                    Definitions of Managed Objects
                  for the SONET/SDH Interface Type

Status of this Memo

   This document specifies an Internet standards track protocol for the
   Internet community, and requests discussion and suggestions for
   improvements. Please refer to the current edition of the "Internet
   Official Protocol Standards" (STD 1) for the standardization state
   and status of this protocol. Distribution of this memo is unlimited.

Abstract

   This memo defines a portion of the Management Information Base (MIB)
   for use with network management protocols in TCP/IP-based internets.
   In particular, it defines objects for managing Synchronous Optical
   Network/Synchronous Digital Hierarchy (SONET/SDH) objects. This
   document is a companion document with Definitions of Managed Objects
   for the DS1/E1 and DS3/E3 Interface Types, RFC1406 [14] and RFC1407
   [13].

   This memo specifies a MIB module in a manner that is both compliant
   to the SNMPv2 SMI, and semantically identical to the peer SNMPv1
   definitions.

Table of Contents

1. The SNMPv2 Network Management Framework

   The SNMPv2 Network Management Framework consists of four major
   components.   They are:

      RFC 1442 [1] which defines the SMI, the mechanisms used for
      describing and naming objects for the purpose of management.

      STD 17, RFC 1213 [6] defines MIB-II, the core set of managed
      objects for the Internet suite of protocols. Reference [12]
      defines the evolution of the Interfaces Group of MIB II in terms
      of extensions and precise applications of the objects.

      RFC 1445 [4] which defines the administrative and other
      architectural aspects of the framework.

      RFC 1448 [5] which defines the protocol used for network access to
      managed objects.

The Framework permits new objects to be defined for the purpose of
experimentation and evaluation.

This specification makes also use of:

   RFC 1443 [2] which defines textual conventions for the
   specification of managed objects.

   RFC 1444 [3] which defines conformance statements for the
   specification of managed objects.

2. Objects

   Managed objects are accessed via a virtual information store, termed
   the Management Information Base or MIB. Objects in the MIB are
   defined using the subset of Abstract Syntax Notation One (ASN.1) [7]
   defined in the SMI. In particular, each object has a name, a syntax,
   and an encoding. The name is an object identifier, an
   administratively assigned name, which specifies an object type. The
   object type together with an object instance serves to uniquely
   identify a specific instantiation of the object. For human
   convenience, we often use a textual string, termed the OBJECT
   DESCRIPTOR, to also refer to the object type.

   The syntax of an object type defines the abstract data structure
   corresponding to that object type. The ASN.1 language is used for
   this purpose. However, the SMI RFC 1442 purposely restricts the
   ASN.1 constructs which may be used. These restrictions are
   explicitly made for simplicity.

   The encoding of an object type is simply how that object type is
   represented using the object type's syntax. Implicitly tied to the
   notion of an object type's syntax and encoding is how the object type
   is represented when being transmitted on the network. The SMI
   specifies the use of the basic encoding rules of ASN.1 [8], subject
   to the additional requirements imposed by the SNMP.

2.1. Format of Definitions

   Section 4 contains contains the specification of all object types
   contained in this MIB module. The object types are defined using the
   conventions defined in the SMI, as amended by the extensions
   specified in the SNMPv2 SMI.

3. Overview

   These objects are used when the particular media being used to
   realize an interface is a SONET/SDH interface. At present, this
   applies to these values of the ifType variable in the Internet-
   standard MIB:

               sonet (39), sonetPath (50), sonetVT (51)

   The definitions contained herein are based on the SONET/SDH
   specifications in ANSI T1.105 and T1.106-1988 [9, 9a, 10] and CCITT
   G.707, 708, 709, and G.783 [15-18].

3.1. Use of the ifTable

   This section specifies how the MIB II interfaces group, as defined in
   [12], is used for SONET/SDH interfaces. The SONET/SDH layers support
   several multiplexing possibilities.

