AFF A700s System-Level Diagnostics Guide

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NetApp®

Contents

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.

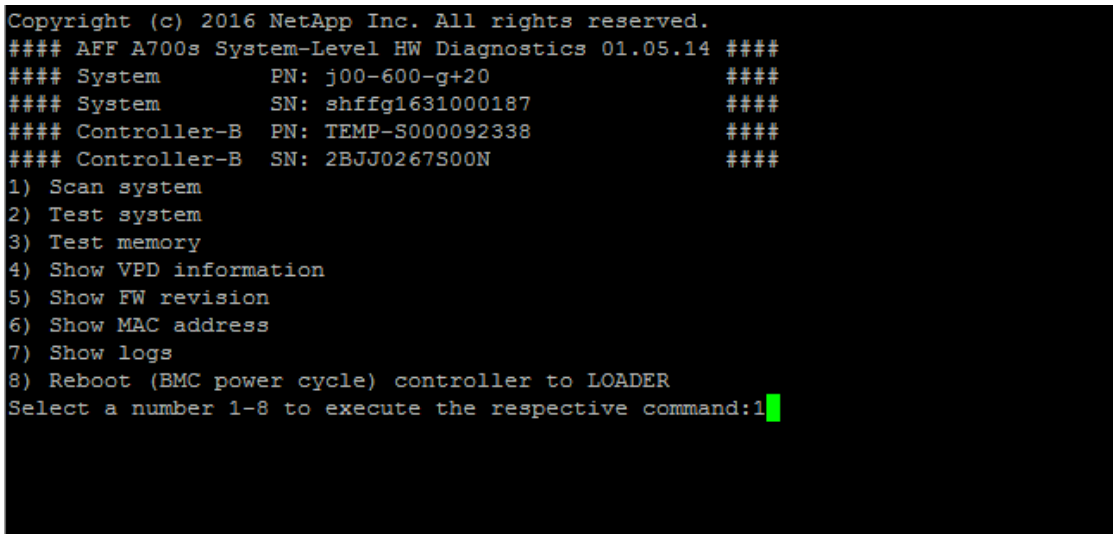
Once a menu command is chosen, all output is displayed on the console session. Terminal session logging can be used to conveniently capture test results and other displayed information. In addition, system scans, system tests and memory tests are persistently logged on the boot media. The last ten results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

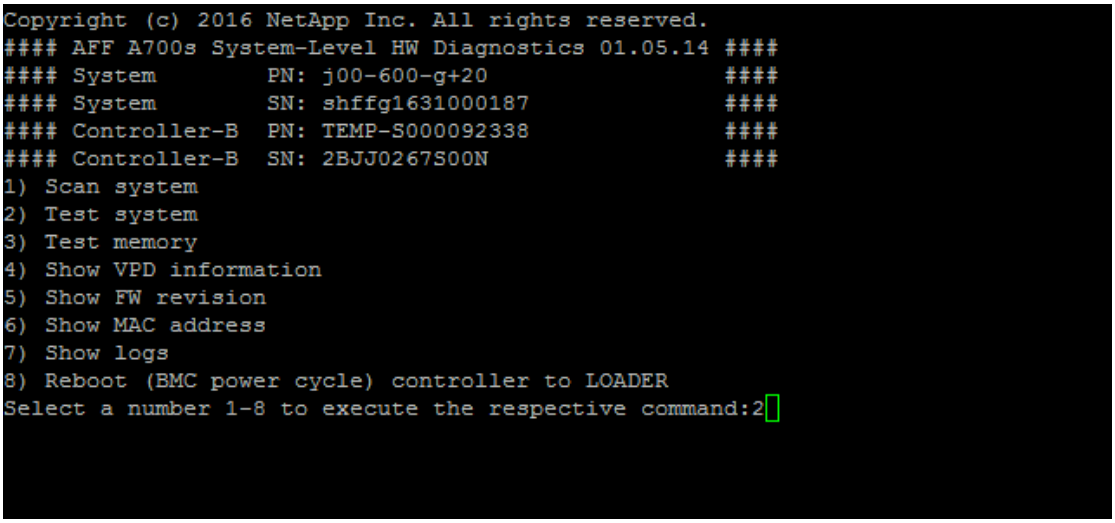


The scan system summary provides general information about the hardware inventory present in the system. Press "Enter" to return to the main menu after the scan is complete.

