suppressed by changing the LAN adapter settings according to the steps below. Be noted, however, that this setting change also suppresses the collecting action for the link connection/disconnection event logs during the system operation and hence would make it difficult to analyze relevant failures.

1. Do steps 1 through 4 in Subsection 3.10.3, “How to set up link speed and duplex mode”.
2. Click **Advanced** tab, select **Log Link State Event** in **Settings** list box (illustrated below), click **Value** drop-down list, and change selection to **Disabled**.



3. When done, click **OK** button.

3. OPERATION

3.11 Screen Display Settings

The Equipment supports display settings of color quality (the number of colors available on the screen), screen resolution (the number of pixels comprising the screen), refresh rate (the number of screen refreshes per second), and switching between single-display and multi-display environments. To set up the display settings, follow the procedure below. (The display image assumes Windows® 7 but it is similar under Windows® XP.)

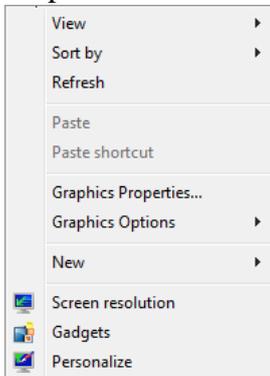
< NOTE >

Prior to changing the display settings, stop running animations if any.

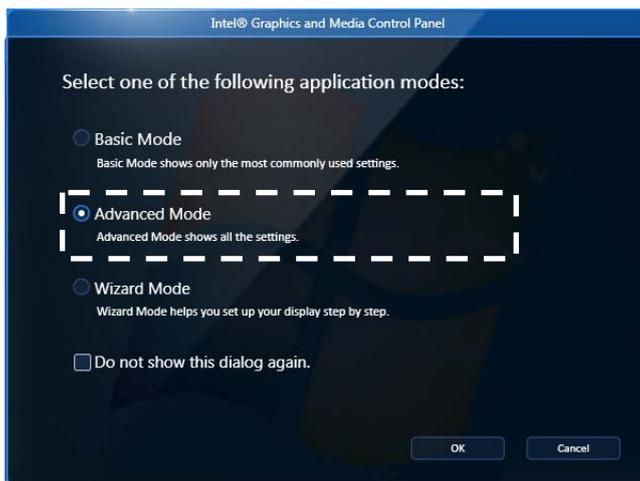
3.11.1 How to set up single-display environment

When you connect one display unit to the Equipment, follow the procedure below.

1. Right-click an empty space on the desktop and select **Graphics Properties** in the drop-down menu.



2. On the startup dialog of the “Intel® Graphics and Media Control Panel,” click to select **Advanced Mode** radio button and then click **OK** button.



3. In the left pane of the “Intel® Graphics and Media Control Panel” window, click **Display** and then click **General Settings**. In the right pane, ensure selection of the target display unit from **Display** list, and then set up **Resolution**, **Color Depth**, and **Refresh Rate** to your preference from the relevant lists.



< NOTE >

- Do not change **Rotation** and **Scaling** settings.
 - Select **Refresh Rate** value from those listed in Section 4.1 (2).
4. When you finish the setting changes, click **OK** button. If the changes include resolution or refresh rate, a confirmation dialog below will appear. In such a case, click **OK** button in the dialog to keep the setting change.



< NOTE >

Resolution options selectable by default include resolution values beyond the limit supported by the connected display unit. If you inadvertently select a resolution value exceeding the said limit, the display unit will stop showing the display image. Since the default resolution value after the video driver installation is automatically set to the maximum of those supported by the connected display unit, be sure to specify a smaller value when you change the resolution from the default.

3. OPERATION

3.11.2 How to set up multi-display environment

You can connect two display units to the Equipment and set up these display units to Clone Displays mode or Extended Desktop mode via “Intel® Graphics and Media Control Panel”.

< NOTE >

- When you desire to switch from single-display to multi-display environment or vice versa, turn off the Equipment, change the display cable connection(s), turn on the Equipment, and set up the resulting multi-display or single-display environment.
- After you change the display connections in any way, set up the display environment again.

In Clone Displays mode, the two displays provide the same images with common resolution, color depth, and refresh rate. It is required to ensure the capabilities of the two display units (e.g., maximum resolutions and maximum refresh rates) prior to connecting them.

In Extended Desktop mode, the two displays provide one large desktop with resolutions, color depths and refresh rates independently available per display unit. The taskbar is not shown on the display specified as Display 2. The available resolutions, color depths, and refresh rates depend on the capabilities of each display unit.

Resulting display images in these modes are shown below, followed by the steps to set up these modes.

<i>Mode</i>	<i>Display image on Display 1</i>	<i>Display image on Display 2</i>
Clone Displays		
Extended Desktop		

(1) Steps to set up Clone Displays mode

1. Do steps 1 and 2 in Subsection 3.11.1, “How to set up single-display environment” to open the “Intel® Graphics and Media Control Panel” window.
2. In the left pane of the “Intel® Graphics and Media Control Panel” window, click **Display** and then click **Multiple Displays**.
3. In the right pane, set **Operating Mode** list to **Clone Displays**.



4. If you wish to specify resolution, color depth, and refresh rate settings commonly applicable to the two display units, do step 3 in Subsection 3.11.1.
5. When you finish the setting changes, click **OK** button. If the changes include resolution or refresh rate, a confirmation dialog below will appear. In such a case, click **OK** button in the dialog to keep the setting change.



3. OPERATION

(2) Steps to set up Extended Desktop mode

1. Do steps 1 and 2 in Subsection 3.11.1, “How to set up single-display environment” to open the “Intel® Graphics and Media Control Panel” window.
2. In the left pane of the “Intel® Graphics and Media Control Panel” window, click **Display** and then click **Multiple Displays**.
3. In the right pane, set **Operating Mode** list to **Extended Desktop**.



4. If you wish to specify resolution, color depth, and refresh rate settings for each display unit, repeat step 3 in Subsection 3.11.1 for each display unit.
5. When you finish the setting changes, click **OK** button. If the changes include resolution or refresh rate, a confirmation dialog below will appear. In such a case, click **OK** button in the dialog to keep the setting change.



< NOTE >

- In Extended Desktop mode, the display specified as secondary cannot show animations. Play animations on the display specified as primary.
- In Extended Desktop mode under Windows® 7, every window and dialog placed on top of an animated gadget does not properly appear on the display specified as secondary. Place such gadgets on the display specified as primary.

CHAPTER 4 SPECIFICATIONS

4.1 Product Specifications

(1) Specifications of the Equipment

Item		Specifications	
Model		HF-W2000 Model 35	
		D model (hardware RAID1 model) HJ-2035vwxyD (*1)	A model (non-RAID HDD model) HJ-2035vwxyA (*1)
OS (on preinstalled model)		Microsoft® Windows® XP Professional 32bit (Embedded License) or Microsoft® Windows® 7 Professional 32bit (Embedded License) or Microsoft® Windows® 7 Professional 64bit (Embedded License) (*2)	
Processor		Intel® Core™ i7® 610E (2.53 GHz)	
Main memory		1 GB to 8 GB (*3)	
Display resolution and color depth		See “(2) Display specifications”	
Built-in	DVD	DVD-RAM drive (*4)	
file device	HDD1 (*5) (*6)	SATA 160 GB (capacity of one HDD due to mirroring)	SATA 160 GB
	HDD2 (*5)		SATA 160 GB (option)
Extended slot	PCI	Full-height short size × 1	
	PCI-Express	Full-height short size ×8 speed × 1, Full-height short size ×1 speed × 1	
Interface	Display	Analog RGB video port: Mini D-sub (15 pins) × 1 Digital video port: DVI-D (24 pins) × 1	
	USB	8 ports (front × 4, rear × 4) compatible with USB 2.0/1.1	
	Serial port	RS-232C (D-Sub 9 pins) × 1 (standard) or 2 (option)	
	LAN port	1000BASE-T/100BASE-TX/10BASE-T auto-switchable × 2 (RJ-45, Wake on LAN™ ready)	
	Audio	LINE IN × 1, LINE OUT × 1	
	External control	Option	
RAS features		Basic RAS features of HF-W2000 Model 30 plus advanced RAS features including <ul style="list-style-type: none"> • Automatic shutdown by remote shutdown signal input • Remote notification • Drive used hours monitoring • RAS library functions 	
Dimensions (W × D × H)		325 × 356 × 93 mm (excluding vertical stand and rubber feet)	
Mass		About 6 kg	
Rush current		35 A or less (100 Vac)	
Leakage current		1 mA or less	
Rated power consumption		270 VA	
Power supply		100–240 Vac ±10 % (wide-range input)	

*1 “vwxy” defines the type of OS, where the combination of “6EW” (Microsoft® Windows® XP Professional 32bit (Embedded License)), “9EW” (Microsoft® Windows® 7 Professional 32bit (Embedded License)), “8EW”(Microsoft® Windows® 7 Professional 64bit (Embedded License)), “E” (English) and “J” (Japanese) makes “6EWE,” “6EWJ,” “9EWE,” or “9EWJ” “8EWE,” or “8EWJ.” For OS-not-installed model, “NOSJ” for “vwxy” means Japanese version and “NOSE” for “vwxy” means English version.

*2 Windows® 7(64bit) is supported by only A model and D model.

*3 By design of the OS, the maximum usable memory size is limited to approximately 3 GB under Windows® XP and Windows® 7(32bit).

*4 Media types supported by the DVD drive are as follows. When the drive cannot read/write a specific medium of supported type depending on the condition thereof, try another medium of supported type.

- Read: CD-ROM and DVD-ROM
- Read/write: CD-R, CD-RW, and DVD-RAM

*5 HDD capacity is calculated as 1 GB=10⁹. The HDD capacity is subject to change depending on the manufacturer’s adoption of HDD parts.

*6 The factory default of capacity of C drive partition is 100GB for Windows® 7(64bit), 80GB for Windows® 7(32bit) or 40GB for Windows® XP, and other space is unallocated.

4. SPECIFICATIONS

Item		Specifications	
Model		HF-W2000 Model 30	
		B model (software RAID1 model) HJ-2030vwxyB (*1)	A model (non-RAID HDD model) HJ-2030vwxyA (*1)
OS (on preinstalled model)		Microsoft® Windows® XP Professional 32bit (Embedded License) or Microsoft® Windows® 7 Professional 32bit (Embedded License) or Microsoft® Windows® 7 Professional 64bit (Embedded License) (*2)	
Processor		Intel® Celeron® P4505 (1.86 GHz)	
Main memory		1 GB to 8 GB (*3)	
Display resolution and color depth		See “(2) Display specifications”	
Built-in file device	DVD	DVD-RAM drive (*4)	
	HDD1 (*5) (*6)	SATA 160 GB	SATA 160 GB
	HDD2 (*5)	SATA 160 GB	SATA 160 GB (option)
Extended slot	PCI	Low-profile short size × 1	
	PCI-Express	Low-profile short size ×8 speed × 1, Low-profile short size ×1 speed × 1	
Interface	Display	Analog RGB video port: Mini D-sub (15 pins) × 1 Digital video port: DVI-D (24 pins) × 1	
	USB	8 ports (front × 4, rear × 4) compatible with USB 2.0/1.1	
	Serial port	RS-232C (D-Sub 9 pins) × 1 (standard) or 2 (option)	
	LAN port	100BASE-T/100BASE-TX/10BASE-T auto-switchable × 2 (RJ-45, Wake on LAN™ ready)	
	Audio	LINE IN × 1, LINE OUT × 1	
	External control	Option	
RAS features		Basic RAS features including <ul style="list-style-type: none"> • Automatic shutdown at fan error or abnormal internal temperature • Memory dump • Maintenance support commands • SMART • Digital LED for status indication 	
Dimensions (W × D × H)		325 × 356 × 93 mm (excluding vertical stand and rubber feet)	
Mass		About 5 kg	
Rush current		35 A or less (100 Vac)	
Leakage current		1 mA or less	
Rated power consumption		270 VA	
Power supply		100–240 Vac ±10 % (wide-range input)	

*1 “vwxy” defines the type of OS, where the combination of “6EW” (Microsoft® Windows® XP Professional 32bit (Embedded License)), “9EW” (Microsoft® Windows® 7 Professional 32bit (Embedded License)), “8EW”(Microsoft® Windows® 7 Professional 64bit (Embedded License)), “E” (English) and “J” (Japanese) makes “6EWE,” “6EWJ,” “9EWE,” or “9EWJ” “8EWE,” or “8EWJ.” For OS-not-installed model, “NOSJ” for “vwxy” means Japanese version and “NOSE” for “vwxy” means English version.

*2 Windows® 7(64bit) is supported by only A model and D model.

*3 By design of the OS, the maximum usable memory size is limited to approximately 3 GB under Windows® XP and Windows® 7(32bit).

*4 Media types supported by the DVD drive are as follows. When the drive cannot read/write a specific medium of supported type depending on the condition thereof, try another medium of supported type.

- Read: CD-ROM and DVD-ROM
- Read/write: CD-R, CD-RW, and DVD-RAM

*5 HDD capacity is calculated as 1 GB=10⁹. The HDD capacity is subject to change depending on the manufacturer’s adoption of HDD parts.

*6 The factory default of capacity of C drive partition is 100GB for Windows® 7(64bit), 80GB for Windows® 7(32bit) or 40GB for Windows® XP, and other space is unallocated.

(2) Display specifications

<i>Application</i>	<i>Resolution</i>	<i>Color depth</i>	<i>Refresh rate (*)</i>	
			<i>Analog output</i>	<i>Digital output</i>
Display unit connected to analog RGB video port (mini D-sub 15 pins)	800 × 600	High (16bit)	60Hz, 75Hz, 85Hz	-
		True (32bit)	60Hz, 75Hz, 85Hz	-
	1024 × 768	High (16bit)	60Hz, 75Hz, 85Hz	-
		True (32bit)	60Hz, 75Hz, 85Hz	-
	1280 × 1024	High (16bit)	60Hz, 75Hz, 85Hz	-
		True (32bit)	60Hz, 75Hz, 85Hz	-
	1600 × 1200	High (16bit)	60Hz	-
		True (32bit)	60Hz	-
	1680 × 1050	High (16bit)	60Hz	-
		True (32bit)	60Hz	-
	1920 × 1200	High (16bit)	60Hz	-
		True (32bit)	60Hz	-
	2048 × 1536	High (16bit)	60Hz	-
		True (32bit)	60Hz	-
Display unit connected to digital video port (DVI-D 24 pins)	800 × 600	High (16bit)	-	60Hz
		True (32bit)	-	60Hz
	1024 × 768	High (16bit)	-	60Hz
		True (32bit)	-	60Hz
	1280 × 1024	High (16bit)	-	60Hz
		True (32bit)	-	60Hz
	1600 × 1200	High (16bit)	-	60Hz
		True (32bit)	-	60Hz
	1680 × 1050	High (16bit)	-	60Hz
		True (32bit)	-	60Hz
	1920 × 1200	High (16bit)	-	60Hz
		True (32bit)	-	60Hz

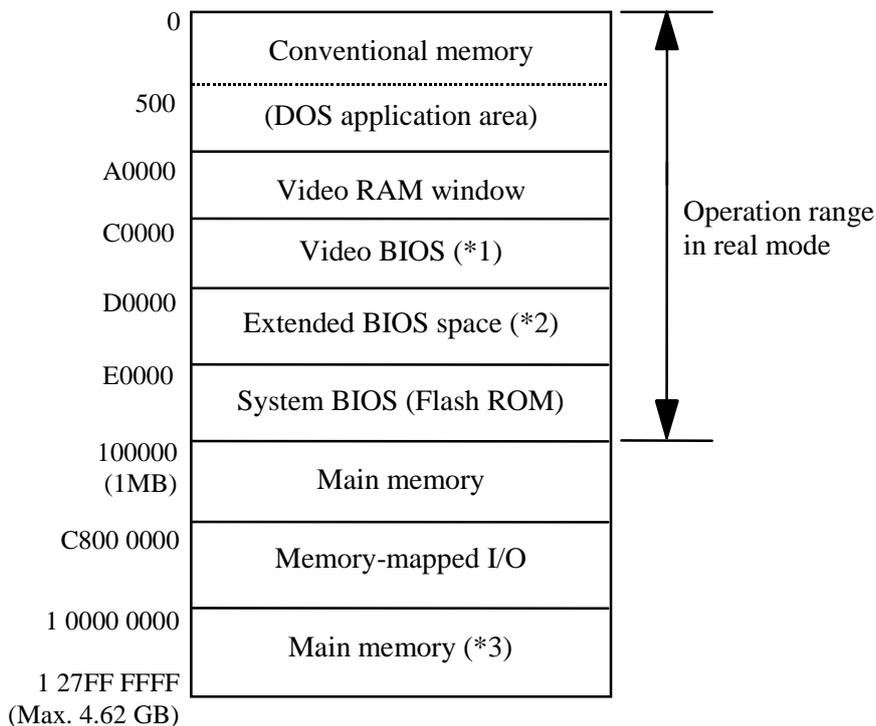
* Refresh rates are those tested on available monitors at Hitachi. Because such refresh rates and resolutions are monitor dependent, your monitor may not fully support these settings. If you set the refresh rate to a value not supported, your monitor may not display properly.

(3) Specifications of optional LAN adapter

<i>Item</i>	<i>Specifications</i>
Interface	1000BASE-T/100BASE-TX/10BASE-T auto-switchable × 2 (RJ-45, Not Wake on LAN™ ready)
Installation slot	PCI-Express ×1 speed slot
Dimensions	168 × 67.5 mm (board only, excluding protrusions)
Mass	About 100 g
Typical consumption current	0.7 A per 3.3 V dc (at 1000BASE-T)

4. SPECIFICATIONS

4.2 Memory Space



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

*2 Because the extended BIOS space is a narrow range from D0000 to DFFFF, the space may be occupied with any existing devices or subject to future BIOS allocation for the then standard adapter. Accordingly, it is least suggested to use the extended BIOS space for configuring a new device. Otherwise, a conflict between devices may cause a malfunction.

*3 Even when 4 GB or greater main memory is physically mounted, the maximum usable memory size is limited to approximately 3 GB by design of the OS.

Note: When multiple PCI/PCI-Express devices equipped with extended ROM are physically mounted, the Equipment may fail to start up because of insufficient memory space for execution of extended ROM.

4.3 I/O Space

<i>I/O address</i>	<i>Device name</i>
0000 to 001F	DMA controller
0020 to 002D	Interrupt controller 1
002E to 002F	Super I/O configuration
0030 to 003D	Interrupt controller 1
0040 to 0043	System timer 1
004E to 004F	Super I/O
0050 to 0053	System timer 2
0060, 0062, 0064, 0066	Keyboard controller
0061	NMI controller
0070 to 0077	RTC (Real-time clock) controller
0080	DMA & Post code
0081 to 0091	DMA page register
0092	Reset controller
0093 to 009F	DMA controller
00A0 to 00B1	Interrupt controller 2
00B2 to 00B3	Power management controller
00B4 to 00BD	Interrupt controller 2
00C0 to 00DF	DMA controller 2
00F0	Coprocessor
0240 to 025F	RAS LSI register
0290 to 029F	Super I/O
02F8 to 02FF	Serial port 2 (COM2)
03F8 to 03FF	Serial port 1 (COM1)
04D0 to 04D1	Interrupt controller
0CF8	PCI configuration (address)
0CF9	Reset controller
0CFC	PCI configuration (data)
1000 to 103F	ACPI controller
1060 to 107F	TCO timer controller
1180 to 11BF	GPIO controller
5020 to 503F	SATA controller 2
5040 to 505F	SATA controller 1
5070 to 507F	SATA controller 2
5080 to 508F	SATA controller 1
50B0 to 50B7	SATA controller 2
50B8 to 50BF	SATA controller 1
EFA0 to EFBF	SMBus controller

4. SPECIFICATIONS

4.4 Interrupt List

<i>Interrupt port</i>	<i>Interrupt type when APIC is enabled</i>	<i>Interrupt type when APIC is disabled</i>
IRQ0	Cascade (from 8259 #1)	Timer
IRQ1	(reserved)	(reserved)
IRQ2	Timer	Cascade
IRQ3	Serial port 2 (COM2)	Serial port 2 (COM2): B
IRQ4	Serial port 1 (COM1)	Serial port 1 (COM1): A
IRQ5	(not used)	(reserved)
IRQ6	(not used)	(not used)
IRQ7	(not used)	(not used)
IRQ8	Real-time clock	Real-time clock
IRQ9	SCI	SATA, SCI, all PCI devices
IRQ10	(not used)	(not used)
IRQ11	(not used)	(not used)
IRQ12	(reserved)	(reserved)
IRQ13	Coprocessor	Coprocessor
IRQ14	(not used)	(not used)
IRQ15	(not used)	(not used)
IRQ16	LAN1, PCI-Express Slot 3	
IRQ17	LAN2	
IRQ18	PCI-Express Slot 2	
IRQ19	(not used)	
IRQ20	PCI Slot 1	
IRQ21	SATA, SMBus	
IRQ22	SATA	
IRQ23	USB	

Notes:

1. IRQ numbers for PCI slots assume use of INTA terminal.
2. Assignment of IRQ numbers to interrupt ports is fixed and cannot be altered.
3. 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.

4.5 Setup of BIOS

The BIOS stores the system configuration information in the SPI-ROM. When the system configuration is changed, the BIOS settings may have to be changed.

Note: The BIOS is optimally set to match the system configuration at shipping. Pay special attention when you change the BIOS settings because the change may result in unstable operation or failure of system initialization. If you are not sure how to set up the BIOS at system configuration change, contact our customer engineer.

(1) Starting setup menu

In order to set up the BIOS, start the setup menu by the following action:
Press the POWER switch (see Section 2.1, “External Views of Operator Access Areas”).
When the system initialization message is displayed, press the F2 key.

(2) Setup menu operation

The keys in the table below are mainly used to operate the setup menu.

<i>Key name</i>	<i>Explanation</i>
ESC	Used to terminate the setup operation or to return the display from a low-order menu to a high-order menu.
← or →	Used to select a menu or a menu group displayed at the top of the screen.
↑ or ↓	Used to select an item or an individual item in each menu group.
+ or –	Used to select a setting value. The value that can be set for a selected item is switched by operating these keys.
Space	Used to select a setting value. When there are only two setting conditions, this key switches the conditions as if using a toggle switch.
Tab	When setting a date and time, this key is used to move between items (e.g., months → day, hours → minutes).
Enter	Used to switch the display from a high-order menu to a low-order menu or to terminate the setup operation (data saving in SPI-ROM).

(3) Setup menu configuration

The setup menu is mainly configured by the following items.

Main: Displayed when the menu is started, and is used to set the basic items of the system such as date or time.

Advanced: Used to set the items that depend on the individual system configuration (e.g., setting of interrupt ports and I/O addresses).

Power: Used to set the automatic power-off function at abnormality detection and the operation mode at power on.

Boot: Used to set the boot device priority.

Exit: Used to save the changed configuration information into SPI-ROM or to restore it to the default setting.

4. SPECIFICATIONS

(4) Setup menu details

The table below shows the details of the items that can be set on each menu.

<i>Menu</i>	<i>Setup item</i>	<i>Default value</i>	<i>Remarks</i>	
Main	System Date		These items must be set at the initial setup.	
	System Time			
	DRIVE1	Auto	(*1)	
	DRIVE2	Auto		
	DRIVE3	Auto		
	Boot Options	Beep on boot	Disabled	Only turns ON/OFF the beep at bootup. Regardless of this setting, the beep at an error occurrence is always ON.
		Reset button function	Reset	Sets up the reset button function. 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 details of memory dump, see Section 7.2, “Memory Dump Collecting Feature”.
		QuickBoot Mode	Disabled	A setting change to “Enabled” causes memory check processing to be skipped, thereby shortening the startup time. Keep the “Disabled” setting in practical use.
		Correctable ECC Error	Pass	Selects, upon encountering a correctable ECC error, whether to stop the ongoing startup and show a message prompt to continue or cancel, or to ignore such an error and continue the startup.
		System Memory	Auto	—
	Extended Memory	Auto		

(Continued on next page)

*1 DRIVE1 through DRIVE3 are assigned to devices as shown below.

<i>ID under BIOS</i>	<i>Device assignment</i>	
	<i>D model (HJ-2035vwxyD)</i>	<i>A model (HJ-203*vwxyA, HJ-203*vwxyS and HJ-2030vwxyB)</i>
DRIVE1	RAID	HDD1
DRIVE2	none	HDD2
DRIVE3	DVD drive	DVD drive

(Continued)

<i>Menu</i>	<i>Setup item</i>	<i>Default value</i>	<i>Remarks</i>	
Advanced	Reset Configuration Data	No	Select "Yes" to clear previous configuration settings when they need to be updated (e.g., addition of any option board or boot device setting change).	
	PCI Configuration	PCI Device Slot# 1	Enable Master	Enabled
			Latency Timer	0040h
			Option ROM Scan	Enabled
		PCI-Express Device Slot# 2	Enable Master	Enabled
			Option ROM Scan	Enabled
			ASPM	Enabled
		PCI-Express Device Slot# 3	Enable Master	Enabled
			Option ROM Scan	Enabled
		PCI Parity Error Detection	Enabled	
	I/O Device Configuration	Serial port A	Enabled	Do not change the default settings.
		Base I/O address	3F8	
		Interrupt	IRQ4	
		Serial port B	Enabled	
		Base I/O address	2F8	
		Interrupt	IRQ3	
	Hyper Threading	Disabled		
EIST	Enabled			
Turbo Boost	Disabled			
No Execute Mode Mem Protector	Enabled			
Legacy USB Support	Enabled	Specifies whether to run USB devices under BIOS. When "Disabled" is selected, a USB keyboard is operable only within BIOS setup menu.		
UEFI Boot	Disabled	Do not change the default setting.		
Enter BIOS Update Mode	No	Select "Yes" when the system BIOS needs to be updated. In other cases, do not change the default setting.		

(Continued on next page)

* Depending on the product shipment time, ASPM is fixed "Enabled", and it is not displayed on BIOS setup menu.

4. SPECIFICATIONS

(Continued)

<i>Menu</i>	<i>Setup item</i>	<i>Default value</i>	<i>Remarks</i>
Power	After AC Power ON	Auto	Selects the action taken when the Equipment is powered on. <ul style="list-style-type: none"> • Stay Off: Enters Soft Power Off mode when the Equipment is powered on. (*2) • Power On: Automatically starts up the OS when the Equipment is powered on. • Auto: If the OS was running at the last power-off of the Equipment, this option starts up the OS in the same manner as “Power On”. If the OS was not running at the last power-off of the Equipment, this option enters Soft Power Off mode in the same manner as “Stay Off”. When the input power cord is disconnected while the backup battery is exhausted or not connected, this setting item will be set to “Stay Off”. (*3)
	FAN failure detection	Enabled	Selects whether to detect abnormal fan rotation when the Equipment is powered on. Do not change the default setting.
	Soft off	Enabled	Do not change the default setting. (*4)
	Power saving mode	Disabled	Selects whether to start up the OS in power saving mode. Do not change the default setting.
Boot	Multi Boot XP	USB FDD SATA DVD-CD ! USB CD DRIVE1 DRIVE2 ! DRIVE3 PCI SCSI ! USB HDD Internal Shell	Sets the boot device priority in starting up the OS. Do not change the default setting.
Exit	Exit Saving Changes	—	Saves the contents changed in the setup into SPI-ROM, and reboots the Equipment.
	Exit Discarding Changes	—	Discards the contents changed by setup of this time, and reboots the Equipment with the setting previously saved in SPI-ROM.
	Load Setup Defaults	—	Reads the default setting values of BIOS. (*5)

*2 In the event that you turn on power again before the Standby lamp turns off, the Stay Off setting may not take effect. Instead of entering Soft Power Off mode, the OS may automatically start up.

*3 System startup initiated by connecting the input power cord and pressing the Power switch on the front panel saves the current value of After AC Power ON. Because the backup battery is exhausted or not connected, however, turning off of the main power by disconnecting the input power cord fails to save the current value and causes this setting to be “Stay Off”.

*4 With “Disabled” Soft off setting, an attempt to shut down the OS does not automatically turn off the primary power but shows the message that says “It is now safe to turn off your computer”.

*5 The default values are only read and are not saved in SPI-ROM. To save the setting contents into SPI-ROM, use “Exit Saving Changes” subsequent to this option.

(5) How to restore BIOS settings to default

In order to restore the BIOS settings to default, follow the steps below.

1. Start the setup menu according to “(1) Starting setup menu” in this section.
2. Go to **Exit** menu, point to **Load Setup Defaults**, and hit the Enter key.
3. In response to “Load default configuration now?” message, hit the Enter key.
4. Go to **Advanced** menu and point to **Reset Configuration Data**.
5. Press the space key to change the setting from **No** to **Yes**.
6. Return to **Exit** menu, point to **Exit Saving Changes**, and hit the Enter key.
7. In response to “Save configuration changes and exit now?” message, hit the Enter key. This completes the restoration operation.

4.6 POST Code Indication

POST (Power On Self Test) is the function performed by the system power-on BIOS routine that checks if the computer hardware such as memory, hard disk and keyboard has any fault. Connecting the power supply to the Equipment causes the CPU to sequentially load the contents of the BIOS ROM on the motherboard. If any fault is found, the digital LED for status indication located in front of the Equipment shows a POST code corresponding to the fault location, along with a message on the monitor screen or several beeps, thus notifying the user of a fault detection. The digital LED for status indication shows POST codes during the startup of the Equipment.

The digital LED for status indication comprises 7-segment panels and status target identification LEDs. The display content on these components may be carried over even in the standby state after the shutdown, until the mains power is disconnected (by detaching the input power cord plug from the outlet) or until the mains power is recycled (by keeping the POWER switch pressed for four seconds or longer and then pressing the same switch again).

Note: For details of the other codes such as RAS status code, see Section 7.1, “Overview of RAS Features” in this manual and *HF-W2000 Model 35/30 RAS Features Manual*.

POST codes on the digital LED for status indication are shown with the status target identification LED for BIOS (orange) turned on. The codes are represented by the upper and lower digits in hexadecimal numbers 0 through F as illustrated below.



Table 4-1 shows POST codes generated at error stops of the system startup, possible error causes, and necessary actions to be taken.

4. SPECIFICATIONS

Table 4-1 POST Codes at Error Stops, Possible Error Causes, and Actions To Be Taken

<i>POST code</i>	<i>Possible error cause and action to be taken</i>
21	Fault in main memory or fault in the CPU is suspect. Check if main memory is properly mounted.
22, 27, 38	Fault in a boot device is suspect. Check if the HDDs and the DVD drive are properly mounted.
26	Fault in the CPU is suspect.
33, 3E	Fault in an extended board is suspect. Check if the problem persists in a different slot. Read the manual of the extended device.
39	Video function is not operating normally. Check if the cable connection is correct and, when a video board is installed in the extended slot, check if it is properly mounted.
40, 54	Fault in a storage medium (e.g., HDD or USB memory) is suspect. Check if storage media are properly mounted.
43, 48, 49, 4A, 4B, 4C, 4D, 4E	Fault in a USB device is suspect. Check if the cable connections are correct and the USB devices are not faulty.
45, D0	Fault in the keyboard, the mouse, or a serial device is suspect. Check if the cable connections are correct, and check if these devices are not faulty.
4C, 4D	Fault in the keyboard or the mouse is suspect. Check if the cable connections are correct, and check if the keyboard and the mouse are not faulty.
C0	Fault in main memory is suspect. Check if main memory is properly mounted.
E0	Rotation of the power supply fan is abnormal. Check if the fan is operating normally.
E1	Rotation of the front fan is abnormal. Check if the fan is operating normally.
F2	A backup HDD is physically installed. Disconnect the power supply to the Equipment and physically deinstall the backup HDD.

4.7 Timer

The Equipment has a built-in timer based on an RTC (real-time clock) IC. The timer contains a calendar component, which continuously runs with battery backup even if the power supply is turned off.

Table 4-2 Timer Specifications

<i>Item</i>	<i>Specifications</i>
Clock	Hour, minute, second (24-hour system)
Calendar	Year, month, day
Allowance	±4 seconds per day (Note)
Battery backup	Lithium battery

Note: Reference-only value when environmental temperature is 25°C.

While the system is running, the system time is managed by the software (system program) timer called cyclic timer which updates other internal timers (also software timers). On the other hand, the built-in timer is read for time setting when the system is started up.

< NOTE >

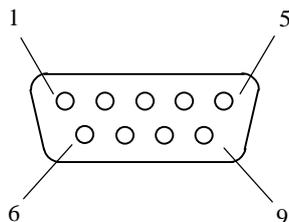
- The Equipment uses a lithium battery. When disposing of it, follow local laws and regulations whatever applicable.
- Persons other than customer engineer must not replace the lithium battery. The lithium battery replacement will reset the system time and BIOS settings.

4.8 Interface Specifications

4.8.1 Connector specifications

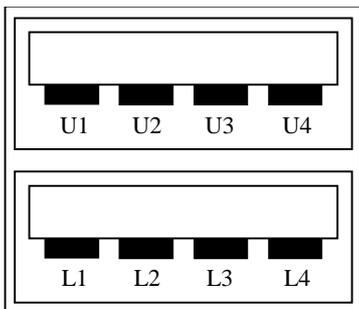
This subsection provides the specifications of the interfaces from the Equipment to external devices. For the insertion positions of each board, see Section 2.1, “External Views of Operator Access Areas”.

(1) Serial port (COM1)



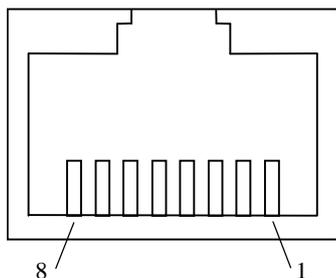
Pin #	Signal name	Pin #	Signal name
1	CD	6	DSR
2	RD	7	RTS
3	TD	8	CTS
4	DTR	9	RI
5	GND		

(2) USB port (front and rear)



Pin #	Signal name	Pin #	Signal name
U1	+5V	L1	+5V
U2	USB D0-	L2	USB D1-
U3	USB D0+	L3	USB D1+
U4	GND	L4	GND

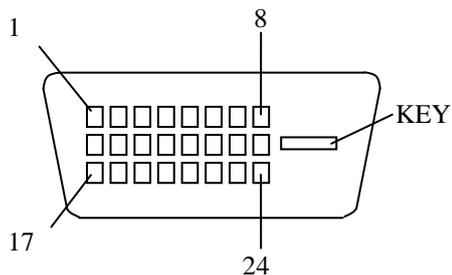
(3) LAN port (RJ-45 modular jack 8-pin)



Pin #	Signal name	
	100BASE-TX/10BASE-T	1000BASE-T
1	TX+	TRD0+
2	TX-	TRD0-
3	RX+	TRD1+
4	NC	TRD2+
5	NC	TRD2-
6	RX-	TRD1-
7	NC	TRD3+
8	NC	TRD3-

4. SPECIFICATIONS

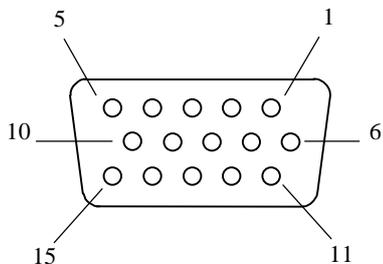
(4) Video port (DVI-D 24 pins)



Pin #	Signal name	Pin #	Signal name
1	TX2M	13	NC
2	TX2P	14	P5
3	FG	15	FG
4	NC	16	HPDETI
5	NC	17	TX0M
6	DDCCLK	18	TX0P
7	DDCDATA	19	FG
8	NC	20	NC
9	TX1M	21	NC
10	TX1P	22	FG
11	FG	23	TXCP
12	NC	24	TXCM

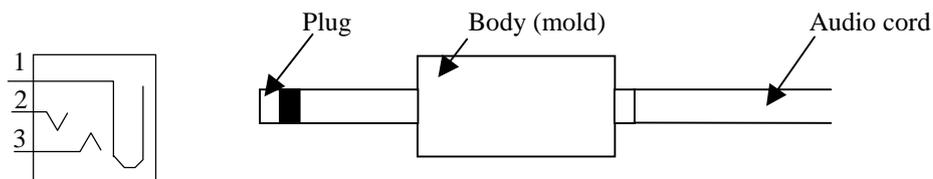
Note: This video port supports Single-Link only.