   For example in SONET, an Synchronous Transport Signal 3 (STS-3) has 3
   SONET Paths, and a STS-3c has 1 SONET Path. Another example could be
   a STS-12 having 4 SONET STS-3c Paths. Similarly, a SONET Synchronous
   Payload Envelope (SPE) can carry many Virtual Tributaries (VTs), for
   example, one SONET SPE can carry 28 VT1.5s. It is important to note
   that an SPE and a VT in SONET is collectively referred to as a
   Virtual Container (VC) in SDH. Also, an STS is called Synchronous
   Transport Module (STM) in SDH.

   Not all SONET/SDH equipment terminate all SONET/SDH layers. For
   example, an SONET/SDH STE regenerator terminates SONET/SDH Sections
   only, and is transparent for all layers above that. SONET/SDH Add-
   Drop multiplexers and Digital Cross Connect Systems terminate
   SONET/SDH Lines. SONET/SDH Terminal Multiplexers may also terminate
   SONET/SDH Paths and VTs/VCs.

   MIB II [6], as extended by [12], accommodates these cases by
   appropriate use of the MIB II system group, and the interfaces group.
   The system group can name and describe the type of managed resource.
   The interfaces group defines which SONET/SDH layers apply, how these
   layers are configured and multiplexed. This is achieved by proper
   representation of SONET/SDH Layers by ifEntries as defined in [12],
   as follows:

```
 _____
|            |        |      |   | >
|            |        |      |   | |
|   VT 1     |........|VT K  |   |  > K ifEntries
|            |        |      |   | |
|_____|_____|____|_|   | >
|            |      |      |     | >
|            |      |      |     | |
|   Path 1   |......|Path L|     |  > L ifEntries
|            |      |      |     | |
|_____|_____|____|_|   | >
|                        |       | >
|                        |       | |
|   Line                 |       | |
|                        |       | |
|_____| |
|                        |       | |
|                        |       | |
|   Section Layer        |       |  > 1 ifEntry
|                        |       | |
|_____| |
|                        |       | |
|                        |       | |
|   Physical Medium Layer|       | |
|                        |       | |
|_____| >
```
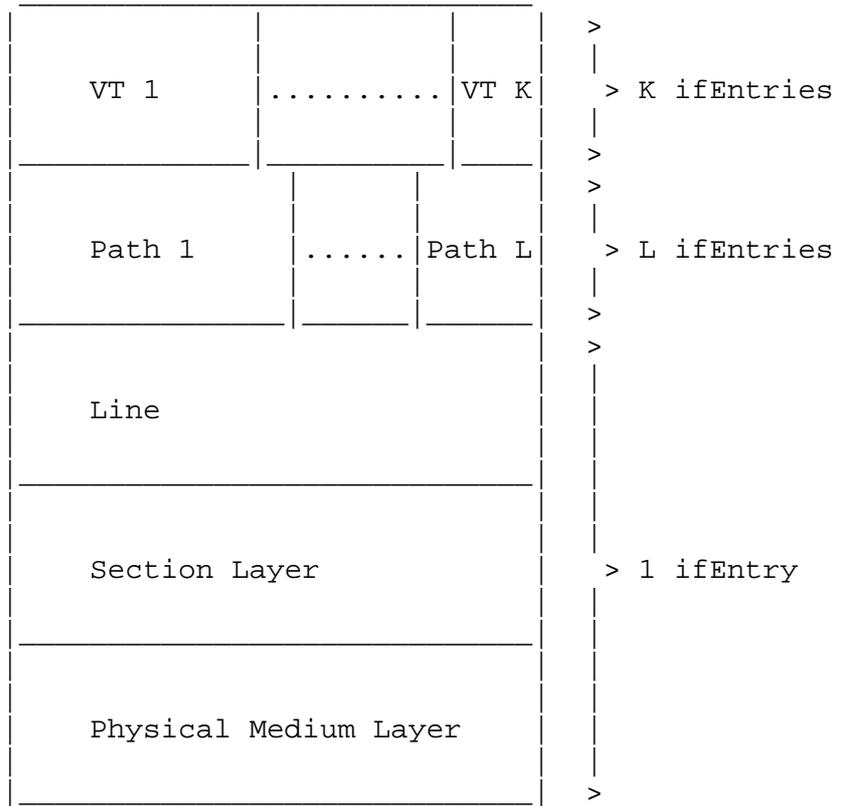
                 Use of ifTable for a SONET/SDH port

   The exact configuration and multiplexing of the layers is maintained
   in the ifStackTable [12].

