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# Release Note for AIC SAS 12G EOB35 Expander

July 30, 2024

## Changelog

07/30/2024

Standard with version A (FW 1.12.60.9 + MFG 1.60.0.11) - Part Number (SEE-00126009_A01 + SEG-0060C011_A01)

Old Part Number SEG-0060C010_A01 is replaced by SEG-0060C011_A01

One wide port with downstream port (FW 1.12.60.9 + MFG 1.60.7.2) - Part Number (SEE-00126009_A01 + SEG-0060C702_A01)

Old Part Number SEG-0060C701_A01 is replaced by SEG-0060C702_A01

1. Bug fix: lower the priority of the slot LED control bit "DO NOT REMOVE" on Broadcom HBA 9600

06/24/2024

Standard with version A (FW 1.12.60.9 + MFG 1.60.0.10) - Part Number (SEE-00126009_A01 + SEG-0060C010_A01)

Old Part Number SEE-00126008_A01 is replaced by SEE-00126009_A01

Old Part Number SEG-0060C009_A01 is replaced by SEG-0060C010_A01

One wide port with downstream port (FW 1.12.60.9 + MFG 1.60.7.1) - Part Number (SEE-00126009_A01 + SEG-0060C701_A01)

1. Read firmware and MFG version by in-band
2. Support Broadcom 9600 series card
3. Support downstream (MFG 1.60.7.x)
   - 4U24 -> SASHD1(DSP)
   - 2U12 -> SASHD1(DSP)
   - 3U16 -> SASHD2(DSP)
   - 2U24 -> SASHD2(DSP)

11/15/2023 (FW 1.12.60.8 + MFG 1.60.0.9) - Part Number (SEE-00126008_A01 + SEG-0060C009_A01)

Old Part Number SEE-00126006_A01 is replaced by SEE-00126008_A01

Old Part Number SEG-0060C008_A01 is replaced by SEG-0060C009_A01

1. Add smart fan function with fan fail – default as disable
2. fix incorrect 2U24 wide port led map

06/12/2023 (FW 1.12.60.6 + MFG 1.60.0.8) - Part Number (SEE-00126006_A01 + SEG-0060C008_A01)

Old Part Number SEG-0060C007_A01 is replaced by SEG-0060C008_A01

1. Modify 2U24 signal value

06/05/2023 (FW 1.12.60.6 + MFG 1.60.0.7) - Part Number (SEE-00126006_A01 + SEG-0060C007_A01)

Old Part Number SEE-00126005_A01 is replaced by SEE-00126006_A01

Old Part Number SEG-0060C006_A01 is replaced by SEG-0060C007_A01

1. Modify SES Temperature Sensor threshold value
2. SES Temperature Sensor value display unknown

04/06/2023 (FW 1.12.60.5 + MFG 1.60.0.6) - Part Number (SEE-00126005_A01 + SEG-0060C006_A01)

Old Part Number SEE-00126004_A01 is replaced by SEE-00126005_A01

Old Part Number SEG-0060C005_A01 is replaced by SEG-0060C006_A01

1. Build with SDK 25
2. Support remote function to 4U24 and 2U12
3. Support phy zone function

03/02/2022 (FW 1.12.60.4 + MFG 1.60.0.5) - Part Number (SEE-00126004_A01 + SEG-0060C005_A01)

Old Part Number SEE-00126002_A01 is replaced by SEE-00126004_A01

Old Part Number SEG-0060C002_A01 is replaced by SEG-0060C005_A01

1. Adjust OS scan hdd order by slot

12/24/2021 (FW 1.12.60.2 + MFG 1.60.0.2) - Part Number (SEE-00126002_A01 + SEG-0060C002_A01)

Old Part Number SEE-00126001_A01 is replaced by SEE-00126002_A01

Old Part Number SEG-0060C001_A01 is replaced by SEG-0060C002_A01

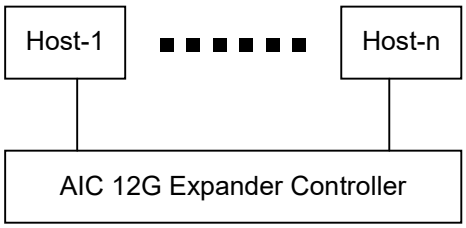
1. Feature: Add CLI command – Set fan quantity