(5) Video port (Mini D-Sub 15 pins)



Pin #	Signal name	Pin #	Signal name
1	R	9	+5V
2	G	10	GND
3	B	11	NC
4	NC	12	DDCDATA
5	GND	13	HSYNC
6	R-GND	14	VSYNC
7	G-GND	15	DDCCLK
8	B-GND		

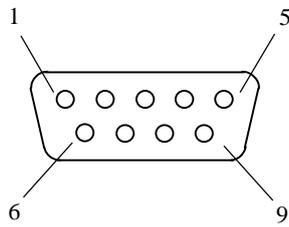
(6) Audio port: LINE IN and LINE OUT (3.5mm stereo mini jack)



Note: Use an audio cord having the body diameter less than 10 mm. If the body diameter exceeds 10 mm, LINE IN and LINE OUT cords cannot be connected at a time because their bodies interfere with each other.

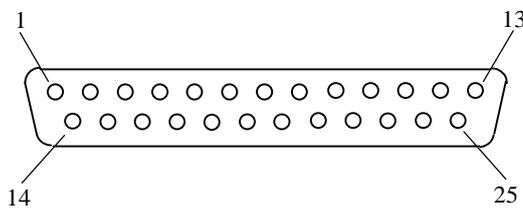
Pin #	Signal name	
	LINE IN	LINE OUT
1	AGND	AGND
2	LIN_L	LOUT_L
3	LIN_R	LOUT_R

- (7) Extended serial port (COM2) male connector (HJ-7816-11 for this connector only; HJ-7815-21 or HJ-7815-22 for this connector in combination with external control I/O port male connector) (option)



<i>Pin #</i>	<i>Signal name</i>	<i>Pin #</i>	<i>Signal name</i>
1	CD	6	DSR
2	RD	7	RTS
3	TD	8	CTS
4	DTR	9	RI
5	GND		

- (8) External control I/O port (EXT) male connector (HJ-7815-21 or HJ-7815-22 for this connector in combination with extended serial port male connector) (option)



<i>Pin #</i>	<i>Signal name</i>	<i>Pin #</i>	<i>Signal name</i>
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	RMTPWON_1/GENDI2_1		

4. SPECIFICATIONS

4.8.2 External control interface specifications

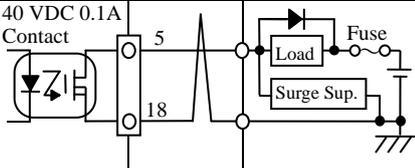
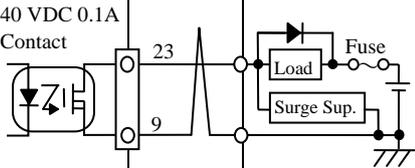
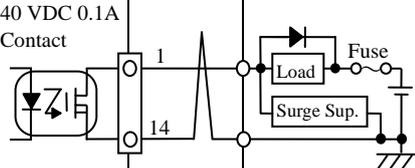
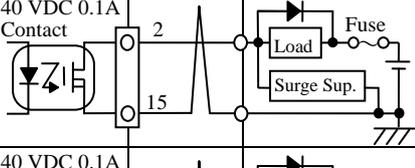
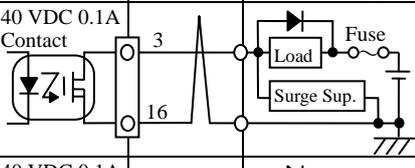
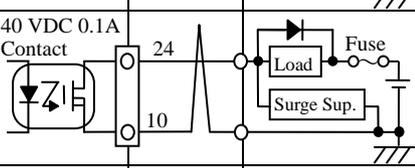
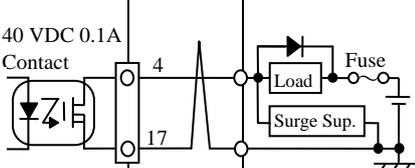
(1) Specifications of external control I/O port (EXT)

<i>Category</i>	<i>Item</i>		<i>Specifications</i>
External control input	Usage		RMTRESET, RMTSHTDN (GENDI), GNDI0, GENDI1, GENDI2 (RMTPWRON) (*1, *2)
	Electrical interface	Interface	No-voltage transistor contact
		Contact current	1 mA/point
		Applicable load	<ul style="list-style-type: none"> • Relay (gold-plated twin contacts) • Switch • Insulated open collector
External control output	Usage		CPUSTOP, WDTTO, PSDOWN, MCALL, GENDO0, GENDO1, GENDO2
	Electrical interface	Interface	Photo-MOS relay contact
		Load voltage	40 V dc max. (external power supply required)
		Load current	<ul style="list-style-type: none"> • Steady: 0.1 A max./point • Rush: 0.6 A max./point, 100 ms
		Dielectric strength	250 V ac, 1 minute
		Applicable load	<ul style="list-style-type: none"> • Relay (clamp diode required) • Buzzer • Lamp • Semiconductor

*1 RMTSHTDN and GENDI use the same contact point (switched by RAS software setting).
RMTPWRON and GENDI2 use the same contact point (switched by a jumper pin).

*2 When using RMTPWRON function, care has to be taken so that the external contact should not be subjected to noise. If the contact becomes closed for 15ms or more because of a factor such as noise during the Soft Power Off state, an inadvertent power on may result. While the OS or the BIOS is running after the power is on, the RMTPWRON function is disabled and the contact operates as GENDI2 input.

(2) List of external control I/O signals

Signal name	Connection diagram			Explanation	Contact specification	
	CPU side	Terminal #	User side		HJ-7815-21 B contact	HJ-7815-22 A contact
PSDOWN_1, PSDOWN_2	40 VDC 0.1A Contact	5 18		Indicates either the OS is shut down (standby or primary power off) or the power supply to the Equipment is disconnected.	<ul style="list-style-type: none"> • Closed at power-off (contact B). • Closed at power down. 	<ul style="list-style-type: none"> • Opened at power-off (contact A). • Opened at power down.
CPUSTOP_1, CPUSTOP_2	40 VDC 0.1A Contact	23 9		Indicates whether the CPU cannot operate normally because of extremely heavy load or the CPU is hung.	<ul style="list-style-type: none"> • Closed at power-off (contact B). • Closed at CPU stop. 	<ul style="list-style-type: none"> • Opened at power-off (contact A). • Opened at CPU stop.
MCALL_1, MCALL_2	40 VDC 0.1A Contact	1 14		Maintenance call signal. Indicates that the temperature, fan rotation or one side of mirrored disks (D model only) is abnormal.	<ul style="list-style-type: none"> • Opened at power-off (contact A). • Closed at maintenance call. 	<ul style="list-style-type: none"> • Opened at power-off (contact A). • Closed at maintenance call.
GENDO0_1, GENDO0_2	40 VDC 0.1A Contact	2 15		General-purpose output signal. The user can define the meaning of the signal on each contact of GENDO0 through GENDO2.	<ul style="list-style-type: none"> • Opened at power-off (contact A). • User-defined. 	<ul style="list-style-type: none"> • Opened at power-off (contact A). • User-defined.
GENDO1_1, GENDO1_2	40 VDC 0.1A Contact	3 16				
GENDO2_1, GENDO2_2	40 VDC 0.1A Contact	24 10				
WDTTO_1, WDTTO_2	40 VDC 0.1A Contact	4 17		Indicates timeout detection by the watchdog timer. A timeout is detected even while the OS is shut down (auxiliary power or primary power off) or the power supply to the Equipment is disconnected.	<ul style="list-style-type: none"> • Closed at power-off (contact B). • Closed at watchdog timer timeout or CPU power down. 	<ul style="list-style-type: none"> • Opened at power-off (contact A). • Opened at watchdog timer timeout or CPU power down.

(Continued on next page)

4. SPECIFICATIONS

(Continued)

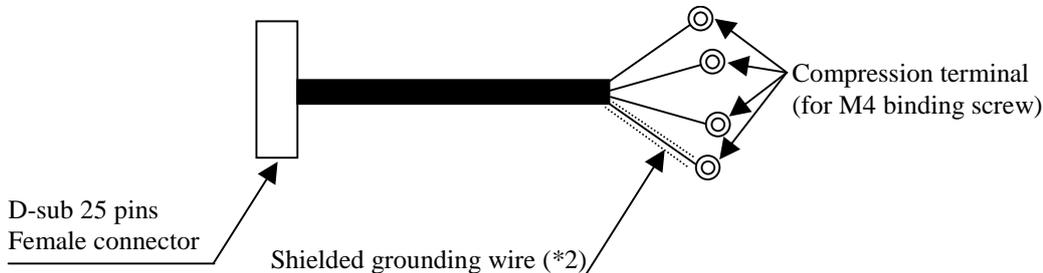
Signal name	Connection diagram			Explanation	Contact specification	
	CPU side	Terminal #	User side		HJ-7815-21 B contact	HJ-7815-22 A contact
RMTSHTDN_1 (GENDI_1), RMTSHTDN_2 (GENDI_2)	5 V (VCC) 	7 20		Shutdown request signal or general-purpose input signal. When this contact is closed, the OS will be shut down. The user can select which signal is to be used. (*1)	—	—
RMTRESET_1, RMTRESET_2	5 V (VCC) 	11 8		Reset request signal. When this contact is closed, the Equipment will be hard-reset. (*1)	—	—
GENDI0_1, GENDI0_2	5 V (VCC) 	6 22		General-purpose input signal. The user can define the meaning of the signal on each contact of GENDI0 and GENDI1.	—	—
GENDI1_1, GENDI1_2	5 V (VCC) 	12 21				
GENDI2_1 (RMTPOWERON_1), GENDI2_2 (RMTPOWERON_2)	5 V (VCC) 	13 19		General-purpose input signal. The user can define the meaning of the signal on the GENDI2 contact. Alternatively, the user can use this contact for remote power on function. (*2)	—	—

*1 RMTSHTDN and RMTRESET pairs of contacts can also be used with pulses. For use with pulses, close these pairs for at least 500 ms. Never allow such a moment when both of these pairs are closed.

*2 RMTPOWERON contact must be used with pulse input only. After closing the contact for 100ms or more, open the contact for approximately 4s or less. If shutdown is performed with this contact closed, the Equipment inadvertently restarts at the very moment of Soft Power Off. For the location of JP2 pin, see Section 5.6, “Setup for Enabling Remote Power-on Function”.

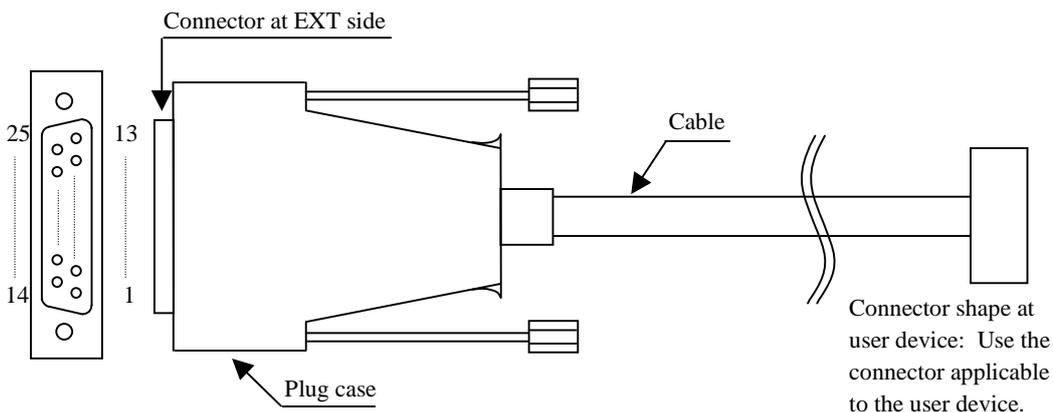
(3) Recommended cable specification for EXT interface

- a. Prepare a cable such like what is shown below for connection (model: HJ-7805-C1-XX). (XX indicates the cable length.) (*1)



- *1 The maximum cable length is 30 m.
- *2 To connect the shielded grounding wire, a dedicated shield ground stud must be provided in the vicinity.

- b. The following shows the cable specification used when the user prepares the cable.



Note: Ensure that the cable's shielded grounding wire is in contact with the plug case conductor (frame ground). Never connect the shielded grounding wire to any of the GND pins in the EXT port because all these pins are signal grounds. Otherwise, a machine failure may result.

- Specification of connector at EXT side
Connector shape: D-sub 25-pin female connector (2 rows)
- Cable specification

<i>Item</i>	<i>Specification</i>
Maximum cable length	30 m
Cable electric shield	Required and must be wired to plug case conductor (frame ground)

4. SPECIFICATIONS

4.9 Miscellaneous Requirements

(1) Maximum lengths of interface cables

The maximum lengths of interface cables connected to the Equipment are recommended as follows.

<i>No.</i>	<i>Connector name</i>	<i>Max. cable length (m)</i>	<i>Remarks</i>
1	Analog RGB video interface	3	
2	Digital video DVI-D interface	3	
3	LAN interface	100	UTP category 5e or higher
4	External control interface connector (option)	30	See 4.8.2 (3) for the cable specifications.
5	Serial interface (COM1)	15	Use a shielded cable.
6	Serial interface (COM2) (option)	15	
7	Front USB (4 ports)	3	Use a USB2.0 compatible shielded cable. Use of an extension cable may cause abnormal operation.
8	Rear USB (4 ports)	3	
9	Audio (LINE IN/LINE OUT)	2	

Ensure operation before use. The device may not always be compatible.

CHAPTER 5 INSPECTION AND MAINTENANCE

5.1 Periodical Maintenance

NOTICE

- When you intend to move the Equipment, first shut down the OS, then disconnect the power cord plug from the outlet, and wait at least one minute. Otherwise, failure of hardware such as HDD may result.
- When transporting or carrying the Equipment, repack it using the packing materials that came with it and are not broken or dented. Transporting or carrying the Equipment either packed by other packing materials or repacked by broken or dented packing materials may damage the Equipment.

(1) Cleaning the dust filter

NOTICE

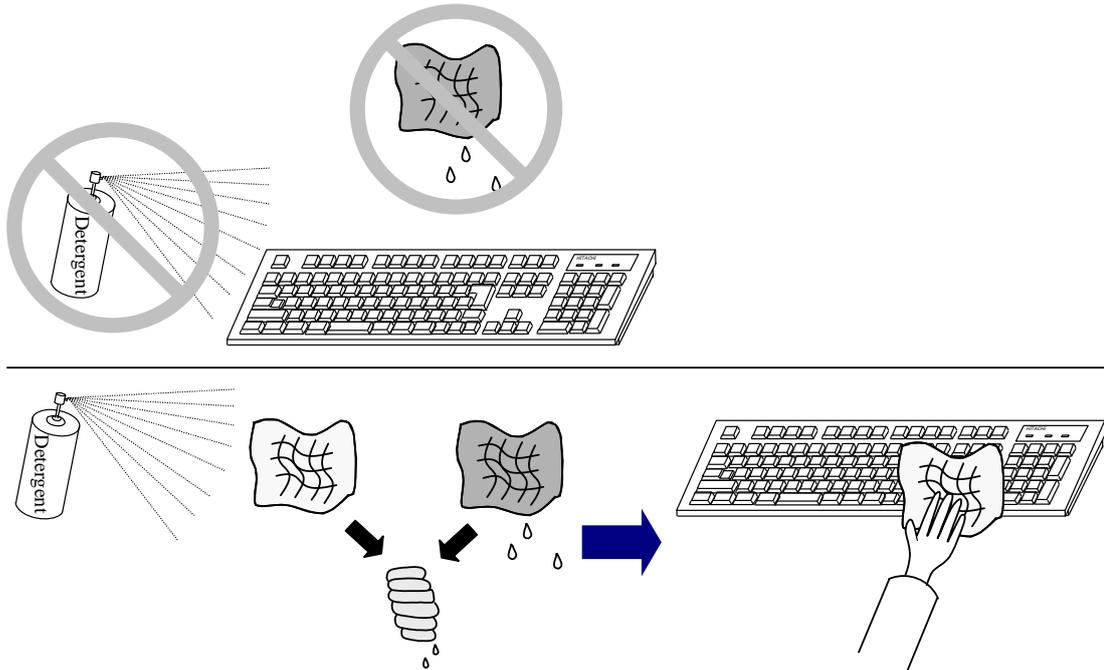
- When you have washed the dust filter, wait until the dust filter is completely dried and then put it back to the Equipment. Operating the Equipment with a wet dust filter may cause a failure.
- You may wash the dust filter with detergent diluted with water, in which case be sure to use neutral detergent and cleanse it until the residue detergent is completely washed away. Otherwise, the performance of the dust filter may be lost.

- Frequency
Once every one to three months, depending on the amount of dust on the filter.
- Method
 1. Shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute.
 2. Detach the front panel, take out the dust filter, and tap the dust filter or wash it with water. When you have washed the dust filter, wait until the dust filter is completely dried. Thereafter, put it back to the Equipment and reattach the front panel.

5. INSPECTION AND MAINTENANCE

(2) Cleaning the keyboard

- **Frequency**
Once every one to three months, depending on the amount of dust on the keyboard.
- **Method**
Shut down the OS, disconnect the power cord plug from the outlet, wait at least one minute, and disconnect the keyboard cable from the Equipment. Then, clean the keyboard following the rules below.



- Use a dry cloth, or a well wrung out cloth moistened with water or neutral detergent.
- When using a detergent, do not directly spray it on the keyboard.
- Do not let water drip onto or into the keyboard.
- Do not use a wet or moistened cloth that is not wrung out enough.
- When using a detergent, read notes on usage in advance.

Another way to clean the keyboard is to cover the entire keyboard with a clean, soft cloth such as gauze, and spray a neutral detergent on it. Leave the cloth for several minutes. Then, uncover the keyboard and wipe it with a new, dry cloth.

< NOTE >

When the USB keyboard cable is loosely connected to the Equipment, the keyboard may not be recognized correctly or the Equipment may not start up correctly. In such a case, ensure the connection of the keyboard cable to the Equipment.

5.2 Periodical Checkout

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

<i>Checkout Item</i>	<i>Frequency</i>	<i>Remarks</i>
Collection of logs	Once per year	
Inspection and cleaning <ul style="list-style-type: none"> • Inspection and cleaning on the exterior and interior of the Equipment • Inspection on fan rotation and removal of dust from the fan • Removal of foreign substance from the interior of the cabinet • Others 	Once per year	
Replacement of the dust filter	Once per year	
Measurement of the power supply voltage	Once per year	
Confirmation of normal operation <ul style="list-style-type: none"> • Functions of switches and lamps • System functions using test programs 	Once per year	
Replacement of consumable parts	As required	
Periodical maintenance <ul style="list-style-type: none"> • Cleaning the keyboard • Cleaning the dust filter 	Once per one to three months	See Section 5.1, "Periodical Maintenance."

5.3 Replacement of Consumable Parts

NOTICE

Do not use consumable parts beyond the recommended interval. Deterioration of parts may cause failure.

Parts deteriorate and become worn off when they are used over a period of time. Replace the parts listed below at certain intervals. These parts are provided on a chargeable basis.

<i>Part name</i>	<i>Recommended replacement interval</i>	<i>Remarks</i>
HDD	2 years (*)	
DVD drive	4 years	
Dust filter	1 year	Use without replacement may cause failure or short service life of the Equipment.

* Based on the assumption that the HDD is used 24 hours per day. Even if your average usage is less than 24 hours a day, replacement is necessary when usage exceeds 4 years or total powered time of 20,000 hours, whichever comes first. In addition, it is highly recommended that you regularly back up your files in your daily operation so that you can quickly recover from unlikely errors in your file contents.

5. INSPECTION AND MAINTENANCE

Notes:

1. The recommended replacement intervals listed above are valid when the Equipment is operating at an average ambient temperature of 25°C or less. When the average ambient temperature exceeds 25°C, these replacement intervals may be shortened.
2. This Equipment uses a lithium battery. When disposing of the battery, follow all local regulations.
3. In the event of repair, there may be a case of replacement with functionally compatible device or component.
4. Environmental conditions for the corrosion of this Equipment fall into the definition of JEITA IT-1004A Class A (temperature of 25°C and humidity of 50%).
5. If the repair of this Equipment is performed by a third party, the functionality of this Equipment will not be guaranteed.
6. There are cases when zinc whiskers cause an adverse effect on the electrical device. Ensure that tin electroplating should not be used on the Equipment or a device near the Equipment.
 - Reference: JEITA Technical Report ITR-1001 “Guideline of Facilities and Equipment for Information Systems” published by Japan Electronics and Information Technology Industries Association (JEITA)
 - Location liable to zinc whisker formation: Environment where tin electroplating is applied, e.g., floor tile, stringer, strut, and anti-seismic support bracket.
 - Effect: Electrical short circuit on a printed circuit board or connector terminal due to contamination with electroconductive zinc whiskers. Such zinc whiskers may be formed under the raised floor, then somehow released in the room air, and finally get into the Equipment or a device with the ventilation air. Because the resulting symptom looks different depending on the affected area, it is difficult to identify any cause and likely to be processed as a transient error. For this reason, failures caused by zinc whiskers tend to require longer time in finding out the root cause.

5.4 Parts Replacement

5.4.1 Inserting/extracting extended board

 **WARNING**

Hazardous voltage. Before you replace an extended board, shut down the OS, and disconnect the power cord plug from the outlet. Make sure you wait at least one minute before detaching the cover of the Equipment. Otherwise, you may get an electric shock or a fire may occur.

 **CAUTION**

During work, do not touch the internal parts directly with bare hands. Otherwise, you may get burned because the parts are hot. In addition, such action may cause damage to the internal parts.

NOTICE

Be sure to disconnect the external cables connected to the Equipment before you insert or extract an extended board. Failure to do so may cause damage to the Equipment.

5.4.1.1 Before inserting/extracting extended board

- Be sure to shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute before work.
- Reserve the specified service clearance (see Subsection 1.2.2, “Installation conditions”) and work in a flat place.
- Wear cotton gloves before starting insertion/extraction work.
- When tightening or loosening a screw, be careful not to crush the screw head. Use a Phillips screwdriver of JIS (Japanese Industrial Standards) No.2 suitable for the size and the type of the screw head.
- When tightening a screw, be careful not to apply excessive force for preventing destruction of the screw mountain. Tighten the screw straight into the screw hole.

5. INSPECTION AND MAINTENANCE

5.4.1.2 Extended board types

The Equipment is equipped with a total of three extended slots consisting of two PCI-Express slots and one PCI slot.

<i>Extended slot</i>	<i>Extended board type</i>	
	<i>HJ-2035</i>	<i>HJ-2030</i>
Slot 1	Full-height short-sized PCI (*1)	Low-profile short-sized PCI (*1)
Slot 2	Full-height short-sized ×1 speed PCI-Express (*2)	Low-profile short-sized ×1 speed PCI-Express (*2)
Slot 3	Full-height short-sized ×8 speed PCI-Express (*2)	Low-profile short-sized ×8 speed PCI-Express (*2)

*1 PCI board in compliance with PCI Local Bus Specification Revision 2.1.

*2 PCI-Express board in compliance with PCI Express Base Specification Revision 1.1.

The dimensions of short-sized PCI-Express/PCI boards are as follows. “Height” includes the connector part.

- PCI-Express board
 - Full-height short size: 167.65 × 111.15 mm
 - Low-profile short size: 167.65 × 68.9 mm
- PCI board (excluding retainers)
 - Full-height short size: 174.63 × 106.68 mm
 - Low-profile short size: 119.9 × 64.4 mm

Note 1: It is the user’s responsibility to keep the temperature rise of the extended board (PCI-Express/PCI board) procured by the user within the specification.

Note 2: Certain hardware options are out of the scope of VCCI, FCC, CE marking or CCC. For details, consult the customer service representative.

< NOTE >

- Limitation of maximum current for a combination of USB ports and extended board slots:

<i>DC output</i>	<i>3.3V</i>	<i>5V</i>	<i>12V</i>	<i>-12V</i>
Maximum current (A) for a combination of up to eight USB ports and up to three extended board slots	3.0	5.0	1.0	0.1

Please follow the Limitation of maximum current for a combination of USB and extended board slots. And the Limitation of maximum current on each device should be as shown below.

Care has to be taken so that the rush current at the moment of connecting to each device should not exceed maximum current. Otherwise, the overcurrent protection circuit may turn on and disable the device.

- Limitation of maximum current on each USB port:

Voltage	5V
Maximum current	0.5A/port

- Limitation of maximum current on extended slot 1 (PCI slot):

Voltage	3.3V	5V
Maximum current	2.5A	2.5A

- Limitation of maximum current on extended slot 2 (PCI Express x1 slot):

Voltage	3.3V
Maximum current	2.5A

- Limitation of maximum current on extended slot 3 (PCI Express x8 slot):

①HJ-2035:

Voltage	3.3V
Maximum current	2.5A

②HJ-2030:(*1)

Voltage	3.3V	12V
Maximum current	2.5A	0.5A

*1 The upper limit of the power consumption of 3.3 V and 12V, please do not exceed 10W

5. INSPECTION AND MAINTENANCE

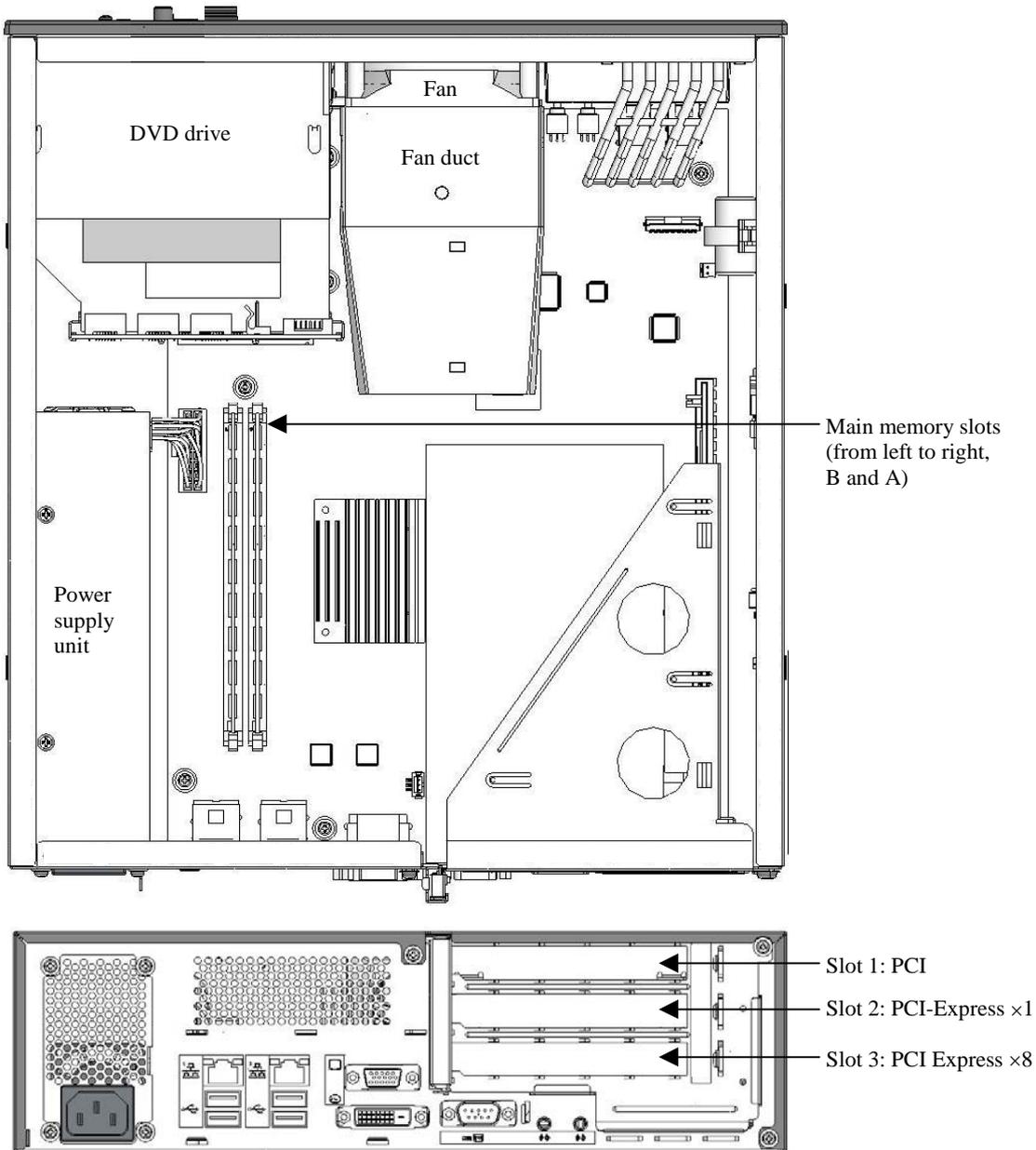


Figure 5-1 Extended Board Types and Mounting Positions on HJ-2035

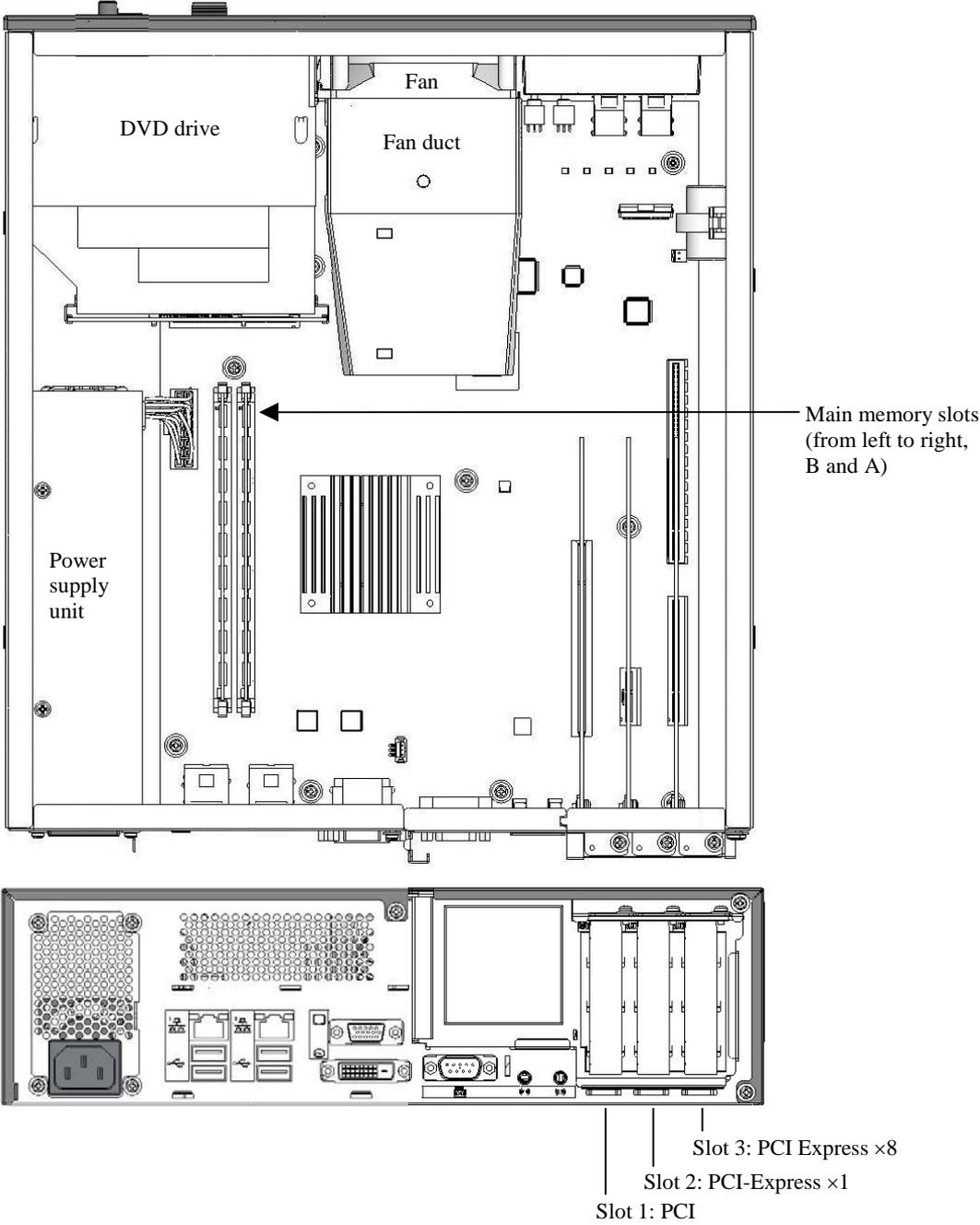


Figure 5-2 Extended Board Types and Mounting Positions on HJ-2030

5. INSPECTION AND MAINTENANCE

5.4.1.3 Inserting/extracting extended board on HJ-2035

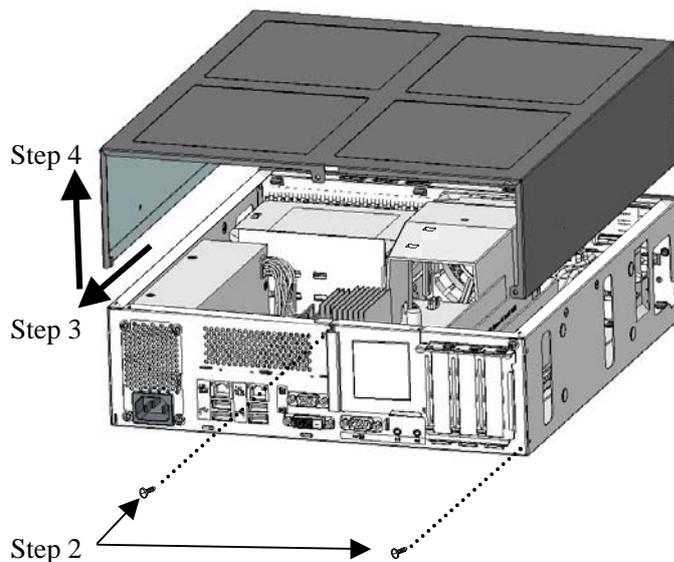
CAUTION

- Do not insert your fingers inside the cover of the Equipment when you reattach it. Otherwise, you may pinch your fingers.
- Pay attention not to get your fingers injured by protrusions in the back of the Equipment.