3.2. Use of ifTable for SONET/SDH Medium/Section/Line Layer

   Only the ifGeneralGroup needs to be supported.

ifTable Object   Use for combined SONET/SDH Medium/Section/Line Layer
===
            ifIndex   Interface index.

            ifDescr   SONET/SDH Medium/Section/Line

            ifType   sonet(39)

            ifSpeed   Speed of line rate for SONET/SDH,
                              (e.g., 155520000 bps).

            ifPhysAddress   The value of the Circuit Identifier.
                              If no Circuit Identifier has been assigned
                              this object should have an octet string with
                              zero length.

            ifAdminStatus   Supports read-only access.
                              The desired administrative status of the
                              interface.

            ifOperStatus   The value testing(3) is not used.
                              This object assumes the value down(2),
                              if the objects sonetSectionCurrentStatus
                              and sonetLineCurrentStatus have
                              any other value than sonetSectionNoDefect(1)
                              and sonetLineNoDefect(1), respectively.

            ifLastChange   sysUpTime at the last change in
                              ifOperStatus.

            ifName   Textual name of the interface or an
                              OCTET STRING of zero length.

            ifLinkUpDownTrapEnable   Set to enabled(1).
                                     Supports read-only access.

            ifHighSpeed   Speed of line in Mega-bits per second
                              (e.g., 155 Mbps)

        ifConnectorPresent Set to true(1).

3.3. Use of ifTable for SONET/SDH Paths

   Only the ifGeneralGroup needs to be supported.

```
            ifTable Object      Use for SONET/SDH Paths
            ========================================
             ifIndex            Interface index.

             ifDescr            SONET/SDH Path

             ifType             sonetPath(50)

             ifSpeed            set to speed of SONET/SDH path
                                (e.g., an STS-1 path has a
                                rate of 50112000 bps.)

             ifPhysAddress      Circuit Identifier or OCTET STRING of
                                zero length.

             ifAdminStatus      Supports read-only access.
                                The desired administrative status of the
                                interface.

             ifOperStatus       This object assumes the value down(2),
                                if the object sonetPathCurrentStatus has
                                any other value than sonetPathNoDefect(1).

             ifLastChange       sysUpTime at the last change in ifOperStatus.

             ifName             Textual name of the interface or an
                                OCTET STRING of zero length.

             ifLinkUpDownTrapEnable   Default value is disabled(2).
                                      Just read-only access may be
                                      supported.

             ifHighSpeed        Set to rate of SONET/SDH path
                                in Mega-bits per second.

             ifConnectorPresent Set to false(2).
```

3.4. Use of ifTable for SONET/SDH VTs/VCs

   Only the ifGeneralGroup needs to be supported.

```
         ifTable Object     Use for SONET/SDH VTs/VCs
         =========================================
          ifIndex           Interface index.

          ifDescr           SONET/SDH VT/VC

          ifType            sonetVT(51)

          ifSpeed           Set to speed of VT/VC
                            (e.g., a VT1.5 has a rate of
                            1728000 bps.)

          ifPhysAddress     Circuit Identifier or OCTET STRING of
                            zero length.

          ifAdminStatus     Supports read-only access.
                            The desired administrative status of the
                            interface.

          ifOperStatus      This object assumes the value down(2),
                            if the object sonetVTCurrentStatus has
                            any other value than sonetVTNoDefect(1).

          ifLastChange      sysUpTime at the last change in
                            ifOperStatus.

          ifName            Textual name of the interface or an
                            OCTET STRING of zero length.

          ifLinkUpDownTrapEnable  Default value is disabled(2).
                                  Just read-only access may be
                                  supported.

          ifHighSpeed       Set to rate of VT in Mega-bits per second.

          ifConnectorPresent Set to false(2).
```

