

Facility Alarms

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Facility Alarms Overview

Facility Alarms provide a useful tool for operators to easily track and display the basic status of their equipment facilities.

CLI display (show routines) allows the system operator to easily identify current facility alarm conditions and recently cleared alarms without searching event logs or monitoring various card and port show commands to determine the health of basic equipment in the system such as cards and ports.

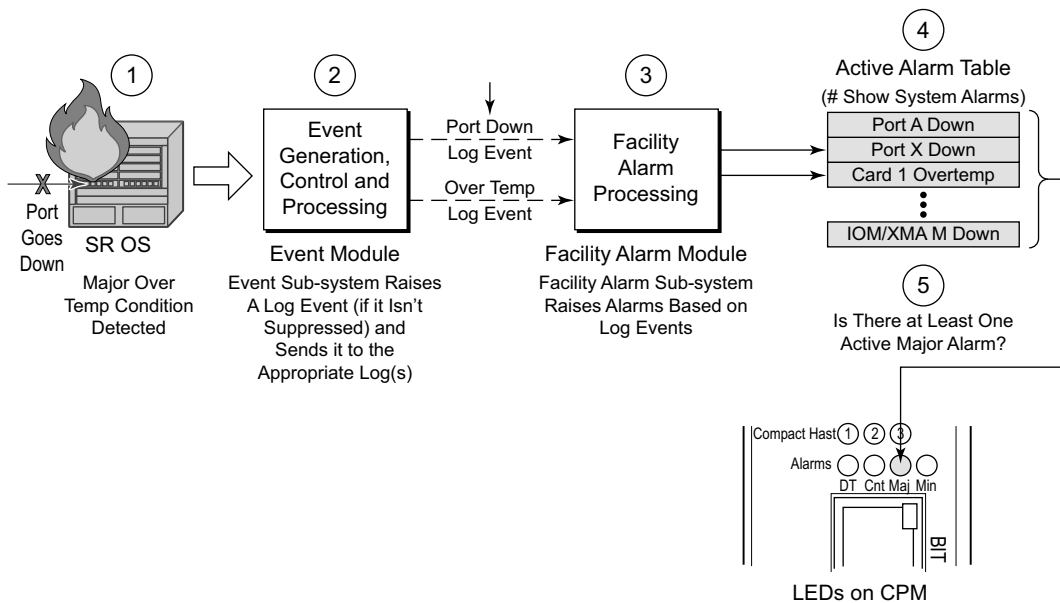
The SR OS alarm model is based on RFC 3877, *Alarm Management Information Base (MIB)*, (which evolved from the IETF DISMAN drafts).

Facility Alarms vs. Log Events

Facility Alarms are different than (log) events. Events are a single point in time and are generally stateless. Facility Alarms have a state (at least two states: active and clear) and duration and can be modeled with state transition events (raised, cleared).

The Facility Alarms module processes log events in order to generate the raised and cleared state for the alarms. If a raising log event is suppressed under event-control, then the associated Alarm will not be raised. If a clearing log event is suppressed under event-control, then it is still processed for the purpose of clearing the associated alarm. Log event filtering, throttling and discarding of events during overload do not affect Facility Alarm processing. Log events are processed by the Facility Alarm module before they are discarded in all cases.

Figure 14 illustrates the relationship of log events, alarms and the LEDs.



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Figure 14: Log Events, Alarms and LEDs

Facility Alarms are different and independent functionality from other uses of the term *alarm* in SR-OS such as:

- Log events that use the term **alarm** (tmnxEqPortSonetAlarm)
- **configure card fp hi-bw-mcast-src [alarm]**
- **configure mcast-management multicast-info-policy bundle channel source-override video analyzer alarms**
- **configure port ethernet report-alarm**
- **configure system thresholds no memory-use-alarm**
- **configure system thresholds rmon no alarm**
- **configure system security cpu-protection policy alarm**

Facility Alarm Severities and Alarm LED Behavior

The Alarm LEDs on the CPM/CCM reflects the current status of the Facility Alarms:

- The Critical Alarm LED is lit if there is 1 or more active Critical Facility Alarms
- Similarly with the Major and Minor alarm LEDs
- The OT Alarm LED is not controlled by the Facility Alarm module

The supported alarm severities are as follows:

- Critical (with an associated LED on the CPM/CCM)
- Major (with an associated LED on the CPM/CCM)
- Minor (with an associated LED on the CPM/CCM)
- Warning (no LED)

Alarms inherit their severity from the raising event.