2. Support 2U12, 3U16, 4U24 and 2U24

8/30/2021 (FW 1.12.60.1 + MFG 1.60.0.1) - Part Number (SEE-00126001_A01 + SEG-0060C001_A01)

1. Built with SDK 12
2. Initial revision

## 1. Support Multiple Host/Path Access




To have multiple host/path access support (the host number can be up to the number of wide ports on each AIC 12G Expander Controller), only the following drives are supported for shared access:

(A) SAS drive / Nearline SAS drive

(B) SATA drive with an interposer which provides SATA-to-SAS conversion

## 2. SES Inband Features

2.1. SES Pages

00h - List of supported diagnostic pages

01h - SES configuration

02h - SES enclosure control / enclosure status

07h - SES element descriptor

0Ah - SES additional element

0Eh - SES download microcode control / SES download microcode status

## 2.2. SES Elements

02h - Power Supply

04h - Temperature Sensor

0Eh - Enclosure

12h - Voltage

17h - Array Device

## 2.3. Implementation on SES Elements

### 2.3.1. Power Supply Element

#### 2.3.1.1. Power Supply Control Element

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON CONTROL | | | | | | | |
| | SELECT | PRDFAIL | DISABLE | RST SWAP | Reserved | | | |
| 1 | RQST IDENT | Reserved | | | | | | |
| 2 | Reserved | | | | | | | |
| 3 | Reserved | RQST FAIL | RQST ON | Reserved | | | | |

| Field | Value |
|---|---|
| RQST ON | Please refer to section “SES Element Control Functions” for details. |

Server Storage only supports Disk Power Supply.

#### 2.3.1.2. Power Supply Status Element

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON STATUS | | | | | | | |
| | Reserved | PRDFAIL | DISABLED | SWAP | ELEMENT STATUS CODE | | | |
| 1 | IDENT | Reserved | | | | | | |
| 2 | Reserved | | | | DC OVER VOLTAGE | DC UNDER VOLTAGE | DC OVER CURRENT | Reserved |
| 3 | HOT | FAIL | RQSTED | OFF | OVERTMP | TEMP | AC FAIL | DC FAIL |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SWAP | | ON | | FAIL | WARN | | |

| Field | Value |
|---|---|
| ELEMENT STATUS CODE | OK: No failure or warning conditions detected<br>CRITICAL: FAIL bit is set due to one or more failure condition |
| FAIL | A failure condition is detected |
| RQSTED ON | 1: On<br>0: Off for Disk Power Supply |
| OFF | 1: Off for Disk Power Supply<br>0: On |
| AC FAIL | A failure condition is detected |
| DC FAIL | A failure condition is detected |

Server Storage only supports “RQSTED ON” and “OFF” for Disk Power Supply.

2.3.3. Temperature Sensor Element

2.3.3.1. Temperature Sensor Control Element

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON CONTROL | | | | | | | |
| | SELECT | PRDFAIL | DISABLE | RST SWAP | Reserved | | | |
| 1 | RQST IDENT | RQST FAIL | Reserved | | | | | |
| 2 | Reserved | | | | | | | |
| 3 | Reserved | | | | | | | |

2.3.3.2. Temperature Sensor Status Element

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON STATUS | | | | | | | |
| | Reserved | PRDFAIL | DISABLED | SWAP | ELEMENT STATUS CODE | | | |
| 1 | IDENT | FAIL | Reserved | | | | | |
| 2 | TEMPERATURE | | | | | | | |
| 3 | Reserved | | | | OT FAILURE | OT WARNING | UT FAILURE | UT WARNING |

| Field | Value |
|---|---|
| ELEMENT STATUS CODE | OK: Everything is Ok<br>NON-CRITICAL: If either warning limit is exceeded |

| | |
|---|---|
| | CRITICAL: If either failure limit is exceeded |
| FAIL | A warning or failure condition is detected |
| TEMPERATURE | Temperature reading |
| OT FAILURE | Temperature has exceeded the failure high threshold value |
| OT WARNING | Temperature has exceeded the warning high threshold value |
| UT FAILURE | Temperature is below the failure low threshold value |
| UT WARNING | Temperature is below the warning low threshold value |

