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Hanlin 15/06/08, 09:46

Release Note for AIC SAS 6G 4U60swap_SubEnclosure Expander

Jun 8, 2015

Changelog

06/08/2015 (firmware 1.11.9.56 + mfg 1.9.0.52 + firmware 1.11.10.55 + mfg 1.10.0.53 + mfg 1.10.1.53) - Part Number (B98-004U60E0110956 + B98-004JS6G0090052 + B98-004U60E0111055 + B98-004JS6G0100053 + B98-004JS6G0100153)
Old Part Number B98-004U60E0110955 is replaced by B98-004U60E0110956.
1. Add a serial console command "subtractive" to support multiple "up" ports

04/16/2015 (firmware 1.11.9.55 + mfg 1.9.0.52 + firmware 1.11.10.55 + mfg 1.10.0.53 + mfg 1.10.1.53) - Part Number (B98-004U60E0110955 + B98-004JS6G0090052 + B98-004U60E0111055 + B98-004JS6G0100053 + B98-004JS6G0100153)
Old Part Number B98-004U60E0110953 is replaced by B98-004U60E0110955.
1. Resolve the email alert issue for PSU failure on LSI MegaRAID

03/25/2015 (firmware 1.11.9.53 + mfg 1.9.0.52 + firmware 1.11.10.55 + mfg 1.10.0.53 + mfg 1.10.1.53) - Part Number (B98-004U60E0110953 + B98-004JS6G0090052 + B98-004U60E0111055 + B98-004JS6G0100053 + B98-004JS6G0100153)
Old Part Number B98-004JS6G0090051 is replaced by B98-004JS6G0090052.
1. Resolve the drive mapping issue in Windows with SAS 12G HBA

04/23/2014 (firmware 1.11.9.53 + mfg 1.9.0.51 + firmware 1.11.10.55 + mfg 1.10.0.53 + mfg 1.10.1.53) - Part Number (B98-004U60E0110953 + B98-004JS6G0090051 + B98-004U60E0111055 + B98-004JS6G0100053 + B98-004JS6G0100153)
Old Part Number B98-004U60E0111054 is replaced by B98-004U60E0111055.
1. Resolve the bug in firmware/MFG update via inband SAS.

04/17/2014 (firmware 1.11.9.53 + mfg 1.9.0.51 + firmware 1.11.10.54 + mfg 1.10.0.53 + mfg 1.10.1.53) - Part Number (B98-004U60E0110953 + B98-004JS6G0090051 + B98-004U60E0111054 + B98-004JS6G0100053 + B98-004JS6G0100153)
Old Part Number B98-004U60E0111053 is replaced by B98-004U60E0111054.
1. Support firmware/MFG update via inband SAS including Hub, L-Edge, and R-Edge.

04/01/2014 (firmware 1.11.9.53 + mfg 1.9.0.51 + firmware 1.11.10.53 + mfg 1.10.0.53 + mfg 1.10.1.53) - Part Number (B98-004U60E0110953 + B98-004JS6G0090051 + B98-004U60E0111053 + B98-004JS6G0100053 + B98-004JS6G0100153)
Old Part Number B98-004U60E0111052 is replaced by B98-004U60E0111053.
Old Part Number B98-004JS6G0100052 is replaced by B98-004JS6G0100053.
Old Part Number B98-004JS6G0100152 is replaced by B98-004JS6G0100153.
1. Improve signal for SATA drives.
2. Support enabling/disabling the blue LED associated with a disk drive

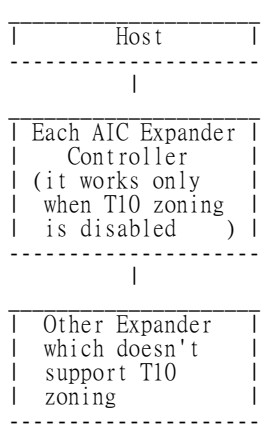
01/13/2014 (firmware 1.11.9.53 + mfg 1.9.0.51 + firmware 1.11.10.52 + mfg 1.10.0.52 + mfg 1.10.1.52) - Part Number (B98-004U60E0110953 + B98-004JS6G0090051 + B98-004U60E0111052 + B98-004JS6G0100052 + B98-004JS6G0100152)
1. Initial revision