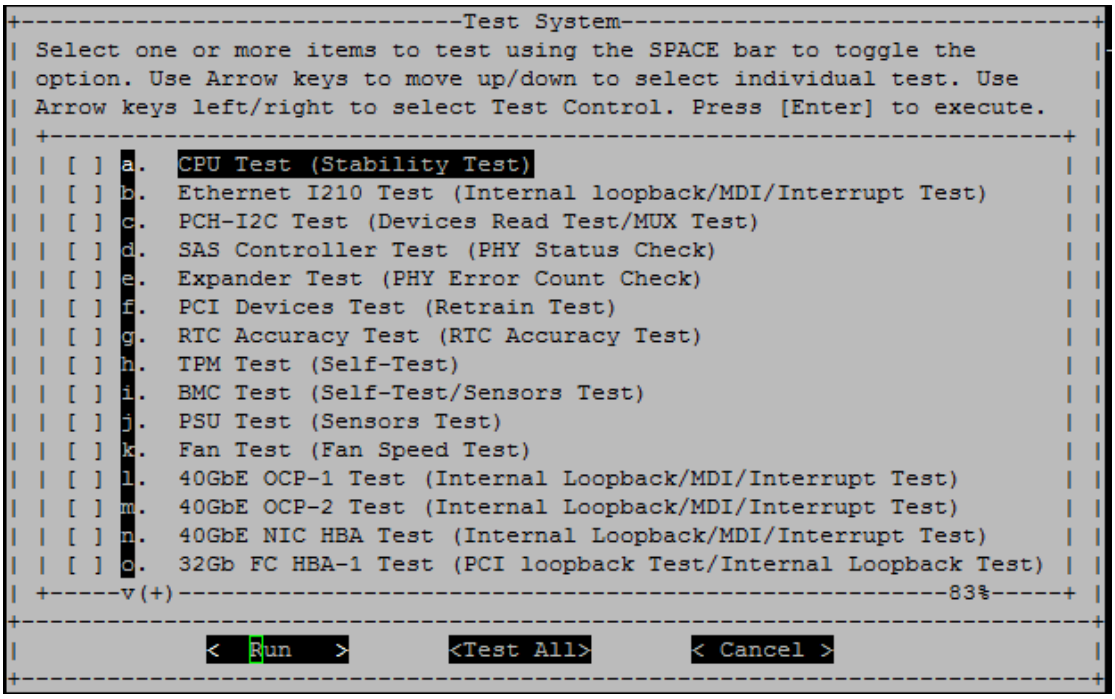
```
Scan System Summary:
Controller-B PN:TEMP-S000092338      SN:2BJJ0267S00N
        CPU              :Expect: 2 Present: 2 Result:PASSED
        TPM              :Expect: 1 Present: 1 Result:PASSED
        SAS              :Expect: 2 Present: 2 Result:PASSED
        Expander         :Expect: 2 Present: 2 Result:PASSED
        SFPGA            :Expect: 1 Present: 1 Result:PASSED
        Ethernet - I210  :Expect: 2 Present: 2 Result:PASSED
        BMC              :Expect: 1 Present: 1 Result:PASSED

Memory: PASSED
Expect:16 Present:16
slot    PN                    SN
dimm1   SHB724G4LML23P2-SB    3213D720
dimm2   SHB724G4LML23P2-SB    3213C819
dimm3   SHB724G4LML23P2-SB    3213D19E
dimm4   SHB724G4LML23P2-SB    3213D47D
dimm5   SHB724G4LML23P2-SB    3213D13C
dimm6   SHB724G4LML23P2-SB    3213CAC5
dimm7   SHB724G4LML23P2-SB    3213D19F
dimm8   SHB724G4LML23P2-SB    3213CB3F
dimm9   SHB724G4LML23P2-SB    3213CB1A
dimm10  SHB724G4LML23P2-SB    3213CD73
dimm11  SHB724G4LML23P2-SB    3213C84B
dimm12  SHB724G4LML23P2-SB    32149EEA
dimm13  SHB724G4LML23P2-SB    3213D250
dimm14  SHB724G4LML23P2-SB    3213D806
dimm15  SHB724G4LML23P2-SB    3213D44B
dimm16  SHB724G4LML23P2-SB    3213D52D

NVMe: PASSED
Expect: 2 Present: 2
slot    PN                    SN
NVME0   SAMSUNG MZVLV128HCGR S2J4NX0H510081
NVME1   SAMSUNG MZVLV128HCGR S2J4NX0H510038

HBA: PASSED
Expect: 7 Present: 7
slot    description                 PN                  SN