2.3.4. Enclosure Element

2.3.4.1. Enclosure Control Element

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON CONTROL | | | | | | | |
| | SELECT | PRDFAIL | DISABLE | RST SWAP | Reserved | | | |
| 1 | RQST IDENT | Reserved | | | | | | |
| 2 | POWER CYCLE REQUEST | POWER CYCLE DELAY | | | | | | |
| 3 | POWER OFF DURATION | | | | | | REQUEST FAILURE | REQUEST WARNING |

| Field | Value |
|---|---|
| RQST IDENT | Please refer to section “SES Element Control Functions” for details. |
| REQUEST FAILURE | Please refer to section “SES Element Control Functions” for details. |
| REQUEST WARNING | Please refer to section “SES Element Control Functions” for details. |

Server Storage does not support this control element.

2.3.4.2. Enclosure Status Element

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON STATUS | | | | | | | |
| | Reserved | PRDFAIL | DISABLED | SWAP | ELEMENT STATUS CODE | | | |
| 1 | IDENT | Reserved | | | | | | |
| 2 | TIME UNTIL POWER CYCLE | | | | | | FAILURE INDICATION | WARNING INDICATION |
| 3 | REQUEST POWER OFF DURATION | | | | | | FAILURE | WARNING |

| | | | |
|---|---|---|---|
| | | REQUESTED | REQUESTED |

| Field | Value |
|---|---|
| ELEMENT STATUS CODE | OK |
| IDENT | 0: Power LED is solid on<br>1: Power LED is blinking |
| FAILURE REQUESTED | Set by the REQUEST FAILURE on Enclosure Control Element |
| WARNING REQUESTED | Set by the REQUEST WARNING on Enclosure Control Element |

Server Storage does not support this status element.

2.3.5. Voltage Element

2.3.5.1. Voltage Control Element

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON CONTROL | | | | | | | |
| | SELECT | PRDFAIL | DISABLE | RST SWAP | Reserved | | | |
| 1 | RQST IDENT | RQST FAIL | Reserved | | | | | |
| 2 | Reserved | | | | | | | |
| 3 | Reserved | | | | | | | |

2.3.5.2. Voltage Status Element

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON STATUS | | | | | | | |
| | Reserved | PRDFAIL | DISABLED | SWAP | ELEMENT STATUS CODE | | | |
| 1 | IDENT | FAIL | Reserved | | WARN OVER | WARN UNDER | CRIT OVER | CRIT UNDER |
| 2 | VOLTAGE | | | | | | | |
| 3 | | | | | | | | |

| Field | Value |
|---|---|
| ELEMENT STATUS CODE | OK |
| FAIL | A warning or failure condition is detected |
| WARN OVER | Voltage has exceeded the warning high threshold value |
| WARN UNDER | Voltage is below the warning low threshold value |
| CRIT OVER | Voltage has exceeded the failure high threshold value |
| CRIT UNDER | Voltage is below the failure low threshold value |
| VOLTAGE | Voltage reading |

2.3.6. Array Device Element

2.3.6.1. Array Device Control Element

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON CONTROL | | | | | | | |
| | SELECT | PRDFAIL | DISABLE | RST SWAP | Reserved | | | |
| 1 | RQST OK | RQST RSVD DEVICE | RQST HOT SPARE | RQST CONS CHECK | RQST IN CRIT ARRAY | RQST IN FAILED ARRAY | RQST REBULD/ REMAP | RQST R/R ABORT |
| 2 | RQST ACTIVE | DO NOT REMOVE | Reserved | RQST MISSING | RQST INSERT | RQST REMOVE | RQST IDENT | Reserved |
| 3 | Reserved | | RQST FAULT | DEVICE OFF | ENABLE BYP A | ENABLE BYP B | Reserved | |

