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Release Note for AIC SAS 24G Hotswap4 Expander

March 14, 2025

Changelog

03/14/2025 (FW 1.24.2.3 + MFG 1.2.0.3) – Part Number (SEE-00240203_A01 + SEG-0002D003_A01)

Old Part Number SEG-0002D002_A01 is replaced by SEG-0002D003_A01.

1. Bug fix: incorrect PWM for requested speed code

06/23/2024 (FW 1.24.2.3 + MFG 1.2.0.2) – Part Number (SEE-00240203_A01 + SEG-0002D002_A01)

Old Part Number SEE-00240202_A01 is replaced by SEE-00240203_A01.

1. Bug fix: incorrect temperatures reported in SES

04/29/2024 (FW 1.24.2.2 + MFG 1.2.0.2) – Part Number (SEE-00240202_A01 + SEG-0002D002_A01)

Old Part Number SEE-00240201_A01 is replaced by SEE-00240202_A01.

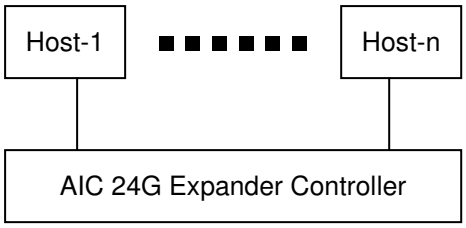
Old Part Number SEG-0002D001_A01 is replaced by SEG-0002D002_A01.

1. Built with SDK 8.1
2. Bug fix: two Hub expanders do not report the same enclosure ID
3. Support Broadcom HBA 9600

12/29/2022 (FW 1.24.2.1 + MFG 1.2.0.1) – Part Number (SEE-00240201_A01 + SEG-0002D001_A01)

1. Built with SDK 3
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 24G 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

05h – SES Threshold Out / In

07h - SES element descriptor

0Ah - SES additional element

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

82h – SES vendor specific page: Chassis Number

83h – SES vendor specific page: Canister Number

8Bh – SES vendor specific page: Drive Bay Blue LED

8Dh – SES vendor specific page: BMC Firmware Version

2.2. SES Elements

02h - Power Supply

03h - Cooling

04h - Temperature Sensor

0Eh - Enclosure

12h - Voltage

17h - Array Device

2.3. Implementation on SES Pages

2.3.1. SES Threshold Out / In

It includes only Temperature Sensor and Voltage Sensor elements.

Threshold control element format

BYTE/BIT	7	6	5	4	3	2	1	0
0	REQUESTED HIGH CRITICAL THRESHOLD							
1	REQUESTED HIGH WARNING THRESHOLD							
2	REQUESTED LOW WARNING THRESHOLD							
3	REQUESTED LOW CRITICAL THRESHOLD							

Threshold status element format

BYTE/BIT	7	6	5	4	3	2	1	0
0	HIGH CRITICAL THRESHOLD							
1	HIGH WARNING THRESHOLD							
2	LOW WARNING THRESHOLD							
3	LOW CRITICAL THRESHOLD							

2.3.2. SES vendor specific page: Chassis Number (page code 82h) Out / In

The length N of chassis number can be 0 ~ 247 bytes. If no chassis number is input (N=0), then chassis number is cleared.

Chassis Number control format

BYTE/BIT	7	6	5	4	3	2	1	0
0~N	Chassis Number							

If no chassis number is found, report Status = 1 (failed). Otherwise report Status = 0 (success) followed by chassis number.

Chassis Number status format

BYTE/BIT	7	6	5	4	3	2	1	0
0	Status (0: success, 1: failed)							
1~N (if success)	Chassis Number							

2.3.3. SES vendor specific page: Canister Number (page code 83h) Out / In

The length N of canister number can be 0 ~ 247 bytes. If no canister number is input (N=0), then canister number is restored to its SAS address.

Canister Number control format

BYTE/BIT	7	6	5	4	3	2	1	0
0~N	Canister Number							

If no canister number is found, report Status = 1 (failed). Otherwise report Status = 0 (success) followed by canister number.