(1) Inserting an extended board

(a) Unmounting the cover of the Equipment

1. If the Equipment is vertically placed, detach the vertical stand according to Subsection 5.4.4, “Detaching/attaching vertical stand.”
2. Remove the two fixing screws in the back of the Equipment.
3. Slide the cover of the Equipment backward.
4. Lift and unmount the cover of the Equipment.



Note: Although the specific model illustrated above is HJ-2030, the work instructions in the figure commonly apply to HJ-2035, and HJ-2030.

Figure 5-3 Unmounting the Cover of the Equipment

(b) Detaching the riser unit

1. Referring to Figure 5-4, loosen and remove the screw fixing the riser unit in the back of the Equipment.
2. Referring to Figure 5-5, hook your fingers in the grills on top of the riser unit. Then, while holding down the Equipment by the other hand, pull out the riser unit slowly and vertically.

< NOTE >

When you reattach the riser unit, also refer to Figure 5-6.

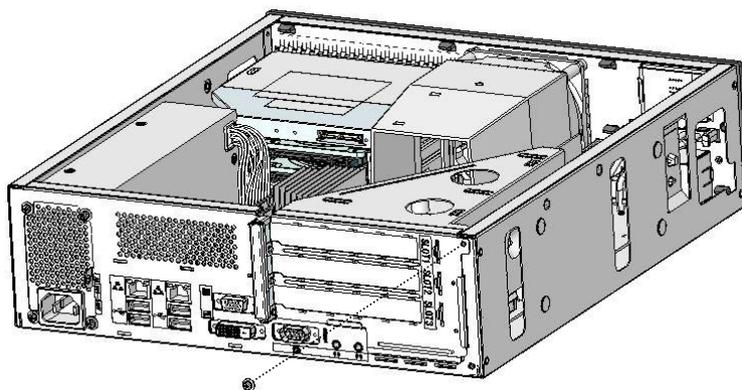


Figure 5-4 Removing the Screw Fixing the Riser Unit on HJ-2035

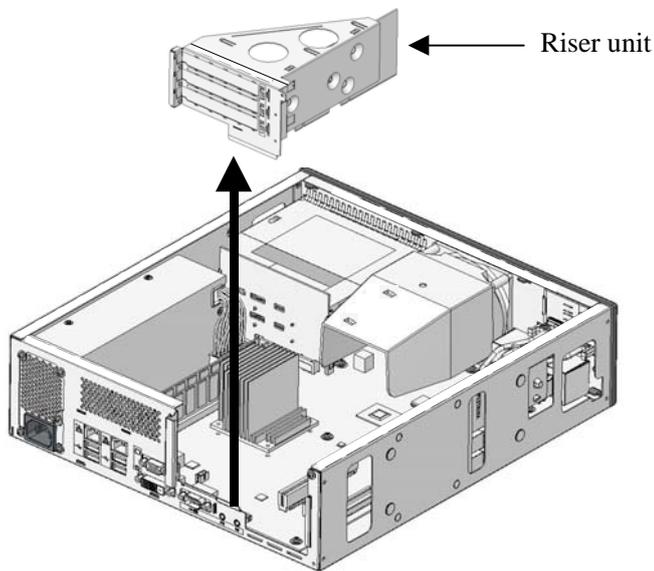
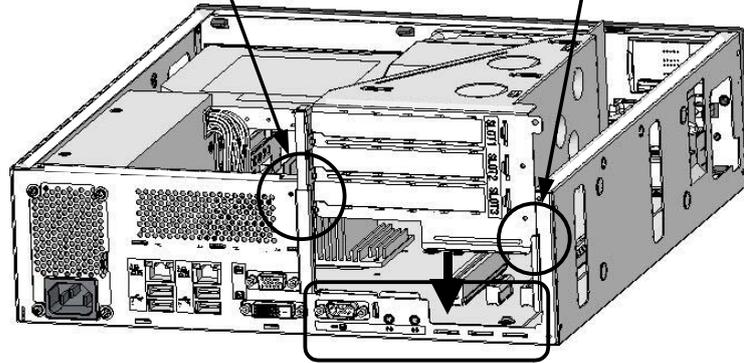
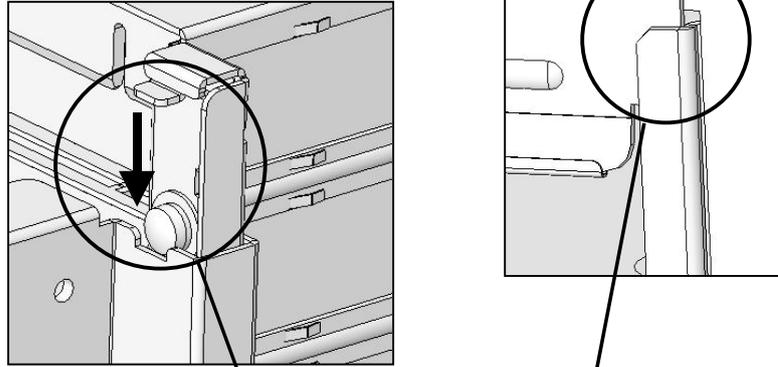


Figure 5-5 Detaching the Riser Unit on HJ-2035

5. INSPECTION AND MAINTENANCE

Insert the end plate edge of the riser unit into the mating groove in the back of the Equipment chassis.

Fit the stopper of the riser unit into the mating notch on top of the bend section in the back of the Equipment chassis.



Fit the end plate bottom of the riser unit alternately into the mating blade in the back of the Equipment chassis.

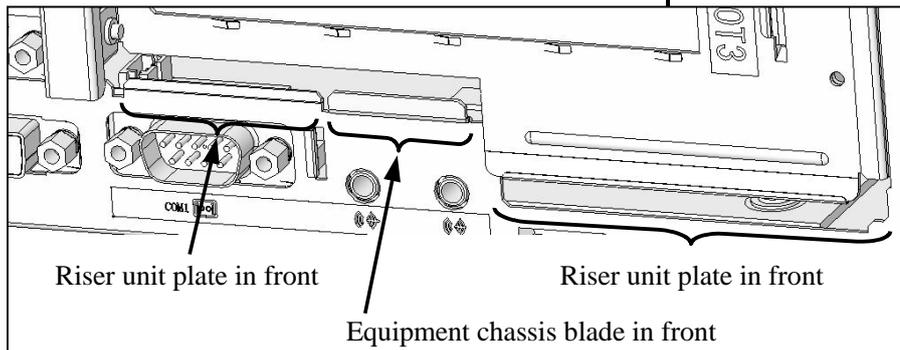


Figure 5-6 Reattaching the Riser Unit on HJ-2035

(c) Detaching the stopping panel from the target slot

Unscrew the stopping panel from the target slot and pull it out. Keep the detached stopping panel for future use.

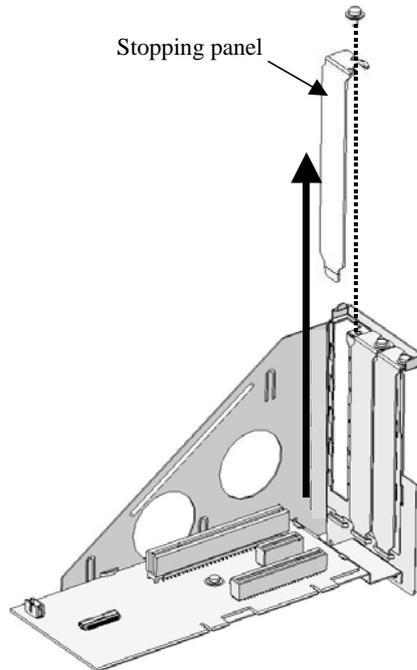


Figure 5-7 Detaching the Stopping Panel from the Target Slot on HJ-2035

5. INSPECTION AND MAINTENANCE

(d) Inserting an extended board

Insert an extended board into the target slot by pushing both ends of the board directly from above. Then, insert the extended board completely by pushing its connector part directly from above. Finally, fix the extended board to the riser unit with the screw removed in the previous step.

When you finish all of these actions, restore the riser unit and the cover of the Equipment by reversing the order of detachment.

< NOTE >

- Be sure to preserve the stopping panel removed as a result of inserting an extended board.
- When an extended board is inserted, the adjacent board may loosen. Ensure that the adjacent board is firmly fixed.

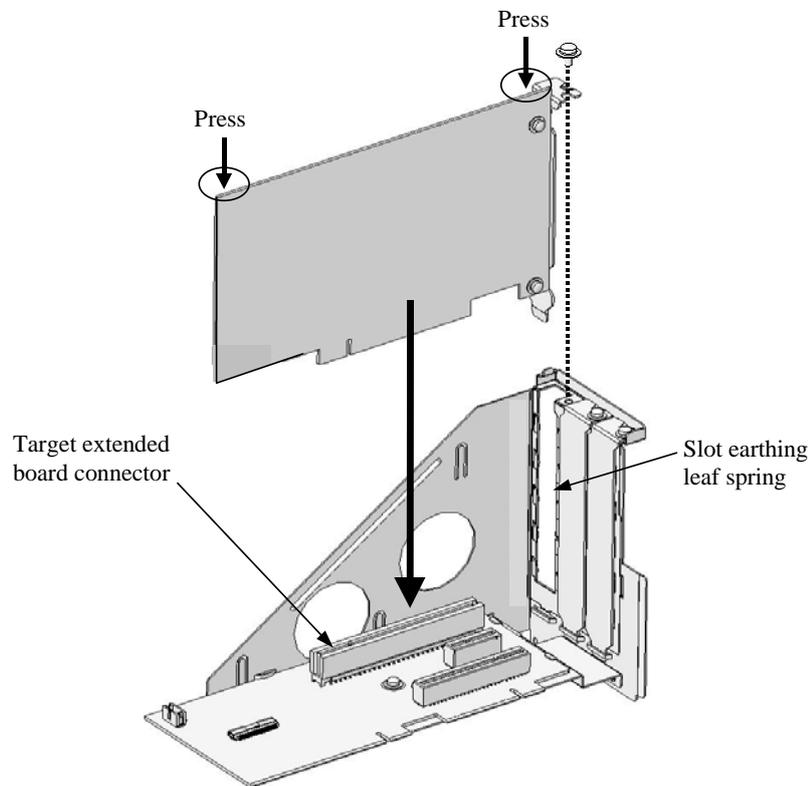


Figure 5-8 Inserting an Extended Board on HJ-2035

(2) Extracting an extended board

⚠ CAUTION

If you happened to bend the blade of slot earthing leaf spring while extracting an extended board, carefully restore the shape of the blade, paying attention not to hurt your hand or fingers on the sharp blade of the leaf spring.

NOTICE

Be sure to reattach a stopping panel to an unused slot from which an extended board is extracted. If the Equipment is used with an exposed unused slot, a machine failure may result.

Extract an extended board by reversing the order of “(1) Inserting an extended board” in this subsection.

< NOTE >

When you have difficulty in extracting an extended board with its panel caught by the blade of the slot earthing leaf spring, do not pull forcibly.

5.4.1.4 Inserting/extracting extended board on HJ-2030

⚠ CAUTION

- Do not insert your fingers inside the cover of the Equipment when you reattach it. Otherwise, you may pinch your fingers.
- Pay attention not to get your fingers injured by protrusions in the back of the Equipment.

If the Equipment is vertically placed, first detach the vertical stand according to Subsection 5.4.4, “Detaching/attaching vertical stand” and then follow the steps below.

(1) Inserting an extended board

(a) Unmounting the cover of the Equipment

Do the steps in (1) (a) of Subsection 5.4.1.3, “Inserting/extracting extended board on HJ-2035.”

5. INSPECTION AND MAINTENANCE

(b) Detaching the low-profile bracket

Loosen and remove the screw fixing the low-profile bracket in the back of the Equipment and then detach the low-profile bracket.

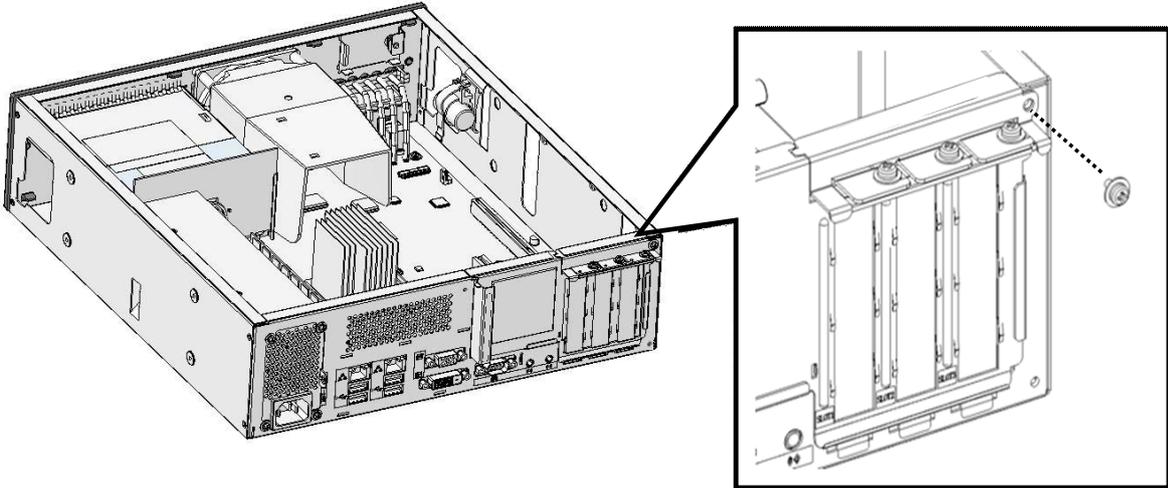


Figure 5-9 Detaching the Low-profile Bracket on HJ-2030

(c) Detaching the stopping panel from the target slot

Unscrew the stopping panel from the target slot and pull it out. Keep the detached stopping panel for future use.

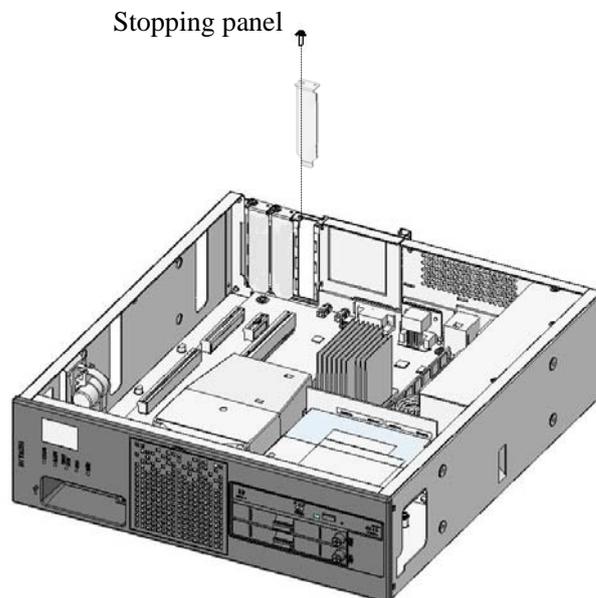


Figure 5-10 Detaching the Stopping Panel from the Target Slot on HJ-2030

(d) Inserting an extended board

Insert an extended board into the target slot by pushing both ends of the board directly from above. Then, insert the extended board completely by pushing its connector part directly from above. Finally, fix the extended board to the Equipment with the screw removed in the previous step.

When you finish all of these actions, restore the low-profile bracket and the cover of the Equipment by reversing the order of detachment.

< NOTE >

- Be sure to preserve the stopping panel removed as a result of inserting an extended board.
- When an extended board is inserted, the adjacent board may loosen. Ensure that the adjacent board is firmly fixed.

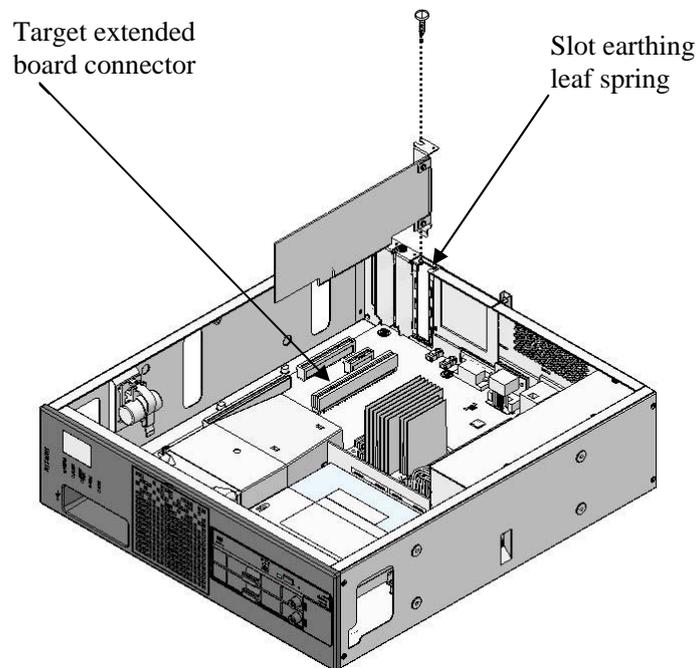


Figure 5-11 Inserting an Extended Board on HJ-2030

5. INSPECTION AND MAINTENANCE

(2) Extracting an extended board

CAUTION

If you happened to bend the blade of slot earthing leaf spring while extracting an extended board, carefully restore the shape of the blade, paying attention not to hurt your hand or fingers on the sharp blade of the leaf spring.

NOTICE

Be sure to reattach a stopping panel to an unused slot from which an extended board is extracted. If the Equipment is used with an exposed unused slot, a machine failure may result.

Extract an extended board by reversing the order of “(1) Inserting an extended board” in this subsection.

< NOTE >

When you have difficulty in extracting an extended board with its panel caught by the blade of the slot earthing leaf spring, do not pull forcibly.

5.4.2 Inserting/extracting main memory

 **WARNING**

- Hazardous voltage. Before you replace an main memory, shut down the OS, and disconnect the power cord plug from the outlet. Make sure you wait at least one minute before detaching the cover of the Equipment. Otherwise, you may get an electric shock or a fire may occur.
- Hazardous voltage. Do not remove the power supply unit. Otherwise, death or serious injury due to electric shock may result.
- Hazardous voltage. Do not open the cover of the power supply unit. Otherwise, death or serious injury due to electric shock may result.

 **CAUTION**

- During work, do not touch the internal parts directly with bare hands. Otherwise, you may get burned because the parts are hot. In addition, such action may cause damage to the internal parts.
- Do not insert your fingers inside the cover of the Equipment when you reattach it. Otherwise, you may pinch your fingers.

NOTICE

- Be sure to disconnect the external cables connected to the Equipment before you insert or extract main memory. Failure to do so may cause damage to the Equipment.
- Main memory and memory sockets have directivity. Be sure to engage them in the right direction. Otherwise, a failure may result.
- This Equipment accepts a main memory board in Slot A only or main memory boards of the same capacity in Slot A and Slot B. Insert a main memory board to comply with this rule, or main memory may become unrecognizable.

5. INSPECTION AND MAINTENANCE

5.4.2.1 Before inserting/extracting main memory

- Be sure to shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute before work.
- Reserve the specified service clearance (see Subsection 1.2.2, “Installation conditions”) and work in a flat place.
- Wear cotton gloves before starting insertion/extraction work.
- When tightening or loosening a screw, be careful not to crush the screw head. Use a Phillips screwdriver of JIS No.2 suitable for the size and the type of the screw head.
- When tightening a screw, be careful not to apply excessive force for preventing destruction of the screw mountain. Tighten the screw straight into the screw hole.
- For positions of main memory slots, see Figure 5-1, “Extended Board Types and Mounting Positions on HJ-2035” and Figure 5-2, “Extended Board Types and Mounting Positions on HJ-2030.”

5.4.2.2 Inserting/extracting main memory

(1) Inserting main memory

(a) Unmounting the cover of the Equipment

Unmount the cover of the Equipment according to the procedure in “(1) (a) Unmounting the cover of the Equipment” in Subsection 5.4.1.3, “Inserting/extracting extended board on HJ-2035.” This procedure also applies to unmounting the cover of the Equipment on HJ-2030.

(b) Inserting main memory

Fit the main memory board into the memory socket. Then, press down the memory board straight into the memory socket. When the memory board is fully inserted, you will hear a click.

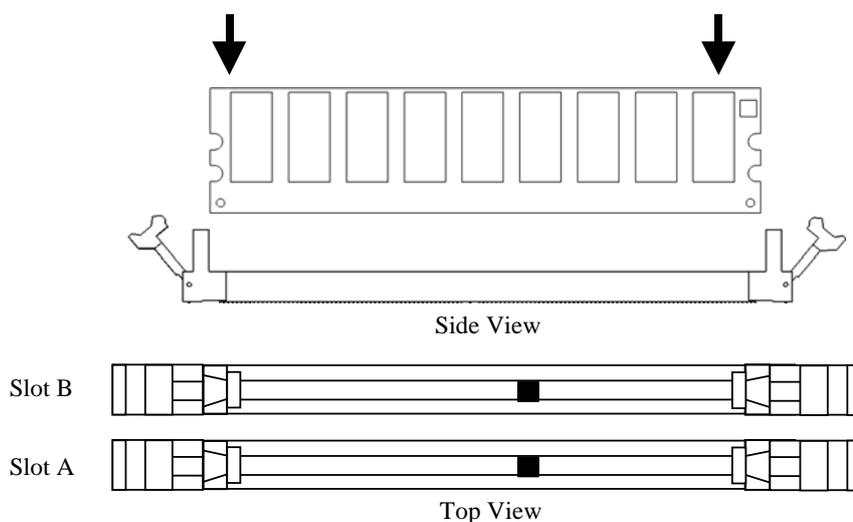


Figure 5-12 Inserting Main Memory

< NOTE >

Install a main memory board in Slot A only or install main memory boards of the same capacity in Slot A and Slot B. On this Equipment, only the following combinations are allowed.

<i>Slot A</i>	<i>Slot B</i>	<i>Total</i>	<i>Main memory model</i>
1 GB	-	1 GB	HJ-7712-10
1 GB	1 GB	2 GB	HJ-7712-20
4 GB	-	4 GB	HJ-7712-40
2 GB	2 GB	4 GB	HJ-7712-41
4 GB	4 GB	8 GB	HJ-7712-80

(*1) When you add more main memories, please change a memory to build more for the main memory which you have already used.

Upgrade from 1GB to 2GB with total capacity: Use HJ-7712-20

Upgrade from 2GB to 4GB with total capacity: Use HJ-7712-41

Upgrade from 4GB to 8GB with total capacity: Use HJ-7712-80

In addition, in the case of the exchanging, you remove the main memory which you have already implemented in the same way, and, please change it.

Please refer to "5.4.2.2 (1) Inserting main memory ", "5.4.2.2 (2) Extracting main memory " for the exchange.

(*2) About total 4GB in capacity, slot configuration varies according to shipment time.

(c) Remounting the cover of the Equipment

Remount the cover of the Equipment by reversing the procedure referenced in (a) above.

(2) Extracting main memory

Extract a main memory board by reversing the order of "(1) Inserting main memory" in this subsection.

5.4.2.3 After inserting/extracting main memory

Reassignment of memory dump collection:

When the capacity of main memory has been changed, reassignment of memory dump collection is necessary. For more information, see Subsection 7.3.4, "Flow of actions on altered settings for saving memory dump."

5. INSPECTION AND MAINTENANCE

5.4.3 Detaching/attaching hard disk drive (HDD)

CAUTION

- Be sure to shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute before you detach or attach an HDD on D Model (if you intend replacement while the Equipment power is off) or A Model. Failure to do so may cause an electric shock or a machine failure.
- To avoid finger injury while detaching/attaching an HDD, pay attention not to get your fingers caught by any protrusion.
- When detaching/attaching an HDD, check out the target drive bay number. If you attach a new HDD to a wrong drive bay, the Equipment may not start or the data may be lost because of inconsistency of the configuration information.

NOTICE

- Pay attention not to apply shock to the replacing HDD and the replaced HDD during work, whether installed or not installed on the Equipment. When not installed, place each HDD on a shock-absorbing material such as antistatic cushion, even temporarily. Direct placement on a hard surface such as desktop may cause damage, data corruption, or shortening of service life due to shock.
- Insert the HDD firmly and precisely. A loose contact or a missing screw will cause a failure.
- While the HDD is powered, never attempt to unscrew and hot-plug the HDD. Otherwise, a machine failure or HDD failure may result.
- The HDD detachment/attachment must be limited to the least, e.g., replacement in the event of a failure. Frequent detachment/attachment may cause damage to the Equipment.
- On D Model, also observe the following:
 - Do not altogether replace the two HDDs in RAID1 configuration.
 - Since each D Model has its own RAID1 configuration information (e.g., serial number), you cannot swap HDDs even between D Models. 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 D Models, manage use and inventory of HDDs so that they are not inadvertently mixed.
 - Never remove the HDD if the corresponding HDD status lamp is off. Otherwise, the stored data will be destroyed.
 - Do not remove or insert an HDD when the “Hardware status” window cannot be checked, for example, immediately after the OS starts. Otherwise, a machine failure or HDD failure may result. When you remove or insert an HDD while the power is on, make sure you put the HDD into the OFFLINE state in the “Hardware status” window before removing or inserting the HDD.

NOTICE

- On B Model, also observe the following:
 - Do not replace two HDDs at the same time except for newly build a RAID1 system.
 - When software RAID1 is used, you cannot replace an HDD while the power is on. To replace an HDD, always make sure the power is off.

5.4.3.1 Before detaching/attaching HDD

- Reserve the specified service clearance (see Subsection 1.2.2, “Installation conditions”) and work in a flat place.
- When tightening or loosening a screw, be careful not to crush the screw head. Use a Phillips screwdriver of JIS No. 2 suitable for the size and the type of the screw head. Where security screws are optionally in place, use a security hexlobe screwdriver size T10.
- When tightening a screw, be careful not to apply excessive force for preventing destruction of the screw mountain. Tighten the screw straight into the screw hole.

5.4.3.2 Detaching/attaching HDD

When detaching/attaching an HDD, pay attention to the following:

- Pull out or insert slowly not to apply shock to the HDD.
- Be careful not to apply excessive force to the rear connector of the HDD case.

(1) On D Model while the Equipment power is on

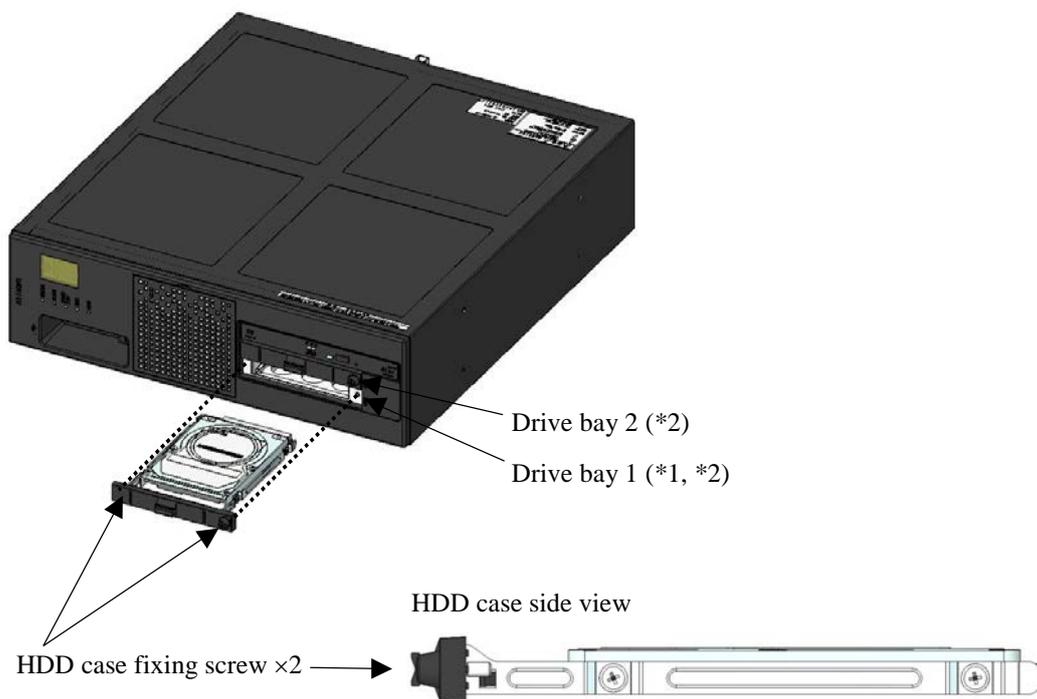
Detach or attach an HDD according to Subsection 9.5.3.2, “Replacing an HDD in RAID1 while the Equipment power is on.”

5. INSPECTION AND MAINTENANCE

(2) On D Model or A Model while the Equipment power is off

1. Shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute.
2. Loosen the two front screws fixing the target HDD case.
3. Holding the front handle of the HDD case, pull out the HDD case halfway.
4. Holding the base part of the HDD case by the other hand, remove the HDD case completely.

To attach an HDD, reverse the order of the above steps. Pay attention to avoid physical shock when you press-fit the rear connector of the HDD case into the mating connector on the chassis.



*1 On A Model, install the system disk to drive bay 1. Make sure of the destination drive bay number for the system disk because the OS can start up even if the system disk is installed in drive bay 2.

*2 On D Model, install the system disks to drive bay 1 and drive bay 2.

Figure 5-13 Detaching/Attaching HDD on D or A Model While Main Power Is Off

5.4.4 Detaching/attaching vertical stand

⚠ CAUTION

- Be sure to shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute before you detach or attach the vertical stand.
- Falling or dropping of the Equipment vertically placed on the desktop may cause injury. Be sure to attach the vertical stand accompanying the Equipment and place the Equipment with the vertical stand on a level surface.

This Equipment optionally provides the vertical stand including the fixing screws. When detaching or attaching the vertical stand, pay attention to the following:

- Do not apply shock to the Equipment.
- Be sure to shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute before work.
- Disconnect all the cables connected to the Equipment.
- Reserve the maintenance area, and work in a flat place. (See Subsection 1.2.2, “Installation conditions.”)
- When tightening or loosening a screw, be careful not to crush the screw head. Use a Phillips screwdriver of JIS No.2 suitable for the size of the screw head.
- When tightening a screw, be careful not to apply excessive force for preventing destruction of the screw mountain. Tighten the screw straight into the screw hole.

(1) Attaching the vertical stand

Attach the vertical stand to the Equipment securely, with the screws provided as part of the vertical stand.

(2) Detaching the vertical stand

Detach the vertical stand by reversing the order of attachment. Keep the detached vertical stand and screws for future use.

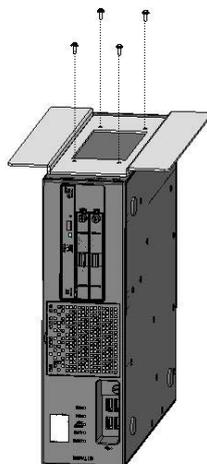


Figure 5-14 Detaching/Attaching Vertical Stand

5.5 Replacing Lithium Battery

WARNING

Hazardous voltage. Be sure to shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute before detaching the cover of the Equipment. Otherwise, you may get an electric shock or a fire may occur.

CAUTION

- This Equipment uses a lithium battery. When replacing the battery, be sure to replace with the type specified by the Manufacturer. Replacement with a wrong type may cause the battery to explode, catch fire, rupture, generate heat, leak electrolyte, or produce gas.
- During work, do not touch the internal parts directly with bare hands. Otherwise, you may get burned because the parts are hot. In addition, such action may cause damage to the internal parts.
- Do not insert your fingers inside the cover of the Equipment when you reattach it. Otherwise, you may pinch your fingers.

< NOTE >

- Persons other than customer engineer must not replace the lithium battery. The lithium battery replacement will reset the system time and BIOS settings.
- The lithium battery replacement resets the BIOS settings. Take notes of the BIOS setup contents beforehand, and manually reenter the BIOS setup contents after the lithium battery replacement. The next OS startup after the lithium battery replacement will include a three-second reset and require a longer startup time than usual.
- When loading the lithium battery to the battery holder, pay attention not to apply shock. Damage on the lithium battery due to shock may cause leakage of electrolyte or generation of gas.
- When disposing of a lithium battery, follow local laws and regulations whatever applicable.

5.5.1 Preparation

- Be sure to shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute before work.
- Reserve the specified service clearance (see Subsection 1.2.2, “Installation conditions”) and work in a flat place.
- Wear cotton gloves before starting the replacement work.

5.5.2 Replacing lithium battery

1. Unmount the cover of the Equipment according to the procedure in “(1) (a) Unmounting the cover of the Equipment” in Subsection 5.4.1.3, “Inserting/extracting extended board on HJ-2035.” This procedure also applies to unmounting the cover of the Equipment on HJ-2030.
2. Referring to Figure 5-15 below, unload the lithium battery from the battery holder.
3. Disconnect the BAT cable connectors of the unloaded lithium battery from the mating connector terminals on the motherboard.
4. Connect the BAT cable connectors of a new lithium battery to the mating connector terminals on the motherboard.
5. Load the new lithium battery into the battery holder by reversing step 2.
6. Remount the cover of the Equipment by reversing the procedure referenced in step 1.

