Release Note for AIC SAS 6G 4U60swap Expander

Apr 30, 2014
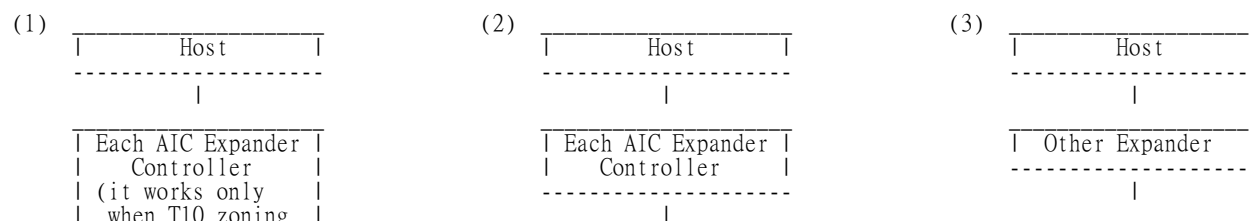
Changelog

04/30/2014 (firmware 1.11.9.3 + mfg 1.9.0.1 + firmware 1.11.10.2 + mfg 1.10.0.3 + mfg 1.10.1.3) - Part
  Number (B98-004U60E0110903 + B98-004JS6G0090001 + B98-004U60E0111002 + B98-004JS6G0100003 +
  B98-004JS6G0100103)
  Old Part Number B98-004JS6G0100002 is replaced by B98-004JS6G0100003.
  Old Part Number B98-004JS6G0100102 is replaced by B98-004JS6G0100103.
 1. Improve signal for SATA drives.

01/07/2014 (firmware 1.11.9.3 + mfg 1.9.0.1 + firmware 1.11.10.2 + mfg 1.10.0.2 + mfg 1.10.1.2) - Part
  Number (B98-004U60E0110903 + B98-004JS6G0090001 + B98-004U60E0111002 + B98-004JS6G0100002 +
  B98-004JS6G0100102)
  Old Part Number B98-004U60E0110902 is replaced by B98-004U60E0110903.
  Old Part Number B98-004JS6G0100001 is replaced by B98-004JS6G0100002.
  Old Part Number B98-004JS6G0100101 is replaced by B98-004JS6G0100102.
 1. Add the console command "power_setting" to configure restoring on AC power loss.
 2. Improve signal for SATA drives.

11/14/2013 (firmware 1.11.9.2 + mfg 1.9.0.1 + firmware 1.11.10.2 + mfg 1.10.0.1 + mfg 1.10.1.1) - Part
  Number (B98-004U60E0110902 + B98-004JS6G0090001 + B98-004U60E0111002 + B98-004JS6G0100001 +
  B98-004JS6G0100101)
  Old Part Number B98-004U60E0110901 is replaced by B98-004U60E0110902.
  Old Part Number B98-004U60E0111001 is replaced by B98-004U60E0111002.
 1. Add the console command "serial_number" to configure Expander serial number and Enclosure serial
  number.

08/21/2013 (firmware 1.11.9.1 + mfg 1.9.0.1 + firmware 1.11.10.1 + mfg 1.10.0.1 + mfg 1.10.1.1) - Part
  Number (B98-004U60E0110901 + B98-004JS6G0090001 + B98-004U60E0111001 + B98-004JS6G0100001 +
  B98-004JS6G0100101)
 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) _____          (2) _____          (3) _____
    |      Host      |              |      Host      |              |      Host      |
    --------------------             --------------------             --------------------
            |                                |                                |
    _____              _____              _____
    | Each AIC Expander |             | Each AIC Expander |             | Other Expander   |
    |   Controller     |             |   Controller     |             --------------------
    | (it works only   |             --------------------                     |
    |  when T10 zoning |                      |                       _____
```

```
| is disabled   ) |                                      | Each AIC Expander |
-------------------              ---------------------    | Controller       |
        |                        | Other Expander    |    ---------------------
                                 | which supports    |
_____               | T10 zoning        |
| Other Expander   |             ---------------------
| which doesn't    |
| support T10      |
| zoning           |
-------------------

     Most 3G Expanders don't
     support T10 zoning.


(4)  _____    _____
     | Host-1 |  ...  | Host-n |    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
     | Each AIC 6G Expander    |     2. SATA drive with an interposer which provides SATA-to-SAS
     |      Controller         |        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.

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.

```bash
#####################################################################
#!/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. We use Linux for example.

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

/dev/sg60    AIC CORP    4U60swap: Hub    0b09
/dev/sg64    AIC CORP    4U60swap: L-Edge    0b0a
/dev/sg65    AIC CORP    4U60swap: R-Edge    0b0a
```

    (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, byte1 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. We use Linux for example.

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

/dev/sg60    AIC CORP    4U60swap: Hub    0b09
/dev/sg64    AIC CORP    4U60swap: L-Edge    0b0a
/dev/sg65    AIC CORP    4U60swap: R-Edge    0b0a
```

    (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. We use Linux for example.

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

/dev/sg60    AIC CORP    4U60swap: Hub    0b09
/dev/sg64    AIC CORP    4U60swap: L-Edge    0b0a
/dev/sg65    AIC CORP    4U60swap: R-Edge    0b0a
```

    (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