1       NVRAM10P Module             031611001295        031615000072
2       32Gb FC HBA-1               111-03249           FC60778265
3       32Gb FC HBA-2               111-03249           FC61004370
4       12Gb SAS HBA                N/A                 N/A
5       40GbE NIC HBA               H76496-002          3CFDFE9DCBB8H76496-002
6       40GbE OCP-1                 H52289-004          90E2BABBDF90H52289-004
7       40GbE OCP-2                 H52289-004          90E2BAC7EC30H52289-004

Fan: PASSED
Expect: 8 Present: 8
Fan_1    13536RPM
Fan_2    13728RPM
Fan_3    13632RPM
Fan_4    13632RPM
Fan_5    13632RPM
Fan_6    13536RPM
Fan_7    13632RPM
Fan_8    13632RPM

PSU: PASSED
Expect: 1 Present: 1
slot     PN                  SN
PSU1                         HZBD1625000552
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.

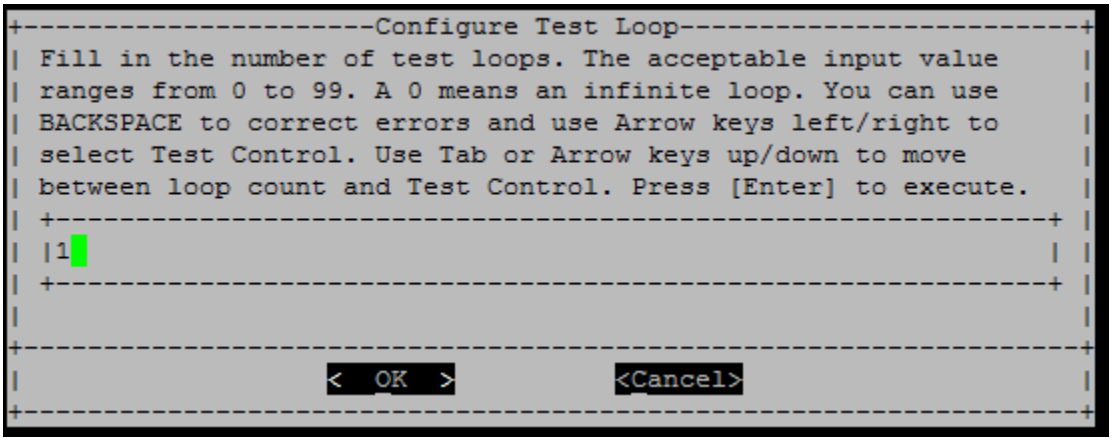


The Test System page is shown, below:



- 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.



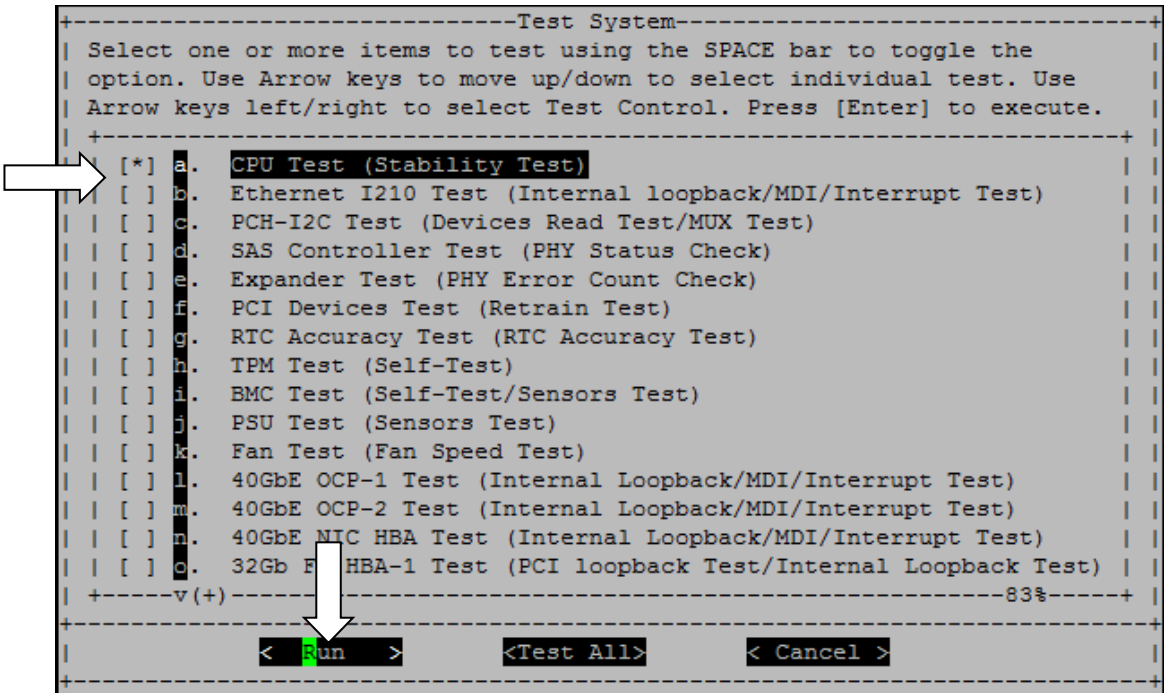
- Enter the number of test loops for the selected tests.
- Use the "Tab" key to switch the cursor between the loop input panel and the

page control panel.

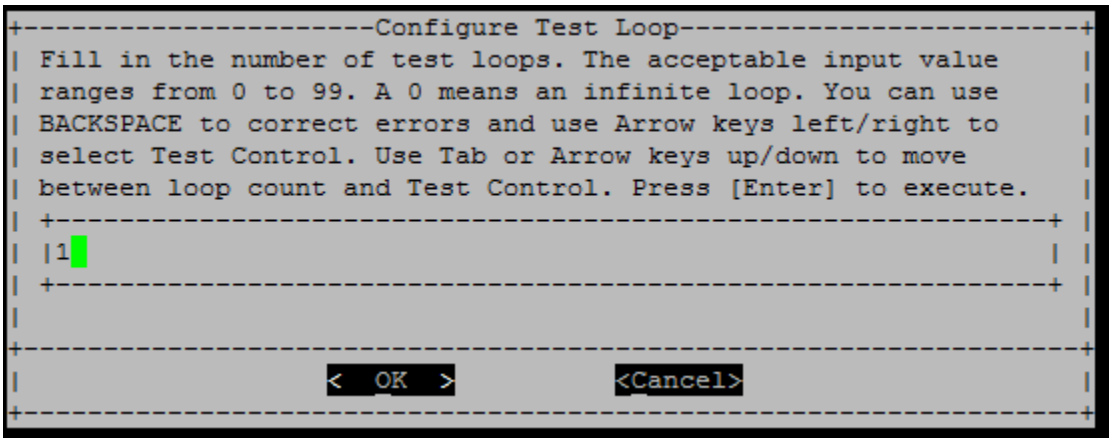
- Use the left and right arrow keys to select "OK" or "Cancel".
- Press "Enter" to start the tests.

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".

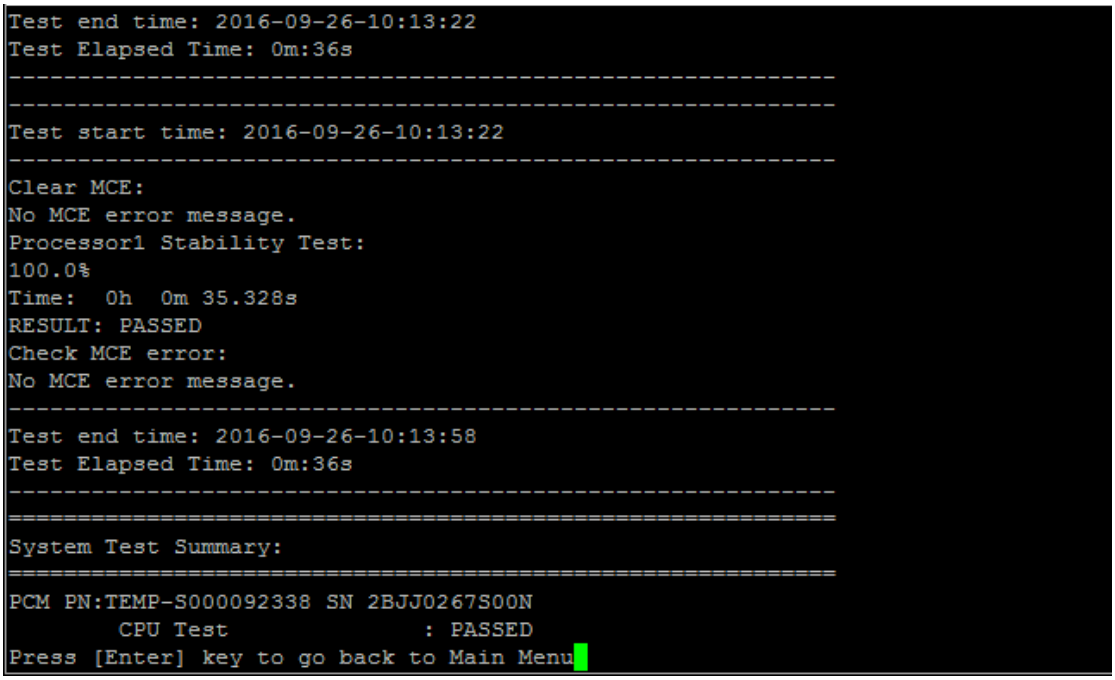


The "Configure Test Loop" page is displayed.



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".