| Field | Value |
|---|---|
| PRDFAIL | Please refer to section “SES Element Control Functions” for details. |
| RQST OK | Please refer to section “SES Element Control Functions” for details. |
| RQST RSVD DEVICE | Please refer to section “SES Element Control Functions” for details. |
| RQST HOT SPARE | Please refer to section “SES Element Control Functions” for details. |
| RQST CONS CHECK | Please refer to section “SES Element Control Functions” for details. |
| RQST IN CRIT ARRAY | Please refer to section “SES Element Control Functions” for details. |
| RQST IN FAILED ARRAY | Please refer to section “SES Element Control Functions” for details. |

| | |
|---|---|
| RQST REBUILD/REMAP | Please refer to section “SES Element Control Functions” for details. |
| RQST R/R ABORT | Please refer to section “SES Element Control Functions” for details. |
| RQST ACTIVE | Please refer to section “SES Element Control Functions” for details. |
| DO NOT REMOVE | Please refer to section “SES Element Control Functions” for details. |
| RQST MISSING | Please refer to section “SES Element Control Functions” for details. |
| RQST INSERT | Please refer to section “SES Element Control Functions” for details. |
| RQST REMOVE | Please refer to section “SES Element Control Functions” for details. |
| RQST IDENT | Please refer to section “SES Element Control Functions” for details. |
| RQST FAULT | Please refer to section “SES Element Control Functions” for details. |
| DEVICE OFF | Please refer to section “SES Element Control Functions” for details. |

2.3.6.2. Array Device Status Element

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON STATUS | | | | | | | |
| | Reserved | PRDFAIL | DISABLED | SWAP | ELEMENT STATUS CODE | | | |
| 1 | OK | RSVD DEVICE | HOT SPARE | CONS CHK | IN CRIT ARRAY | IN FAILED ARRAY | REBUILD/ REMAP | R/R ABORT |
| 2 | APP CLIENT BYPASSED A | DO NOT REMOVE | ENCLOSURE BYPASSED A | ENCLOSURE BYPASSED B | READY TO INSERT | RMV | IDENT | REPORT |
| 3 | APP CLIENT BYPASSED B | FAULT SENSED | FAULT REQSTD | DEVICE OFF | BYPASSED A | BYPASSED B | DEVICE BYPASSED A | DEVICE BYPASSED B |

| Field | Value |
|---|---|
| PRDFAIL | Set by the PRDFAIL on Array Device Control Element |
| ELEMENT STATUS CODE | OK: A drive is detected in the slot<br>NOT INSTALLED: No drive is installed in the slot |

| | |
|---|---|
| OK | Set by the RQST OK on Array Device Control Element |
| RSVD DEVICE | Set by the RQST RSVD DEVICE on Array Device Control Element |
| HOT SPARE | Set by the RQST HOT SPARE on Array Device Control Element |
| CONS CHK | Set by the RQST CONS CHECK on Array Device Control Element |
| IN CRIT ARRAY | Set by the RQST IN CRIT ARRAY on Array Device Control Element |
| IN FAILED ARRAY | Set by the RQST IN FAILED ARRAY on Array Device Control Element |
| REBUILD/REMAP | Set by the RQST REBUILD/REMAP on Array Device Control Element |
| R/R ABORT | Set by the RQST R/R ABORT on Array Device Control Element |
| DO NOT REMOVE | Set by the DO NOT REMOVE on Array Device Control Element |
| READY TO INSERT | Set by the RQST INSERT on Array Device Control Element |
| RMV | Set by the RQST REMOVE on Array Device Control Element |
| IDENT | Set by the RQST IDENT on Array Device Control Element |
| FAULT REQSTD | Set by the RQST FAULT on Array Device Control Element |
| DEVICE OFF | Set by the DEVICE OFF on Array Device Control Element |