Canister Number status format

BYTE/BIT	7	6	5	4	3	2	1	0
0	Status (0: success, 1: failed)							
1~N (if success)	Canister Number							

2.3.4. SES vendor specific page: Drive Bay Blue LED (page code 8Bh) Out / In

The drive bay blue LED can be enabled/disabled through the control format:

Drive Bay Blue LED control format

BYTE/BIT	7	6	5	4	3	2	1	0
0	Drive Bay ID in hexadecimal							
1	0x00 to disable the blue LED, and 0x1 to enable the blue LED							

The reported length of the drive bay blue LED status format depends on the number of the drive bays. The report represents the statuses of all drive bays. The status of the drive bay is either 0x00 or 0x01. The status “0x00” means that the drive bay blue LED is disabled, and the status “0x01” means the drive bay blue LED is enabled.

2.3.5. SES vendor specific page: BMC Firmware Version (page code 8Dh) In

There are 3 bytes for BMC firmware version.

BMC Firmware Version status format

BYTE/BIT	7	6	5	4	3	2	1	0
0~2	BMC Firmware Version							

2.4. Implementation on SES Elements

Only the fields highlighted in green are supported.

2.4.1. Power Supply Element

2.4.1.1. 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	DO NOT REMOVE	Reserved					
2	Reserved							
3	Reserved	RQST FAIL	RQST ON	Reserved				

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

2.4.1.2. 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	DO NOT REMOVE	Reserved					
2	Reserved				DC OVER VOLTAGE	DC UNDER VOLTAGE	DC OVER CURRENT	Reserved
3	HOT SWAP	FAIL	RQSTED ON	OFF	OVERTMP FAIL	TEMP WARN	AC FAIL	DC FAIL

Field	Value
ELEMENT STATUS CODE	OK: No failure or warning conditions detected CRITICAL: FAIL bit is set due to one or more failure condition UNKNOWN: The power supply can’t be read
DC OVER CURRENT	An output overcurrent fault has occurred
FAIL	A failure condition is detected
RQSTED ON	1: On 0: Off for Disk Power Supply
OFF	1: Off for Disk Power Supply 0: On
OVERTMP FAIL	Over temperature fault has occurred
TEMP WARN	Over temperature warning has occurred

AC FAIL	A failure condition is detected
DC FAIL	A failure condition is detected

2.4.2. Cooling Element

2.4.2.1. Cooling Control Element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST IDENT	DO NOT REMOVE	Reserved					
2	Reserved							
3	Reserved	RQST FAIL	RQST ON	Reserved		REQUESTED SPEED CODE		

Field	Value
RQST IDENT	Please refer to section “SES Element Control Functions” for details.
REQUESTED SPEED CODE	Please refer to section “SES Element Control Functions” for details.

2.4.2.2. Cooling Status Element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON STATUS							
	Reserved	PRDFAIL	DISABLED	SWAP	ELEMENT STATUS CODE			
1	IDENT	DO NOT REMOVE	Reserved			ACTUAL FAN SPEED (MSB)		
2	ACTUAL FAN SPEED (LSB)							
3	HOT SWAP	FAIL	RQSTED ON	OFF	Reserved	ACTUAL SPEED CODE		

Field	Value
ELEMENT STATUS CODE	OK: Everything is Ok NON-CRITICAL: Either warning limit is exceeded CRITICAL: The fan RPM can’t be detected, or either failure limit is exceeded.
IDENT	Applicable only for Cooling element 0 0: Enable the auto fan function

	1: Disable the auto fan function
ACTUAL FAN SPEED	Current fan RPM
FAIL	The fan RPM can't be detected, or either failure limit is exceeded.

2.4.3. Temperature Sensor Element

2.4.3.1. 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	OFFSET FOR REFERENCE TEMPERATURE					
2	REQUESTED TEMPERATURE							
3	RQST OVERRIDE	Reserved						

2.4.3.2. 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	OFFSET FOR REFERENCE TEMPERATURE					
2	TEMPERATURE							
3	RQSTED OVERRIDE	Reserved			OT FAILURE	OT WARNING	UT FAILURE	UT WARNING

Field	Value
ELEMENT STATUS CODE	OK: Everything is Ok NON-CRITICAL: Either warning limit is exceeded CRITICAL: Either failure limit is exceeded
FAIL	A warning or failure condition is detected
TEMPERATURE	Temperature reading
OT FAILURE	Temperature exceeds the failure high threshold value
OT WARNING	Temperature exceeds 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

2.4.4. Enclosure Element

2.4.4.1. 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.

