Contents

1. Introduction to System-Level Diagnostics..............................................................4
2. Scan system .............................................................................................................5
3. Test system ..............................................................................................................7
   3.1. Test example: Run CPU Test.................................................................9
4. Test memory ..........................................................................................................10
   4.1. Configure Memory Test Range.............................................................11
   4.2. Memory Test Selection and Loop Count...........................................12
5. Show VPD information .......................................................................................13
6. Show FW revision ...............................................................................................15
7. Show MAC address ............................................................................................16
8. Show logs ............................................................................................................17
   8.1. Show Logs Selection ..............................................................................18
9. Reboot (BMC power cycle) controller to LOADER .......................................20
Copyright information ............................................................................................21
Trademark information ...........................................................................................22
How to send comments about documentation and receive update notifications ....23
1. Introduction to System-Level Diagnostics

AFF A700s System-level diagnostics provides a menu-driven interface for tests that search for and determine hardware problems on supported storage systems. You use system-level diagnostics to confirm that a specific component is operating properly or to help identify faulty components. AFF A700s system-level diagnostics is specifically designed for AFF A700s storage systems only.

You run system-level diagnostics after one of the following common troubleshooting situations:

- Initial system installation
- Addition or replacement of hardware components
- System panic caused by an unidentified hardware failure
- Access to a specific device becomes intermittent or the device becomes unavailable

To access system-level diagnostics for the storage system, you must directly connect to the serial console port of the storage system or access the serial console remotely via the Baseband Management Controller (BMC) of the storage system. Then, take over or halt the storage system to reach the LOADER prompt. Once at the LOADER prompt, enter the `boot_diags` command to start system-level diagnostics.

From the main menu of system-level diagnostics, the following choices are available:

1. **Scan system** – Scan the system to obtain an accurate H/W inventory of the system for subsequent testing.
2. **Test system** – Test specific components or the entire system for proper operation.
3. **Test memory** – Test part of all of the system’s memory.
4. **Show VPD information** – Display vital product data (VPD) for components in the system.
5. **Show FW revision** – Display the firmware revision information for components in the system.
6. **Show MAC address** – Display the unique MAC addresses allocated to components in the system.
7. **Show logs** – Display a recorded log of previous scan and test results.
8. **Reboot (BMC power cycle) controller to LOADER** – Exit system-level diagnostics and return to the LOADER prompt.

Once a menu command is chosen, all output is displayed on the console session. Terminal session logging can be used to conveniently capture test results and other displayed information. In addition, system scans, system tests and memory tests are persistently logged on the boot media. The last ten results for each scan or test
command are available for review.

If test results complete successfully, you can exit system-level diagnostics and reboot the system for normal operation. In the event of test failures, the test results will help technical support make appropriate recommendations. The failure could be resolved by reinstalling the FRU. If the failure cannot be resolved, then there is a likely hardware failure and the affected hardware must be replaced.

2. Scan system

When you scan the system, system-level diagnostics obtains an accurate hardware inventory of the system. You must scan the system first, before you run any tests. To execute the "Scan system" operation, type "1" and then press "Enter" to start the system scan.

```
1) Scan system
2) Test system
3) Test memory
4) Show VPD information
5) Show FW revision
6) Show MAC address
7) Show logs
8) Reboot (BMC power cycle) controller to LOADER

Select a number 1-8 to execute the respective command: 1
```

The scan system summary provides general information about the hardware inventory present in the system. Press "Enter" to return to the main menu after the scan is complete.
Scan System Summary:
Controller-B PN: TEMP-S000092338  SN: 2B7J0267S00
CPU : Expect: 2 Present: 2 Result: PASSED
TPM : Expect: 1 Present: 1 Result: PASSED
SAS : Expect: 2 Present: 2 Result: PASSED
Exander : Expect: 2 Present: 2 Result: PASSED
SFPDA : Expect: 1 Present: 1 Result: PASSED
Ethernet - 1210 : Expect: 2 Present: 2 Result: PASSED
BMC : Expect: 1 Present: 1 Result: PASSED