2.4. SES Element Control Functions

2.4.1. LED indicators (blue and red) associated with an attached disk drive

**Array Device Slot control element**

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON CONTROL | | | | | | | |
| | SELECT | PRDFAIL | DISABLE | RST SWAP | Reserved | | | |
| 1 | RQST OK | RQST RSVD DEVICE | RQST HOT SPARE | RQST CONS CHECK | RQST IN CRIT ARRAY | RQST IN FAILED ARRAY | RQST REBULD/ REMAP | RQST R/R ABORT |
| 2 | RQST ACTIVE | DO NOT REMOVE | Reserved | RQST MISSING | RQST INSERT | RQST REMOVE | RQST IDENT | Reserved |
| 3 | Reserved | | RQST FAULT | DEVICE OFF | ENABLE BYP A | ENABLE BYP B | Reserved | |

The default behavior for blue LED is "LED is on when the disk is not busy, and off when the disk is executing a command". When the "RQST IDENT" bit is set, the blue LED overwrites its default behavior with a slow blink while the red LED is off. The blue LED is set "Activity" for not overwriting its default behavior.

| Slot Control Bit | Blue LED | Red LED |
|---|---|---|
| RQST OK | Activity | OFF |
| RQST RSVD DEVICE | Activity | OFF |
| RQST HOT SPARE | Activity | OFF |
| RQST CONS CHECK | Activity | Fast blink |
| RQST IN CRIT ARRAY | Activity | Slow blink |
| RQST IN FAILED ARRAY | Activity | Slow blink |
| RQST REBUILD/REMAP | Activity | Fast blink |
| RQST R/R ABORT | Activity | Slow blink |
| RQST ACTIVE | Activity | OFF |
| DO NOT REMOVE | Activity | OFF |
| RQST MISSING | ON | ON |
| RQST INSERT | Activity | Slow blink |
| RQST REMOVE | Activity | Slow blink |
| RQST IDENT | Slow blink | OFF |
| RQST FAULT | ON | ON |
| DEVICE OFF | OFF | OFF |
| PRDFAIL | Activity | Slow blink |

2.4.2. How to turn on/off the power of a drive slot

**Array Device Slot control element**

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON CONTROL | | | | | | | |
| | SELECT | PRDFAIL | DISABLE | RST SWAP | Reserved | | | |
| 1 | RQST OK | RQST RSVD DEVICE | RQST HOT SPARE | RQST CONS CHECK | RQST IN CRIT ARRAY | RQST IN FAILED ARRAY | RQST REBULD/ REMAP | RQST R/R ABORT |
| 2 | RQST ACTIVE | DO NOT REMOVE | Reserved | RQST MISSING | RQST INSERT | RQST REMOVE | RQST IDENT | Reserved |
| 3 | Reserved | | RQST FAULT | DEVICE OFF | ENABLE BYP A | ENABLE BYP B | Reserved | |

The "DEVICE OFF" for a drive slot is defined in the bit4, byte3 of the "Array Device Slot control element" in the SES specification. Set the bit to turn off a slot power, and vice versa. We use the software package "sg3_utils" on Linux for example, and have a SAS HBA and a cable to connect your host with the expander.

(A) Show the device for AIC Expander Controller (canister)

$ sg_map -i

/dev/sg2 AIC 12G 2U24SAS3EOB 0c01

(B) Get the current state of a slot power. The "Device off=0" means the slot power is on.

$ sg_ses --page=2 /dev/sg2

Element 0 descriptor:

App client bypass B=0, Fault sensed=0, Fault reqstd=0, Device off=0

(C) Get the descriptor of a slot power

$ sg_ses --page=7 /dev/sg2

Element 0 descriptor: Disk001

(D) Turn off a slot power

$ sg_ses --descriptor=Disk001 --set=3:4:1 /dev/sg2

(E) Turn on a slot power

$ sg_ses --descriptor=Disk001 --clear=3:4:1 /dev/sg2

2.4.3. How to power off/on all disk drives manually

**Power Supply control element**

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON CONTROL | | | | | | | |
| | SELECT | PRDFAIL | DISABLE | RST SWAP | Reserved | | | |
| 1 | RQST IDENT | Reserved | | | | | | |
| 2 | Reserved | | | | | | | |
| 3 | Reserved | RQST FAIL | RQST ON | Reserved | | | | |

The "RQST ON" for Power Supply is defined in the bit5, byte3 of the "Power Supply

control element" in the SES specification. Clear the bit on Power Supply Element “DiskPowerSupply” to power off all disk drives. Set the bit on Power Supply Element “DiskPowerSupply” to power on all disk drives. We use the software package "sg3_utils" on Linux for example, and have a SAS HBA and a cable to connect your host with the expander.