Log events that are a raising event for a facility alarm configured with a severity of *indeterminate* or *cleared* will result in those alarms not being raised (but clearing events are processed in order to clear alarms regardless of the severity of the clearing event).

Changing the severity of a raising event only affects subsequent occurrences of that event and alarms. Alarms that are already raised when their raising event severity is changed maintain their original severity.

Facility Alarm Hierarchy

Facility Alarms for *children* objects is not raised for failure of a *parent* object. For example, when an MDA fails (or is *shutdown*) there is not a set of port alarms raised.

When a parent alarm is cleared, children alarms that are still in occurrence on the node appears in the active alarms list. For example, when a port fails there is a port alarm, but if the MDA is later shutdown the port alarm is cleared (and a card alarm will be active for the MDA). If the MDA comes back into service, and the port is still down, then a port alarm becomes active once again.

The supported Facility Alarm hierarchy is as follows (parent objects that are *down* cause alarms in all children to be masked):

- CPM -> Compact Flash
- CCM -> Compact Flash
- IOM/IMM -> MDA -> Port -> Channel
- XCM -> XMA -> Port
- MCM -> MDA -> Port -> Channel

Note that a *masked* alarm is not the same as a *cleared* alarm. The cleared alarm queue does not display entries for previously raised alarms that are currently masked. If the masking event goes away, then the previously raised alarms will once again be visible in the active alarm queue.

Facility Alarm List

The following table(s) show the supported Facility Alarms.

Table 55: Alarm, Alarm Name/Raising Event, Sample Details String and Clearing Event

Alarm *1	Alarm Name/Raising Event	Sample Details String	Clearing Event
7-2001-1	tmnxEqCardFailure	Class MDA Module: failed, reason: Mda 1 failed startup tests	tmnxChassisNotification Clear
7-2003-1	tmnxEqCardRemoved	Class CPM Module: removed	tmnxEqCardInserted
7-2004-1	tmnxEqWrongCard	Class IOM Module: wrong type inserted	tmnxChassisNotification Clear
7-2005-1	tmnxEnvTempTooHigh	Chassis 1: temperature too high	tmnxChassisNotification Clear
7-2006-1	tmnxEqFanFailure	Fan 2 failed	tmnxChassisNotification Clear
7-2007-1	tmnxEqPowerSupplyFailureOvt	Power supply 2 over temperature	tmnxChassisNotification Clear
7-2008-1	tmnxEqPowerSupplyFailureAc	Power supply 1 AC failure	tmnxChassisNotification Clear
7-2009-1	tmnxEqPowerSupplyFailureDc	Power supply 2 DC failure	tmnxChassisNotification Clear
7-2011-1	tmnxEqPowerSupplyRemoved	Power supply 1, power lost	tmnxEqPowerSupplyInserted
7-2017-1	tmnxEqSyncIfTimingHoldover	Synchronous Timing interface in holdover state	tmnxEqSyncIfTimingHoldoverClear
7-2019-1	tmnxEqSyncIfTimingRef1Alarm with attribute tmnxSyncIfTimingNotifyAlarm == 'los(1)'	Synchronous Timing interface, alarm los on reference 1	tmnxEqSyncIfTimingRef1AlarmClear
7-2019-2	tmnxEqSyncIfTimingRef1Alarm with attribute tmnxSyncIfTimingNotifyAlarm == 'oof(2)'	Synchronous Timing interface, alarm oof on reference 1	same as 7-2019-1
7-2019-3	tmnxEqSyncIfTimingRef1Alarm with attribute tmnxSyncIfTimingNotifyAlarm == 'oopir(3)'	Synchronous Timing interface, alarm oopir on reference 1	same as 7-2019-1
7-2021-x	same as 7-2019-x but for ref2	same as 7-2019-x but for ref2	same as 7-2019-x but for ref2
7-2030-x	same as 7-2019-x but for the BITS input	same as 7-2019-x but for the BITS input	same as 7-2019-x but for the BITS input
7-2033-1	tmnxChassisUpgradeInProgress	Class CPM Module: software upgrade in progress	tmnxChassisUpgradeComplete