3.5. SONET/SDH Terminology

   The terminology used in this document to describe error conditions on
   a SONET circuit as monitored by a SONET system are from the ANSI
   T1M1.3/93-005R2 [11].   The terminology used in this document to
   describe error conditions on a SDH circuit as monitored by a SDH
   system are from the CCITT G.783 [18].   Only the SONET Performance
   Monitoring terminology is defined in this document.   The definitions
   for SDH Performance Monitoring terms are similar but not identical,
   and they can be found in [18].   If the definition in this document
   does not match the definition in the ANSI T1M1.3/93-005R2 draft
   document, the implementer should follow the definition described in
   this document.

              Section Loss Of Frame Failure (Out of Frame Event, Severely
                  Errored Frame Defect)
                  An Out of Frame (OOF) event (or Severely Errored Frame
                  defect) is the occurrence of four contiguous errored
                  frame alignment words. A frame alignment work occupies
                  the A1 and A2 bytes of an STS frame, and is defined in
                  T1.105. The SEF defect is terminated when two contiguous
                  error-free frame words are detected. Any implementation
                  of the frame recovery circuitry which achieves
                  realignment following an OOF within the 250 microsecond
                  (two frames) interval implied by this definition is
                  acceptable.

                  An Loss of Frame (LOF) defect is declared when an OOF/SEF
                  defect persists for a period of 3 milliseconds. The LOF
                  defect is terminated when the incoming signal remains
                  continuously in-frame for a period of 1 ms to 3 ms.

                  An LOF failure is declared when the LOF defect persists
                  for a period of 2.5 +/- 0.5 seconds, except when an LOS
                  defect or failure is present. The LOF failure is cleared
                  when the LOS failure is declared, or when the LOF defect
                  is absent for 10 +/- 0.5 seconds.

            Loss of Signal
                  The Loss of Signal (LOS) defect is declared when no
                  transitions are detected on the incoming signal (before
                  descrambling). The LOS defect is detected upon
                  observing 2.3 to 100 microseconds of no transitions. The
                  LOS defect is cleared after a 125 microsecond interval
                  (one frame) during which no LOS defect is detected.

                  The LOS failure is declared when the LOS defect persists
                  for a period of 2.5 +/- 0.5 seconds, or if LOS defect is

present when the criteria for LOF failure declaration
have been met. The LOS failure is cleared when the LOS
defect is absent for a period of 10 +/- 0.5 seconds.
Declaration of LOS failure clears any existing LOF
failure. Clearing the LOS failure allows immediate
declaration of the LOF failure if conditions warrant.

STS-Path Loss of Pointer
     An Loss of Pointer (LOP) defect is declared when either a
     valid pointer is not detected in eight consecutive
     frames, or when eight consecutive frames are detected
     with the New Data Flag (NDF) set to "1001" without a
     valid concatenation indicator (see ANSI T1.105). A LOP
     defect is terminated when either a valid pointer with a
     normal NDF set to "0110", or a valid concatenation
     indicator is detected for three contiguous frames.
     Incoming STS-Path AIS shall not result in the declaration
     of a LOP defect.

     A STS-Path LOP failure is declared when the STS-Path LOP
     defect persists for a period of 2.5 +/- 0.5 seconds. A
     STS-Path LOP failure is cleared when the STS-Path LOP
     defect is absent for 10 +/- 0.5 seconds.