(A) Show the device for AIC Expander Controller (canister)

$ sg_map -i

/dev/sg2 AIC 12G 2U24SAS3EOB 0c02

(B) Power off all disk drives

$ sg_ses --descriptor=DiskPowerSupply --clear=3:5:1 /dev/sg2

(C) Power on all disk drives

$ sg_ses --descriptor=DiskPowerSupply --set=3:5:1 /dev/sg2

2.4.4. How to power off the entire enclosure

(Storage Server does not support this function)

**Power Supply control element**

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON CONTROL | | | | | | | |
| | SELECT | PRDFAIL | DISABLE | RST SWAP | Reserved | | | |
| 1 | RQST IDENT | Reserved | | | | | | |
| 2 | Reserved | | | | | | | |
| 3 | Reserved | RQST FAIL | RQST ON | Reserved | | | | |

The "RQST ON" for Power Supply is defined in the bit5, byte3 of the "Power Supply control element" in the SES specification. Clear the bit on Power Supply Element “PowerSupply01” to power off the entire enclosure. We use the software package "sg3_utils" on Linux for example, and have a SAS HBA and a cable to connect your host with the expander.

(A) Show the device for AIC Expander Controller (canister)

$ sg_map -i

/dev/sg2 AIC 12G 2U24SAS3EOB 0c02

(B) Power off the entire enclosure

$ sg_ses --descriptor=PowerSupply01 --clear=3:5:1 /dev/sg2

2.4.5. How to identify the enclosure

(Storage Server does not support this function)

**Enclosure control element**

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON CONTROL | | | | | | | |
| | SELECT | PRDFAIL | DISABLE | RST SWAP | Reserved | | | |
| 1 | RQST IDENT | Reserved | | | | | | |
| 2 | POWER CYCLE REQUEST | POWER CYCLE DELAY | | | | | | |
| 3 | POWER OFF DURATION | | | | | | REQUEST FAILURE | REQUEST WARNING |

The power LED is used for the identity. When the power LED is solid on, the identity is disabled. When blinking, the identity is enabled. The "RQST IDENT" for Enclosure is defined in the bit7, byte1 of the "Enclosure control element" in the SES specification. Set the bit to enable the identity. Clear the bit to disable the identity. We use the software package "sg3_utils" on Linux for example, and have a SAS HBA and a cable to connect your host with the expander.

(A) Show the device for AIC Expander Controller (canister)

$ sg_map -i

/dev/sg2 AIC 12G 2U24SAS3EOB 0c02

(B) Enable the identity

$ sg_ses --descriptor=EnclosureElement01 --set=1:7:1 /dev/sg2

(C) Disable the identity

$ sg_ses --descriptor=EnclosureElement01 --clear=1:7:1 /dev/sg2

2.4.6. How to enable/disable the enclosure alarm by your software

(Storage Server does not support this function)

**Enclosure control element**

| BYTE/BIT | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | COMMON CONTROL | | | | | | | |
| | SELECT | PRDFAIL | DISABLE | RST SWAP | Reserved | | | |
| 1 | RQST IDENT | Reserved | | | | | | |
| 2 | POWER CYCLE REQUEST | POWER CYCLE DELAY | | | | | | |
| 3 | POWER OFF DURATION | | | | | | REQUEST FAILURE | REQUEST WARNING |

The system alarm LED is used for the enclosure alarm and power alarm. The "REQUEST FAILURE" and “REQUEST WARNING” for Enclosure are defined in the bit1, byte3 and bit0, byte3 of the "Enclosure control element" in the SES specification. Setting either bit can enable the enclosure alarm. Clearing both bits disables the enclosure alarm. We use the software package "sg3_utils" on Linux for example, and have a SAS HBA and a cable to connect your host with the expander.