```
Copyright (c) 2016 NetApp Inc. All rights reserved.
#### AFF A700s System-Level HW Diagnostics 01.05.14 ####
#### System        PN: j00-600-g+20                 ####
#### System        SN: shffg1631000187              ####
#### Controller-B  PN: TEMP-S000092338              ####
#### Controller-B  SN: 2BJJ0267S00N                 ####
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:3
```

4.1. Configure Memory Test Range

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

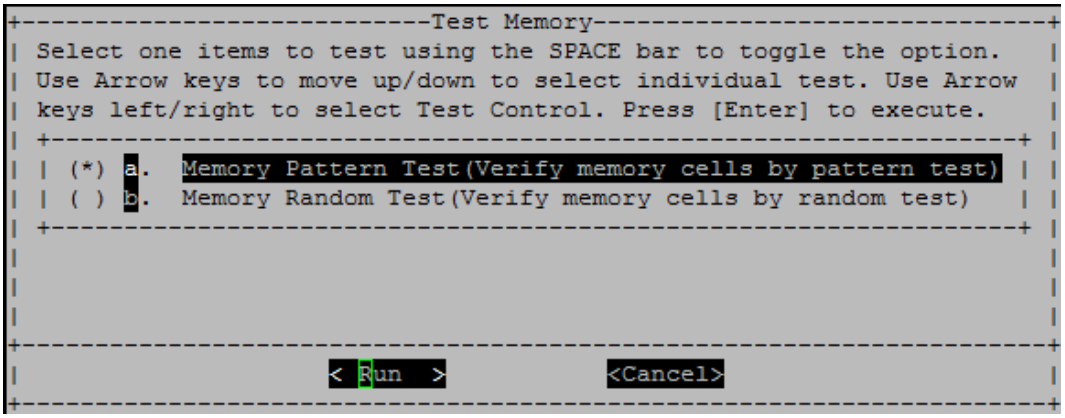
- Fill in the "Start Address" and "End Address" fields with the desired memory address range (in hexadecimal).
- Use the "Tab" key to switch the cursor between memory address input and the page control panel ("OK" or "Cancel").
- Select "OK" in the control panel, and then press "Enter".

