

## Chapter 27

# Interpreting the Enterprise-Specific SONET APS MIB

The SONET Automatic Protection Switching (APS) management MIB monitors any SONET interface that participates in APS. APS is used by SONET add/drop multiplexers (ADMs) to protect against circuit failures. The JUNOS implementation of APS allows you to protect against circuit failures between an ADM and one or more routers, and between multiple interfaces in the same router. When a circuit or router fails, a backup immediately takes over. For more information about APS, see the *JUNOS Network Interfaces and Class of Service Configuration Guide*.



**NOTE:** The JUNOS software supports only read access, 1+ 1 architecture, bidirectional, revertive, and nonrevertive mode.

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For a downloadable version of this MIB, see [www.juniper.net/techpubs/software/junos/junos71/swconfig71-net-mgmt/html/mib-jnx-sonetaps.txt](http://www.juniper.net/techpubs/software/junos/junos71/swconfig71-net-mgmt/html/mib-jnx-sonetaps.txt).

This chapter discusses the following topics:

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## apsConfigTable

apsConfigTable lists the APS groups that are configured on the system.

### apsConfigEntry

apsConfigEntry objects have read access only and are listed in Table 56.

**Table 56: apsConfigTable**

Object	Object Identifier	Description
apsConfigName	apsConfigEntry 1	A text name for the APS group.  An entry cannot exist in the active state unless all objects in the entry have an appropriate value. Also, all associated apsChanConfigEntry rows must represent a set of consecutive channel numbers beginning with 0 or 1, depending on the selected architecture.
apsConfigRowStatus	apsConfigEntry 2	The status of a APS group entry.
apsConfigMode	apsConfigEntry 3	The architecture of the APS group. The JUNOS software supports only the 1+ 1 architecture.
apsConfigRevert	apsConfigEntry 4	The revertive mode of the APS group.  Revertive mode—When the condition that caused a switch to the protection line has been cleared, the signal is switched back to the working line. Switching can optionally be revertive with 1+ 1 architecture.  Nonrevertive mode—Traffic remains on the protection line until another switch request is received.
apsConfigDirection	apsConfigEntry 5	The directional mode of the APS group. The JUNOS software supports only bidirectional mode. Bidirectional mode provides protection in both directions.
apsConfigExtraTraffic	apsConfigEntry 6	This object always returns the value disabled.
apsConfigSdBerThreshold	apsConfigEntry 7	The signal degrade bit error rate (BER). The negative value of this number is used as the exponent of 10 for computing the threshold value for the BER. For example, a value of 5 indicates a BER threshold of 10 <sup>-5</sup> .
apsConfigSfBerThreshold	apsConfigEntry 8	The signal failure bit error rate. The negative value of this number is used as the exponent of 10 for computing the threshold value for the BER. For example, a value of 5 indicates a BER threshold of 10 <sup>-5</sup> .

Object	Object Identifier	Description
apsConfigWaitToRestore	apsConfigEntry 9	The wait to restore period, in seconds. After a condition that necessitated an automatic switch is cleared, the wait to restore period must elapse before reverting. This avoids rapid switch oscillations.  GR-253-CORE specifies a range of 5 to 12 minutes. G.783 defines a 5 to 12 minute range in section 5.4.1.1.3, but also allows a shorter period in Table 2-1, WaitToRestore value (MI_WTRtime: 0..(5)..12 minutes).
apsConfigCreationTime	apsConfigEntry 10	The value of sysUpTime at the time the row was created
apsConfigStorageType	apsConfigEntry 11	The storage type for this conceptual row. For information about conceptual rows, see RFC 2579, <i>Textual Conventions for SMIv2</i> .

## apsStatusTable

apsStatustable provides status information about configured APS groups.

### apsStatusEntry

apsStatusEntry objects have read access only and are listed in Table 57.

**Table 57: apsStatusTable**

Object	Object Identifier	Description
apsStatusK1K2Rcv	apsStatusEntry 1	The current value of the K1 and K2 bytes received on the protection channel.
apsStatusK1K2Trans	apsStatusEntry 2	The current value of the K1 and K2 bytes transmitted on the protection channel.
apsStatusCurrent	apsStatusEntry 3	The current status of the APS group. This object has the following values:  modeMismatch—Modes other than 1+ 1 unidirectional monitor protection line K2 bit 5, which indicates the architecture, and K2 bits 6 through 8, which indicate if the mode is unidirectional or bidirectional. A conflict between the current local mode and the received K2 mode information constitutes a mode mismatch. The JUNOS software supports only bidirectional mode.  channelMismatch—A mismatch between the transmitted K1 channel and the received K2 channel has been detected.