Table 55: Alarm, Alarm Name/Raising Event, Sample Details String and Clearing Event (Continued)

Alarm *1	Alarm Name/Raising Event	Sample Details String	Clearing Event
7-2050-1	tmnxEqPowerSupplyFailureInput	Power supply 1 input failure	tmnxChassisNotificationClear
7-2051-1	tmnxEqPowerSupplyFailureOutput	Power supply 1 output failure	tmnxChassisNotificationClear
7-2073-x	same as 7-2019-x but for the BITS2 input	same as 7-2019-x but for the BITS2 input	same as 7-2019-x but for the BITS2 input
7-2092-1	tmnxEqPowerCapacityExceeded	The system has reached maximum power capacity <x> watts	tmnxEqPowerCapacityExceededClear
7-2094-1	tmnxEqPowerLostCapacity	The system can no longer support configured devices. Power capacity dropped to <x> watts	tmnxEqPowerLostCapacityClear
7-2096-1	tmnxEqPowerOverloadState	The system has reached critical power capacity. Increase available power now.	tmnxEqPowerOverloadStateClear
7-4001-1	tmnxInterChassisCommsDown	Control communications disrupted between the Active CPM and the chassis	tmnxInterChassisCommsUp
7-4003-1	tmnxCpmIcPortDown	CPM Interconnect Port is not operational. Error code = invalid-connection	tmnxCpmIcPortUp
7-4007-1	tmnxCpmANoLocalIcPort	CPM A can not reach the chassis using its local CPM interconnect ports	tmnxCpmALocalIcPortAvail
7-4008-1	tmnxCpmBNoLocalIcPort	CPM B can not reach the chassis using its local CPM interconnect ports	tmnxCpmBLocalIcPortAvail
7-4017-1	tmnxSfmIcPortDown	SFM interconnect Port is not operational. Error code = invalid-connection to Fabric 10 IcPort 2	tmnxSfmIcPortUp
59-2004-1	linkDown	Interface intf-towards-node-B22 is not operational	linkUp
64-2091-1	tmnxSysLicenseInvalid	Error - <reason> record. <hw> will reboot the chassis <timeRemaining>	None
64-2092-1	tmnxSysLicenseExpiresSoon	The license installed on <hw> expires <timeRemaining>.	None

Table 56: Alarm Name/Raising Event, Cause, Effect and Recovery

Alarm *1	Alarm Name/Raising Event	Cause	Effect	Recovery
7-2001-1	tmnxEqCardFailure	Generated when one of the cards in a chassis has failed. The card type may be IOM , MDA , , CCM, CPM, Compact Flash, etc. The reason is indicated in the details of the log event or alarm, and also available in the tmnxChassisNotifyCardFailure Reason attribute included in the SNMP notification.	The effect is dependent on the card that has failed. IOM or MDA failure will cause a loss of service for all services running on that card. A fabric failure can impact traffic to/from all cards.	Before taking any recovery steps collect a tech-support file, then try resetting (clear) the card. If that doesn't work then try removing and then re-inserting the card. If that doesn't work then replace the card.
7-2003-1	tmnxEqCardRemoved	Generated when a card is removed from the chassis. The card type may be IOM , MDA , , CCM, CPM, Compact Flash, etc.	The effect is dependent on the card that has been removed. IOM or MDA removal will cause a loss of service for all services running on that card. A fabric removal can impact traffic to/ from all cards.	Before taking any recovery steps collect a tech-support file, then try re-inserting the card. If that doesn't work then replace the card.
7-2004-1	tmnxEqWrongCard	Generated when the wrong type of card is inserted into a slot of the chassis. Even though a card may be physically supported by the slot, it may have been administratively configured to allow only certain card types in a particular slot location. The card type may be IOM , MDA , , CCM, CPM, Compact Flash, etc.	The effect is dependent on the card that has been incorrectly inserted. Incorrect IOM or MDAnsertion will cause a loss of service for all services running on that card.	Insert the correct card into the correct slot, and ensure the slot is configured for the correct type of card.
7-2005-1	tmnxEnvTempTooHigh	Generated when the temperature sensor reading on an equipment object is greater than its configured threshold.	This could be causing intermittent errors and could also cause permanent damage to components.	Remove or power down the affected cards, or improve the cooling to the node. More powerful fan trays may also be required.