```
+-------------Configure Memory Test Range----------------+
| Fill in the start address and the end address for the   |
| memory test range. The default range is the maximum     |
| testable memory range. You can use BACKSPACE to correct |
| errors and use Arrow keys left/right to select Test     |
| Control. Press [Enter] to execute.                      |
| +-----------------------------------------------------+ |
| |Start Address:     0x180000000                       | |
| |End Address:       0x807fffffff                      | |
| +-----------------------------------------------------+ |
|                                                         |
+---------------------------------------------------------+
|              < OK >          <Cancel>                   |
+---------------------------------------------------------+
```

4.2. Memory Test Selection and Loop Count

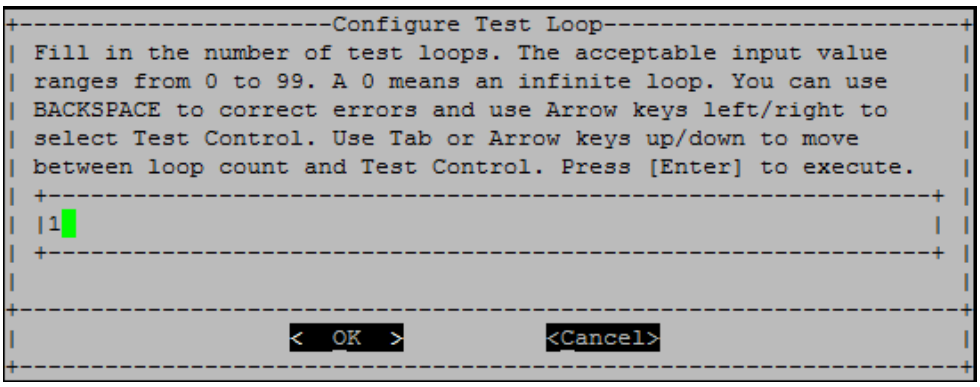