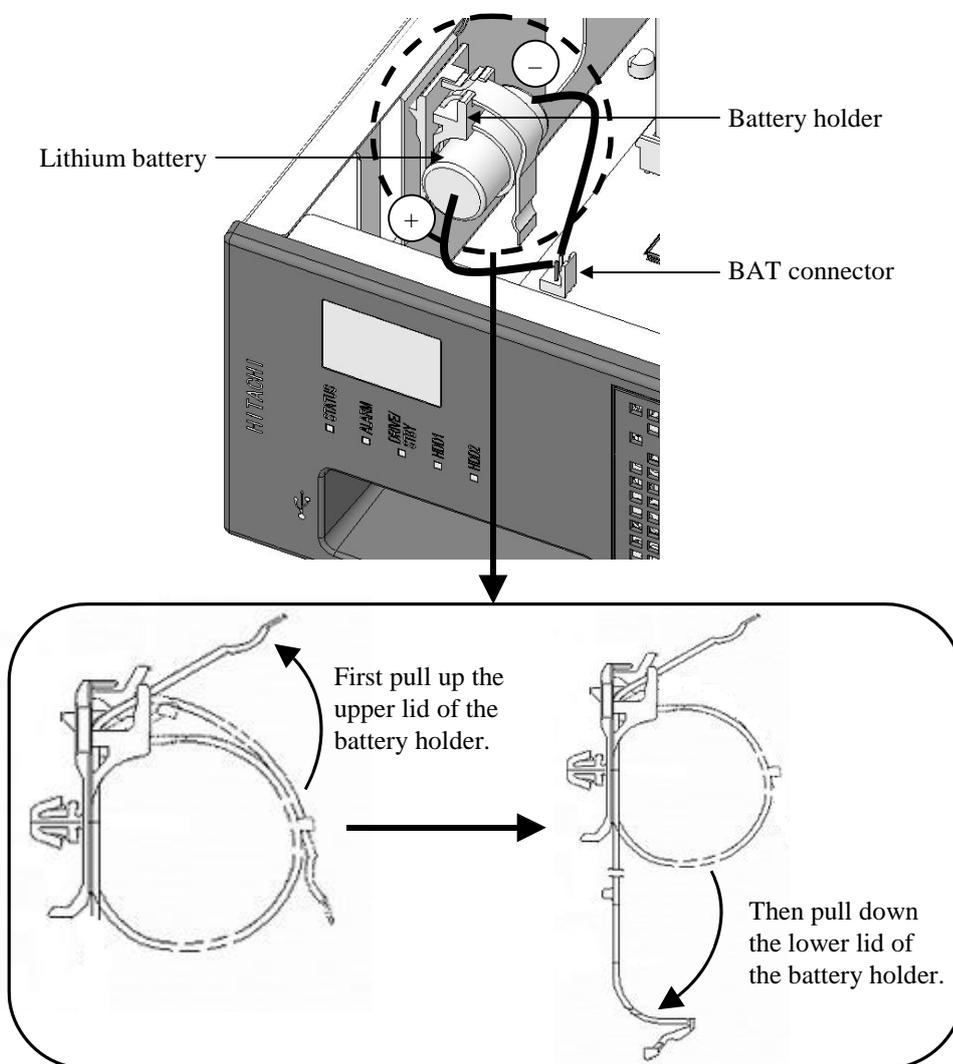


Figure 5-15 Replacing Lithium Battery

5.6 Setup for Enabling Remote Power-on Function

 WARNING
Hazardous voltage. Be sure to shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute before detaching the cover of the Equipment. Otherwise, you may get an electric shock or a fire may occur.

 CAUTION
<ul style="list-style-type: none"> • During work, do not touch the internal parts directly with bare hands. Otherwise, you may get burned because the parts are hot. In addition, such action may cause damage to the internal parts. • Do not insert your fingers inside the cover of the Equipment when you reattach it. Otherwise, you may pinch your fingers.

5.6.1 Preparation

- Be sure to shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute before work.
- Reserve the specified service clearance (see Subsection 1.2.2, “Installation conditions”) and work in a flat place.

5.6.2 Enabling remote power-on function

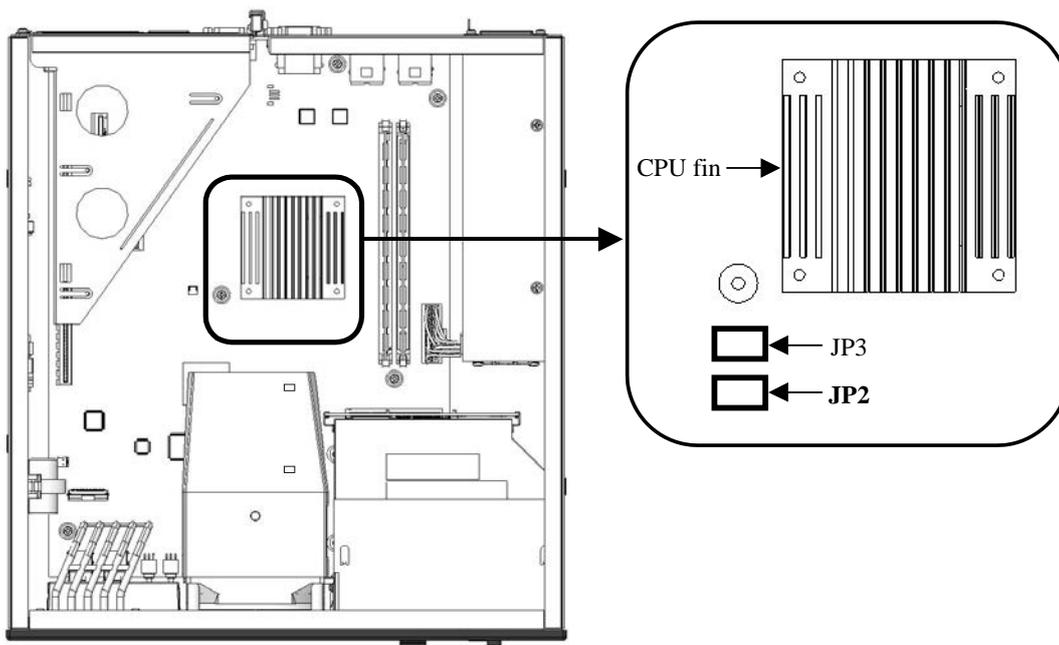
The remote power-on function provided by the RAS external control interface options (HJ-7815-21 and HJ-7815-22) is enabled or disabled by the presence of the JP socket on the motherboard. Specifically, the JP socket selects the GENDI2 signal setting of the external control interface to be either general-purpose input or remote power-on (Subsection 4.8.2, “External control interface specifications”) as shown below.

<i>Presence of JP socket</i>	<i>GENDI2 signal setting</i>
Yes	General-purpose input signal
No	Remote power-on signal

To enable the remote power-on function, remove the JP socket from the JP2 pin on the motherboard according to the steps below.

1. Unmount the cover of the Equipment according to the procedure in “(1) (a) Unmounting the cover of the Equipment” in Subsection 5.4.1.3, “Inserting/extracting extended board on HJ-2035.” This procedure also applies to unmounting the cover of the Equipment on HJ-2030.
2. If the Equipment is HJ-2035, detach the riser unit according to the procedure in “(1) (b) Detaching the riser unit” in Subsection 5.4.1.3, “Inserting/extracting extended board on HJ-2035.”
3. Referring to Figure 5-16 below, remove the JP socket from the JP2 pin on the motherboard. Keep the removed JP socket for future use in restoring to the original setting.
4. Reattach the riser unit by reversing the procedure referenced in step 2, if applicable, and remount the cover of the Equipment by reversing the procedure referenced in step 1.

To disable the remote power-on function, attach the JP socket to the JP2 pin on the motherboard by reversing the steps above.



Note: Although the specific model illustrated above is HJ-2035, the work instructions in the figure also apply to HJ-2030.

Figure 5-16 Removing JP Socket

This Page Intentionally Left Blank

CHAPTER 6 TROUBLESHOOTING

6.1 Interview Sheet

WARNING

In case of smoke or nasty smell, disconnect the power cord plug from the outlet and contact your distributor or customer engineer. Using the faulty Equipment without repair may lead to an electric shock or fire.

Perform root cause analysis and take recovery actions according to the interview sheet below.

No.	Symptom	Possible cause	Action	Point
1	The power supply is connected but the Equipment does not start up. The lamps remain off.	<ul style="list-style-type: none"> The Equipment is not powered with 100–240 Vac. A fault in the Equipment. 	<ul style="list-style-type: none"> Firmly connect the power cord plug to the outlet. Turn on the breaker on the power distribution board. If the above actions do not cure the symptom, contact the system administrator or customer engineer. 	Record the state of the lamps on the Equipment.
2	The ALARM lamp is on.	<ul style="list-style-type: none"> An over-temperature inside the Equipment or a failure on any of the fans, as identified by the error message. <ul style="list-style-type: none"> Over-temperature: “Temperature exceeded prescribed value” Failure on the fan: “Spin of CPU fan deteriorated remarkably” or “Spin of power supply fan deteriorated remarkably” RAID function of the Equipment is in error. 	<ul style="list-style-type: none"> Check whether the ventilation or air conditioning is abnormal (i.e., ambient temperature of 40°C or higher). Check the “Hardware status” window and the HDD status lamps. When there is any failing drive, replace it with a new one. If the above actions do not cure the symptom, contact the system administrator or customer engineer. 	<ul style="list-style-type: none"> Check spin condition of the fans. Check the “Hardware status” window and the HDD status lamps.
3	An error message is displayed.	<ul style="list-style-type: none"> A misoperation. A program error. A fault in a built-in optional adapter or a peripheral device. 	<ul style="list-style-type: none"> Record the displayed error message. Follow the instruction of the error message. If the above action does not cure the symptom, contact the system administrator or customer engineer. 	Record the error message.
4	System startup after system power on always error-stops with the same code shown on the digital LED for status indication.	<ul style="list-style-type: none"> A fault in the Equipment. Misconnection of or fault in the peripheral devices such as keyboard and mouse. 	<ul style="list-style-type: none"> According to Table 4-1, “POST Codes at Error Stops, Possible Error Causes, and Actions To Be Taken,” follow applicable instructions therein. If the above action does not cure the symptom, contact the system administrator or customer engineer. 	Record the code displayed on the digital LED for status indication.

(Continued on next page)

6. TROUBLESHOOTING

(Continued)

No.	Symptom	Possible cause	Action	Point
5	The keyboard or the mouse does not function.	<ul style="list-style-type: none"> • Misconnection or loose connection of the keyboard or the mouse. • Fault in the keyboard or the mouse. • A program error. 	<ul style="list-style-type: none"> • Check whether the keyboard or the mouse is connected correctly and firmly. If not, press the Power switch while the OS is running to shut down the OS and, after the OS shutdown, disconnect the power cord plug from the outlet. Then, connect the keyboard and the mouse correctly and firmly. Finally, connect the power cord plug to the outlet and start up the system. • If a program error is suspect, press the RESET switch. • If the above actions do not cure the symptom, contact the system administrator or customer engineer. 	Check to see if the keyboard cable and the mouse cable are connected correctly and firmly.
6	Screen display is abnormal.	<ul style="list-style-type: none"> • The display unit is not powered. • Analog/digital signal switching on the display unit is not correctly set. • Misconnection or loose connection of the display interface cable. 	<ul style="list-style-type: none"> • Firmly connect the power cord plug to the outlet and turn on the display unit. • Correct the setting of analog/digital signal switching on the display unit. • Check whether the display interface cable is connected correctly and firmly. If not, press the Power switch while the OS is running to shut down the OS and, after the OS shutdown, disconnect the power cord plug from the outlet. Then, connect the display interface cable correctly and firmly. Finally, connect the power cord plug to the outlet and start up the system. • If the above actions do not cure the symptom, contact the system administrator or customer engineer. 	
7	Blue screen is displayed.	See Section 7.2, "Memory Dump Collecting Feature".	<ul style="list-style-type: none"> • Referring to Section 7.2, "Memory Dump Collecting Feature," execute memory dump to check if memory dump collecting feature is operating properly. If not, record the STOP error message text in the blue screen as instructed in Section 7.2. • If deemed necessary, notify the system administrator or customer engineer of the recorded STOP error message text. 	
		<ul style="list-style-type: none"> •If the STOP error code is 0x00009502: <ul style="list-style-type: none"> •The RAID configuration is possibly not correct. (B Model only) •A possible fault in the HDDs. (B Model only) 	<ol style="list-style-type: none"> 1. See the Subsection 10.4.5, "When a Trouble Occurs During Recovery", and follow the instructions to do the recovery. 2. Check the status of the RAID1 by using the software RAID1 construction utility. If an HDD is indicated with "ERROR", replace the HDD. 3. If the above actions in 1 and 2 do not resolve the symptom, contact the system administrator or customer engineer. 	
		<ul style="list-style-type: none"> •If the STOP error code is 0x00009501, <ul style="list-style-type: none"> •Possible RAID1 configuration information mismatch. (B Model only) 	<ol style="list-style-type: none"> 1. Record the STOP error message text in the blue screen. 2. If deemed necessary, notify the system administrator or customer engineer of the recorded STOP error message text. 	

(Continued on next page)

(Continued)

<i>No.</i>	<i>Symptom</i>	<i>Possible cause</i>	<i>Action</i>	<i>Point</i>
8	Power unexpectedly turns off and on, either occasionally or repeatedly, during operation.	<ul style="list-style-type: none"> • Misconnection of or fault in the peripheral devices such as USB devices and display units. • A fault in the Equipment. 	<ul style="list-style-type: none"> • Check if the symptom disappears after the peripheral devices other than a keyboard, a mouse, and a display unit are disconnected. • Disconnect the keyboard, the mouse, and the display unit. Remove dust or foreign material, if any, from inside the cable connectors through cleaning. • Disconnect the power cord plug from the inlet of the Equipment. Remove dust or foreign material, if any, from inside the inlet through cleaning. • If the above actions do not cure the symptom, contact the system administrator or customer engineer. 	Check the status of the peripheral devices connected to the Equipment.

6.2 STOP Error Code

STOP error code provides summary information on error cause. This code is displayed in the blue screen and, at the same time, is embedded in the memory dump file. Table 6-1 shows the relationship between error cause, STOP error code, and error message. Although the STOP error code at a forced recovery from CPU lock and the STOP error code at a hardware NMI are the same with each other, you can identify the error cause from the contents of the “Detailed Information” displayed below the STOP error code on the blue screen.

Table 6-1 List of STOP Error Codes

<i>No.</i>	<i>Error cause</i>	<i>STOP error code</i>	<i>Message display in blue screen</i>
1	Forced recovery from CPU lock	0x00000080	Hardware malfunction. == Detailed Information == 0x9201: IOCHK Error.
2	Hardware NMI	0x00000080	Hardware malfunction. == Detailed Information == 0x9202: PCI Bus Parity Error.
3	Uncorrectable memory error	0x00000080	Hardware malfunction. == Detailed Information == 0x9217: Uncorrectable Error at DIMM B. <i>or</i> 0x9218: Uncorrectable Error at DIMM A.
4	Remote shutdown input at startup of Windows®	0x00009221	Remote shutdown contact is closed at startup. Check remote shutdown contact.
5	RAID1 configuration information mismatch (B Model only)	0x00009501	A failure occurred in the Software RAID1. Please refer to HF-W instruction manual for more information.
6	Incorrect RAID configuration (B Model only)	0x00009502	Array configuration is not correct. Please refer to HF-W instruction manual for more information.
7	Windows® STOP error	(Predefined)	(Predefined)

6.3 Event Logs

When a critical event arises, e.g., when environment information is changed or a remote shutdown request is issued, the Equipment collects logs by using the event log function of Windows®.

Table 6-2 lists the event logs unique to the Equipment. Of these events, Nos. 1 to 13 and 16 to 25 are collected in the system log, while Nos. 14 and 15 are collected in the application log.

Table 6-2 Event Logs Unique to the Equipment

No.	Event ID	Source	Type	Classification	Meaning
1	257	HFWRAS_SYS	Error	HFWRAS	Revolutions of fan at power supply deteriorated remarkably.
2	259	HFWRAS_SYS	Warning	HFWRAS	Temperature exceeded prescribed value.
3	260	HFWRAS_SYS	Information	HFWRAS	Remote shutdown request occurred.
4	261	HFWRAS_SYS	Information	HFWRAS	Revolutions of fan at power supply returned to normal value.
5	263	HFWRAS_SYS	Information	HFWRAS	Temperature returned to prescribed value.
6	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).
7	266	HFWRAS_SYS	Error	HFWRAS	Revolutions of cpu fan deteriorated remarkably.
8	267	HFWRAS_SYS	Information	HFWRAS	Revolutions of cpu fan returned to normal value.
9	268	HFWRAS_SYS	Error	HFWRAS	The computer was shut down because temperature became dangerous.
10	270	HFWRAS_SYS	Information	HFWRAS	Used hours on the drive of the drive bay%1 exceeded prescribed value.
11	524	HFWRAS_SYS	Information	HFWRAS	In the current setting, memory dump file won't be saved.
12	525	HFWRAS_SYS	Information	HFWRAS	In the DIMM %1, error correctings have occurred with high frequency.
13	539	HFWRAS_SYS	Error	HFWRAS	The "%1" was finished.
14	769	HFWRAS_APP	Error	HFWRAS	An error occurred in %1. errorcode = %2.
15	771	HFWRAS_APP	Error	HFWRAS	Because a wrong value is set up in registry value "%1", default value %2 is set up.
16	800	HFWRAS_SYS	Information	HFWRAS	%1. Detailed code = %2.
17	2001	HFWRAS_SYS	Error	HFWRAS	The drive on the drive bay%1 is OFFLINE because of failure.
18	2002	HFWRAS_SYS	Information	HFWRAS	RAID status is OPTIMAL.
19	2003	HFWRAS_SYS	Error	HFWRAS	RAID status is UNKNOWN.
20	2004	HFWRAS_SYS	Information	HFWRAS	RAID status was revealed.
21	2009	HFWRAS_SYS	Information	HFWRAS	The drive on the drive bay%1 is OFFLINE because of manual operation.
22	2011	HFWRAS_SYS	Information	HFWRAS	Rebuilding was completed. But unreadable sectors were detected on the source drive (Drive bay%1). (Media error)
23	2012	HFWRAS_SYS	Error	HFWRAS	Rebuilding failed due to error on the destination drive (Drive bay%1).
24	2019	HFWRAS_SYS	Information	HFWRAS	Media error is occurred on RAID.
25	2020	HFWRAS_SYS	Error	HFWRAS	RAID status is FAIL.
26	2021	HFWRAS_SYS	Error	HFWRAS	The drive on the drive bay%1 becomes OFFLINE.

No. 6: %1 indicates the drive bay number. %2 indicates the manufacturer and model of the drive.

No. 10: %1 indicates the drive bay number.

No. 12: %1 indicates the DIMM slot number.

No. 13: %1 indicates one of the following: FAN, TEMP, RMTSTDN, MEM, CPU, TEMPLOG, WDT, RAID1, RAID_SMART, SMART, USETIME, RASLOG, or INTERNAL-LOGD.

No. 14: %1 indicates the error-stopped function name. %2 indicates the error code.

No. 15: %1 indicates the registry key containing an invalid value. %2 indicates the default value.

No. 16: For %1 and %2, one of the following combinations are recorded:

- Combination 1: [%1: Reset signal was input.] and [%2: 0x9201]
- Combination 2: [%1: PCI Bus Parity Error.] and [%2: 0x9202]
- Combination 3: [%1: Uncorrectable Error at DIMM B.] and [%2: 0x9217]
- Combination 4: [%1: Uncorrectable Error at DIMM A.] and [%2: 0x9218]

Nos. 17, 21, 22, 23: %1 indicates the drive bay number.

6. TROUBLESHOOTING

Notes:

- There may be cases when an error log of event ID 7034 is collected in the system log. Although the message for this event states “The AUDIO service terminated unexpectedly,” this event is not an issue for the function of the audio ports (LINE IN and LINE OUT).
- There may be cases when an error log of the event ID shown below is collected in the system log after a read error on one drive followed by a successful recovery thereof with a normal read from the other drive. One error log of the said event ID is taken if the recovery of the read error is successful. If you find multiple instances of such error logs consecutively taken within one or two minutes, the read error may not be recovered.
 - On D Model under Windows® XP: Event ID 11, source “Disk,” message “The driver detected a controller error on \Device\Harddisk0\D”.
 - On D Model under Windows® 7: Event ID 11, source “atapi,” message “The driver detected a controller error on \Device\ide\idePort0”.

6.4 System Load Monitoring with Windows® Performance Monitor Utility

Windows® is equipped with a utility called Performance Monitor (or “perfmon”) that shows usages of the CPU, memory, and other hardware resources according to the user’s selection of specific counters.

The Performance Monitor counters in Table 6-3 are a collection of such counters that are useful in system load monitoring. These counters may also be helpful in troubleshooting and analyzing performance issues.

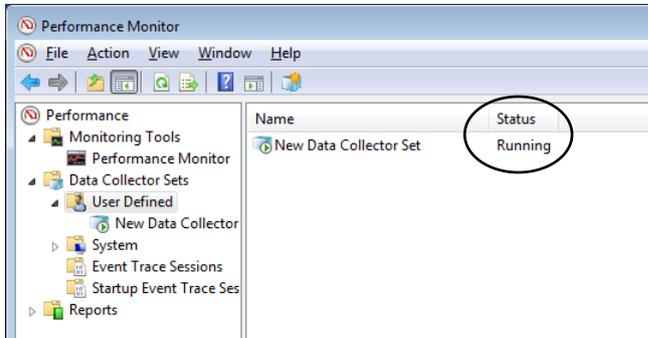
Table 6-3 Performance Monitor Counters Useful in System Load Monitoring

<i>No.</i>	<i>Performance object</i>	<i>Counter</i>	<i>Meaning</i>
1	Processor	% Processor Time	This counter indicates the CPU usage. If the value of this counter remains high, the CPU performance may become a system performance bottleneck.
2	Memory	Pages/sec	This counter indicates the number of pages per second that are read/written between memory and the disk to resolve page faults. If the value of this counter is high, the memory size may be insufficient. The closer to zero the value is, the more adequate level the memory size is at.
3		Available Bytes	This counter indicates the physical memory size allocatable to each process. If the value of this counter is on the decrease, a memory leak is suspect.
4		Pool Nonpaged Bytes	This counter indicates the size of the memory area that is not paged to the disk and stays in the physical memory as long as it is allocated (pool space). If the value of this counter is on the increase, a memory leak is suspect.
5	PhysicalDisk	% Disk Time	This counter indicates the disk busy rate due to disk read or disk write. If the value of this counter remains high, the disk performance may become a system performance bottleneck.
6	Network Interface	Bytes Total/sec	This counter indicates the number of bytes of data per second sent or received on the network adapter. If the value of this counter remains high as compared to the “Current Bandwidth,” the network adapter performance may become a system performance bottleneck.
7		Current Bandwidth	This counter indicates the bandwidth currently used by the network adapter.

6. TROUBLESHOOTING

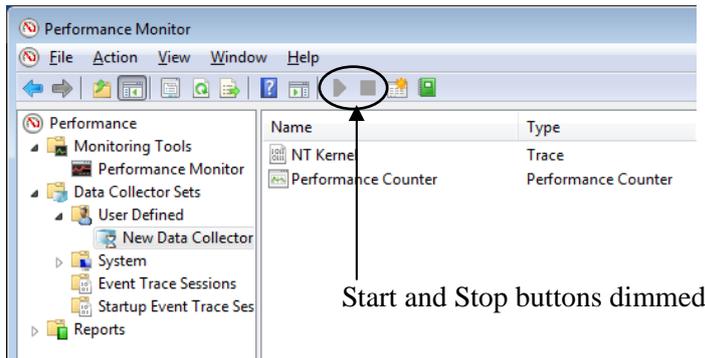
< NOTE >

Under Windows® 7, the system load monitoring with the Performance Monitor counters may not start properly if the system is heavily loaded. After activating the system load monitoring with the Performance Monitor counters, ensure that the “Status” field of the relevant Data Collector Set shows “Running” as illustrated below.



< NOTE >

Under Windows® 7, starting/stopping of the system load monitoring with the Performance Monitor counters may become disabled (relevant buttons and menu items dimmed) if the system is heavily loaded or after the start/stop actions are repeated very often. In this case, exit Performance Monitor once, wait for a while, and then start Performance Monitor again. If the disability persists thereafter, restart the system and start Performance Monitor again.



CHAPTER 7 MAINTENANCE ACTIONS

This chapter describes maintenance actions using the reliability, availability, and serviceability (RAS) features of the Equipment.

7.1 Overview of RAS Features

To meet demands for a highly reliable industrial PC, the Equipment implements the RAS features summarized in the table below.

Classification		Feature	Application	
			HJ-2035	HJ-2030
Monitoring		(1) Hardware status monitoring feature	Yes	Yes (*1)
		(2) OS lock-up monitoring feature	Yes	No
		(3) Watchdog timer monitoring feature	Yes	No
GUI setup		(4) "RAS Setup" window	Yes	Yes (*2)
Display and notification of hardware status	GUI display	(5) "Hardware status" window	Yes	Yes (*3)
	Notification	(6) Event notification	Yes	No
		(7) Pop-up notification	Yes	No
		(8) Digital LED for status indication	Yes	Yes
		(9) Remote notification	Yes	No
		(10) Hardware status acquisition by library functions	Yes	No
Supervisory control	Automatic shutdown and startup suppression	(11) Automatic shutdown	Yes	Yes (*4)
		(12) Startup suppression on serious failure detection	Yes	Yes (*4)
		(13) Control of general external I/O ports	Yes	No
		(14) Control of digital LED for status indication	Yes	No
Library functions		(15) RAS library functions	Yes	No
Maintenance and error analysis	Memory dump	(16) Memory dump collecting feature	Yes	Yes
		(17) STOP error-cause recording feature	Yes	No
		(18) "RAS Maintenance Support" window	Yes	No
		(19) Maintenance support commands	Yes	Yes (*5)
		(20) Internal temperature trend logging feature	Yes	No

*1 Drive used hours monitoring is excluded.

*2 Features not supported on HJ-2030 are dimmed (not operable). See *HF-W2000 Model 35/30 RAS Features Manual* for details.

*3 Information relating to drive used hours monitoring is dimmed (not enabled).

*4 Execution with remote shutdown signal input is excluded.

*5 Information relating to features not supported on HJ-2030 is excluded from command execution results.

Additional explanation on the features in the table above is shown below. Of these, details of (13), (16), and (19) are provided in this manual. For details of the rest, see *HF-W2000 Model 35/30 RAS Features Manual*. For (8), also see Section 4.6, "POST Code Indication".

7. MAINTENANCE ACTIONS

[Monitoring]

(1) Hardware status monitoring feature

This feature monitors the hardware status of the Equipment such as fans, temperature inside the chassis, and the internal drives. On HJ-2030, the drive used hours monitoring is excluded from this feature.

(2) OS lock-up monitoring feature

This feature monitors the processing status of the OS using the OS monitoring timer implemented in the Equipment. As long as the highest level processes (realtime priority) are running normally, the status lamp (STATUS) on the front panel of the Equipment remains lit green.

(3) Watchdog timer monitoring feature

Using the watchdog timer implemented in the Equipment, this feature monitors that the processes are scheduled normally. This feature also provides library functions for using the watchdog timer.

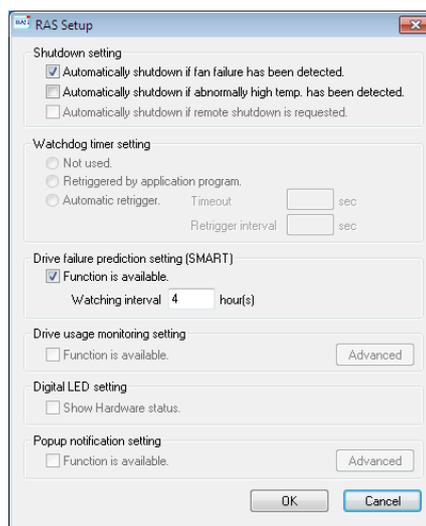
[GUI setup]

(4) “RAS Setup” window

This window provides a GUI for setting up the RAS features such as automatic shutdown and watchdog timer. On HJ-2030, the GUI elements for setting up the RAS features not supported on HJ-2030 are dimmed (not operable).



“RAS Setup” window on HJ-2035



“RAS Setup” window on HJ-2030

[Display and notification of hardware status]

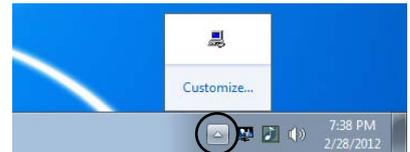
(5) “Hardware status” window

This window provides a GUI that shows the hardware status of the Equipment. Information relating to drive used hours monitoring is dimmed (not enabled).

You can easily refer to the hardware status of the Equipment by clicking the Hardware Status icon in the task tray on the desktop.



With default task tray settings under Windows® 7, the said Hardware Status icon is usually hidden and selectable from the “more” icon menu in the task tray. If you like, you can customize the task tray settings to make the Hardware Status icon always visible in the task tray.



(6) Event notification

This feature enables the user to confirm the hardware status of the Equipment by monitoring the status of event objects from the user application programs.

(7) Pop-up notification

This feature notifies the user of the occurrence of an abnormal event on the Equipment hardware by displaying pop-up messages.

(8) Digital LED for status indication

The digital LED for status indication located on the front panel notifies the user of the occurrence of an abnormal event on the Equipment hardware. Because this LED is also usable from the user application programs, you can utilize it for custom purposes such as notification of application failure.

(9) Remote notification

This feature enables the user in a remote environment to confirm the hardware status of the Equipment over the network. This feature also notifies the occurrence of any change in the status of the Equipment hardware to the user in a remote environment.

(10) Hardware status acquisition by library functions

This feature enables the user to acquire the hardware status of the Equipment by using the RAS library functions from the user application programs.

7. MAINTENANCE ACTIONS

[Supervisory control]

(11) Automatic shutdown

This feature automatically shuts down the Equipment upon detecting a hardware failure (e.g., fan error or abnormal temperature inside the cabinet) or, on HJ-2035, a remote shutdown signal input. The user can define whether to perform this automatic shutdown, using the “RAS Setup” window shown in (4) above.

(12) Startup suppression on serious failure detection

This feature suppresses the startup of the Equipment in order to protect the hardware when a serious failure such as fan error is detected during the OS startup. On HJ-2035, this feature can also suppress the startup of the Equipment by causing the Equipment to detect a remote shutdown signal input during the OS startup.

(13) Control of general external I/O ports

This feature provides the user with the RAS library functions for controlling the general external I/O ports of the RAS external interface option, four ports for input and three ports for output. The user can utilize these ports for receiving an input signal from an external device or sending an output signal to an external device.

(14) Control of digital LED for status indication

This feature provides the user with the RAS library functions for controlling the digital LED for status indication from the user application programs, thereby enabling the user to use this LED for custom purposes.

[Library functions]

(15) RAS library functions

In addition to the RAS library functions for (10), (13), and (14), a RAS library function for adding text data to the stored log information is provided.

[Maintenance and error analysis]

(16) Memory dump collecting feature

In the event of a failure in the Equipment such as an unexpected halt, pressing the RESET switch causes all the memory contents to be saved into a file (memory dump file). By analyzing the contents of this memory dump file, the cause of the failure can be inspected.

(17) STOP error-cause recording feature

This feature detects the occurrence of a blue screen by the STOP error code 0x80 and records the error cause for the blue screen into the event log.

(18) “RAS Maintenance Support” window

With graphical look and feel, this window facilitates saving of log data and/or memory dump files into a local drive or external drive connected to the Equipment.

(19) Maintenance support commands

These commands support maintenance actions, e.g., saving of log data and/or memory dump files into a local drive or external drive connected to the Equipment.

(20) Internal temperature trend logging feature

This feature periodically records the temperature inside the Equipment chassis into a log file.

7.2 Memory Dump Collecting Feature

When any of the triggers in Table 7-1 occurs, the Equipment saves the system memory contents into a file (memory dump file). At this time, a blue screen appears with a STOP error code. You can troubleshoot the error by analyzing the contents of this memory dump file. For details of the STOP error code, see Section 6.2, “STOP Error Code”.

Table 7-1 Triggers for Collecting Memory Dump

<i>Trigger</i>	<i>Explanation</i>
Forced recovery from CPU lock	Press the RESET switch or send a remote reset signal to the external control port RMTRESET when the CPU locked, and memory dump will be collected. Note: Do not send two or more remote set signals to the RMTRESET port consecutively. Such consecutive input will cause the Equipment to be unable to collect the memory dump.
Hardware NMI	At the occurrence of a severe hardware failure in the Equipment (e.g., uncorrectable memory error or PCI bus parity error), NMI (non-maskable interrupt) is automatically generated and memory dump collection is triggered.
Microsoft® Windows® STOP error	At the occurrence of a severe error in the kernel of Microsoft® Windows®, memory dump collection is triggered.

(1) Memory dump setup for Microsoft® Windows®

One type of memory dump file is selectable among the three options in the “System Properties” window opened from Control Panel. Of these options differentiated by the range of data, Complete Memory Dump (factory-set default) is recommended.

- Complete Memory Dump: The entire contents of system memory are saved. The Boot Volume* needs to be allocated to accommodate a paging file that amounts to physical memory size + 1 MB.
- Kernel Memory Dump: Only the contents of kernel memory are saved. The Boot Volume* needs to be allocated to accommodate a paging file that amounts to one third of physical memory size.
- Small Memory Dump: Only necessary minimum memory contents for identifying the cause of STOP error on the Equipment are saved. The Boot Volume* needs to be allocated to accommodate a paging file that amounts to at least 2 MB.

* “Boot Volume” means the volume containing Windows® and its support files.

< NOTE >

Although Complete Memory Dump is factory-set on the Equipment with Windows® 7 preinstalled, once this default setting is changed to any other type of memory dump, you cannot restore the setting to Complete Memory Dump via the “System Properties” window. For how to restore the setting under Windows® 7, see (2) (b) of Subsection 7.3.5, “Various setup procedures relating to memory dump”.

In the “System Properties” window, you can also set up virtual memory and automatic restart after collection of memory dump. For the procedures of these settings, see Subsection 7.3.5, “Various setup procedures relating to memory dump”.

(2) Blue screen samples

The following figures provide the blue screen samples displayed when a failure causing memory dump occurs or when the RESET switch is pressed. Although the STOP error code at a forced recovery from CPU lock and the STOP error code at a hardware NMI are the same with each other, you can identify the error cause from the contents of the “Detailed Information” displayed below the STOP error code.