Object	Object Identifier	Description
apsStatusCurrent (cont.)	apsStatusEntry 3	<p>psbf—A protection switch byte failure (PSBF) is in effect. This condition occurs when either an inconsistent APS byte or an invalid code is detected. An inconsistent APS byte occurs when no 3 consecutive K1 bytes of the last 12 successive frames are identical, starting with the last frame containing a previously consistent byte. An invalid code occurs when the incoming K1 byte contains an unused code or a code irrelevant for the specific switching operation (for example, reverse request while no switching request is outstanding) in three consecutive frames. An invalid code also occurs when the incoming K1 byte contains an invalid channel number in three consecutive frames.</p> <p>feplf—Modes other than 1+ 1 unidirectional monitor the K1 byte for far-end protection-line failures. A far-end protection-line defect is declared based on receiving a signal failure (SF) on the protection line.</p> <p>extraTraffic—Indicates whether extra traffic is currently being accepted on the protection line.</p> <p>extraTraffic—Indicates whether extra traffic is currently being accepted on the protection line.</p>
apsStatusModeMismatches	apsStatusEntry 4	<p>Counts mode mismatch conditions. Discontinuities in the value of this counter can occur when the management system is reinitialized, and at other times as indicated by the value of apsStatusDiscontinuityTime.</p>
apsStatusChannelMismatches	apsStatusEntry 5	<p>Counts channel mismatch conditions. Discontinuities in the value of this counter can occur when the management system is reinitialized, and at other times as indicated by the value of apsStatusDiscontinuityTime.</p>

Object	Object Identifier	Description
apsStatusPSBFs	apsStatusEntry 6	<p>Counts protection switch byte failure conditions. This condition occurs when either an inconsistent APS byte or an invalid code is detected.</p> <p>An inconsistent APS byte occurs when no 3 consecutive K1 bytes of the last 12 successive frames are identical, starting with the last frame containing a previously consistent byte.</p> <p>An invalid code occurs when the incoming K1 byte contains an unused code or a code irrelevant for the specific switching operation (for example, reverse request while no switching request is outstanding) in three consecutive frames. An invalid code also occurs when the incoming K1 byte contains an invalid channel number in three consecutive frames.</p> <p>Discontinuities in the value of this counter can occur when the management system is reinitialized, and at other times as indicated by the value of apsStatusDiscontinuityTime.</p>
apsStatusFEPLFs	apsStatusEntry 7	<p>Counts far-end protection-line failure conditions. This condition is declared based on receiving a signal failure (SF) on the protection line in the K1 byte. Discontinuities in the value of this counter can occur when the management system is reinitialized, and at other times as indicated by the value of apsStatusDiscontinuityTime.</p>
apsStatusSwitchedChannel	apsStatusEntry 8	<p>This field is set to the number of the channel that is currently switched to protection. The value 0 indicates that no channel is switched to protection. The values 1 through 14 indicate that the working channel is switched to protection.</p>
apsStatusDiscontinuity-Time	apsStatusEntry 9	<p>The value of sysUpTime when the last one or more of this APS group's counters experienced a discontinuity. The relevant counters are the specific instances associated with this APS group of any Counter32 object contained in apsStatusTable. If no such discontinuities have occurred since the last reinitialization of the local management subsystem, then this object contains a zero value.</p>

## apsChanConfigTable

apsChanConfigTable lists the APS channels that have been configured in APS groups.

### apsChanConfigEntry

apsChanConfigEntry objects have read access only and are listed in Table 58.

**Table 58: apsChanConfigTable**

Object	Object Identifier	Description
apsChanConfigGroupName	apsChanConfigEntry 1	A text name for the APS group in which this channel is included.
apsChanConfigNumber	apsChanConfigEntry 2	A unique channel number within an APS group. The value 0 indicates the null channel. The values 1 through 14 define a working channel.
apsChanConfigRowStatus	apsChanConfigEntry 3	<p>The status of this APS channel entry. An entry cannot exist in the active state unless all objects in the entry have an appropriate value. The JUNOS software supports only 1+ 1 architecture.</p> <p>The values 1 through 14 define a working channel. When an attempt is made to set the corresponding apsConfigRowStatus field to active, the apsChanConfigNumber values of all entries with equal apsChanConfigGroupName fields must be a set of consecutive integer values beginning with 0 or 1, depending on the architecture of the group, and ending with <math>n</math>, where <math>n</math> is greater than or equal to 1 and less than or equal to 14. Otherwise, the error inconsistentValue is returned to the apsConfigRowStatus set attempt.</p>
apsChanConfigIfIndex	apsChanConfigEntry 4	<p>The interface index assigned to a SONET LTE. This is an interface with ifType sonet(39). The value of this object must be unique among all instances of apsChanConfigIfIndex. In other words, a particular SONET LTE can only be configured in one APS group.</p> <p>This object cannot be set if the apsChanConfigGroupName instance associated with this row is equal to an instance of apsConfigName and the corresponding apsConfigRowStatus object is set to active. In other words, this value cannot be changed if the APS group is active. However, this value can be changed if the apsConfigRowStatus value is equal to notInService. The JUNOS software supports only read access.</p>

Object	Object Identifier	Description
apsChanConfigPriority	apsChanConfigEntry 5	The priority of the channel. This field returns the value low priority. The JUNOS software supports only 1+ 1 architecture.
apsChanConfigStorageType	apsChanConfigEntry 6	The storage type for this conceptual row. Conceptual rows having the value permanent need not allow write access to any columnar objects in the row. For information about conceptual rows, see RFC 2579, <i>Textual Conventions for SMIv2</i> .