The "Test Memory" page displays the available memory tests:

- Memory Pattern Test – Verifies system memory with a pre-determined pattern
- Memory Random Test – Verifies system memory with randomly generated patterns



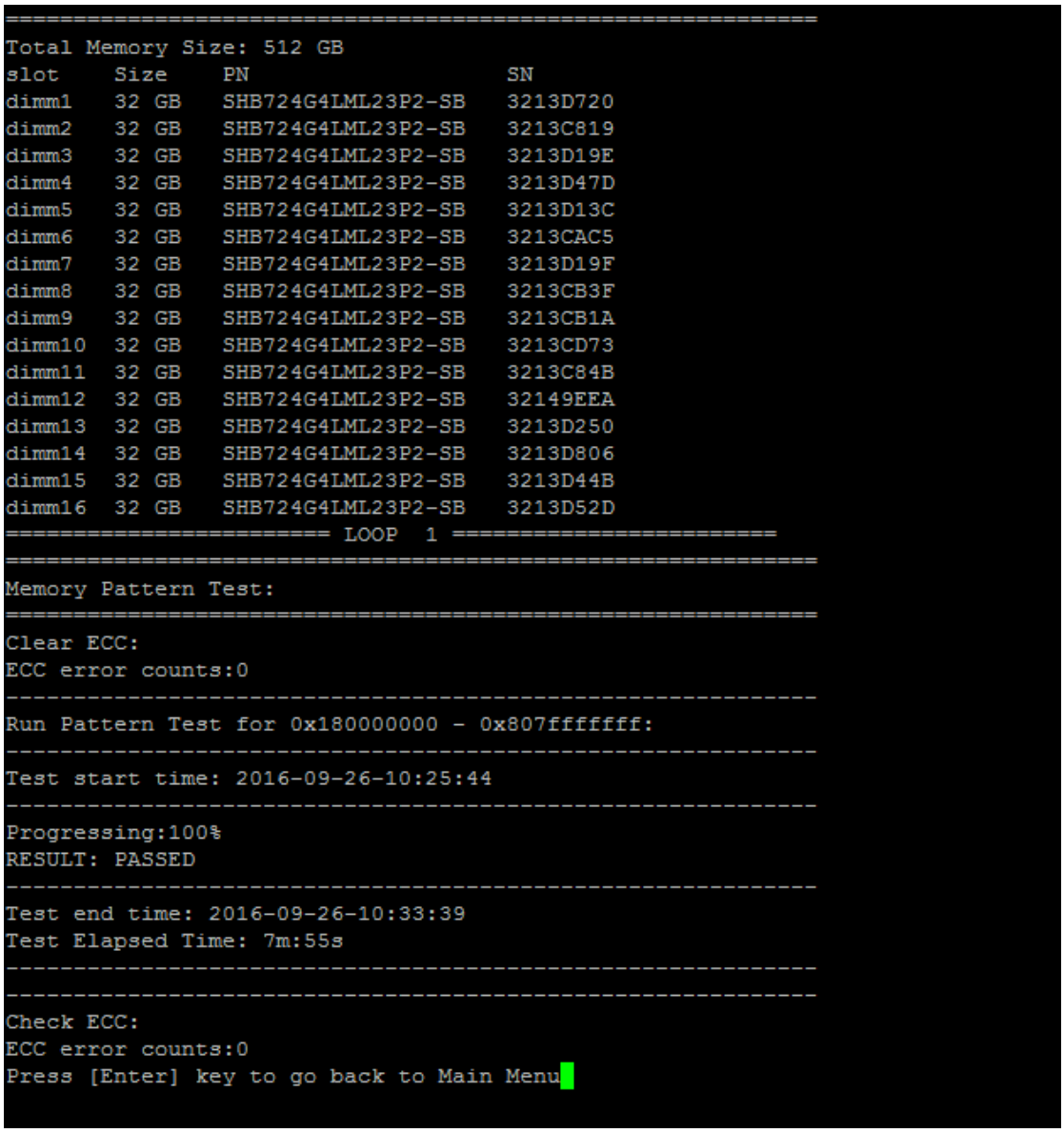
- Use the "up" and "down" arrow keys to select test options "a" or "b"
- Use the "space" bar to toggle an option on or off.
- Use the left and right arrow keys to select "Run" or "Cancel".
- Press "Enter" to execute your choice.

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.

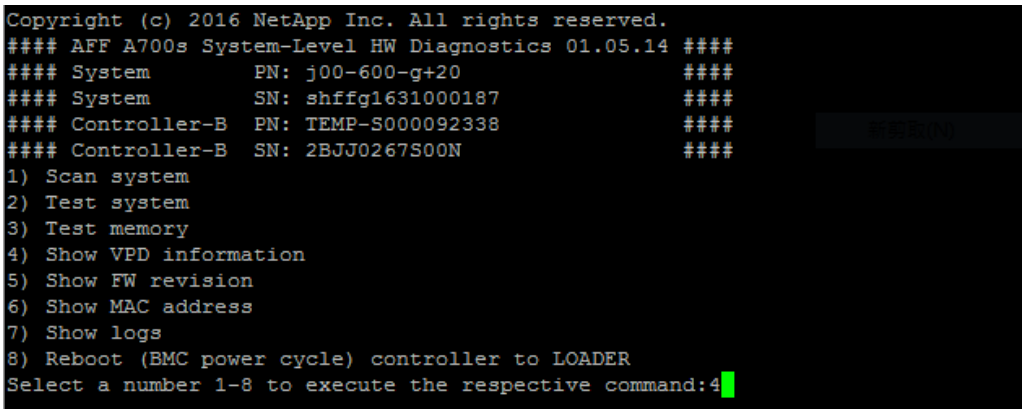
The test results are displayed on the console, as shown below. Press "Enter" to return to the main menu.



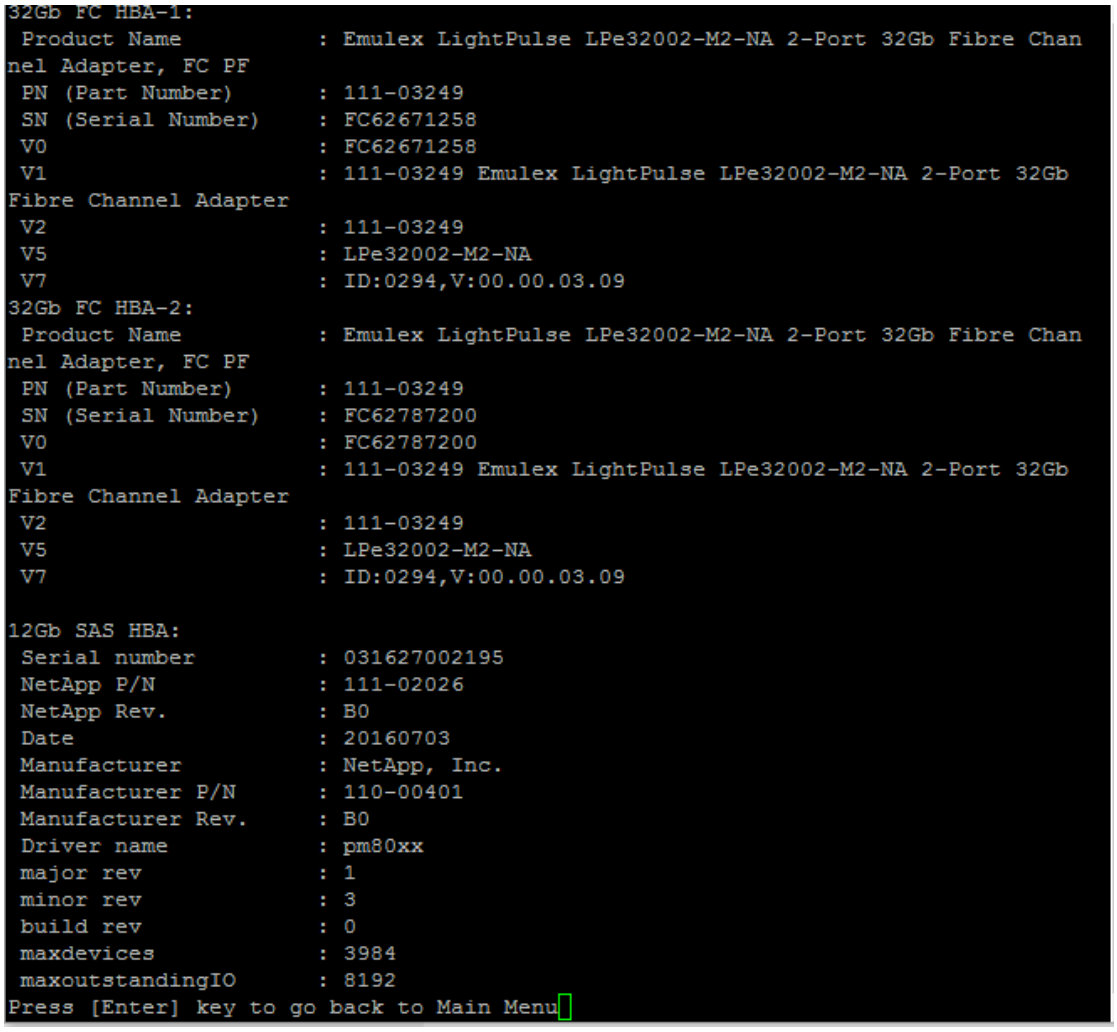
5. Show VPD information

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".

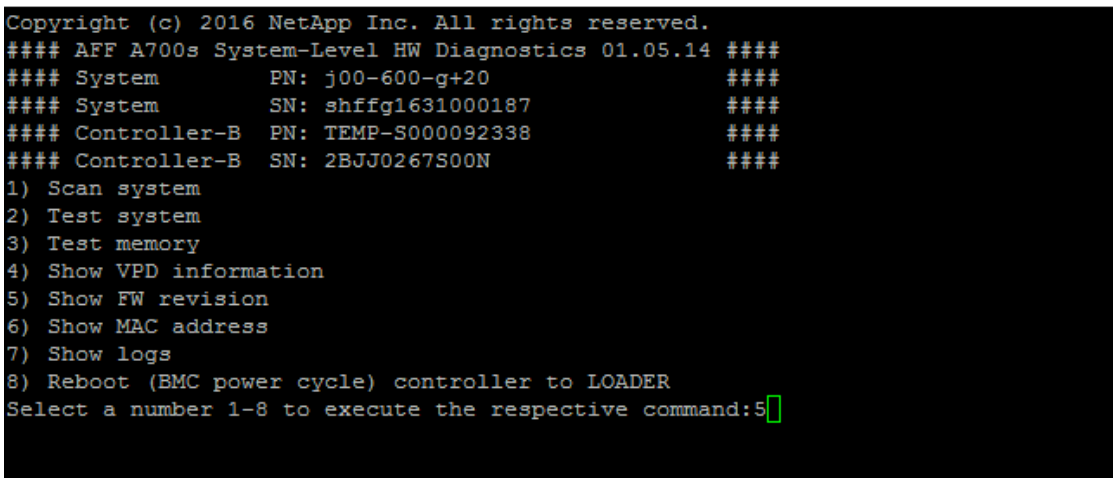


VPD information is displayed. Press "Enter" to return to the main menu.



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.