(a) Forced recovery from CPU lock

```
Hardware malfunction.
***STOP :0x00000080(0x00000060,0x00008806,0x00000000,0x00000000)

== Detailed Information ==
0x9201: IOCHK Error.
Beginning dump of physical memory
Physical memory dump complete. ← Displayed after completion of dumping
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. ← Displayed after completion of dumping
Contact your system administrator or technical support group.
```

(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
: ← (Driver list)
: ← (Stack list)
Beginning dump of physical memory
Physical memory dump complete. ← Displayed after completion of dumping
Contact your system administrator or technical support group.
```

7. MAINTENANCE ACTIONS

< NOTE >

- The time required for collecting memory dump varies depending on the targeted type of memory dump, the installed drive configuration, and the installed memory size. Be noted that Complete Memory Dump factory-set on the Equipment requires a relatively long time. (If you install 4GB memory in the B model, it takes about 40 minutes for Windows® XP and about 60 minutes for Windows® 7.)
- There may be a case that the “Beginning dump of physical memory” message on the blue screen is not followed by the progress rate of memory dump but halts. This means that the memory dump processing failed because of an error in the file system or a disk error. If this symptom happens at a forced recovery from CPU lock, at a hardware NMI, or at an uncorrectable memory error, record the upper five lines of the STOP error message. Then, restart the Equipment either by pressing the RESET switch or by recycling the power supply. For example, when a hardware NMI has shown the screen (b) aforementioned, record the following lines:

```
Hardware malfunction.  
***STOP :0x00000080(0x00000080,0x00003000,0x00000000,0x00000000)  
  
== Detailed Information ==  
0x9217: Uncorrectable Error at DIMM B
```

- In the above-mentioned case, however, if the symptom happens at a Windows® STOP error, record the upper two lines of the STOP error message and then restart the Equipment. For example, when a Windows® STOP error has shown the screen (c) aforementioned, record the following lines:

```
***STOP.0x0000001e (0x0000009a,0x80123f36,0x02000000,0x00000246)  
Unhandled Kernel exception c000009a from 80123f 36
```

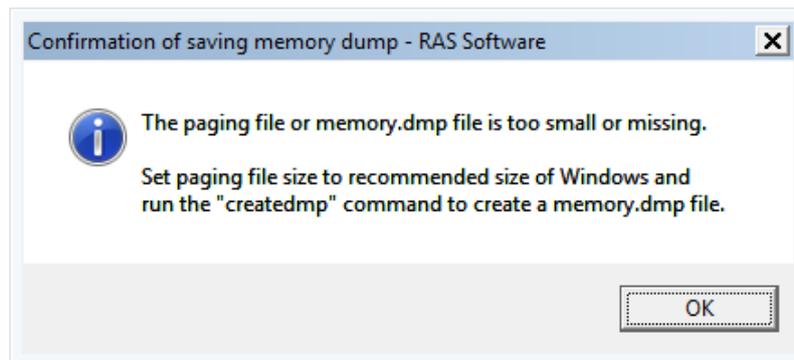
7.3 Operating Procedures Relating to Memory Dump Collection

The Equipment is preset to perform memory dump in the event of a system error (blue screen) in order to support more definite failure analysis by the user. If any memory dump setting unable to execute is detected at the startup of Windows® on the Equipment, the Equipment shows a message dialog and records such incident in the event log, thereby calling the user's attention.

7.3.1 Required storage sizes for memory dump

To collect the memory dump, it is required that the memory dump file size is set in accordance with the physical memory size and that the virtual memory (paging file) is set to the size recommended for the Equipment.

If the physical memory size exceeds the defined virtual memory size or memory dump file size because of memory upgrade or any other reason, or if the virtual memory size has been altered to the value not compatible with the memory dump functionality, the message dialog below appears. (The display image assumes Windows® 7 but it is similar under Windows® XP.)



In such a case, enable the memory dump collection again by setting the virtual memory size and the memory dump file size according to Subsection 7.3.3, “Flow of actions on shortage of memory dump file size”.

If the physical memory size exceeds the defined virtual memory size or memory dump file size because of memory upgrade or any other reason, or if the virtual memory size has been altered to the value not compatible with the memory dump functionality, enable the memory dump collection again by setting the virtual memory size and the memory dump file size according to Subsection 7.3.3, “Flow of actions on shortage of memory dump file size”.

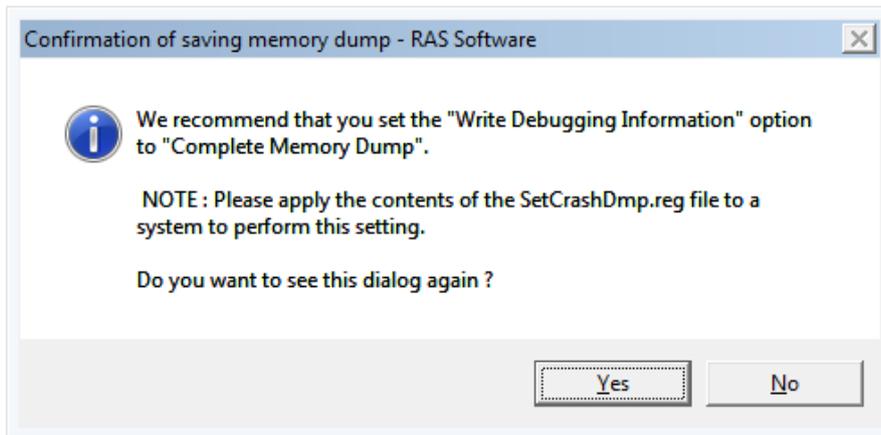
< NOTE >

In some cases when the message dialog shown above appears, an information log of event ID 26 may be taken in the event logs.

7. MAINTENANCE ACTIONS

7.3.2 Recommended memory dump types

On this Equipment, it is recommended to perform Complete Memory Dump that requires appropriate settings for saving memory dump. If such settings are altered to the extent that Complete Memory Dump becomes disabled, the message dialog below appears. (The display image assumes Windows® 7 but it is similar under Windows® XP.)



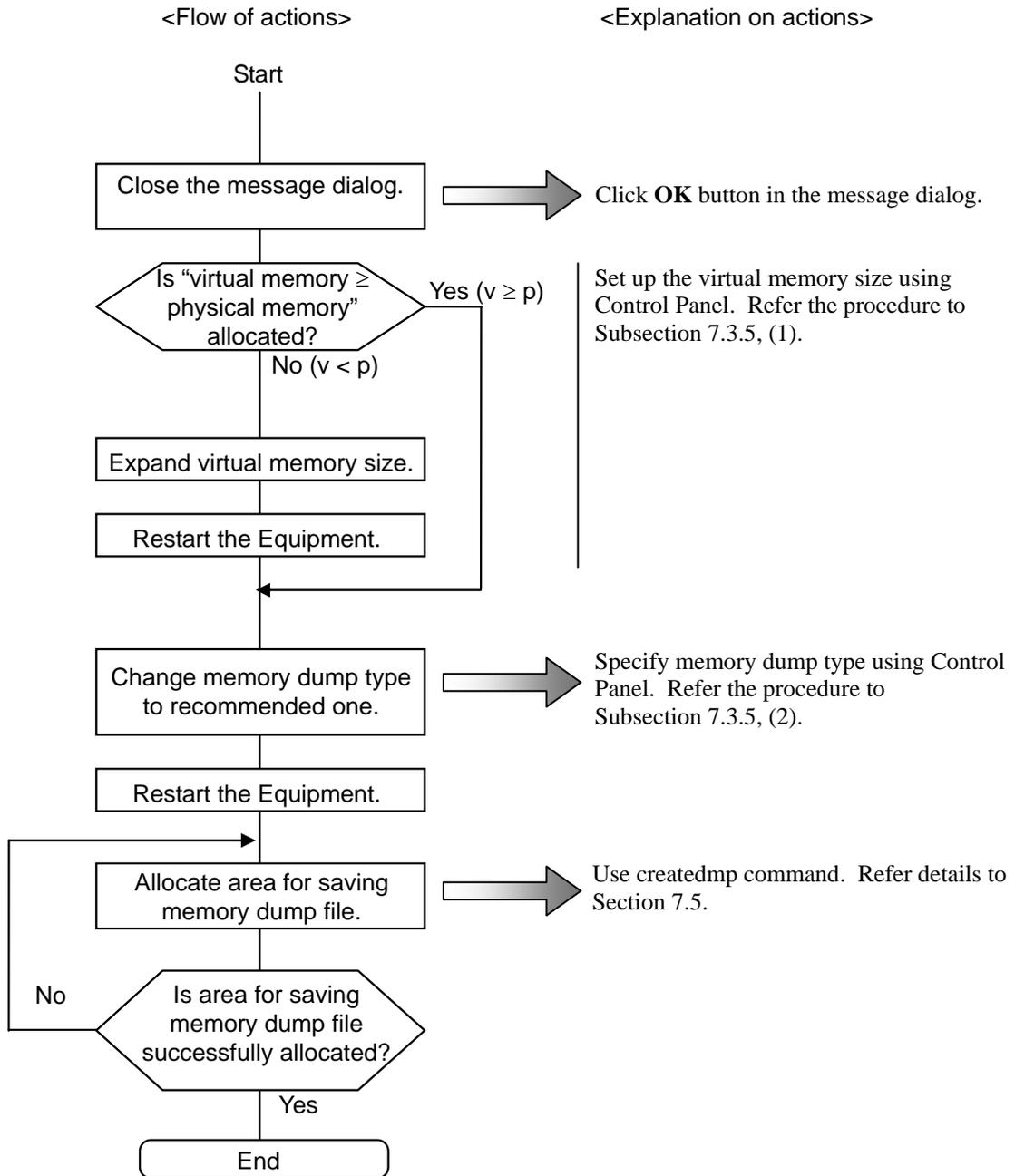
In such a case, change the settings of saving memory dump to the extent that Complete Memory Dump becomes enabled again, according to Subsection 7.3.4, “Flow of actions on altered settings for saving memory dump”.

< NOTE >

- If you click **No** button in the message dialog shown above, the dialog will never appear again. Click **No** to use the Equipment as incapable of performing Complete Memory Dump.
- In some cases when the message dialog shown above appears, an information log of event ID 26 may be taken in the event logs.

7.3.3 Flow of actions on shortage of memory dump file size

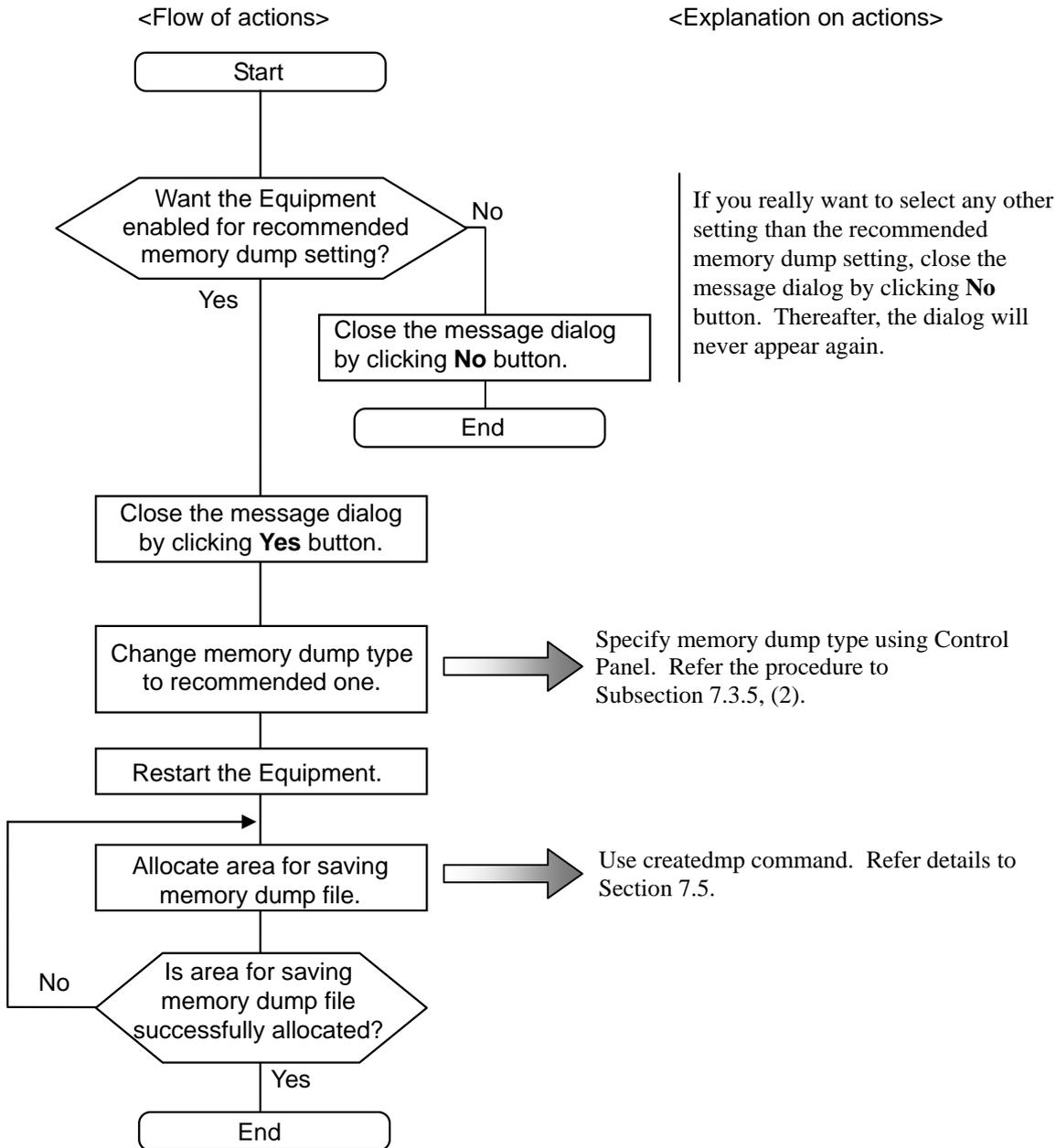
When the memory dump file size is smaller than the required size, take the flow of actions shown below.



7. MAINTENANCE ACTIONS

7.3.4 Flow of actions on altered settings for saving memory dump

When the settings for saving memory dump are altered to the extent that the recommended type of memory dump becomes disabled, take the flow of actions shown below.



7.3.5 Various setup procedures relating to memory dump

< NOTE >

- Prior to performing the procedures below, you must log on to the local computer as a member of the Administrators group.
- The procedures below assume the standard start menu settings under the operating systems, which may differ with non-standard or customized start menu settings.

(1) Setting up virtual memory

(a) Windows® XP

1. Click **Start** and click **Control Panel**. In the “Control Panel” window opened, click **Performance and Maintenance** and then click **System**.
2. In the “System Properties” window newly opened, click **Advanced** tab and then click **Settings** button in “Performance” group box.
3. In the “Performance Options” window newly opened, click **Advanced** tab and then click **Change** button in “Virtual memory” group box.
4. In the upper “Drive” list of the “Virtual Memory” window newly opened, click the system drive that stores the paging file to be altered.
5. At **Initial Size (MB)** text box in “Paging file size for selected drive” group box, type a new value of paging file size in MB. Here, specify the new value to be no less than **Recommended** size (1.5 times the total system memory) referenced in “Total paging file size for all drives” group box.
6. Click **Set** button and then click **OK** button.

(b) Windows® 7

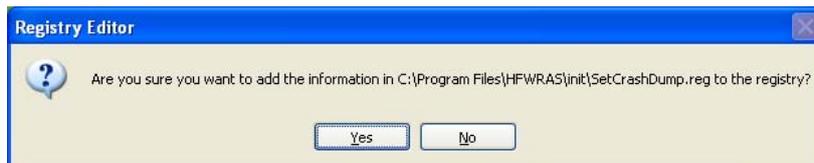
1. Click **Start** and click **Control Panel**. In the “Control Panel” window opened, click **System and Security** and then click **System**.
2. In the left pane of the “System” window navigated from the “Control Panel” window, click **Advanced system settings**.
3. If the “User Account Control” dialog box opens, click **Yes** button to continue.
4. On **Advanced** tab of the “System Properties” window navigated, click **Settings** button in “Performance” group box.
5. In the “Performance Options” window newly opened, click **Advanced** tab and then click **Change** button in “Virtual memory” group box.
6. At the top of the “Virtual Memory” window newly opened, uncheck (turn off) **Automatically manage paging file size for all drives** checkbox.
7. In the “Drive” list in “Paging file size for each drive” group box, click the system drive that stores the paging file to be altered.
8. Click **Custom Size** radio button thereunder and, at both **Initial Size (MB)** and **Maximum Size (MB)** text boxes, type a new value of paging file size in MB. Here, specify the new value for **Initial Size (MB)** to be no less than **Recommended** size (1.5 times the total system memory) referenced in “Total paging file size for all drives” group box.
9. Click **Set** button and then click **OK** button.

7. MAINTENANCE ACTIONS

(2) Setting up the memory dump file

(a) Windows® XP

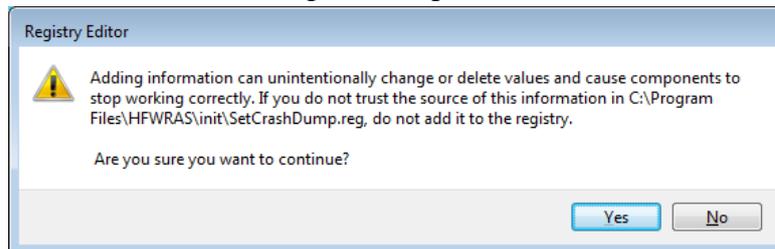
1. Click **Start** and click **Control Panel**. In the “Control Panel” window opened, click **Performance and Maintenance** and then click **System**.
2. In the “System Properties” window newly opened, click **Advanced** tab and then click **Settings** button in “Startup and Recovery” group box.
3. In **Dump file** text box in “Write debugging information” group box of the “Startup and Recovery” window newly opened,, type a new memory dump file path if you desire. If not, leave the default “%SystemRoot%\MEMORY.DMP” as it is.
4. Check (turn on) **Overwrite any existing file** checkbox thereunder.
5. Click **OK** button.
6. To reselect “Complete Memory Dump” recommended for the Equipment, follow the substeps below.
 - a. Click **Start** and click **Run**.
 - b. In **Name** text box of the “Run” window opened, type “C:\Program Files\HFWRAS\init\SetCrashDmp.reg” and click **OK** button. (Alternatively, double-click the same file in the file path.)
 - c. The confirmation dialog below opens. Click **Yes** button.



- d. A completion message dialog opens. Click **OK** button.

(b) Windows® 7

1. Click **Start** and click **Control Panel**. In the “Control Panel” window opened, click **System and Security** and then click **System**.
2. In the left pane of the “System” window navigated from the “Control Panel” window, click **Advanced system settings**.
3. If the “User Account Control” dialog box opens, click **Yes** button to continue.
4. On **Advanced** tab of the “System Properties” window navigated, click **Settings** button in “Startup and Recovery” group box.
5. In **Dump file** text box in “Write debugging information” group box of the “Startup and Recovery” window newly opened, type a new memory dump file path if you desire. If not, leave the default “%SystemRoot%\MEMORY.DMP” as it is.
6. Check (turn on) **Overwrite any existing file** checkbox.
7. Click **OK** button.
8. To reselect “Complete Memory Dump” recommended for the Equipment, follow the substeps below.
 - a. Click **Start** and click **All programs**.
 - b. Click **Accessories** and click **Run**. In **Name** text box of the “Run” window opened, type “C:\Program Files\HFWRAS\init\SetCrashDmp.reg” and click **OK** button. (Alternatively, double-click the same file in the file path.)
 - c. If the “User Account Control” dialog box opens, click **Yes** button to continue.
 - d. The confirmation dialog below opens. Click **Yes** button.



- a. A completion message dialog opens. Click **OK** button.

7. MAINTENANCE ACTIONS

(3) Setting up automatic restart after memory dump

(a) Windows® XP

1. Click **Start** and click **Control Panel**. In the “Control Panel” window opened, click **Performance and Maintenance** and then click **System**.
2. In the “System Properties” window newly opened, click **Advanced** tab and then click **Settings** button in “Startup and Recovery” group box.
3. In “System failure” group box of the “Startup and Recovery” window newly opened, check (turn on) **Automatically restart** checkbox if you desire to enable automatic restart after memory dump. Otherwise, uncheck this checkbox.
4. Click **OK** button.

(b) Windows® 7

1. Click **Start** and click **Control Panel**. In the “Control Panel” window opened, click **System and Security** and then click **System**.
2. In the left pane of the “System” window navigated from the “Control Panel” window, click **Advanced system settings**.
3. If the “User Account Control” dialog box opens, click **Yes** button to continue.
4. On **Advanced** tab of the “System Properties” window navigated, click **Settings** button in “Startup and Recovery” group box.
5. In “System failure” group box of the “Startup and Recovery” window newly opened, check (turn on) **Automatically restart** checkbox if you desire to enable automatic restart after memory dump. Otherwise, uncheck this checkbox.
6. Click **OK** button.

7.4 Startup Suppression on Serious Failure Detection

For protection of hardware, the Equipment suppresses its own startup when any of the following factors is detected at the startup of Windows®:

- Fan abnormality
- Remote shutdown input

< NOTE >

For the cases of “Remote shutdown input” shown above, suppression of startup takes effect only when automatic shutdown has been enabled in the “RAS Setup” window. The startup cannot be suppressed unless the automatic shutdown is enabled. For how to use the “RAS Setup” window, see *HF-W2000 Model 35/30 RAS Features Manual*. It should also be noted that detection of a remote shutdown input causes the Equipment to stop with a blue screen displaying a STOP error code. For details of the STOP error code, see Section 6.2, “STOP Error Code”.

7. MAINTENANCE ACTIONS

7.5 Maintenance Support Commands

This section describes how to use the maintenance support commands. These commands are used when a trouble occurred in the Equipment, or when a preventive maintenance action is to be performed.

Table 7-2 lists the maintenance support commands.

Table 7-2 Maintenance Support Commands

<i>Command Name</i>	<i>Function</i>
logsave	When a preventive maintenance action is to be performed or when a trouble occurred, use this command to save the log information for preventive maintenance or analysis of the trouble.
mdump	When a STOP error or any other cause has collected memory dump, use this command to copy the memory dump file to a portable medium.
createdmp	When a message tells you that the current memory dump file has not enough space, use this command to allocate an area for saving the memory dump file.
getrasinfo	Use this command to check for statuses of the Equipment such as rotation of fans and temperature inside the cabinet.

< NOTE >

- To execute each maintenance support command, you must log on to the local computer as a member of the Administrators group.
- You cannot execute multiple sessions of the same maintenance support command at a time.
- To execute each maintenance support command under Windows® 7 with User Account Control (UAC) enabled, you must activate the command prompt as administrator according to “(2) Activating command prompt under Windows® 7” below.

All these maintenance support commands are activated and used from the command prompt. To activate the command prompt, follow the steps below.

(1) Activating command prompt under Windows® XP

1. Log on to the local computer as a member of the Administrators group.
2. Click **Start**.
3. Point to **All Programs** (or **Programs**).
4. Point to **Accessories**.
5. Click **Command Prompt**.

(2) Activating command prompt under Windows® 7

1. Log on to the local computer as a member of the Administrators group.
2. Click **Start**.
3. Click **All Programs**.
4. Click **Accessories**.
5. If you have logged on to the local computer with the built-in Administrator account, click **Command Prompt**. Otherwise, right-click **Command Prompt** and click **Run as administrator**.
6. If the “User Account Control” dialog box opens, click **Yes** button to continue.

7.5.1 Log information save command—logsave

INPUT FORMAT

logsave [-e *absolute_filepath*] [*directory*]

PARAMETER

[*-e absolute_filepath*]:

This set of option and parameter specifies expanding the compressed file in the absolute filepath for the log information saved by the logsave command. Omission of this option specifies saving the log information in a compressed file.

[*directory*]:

If not preceded by “-e” option, this parameter specifies the destination directory for the saving operation. Omission of this parameter creates “logsave” directory under the system drive root (usually C:\) for saving data.

If preceded by “-e” option, this parameter specifies the destination directory for the expanding operation. Omission of this parameter causes the Equipment to assume that the current directory is specified.

7. MAINTENANCE ACTIONS

FUNCTION

The logsave command without “-e” option saves the log information for preventive maintenance and analysis of a trouble in a compressed file (logsave.dat). With “-e” option, the logsave command expands the logsave.dat file. Table 7-3 lists the log information saved by the logsave command.

Table 7-3 Log Information Saved by logsave Command

<i>Item</i>	<i>Description</i>
Event log file of Windows®	Backup of event log file
RAS Software log data	RAS Software operation log
Version information of Windows®	Versions of Windows® system files and driver files
Small Memory Dump	Small Memory Dump files under “Minidump” directory
System information	System information such as hardware resources and software environment
Output results of getrasinfo command	Statuses of the Equipment, e.g., rotation of fans and temperature inside the cabinet, and/or RAS software settings
Output results of ipconfig command	Network settings
RAID log data	RAID operational log (D Model and B Model only)

MESSAGE

When execution of the logsave command ends in an error, the error message below is displayed. When no target directory is found, an error message output by the xcopy command of Windows® is displayed.

Table 7-4 Error Message with logsave Command

<i>Error message</i>	<i>Explanation</i>
You do not have the privilege to run this command. Please run this command again on “Administrator: Command Prompt”.	You do not have the Administrator privilege. Log on to the local computer as a member of the Administrators group and then retry the command execution. If User Account Control (UAC) is enabled, activate the command prompt as administrator and retry the command execution. (Windows® 7 only)

7.5.2 Copy command for memory dump file—mdump

INPUT FORMAT

```
mdump [-n | -e filename] copy_destination_path
```

```
mdump [/? | -?]
```

PARAMETER

[-n | -e filename]:

This set of options and parameter specifies whether to perform compression in the copy operation and which file is selected for the copy operation. Omission of these options copies the system-defined memory dump file in a compressed file.

- *-n*: Specifies copying without compression.
- *-e filename*: Specifies expanding the specified source file, which has been compressed by the previous execution of the mdump command. Use of “-e” option always requires a file name.

copy_destination_path:

If not preceded by “-e” option, this parameter specifies the copy destination path including the drive name. When the memory dump file is to be copied into a subdirectory, specify the full path including the directory. If preceded by “-e” option, this parameter specifies the destination directory to save expanded files.

FUNCTION

When only the copy destination path is specified, the mdump command copies both the memory dump files collected by Microsoft® Windows® as set up in the “System Properties” window (“Startup and Recovery” group box in **Advanced** tab) and all Small Memory Dump files under “Minidump” directory to the specified destination in a portable medium at a STOP error on the Equipment. In the copy destination, a compressed file named “memory.mcf” is saved. If the same file name is found in the destination, the existing file will be overwritten.

When “-e” option is specified together with the copy destination path, the mdump command expands the compressed file.

When no parameter is specified, or when /? or -? is specified, the mdump command displays help on how to perform the memory dump operation. Such help is also displayed when an error exists in the parameter specifying of the mdump command intended for copying of memory dump file.

7. MAINTENANCE ACTIONS

MESSAGE

When execution of the mdump command (either copying or expanding the memory dump files) is complete, a termination code 0 is returned. At the same time, one of the following completion messages may be displayed.

Table 7-5 Completion Messages with mdump Command

<i>Completion Message</i>	<i>Explanation</i>
Warning: Memory dump file was not copied.	The Equipment could not copy the memory dump file.
Warning: Minidump files were not copied.	The Equipment could not copy some of the Small Memory Dump files.

Note: In some cases, a completion message may accompany the error message described below.

When execution of the mdump command ends in an error, either of the error messages below is displayed and a termination code 1 is returned.

Table 7-6 Error Messages with mdump Command

<i>Error message</i>	<i>Explanation</i>
Error: Systemcall failed. (%s, %x) <ul style="list-style-type: none"> • %s: Name of error-detected function for Windows API. • %x: Error code of Windows API. 	An internal error occurred.
You do not have the privilege to run this command. Please run this command again on "Administrator: Command Prompt".	You do not have the Administrator privilege. Log on to the local computer as a member of the Administrators group and then retry the command execution. If User Account Control (UAC) is enabled, activate the command prompt as administrator and retry the command execution. (Windows® 7 only)

7.5.3 Disk area allocation command for saving memory dump file—createdmp

INPUT FORMAT

createdmp

FUNCTION

The createdmp command judges the memory dump settings in the Equipment and, if the Equipment is judged capable of collecting the specified type of memory dump, allocates a disk area for saving the memory dump file by creating a blank memory dump file. As a result, possible failure in collecting the memory dump due to shortage of the disk capacity can be avoided.

The createdmp command successfully allocates “installed memory size + 10 MB” disk area only when all the requirements below are met. If not successful, the createdmp command ends in an error. Ensure the settings of memory dump parameters according to Subsection 7.3.5, “Various setup procedures relating to memory dump,” and then execute the createdmp command again.

- Complete Memory Dump is specified.
- The memory dump file name input is correct.
- Overwriting the memory dump file name is enabled.
- There is 10 % or more free space left in the pertinent disk partition after the area for saving the memory dump file is allocated.

MESSAGE

When execution of the createdmp command finishes normally, it ends without displaying anything. When execution of the createdmp command ends in an error, one of the error messages below is displayed.

7. MAINTENANCE ACTIONS

Table 7-7 Error Messages with createdmp Command

<i>Error message</i>	<i>Explanation</i>
Error: In the current settings, memory dump file won't be saved.	Memory dump cannot be collected with the current settings. Change the target type of memory dump to Complete Memory Dump.
Error: Free disk space is too low.	Free disk space is insufficient. Increase the free disk space and try again.
Error: Systemcall failed. (%s, %x) <ul style="list-style-type: none"> • %s: Name of error-detected function for Windows API. • %x: Error code of Windows API. 	An internal error occurred.
You do not have the privilege to run this command. Please run this command again on "Administrator: Command Prompt".	You do not have the Administrator privilege. Log on to the local computer as a member of the Administrators group and then retry the command execution. If User Account Control (UAC) is enabled, activate the command prompt as administrator and retry the command execution. (Windows® 7 only)

7.5.4 RAS information acquisition command—getrasinfo

INPUT FORMAT

getrasinfo [/status | /setting] [/e filename]

PARAMETER

[/status | /setting]:

This set of options specifies which type of information is subject to acquisition. Omission of these options specifies all types of information.

- /status: Specifies the current statuses of the Equipment such as rotation of fans and temperature inside the cabinet.
- /setting: Specifies the RAS software settings.

[/e filename]:

This set of option and parameter specifies the destination file name for storing acquired results in text file format. Use of "/e" option always requires a file name. Omission of this option causes acquired results to be displayed in the command prompt instead of storing them.

< NOTE >

When the file name of an existing file is found the same as specified by "/e" option, the existing file will be overwritten.

FUNCTION

The `getrasinfo` command acquires the current statuses of the Equipment, e.g., rotation of fans and temperature inside the cabinet, and/or the RAS software settings. The acquired results are either stored in text file format or displayed in the command prompt as specified by the options of this command. Table 7-8 shows the types of information acquired by the `getrasinfo` command. Letters enclosed with double quotes indicate actual text stored or displayed with the command execution.

Table 7-8 Types of Information Subject to Acquisition with `getrasinfo` Command

<i>Category</i>	<i>Content</i>
“Hardware Status” (Equipment status)	<ul style="list-style-type: none"> • “Fan condition” (rotation of fans) • “Temperature condition” (temperature inside cabinet) • “RAID condition” (D Model and B Model only) • “Drive condition” • “Memory condition”
“RAS Setting” (RAS software setting)	<ul style="list-style-type: none"> • “Automatic shutdown setting” • “Watchdog timer setting” • “Drive failure prediction settings” (SMART setting) • “Drive used hours monitoring setting” • “Digital LED setting” (setting of digital LED for status indication) • “Popup setting” (pop-up notification setting)

7. MAINTENANCE ACTIONS

OUTPUT FORMAT

< NOTE >

Errors in acquiring certain information may cause the results to include section titles without content or content fields filled with “---” due to error. In such a case, execute the getrasinfo command again.

Shown below is a sample output image after executing the getrasinfo command without specifying parameters, followed by the explanation on the content.

Sample output image

```
<<getrasinfo result>>
Date: 2011/07/30 17:28:30
Computer Name: HF-W2000 Model135 * Model
[Hardware Status]
[Fan condition]
PS fan status:          Normal
CPU fan status:        Normal

[Temperature condition]
Internal temperature status: Normal
Internal temperature value: 28 deg C