VT Loss of Pointer
     A VT LOP defect is declared when either a valid pointer
     is not detected in eight consecutive VT superframes, or
     when eight consecutive VT superframes are detected with
     the NDF set to "1001" without a valid concatenation
     indicator. A VT LOP defect is terminated when either a
     valid pointer with a normal NDF set to "0110", or a valid
     concatenation indicator is detected for three contiguous
     VT superframes. Incoming VT-Path AIS shall not result in
     declaring a VT LOP defect.

     A VT LOP failure is declared when the VT LOP defect
     persists for 2.5 +/- 0.5 seconds. A VT LOP failure is
     cleared when the VT LOP defect is absent for 10 +/- 0.5
     seconds.

Line Alarm Indication Signal
     A Line Alarm Indication Signal (L-AIS) is defined in ANSI
     T1.105. The following criteria are specific to the L-AIS
     defect:

     -- Line AIS defect is detected as a "111" pattern in
     bits 6, 7, and 8 of the K2 byte in five consecutive
     frames.

-- Line AIS defect is terminated when bits 6, 7, and 8
of the K2 byte do not contain the code "111" for five
consecutive frames.

A Line AIS failure is declared when the Line AIS defect
persists for a period of 20.5 +/- 0.5 seconds. A Line
AIS failure is cleared when the Line AIS defect is absent
for 10 +/- 0.5 seconds.

STS-Path Alarm Indication Signal
    The STS-Path Alarm Indication Signal (AIS) is defined in
    ANSI T1.105 as all ones in bytes H1, H2, and H3 as well
    as all ones in the entire STS SPE. The following
    criteria are specific to the STS-Path AIS defect:

    -- STS-Path AIS defect is detected as all ones in bytes
    H1 and H2 in three contiguous frames.

    -- The STS-Path AIS defect is terminated when a valid STS
    Pointer is detected with the NDF set to "1001" (inverted)
    for one frame, or "0110" (normal) for three contiguous
    frames.

    A STS-Path AIS failure is declared when the STS-Path AIS
    defect persists for 2.5 +/- 0.5 seconds. A STS-Path AIS
    failure is cleared when the STS-Path AIS defect is absent
    for 10 +/- 0.5 seconds.

VT-Path Alarm Indication Signal
    The VT-Path Alarm Indication Signal (AIS) is only
    applicable for VTs in the floating mode of operation.
    VT-Path AIS is used to alert the downstream VT Path
    Terminating Entity (PTE) of an upstream failure. Upon
    detection of a failure, Line AIS, or STS-Path AIS, an STS
    PTE will generate downstream VT-Path AIS if the STS
    Synchronous Payload Envelope (SPE) is carrying floating
    VTs. VT-Path AIS is specified in ANSI T1.105 as all ones
    in bytes V1, V2, V3, and V4, as well as all ones in the
    entire VT SPE. The following criteria are specific to
    VT-Path AIS defect:

    -- VT-Path AIS defect is detected by a VT PTE as all
    ones in bytes V1 and V2 in three contiguous VT
    superframes.

    -- VT-Path AIS defect is terminated when valid VT
    pointer with a valid VT size is detected with the NDF set
    to "1001" (inverted) for one VT superframe, or "0110"

(normal) for three contiguous VT superframes are
detected.

A VT-Path AIS failure is declared when the VT-Path AIS
defect persists for 2.5 +/- 0.5 seconds. A VT-Path AIS
failure is cleared when the VT-Path AIS defect is absent
for 10 +/- 0.5 seconds.

Line Remote Defect Indication
Line Remote Defect Indication (RDI) (aka Line FERF)
signal is the occurrence of a "110" pattern in bit
positions 6, 7, and 8 of the K2 byte in STS-1 #1 of the
STS-N signal. Line RDI is defined in ANSI T1.105. The
following criteria are specific to Line RDI defect:

-- Line RDI defect is a "110" code in bits 6, 7, and 8
of the K2 byte of in STS-1 #1 in five consecutive frames.

-- Line RDI defect is terminated when any code other
than "110" is detected in bits 6, 7, and 8 of the K2 byte
in five consecutive frames.