2.4.4.2. 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 REQUESTED	WARNING REQUESTED

Field	Value
ELEMENT STATUS CODE	OK
IDENT	Set by the RQST IDENT on Enclosure Control Element
FAILURE REQUESTED	Set by the REQUEST FAILURE on Enclosure Control Element
WARNING REQUESTED	Set by the REQUEST WARNING on Enclosure Control Element

2.4.5. Voltage Element

2.4.5.1. 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							

2.4.5.2. 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: Everything is Ok NON-CRITICAL: Either warning limit is exceeded CRITICAL: Either failure limit is exceeded
FAIL	A warning or failure condition is detected
WARN OVER	Voltage exceeds the warning high threshold value
WARN UNDER	Voltage is below the warning low threshold value
CRIT OVER	Voltage exceeds the failure high threshold value
CRIT UNDER	Voltage is below the failure low threshold value
VOLTAGE	Voltage reading

2.4.6. Array Device Element

2.4.6.1. 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.

2.4.6.2. 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 drive bay NOT INSTALLED: No drive is installed in the drive bay
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

2.5. SES Element Control Functions

2.5.1. 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.

The behavior “Fast Blink” is “LED is blinking at 8Hz frequency”.

The behavior “Slow Blink” is “LED is blinking at 1Hz frequency”.

The behavior “ON”/”OFF” is “LED is solid ON/OFF without blinking”.

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	Slow Blink
RQST FAULT	ON	ON
DEVICE OFF	OFF	OFF
PRDFAIL	Activity	Slow Blink

2.5.2. How to turn on/off the power of a drive bay

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 bay is defined in the bit4, byte3 of the "Array Device Slot control element" in the SES specification. Set the bit to turn off a drive bay 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 24G Hotswap Expander 1801

(B) Get the current power state of a drive bay. The "Device off=0" means the drive bay 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 drive bay

$ sg_ses --page=7 /dev/sg2

Element 0 descriptor: Disk001

(D) Turn off a drive bay power

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

(E) Turn on a drive bay power

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

2.5.3. How to power off/on all drive bays 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	DO NOT REMOVE	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 drive bays. Set the bit on Power Supply Element “DiskPowerSupply” to power on all drive bays. 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 24G Hotswap Expander 1801

(B) Power off all drive bays

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

(C) Power on all drive bays

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

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

Enclosure control element

<table>
<tr><th>BYTE/BIT</th><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th></tr>
<tr><td rowspan="2">0</td><td colspan="8">COMMON CONTROL</td></tr>
<tr><td>SELECT</td><td>PRDFAIL</td><td>DISABLE</td><td>RST SWAP</td><td colspan="4">Reserved</td></tr>
<tr><td>1</td><td>RQST IDENT</td><td colspan="7">Reserved</td></tr>
<tr><td>2</td><td colspan="2">POWER CYCLE REQUEST</td><td colspan="6">POWER CYCLE DELAY</td></tr>
<tr><td>3</td><td colspan="6">POWER OFF DURATION</td><td>REQUEST FAILURE</td><td>REQUEST WARNING</td></tr>
</table>

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 24G Hotswap Expander 1801

(B) Enable the enclosure alarm

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

or

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

(C) Disable the enclosure alarm

$ sg_ses --descriptor=EnclosureElement --clear=3:1:2 /dev/sg2

2.5.5. How to manually change PWM (fan speed) for all Cooling elements

Cooling control element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST IDENT	DO NOT REMOVE	Reserved					
2	Reserved							
3	Reserved	RQST FAIL	RQST ON	Reserved		REQUESTED SPEED CODE		

The "RQST IDENT" for Cooling is defined in the bit7, byte1 and the "REQUESTED SPEED CODE" is defined in the bit2 ~ 0, byte3 of the "Cooling control element" in the SES specification. Set "RQST IDENT" bit to disable the auto fan function, and then change PWM or fan speed for all Cooling elements by setting the "REQUESTED SPEED CODE" bits. Clear "RQST IDENT" bit to enable the auto fan function again. Please disable the auto fan function before changing PWM or fan speed. Only Cooling element 0 supports this feature. 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 24G Hotswap Expander 1801