[RAID condition]
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

[Memory condition]
DIMM A status:         Normal
DIMM B status:         Error
```

Header (*1)

Hardware Status section (Equipment status) (*2)

(Continued on next page)

*1 Content of “Computer Name” field in the header depends on the model type of the Equipment.

*2 The [RAID condition] in “Hardware Status” section is displayed on D Model and B Model.

(Continued)

[RAS Setting]		}	RAS Setting section (RAS software 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		
[Drive used hours monitoring setting]			
Function is available:	Enable		
[Advanced]			
Time limit of drive bay1:	20000 hours		
Time limit of drive bay2:	20000 hours		
[Digital LED setting]			
Show Hardware status:	ON		
[Popup setting]			
Function is available:	Disable		
[Advanced]			
Fan:	Enable		
Temperature:	Disable		
SMART:	Disable		
Used hours:	Enable		
RAID:	Enable		
Memory:	Disable		

7. MAINTENANCE ACTIONS

Explanation

Header: Shows gettrinfo command execution date, followed by computer name.

Hardware Status section: Shows various statuses of the Equipment in subsections.

- Fan condition: Shows the status of each fan in “xx fan status: yy” format.
 - xx: Fan name, where “PS” represents power supply fan and “CPU” represents CPU fan.
 - yy: Status in one of the representations below.
 - “Normal”: Normal status
 - “Error”: Abnormal status
- Temperature condition: Shows the status of temperature in “xx temperature status: yy” “xx temperature value: zz” format.
 - xx: Temperature type, where “Internal” represents temperature inside the cabinet.
 - yy: Status in one of the representations below.
 - “Normal”: Normal status
 - “Error”: Abnormal status
 - zz: Temperature value.
- RAID condition: Shows the status of RAID in “Arrayxx” “Status: yy(zz ww, Media Error)” “RAID level: vv” format. This subsection is available on D Model only.
 - xx: RAID count.
 - yy: RAID status in one of the representations below.
 - “Optimal”: Normal status
 - “Degrade”: Degraded (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.
 - vv: RAID level in the representation below.
 - “1”: RAID1 (mirroring)

- Drive condition: Shows the drive status in “Drive bay xx ” “Status: yy ” “Used hours: zz ” format.
 - xx : Drive bay number.
 - yy : Drive status in one of the representations below.
 - “Healthy”: Normal
 - “Not Connected”: Not physically installed
 - “Smart Detected”: SMART detected
 - “Offline”: Offline (D Model and B Model displayed)
 - “Offline” (Incomplete data): Offline due to data mismatch (B Model only)
 - “Rebuild”: Rebuilding (D Model only)
 - “Overrun”: Used hours exceeded
 - “Unknown”: Unknown
 - “Smart Detected, Overrun”: “Smart Detected” and “Overrun” at a time
 - zz : Drive used hours

- Memory condition: Shows the status of memory in “DIMM xx status: yy ” format.
 - xx : Memory slot name, where “A” represents DIMM A and “B” represents DIMM B.
 - yy : Status in one of the representations below.
 - “Normal”: Normal status
 - “Error”: Highly frequent error correction status
 - “Not Mounted”: Not mounted status

RAS Setting section: Shows RAS software settings in subsections.

- Automatic shutdown setting: Shows the settings for automatic shutdown in “Fan: xx ” “Temperature: yy ” “Remote shutdown: zz ” format.
 - xx : Setting of automatic shutdown upon fan error. “ON” represents enabled and “OFF” represents disabled.
 - yy : Setting of automatic shutdown upon temperature error. “ON” represents enabled and “OFF” represents disabled.
 - zz : Setting of automatic shutdown upon remote shutdown signal input to external contact. “ON” represents enabled and “OFF” represents disabled.

- Watchdog timer setting: Shows the settings for watchdog timer in “Retrigger type: xx ” “Timeout: yy ” “Interval: zz ” format.
 - xx : Type of retrigger, where “Automatic” represents automatic execution of retrigger, “Application” represents execution of retrigger by application program, and “Not used” represents no use of retrigger.
 - yy : Timeout value for automatic execution of retrigger. “ON” represents enabled and “OFF” represents disabled.
 - zz : Value of retrigger interval for automatic execution of retrigger.

7. MAINTENANCE ACTIONS

- Drive failure prediction setting: Shows the settings for drive failure prediction (SMART) in “Function is available: *xx*” “Interval: *yy*” format.
 - *xx*: Enabled or disabled setting of drive failure prediction (SMART), where “Enable” represents enabled and “Disable” represents disabled.
 - *yy*: Value of monitoring interval.
- Drive used hours monitoring setting: Shows the settings for drive used hours monitoring in “Function is available: *xx*” “[Advanced]” “Time limit of drive bay yy : *zz*” format.
 - *xx*: Enabled or disabled setting of drive used hours monitoring, where “Enable” represents enabled and “Disable” represents disabled.
 - *yy*: Drive bay number.
 - *zz*: Threshold for drive used hours monitoring in advanced settings.
- Digital LED setting: Shows the settings for the status indication digital LED in “Show Hardware status: *xx*” format.
 - *xx*: Enabled or disabled setting of hardware status indication, where “ON” represents enabled and “OFF” represents disabled.
- Popup setting: Shows the settings for pop-up notification in “Function is available: *xx*” “[Advanced]” “Fan: *yy*” “Temperature: *zz*” “SMART: *aa*” “Used hours: *bb*” “RAID: *cc*” “Memory: *dd*” format, where “RAID: *cc*” is available on D Model only.
 - *xx*: Enabled or disabled setting of pop-up notification, where “Enable” represents enabled and “Disable” represents disabled.
 - *yy*: Whether fan errors are selected or deselected for pop-up notification in advanced settings, where “Enable” represents selected and “Disable” represents deselected.
 - *zz*: Whether temperature errors are selected or deselected for pop-up notification in advanced settings, where “Enable” represents selected and “Disable” represents deselected.
 - *aa*: Whether detection of drive failure prediction is selected or deselected for pop-up notification in advanced settings, where “Enable” represents selected and “Disable” represents deselected.
 - *bb*: Whether detection of exceeded drive used hours monitoring is selected or deselected for pop-up notification in advanced settings, where “Enable” represents selected and “Disable” represents deselected.
 - *cc*: Whether detection of abnormal RAID status is selected or deselected for pop-up notification in advanced settings, where “Enable” represents selected and “Disable” represents deselected. Available on D Model only.
 - *dd*: Whether detection of highly frequent memory error correction is selected or deselected for pop-up notification in advanced settings, where “Enable” represents selected and “Disable” represents deselected.

MESSAGE

When execution of the `getrasinfo` command finishes normally, the termination code 0 is returned. When execution of the `getrasinfo` command ends in an error, one of the error messages below is displayed and a termination code 1 is returned.

Table 7-9 Error Messages with `getrasinfo` Command

<i>Error message</i>	<i>Explanation</i>
Usage: <code>getrasinfo [/status /setting] [/e File]</code>	Specifying of options is incorrect. Specify options correctly.
An error occurred in %s. errorcode=%x. <ul style="list-style-type: none"> • %s: Name of error-detected Windows API function or error-detected internal function. • %x: Error code of Windows API or internal function. 	An internal error occurred. Execute the <code>getrasinfo</code> command again.
You do not have the privilege to perform this command. Please log on as a group of administrators and perform this command again.	Log on as a group of administrators and execute the <code>getrasinfo</code> command again.
You do not have the privilege to run this command. Please run this command again on “Administrator: Command Prompt”.	You do not have the Administrator privilege. Log on to the local computer as a member of the Administrators group and then retry the command execution. If User Account Control (UAC) is enabled, activate the command prompt as administrator and retry the command execution. (Windows® 7 only)

7. MAINTENANCE ACTIONS

MEMO

CHAPTER 8 USAGE NOTES

8.1 Backing Up Files

NOTICE

A machine error, an unexpected power failure, or an operation error on the Equipment may cause files to be lost permanently. To prevent such loss of data, implement scheduled backup in daily operation.

Determine the backup means taking the time for file recovery into consideration.

< NOTE on handling of HDD >

This Equipment uses high-precision mechanical parts. In particular, the HDD is very sensitive to vibration and shock, thus requiring an extreme care in handling. Be sure to comply with the following requirements.

Handling of the Equipment with HDDs installed

- Do not apply vibration or shock.
- When you intend to move the Equipment, first shut down the OS, then disconnect the power cord plug from the outlet, and wait at least one minute.
- When transporting or carrying the Equipment, try using the special box for the Equipment whenever possible. When you desire to transport or carry the Equipment installed in a rack or cabinet, take necessary protections so that vibration or shock to the Equipment will not exceed the specifications.
- To avoid condensation on the Equipment when moved from the exterior to the interior, keep the cargo packed for at least four hours before you use the Equipment.

Handling of HDD alone

- When you intend to remove the HDD from the Equipment, first shut down the OS, then disconnect the power cord plug from the outlet, and wait at least one minute.
- Do not apply vibration or shock.
- Take measures of static electricity discharge on your body and the work area.
- Hold the chassis or the side of the HDD so as not touch the printed pattern.
- Even for a short time, place the HDD on shock-absorbing anti-static material (e.g., cushion). Placing on a hard surface such as table is liable to shock and shortens life.
- For storage over a long time, put the HDD in an anti-static bag and then in a special HDD box.
- When transporting or carrying the HDD, put the HDD in a special HDD box and ensure that the cargo is handled as a precision component.

8.2 Restrictions

(1) The Equipment

NOTICE

- When you intend to move the Equipment, first shut down the OS, then disconnect the power cord plug from the outlet, and wait at least one minute. Otherwise, failure of hardware such as HDD may result.
- When transporting or carrying the Equipment, repack it using the packing materials that came with it and are not broken or dented. Transporting or carrying the Equipment either packed by other packing materials or repacked by broken or dented packing materials may damage the Equipment.
- By the characteristics of rush current suppression circuit on this Equipment, a larger rush current than usual may flow when power is supplied before the power supply unit is naturally cooled after the last power-off. To avoid possible adverse effects on the connected electronic devices such as fuse-free breakers and on the service life of this Equipment, wait at least one minute of the last power-off before you supply power to the Equipment.

- Packing
 - After unpacking the Equipment, make sure that you retain all the packing materials for future transportation and carriage.
- Cable connection
 - Insert each connector in the correct orientation and at the correct angle so that it properly functions. If the connector is inserted incorrectly, the Equipment may not operate or may malfunction.
 - Make sure that the cables are routed neatly around the Equipment so that feet or hands are not caught. If a power cable is disconnected during operation and the power is disrupted, important data in the disk may be destroyed.
 - Be sure to disconnect the power supplies to the Equipment and the peripherals before connecting or disconnecting the Equipment and the peripherals. If such connection or disconnection between the Equipment and the peripherals is made while the power supplies to the Equipment and the peripherals are connected, a failure may occur.
 - Use only the specified cables.
 - Do not pull the cables with a strong force. Do not place things on the cables.

- Usage
 - In a hot place, make sure that the ambient temperature is lowered to a sufficient degree by an air conditioner before the Equipment is operated.
 - After powering off the Equipment, wait at least 20 seconds before powering on the Equipment again. The Equipment may not start within less than 20 seconds.
 - Connect the power supplies to the peripherals before connecting the power supply to the Equipment. Also, disconnect the power supply to the Equipment before disconnecting any of the power supplies to the peripherals.
 - Powering on the Equipment may generate low-frequency sound. This sound is caused by low-frequency vibrations from the harmonics choke coils during the transition period, which has no adverse effect on the performance and life of the Equipment.
 - Do not use the Equipment in an extremely hot or cold place or a place subject to rapid temperature changes.
 - Do not use the Equipment in a place exposed to direct sunlight or any source of high heat such as a stove.
 - Try not to use the Equipment in a dusty or humid place.
 - To wipe away dust from the surface of the Equipment, use a soft cloth moistened with detergent and wipe lightly. Be noted that use of volatile substance (e.g., benzene, thinner or alcohol) or other chemical substance may deform or discolor the Equipment.
 - The Equipment includes high-precision electronic parts. Do not apply shock to the Equipment, and do not use the Equipment in a place subject to shocks or vibrations.
 - Do not use the Equipment in a room filled with chemical fumes or in a place exposed to chemicals.
 - When not using the Equipment, disconnect the power supply to the Equipment. When not using the Equipment for a long period, disconnect the power cord plug from the outlet.
 - Dust such as cotton dust is likely to adhere to the vents and areas around them. Clean them periodically.
 - Corrosive gasses and a salt-laden atmosphere chemically corrode surfaces of the Equipment, affecting the contact resistances of electronic parts and also reducing the structural strengths of moving parts. This significantly reduces the reliability of the Equipment. Install the Equipment in a place free from corrosive gases (particularly sulfur dioxide, hydrogen sulfide, chlorine gases, and ammonia gases).
 - The clock displayed on the BIOS setup menu screen is used for the time setting rather than used as ordinary clock. Hence, when the date changes, the date on the setup menu screen remains unchanged. Change the date manually on the same screen.
 - The time-of-day clock may lag while the setup menu is being used. After closing the setup menu, be sure to check the time.
 - Carpets and lap robes of some materials generate electrostatic, which may cause an adverse effect on the Equipment. Use conductive carpets and lap robes that do not easily generate static electricity.

8. USAGE NOTES

- Keep the voltages between the low-voltage side of the power supply and the maintenance ground (Class D grounding* (formerly Class 3 grounding)) at 250 VAC or less. If the voltage is higher than 250 VAC, install an insulation transformer or constant-voltage regulator.
- Keep the Equipment away from magnets, speakers and other components that generate strong magnetic fields. The Equipment may fail when it is placed near them.
- Since the Equipment includes high-precision components, do not allow the Equipment to receive a shock during transportation, movement, or usage.
- The Manufacturer assumes no responsibility for loss of data or application software damage caused by a hardware failure on the Equipment.
- Do not disconnect the power supply to the Equipment or do not press the RESET switch while communication is in progress or a disk is being read or written.
- During the use of the Equipment, the screen may be suddenly turned off due to an outage or voltage drop caused by lightning or an unstable power supply. When this happens, restart the Equipment by disconnecting and connecting the power supply to the Equipment.
- Use the basic software products specified by the Manufacturer. If any other basic software product is used, correct operation of the Equipment will not be guaranteed.
- This Equipment is evaluated with the specified hardware in this manual. If any other hardware product is used, correct operation of the Equipment will not be guaranteed.
- If the Equipment is moved from a hot place to a cold place, condensation may occur on surfaces or inside the Equipment. Let the Equipment stand for several hours in the place where the Equipment is to be used before using it.

* Class D grounding is defined in the Technical Standard for Electrical Facilities of Japan. This standard states that the grounding resistance must be 100 ohms or less for devices operating on 300 VAC or less, and 500 ohms or less for devices that shut down automatically within 0.5 second when shorting occurs in low tension lines.

(2) HDD

Do not disconnect the power supply to the Equipment or do not press the RESET switch while the hard disk is being read or written. Otherwise, the contents of the disk may be destroyed.

- Handling the HDD
 - Back up the contents of the disk periodically.
 - When changing an already-created partition, delete it and then create a new partition.
 - When a partition is deleted, all files in it are also deleted. Back up important files before deleting a partition.

(3) DVD drive

Do not disconnect the power supply to the Equipment or do not press the RESET switch while the DVD medium is being read or written. Otherwise, the contents of the DVD medium may be destroyed.

- Handling the DVD drive
 - Use the DVD drive in a low-dust environment. Keep the areas around the DVD drive neat. When spraying an insecticide or other liquid, completely cover the entire DVD drive with a vinyl sheet or similar protection in advance.
 - Do not apply a strong shock to the DVD drive while it is in use.
 - Do not open the tray except when mounting or unmounting a DVD medium. Do not place foreign materials in the tray. Otherwise, the DVD drive may be damaged or cause a failure.
 - Remove the DVD medium before disconnecting the power supply to the Equipment. Leaving the DVD medium in the tray may cause a failure.

- Handling the DVD medium
 - Wipe the DVD medium in a radiating manner with a dry and soft cloth, from its center toward the outer edge.
 - Do not use a cloth with benzine, thinner, water, record cleaner, antistatic agent, or silicon.
 - Do not use a hair drier to remove dust or moisture.
 - Do not store a DVD medium in a hot place.
 - Do not fold or bend a DVD medium.
 - Do not hand-write characters or scratch the recording surface.
 - Do not play with a DVD medium, e.g., by inserting a bar into the center hole and rotating the DVD medium.

(4) Optical mouse

The optical mouse may fail to operate properly on a transparent, translucent or reflecting surface (such as glass or mirror) because of the characteristics of the optical sensor. In this case, avoid using the optical mouse on such surfaces or use a commercially available optical mouse pad. The optical mouse may also fail to operate properly if the surface of the optical sensor is contaminated by condensation or oil mist. To use the optical mouse in such an environment, take sufficient protective measures in the same manner as for the Equipment.

8.3 Limitations on Maintenance Services

- Microsoft® Windows® XP Professional, Microsoft® Windows® 7 Professional, device drivers, and some commercially available applications may not be modified to correct the causes of errors. In this case, solutions to prevent errors may be suggested rather than actions to correct the causes of errors.
- If commercially available hardware is added to the Equipment without permission from the Manufacturer, warranty of the entire Equipment will be lost.
- The Manufacturer does not have rights to investigate the causes of errors (such as requests for disassembling for investigation of errors) for some parts (such as LSI chips manufactured by Intel®). Therefore, the Manufacturer cannot disassemble these parts for investigation of errors. In most such cases, the Manufacturer only reports the replacement action and the unit of replacement.
- When the user asks for the failed Equipment to be repaired, the faulty component or the entire Equipment may sometimes be replaced with a functionally compatible one.

8.4 Notes on Power Options of Windows® 7

(1) Link state power management setting of PCI Express

Do not change the link state power management setting of PCI Express (**Link State Power Management** under **PCI Express** under **Advanced settings** under **Power Options**) from the default “Off”. Otherwise, the onboard LAN may become unable to communicate or the system may hang during communications using the onboard LAN.

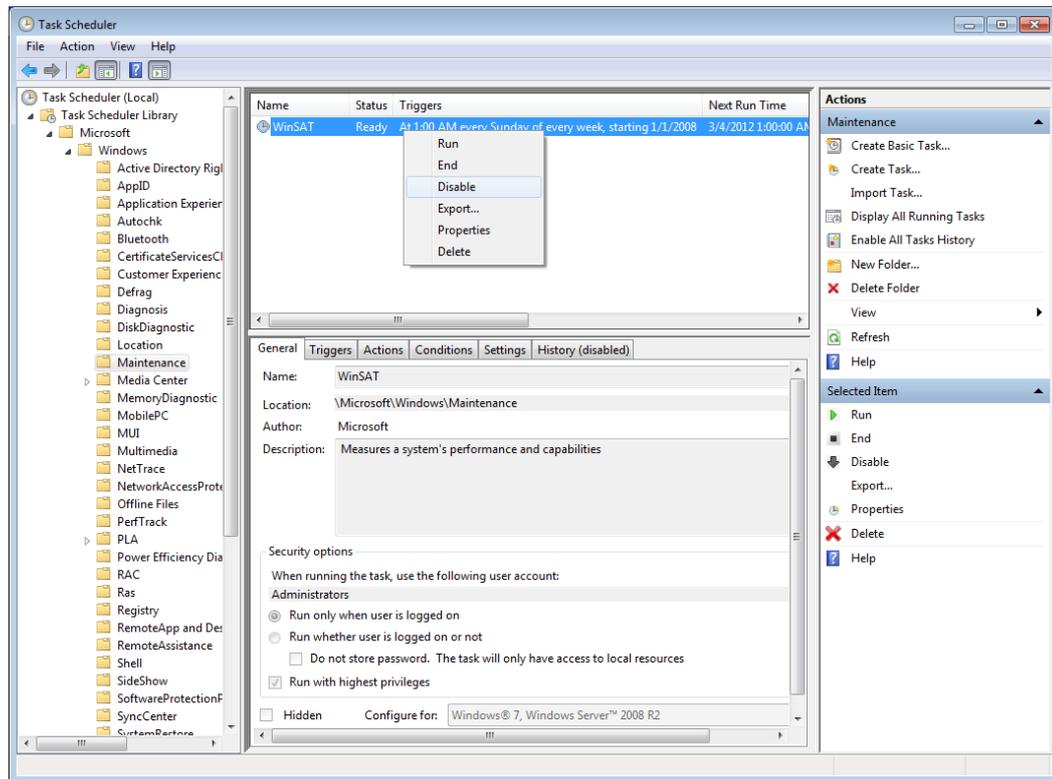
(2) How to avoid unintended turning off of the display screen

Even if you set **Turn off the display** to **Never**, the screen may still turn off because the High Performance plan is temporarily activated by the Windows Experience Index running in the background. If you wish to avoid such unintended turning off of the display screen, turn off automatic execution of the Windows Experience Index according to the procedure below.

1. Log on to the local computer as a member of the Administrators group unless you have already logged on as such.
2. Click **Start** and click **Control Panel**.
3. In the “Control Panel” window, click **System and Security**.
4. In the “System and Security” window navigated from the “Control Panel” window, click **Administrative Tools**.
5. In the “Administrative Tools” window navigated from the “System and Security” window, double-click **Task Scheduler**.
6. In the tree view of the left pane of the “Task Scheduler” window, sequentially click **Task Scheduler Library**, **Microsoft**, **Windows**, and **Maintenance**.

8. USAGE NOTES

7. In the center pane, right-click **WinSAT** and select **Disable** from the drop-down menu.



< NOTE >

After you disable the Windows Experience Index by the procedure above, the Windows Experience Index may remain stopped or unable to run at device driver update or hardware configuration change. Because these situations may disable optimum operation of Windows® and hence degrade the performance of the Equipment, manually start the Windows Experience Index according to the procedure below.

1. Click **Start** and click **Control Panel**.
2. In the “Control Panel” window, click **System and Security**.
3. In the “System and Security” window navigated from the “Control Panel” window, click **Check the Windows Experience Index**.
4. In the bottom right of the “Rate and improve your computer’s performance” window navigated from the “System and Security” window, click **Rate this computer** button (for the first time) or **Re-run the assessment** button (for the second time and on).
5. If the “User Account Control” dialog box opens, click **Yes** button to continue.

CHAPTER 9 RAID1

9.1 What Is RAID1?

This chapter explains how to use the RAID1 functions peculiar to HJ-2035vwxyD (D Model) of HF-W2000 Model 35. References to the “Equipment” in this chapter only apply to D Model of HF-W2000 Model 35. It is only an HDD that Equipment adopts.

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.
- Each Equipment contains uniquely assigned HDD serial numbers in its own RAID1 configuration information. Accordingly, if you create a copy of the existing HDD without using the RAID1 rebuilding process, the copy will be recognized new and invalid. This new HDD, if installed in the drive bay, will not start up the Equipment.
- Maintenance of a disk array system requires in-depth knowledge. In case of an operation error, data in the HDD may be lost.

RAID1 (Redundant Array of Independent Disks Level 1) is a technique commonly known as mirroring. The controller of the RAID1 divides the HDDs of an array into two groups and writes the same data to both of them. Reading is performed from one of the groups. If an HDD in one group should become faulty, the system can read from the corresponding normal HDD of the other group. Although the Equipment uses two HDDs, the available disk capacity is that of one HDD due to mirroring.

This Equipment graphically displays the HDD status of RAID1 by means of the built-in RAS software. For how to use this RAS software, refer to Section 2.8, “RAID Monitoring Feature” in *HF-W2000 Model 35/30 RAS Features Manual*. The display images in this chapter assume those under Windows® 7.

9. RAID1

9.2 Setup

9.2.1 Outline of setup

The built-in RAID controller causes the two HDDs connected thereto to be recognized as one HDD to the Equipment, and performs jobs relevant to RAID1 by itself transparently to the Equipment. Accordingly, the Equipment does not require BIOS or device driver for controlling the RAID controller from the Equipment or OS. Since the Equipment treats these HDDs as a common SATA HDD, no special procedure such as installation of specific software is necessitated at the setup time.

9.2.2 Procedure of new setup

NOTICE

- When you newly build a RAID1 system on the Equipment, the setup process writes the RAID1 configuration information, which only applies to this specific serial numbered Equipment. Since these HDDs containing such RAID1 configuration information are not usable on any other Equipment with a different serial number, manage handling and inventory of HDDs so that they are not inadvertently mixed if you own multiple units of this Equipment. Should a wrong HDD be installed, the Equipment may not start up or you may lose data stored in the HDD due to inconsistency of the RAID1 configuration information.
- When you newly build a RAID1 system on the Equipment, prepare two new units of specific HDD models authorized by the Manufacturer. If you use an unauthorized HDD, you may lose data stored in the HDD.

To build a new RAID1 system on the Equipment, follow the procedure below. This procedure is not necessary when you initially use the Equipment because a RAID1 system is factory-set.

1. Prepare two new HDDs.
2. Shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute. Then, mount new HDDs in drive bay 1 and drive bay 2, referring to Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)” for details.
3. Turn on the Equipment by connecting the power cord plug to the outlet and pressing the Power switch on the front panel. The RAID controller automatically detects mounting of the new HDDs and writes the RAID1 configuration information to both of these HDDs.
4. Install the OS using the Recovery DVD. (Refer to *HF-W2000 Model 35/30 Setup Guide*.)

9.3 Monitoring of RAID1 Status

9.3.1 Status monitoring via HDD status lamps

Compared with A Model, D Model is additionally provided with HDD1 status lamp and HDD2 status lamp indicating the status of each HDD in the RAID1 system as illustrated below.

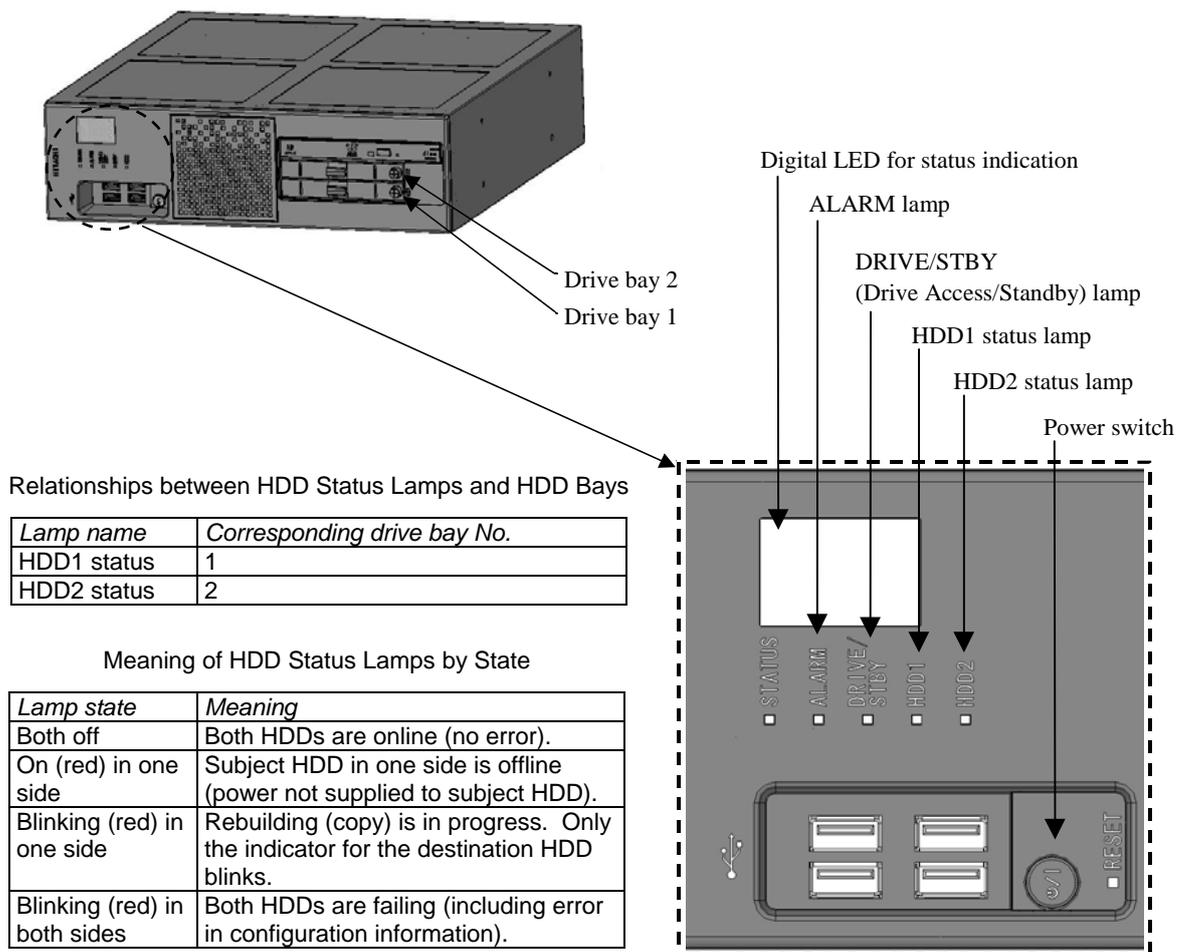
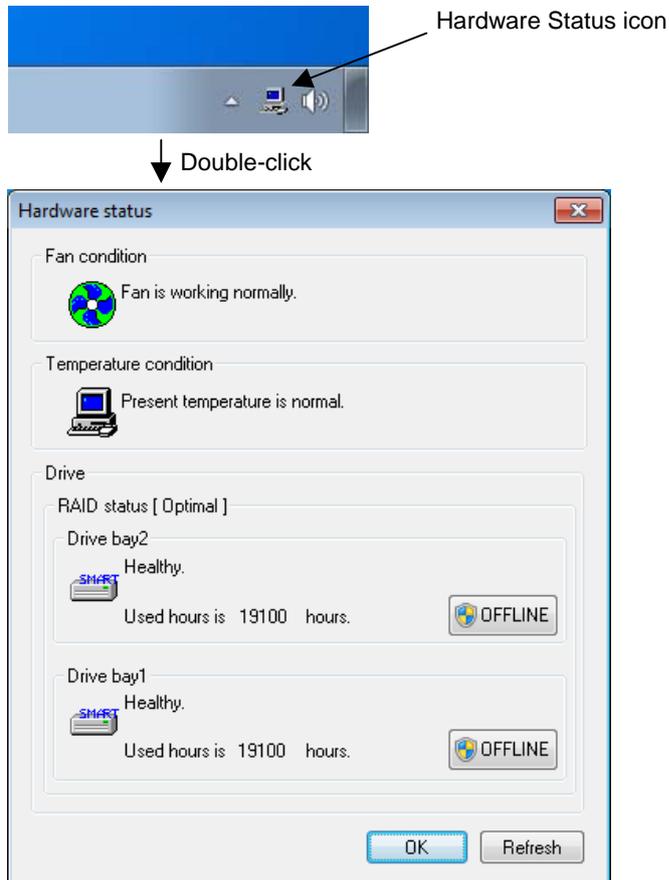


Figure 9-1 HDD Status Lamps

9. RAID1

9.3.2 Status monitoring via the “Hardware status” window

On this Equipment, you can monitor the status of each HDD in the RAID1 system via the “Hardware status” window. To open it, double-click the Hardware Status icon in the task tray. When both HDDs are normally running, the “Hardware status” window will appear as illustrated below.



Note: Under the RAS software, storage devices such as HDDs are generically referred to as “drive” (singular) or “drives” (plural).

9.4 Recovery from Failure

9.4.1 Detecting a failure

The Equipment performs the following actions upon detecting a RAID1 failure.

Action	Cause
HDD status lamp turns on (red).	HDD failure (one side or both sides)
POST code appears on the digital LED for status indication. (See Section 4.6, "POST Code Indication" in this manual and also see <i>HF-W2000 Model 35/30 RAS Features Manual</i> .)	
ALARM lamp turns on (red).	HDD failure in one side
MCALL (CE call signal) closes. (See Subsection 4.8.2, "External control interface specifications".)	
Event log records the error information. (See Section 6.3, "Event Log".)	
"Hardware status" window displays the status of each HDD in the RAID1 system. (See <i>HF-W2000 Model 35/30 RAS Features Manual</i> .)	

9.4.2 Recovering from HDD failure in one side

NOTICE

- Never remove the HDD if the corresponding HDD status lamp is off. Otherwise, the stored data will be destroyed.
- To prevent damage due to static electricity discharge, wear cotton gloves when you replace an HDD. Otherwise, the stored data may be destroyed.
- Before you ensure "Not Connected" status in the "Hardware status" window, never mount a new HDD.
- Insert a new HDD firmly and precisely. A loose contact or a missing screw will cause a failure.
- Pay attention not to apply shock to the replacing HDD and the replaced HDD during work, whether installed or not installed on the Equipment. Otherwise, a failure may result.
- Never shut down the OS or perform the HDD detachment/attachment work before the RAID1 rebuilding process is complete. Otherwise, the stored data in the HDD may be lost or a failure may result.

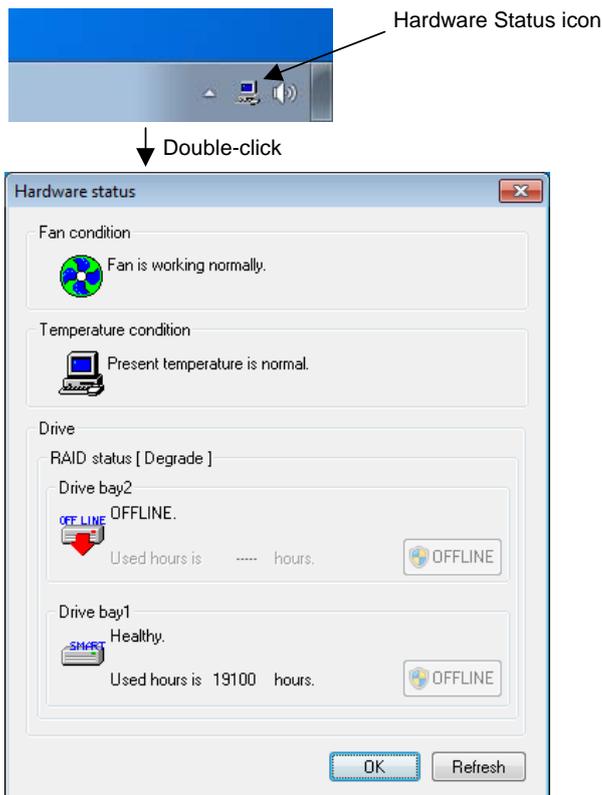
< NOTE >

The procedure in this subsection assumes that you are to replace an HDD while the Equipment power is on. If you are to replace an HDD while the Equipment power is off, first identify the failing HDD and then follow the steps of Subsection 9.5.3.1 "Replacing an HDD in RAID1 while the Equipment power is off". After completion of the rebuilding process, restart the Equipment and ensure that the RAID status for the drive bay number to which the new HDD is attached shows "Healthy" in the "Hardware status" window. If the RAID status shows "Optimal (Media Error)", follow the step 9 of Subsection 9.4.2 "Recovering from HDD failure in one side".

9. RAID1

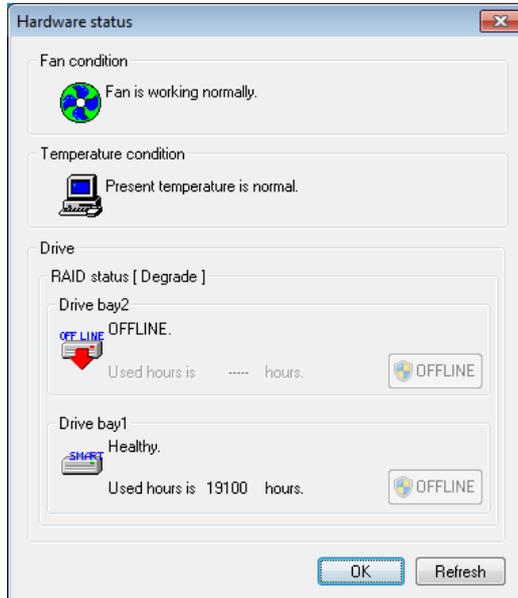
To recover from HDD failure in one side, follow the steps below.

1. Back up the data (see Section 8.1, “Backing Up Files”).
2. Terminate all the running application programs. Ensure that the HDD status lamp corresponding to the target HDD is lit because of the HDD failure.
3. Double-click the Hardware Status icon in the task tray to open the “Hardware status” window. Identify the failing HDD status shown in the window. The example below shows that the HDD in drive bay 2 is failing.

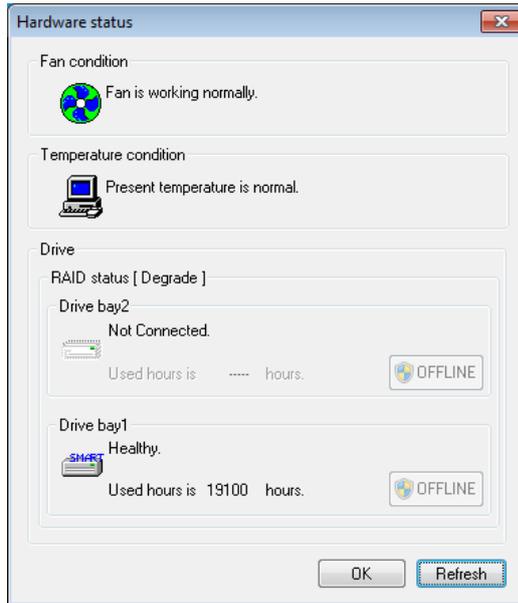


4. Referring to Steps 2 through 4 of “(2) On D Model or A Model while the Equipment power is off” in Subsection 5.4.3.2, “Detaching/attaching HDD,” loosen the two front screws fixing the subject HDD case and then detach the HDD case from the Equipment.

- In the “Hardware status” window, click **Refresh** button and ensure that the RAID status for the drive bay number from which the HDD is removed shows “Not Connected”. If the status differs, wait for a while and click **Refresh** button again. Repeat until you ensure the “Not Connected” status.



Click **Refresh** button.



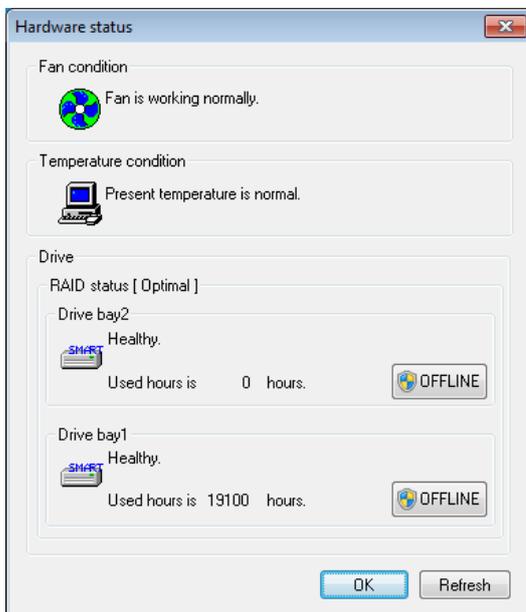
- Referring to “(2) On D Model or A Model while the Equipment power is off” in Subsection 5.4.3.2, “Detaching/attaching HDD,” attach the HDD case loaded with a new HDD and tighten the two front screws loosened in step 4.

9. RAID1

7. After a while (approximately 10 seconds), the HDD status lamp corresponding to the drive bay number to which the new HDD is attached starts blinking, and the RAID1 rebuilding process automatically starts. The rebuilding process for a 160 GB HDD takes about 70 minutes (under light-load condition).

Note: In the event that the rebuilding process does not start about a minute after attaching the HDD case loaded with the new HDD, detach the HDD case and retry from Step 4. If the rebuilding process still does not start, the HDD or the Equipment may be broken. Consult your distributor or maintenance personnel.

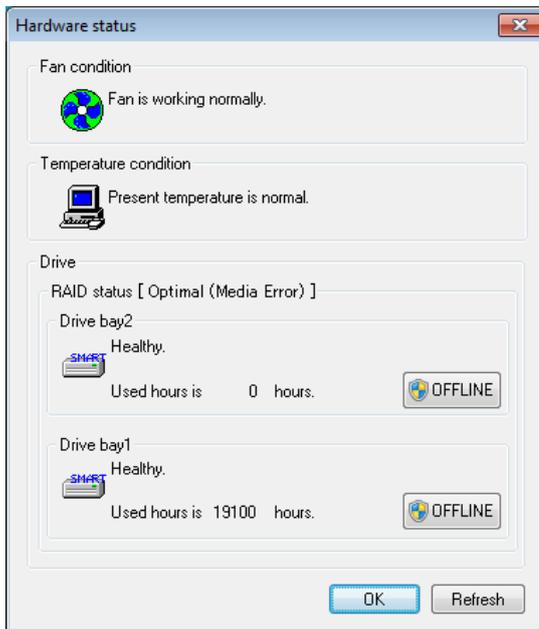
8. Completion of the rebuilding process turns off the HDD status lamp corresponding to the new HDD, and restores the RAID1 system. In the “Hardware status” window, click **Refresh** button and ensure that the RAID status for the drive bay number to which the new HDD is attached shows “Healthy”.



9. If the RAID status shows “Optimal (Media Error)”, it is recommended that you back up the data and replace the two HDDs with new HDDs. Refer the replacement procedure to Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”.

After the replacement, set up the Equipment all over again according to Subsection 9.2.2, “Procedure of new setup” and then restore the data from the backup file according to Section 8.1 “Backing Up Files”.

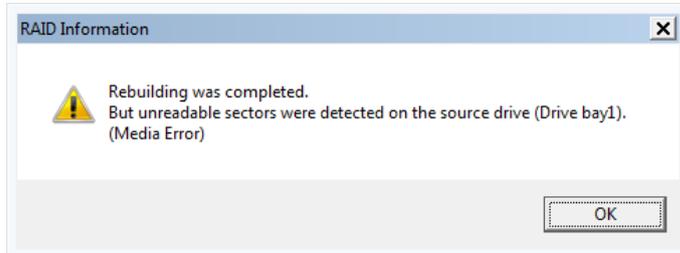
Alternatively, restore the Equipment by utilizing a backup HDD (see Subsection 9.5.2, “Performing restoration from backup HDD”).



9. RAID1

9.4.3 Acting against read error during RAID1 rebuilding process

When a read error is detected on the copy source HDD during the RAID1 rebuilding process, the area from which no data is read is notified by the message dialog below upon completion of the RAID1 rebuilding process. (The sample below indicates that the read error has been detected on the existing HDD installed in drive bay 1.)



If this happens, back up the data and replace the copy source HDD as well with a new one. Refer the replacement procedure to Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”.

After the replacement, set up the Equipment all over again according to Subsection 9.2.2, “Procedure of new setup” and then restore the data from the backup file according to Section 8.1 “Backing Up Files”.

Alternatively, restore the Equipment by utilizing a backup HDD (see Subsection 9.5.2, “Performing restoration from backup HDD”).

9.4.4 Recovering from HDD failure in both sides

To recover from HDD failure in both sides, first replace the HDDs in both sides with new ones according to Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”.

After the replacement, set up the Equipment all over again according to Subsection 9.2.2, “Procedure of new setup” and then restore the data from the backup file according to Section 8.1 “Backing Up Files”.

Alternatively, restore the Equipment by utilizing a backup HDD (see Subsection 9.5.2, “Performing restoration from backup HDD”).

9.5 Preventive Maintenance

9.5.1 Creating backup HDD

NOTICE

- To prevent damage due to static electricity discharge, wear cotton gloves when you replace an HDD. Otherwise, the stored data may be destroyed.
- Observe the work order and follow the given instructions. Otherwise, the stored data may be lost.

Although the RAID1 system is more reliable than general systems, it is still prone to the loss of data stored in the HDD due to a misoperation or other causes. Preparation of a backup HDD would then enable you to restore the lost data (up to the moment when the backup was taken). It is recommended that you prepare a new HDD and regularly keep the backup copy according to the procedure below.

Note: The procedure below assumes the steps to create a backup HDD from the HDD installed in drive bay 1. When you create a backup HDD from the HDD installed in drive bay 2, read “drive bay 1” and “HDD1 status lamp” in the steps below as “drive bay 2” and “HDD2 status lamp”.

1. Prepare a new HDD.
2. Shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute. Then, replace the HDD in drive bay 1 with a new HDD according to Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”.
3. Store the detached HDD in a safe place. Keep it as a backup HDD.
4. Turn on the Equipment by connecting the power cord plug to the outlet and pressing the Power switch on the front panel. The RAID controller automatically detects mounting of the new HDD and starts the RAID1 rebuilding process. Ensure that the HDD1 status lamp blinks.
5. Along the progress of the rebuilding process, the OS starts up. Time required for the rebuilding process depends on what application programs are running during the process. Accordingly, it is suggested that you do not run any application program until the rebuilding process is complete.

Note: If you do not want to start up the OS, activate the BIOS setup menu by pressing the F2 key while the system initialization message (BIOS memory check) is displayed or when the digital LED for status indication shows “C0”. In the background, the rebuilding process continues. Let it run to completion for about 70 minutes on a 160GB HDD.

9. RAID1

6. When the rebuilding process is complete, the blinking HDD1 status lamp goes off. Open the “Hardware status” window from the task tray icon, and ensure that the status of each HDD in RAID1 configuration is shown “Healthy” in this window.

Note: If you activated BIOS setup menu in step 5, ensure completion of the rebuilding process with turning off of the HDD1 status lamp. Then, select **Exit** in the BIOS setup menu, point to **Exit Saving Changes**, and hit the Enter key. Respond to the “Save configuration changes and exit now?” message dialog by hitting the Enter key to restart the Equipment.

9.5.2 Performing restoration from backup HDD

NOTICE

- To prevent damage due to static electricity discharge, wear cotton gloves when you replace an HDD. Otherwise, the stored data may be destroyed.
- Observe the work order and follow the given instructions. Otherwise, the stored data may be lost.

Prepare the backup HDD and a new HDD. Then, perform restoration according to the procedure below.

Note: The procedure below assumes the steps to perform restoration from the backup HDD to be installed in drive bay 1. When you perform restoration from the backup HDD to be installed in drive bay 2, read “drive bay 1” and “HDD1 status lamp” in the steps below as “drive bay 2” and “HDD2 status lamp” and vice versa.

1. Shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute. Then, detach the two HDDs from the Equipment according to Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”.
2. Attach the backup HDD to drive bay 1 according to Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”.
3. Turn on the Equipment by connecting the power cord plug to the outlet and pressing the Power switch on the front panel. Ensure that the HDD1 status lamp is off and the HDD2 status lamp is on.
4. Attach a new HDD to drive bay 2 according to Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”. The RAID controller automatically detects mounting of the new HDD and starts the RAID1 rebuilding process. Ensure that the HDD2 status lamp blinks.

5. Along the progress of the rebuilding process, the OS starts up. Time required for the rebuilding process depends on what application programs are running during the process. Accordingly, it is suggested that you do not run any application program until the rebuilding process is complete.

Note: If you do not want to start up the OS, activate the BIOS setup menu by pressing the F2 key while the system initialization message (BIOS memory check) is displayed or when the digital LED for status indication shows “C0”. In the background, the rebuilding process continues. Let it run to completion for about 70 minutes on a 160GB HDD.

6. When the rebuilding process is complete, the blinking HDD1 status lamp goes off. Open the “Hardware status” window from the task tray icon, and ensure that the status of each HDD in RAID1 configuration is shown “Healthy” in this window.

Note: If you activated BIOS setup menu in step 5, ensure completion of the rebuilding process with turning off of the HDD1 status lamp. Then, select **Exit** in the BIOS setup menu, point to **Exit Saving Changes**, and hit the Enter key. Respond to the “Save configuration changes and exit now?” message dialog by hitting the Enter key to restart the Equipment.

9.5.3 Performing periodical HDD replacement

NOTICE

- Do not replace with an HDD previously used in any RAID level. Otherwise, the Equipment may not start up or you may lose data stored in the HDD due to inconsistency of the RAID1 configuration information or similar cause.
- Selecting a wrong HDD as the target will erase the data stored in the HDD. Fully ensure the drive bay number for the target HDD on the Equipment at the user’s responsibility.
- Do not altogether replace the two HDDs in RAID1 configuration.
- To prevent damage due to static electricity discharge, wear cotton gloves when you replace an HDD. Otherwise, the stored data may be destroyed.
- When you replace an HDD while the Equipment power is on, first stop the power supply to the target HDD by placing the HDD into OFFLINE state in the “Hardware status” window. Never attempt HDD replacement before this window is ready (e.g., immediately after the OS startup). Otherwise, a machine failure or HDD failure may result.

The HDD is a consumable part with its life, requiring periodical replacement in about 2-year intervals (assuming use of 24 hours per day). At each periodical replacement, follow the steps of Subsection 9.5.3.1 or Subsection 9.5.3.2 as applicable. Because these steps include RAID1 rebuilding process, you must not altogether replace the two HDDs comprising the RAID1 system. If you need to replace the two HDDs, repeat the steps of Subsection 9.5.3.1 or Subsection 9.5.3.2, as applicable, for each HDD including the rebuilding process.

9. RAID1

9.5.3.1 Replacing an HDD in RAID1 while the Equipment power is off

To replace an HDD in RAID1 while the Equipment power is off, follow the procedure below.

Note: The procedure below exemplifies how to replace the HDD installed in drive bay 1. When you replace the HDD installed in drive bay 2, read “drive bay 1” and “HDD1 status lamp” in the procedure below as “drive bay 2” and “HDD2 status lamp”.

1. Back up the data.
2. Shut down the OS, disconnect the power cord plug from the outlet, and wait at least one minute. Then, replace the HDD in drive bay 1 with a new HDD according to Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD).”
3. Turn on the Equipment by connecting the power cord plug to the outlet and pressing the Power switch on the front panel. The RAID controller automatically detects mounting of the new HDD and starts the RAID1 rebuilding process. Ensure that the HDD1 status lamp blinks.
4. Along the progress of the rebuilding process, the OS starts up. Time required for the rebuilding process depends on what application programs are running during the process. Accordingly, it is suggested that you do not run any application program until the rebuilding process is complete.

Note: If you do not want to start up the OS, activate the BIOS setup menu by pressing the F2 key while the system initialization message (BIOS memory check) is displayed or when the digital LED for status indication shows “C0”. In the background, the rebuilding process continues. Let it run to completion for about 70 minutes on a 160GB HDD.

5. When the rebuilding process is complete, the blinking HDD1 status lamp goes off. Open the “Hardware status” window from the task tray icon, and ensure that the status of each HDD in RAID1 configuration is shown “Healthy” in this window.

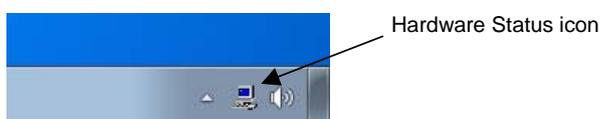
Note: If you activated BIOS setup menu in step 4, ensure completion of the rebuilding process with turning off of the HDD1 status lamp. Then, select **Exit** in the BIOS setup menu, point to **Exit Saving Changes**, and hit the Enter key. Respond to the “Save configuration changes and exit now?” message dialog by hitting the Enter key to restart the Equipment.

9.5.3.2 Replacing an HDD in RAID1 while the Equipment power is on

To replace an HDD in RAID1 while the Equipment power is on, follow the procedure below.

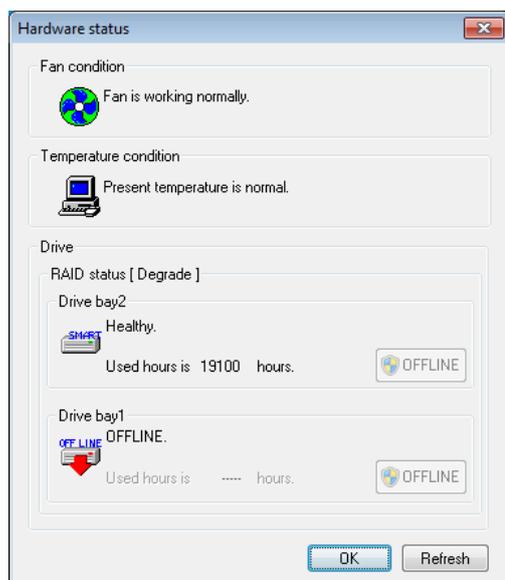
Note: The procedure below exemplifies how to replace the HDD installed in drive bay 1. When you replace the HDD installed in drive bay 2, read “drive bay 1” and “HDD1 status lamp” in the procedure below as “drive bay 2” and “HDD2 status lamp”.

1. Back up the data.
2. Terminate all the running application programs.
3. Double-click the Hardware Status icon in the task tray.



4. In the “Hardware status” window opened, click **OFFLINE** button corresponding to the replacement target, i.e., drive bay 1. Ensure that the subject HDD icon in the window shows “OFFLINE”. Also ensure that the HDD1 status lamp turns on. (In some cases you must wait several tens of seconds.)

Note: To perform operation of this step under Windows® 7, administrator’s access privilege is required. For this purpose, log on to the local computer as a member of the Administrators group and then click **OFFLINE** button in the “Hardware status” window. If the User Account Control dialog opens after responding to the confirmation dialog, click **Yes** button to continue.



5. After you ensure the HDD1 status lamp lit, replace the HDD in drive bay 1 according to Step 4 and on in Subsection 9.4.2 “Recovering from HDD failure in one side”.

9. RAID1

MEMO

CHAPTER 10 SOFTWARE RAID1

10.1 Overview of Software RAID1

This chapter explains how to use the software RAID function of the equipment model HJ-2030****B (B model).

In this chapter, “the Equipment” means HJ-2030****B (B model). HDDs are the only drives the Equipment uses for the software RAID function, and therefore, a drive is denoted as “HDD” in the following explanation.

NOTICE

- The Equipment features RAID1 and is highly reliable compared to a system with a conventional configuration. Nonetheless, the data stored on the HDDs may be lost depending on the type of the failure. In addition to equipment failure data can also be lost by power failure and human mistakes during operation. Should such situation occur, the data cannot be recovered. In order to prevent data loss, make it a routine to save your data and establish a systematic way of backup. In addition, increase the reliability of power supply by, for example, using a UPS.
- The Equipment is evaluated under the assumption that the HDD models specified by HITACHI are used. When you replace an HDD, use the HDD models specified by HITACHI. Otherwise, the data stored in the HDDs may be lost. Stick to the recommended replacement cycle when you replace an HDD. (See Section 5.3, “Replacement of Consumable Parts”.)
- The Equipment manages the unique serial number of each HDD (each HDD has a different serial number) as part of RAID1 configuration information. Therefore, if you copy the contents of an HDD to another HDD without using the rebuild function of the software RAID1 construction utility, the HDD with the copied contents is recognized as an invalid medium. Even if you mount the HDD to a drive bay, the Equipment will not start.
- Maintenance of a disk array system requires a high level of expertise. Should any mistakes be made during the maintenance work, data stored in the HDDs may be lost.

RAID1 (Redundant Array of Independent Disks Level 1) is a technology generally referred to as “mirroring”. The software RAID1 does not use a RAID controller (hardware) for mirroring but uses software to implement RAID1. Should either one of the HDD pair fail, you can read out data from the other working HDD. RAID1 uses two HDDs but the available capacity is the capacity of one HDD.

The Equipment graphically shows the status of HDDs used for software RAID1 using the RAS software. For information about how to use the RAS software, refer to Section 2.8, “RAID Monitor Function” in the “*HF-W2000 Model 35/30 RAS Features Manual*”. Screen images of the hardware status window in this chapter are examples from Windows® 7.

The Equipment comes with the software RAID1 construction utility “Software RAID1 For

10. SOFTWARE RAID1

Windows(R)". By using this utility, you can check the status of the software RAID1 and rebuild RAID1. For information about how to use the utility, see Section 10.6, "Software RAID1 construction utility".

10.2 Setup

10.2.1 Overview of setup

The software RAID1 device driver used for the RAID1 on the Equipment enables the OS to recognize two HDDs connected to the Equipment as one HDD and is responsible for data processing associated with mirroring. The software RAID1 device driver has been already installed when the product is shipped, and you do not need to install it when you set up RAID1.

10.2.2 Setting up from scratch

NOTICE

- When you build software RAID1 from scratch, the unique serial number of each HDD (each HDD has a different serial number) is stored in the HDDs as part of RAID1 configuration information. If you use multiple sets of Equipment, pay attention when you handle and store the HDDs so that the HDDs are not mixed up. Otherwise, RAID1 configuration information mismatch occurs, and the Equipment may not start up, and the data in the HDDs may be lost.
- When you build software RAID1 from scratch, prepare two new HDDs selected from the models specified and tested by HITACHI. Otherwise, the data stored in the HDDs may be lost.

Follow the procedure below when you build software RAID1 from scratch.

Be noted that, when the product is shipped, software RAID1 has been already built, and the following procedure is not necessary.

1. Prepare two new HDDs.
2. Shut down the OS, and pull out the plug of the power cable from the outlet. Wait one minute or more, and then mount new HDDs to the drive bay 1 and 2. (For information about how to mount an HDD, see Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”.)
3. Connect the plug of the power cable to the outlet, and turn on the power for the Equipment.
4. Install the OS from the recovery DVD.
(Refer to the “*HF-W2000 Model 35/30 Setup Guide*”.)

10. SOFTWARE RAID1

10.3 Checking the Status of the Software RAID1

10.3.1 Status indicator lamps

The Equipment has an alarm lamp used for showing the status of the software RAID1.

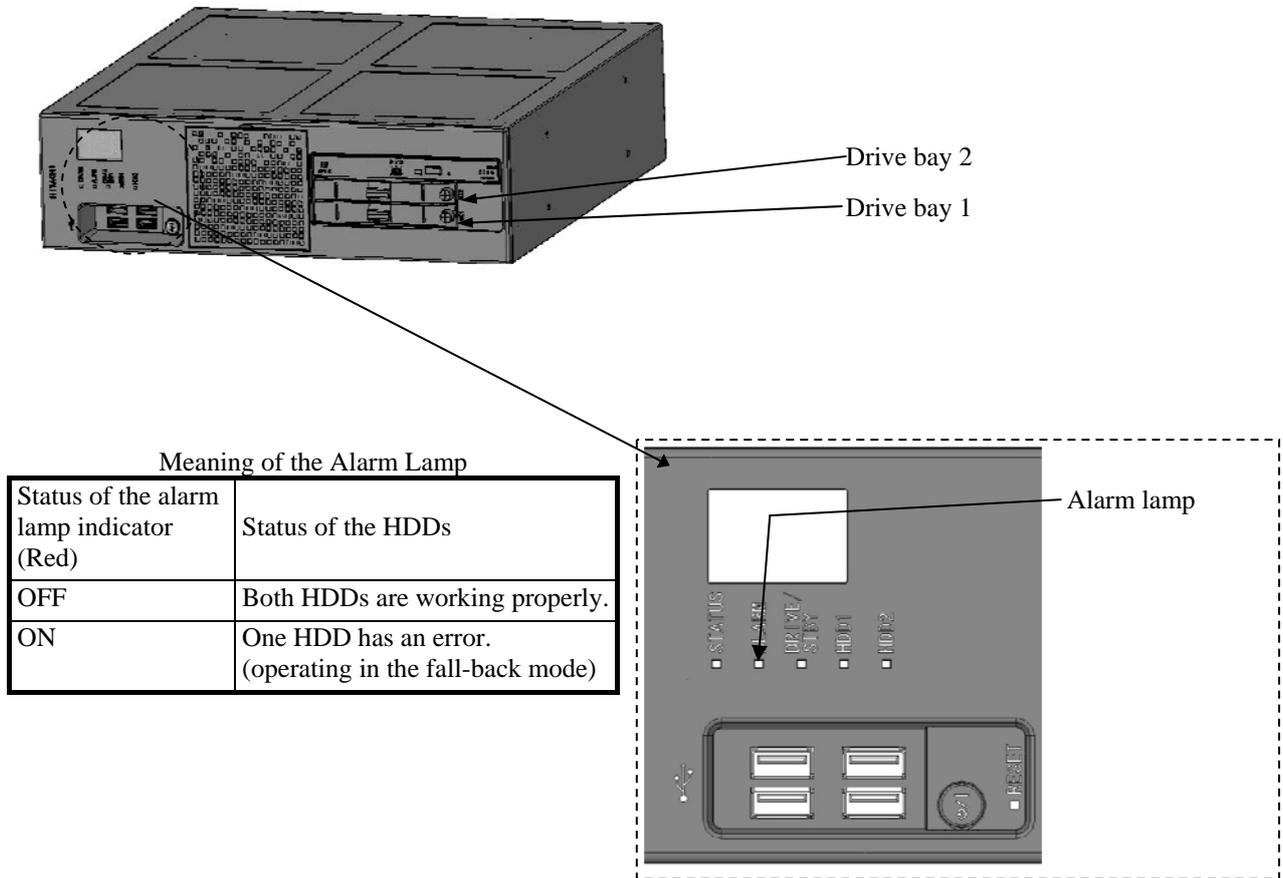
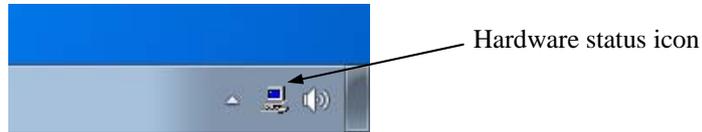


Figure 10-1 Alarm Lamp

(Note) The alarm lamp is also used for monitoring the status of other what than the software RAID1. The alarm lamp is not turned off when the software RAID1 recovers from an error if an error is detected in another monitored item.

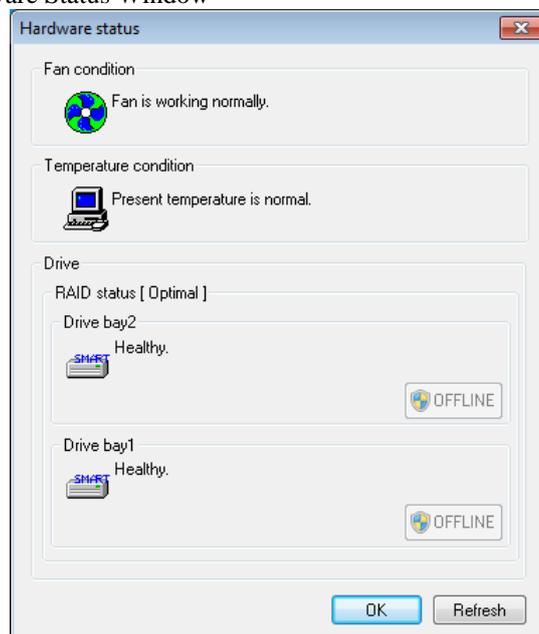
10.3.2 Hardware status window

The Equipment allows you to check the status of HDDs used for software RAID1 using the hardware status window. To display the hardware status window, double-click the hardware status window icon in the notification area of the taskbar.



If both HDDs are working properly, the following window will appear.

Hardware Status Window



(Note) In the RAS software, an auxiliary storage unit such as an HDD is denoted as “drive”.

10. SOFTWARE RAID1

10.3.3 Software RAID1 construction utility

You can use the RAID status display function of the software RAID1 construction utility “Software RAID1 For Windows(R)” to check the status of the software RAID1.

If the status of the software RAID1 is normal, the following screen will appear.