Table 56: Alarm Name/Raising Event, Cause, Effect and Recovery (Continued)

Alarm *1	Alarm Name/Raising Event	Cause	Effect	Recovery
7-2006-1	tmnxEqFanFailure	Generated when one of the fans in a fan tray has failed.	This could be cause temperature to rise and resulting intermittent errors and could also cause permanent damage to components.	Replace the fan tray immediately, improve the cooling to the node, or reduce the heat being generated in the node by removing cards or powering down the node.
7-2007-1	tmnxEqPowerSupplyFailureOvt	Generated when the temperature sensor reading on a power supply module is greater than its configured threshold.	This could be causing intermittent errors and could also cause permanent damage to components.	Remove or power down the affected power supply module or improve the cooling to the node. More powerful fan trays may also be required. The power supply itself may be faulty so replacement may be necessary.
7-2008-1	tmnxEqPowerSupplyFailureAc	Generated when an AC failure is detected on a power supply.	Reduced power can cause intermittent errors and could also cause permanent damage to components.	First try re-inserting the power supply. If that doesn't work, then replace the power supply.
7-2009-1	tmnxEqPowerSupplyFailureDc	Generated when an DC failure is detected on a power supply.	Reduced power can cause intermittent errors and could also cause permanent damage to components.	First try re-inserting the power supply. If that doesn't work, then replace the power supply.
7-2011-1	tmnxEqPowerSupplyRemoved	Generated when one of the chassis's power supplies is removed.	Reduced power can cause intermittent errors and could also cause permanent damage to components.	Re-insert the power supply.

Table 56: Alarm Name/Raising Event, Cause, Effect and Recovery (Continued)

Alarm *1	Alarm Name/Raising Event	Cause	Effect	Recovery
7-2017-1	tmnxEqSyncIfTimingHoldover	Generated when the synchronous equipment timing subsystem transitions into a holdover state.	Any node-timed ports will have very slow frequency drift limited by the central clock oscillator stability. The oscillator meets the holdover requirements of a Stratum 3 and G.813 Option 1 clock.	Address issues with the central clock input references.
7-2019-1	tmnxEqSyncIfTimingRef1Alarm with attribute tmnxSyncIfTimingNotifyAlarm == 'los(1)'	Generated when an alarm condition on the first timing reference is detected. The type of alarm (los, oof, etc) is indicated in the details of the log event or alarm, and is also available in the tmnxSyncIfTimingNotifyAlarm attribute included in the SNMP notification. The SNMP notification will have the same indices as those of the tmnxCpmCardTable.	Timing reference 1 cannot be used as a source of timing into the central clock.	Address issues with the signal associated with timing reference 1.
7-2019-2	tmnxEqSyncIfTimingRef1Alarm with attribute tmnxSyncIfTimingNotifyAlarm == 'oof(2)'	same as 7-2019-1	same as 7-2019-1	same as 7-2019-1
7-2019-3	tmnxEqSyncIfTimingRef1Alarm with attribute tmnxSyncIfTimingNotifyAlarm == 'oopir(3)'	same as 7-2019-1	same as 7-2019-1	same as 7-2019-1
7-2021-x	same as 7-2019-x but for ref2	same as 7-2019-x but for the second timing reference	same as 7-2019-x but for the second timing reference	same as 7-2019-x but for the second timing reference
7-2030-x	same as 7-2019-x but for the BITS input	same as 7-2019-x but for the BITS timing reference	same as 7-2019-x but for the BITS timing reference	same as 7-2019-x but for the BITS timing reference