A Line Remote Failure Indication (RFI) failure is
declared when the incoming Line RDI defects lasts for 2.5
+/- 0.5 seconds. The Line RFI failure is cleared when no
Line RDI defects are detected for 10 +/- 0.5 seconds.

STS-Path Remote Defect Indication
STS-Path RDI (aka STS-Path FERF) signal shall be
generated within 100 milliseconds by the STS PTE upon
detection of an AIS or LOP defect. Transmission of the
STS-Path RDI signal shall cease within 100 milliseconds
when the STS PTE no longer detects STS-Path AIS or STS-
Path LOP defect. The STS-Path RDI shall accurately
report the presence or absence of STS-Path AIS or STS-
Path LOP defects. STS-Path RDI defect is defined in ANSI
T1.105. The following requirements are specific to the
STS-Path RDI defect:

-- STS-Path RDI is detected by all STS PTEs. STS-Path
RDI is detected by the upstream STS PTE as a "1" in bit
five of the Path Status byte (G1) for five contiguous
frames.

-- Removal of STS-Path Remote Defect Indication is
detected by a "0" in bit 5 of the G1 byte in five
contiguous frames.

A STS-Path Remote Failure Indication (RFI) failure is
declared when the incoming STS-Path RDI defects lasts for
2.5 +/- 0.5 seconds. The STS-Path RFI failure is cleared
when no STS-Path RDI defects are detected for 10 +/- 0.5
seconds.

VT-Path Remote Defect Indication
    VT Path RDI (aka VT Path FERF) signal shall be generated
    within 100 milliseconds by the VT PTE upon detection of a
    VT-Path AIS or LOP defect. Transmission of the VT-Path
    RDI signal shall cease within 100 milliseconds when the
    VT PTE no longer detects VT-Path AIS or VT-Path LOP
    defect. The VT-Path RDI shall accurately report the
    presence or absence of VT-Path AIS or VT-Path LOP
    defects. VT-Path RDI defect is defined in ANSI T1.105.
    The following requirements are specific to VT-Path RDI
    defect:

    -- VT-Path RDI defect is the occurrence of a "1" in bit
    4 of the VT-Path Overhead byte (V5) in five contiguous
    frames.

    -- VT-Path RDI defect is terminated when a "0" is
    detected in bit 4 of the VT-Path Overhead byte (V5) for
    five contiguous frames.

    A VT-Path Remote Failure Indication (RFI) (derived)
    failure is declared when the incoming VT-Path RDI defects
    lasts for 2.5 +/- 0.5 seconds. The VT-Path RFI failure
    is cleared when no VT-Path RDI defects are detected for
    10 +/- 0.5 seconds.

VT-Path Remote Failure Indication
    The VT-Path RFI signal is only required for the case of
    byte synch mapped DS1s where the DS1 frame bit is not
    mapped. The VT-Path RFI is specified in ANSI T1.105,
    where it is currently called VT path yellow. When
    provided, the VT-Path RFI signal is used to indicate the
    occurrence of far-end failures. When the VT-Path RFI is
    not provided, far-end failures are derived from local
    timing of the VT-Path RDI defect. The VT-Path RFI
    failure is declared within 5 ms of detecting the incoming
    VT-Path RFI Signal. The VT-Path Remote Failure
    Indication (RFI) failure is cleared within 50 ms of
    detecting the removal of the incoming VT-Path RFI signal.