Definition of the visual LED indicators (blue and red) associated with a disk drive

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

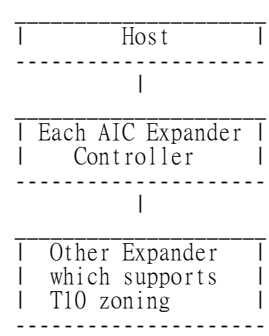
Supported Configuration

(1)

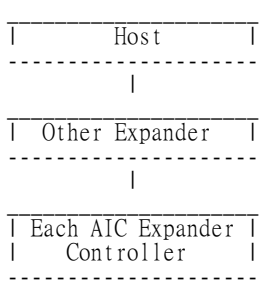


Most 3G Expanders don't support T10 zoning.

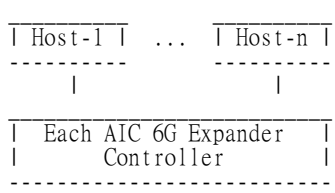
(2)



(3)



(4)



To have multiple host access support (the host number can be up to the number of wide ports on each AIC 6G Expander Controller), only the following drives are supported for shared access:

1. SAS drive
2. SATA drive with an interposer which provides SATA-to-SAS convertion

Unsupported Configuration

1. This only applies to the enclosure which supports dual AIC 6G Expander Controllers.
   The enclosure with dual AIC 6G Expander Controllers attached is inserted with a SATA drive without any interposer. It will cause the drive LEDs behaves incorrect.

Unsupported Feature

1. Enclosure logical identifier can be changed.
2. Locating a drive via any HBA utility. Users should send standard SES command to the enclosure service (4U60swap: Hub) to locate a drive.

Power on/off the enclosure via RS232

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, that means 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
#######################################################################
```

Command Line Interface Operation

1. How to configure zone count

Remove the SAS cable between the HBA/RAID card and the 4U60swap before configuring zone count. Power off the 4U60swap after configuring zone count. Power on the 4U60swap, then insert the SAS cable.

Three zone configurations supported are one zone with 60 drives, two zones with 30 drives per zone, and four zones with 15 drives per zone. The default configuration is one zone of which T10 zoning configuration is disabled. T10 zoning configuration of the other configurations (two zones and four zones) is enabled.

Each of three COM ports (COM for Hub, COM for Left Edge, and COM for Right Edge) should be applied with the respective configuration. Each host can access via each down link.

(A) Check the current zone configuration

```
cmd> zonecount
Zone count = 1
```

(B) One-zone configuration supports four-down links or one-up/three-down links. Each host can access up to 60 drives in this 4U60swap.

```
=> Hub, four-down links:
       cmd> zonecount 1
       cmd> reset
=> Hub, one-up/three-down links:
       cmd> zonecount 1-1
       cmd> reset
=> Left Edge and Right Edge:
       cmd> zonecount 1
       cmd> reset
```

(C) Two-zone configuration supports two-down links or one-up/one-down links per zone. Each host can access up to 30 drives in this 4U60swap.

```
=> Hub, two-down links per zone:
       cmd> zonecount 2
       cmd> reset
=> Hub, one-up/one-down links per zone:
       cmd> zonecount 2-2
       cmd> reset
=> Left Edge and Right Edge:
       cmd> zonecount 2
       cmd> reset
```

(D) Four-zone configuration supports one-down link or one-up link per zone. Each host can access up to 15 drives in this 4U60swap.