Table 56: Alarm Name/Raising Event, Cause, Effect and Recovery (Continued)

Alarm *1	Alarm Name/Raising Event	Cause	Effect	Recovery
7-2033-1	tmnxChassisUpgradeInProgress	The tmnxChassisUpgradeInProgress notification is generated only after a CPM switchover occurs and the new active CPM is running new software, while the IOMs are still running old software. This is the start of the upgrade process. The tmnxChassisUpgradeInProgress notification will continue to be generated every 30 minutes while at least one IOM is still running older software.	A software mismatch between the CPM and IOM is generally fine for a short duration (during an upgrade) but may not allow for correct long term operation.	Complete the upgrade of all IOMs.
7-2050-1	tmnxEqPowerSupplyFailureInput	Generated when an input failure is detected on a power supply.	Reduced power can cause intermittent errors and could also cause permanent damage to components.	First try re-inserting the power supply. If that doesn't work, then replace the power supply.
7-2051-1	tmnxEqPowerSupplyFailureOutput	Generated when an output failure is detected on a power supply.	Reduced power can cause intermittent errors and could also cause permanent damage to components.	First try re-inserting the power supply. If that doesn't work, then replace the power supply.
7-2073-x	same as 7-2019-x but for the BITS2 input	same as 7-2019-x but for the BITS 2 timing reference	same as 7-2019-x but for the BITS 2 timing reference	same as 7-2019-x but for the BITS 2 timing reference
7-2092-1	tmnxEqPowerCapacityExceeded	Generated when a device needs power to boot, but there is not enough power capacity to support the device.	A non-powered device will not boot until the power capacity is increased to support the device.	Add a new power supply to the system, or change the faulty power supply with a working one.
7-2094-1	tmnxEqPowerLostCapacity	Generated when a power supply fails or is removed which puts the system in an overloaded situation.	Devices are powered off in order of lowest power priority until the available power capacity can support the powered devices.	Add a new power supply to the system, or change the faulty power supply with a working one.

Table 56: Alarm Name/Raising Event, Cause, Effect and Recovery (Continued)

Alarm *1	Alarm Name/Raising Event	Cause	Effect	Recovery
7-2096-1	tmnxEqPowerOverloadState	Generated when the overloaded power capacity can not support the power requirements and there are no further devices that can be powered off.	The system runs a risk of experiencing brownouts while the available power capacity does not meet the required power consumption.	Add power capacity or manually shutdown devices until the power capacity meets the power needs.
59-2004-1	linkDown	A linkDown trap signifies that the SNMP entity, acting in an agent role, has detected that the ifOperStatus object for one of its communication links is about to enter the down state from some other state (but not from the notPresent state).	The indicated interface is taken down.	If the ifAdminStatus is down then the interface state is deliberate and there is no recovery. If the ifAdminStatus is up then try to determine that cause of the interface going down: cable cut, distal end went down, etc.
64-2091-1	tmnxSysLicenseInvalid	Generated when the license becomes invalid for the reason specified in the log event/alarm.	The system will reboot at the end of the time remaining.	Configure a valid license file location and file name.
64-2092-1	tmnxSysLicenseExpires Soon	Generated when the license is due to expire soon.	The system will reboot at the end of the time remaining.	Configure a valid license file location and file name.

The linkDown Facility Alarm is supported for the following objects (note that all objects may not be supported on all platforms):

Table 57: linkDown Facility Alarm Support

Object	Supported?
Ethernet Ports	Yes
Sonet Section, Line and Path (POS)	Yes
TDM Ports (E1, T1, DS3) including CES MDAs/CMAs	Yes
TDM Channels (DS3 channel configured in an STM-1 port)	Yes
ATM Ports	Yes
Ethernet LAGs	No

Table 57: linkDown Facility Alarm Support (Continued)

Object	Supported?
APS groups	No
Bundles (MLPPP, IMA, etc)	No
ATM channels, Ethernet VLANs, Frame Relay DLCIs	No