Memory: PASSED
Expect: 16 Present: 16
slot  PN  SN
dimm1  3HB726G4LML23P2-SB  3213D720
dimm2  3HB726G4LML23P2-SB  3213C819
dimm3  3HB726G4LML23P2-SB  3213D19E
dimm4  3HB726G4LML23P2-SB  3213D07D
dimm5  3HB726G4LML23P2-SB  3213D15C
dimm6  3HB726G4LML23P2-SB  3213C6C5
dimm7  3HB726G4LML23P2-SB  3213D19F
dimm8  3HB726G4LML23P2-SB  3213C86F
dimm9  3HB726G4LML23P2-SB  3213C01A
dimm10 3HB726G4LML23P2-SB  3213C0D3
dimm11 3HB726G4LML23P2-SB  3213C94B
dimm12 3HB726G4LML23P2-SB  3213E9EA

dimm13 3HB726G4LML23P2-SB  3210D250
dimm14 3HB726G4LML23P2-SB  3213D066
dimm15 3HB726G4LML23P2-SB  3213D45B
dimm16 3HB726G4LML23P2-SB  3214D65D

NVMe: PASSED
Expect: 2 Present: 2
slot  PN  SN
NVMe0  SAMSUNG MZVLV128HCGR  32J4NX0H510081
NVMe1  SAMSUNG MZVLV128HCGR  32J4NX0H510038

HBA: PASSED
Expect: 7 Present: 7
slot description   PN    SH
1  NVRML0P Module   63161001295   63161500072
2  32Gb FC HBA-1    111-03249   FC60776255
3  32Gb FC HBA-2    111-03249   FC61004370
4  12Gb SAS HBA  N/A     N/A
5  40Gbe NIC HBA   MA4948-002   3GTQ0C8J8T76498-002
6  40Gbe OCP-1    MA2259-004   39E2EAB66F90H52259-004
7  40Gbe OCP-2    MA2259-005   39E2EACF7E6G952259-005

Fan: PASSED
Expect: 8 Present: 8
Fan_1  13536RPM
Fan_2  13725RPM
Fan_3  13539RPM
Fan_4  13632RPM
Fan_5  13632RPM
Fan_6  13536RPM
Fan_7  13632RPM
Fan_8  13539RPM

PSU: PASSED
Expect: 1 Present: 1
slot  PN  SN
PSU1  H2BD1625000552

Press [Enter] key to go back to Main Menu.
3. Test system

The "Test system" command allows you to specify component-level or system-level testing of the system. One or more iterations or "loops" can be specified, as well. To execute the "Test System" operation, type "2" and then press "Enter" to go to the Test System option page.

The Test System page is shown, below:
Use the "up" and "down" arrow keys to select test options (from option "a" to option "r").
- Note: Scroll down to see all available tests
- Use the "space" bar to toggle an option on or off.
- Use the left and right arrow keys to select "Run", "Test All" or "Cancel":
  - Run – Run the selected tests from the Test System page
  - Test All – Run all available system tests
  - Cancel – Cancel system test and return to the main menu.
- Press "Enter" to execute your choice.

If "Run" or "Test All" is chosen, the "Configure Test Loop" page is displayed.

- Enter the number of test loops for the selected tests.
- Use the "Tab" key to switch the cursor between the loop input panel and the
page control panel.

- Use the left and right arrow keys to select "OK" or "Cancel".
- Press "Enter" to start the tests.

### 3.1. Test example: Run CPU Test

To only run the CPU test, toggle on option "a. CPU test (Execute stability Test)", select "Run", and then press "Enter".

The "Configure Test Loop" page is displayed.
To run one test loop only, retain the default "1" value, press "Tab" to switch contexts to the control panel, select "OK", and then press "Enter" to start the test.

The test results are displayed on the console, as shown below. Press "Enter" to return to the main menu.

4. Test memory

The "Test memory" command allows you to run tests on part or all of system memory. To execute the "Test Memory" operation, type "3" and then press "Enter".
4.1. Configure Memory Test Range

Use the Configure Memory Test Range to specify the start and the end addresses for the memory tests.