```
Canister firmware      : E0.A2
Canister firmware date : Jun 30 2016 09:12:12
Canister bootloader    : 0.A5
Canister config CRC    : Not present
Canister VPD structure : 0x0B
Canister VPD CRC       : 0x0E1325F7
Canister CPLD          : 0x1B
Canister chip          : 0x00000003
Canister SDK           : 00.0A.04.00
Midplane VPD structure : 0x0C
Midplane VPD CRC       : 0x9A076550
Midplane CPLD          : 0x14

32Gb FC HBA-1:
FW Version                    : 11.0.250.0

32Gb FC HBA-2:
FW Version                    : 11.0.250.0

40GbE NIC:
FW Version: f4.40.35115 a1.4 n4.53 e1fa6

40GbE OCP-1:
FW Version: f5.0.40043 a1.5 n5.02 e2422

40GbE OCP-2:
FW Version: f5.0.40043 a1.5 n5.02 e2422
Press [Enter] key to go back to 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".

```
Copyright (c) 2016 NetApp Inc. All rights reserved.
#### AFF A700s System-Level HW Diagnostics 01.05.14 ####
#### System        PN: j00-600-g+20                 ####
#### System        SN: shffg1631000187              ####
#### Controller-B  PN: TEMP-S000092338              ####
#### Controller-B  SN: 2BJJ0267S00N                 ####
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:6
```

MAC address information is displayed. Press "Enter" to return to the main menu.

