Controller Self Diagnosis

Introduction

Operation of the (2 types of) error diagnosis tools added to the main body and remedy for errors are described. These tools can reduce time to determine cause of errors occurred in field and improve the accuracy of specifying error locations. This manual can be applied when the main body is placed in the following conditions.

- The main body does not boot. (In such a case that the Control Panel is not displayed or the progress bar does not work, etc.)
- An error is suspected to have occurred in the Main Controller PCB 1/2 and other related PCBs (child PCBs such as SDRAM or TPM mounted in the Main Controller PCB 1/2).

PCBs and units diagnosed by each tool are as follow:

- **Boot System Error Diagnosis Tool**
  - Main Controller PCB 1 side <Main Controller PCB 1, SDRAM, PCI Expansion PCB (option)>
  - Control Panel
  - All-night Power Supply, Non-all-night Power Supply
- **Controller System Error Diagnosis Tool**
  - Main Controller PCB 1 side <Main Controller PCB 1, SDRAM, TPM PCB, FLASH Memory PCB, PCI Expansion PCB (option)>
  - Main Controller PCB 2 side <Main Controller PCB 2, SDRAM (M0*, M1), SDRAM (P), Memory PCB, Open I/F PCB (option)>
  - Rizer PCB / HDD

  * SDRAM (M0) is an option.

Overview

Two types of error diagnosis tools are installed in this machine, and stored in the locations shown below.

Boot System Error Diagnosis Tool covers the components shown in the red frame (solid line) in the figure. Controller System Error Diagnosis Tool covers the components shown in the blue frame (dotted line).

- **Boot System Error Diagnosis Tool**
  - This tool automatically checks the Control Panel, Main Controller PCB 1, All-night Power Supply, and Non-all-night Power Supply, and notifies the result by the number of light-out and blinking interval of the lamp on the Control Panel.
  - This tool is installed in the ROM of Main Controller PCB 1.
  - Therefore, regardless the version of MN-CNT, this tool can be used even when an error occurs in child PCBs or when the Controller System Error Diagnosis Tool cannot be booted.
**Controller System Error Diagnosis Tool**

This tool automatically checks the Main Controller PCB 1/2, child PCBs mounted on the Main Controller PCB 1/2, and HDD, and display the result on the Control Panel. This tool is installed in HDD. Therefore, this tool cannot be used when an error occurred in HDD or HDD cannot be accessed.

**Layout Drawing**

Layout Drawing of PCBs Subject to Diagnosis
**Basic Flowchart**

Basic Check Items

Check all of the items shown below.

1. **Turn ON the main power switch.**
   - **Yes**
     - **Is the Control Panel displayed?**
       - **Yes**
         - **Does the main body boot correctly?**
           - **Yes**
             - **Take an action appropriate for the error.**
           - **No**
             - **Execute Controller System Error Diagnosis Tool.**
       - **No**
         - **Execute Boot System Error Diagnosis Tool.**
   - **No**
     - **Does the Power Supply LED on the Control Panel light up?**
       - **Yes**
         - **Execute basic check.**
       - **No**
         - **Execute basic check.**
Basic Check Items
1. Check if the Leakage Breaker is turned OFF.
2. Check if the Power Supply Plug is disconnected.
3. Check if the Connection Cable between the Main Controller PCB 1 and Control Panel is disconnected.
4. Check if the Connection Main Controller PCB 1 and Main Controller PCB 2 definitely?
5. Check if the Connection An All-night Power Supply. Change Non-all-night Power Supply if not recovered.

Prerequisite
Make sure that the version of MN-Cont of the main body is Ver.30.30 or later.
When the version is old (older than Ver.30.30), although Controller System Error Diagnosis Tool (BCT) (see Memo) is downloaded, it cannot be installed and is discarded.
Therefore, if the version of MN-Cont of the main body is old (older than Ver.30.30), update the version to Ver.30.30 or later using SST (Service Support Tool) or USB memory, and enter the SST download mode again to install BCT.

Caution:
When upgrading of system software, HDD format, or BootDev format is performed, BCT is simultaneously installed with other system software if the MN-Cont version is new (Ver.30.30 or later).
In other words, when the MN-Cont version is new (Ver.30.30 or later), it is not necessary to install BCT again.

However, installation of BCT via CDS is not supported by the current version. (It will be supported in the future.)

NOTE:
BCT stands for Box Checker Test.
When BCT is installed on the main body, version of the installed module can be checked using service mode (COPIER>DISPLAY>VERSION>BCT).