## apsChanStatusTable

apsChanStatusTable provides APS channel statistics.

### apsChanStatusEntry

apsChanConfigEntry objects have read access only and are listed in Table 59.

**Table 59: apsChanStatusTable**

Object	Object Identifier	Description
apsChanStatusCurrent	apsChanStatusEntry 1	<p>The current state of the port. This object has the following values:</p> <p>lockedOut—This bit, when applied to a working channel, indicates that the channel is prevented from switching to the protection line. When applied to the null channel, this bit indicates that no working channel can switch to the protection line.</p> <p>sd—A signal degrade condition is in effect.</p> <p>sf—A signal failure condition is in effect switched. The switched bit is applied to a working channel if that channel is currently switched to the protection line.</p> <p>wtr—A wait-to-restore state is in effect.</p>
apsChanStatusSignalDegrades	apsChanStatusEntry 2	<p>A count of signal degrade conditions. A signal degrade condition occurs when the line bit error rate exceeds the currently configured value of the relevant instance of <code>apsConfigSdBerThreshold</code>. Discontinuities in the value of this counter can occur when the management system is reinitialized, and at other times as indicated by the value of <code>apsChanStatusDiscontinuityTime</code>.</p>
apsChanStatusSignalFailures	apsChanStatusEntry 3	<p>A count of signal failure conditions that have been detected on the incoming signal. A signal failure condition occurs when a loss of signal, loss of frame, AIS-L or line bit error rate exceeds the currently configured value of the relevant instance of <code>apsConfigSfBerThreshold</code>. Discontinuities in the value of this counter can occur when the management system is reinitialized, and at other times as indicated by the value of <code>apsChanStatusDiscontinuityTime</code>.</p>

Object	Object Identifier	Description
apsChanStatusSwitchovers	apsChanStatusEntry 4	<p>When queried with index value apsChanConfigNumber other than 0, this object returns the number of times this channel has switched to the protection line.</p> <p>When queried with index value s set to 0, which is the protection line, this object returns the number of times that any working channel has switched back to the working line from this protection line. Discontinuities in the value of this counter can occur when the management system is reinitialized, and at other times as indicated by the value of apsChanStatusDiscontinuityTime.</p>
apsChanStatusLastSwitchover	apsChanStatusEntry 5	<p>When queried with index value apsChanConfigNumber other than 0, this object returns the value of sysUpTime when this channel last completed a switch to the protection line. If this channel has never switched to the protection line, the value 0 is returned.</p> <p>When queried with index value apsChanConfigNumber set to 0, which is the protection line, this object will return the value of sysUpTime the last time that a working channel was switched back to the working line from this protection line. If no working channel has ever switched back to the working line from this protection line, the value 0 is returned.</p>

Object	Object Identifier	Description
apsChanStatusSwitchoverSeconds	apsChanStatusEntry 6	<p>The cumulative Protection Switching Duration (PSD) time, in seconds. For a working channel, this is the cumulative number of seconds that service was carried on the protection line. For the protection line, this is the cumulative number of seconds that the protection line has been used to carry any working channel traffic.</p> <p>This information is only valid if revertive switching is enabled. The value 0 will be returned. Otherwise, discontinuities in the value of this counter can occur at reinitialization of the management system, and at other times as indicated by the value of <code>apsChanStatusDiscontinuityTime</code>. For example, if the value of an instance of <code>apsChanStatusSwitchoverSeconds</code> changes from a non-zero value to zero due to revertive switching being disabled. It is expected that the corresponding value of <code>apsChanStatusDiscontinuityTime</code> is updated to reflect the time of the configuration change.</p>
apsChanStatusDiscontinuityTime	apsChanStatusEntry 7	<p>The value of <code>sysUpTime</code> on the most recent occasion at which any one or more of this channel's counters suffered a discontinuity. The relevant counters are the specific instances associated with this channel of any <code>Counter32</code> object contained in <code>apsChanStatusTable</code>. If no such discontinuities have occurred since the last reinitialization of the local management subsystem, then this object contains a zero value for <code>apsChanStatusEntry</code>.</p>