```
Show the status
Array Status:          OPTIMAL
HDD#2:                ONLINE
HDD#1:                ONLINE

Press Enter:
```

< NOTE >

In this utility, the HDD mounted in the drive bay 1 of the Equipment is displayed as “HDD#1” and the HDD mounted in the drive bay 2 as “HDD#2”.

(The same notation is used for the rest of this chapter.)

For information about how to check the status of the RAID1 using the software RAID1 construction utility and the explanation of the information displayed on the screen, see Subsection 10.6.3, “Status display function for RAID1”.

10.4 Recovering from failure

This section explains how to recover from failure. During recovery, use the software RAID1 construction utility “Software RAID1 For Windows(R)” to check the status of the software RAID1 and rebuild RAID1. Set up the utility before starting recovery.

10.4.1 Detecting a failure

When failure is detected in the RAID1, the following actions are executed by the Equipment.

No.	Action	Cause
1	The alarm lamp (Red) is turned on.	<ul style="list-style-type: none"> • Failure in one HDD • Power failure occurred during operation, and highly likely there is data mismatch between the two HDDs.
2	Data is recorded using the event log. (See Section 6.3, “Event Log”.)	
3	The status of HDDs used for software RAID1 is displayed on the hardware status window. (Refer to the “ <i>HF-W2000 Model35/30 RAS Features Manual</i> ”)	

< NOTE >

- When failure is detected in the RAID1, the Equipment goes into the fall-back mode using one of the two HDDs. When you start up the Equipment for the first time after it went into the fall-back mode, you might need to reboot it to ensure that the Equipment does not start up from the failed HDD.

10.4.2 Checking the status of failure

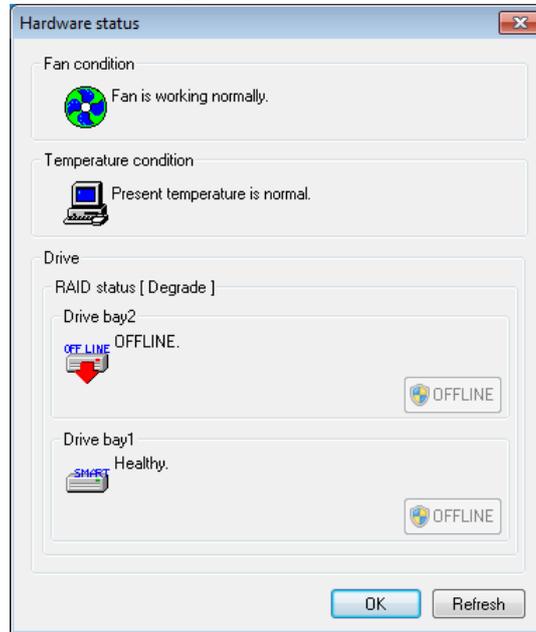
Before starting recovery, check the status of failure by following the procedure below.

1. Confirm that the alarm lamp is on. (See Subsection 10.3.1, “Status indicator lamps”.)
2. Double-click the hardware status icon on the notification area of the taskbar. Check the status of failure on the hardware status window.

10. SOFTWARE RAID1

- If the status of the HDD in the drive bay 1 or 2 is displayed as “OFFLINE.”, Follow the instruction in Subsection 10.4.3, “Recovering from HDD failure in one side” for recovery.

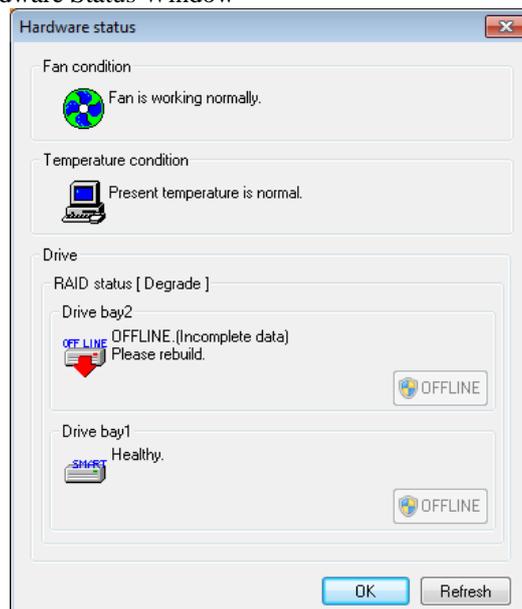
Hardware Status Window



(Note) The screen above shows the case when the HDD mounted in the drive bay 2 is failed.

- If the status of the HDD in the drive bay 2 is displayed as “OFFLINE.(Incomplete data) Please rebuild.”, Please rebuild.”, Follow the instruction in Subsection 10.4.4, “Recovering from power failure during system operation” for recovery.

Hardware Status Window



10.4.3 Recovering from HDD failure in one side

NOTICE

- Wear cotton gloves when replacing an HDD in order to prevent failure caused by static electricity. Otherwise, the data in the HDDs may be corrupted.
- Mount an HDD steadily. Loose contact and missing screws may result in failure.
- Do not shake the installing HDD and the already mounted HDDs while replacing an HDD. If you do so, the device may fail.
- When you use the software RAID1 construction utility, disconnect all the external storage devices connected to the Equipment beforehand. Otherwise, the Equipment may not start up, or the data in the HDDs may be lost.
- Until rebuild is complete, avoid shutting off the power for the Equipment or attaching and detaching HDDs. Otherwise, the data in the HDDs may be lost or failure may result.

When you recover from failure in one HDD, follow the procedure below.

1. Back up the data. (See Subsection 8.1, “Backing Up Files”.)
2. Shut down the OS, and pull out the plug of the power cable from the outlet. Wait one minute or more, and then replace the failed HDD with a new HDD. (For information about how to replace an HDD, see Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”.)

If any external storage devices are connected to the Equipment, disconnect them.

3. Turn on the power for the Equipment. Before the OS starts, insert the software RAID1 construction utility “Software RAID1 For Windows(R)” into the DVD drive.

10. SOFTWARE RAID1

4. The software RAID1 construction utility starts. On the menu screen, enter “1” and then press the [Enter] key to check the status of the software RAID1.
Confirm that the new HDD is displayed as “NORMAL” on the screen.

Show the status	
Array Status:	DEGRADE
HDD#2:	ONLINE
HDD#1:	NORMAL
Press Enter:	

(Note) The screen above shows the case when a new HDD is mounted in the drive bay 1.

If the new HDD is not displayed as “NORMAL”, it is possible that the mounted HDD was used for software RAID before and is mounted by mistake. Stop the recovery, and check that the mounted HDD is the correct one.

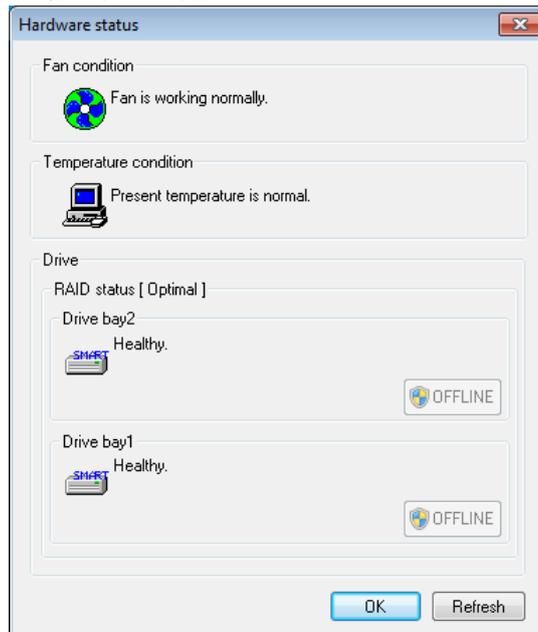
5. Press the [Enter] key to go back to the menu screen of the software RAID1 construction utility.
6. On the menu screen, enter “2” and then press the [Enter] key to start rebuilding RAID1. (For information about the rebuild procedure, see Subsection 10.6.4, “Rebuild function of RAID1”.)
A rebuild process takes about 60 minutes if the capacity of the HDD is 160GB.
7. After the rebuild is complete, on the menu screen, enter “1” and then press the [Enter] key to check the status of the software RAID1.
Confirm that the status of the software RAID1 is normal (Array Status is “OPTIMAL” and the HDD on either drive bay is “ONLINE”) as shown below.

Show the status	
Array Status:	OPTIMAL
HDD#2:	ONLINE
HDD#1:	ONLINE
Press Enter:	

8. Press the [Enter] key to go back to the menu screen of the software RAID1 construction utility.
9. On the menu screen, enter “5” and then press the [Enter] key to exit the software RAID1 construction utility.

10. Remove the software RAID1 construction utility “Software RAID1 For Windows(R)” from the DVD drive. Then press the power switch for four seconds or more to shut down the power for the Equipment.
If you disconnected any external storage devices at Step 2, reconnect them to the Equipment.
11. Turn on the power for the Equipment. After the OS starts up, confirm that both HDDs are working properly on the hardware status screen.

Hardware Status Window



10. SOFTWARE RAID1

10.4.4 Recovering from power failure during system operation

NOTICE

- When you use the software RAID1 construction utility, disconnect all the external storage devices connected to the Equipment beforehand. Otherwise, the Equipment may not start up, or the data in the HDDs may be lost.
- Until rebuild is complete, avoid shutting off the power for the Equipment or attaching and detaching HDDs. Otherwise, the data in the HDDs may be lost or failure may result.

If the system starts up after power failure during system operation, for example, and it is possible that there is data mismatch between the two HDDs, the Equipment logically disconnects the HDD mounted in the drive bay 2 and goes into the fall-back mode. In this case, the HDD mounted in the drive bay 2 does not have to be replaced and can continue to be used.

When you recover from this situation, follow the procedure below.

1. Back up the data. (See Subsection 8.1, “Backing Up Files”.)
2. Shut down the OS. If any external storage devices are connected to the Equipment, pull out the plug of the power cable from the outlet. Wait one minute or more, and then disconnect them.
3. Turn on the power for the Equipment. Before the OS starts, insert the software RAID1 construction utility “Software RAID1 For Windows(R)” into the DVD drive.
4. The software RAID1 construction utility starts. On the menu screen, enter “1” and then press the [Enter] key to check the status of the software RAID1.
Confirm that the HDD mounted in the drive bay 2 can continue to be used (“OFFLINE (INCOMPLETE DATA)”) as shown below.

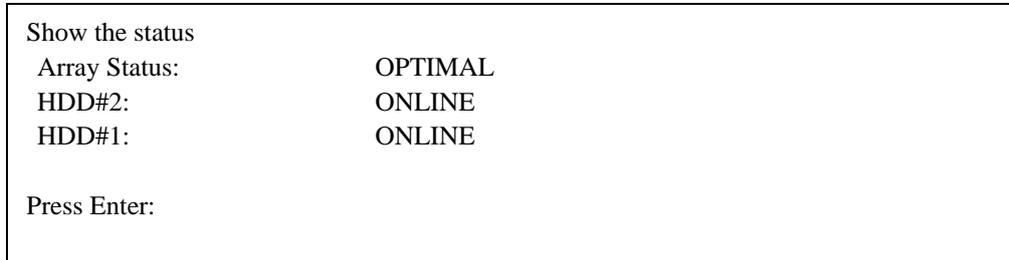
```
Show the status
Array Status:          DEGRADE
HDD#2:                OFFLINE (INCOMPLETE DATA)
HDD#1:                ONLINE

Press Enter:
```

5. Press the [Enter] key to go back to the menu screen of the software RAID1 construction utility.
6. On the menu screen, enter “2” and then press the [Enter] key to start rebuilding RAID1. (For information about the rebuild procedure, see Subsection 10.6.4, “Rebuild function of RAID1”.)

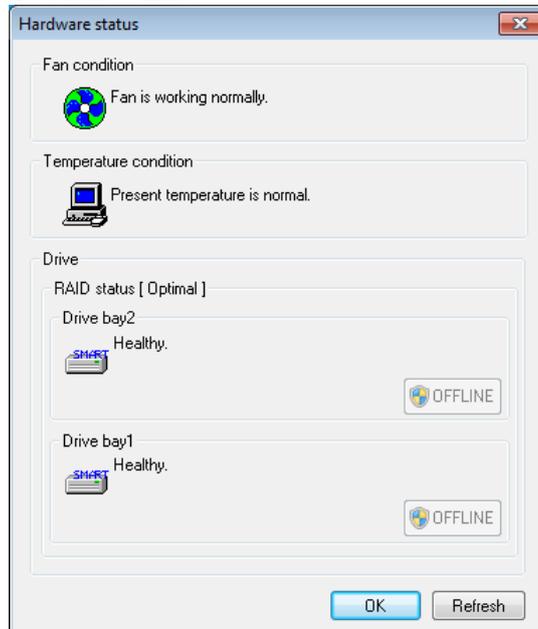
A rebuild process takes about 60 minutes if the capacity of the HDD is 160GB.

7. After the rebuild is complete, on the menu screen, enter “1” and then press the [Enter] key to check the status of the software RAID1.
 Confirm that the status of the software RAID1 is normal (Array Status is “OPTIMAL” and the HDD on either drive bay is “ONLINE”) as shown below.



8. Press the [Enter] key to go back to the menu screen of the software RAID1 construction utility.
9. On the menu screen, enter “5” and then press the [Enter] key to exit the software RAID1 construction utility.
10. Remove the software RAID1 construction utility “Software RAID1 For Windows(R)” from the DVD drive. Then press the power switch for four seconds or more to shut down the power for the Equipment.
 If you disconnected any external storage devices at Step 2, reconnect them to the Equipment.
11. Turn on the power for the Equipment. After the OS starts up, confirm that both HDDs are working properly on the hardware status screen.

Hardware Status Window



10. SOFTWARE RAID1

10.4.5 When a trouble occurs during recovery

(1) If read or write error occurred during rebuild

If unreadable area is detected during rebuild of the RAID1, an error message is displayed as shown on the following screen. The rebuild process continues.