Operation
Operations of the two diagnosis tools are explained below.
Use each tool according to the following purposes.
- When the main body does not boot (the Control Panel is not displayed): Execute Boot System Error Diagnosis.
- When an error is suspected to have occurred in the Main Controller PCB 1/2 or child PCBs mounted on the Main Controller PCB 1/2: Execute Controller System Error Diagnosis.

Boot System Error Diagnosis

Boot Method
1) Turn ON the Main Power Supply Switch while pressing the Control Panel Power Supply Switch.
2) Right after the Main Power Supply Lamp lights up once, it lights out instantly, and diagnosis starts.
(When the Main Power Supply Lamp lights out, you can release your finger from the Control Panel Switch.)

* Diagnosis Time
Diagnosis is completed in approx. 1 minuites.

<When the diagnosis result is normal>
After the Main Power Supply Lamp repeatedly lights out 5 times, it lights up and the diagnosis is completed.
After completion of the diagnosis, this machine executes normal boot sequence.

<When an error is detected by diagnosis>
The Main Power Supply Lamp repeats high-speed blinking after completion of a check in which an error is detected. (See *1.)
For example, when an error is detected in Check 2, the Main Power Supply Lamp lights out twice and repeats high-speed blinking (ON/OFF in 0.3 seconds interval).
When an error is detected, be sure to count the number of times the Main Power Supply Lamp lights out.
For detailed results, see “Error Diagnosis”.

*1: When an error is detected, there is a possibility that the Main Power Supply Lamp may not perform high-speed blinking but perform other operation (continuous light-up, light-out). In this case, remove and then install the 2 SDRAMs on the Main Controller PCB 1.
If the error is not resolved, execute the remedy of the Check No. which is not completed normally. (For details, see “Error Diagnosis”.)
*2: Although diagnosis time for Check 3, and Check 4 is longer than that of other Checks, it is correct operation.
*3: When the 2 SDRAMs are not mounted on the Main Controller PCB 1, this diagnosis is not completed. In this case, install the appropriate 2 SDRAMs.
Error Diagnosis

<Boot System Error Diagnosis Table>

The error locations are identified according to the following table.

![Flowchart diagram]

Controller System Error Diagnosis

Boot Method

1) Turn ON the Main Power Supply Switch while pressing the numeric keys ‘2’ and ‘4’ simultaneously.

This tool does not perform a boot check for the Flash Memory PCB.
2) Keep pressing the numeric keys (for approx. 20 seconds) until the following screen appears on the Control Panel.

![Screen Image](F-6-143)

**NOTE:**
When this tool is not installed correctly, the following regular screen is displayed. In this case, perform the following remedy.
Turn OFF the Main Power Supply Switch again, and execute step 1 and 2 shown above.
If this tool still does not boot, it means that BCT is deleted. So, install BCT.
If BCT is not installed correctly, "--.--" is displayed in Service Mode (COPIER>DISPAY>VERSION>BCT) in the main body.

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### Diagnosis Time

Diagnosis is completed in approx. 3 minutes.
The result is displayed on the Control Panel.

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<When the diagnosis result is normal>

![Diagnosis Result](F-6-145)

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<When an error is detected by diagnosis>

Detailed information is displayed under the judgment result. In detailed information, the name of the test where an error was detected is indicated.

![Detailed Information](F-6-146)
How to view the error result

The following screen is an enlarged view of the detailed information indicated above. Explanation of the detailed error information is described.

![Image](F-6-147)

- [no] means that optional PCBs are not mounted.
- When [no] is displayed although an optional PCB is mounted, it means that an error has been occurring.
- [NG] means that an error occurred to PCBs mounted as standard.

NOTE:
Once the tool is activated, this machine reboots after approx. 2 minutes.
After completion of the diagnosis, be sure to turn OFF and then ON the main power. By turning the power OFF, the operation of this tool completes.

Controller System Error Diagnosis Table

The error locations are identified according to the following table.

