



## Environmental Monitoring

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The SCSI Management Module (SMM) provides environmental monitoring for the Storage Array 12. The SMM provides three primary functions:

- It serves as a SCSI bus passthrough from the external cabling to the internal backplane.
- It provides SCSI multimode termination to the SCSI bus in the absence of an external cable.
- It provides monitoring and control for the Storage Array 12.

The SMM reports status and receives control information through the SCSI bus. The SMM also supports SAF-TE.

A fully configured Storage Array 12 contains two SMMs located in the rear of the Storage Array 12 on each end. Each SMM continuously monitors the Storage Array 12. If the Storage Array 12 is configured as a single SCSI bus, then one SMM acts as a master and takes responsibility for reporting Storage Array 12 information through the SCSI bus and performs control functions for the Storage Array 12. If the slave SMM detects the loss of the master, it assumes the responsibility for reporting and control. If the SCSI bus is in a split-bus configuration, then the SMM reports Storage Array 12 information over the SCSI bus to which it is connected.

# SMM Features

- Monitoring and control for 12 SCSI multimode disk drives
- Control of three LEDs over each disk drive
- Monitoring and control for two power supplies
- Monitoring and control for three ACMs
- Control of three front panel system LEDs
- Status reports and control information received through the SCSI bus
- Microcontroller for data processing, control, and communications
- Volatile and nonvolatile memory for the microcontroller
- Field-programmable gate array (FPGA) for system logic, including data input/output and LED control
- Temperature sensor
- Audible alarm with manual and software mute switch
- SCSI LVD multimode protocol and interface chip
- SCSI LVD multimode termination

## In-Band Reporting

The SMM communicates with the host system using in-band reporting. The SMM supports both the SAF-TE and SES protocols.

## SMM SCSI ID

The SMM is on the SCSI bus and is assigned a SCSI ID of 15.

# SMM Fault Notifications

The following sections describe the methods of fault notification that are used by the Storage Array 12. The SMM monitors the environmental conditions inside the Storage Array 12 and detects component failure. The SMM controls the error LEDs on the disk drives, power supplies, and ACMs.

## Disk Drive Carrier LEDs

Each disk drive carrier has three LEDs, which are visible from the front of the Storage Array 12. These disk drive LEDs are driven by the SMM. Figure 4-1 shows the location of the LEDs and what each LED means.

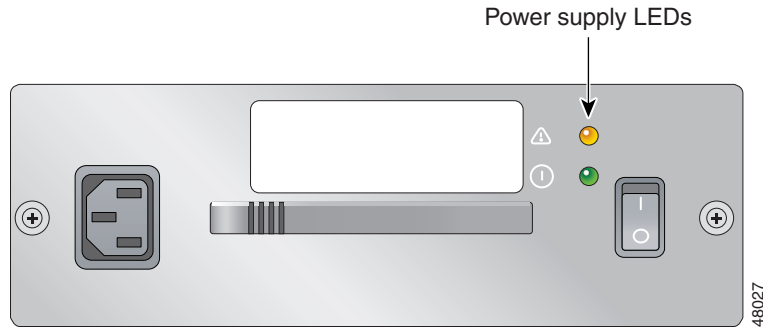
**Figure 4-1 Disk Drive Carrier LEDs**



- X = Drive fault indicator
- D = Drive activity indicator
- O = Drive on-line indicator

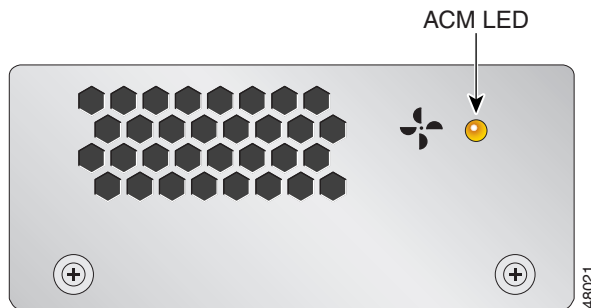
## Power Supply LEDs

The power supply has two LEDs. The green LED is the Power OK LED and is on when the power supply is operating normally. This green LED is driven by the power supply. The second LED is the amber LED. This LED is on when the SMM detects that a power supply fault has occurred. This amber LED is driven by the SMM. The power supply LEDs are located on the power supply at the rear of the Storage Array 12, as shown in Figure 4-2.

**Figure 4-2 Power Supply LEDs**

## ACM LED

Each of the installed ACMs has an amber LED located on the ACM assembly, as shown in Figure 4-3. This ACM LED is off when the ACM is operating normally. The ACM LED is controlled by the SSM and is on if the SMM detects that an ACM speed fault has occurred.

**Figure 4-3 ACM LED**

## Front Panel LEDs

The Storage Array 12 front panel has three LEDs, as shown in Figure 4-4. The following table explains the function of these LEDs.




LED	Description	Icon	Indication
Green	Power on		Normally on, indicating that power is applied to the Storage Array. Off indicates no power.
Green	Split SCSI bus mode		On indicates split SCSI bus. Off indicates single SCSI bus.
Amber	Storage Array fault		Normally off, indicating that no faults are detected in the Storage Array 12. On indicates a fault condition.

Figure 4-4 Storage Array 12 Front Panel LEDs