```
>>Start Rebuild   (Press `Ctrl+C' to abort) 01/31/2012 12:40:00
Read error on HDD#1.(error sector = 0XXXXXXXXX) ← Sector number
Read error on HDD#1.(error sector = 0YYYYYYYYY) ← where read error occurred
100%
>>End 01/31/2012 13:31:00
```

(Note) The screen above shows the case when read error occurred on the HDD mounted in the drive bay 1.

If unwritable area is detected during rebuild of the RAID1, an error message is displayed as shown on the following screen.

```
>>Start Rebuild   (Press `Ctrl+C' to abort) 01/31/2012 12:40:00
20%
Write error on HDD#2.(error sector = 0XXXXXXXXX) ← Sector number
>>End 01/31/2012 13:31:00                               where write error occurred
```

(Note) The screen above shows the case when write error occurred on the HDD mounted in the drive bay 2.

(a) Corrective action when the copy source HDD has an error

If the copy source HDD has a read or write error, replace the failed HDD. (For information about how to replace an HDD, see Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”.) After the HDD is replaced, follow the instruction described in Subsection 10.2.2 “Setting up from scratch” to build software RAID1 from scratch. Or, recover the Equipment using a backup HDD. (See Subsection 10.5.2, “Performing restoration from backup HDD”.)

< NOTE >

The copy destination HDD can be used as an HDD for replacement later. But note that the RAID1 configuration information has been already updated. When you rebuild RAID1, you need to manually select HDDs to be rebuilt. (For details, see Subsection 10.6.4, “Rebuild function of RAID1”.)

(b) Corrective action when the copy destination HDD has an error

If the copy destination HDD has a read or write error, replace the failed HDD. (For information about how to replace an HDD, see Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”.) After the HDD is replaced, try to rebuild RAID1 again.

(2) When the Equipment started up with incorrect RAID configuration

When you mount an HDD used for another HJ-2030****B (B model) or an HDD previously used for backup by mistake during HDD replacement and try to start up the OS without rebuild, the Equipment displays a blue screen and stops there in order to prevent it starting up. If this happens, the blue screen shows the following.

```
***STOP :0x00009502( 0x00000000,0x00000000,0x00000000,0x00000000)
```

Array configuration is not correct.

Please refer to HF-W instruction manual for more information.

If you see this screen, remove the HDD mounted by mistake. (For information about how to remove on HDD, see Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”.) In addition, after removing the HDD, follow Step 2 through 5 described in Subsection 10.5.3, “Performing periodical HDD replacement”.

10.4.6 Recovering from HDD failure in both sides

After you replace both HDDs, set up the Equipment again, and recover the data from backup files (See Subsection 8.1, “Backing Up Files”.)

Or, recover the Equipment using a backup HDD. (See Subsection 10.5.2, “Performing restoration from backup HDD”.)

10.5 Preventive Maintenance

10.5.1 Creating backup HDD

NOTICE

- Do not use an HDD previously used for software RAID1 in place of a new HDD. Otherwise, the Equipment may not start up or the data in the HDDs may be lost because of RAID1 configuration information mismatch or other reasons.
- Do not create a backup HDD by mounting a new HDD and then rebuilding RAID1. The RAID1 configuration information stored in each HDD is updated after RAID1 is rebuilt. Therefore, even if the previous HDD is reinstalled after the rebuild is complete, the Equipment may not start up or the data in the HDDs may be lost due to RAID1 configuration information mismatch or other reasons.
- Wear cotton gloves when replacing an HDD in order to prevent failure caused by static electricity. Otherwise, the data in the HDDs may be corrupted.
- During the work, make sure you follow the correct procedure. Should any mistakes be made, the data stored in the HDDs may be lost.

RAID1 is highly reliable compared to a system with a conventional configuration. Nevertheless, the data stored in the HDDs may be lost due to human errors or other reasons. If you create a backup HDD, you can recover from such data loss. (Note that you can only restore from the point of backup.) We recommend that you backup periodically using a new HDD and the software RAID1 construction utility “Software RAID1 For Windows(R)”. Follow the procedure below to create a backup HDD.

(Note) The following procedure is for the HDD mounted in the drive bay 1.

When you create a backup HDD from the HDD mounted in the drive bay 2, replace the drive bay 1 with the drive bay 2 in the procedure.

1. Shut down the OS, and pull out the plug of the power cable from the outlet. Wait one minute or more, and then replace the HDD mounted in the drive bay 1 with a new HDD. (For information about how to replace on HDD, see Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”.)
If any external storage devices are connected to the Equipment, disconnect them.
2. Store the removed HDD in a safe place as a backup HDD.
3. Turn on the power for the Equipment. Before the OS starts, insert the software RAID1 construction utility “Software RAID1 For Windows(R)” into the DVD drive.

4. The software RAID1 construction utility starts. On the menu screen, enter “1” and then press the [Enter] key to check the status of the software RAID1. Confirm that the HDD mounted in the drive bay 1 is a new HDD (“NORMAL”) as shown below.

Show the status	
Array Status:	DEGRADE
HDD#2:	ONLINE
HDD#1:	NORMAL
Press Enter:	

If the new HDD is not displayed as “NORMAL”, it is possible that the mounted HDD was used for software RAID before and is mounted by mistake. Stop the work for creating a backup HDD, and check that the mounted HDD is the correct one.

5. Press the [Enter] key to go back to the menu screen of the software RAID1 construction utility.
6. On the menu screen, enter “2” and then press the [Enter] key to start rebuilding RAID1. (For information about the rebuild procedure, see Subsection 10.6.4, “Rebuild function of RAID1”.)
A rebuild process takes about 60 minutes if the capacity of the HDD is 160GB.
7. After the rebuild is complete, on the menu screen, enter “1” and then press the [Enter] key to check the status of the software RAID1. Confirm that the status of the software RAID1 is normal (Array Status is “OPTIMAL” and the HDD on either drive bay is “ONLINE”) as shown below.

Show the status	
Array Status:	OPTIMAL
HDD#2:	ONLINE
HDD#1:	ONLINE
Press Enter:	

8. Press the [Enter] key to go back to the menu screen of the software RAID1 construction utility.
9. On the menu screen, enter “5” and then press the [Enter] key to exit the software RAID1 construction utility.
10. Remove the software RAID1 construction utility “Software RAID1 For Windows(R)” from the DVD drive. Then press the power switch for four seconds or more to shut down the power for the Equipment.
If you disconnected any external storage devices at Step 1, reconnect them to the Equipment.
11. Turn on the power for the Equipment. After the OS starts up, confirm that both HDDs are working properly on the hardware status screen.

10. SOFTWARE RAID1

10.5.2 Performing restoration from backup HDD

NOTICE

- Do not use an HDD previously used for software RAID1 in place of a new HDD. Otherwise, the Equipment may not start up or the data in the HDDs may be lost because of RAID1 configuration information mismatch or other reasons.
- Wear cotton gloves when replacing an HDD in order to prevent failure caused by static electricity. Otherwise, the data in the HDDs may be corrupted.
- During the work, make sure you follow the correct procedure. Should any mistakes be made, the data stored in the HDDs may be lost.

Prepare the backup HDD, a new HDD, and the software RAID1 construction utility “Software RAID1 For Windows(R)”. Follow the procedure below for recovery.

(Note) The following is a recovery procedure for the case that the backup HDD is mounted in the drive bay 1. When you mount the backup HDD in the drive bay 2, replace the drive bay 1 with the drive bay 2 in the procedure.

1. Shut down the OS, and pull out the plug of the power cable from the outlet. If HDDs are mounted, wait one minute or more, and remove both HDDs.
In addition, if any external storage devices are connected to the Equipment, disconnect them.
2. Mount the backup HDD in the drive bay 1 and a new HDD in the drive bay 2. (For information about how to mount an HDD, see Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”.)
3. Turn on the power for the Equipment. Before the OS starts, insert the software RAID1 construction utility “Software RAID1 For Windows(R)” into the DVD drive.

4. The software RAID1 construction utility starts. On the menu screen, enter “1” and then press the [Enter] key to check the status of the software RAID1. Confirm that the HDD mounted in the drive bay 2 is a new HDD (“NORMAL”) as shown below.

```
Show the status
Array Status:          DEGRADE
HDD#2:                NORMAL
HDD#1:                ONLINE

Press Enter:
```

- If the new HDD is not displayed as “NORMAL”, it is possible that the mounted HDD was used for software RAID before and is mounted by mistake. Stop the recovery from the backup HDD, and check that the mounted HDD is the correct one.
5. Follow Step 5 through 11 described in Subsection 10.5.1, “Creating backup HDD”.

10. SOFTWARE RAID1

10.5.3 Performing periodical HDD replacement

NOTICE

- Do not use an HDD previously used for software RAID1 in place of a new HDD for replacement. Otherwise, the Equipment may not start up or the data in the HDDs may be lost because of RAID1 configuration information mismatch or other reasons.
- If you pick up a wrong HDD when selecting the HDD to be replaced, the data in the HDDs will be lost. Make sure the drive bay number of the HDD to be replaced is correct, and replace the HDD at your own risk.
- Wear cotton gloves when replacing an HDD in order to prevent failure caused by static electricity. Otherwise, the data in the HDDs may be corrupted.
- During the work, make sure you follow the correct procedure. Should any mistakes be made, the data stored in the HDDs may be lost.
- When software RAID1 is used, you cannot replace an HDD while the power is on. When you replace an HDD, make sure the power is off.

An HDD is a perishable component. Replace an HDD every two years (if used 24 hours a day).

Prepare a new HDD, and the software RAID1 construction utility “Software RAID1 For Windows(R)”. Follow the procedure below for periodical replacement work.

Be noted that in order to rebuild RAID1, you cannot replace both HDDs at the same time. Replace one HDD at a time.

(Note) The following is a procedure for replacing the HDD mounted in the drive bay 1.

When you replace the HDD mounted in the drive bay 2, interpret the drive bay 1 as the drive bay 2 in the procedure.

1. Back up the data.
2. Shut down the OS, and pull out the plug of the power cable from the outlet. Wait one minute or more, and then replace the HDD mounted in the drive bay 1 with a new HDD. (For information about how to replace an HDD, see Subsection 5.4.3, “Detaching/attaching hard disk drive (HDD)”.)
In addition, if any external storage devices are connected to the Equipment, disconnect them.
3. Turn on the power for the Equipment. Before the OS starts, insert the software RAID1 construction utility “Software RAID1 For Windows(R)” into the DVD drive.

- The software RAID1 construction utility starts. On the menu screen, enter “1” and then press the [Enter] key to check the status of the software RAID1. Confirm that the HDD mounted in the drive bay 1 is a new HDD (“NORMAL”) as shown below.

Show the status	
Array Status:	DEGRADE
HDD#2:	ONLINE
HDD#1:	NORMAL
Press Enter:	

- If the new HDD is not displayed as “NORMAL”, it is possible that the mounted HDD was used for software RAID before and is mounted by mistake. Stop the periodical replacement work, and check that the mounted HDD is the correct one.
- Follow Step 5 through 11 described in Subsection 10.5.1, “Creating backup HDD”.

10. SOFTWARE RAID1

10.5.4 Check and restoration of error areas on an HDD

Deterioration over time or other reasons can cause bad blocks on an HDD so that some data cannot be read any more.

If you periodically runs a consistency check to check and restore error areas on the HDD, you can reduce the possibility of rebuild failure when the system recovers from fall-back operation.

Prepare the software RAID1 construction utility “Software RAID1 For Windows(R)”, and follow the procedure below to run a consistency check.

1. Shut down the OS. If any external storage devices are connected to the Equipment, pull out the plug of the power cable form the outlet. Wait one minute or more, and then disconnect them.
2. Turn on the power for the Equipment. Before the OS starts, insert the software RAID1 construction utility “Software RAID1 For Windows(R)” into the DVD drive.
3. The software RAID1 construction utility starts. On the menu screen, enter “1” and then press the [Enter] key to check the status of the software RAID1.
Confirm that the status of the software RAID1 is normal (Array Status is “OPTIMAL” and the HDD on either drive bay is “ONLINE”) as shown below.

Show the status	
Array Status:	OPTIMAL
HDD#2:	ONLINE
HDD#1:	ONLINE
Press Enter:	

When the status of the software RAID1 is not normal, you cannot run a consistency check. Use the rebuild function of RAID1 to normalize the status of the software RAID1, and then run a consistency check.

4. Press the [Enter] key to go back to the menu screen of the software RAID1 construction utility.
5. On the menu screen, enter “3” and then press the [Enter] key to start running a consistency check. (For information about the consistency check procedure, see Subsection 10.6.5, “Consistency check function”.)
A consistency check takes about 80 minutes if the capacity of the HDD is 160GB.
6. After the consistency check is complete, on the menu screen, enter “5” and then press the [Enter] key to exit the software RAID1 construction utility.
7. Remove the software RAID1 construction utility “Software RAID1 For Windows(R)” from the DVD drive. Then press the power switch for four seconds or more to shut down the power for the Equipment.
If you disconnected any external storage devices at Step 1, reconnect them to the Equipment.
8. Turn on the power for the Equipment. After the OS starts up, confirm that both HDDs are working properly on the hardware status screen.

10.6 Software RAID1 construction utility

10.6.1 Overview of software RAID1 construction utility

NOTICE

When you use the software RAID1 construction utility, disconnect all the external storage devices connected to the Equipment beforehand. Otherwise, the Equipment may not start up, or the data in the HDDs may be lost.

The software RAID1 construction utility is a utility used for checking the status of the software RAID1 and rebuilding RAID1.

The software RAID1 construction utility offers the following functions.

(1) Status display function for RAID1

This function shows the current status of the software RAID1. It is used for checking the status of the software RAID1.

(2) Rebuild function of RAID1

This function rebuilds RAID1 (copying data from the HDD mounted in the drive bay 1 or 2 to the other HDD). When the rebuild is complete, the status of the software RAID1 is set to be normal.

(3) Consistency check function

This function checks all the areas of the HDDs on both the drive bay 1 and 2 for error areas and restores them.

(4) Backup restoration preparation function

This function adjusts the RAID1 configuration information of the HDDs and prepares for restoration from the backup data.

This function is used when you restore from the backup data with commercially available backup software or Windows Recovery Environment (Windows RE).

< NOTE >

- When you use the software RAID1 construction utility, do not press any keys until prompted. If you do, you may have trouble entering keys.

10. SOFTWARE RAID1

10.6.2 Starting and exiting the utility

(1) Starting the utility

Follow the procedure below to start the software RAID1 construction utility.

1. When the OS is running, shut down the OS. If any external storage devices are connected to the Equipment, pull out the plug of the power cable form the outlet. Wait one minute or more, and then disconnect them.
2. Turn on the power for the Equipment. Before the OS starts, insert the software RAID1 construction utility “Software RAID1 For Windows(R)” into the DVD drive.
3. When the software RAID1 construction utility starts up, the information about the mounted HDDs is displayed and then the following menu screen is displayed.

```
<<<<< Software RAID1 Construction Utility >>>>>
HDD#2:Model          XXXXXXXXX
      :Serial Number  YYYYYYYY
      :Size            ZZZZZZZZZ MB
HDD#1:Model          XXXXXXXXX
      :Serial Number  YYYYYYYY
      :Size            ZZZZZZZZZ MB

Select Function :
  1:Status
  2:Rebuild
  3:Consistency Check
  4:Prepare For Restore
  5:Quit
Please select No.=
```

} Model and serial number, and the capacity of the mounted HDD are displayed.

The following is a list of functions displayed on the menu screen.

- | | |
|----------------------|---|
| 1:Status | ... Displays the current status of software RAID1. (See Subsection 10.6.3, “Status display function for RAID1”.) |
| 2:Rebuild | ... Start rebuilding RAID1. (See Subsection 10.6.4, “Rebuild function of RAID1”.) |
| 3:Consistency Check | ... Runs a consistency check. (See Subsection 10.6.5, “Consistency check function”.) |
| 4:Prepre For Restore | ... Prepares for the restoration from the backup. (See Subsection 10.6.6, “Backup restoration preparation function”.) |
| 5:Quit | ... Exits the software RAID1 construction utility. |

Select the number of the function you want to execute, and then press the [Enter] key.

(2) Exiting the utility

Follow the procedure below to exit the software RAID1 construction utility.

1. On the menu screen, enter “5” and then press the [Enter] key.

```
Select Function :
1:Status
2:Rebuild
3:Consistency Check
4:Prepare For Restore
5:Quit
Please select No.= 5 (Enter)
```

2. The following message is displayed and then the utility finishes.

```
Software RAID1 Construction Utility is finished.
```

3. Remove the software RAID1 construction utility “Software RAID1 For Windows(R)” from the DVD drive. Then press the power switch for four seconds or more to shut down the power for the Equipment.
If you disconnected any external storage devices before you start the software RAID1 construction utility, reconnect them to the Equipment.

10. SOFTWARE RAID1

10.6.3 Status display function for RAID1

The status display function for RAID1 shows the current status of the software RAID1. It is used for checking the status of the software RAID1.

The following is a list of information this function displays.

• RAID status

Item	Value	Description
Array Status	OPTIMAL	The RAID is working properly. The array has redundancy. (*1)
	DEGRADE	The RAID is in fall-back operation. The array does not have redundancy. (*1)
	UNKNOWN	The status is unknown.

(*1) If medium error occurs, “(MEDIA ERROR)” is attached to the end of the value.

Medium error means that read error occurred at the copy source HDD during rebuild and there is a problem with data integrity.

• Status of each HDD

Item	Value	Description
HDD#1, HDD#2	ONLINE	The HDD is working properly.
	OFFLINE	Due to HDD failure, the HDD is disconnected. You need to replace the HDD.
	OFFLINE (INCOMPLETE DATA)	The HDD is disconnected due to power failure or reset. If you rebuild the RAID, you can continue to use the HDD.
	REBUILD	The HDD is under a rebuild process. (*2)
	NORMAL	The HDD has never been used for the B model.
	NOTMOUNTED	No HDD is mounted in the drive bay.
	UNKNOWN	Acquisition of the HDD status failed.
	ERROR	Access to the HDD failed.

(*2) This includes the cases where write error occurred during a rebuild process or a rebuild process is aborted.

The following shows how to use this function.

1. On the menu screen, enter “1” and then press the [Enter] key.

```

Select Function :
 1:Status
 2:Rebuild
 3:Consistency Check
 4:Prepare For Restore
 5:Quit
Please select No.= 1 (Enter)

```

2. The current status of the software RAID1 is displayed. Press the [Enter] key to go back to the menu screen.

The following are examples of screens.

Example 1) The software RAID1 is working properly.

(The status of RAID and the status of the HDDs on both drive bays are normal.)

```

Please select No.= 1

Show the status
Array Status:          OPTIMAL
HDD#2:                ONLINE
HDD#1:                ONLINE

Press Enter:

```

Example 2) The software RAID1 is in fall-back operation.

(The HDD in the drive bay 2 has an error and only the HDD in the drive bay 1 is working.)

```

Please select No.= 1

Show the status
Array Status:          DEGRADE
HDD#2:                OFFLINE
HDD#1:                ONLINE

Press Enter:

```

10. SOFTWARE RAID1

10.6.4 Rebuild function of RAID1

NOTICE

- If you manually select the direction of rebuild during a rebuild process, make sure you select the right direction. Otherwise, the data stored in the HDDs may be lost.
- Until rebuild is complete, avoid shutting off the power for the Equipment or attaching and detaching HDDs. Otherwise, the data may be corrupted or failure may result.
- If read or write error occurred during rebuild, it may take about one minute after an error message is displayed until next input is allowed.

This function rebuilds RAID1 (copying data from the HDD mounted in the drive bay 1 or 2 to the other HDD). When the rebuild is complete, the status of the software RAID1 is set to be normal.

This function is used for, for example, recovering from HDD failure during system operation or fall-back operation due to power failure or reset.

In the case of aforementioned conditions, the direction of rebuild is automatically selected. Otherwise, a message is displayed to prompt you to select the direction of rebuild. Follow the message to select the direction and start rebuild.

Be noted that this function uses an HDD in the normal state as the copy source for rebuild. Make sure that at least one of the mounted HDDs is in the normal state. An HDD is in the normal state if and only if the status of the HDD is displayed as “ONLINE” on the status display for RAID1.

The following shows how to use this function.

1. On the menu screen, enter “2” and then press the [Enter] key.

```
Select Function :
 1:Status
 2:Rebuild
 3:Consistency Check
 4:Prepare For Restore
 5:Quit
Please select No.= 2 (Enter)
```

2. A message is displayed for confirmation of starting rebuild.

2-1: If the direction of rebuild is automatically selected

The following is an example of screen. (This is when you install a new HDD in the drive bay 2. Rebuild is from the HDD in the drive bay 1 to the HDD in the drive bay 2.)

```

Please select No.= 2

Start Rebuild from HDD#1 to HDD#2.
All the data on HDD#2 might be lost.
Do you continue? (yes, no) :
  
```

If you start rebuild, enter “yes”. If you enter “no”, the menu screen will return.

2-2: If the direction of rebuild is manually selected

The status of each HDD used for software RAID1 is displayed. If an HDD is previously used for rebuild, its “rebuild completion date and time” is displayed to help you select the correct direction of rebuild. The following is an example of screen.

```

Please select No.= 2

Not Rebuild from ONLINE HDD to NORMAL HDD.

HDD#2:                OFFLINE
Rebuild completion time: 01/05/2012  14:20:00 ←
HDD#1:                ONLINE
Rebuild completion time: 01/13/2012  20:52:00 ←
Do you continue? (yes, no) :
  
```

← Rebuild completion date and time

If you start rebuild, enter “yes”. If you enter “no”, the menu screen will return.

If you select “yes”, a message is displayed to prompt you to select the direction of rebuild.

```

Select operation
1:Rebuild(From HDD#1 to HDD#2)
2:Rebuild(From HDD#2 to HDD#1)
3:Quit
Please select No.=
  
```

10. SOFTWARE RAID1

To select rebuild from the HDD in the drive bay 1 to the HDD in the drive bay 2, enter “1”. To select rebuild from the HDD in the drive bay 2 to the HDD in the drive bay 1, enter “2”. Make sure you select an HDD indicated as “ONLINE” as a copy source when you select the direction of rebuild. If you enter “3”, the menu screen will return. If you enter “1” or “2”, the screen described in “2-1: If the direction of rebuild is automatically selected” is displayed. If you start rebuild, enter “yes”. If you enter “no”, the menu screen will return.

3. If you enter “yes”, rebuild starts and the progress is indicated in %. When the rebuild process is complete, a message to indicate completion is displayed and the menu screen will return.

```
>>Start Rebuild    (Press `Ctrl+C' to abort) 01/31/2012 12:40:00
100%
>>End 01/31/2012 13:31:00
```

If you abort the rebuild in the middle, enter Ctrl+C.

If an error message is displayed while selecting options or during a rebuild process, see Subsection 10.6.7, “Error Message” and take a corrective action based on the error message.

10.6.5 Consistency check function

A consistency check reads all the areas of the HDDs on both the drive bay 1 and 2 and checks for error areas. If read fails on some areas, data is copied from the other HDD to those areas to restore the data. A consistency check does not compare the data of an area between the two HDDs if the area does not have any errors.

If you periodically runs a consistency check, you can reduce the possibility of rebuild failure when the system recovers from fall-back operation.

This function can be used only when the status of the software RAID1 is normal (that is, Array Status on the status display for RAID1 is “OPTIMAL” or “OPTIMAL (MEDIA ERROR)”).

The following shows how to use this function.

1. On the menu screen, enter “3” and then press the [Enter] key.

```
Select Function :
 1:Status
 2:Rebuild
 3:Consistency Check
 4:Prepare For Restore
 5:Quit
Please select No.= 3 (Enter)
```

2. A message is displayed for confirmation of starting a consistency check.

```
Please select No.= 3

Are you sure you select Consistency Check? (yes, no) :
```

If you start a consistency check, enter “yes”. If you enter “no”, the menu screen will return.

3. If you enter “yes”, a consistency check starts and the progress is indicated in %. When the consistency check is complete, a message to indicate completion is displayed and the menu screen will return.

```
>>Start Consistency Check   (Press `Ctrl+C' to abort) 01/31/2012 12:40:00
100%
>>End 01/31/2012 13:31:00
```

If you abort a consistency check in the middle, enter Ctrl+C.

If an error message is displayed while selecting options or running a consistency check, see Subsection 10.6.7, “Error Message” and take a corrective action based on the error message.

10. SOFTWARE RAID1

10.6.6 Backup restoration preparation function

The backup restoration preparation function adjusts the RAID1 configuration information of the HDDs and prepares for restoration from the backup data. This function is used before you restore from the backup data created by commercially available backup software or Windows Recovery Environment (Windows RE). (For information about when this function is used, see Section 10.7, “Backing Up under the Offline Situation”.) This function creates RAID1 configuration information of the HDDs so that the HDDs can be set up as RAID1. It also changes the HDD status of the drive bay 1 to “ONLINE” and the HDD status of drive bay 2 to “NORMAL”. By doing so, RAID1 can be rebuilt after backup data is restored.

< NOTE >

- This function just creates and adjusts RAID1 configuration management information. It does not restore or change data stored in the HDDs. Do not use this function for other purposes than preparing the restoration from backup.

The following shows how to use this function.

1. On the menu screen, enter “4” and then press the [Enter] key.

```
Select Function :
 1:Status
 2:Rebuild
 3:Consistency Check
 4:Prepare For Restore
 5:Quit
Please select No.= 4 (Enter)
```

2. A message is displayed for confirmation of starting a backup restoration preparation.

```
Please select No.= 4

Prepare for the restoration.
Array Status will be to DEGRADE.
Do you continue? (yes, no) :
```

If you start a backup restoration preparation, enter “yes”. If you enter “no”, the menu screen will return.

3. If you enter “yes”, a backup restoration preparation starts. When the backup restoration preparation is complete, a message to indicate completion is displayed and the menu screen will return.

```
>>Start Prepare For Restore  
>>End
```

If an error message is displayed while selecting options, see Subsection 10.6.7, “Error Message” and take a corrective action based on the error message.

10. SOFTWARE RAID1

10.6.7 Error Message

This section lists error messages displayed by the software RAID1 construction utility and the corrective actions for each item.

Table 10-1 Error Messages from the Software RAID1 construction utility (1/2)

No.	Error message	Description	Corrective action
1	Read error on HDD#X. (error sector = 0xYYYYYYYY)	Read error occurred at HDDX. (X is an HDD number.) The error occurred at the sector address indicated inside the parentheses.	<ul style="list-style-type: none"> • If the error occurred at the copy source HDD during rebuild, replace the failed HDD. Then build the software RAID1 from scratch, and restore data from backup. • If the error occurred at the copy destination HDD during rebuild or at either HDD during a consistency check, replace the failed HDD and then rebuild the software RAID1.
2	Read error on HDD#1 and HDD#2.(error sector = 0xYYYYYYYY)	Read error occurred at the same sector for both HDD1 and HDD2. The error occurred at the sector address indicated inside the parentheses.	Replace both HDDs. Then build the software RAID1 from scratch, and restore data from backup.
3	Write error on HDD#X. (error sector = 0xYYYYYYYY)	Write error occurred at HDDX. (X is an HDD number.) The error occurred at the sector address indicated inside the parentheses.	<ul style="list-style-type: none"> • If the error occurred at the copy source HDD during rebuild, replace the failed HDD. Then build the software RAID1 from scratch. • If the error occurred at the copy destination HDD during rebuild or at either HDD during a consistency check, replace the failed HDD and then rebuild the software RAID1.
4	The capacity of disks is not equal.	The two HDDs used for rebuild have different capacities.	Mount HDDs with the same capacity and then start rebuild.
5	Require at least one ONLINE HDD.	At least one HDD needs to be in the normal state.	Mount an HDD in the normal state (that is, the status of the HDD#X (X is an HDD number) is displayed as "ONLINE" on the status display for RAID1) as a copy source and then start rebuild.
6	HDD#X is not ONLINE HDD.	The copy source HDD#X (X is an HDD number) is not in the normal state.	Specify an HDD in the normal state (that is, the status of the HDD#X (X is an HDD number) is displayed as "ONLINE" on the status display for RAID1) for the copy source and then start rebuild.

Table 10-1 Error Messages from the Software RAID1 construction utility (2/2)

No.	Error message	Description	Corrective action
7	Disk is not mounted.	Rebuild or a consistency check is selected when two HDDs are not mounted.	Make sure two HDDs are mounted, and then start rebuild or a consistency check.
8	Disk access error on HDD#X.	Access to the RAID1 configuration information of the HDD#X (X is an HDD number) failed.	Replace the failed HDD, and then start rebuild.
9	RAID condition is not correct.	The configuration or status of the array is not normal.	Set the status of the software RAID1 to be normal (that is, Array Status on the status display for RAID1 is "OPTIMAL" or "OPTIMAL (MEDIA ERROR)"), and then start a consistency check.
10	Cannot execute the Prepare For Restore operation.	The backup restoration preparation function cannot be executed.	Check the status of installation of the HDDs. Make sure both HDDs are installed, and then start the backup restoration preparation function.

10.7 Backing Up under the Offline Situation

The Equipment processes mirroring with the software RAID1 device driver running on the OS. If you perform backup-related work (creating or restoring from backup data) under the offline situation without running the OS, you need to consider the configuration of the software RAID1 because you can independently access each HDD used by the software RAID1.

This section explains the procedure and what you need to know when you create or restore from backup data under the offline situation.

The offline situation mentioned here means, for example, an environment started up by Windows® 7 Windows Recovery Environment (Windows RE) or the startup disk of commercially available backup software.

<Procedure of creating backup data>

1. Follow the recommended procedure of your backup software to create backup data.
2. Rebuild RAID1 using the HDD used as the source of backup data as a copy source. (For information about rebuilding RAID1, see Subsection 10.6.4, “Rebuild function of RAID1”.)

< NOTE >

- When you create backup data for the system operating in fall-back mode, it is possible that you specify the already disconnected HDD for the source of backup data by mistake. Make sure that the HDD used as the source of backup data is in the normal state (ONLINE). (For information about how to check the status of an HDD, see Subsection 10.6.3, “Status display function for RAID1”.)
- Depending on the backup software you use, the backup software may write something to an HDD while creating backup data. Because of this, do not forget to rebuild RAID1 after you created backup data so that both HDDs in the drive bay 1 and 2 have the same data.

<Procedure of restoring from backup data>

1. Mount an HDD on both the drive bay 1 and 2.
2. Perform backup restoration preparation. (For information about backup restoration preparation, see Subsection 10.6.6, “Backup restoration preparation function”.)
3. Follow the recommended procedure of your backup software to copy the preserved backup data to the HDD in the drive bay 1 for restoration.
4. Rebuild RAID1. (For information about rebuilding RAID1, see Subsection 10.6.4, “Rebuild function of RAID1”.)

< NOTE >

- If you forgot to perform backup restoration preparation and specify an HDD that has never been used on the Equipment (a new HDD, for example) for the HDD where the backup data is restored, the HDD does not have RAID1 configuration information and you cannot use it as a part of software RAID1 even if you restore the backup data there.
- The backup restoration preparation function configures the HDDs so that the direction of the rebuild is from the HDD in the drive bay 1 to the HDD in the drive bay 2. Make sure you copy the backup data to the HDD in the drive bay 1 for restoration.
- If you restore from backup data under the offline situation, the HDD is accessed without the software RAID1 device driver, and data mismatch between the HDDs in the drive bay 1 and 2 is inevitable. Because of this, do not forget to rebuild RAID1 after you restored backup data so that both HDDs in the drive bay 1 and 2 have the same data.

10. SOFTWARE RAID1

MEMO