```
=> Hub, one-down link per zone:
       cmd> zonecount 4
```

```
        cmd> reset
    => Hub, one-up link per zone:
        cmd> zonecount 4-4
        cmd> reset
    => Left Edge and Right Edge:
        cmd> zonecount 4
        cmd> reset
```

2. How to get all revisions in AIC SAS 6G Expander

(A) Expander firmware revision

```
cmd> rev
```

(B) Expander configuration revision

```
cmd> showmfg
```

(C) Microchip firmware for managing sensors (Only the COM for Hub supports this command)

```
cmd> sensor
```

3. How to configure temperature sensor

Four temperature settings in Celsius are T1, T2, warning threshold, and alarm (critical) threshold. Only the COM for Hub supports this command.

(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
```

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

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-3 specification. Setting either one can enable the enclosure alarm. Clearing both settings disables the enclosure alarm. Please install a software package "sg_utils" on your host computer, and have a SAS HBA and a cable to connect your host with the 4U60swap_SubEnclosure. We use Linux for example.

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

```
$ sg_map -i

/dev/sg60   AIC CORP   4U60swap: Hub   0b09
```

(B) Enable the enclosure alarm (Only Hub should be applied)

```
$ sg_ses --descriptor=EnclosureElement01 --set=3:1:1 /dev/sg60
or
$ sg_ses --descriptor=EnclosureElement01 --set=3:0:1 /dev/sg60
```

(C) Disable the enclosure alarm (Only Hub should be applied)

```
$ sg_ses --descriptor=EnclosureElement01 --clear=3:1:1 /dev/sg60
$ sg_ses --descriptor=EnclosureElement01 --clear=3:0:1 /dev/sg60
```

5. How to identify AIC Expander Controller (canister) in the enclosure

The canister LED is used for the canister identity. The "RQST IDENT" for Enclosure is defined in the bit7, bytel of the "Enclosure control element" in the SES-3 specification. Please install a software package "sg_utils" on your host computer, and have a SAS HBA and a cable to connect your host with the 4U60swap_SubEnclosure. We use Linux for example.

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

```
$ sg_map -i

/dev/sg60   AIC CORP   4U60swap: Hub   0b09
```

(B) Enable the canister identity (Only Hub should be applied)

```
$ sg_ses --descriptor=EnclosureElement01 --set=1:7:1 /dev/sg60
```

(C) Disable the canister identity (Only Hub should be applied)

```
$ sg_ses --descriptor=EnclosureElement01 --clear=1:7:1 /dev/sg60
```

6. How to power off the enclosure via inband SAS

The "RQST ON" for Power Supply is defined in the bit5, byte3 of the "Power Supply control element" in the SES-3 specification. Clear the bit to power off the enclosure. Please install a software package

"sg_utils" on your host computer, and have a SAS HBA and a cable to connect your host with the 4U60swap_SubEnclosure. We use Linux for example.

(A) Show the device for AIC Expander Controller (canister)
```
$ sg_map -i

/dev/sg60   AIC CORP   4U60swap: Hub   0b09
```

(B) Power off the enclosure (Only Hub should be applied)
```
$ sg_ses --descriptor=PowerSupply01 --clear=3:5:1 /dev/sg60
```

7. How to configure SAS standby timer

This feature is applicable for SAS drives instead of SATA drives. SAS standby timer is in units of minutes. Setting SAS standby timer with 0 minute disables this feature. The COM ports for Left Edge and Right Edge support this command.

(A) Get the current SAS standby timer
```
cmd> sas_standby_timer
SAS standby timer : 0 minutes
```

(B) Set the SAS standby timer with 10 minutes. The new setting will take effect after reset.
```
cmd> sas_standby_timer 10
cmd> reset
```

8. 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. All COM ports support this command. Please apply the same setting on all COM ports.