(A) Show the device for AIC Expander Controller (canister)

$ sg_map -i

/dev/sg2 AIC 12G 2U24SAS3EOB 0c02

(B) Enable the enclosure alarm

$ sg_ses --descriptor=EnclosureElement01 --set=3:1:1 /dev/sg2

or

$ sg_ses --descriptor=EnclosureElement01 --set=3:0:1 /dev/sg2

(C) Disable the enclosure alarm

$ sg_ses --descriptor=EnclosureElement01 --clear=3:1:1 /dev/sg2

or

$ sg_ses --descriptor=EnclosureElement01 --clear=3:0:1 /dev/sg2

## 2. Power on/off the enclosure via RS232

(Storage Server does not support this function)

The RS232 setting - baud rate: 9600 bps, data bits: 8, parity: odd, stop bits: 1, flow control: none

The power-on command is "RemoteStart\n" where "\n" means Carriage Return and

Linefeed. The power-off command is "RemoteStop\n". When the host RS232 receives "RemoteStart\n" or "RemoteStop\n" from the enclosure after the same command was sent to the enclosure, it means that the enclosure accepts the command sent by the host. The reference script below runs on Linux.

```
#########################################################################
#!/bin/bash

PORT="/dev/ttyS0"
BAUDRATE="9600"
NOFLOW="-ixon -ixoff -crtscts"
SOFTFLOW="ixon ixoff -crtscts"
DEFAULT="-inpck clocal -istrip ignbrk ignpar opost onlcr -iexten"

if [ $# -eq 0 ] ; then
    echo "Usage: $0 start/stop"
    exit 1
fi

[ ! -e "$PORT" ] && echo "Console closed..."
stty -F $PORT $BAUDRATE cs8 parenb parodd -cstopb $NOFLOW opost onlcr

case $1 in
    start)
        echo "RemoteStart"
        echo -e   "\n" > $PORT
        echo -e   "RemoteStart\n" > $PORT
        echo -e   "RemoteStart\n" > $PORT
        echo -e   "RemoteStart\n" > $PORT
        echo -e   "RemoteStart\n" > $PORT
        echo -e   "RemoteStart\n" > $PORT
        ;;
    stop)
        echo "RemoteStop"
        echo -e "\n" > $PORT
        echo -e "RemoteStop\n" > $PORT
        echo -e "RemoteStop\n" > $PORT
        echo -e "RemoteStop\n" > $PORT
```

```
        echo -e "RemoteStop\n" > $PORT
        echo -e "RemoteStop\n" > $PORT
        ;;
esac
#########################################################################
```

## 4. Serial Command Line Interface Functions

The RS232 setting - baud rate: 38400 bps, data bits: 8, parity: none, stop bits: 1, flow control: none

### 4.1. How to enable/disable T10 zoning

The default T10 zoning configuration is off.

(A) Check the current zoning state

```
cmd> phyzone state
Zoning is OFF
```

(B) Enable zoning

```
cmd> phyzone on
```

(C) Disable zoning

```
cmd> phyzone off
```

### 4.2. How to configure T10 zoning

After enabling T10 zoning, five predefined groups are Group1, Group8, Group9, Group10, and Group11. Each PHY should be in one of the five groups, and all PHYs in a wide port should be in the same group. Each PHY in Group1 can access any PHY in other groups, and vice versa. Each PHY in Group8 cannot access any PHY in Group9, and vice versa.

The command syntax is "phyzone phy_index group". The following example shows how to setup one drive accessed only by the first port and another drive accessed only by the second port.

