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Hanlin Lin 2019-06-27 4:06 pm

Release Note for AIC SAS 12G EOB Expander for Microsemi RAID

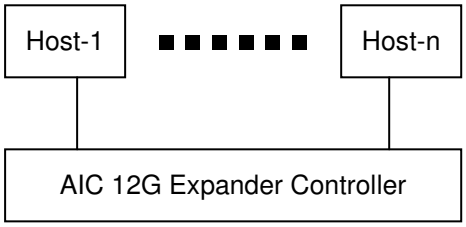
June 27, 2019

Changelog

06/27/2019 (FW 1.12.2.27 + MFG 1.2.0.8) – Part Number (SEE-00120227_A01 + SEG-0002C008_A01)

1. Enable SATA SSC
2. Support Microsemi RAID, but not guarantee LSI RAID

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

03h - Cooling

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 CRITICAL: FAIL bit is set due to one or more failure condition
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
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.

2.3.2. Cooling Element

2.3.2.1. 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	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.

Server Storage does not support this control element.

2.3.2.2. 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	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: Actual fan speed > 0 CRITICAL: The fan RPM can't be detected or equal to 0.
IDENT	Applicable only for Cooling element 0 0: Enable the smart fan function 1: Disable the smart fan function
ACTUAL FAN SPEED	Current fan RPM
FAIL	The fan RPM can't be detected or equal to 0.
ACTUAL SPEED CODE	Speed code level bases on current fan RPM.

Server Storage does not support this status element.

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 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 REQUESTED	WARNING REQUESTED

Field	Value
ELEMENT STATUS CODE	OK
IDENT	0: Power LED is solid on 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 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

<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="8">Reserved</td></tr>
<tr><td>3</td><td>Reserved</td><td>RQST FAIL</td><td>RQST ON</td><td colspan="5">Reserved</td></tr>
</table>

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

2.4.7. How to manually change PWM (fan speed) for all Cooling elements (Storage Server does not support this function)

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	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 smart 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 smart fan function again. Please disable the smart 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 12G 2U24SAS3EOB 0c02

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

$ sg_ses --descriptor=SystemCoolingElement01 --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=SystemCoolingElement01 --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. 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

4.11. How to configure power setting

(Storage Server does not support this function)

This feature is for restoring on AC power loss. Three supported options are "keep off", "keep on", and "keep last state". The default setting is "keep off".

(A) Get the current power setting

cmd> power_setting

Power setting: keep off

(B) Set "keep off"

cmd> power_setting keep_off

(C) Set "keep on"

cmd> power_setting keep_on

(D) Set "keep last state"

cmd> power_setting keep_last_state