(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
```

9. 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
```

10. 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
```

11. How to configure power setting

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". Only the COM for Hub supports this command.

(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

12. How to enable/disable the blue LED associated with a disk drive
The "Report" for a drive slot is defined in the bit0, byte2 of the "Array Device Slot status element" in the SES-3 specification. Set the bit to disable a slot blue LED, and vice versa. Please install a software package "sg_utils" on your host computer, and have a SAS HBA and a cable to connect your host with the 4U60swap_SubEnclosure. We use Linux for example.

(A) Show the device for AIC Expander Controller (canister)
$ sg_map -i

/dev/sg60 AIC CORP 4U60swap: Hub 0b09

(B) Get the current state of a slot blue LED. In this example the "Report=0" means the slot blue LED is enabled.
$ sg_ses --page=2 /dev/sg60

Element 0 descriptor:
  Ready to insert=0, RMV=0, Ident=0, Report=0

(C) Get the descriptor of a slot blue LED
$ sg_ses --page=7 /dev/sg60

Element 0 descriptor: Disk001

(D) Disable a slot blue LED
$ sg_ses --descriptor=Disk001 --set=2:0:1 /dev/sg60

(E) Enable a slot blue LED
$ sg_ses --descriptor=Disk001 --clear=2:0:1 /dev/sg60

13. How to update firmware/MFG on L-Edge and R-Edge via inband SAS
The L-Edge and R-Edge are hidden behind the Hub, so please follow the steps below to update firmware and MFG on the L-Edge via inband SAS. The same steps can be applied to the R-Edge also. Please install the software package "sg_utils" and LSI utility "xflash" on your host computer, and have a SAS HBA and a cable to connect your host with the 4U60swap_SubEnclosure. We use Linux for example.

Step1. Show the device for the Hub
$ sg_map -i

/dev/sg1 AIC CORP 4U60swap: Hub 0b09

Step2. Make the L-Edge or R-Edge be visible (Use Disk001 for L-Edge, and Disk015 for R-Edge)
$ sg_ses --descriptor=Disk001 --set=2:5:1 /dev/sg1

Step3. Get SAS address for the Hub. The SAS address (500605B0:000272BF) is used for the Hub.
$ ./xflash -i get avail

Step4. Reset the Hub to have an additional device for the L-Edge in Linux
$ ./xflash -i 500605b0000272bf reset exp

Step5. Show the devices for the Hub and L-Edge
$ sg_map -i

/dev/sg1 AIC CORP 4U60swap: Hub 0b09
/dev/sg2 AIC CORP 4U60swap: L-Edge 0b0a

Step6. Update firmware on L-Edge
$ sg_write_buffer --id=0x0 --in=<firmware filename> --mode=0x2 --offset=0 /dev/sg2

Step7. Update MFG on L-Edge
$ sg_write_buffer --id=0x83 --in=<MFG filename> --mode=0x2 --offset=0 /dev/sg2

Step8. Get SAS address for the L-Edge. The SAS address (50015B20:9000EBBF) is used for the L-Edge.
$ ./xflash -i get avail

Step9. Reset the L-Edge to activate its new firmware/MFG
$ ./xflash -i 50015b209000ebbf reset exp

Step10. Get the current firmware version on L-Edge for confirmation
$ ./xflash -i 50015b209000ebbf get ver

Step11. Make the L-Edge or R-Edge be invisible (Use Disk001 for L-Edge, and Disk015 for R-Edge)
$ sg_ses --descriptor=Disk001 --set=3:7:1 /dev/sg1

Step12. Reset the Hub to refresh the change on the L-Edge in Linux
$ ./xflash -i 500605b0000272bf reset exp

14. How to configure multiple "up" ports
This feature can support multiple "up" ports when the zone count = 1. Only the COM for Hub supports this command.

(A) Configure Port-1 and Port-2 to be "up" ports. Port-1 is composed of PHY 8 ~ 11, and Port-2 is composed of PHY 4 ~ 7.
cmd> subtractive 8
cmd> subtractive 9
cmd> subtractive 10
cmd> subtractive 11
cmd> subtractive 4
cmd> subtractive 5
cmd> subtractive 6
cmd> subtractive 7
cmd> reset

(B) Restore the default of the zone count = 1 after keeping the SAS address. The SAS address (500605B0:000272BF) is used for the Hub.
cmd> regerase 4
cmd> regerase 5
cmd> sasaddr 500605B0000272BF
cmd> reset