The configuration for the example is

(A) PHY0 - PHY3 for the first wide port

(B) PHY4 - PHY7 for the second wide port

(C) PHY12 - PHY35 for drive

Step 1: Read the current group for PHY4

cmd> phyzone 4

Phy 4 for Zone Group 1

Step 2: Assign the second port (PHY4 - PHY7) for Group9

cmd> phyzone 4 9

cmd> phyzone 5 9

cmd> phyzone 6 9

cmd> phyzone 7 9

Step 3: Assign the first port (PHY0 - PHY3) for Group8

cmd> phyzone 0 8

cmd> phyzone 1 8

cmd> phyzone 2 8

cmd> phyzone 3 8

Step 4: Assign the drive on PHY12 to be accessed only by the first port instead of the second port

cmd> phyzone 12 8

Step 5: Assign the drive on PHY13 to be accessed only by the second port instead of the first port

cmd> phyzone 13 9

Step 6: Reset for taking effect with the new settings

cmd> reset

4.3. How to get all revisions in AIC SAS 12G Expander

(A) Expander firmware revision

cmd> rev

(B) Expander configuration revision

cmd> showmfg

(C) MCU firmware for managing sensors

cmd> sensor

4.4. How to configure temperature sensor

(Storage Server does not support this function)

Four temperature settings in Celsius are T1, T2, warning threshold, and alarm (critical) threshold. The T1, T2 and alarm (critical) threshold are applied to the smart fan function.

(A) Get the current temperature settings

cmd> temperature

Temperature in Celsius (t1=20 C, t2=55 C, warning=50 C, alarm=55 C)

(B) Set temperature with new T1=18 C, T2=52 C, warning threshold=48 C, and alarm threshold=54 C. The new setting will take effect after reset.

cmd> temperature 18 52 48 54

cmd> reset

(C) We also take expander temperature into consideration, and the temperature parameters for expander are non-changeable. Expander temperature parameters: T1=40, T2=86 (max 115*0.75), and no warning and alarm. The smart fan function will use the highest PWM output which is calculated from system and expander temperature parameters.

4.5. How to configure enclosure address

(A) Get the current enclosure address

cmd> enclosure_addr

Enclosure Address: 0x500605B0000272BF

(B) Set the enclosure address with 0x500605B0000272BF. The new setting will take effect after reset.

cmd> enclosure_addr 500605B0000272BF

cmd> reset

4.6. How to configure standby timer for all disk drives

This feature is applicable for SAS/SATA drives. Standby timer is in units of minutes.

Setting standby timer with 0 minute disables this feature.

(A) Get current standby timer

cmd> standby_timer

Standby Timer : 0 minutes

(B) Set the standby timer with 10 minutes. The new setting will take effect after reset.

cmd> standby_timer 10

cmd> reset

4.7. How to configure wide port checker

(Storage Server does not support this function)

This feature is applicable for SAS drives instead of SATA drives. If there is no connection with any active SAS initiator by checking all wide ports, AIC Expander Controller stops all attached SAS drives to save power consumption of SAS drives. Otherwise, AIC Expander Controller starts all attached SAS drives to provide drive access service to any active SAS initiator.

(A) Get the current state of wide port checker

cmd> check_wide_port

Checking wide port is OFF

(B) Enable checking wide port. The new setting will take effect after reset.

cmd> check_wide_port on

cmd> reset

(C) Disable checking wide port. The new setting will take effect after reset.

cmd> check_wide_port off

cmd> reset

4.8. How to configure serial number

(A) Get the current serial number

cmd> serial_number

Expander number: 421-12021704510010

or

Expander number: 421-12021704510010 Enclosure number: 526-12071100500088

(B) Only set Expander serial number with 421-12021704510010.

cmd> serial_number 421-12021704510010

(C) Set both of Expander serial number (421-12021704510010) and Enclosure serial number (526-12071100500088).

cmd> serial_number 421-12021704510010 526-12071100500088

4.9. How to power off/on all disk drives automatically

(Storage Server does not support this function)

This feature is applicable for SAS/SATA drives. If there is no connection with any active SAS initiator by checking all wide ports, AIC Expander Controller powers off all attached SAS/SATA drives to save power consumption. Otherwise, AIC Expander Controller powers on all attached SAS/SATA drives to provide drive access service to any active SAS initiator.

cmd> check_wide_port standby

cmd> reset

4.10. How to configure EDFB

The default EDFB configuration is off.

(A) Check the current configuration

cmd> edfb

EDFB is OFF

(B) Enable EDFB

cmd> edfb on

(C) Disable EDFB

cmd> edfb off