- Fill in the "Start Address" and "End Address" fields with the desired memory address range (in hexadecimal).
- Use the "Tab" key to switch the cursor between memory address input and the page control panel ("OK" or "Cancel").
- Select "OK" in the control panel, and then press "Enter".
4.2. Memory Test Selection and Loop Count

The "Test Memory" page displays the available memory tests:
- Memory Pattern Test – Verifies system memory with a pre-determined pattern
- Memory Random Test – Verifies system memory with randomly generated patterns

If "Run" is chosen, the "Configure Test Loop" page is displayed.

- Enter the number of test loops for the selected tests.
  - Note: For the "Memory Random Test", this value specifies the number of seconds spent running the test.
- Use the "Tab" key to switch the cursor between the loop input panel and the page control panel.
- Use the left and right arrow keys to select "OK" or "Cancel".
- Press "Enter" to start the tests.
The test results are displayed on the console, as shown below. Press "Enter" to return to the main menu.

```
Total Memory Size: 512 GB

<table>
<thead>
<tr>
<th>Slot</th>
<th>Size</th>
<th>PN</th>
<th>SN</th>
</tr>
</thead>
<tbody>
<tr>
<td>dimm1</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213D720</td>
</tr>
<tr>
<td>dimm2</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213C019</td>
</tr>
<tr>
<td>dimm3</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213D19E</td>
</tr>
<tr>
<td>dimm4</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213D47D</td>
</tr>
<tr>
<td>dimm5</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213D13C</td>
</tr>
<tr>
<td>dimm6</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213C1CA</td>
</tr>
<tr>
<td>dimm7</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213D19F</td>
</tr>
<tr>
<td>dimm8</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213C83F</td>
</tr>
<tr>
<td>dimm9</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213C81A</td>
</tr>
<tr>
<td>dimm10</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213C79D</td>
</tr>
<tr>
<td>dimm11</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213C84B</td>
</tr>
<tr>
<td>dimm12</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213F66A</td>
</tr>
<tr>
<td>dimm13</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213D750</td>
</tr>
<tr>
<td>dimm14</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213D306</td>
</tr>
<tr>
<td>dimm15</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213D41B</td>
</tr>
<tr>
<td>dimm16</td>
<td>32 GB</td>
<td>SHE724841ML23F2-SB</td>
<td>3213D52D</td>
</tr>
</tbody>
</table>
```

5. Show VPD information

The "Show VPD information" command displays vital product data (VPD) information for components of the system. To execute the "Show VPD information" operation, type "4"
and then press "Enter".

VPD information is displayed. Press "Enter" to return to the main menu.
6. Show FW revision

The "Show FW revision" command displays the firmware revision information for components in the system. To execute the "Show FW revision" operation, type "5" and then press "Enter".

The FW revision is displayed. Press "Enter" to return to the main menu.
7. Show MAC address

The "Show MAC address" command displays the unique MAC addresses allocated to components in the system. To execute the "Show MAC address" operation, type "6" and then press "Enter".
MAC address information is displayed. Press "Enter" to return to the main menu.

8. Show logs

The "Show logs" command displays a recorded log of previous scan and test results. System scans, system tests and memory tests are persistently logged on the boot media. The last ten results for each scan or test command are available for review. To execute the "Show logs" operation, type "7" and then press "Enter" to go to the "Show Logs" page.
8.1. Show Logs Selection

- Use the "up" and "down" arrow keys to select the log types to display.
- Use the "space" bar to toggle an option on or off.
- Use the left and right arrow keys to select "Show" or "Cancel".
- Press "Enter" to execute your choice.

The "Select Logs" page is displayed:
The system saves the latest ten logs and conveniently includes the timestamp in the log name.

- Use the "up" and "down" arrow keys to select the logs to display.
- Use the "space" bar to toggle an option on or off.
- Use the left and right arrow keys to select "Show" or "Cancel".
- Press "Enter" to execute your choice.

The logs are displayed, shown as below.
Use the following keys to control the displayed log output:

- PgUp/PgDn – Scroll up or down page by page
- Up/Down Arrow keys – Scroll up or down line by line
- Home – Return to the beginning of the page
- End – Go to the end of the page
- / (slash) – Keyword search (enter text and press "Enter")
- Q – Return to the main menu

9. Reboot (BMC power cycle) controller to LOADER

To exit system-level diagnostics and return to the LOADER prompt, type "8" and then press "Enter".
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