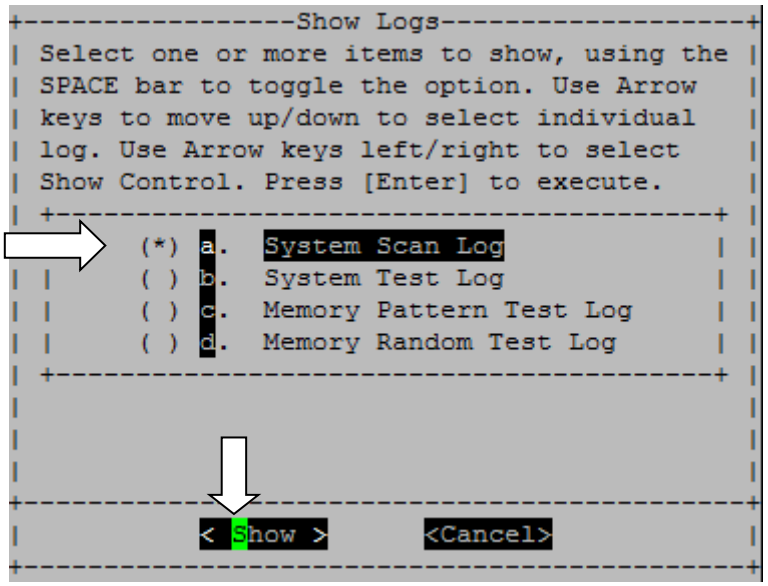
```
I210(Copper)         : 1C:66:6D:BE:28:A4
I210(SerDes)         : 1C:66:6D:BE:28:A5
BMC MAC0             : 1c:66:6d:be:28:a6
LSI SAS3x40          : 1C:66:6D:BE:28:A7
BMC MAC1             : 1c:66:6d:be:28:a8
32Gb FC HBA-1 Port0 : 10:00:00:90:fa:c7:72:ca
32Gb FC HBA-1 Port1 : 10:00:00:90:fa:c7:72:cb
32Gb FC HBA-2 Port0 : 10:00:00:90:fa:c7:71:1a
32Gb FC HBA-2 Port1 : 10:00:00:90:fa:c7:71:1b
40GbE NIC Port0      : 3C:FD:FE:9D:CB:B8
40GbE NIC Port1      : 3C:FD:FE:9D:CB:B9
40GbE OCP-1 Port0    : 90:E2:BA:BB:DF:90
40GbE OCP-1 Port1    : 90:E2:BA:BB:DF:91
40GbE OCP-2 Port0    : 90:E2:BA:C7:EC:30
40GbE OCP-2 Port1    : 90:E2:BA:C7:EC:31
Press [Enter] key to go back to 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.

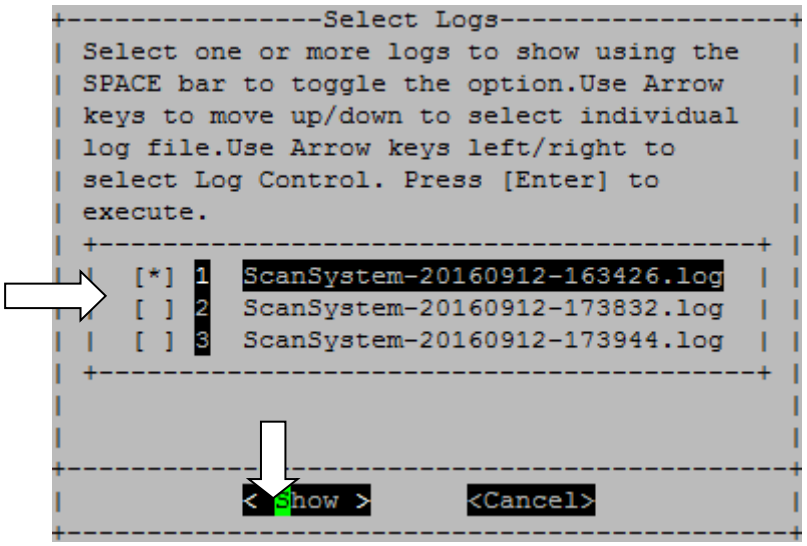
```
Copyright (c) 2016 NetApp Inc. All rights reserved.
#### AFF A700s System-Level HW Diagnostics 01.05.14 ####
#### System        PN: j00-600-g+20                  ####
#### System        SN: shffg1631000187               ####
#### Controller-B  PN: TEMP-S000092338               ####
#### Controller-B  SN: 2BJJ0267S00N                  ####
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:7
```

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.

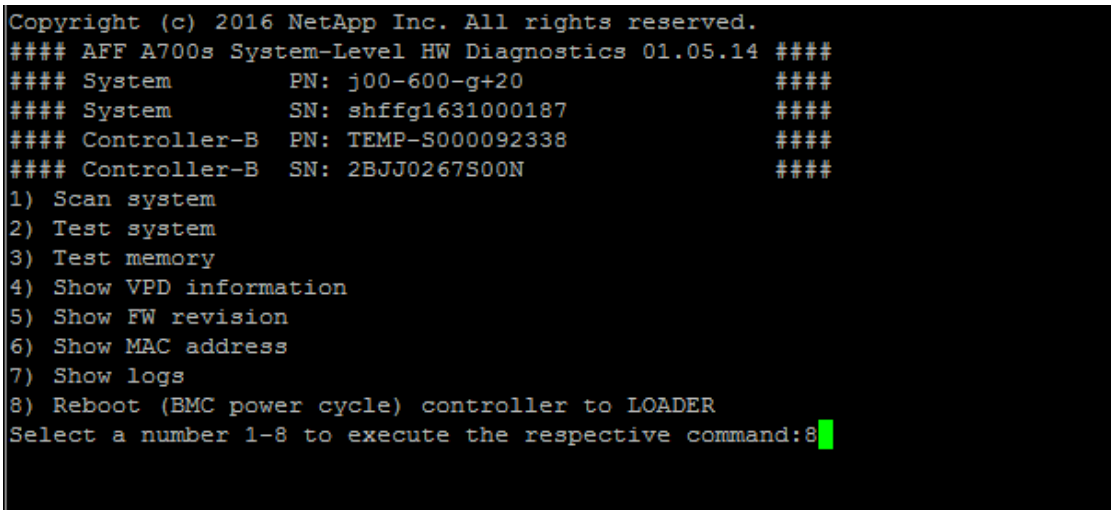
```
============================================================
CPU:
Processor    T/C  Vendor        Model  Family Core  Frequency  Stepping  Cache
   Temperature
Processor0   1    GenuineIntel  79     6      18    2.30GHz    1         46080 K
B  39
Processor1   1    GenuineIntel  79     6      18    2.30GHz    1         46080 K
B  39
============================================================
Memory:
DIMM    Size    Speed     Rank  Manufacturer  PN                  SN
dimm1   32 GB   2133 MHz  2     Samsung       SHB724G4LML23P2-SB  3213D720
dimm2   32 GB   2133 MHz  2     Samsung       SHB724G4LML23P2-SB  3213C819
dimm3   32 GB   2133 MHz  2     Samsung       SHB724G4LML23P2-SB  3213D19E
dimm4   32 GB   2133 MHz  2     Samsung       SHB724G4LML23P2-SB  3213D47D
dimm5   32 GB   2133 MHz  2     Samsung       SHB724G4LML23P2-SB  3213D13C
dimm6   32 GB   2133 MHz  2     Samsung       SHB724G4LML23P2-SB  3213CAC5
dimm7   32 GB   2133 MHz  2     Samsung       SHB724G4LML23P2-SB  3213D19F
dimm8   32 GB   2133 MHz  2     Samsung       SHB724G4LML23P2-SB  3213CB3F
dimm9   32 GB   2133 MHz  2     Samsung       SHB724G4LML23P2-SB  3213CB1A
dimm10  32 GB   2133 MHz  2     Samsung       SHB724G4LML23P2-SB  3213CD73
dimm11  32 GB   2133 MHz  2     Samsung       SHB724G4LML23P2-SB  3213C84B
dimm12  32 GB   2133 MHz  2     Samsung       SHB724G4LML23P2-SB  32149EEA
/boot/EFI/lemur/ScanSystem-20160923-094234.log
```

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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