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Description</th>
<th>Assumed Error Location</th>
<th>Remedy</th>
<th>Error Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SN-4 SM BUS IA Clock Gen</td>
<td>Check an SM bus error in Clock Generator on the Main Controller PCB 1 and SDRAM (M1) on the Main Controller PCB 2</td>
<td>Main Controller PCB 1</td>
<td>1. Check the connection of the Main Controller PCB 1, and the Main Controller PCB 2. 2. Check the installation of SDRAM (M1) on the Main Controller PCB 2. 3. Replace SDRAM (M1) on the Main Controller PCB 2. 4. Replace the Main Controller PCB 2. 5. Replace the Main Controller PCB 1.</td>
<td>-</td>
</tr>
<tr>
<td>SN-5 SM BUS SOC DIMM1</td>
<td>Check an SM bus error in the Main Controller PCB 1 and SDRAM (M1) on the Main Controller PCB 2</td>
<td>Main Controller PCB 1</td>
<td>1. Check the connection of the Main Controller PCB 1, and the Main Controller PCB 2. 2. Check the installation of SDRAM (M1) on the Main Controller PCB 2. 3. Replace SDRAM (M1) on the Main Controller PCB 2. 4. Replace the Main Controller PCB 2. 5. Replace the Main Controller PCB 1.</td>
<td>-</td>
</tr>
<tr>
<td>SN-6 SM BUS SOC DIMM2</td>
<td>Check an SM bus error in the Main Controller PCB 1 and SDRAM (M0) on the Main Controller PCB 2</td>
<td>Main Controller PCB 1</td>
<td>1. Check the connection of the Main Controller PCB 1, and the Main Controller PCB 2. 2. Check the installation of SDRAM (M0) on the Main Controller PCB 2. 3. Replace SDRAM (M0) on the Main Controller PCB 2. 4. Replace the Main Controller PCB 2. 5. Replace the Main Controller PCB 1.</td>
<td>-</td>
</tr>
<tr>
<td>SN-7 PCI Config Maestro</td>
<td>Check a PCI bus error in the Main Controller PCB 1 and the Main Controller PCB 2</td>
<td>Main Controller PCB 1</td>
<td>1. Check the connection of the Main Controller PCB 1, and the Main Controller PCB 2. 2. Check the installation of SDRAM (M0/M1) on the Main Controller PCB 2. 3. Replace SDRAM (M0/M1) on the Main Controller PCB 2. 4. Replace the Main Controller PCB 2. 5. Replace the Main Controller PCB 1.</td>
<td>-</td>
</tr>
<tr>
<td>SN-8 PCI Config LANC</td>
<td>Check a LAN chip error on the Main Controller PCB 1</td>
<td>Main Controller PCB 1</td>
<td>1. Check the connection of the Main Controller PCB 1, and the Main Controller PCB 2. 2. Check the installation of SDRAM (M0/M1) on the Main Controller PCB 2. 3. Replace SDRAM (M0/M1) on the Main Controller PCB 2. 4. Replace the Main Controller PCB 2. 5. Replace the Main Controller PCB 1.</td>
<td>-</td>
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<td>Test Name</td>
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<td>Assumed Error Location</td>
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<tr>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>SN-9 PCI Config PCI-Bridge</td>
<td>Check a PCI bus error between the Main Controller PCB 1 and the PCI Expansion PCB</td>
<td>Main Controller PCB 1 PCI Expansion PCB</td>
<td>1. Check the installation between the Main Controller PCB 1 and PCI Expansion PCB. 2. Replace PCI Expansion PCB. 3. Replace the Main Controller PCB 1.</td>
<td>-</td>
</tr>
<tr>
<td>SN-10 CPLD</td>
<td>Check failure of CPLD chip on the Main Controller PCB 1</td>
<td>Main Controller PCB 1</td>
<td>1. Replace the Main Controller PCB 1.</td>
<td>-</td>
</tr>
<tr>
<td>SN-11 LANC SPI</td>
<td>Check failure of LANC SPI on the Main Controller PCB 1</td>
<td>Main Controller PCB 1</td>
<td>1. Replace the Main Controller PCB 1.</td>
<td>-</td>
</tr>
<tr>
<td>SN-12 RTC CHECK</td>
<td>Check failure of RTC on the Main Controller PCB 1</td>
<td>Main Controller PCB 1</td>
<td>1. Replace the Main Controller PCB 1.</td>
<td>-</td>
</tr>
<tr>
<td>SN-13 TPM</td>
<td>Check failure of the TPM PCB on the Main Controller PCB 1</td>
<td>Main Controller PCB 1 TPM PCB</td>
<td>1. Check the installation of the TPM PCB. 2. Replace the TPM PCB. 3. Replace the Main Controller PCB 1.</td>