(B) Set "RQST IDENT" of Cooling element 0 to disable the auto fan function

$ sg_ses --descriptor=CoolingElement00 --set=1:7:1 /dev/sg2

(C) Set "REQUESTED SPEED CODE" of Cooling element 0 to change PWM or fan speed for all Cooling elements. Set "REQUESTED SPEED CODE"=7 (100% PWM) for example.

$ sg_ses --descriptor=CoolingElement00 --set 3:2:3=7 /dev/sg2

REQUESTED SPEED CODE	PWM
7	100%
6	90%
5	80%

4	70%
3	60%
2	50%
1	40%
0	Leave at current speed

2.5.6. How to enable/disable the enclosure identification

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 blue and red LEDs of all the drives are used for the enclosure identification with slow blink. The "RQST IDENT" for Enclosure is defined in the bit7, byte1 of the "Enclosure control element" in the SES specification. Setting the bit can enable the enclosure identification. Clearing the bit disables the enclosure identification. 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 24G      Hotswap Expander          1801
```

(B) Enable the enclosure identification

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

(C) Disable the enclosure identification

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

3. Serial Command Line Interface Functions

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

3.1. 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
```

3.2. 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 bay accessed only by the first wide port and another drive bay accessed only by the second wide port. The PHYs for the wide ports and drives in the example are not the PHY map in the Hotswap4.

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 bays

Step 1: Read the current group for PHY4

```
cmd> phyzone 4
Phy 4 for Zone Group 1
```

Step 2: Assign the second wide 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 wide 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 bay on PHY12 to be accessed only by the first wide port instead of the second wide port

cmd> phyzone 12 8

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

cmd> phyzone 13 9

Step 6: Reset for taking effect with the new settings

cmd> reset

3.3. How to get all revisions in AIC SAS 24G Expander

(A) Expander firmware revision

cmd> rev

(B) Expander configuration revision

cmd> showmfg

(C) Model and sensor information

cmd> sensor

3.4. How to configure temperature sensor

There are 5 temperature sensors. Four temperature settings in Celsius per sensor are T1, T2, warning threshold, and alarm (critical) threshold. The T1 and T2 are applied to the auto fan

function.

(A) Get the current settings of Temperature Sensor 1

cmd> temperature 1

Temperature in Celsius (t1=20 C, t2=60 C, warning=57 C, alarm=60 C)

(B) Set 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 1 18 52 48 54

cmd> reset

3.5. 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

3.6. 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

3.7. How to configure wide port checker

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
```

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

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
```

The function will not work properly when the drive bay power is turned off with SES command of clearing “RQST_ON” of the Power Supply Element “DiskPowerSupply”.

The drive bay power will be turned on/off when SAS cable is connected/disconnected, even if the drive bay power is turned off/on by BMC or SES command of array device before SAS cable connected/disconnected.

3.9. How to configure EDFB

The default EDFB configuration is on.

(A) Check the current configuration

```
cmd> edfb
```

EDFB is OFF

(B) Enable EDFB

cmd> edfb on

(C) Disable EDFB

cmd> edfb off

4. Vendor Specific Vital Product Data (VPD) Page

The Vendor Specific VPD pages provide MFR_ID, MFR_MODEL, MFR_REVISION, MFR_SERIAL, and MFR_FW_ REVISION of the power module 0 (page code 0xC1) and power module 1 (page code 0xC2).

Vendor Specific VPD Page Format

BYTE/BIT	7	6	5	4	3	2	1	0
1	MFR_ID							
m								
m+1	0x20 (ASCII code space)							
m+2	MFR_MODEL							
n								
n+1	0x20 (ASCII code space)							
n+2	MFR_REVISION							
o								
o+1	0x20 (ASCII code space)							
o+2	MFR_SERIAL							
p								
p+1	0x20 (ASCII code space)							
p+2	MFR_FW_REVISION							
q								
q+1	0x20 (ASCII code space)							