<td>E746</td>
</tr>
<tr>
<td>SN-14 M-SDRAM</td>
<td>Check an error between SDRAMs on the Main Controller PCB 2</td>
<td>Main Controller PCB 2 SDRAM (M0/M1) on Main Controller PCB 2</td>
<td>1. Check the installation of SDRAM (M0, M1) on the Main Controller PCB 2. 2. Replace SDRAM (M0, M1) on Main Controller PCB 2. 3. Replace the Main Controller PCB 2.</td>
<td>-</td>
</tr>
</tbody>
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<tr>
<td>SN-15 FLASH ROM</td>
<td>Check failure of CPU ROM (IC60) on the Main Controller PCB</td>
<td>Main Controller PCB 2</td>
<td>1. Replace the Main Controller PCB 2.</td>
<td>-</td>
</tr>
<tr>
<td>SN-16 P-SDRAM</td>
<td>Check an error between the Main Controller PCB 2 and SDRAM (P) on the Main Controller PCB 2</td>
<td>Main Controller PCB 2 SDRAM (P) Open I/F PCB</td>
<td>1. Check the installation of SDRAM (P) on the Main Controller PCB 2. 2. Replace SDRAM (P) on the Main Controller PCB 2. 3. Replace the Main Controller PCB 2.</td>
<td>E747 E748</td>
</tr>
<tr>
<td>SN-17 R-SDRAM</td>
<td>Check failure of SDRAM on the Main Controller PCB 2</td>
<td>Main Controller PCB 2  Open I/F PCB</td>
<td>1. Replace the Main Controller PCB 2.</td>
<td>E747</td>
</tr>
<tr>
<td>SN-18 S-SDRAM</td>
<td>Check failure of SDRAM on the Main Controller PCB 2</td>
<td>Main Controller PCB 2</td>
<td>1. Replace the Main Controller PCB 2.</td>
<td>E747 E732</td>
</tr>
<tr>
<td>SN-19 O-SDRAM</td>
<td>Check failure of SDRAM on the Open I/F PCB</td>
<td>Main Controller PCB 2  Open I/F PCB</td>
<td>1. Check the installation of the Open I/F PCB. 2. Replace the Open I/F PCB. 3. Replace the Main Controller PCB 2.</td>
<td>E747 E748</td>
</tr>
<tr>
<td>SN-20 GBUS</td>
<td>Check a GBUS error on the Main Controller PCB 2</td>
<td>Main Controller PCB 2  Open I/F PCB Bypass PCB</td>
<td>1. Check the installation of the Open I/F PCB or the Bypass I/F PCB on the Main Controller PCB 2. 2. Replace the Open I/F PCB or the Bypass I/F PCB on the Main Controller PCB 2. 3. Replace the Main Controller PCB 2.</td>
<td>E747 E748</td>
</tr>
<tr>
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<td>------------</td>
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</tr>
<tr>
<td>SN-21 FRAM</td>
<td>Check failure between the Main Controller PCB 2 and the Memory PCB</td>
<td>Main Controller PCB 2 Memory PCB</td>
<td>1. Check the installation of the Memory PCB on the Main Controller PCB 2. 2. Replace the Memory PCB on the Main Controller PCB 2. 3. Replace the Main Controller PCB 2.</td>
<td>E355</td>
</tr>
<tr>
<td>SN-22 SRAM</td>
<td>Check failure of SDRAM and battery exhaustion on the Main Controller PCB 2</td>
<td>Main Controller PCB 2</td>
<td>1. Replace the Main Controller PCB 2.</td>
<td>E246 E350 E355</td>
</tr>
<tr>
<td>SN-23 JUST ROM READ</td>
<td>Check ROM READ on the Main Controller PCB 2</td>
<td>Main Controller PCB 2</td>
<td>1. Replace the Main Controller PCB 2.</td>
<td>-</td>
</tr>
<tr>
<td>SN-24 HDD I/F error</td>
<td>Check an HDD I/F error</td>
<td>Main Controller PCB 2 PCI Expansion PCB HDD Cable HDD</td>
<td>1. Check the cable connection of the HDD. 2. Check the connection between the Main Controller PCB 2 and the Main Controller PCB 1. 3. Replace the HDD.</td>
<td>-</td>
</tr>
</tbody>
</table>

### Restrictions

- **<Boot System Error Diagnosis>**
  - If an error cannot be resolved by executing remedy according to the error diagnosis table described above, consider boot failure of the main power supply and take appropriate actions.

- **<Controller System Error Diagnosis>**
  - Regarding the diagnosis for the test names (SN-1, 2, 7, 15, 21, 24), if an error occurs in the diagnosis under the test names, this diagnosis tool will not boot.
  - When no PCBs are installed on the Main Controller PCB 1/2, the following judgment results are displayed.
    - Standard PCB: [NG]
    - Optional PCB: [OK]

However, [no] is displayed in detailed error information for optional PCBs.