Coding Violation
     Coding Violations (CV) are Bit Interleaved Parity (BIP)
     errors that are detected in the incoming signal. CV
     counters are incremented for each BIP error detected.
     That is, each BIP-8 can detect up to eight errors per
     STS-N frame, with each error incrementing the CV counter.
     Section CVs shall be collected using the BIP-8 in the B1
     byte located in the Section Overhead of STS-1 #1. Line
     CVs shall be collected using the BIP-8s in B2 bytes
     located in the Line Overhead of each STS-1 (since all CVs
     on an STS-N line are counted together, this is equivalent
     to counting each error in the BIP-8*N contained in the B2
     bytes of the STS-N Line Overhead). Thus, on an STS-N
     signal, up to 8 x N CVs may occur in each frame. Path
     CVs shall be collected using the BIP-8 in the B3 byte of
     the STS-Path Overhead of the STS SPE. VT CVs shall be
     collected using the BIP-2 in the V5 overhead byte of the
     floating VT.

Errored Seconds
     At each layer, an Errored Second (ES) is a second with
     one or more Coding Violations at that layer OR one or
     more incoming defects (e.g., SEF, LOS, AIS, LOP) at that
     layer has occurred.

Severely Errored Seconds
     At each layer, an Severely Errored Second (SES) is a
     second with x or more CVs at that layer, or a second
     during which at least one or more incoming defects at
     that layer has occurred. Values of x vary depending on
     the line rate and the Bit Error Rate. See Section 3.4
     for values for x.

Severely Errored Framing Seconds
     A Severely Errored Framing Second (SEFS) is a seconds
     with containing one or more SEF events. This counter is
     only counted at the Section Layer.

Unavailable Seconds
     At the Line, Path, and VT layers, an unavailable second
     is calculated by counting the number of seconds that the
     interface is unavailable. At each layer, the SONET/SDH
     interface is said to be unavailable at the onset of 10
     contiguous SESs. The 10 SESs are included in unavailable
     time. Once unavailable, the SONET/SDH interface becomes
     available at the onset of 10 contiguous seconds with no
     SESs. The 10 seconds with no SESs are excluded from
     unavailable time. With respect to the SONET/SDH error

counts at each layer, all counters at that layer are
incremented while the SONET/SDH interface is deemed
available at that layer. While the interface is deemed
unavailable at that layer, the only count that is
incremented is UASs at that layer.

A special case exists when the 10 or more second period
crosses the 900 second statistics window boundary, as the
foregoing description implies that the SES and UAS
counters must be adjusted when the Unavailable Signal
State is entered. Clearly, successive GETs of the
affected sonetPathIntervalSES and sonetPathIntervalUAS
(for the Line and VT also) objects will return differing
values if the first GET occurs during the first few
seconds of the window. This is viewed as an unavoidable
side-effect of selecting the presently defined managed
objects as a basis for this memo.

Unequipped
     If a Path or VT connection is not provisioned (idle) the
     SONET equipment will signal this state by transmitting
     the Path or VT Signal Label as follows:
     - byte C2 of the STS Path Overhead equal to 0 for an
     unequipped Path,
     - byte V5 of the VT Path Overhead equal to 0 for an
     unequipped VT.

Signal Label Mismatch
     A Path or VT connection is not correctly provisioned if a
     received Path or VT Signal Label mismatch occurs. A
     received Signal Label is considered mismatched if it does
     not equal either the locally provisioned value or the
     value 'equipped non-specific' (1 hex). Note that any
     received non-zero Signal Label is considered a locally
     provisioned value of 'equipped non-specific'. Only in-
     service, provisioned Path Terminating equipment can
     detect mismatched Signal labels. It is considered
     provisioned if it has been configured for a mapping and
     has been assigned signals to and from which the mapping
     takes place.

Circuit Identifier
     This is a character string specified by the circuit
     vendor, and is useful when communicating with the vendor
     during the troubleshooting process.

3.6. Values for x for the Section, Line, Path, and VT Layers

Value for x for SONET/SDH Section SES Definition

Rate	x	Minimum Bit Error Rate
OC-1	9	1.5 x 10^-7
0C-3	16	1 x 10^-7
OC-9	47	1 x 10^-7
OC-12	63	1 x 10^-7
OC-18	94	1 x 10^-7
OC-24	125	1 x 10^-7
OC-36	187	1 x 10^-7
OC-48	249	1 x 10^-7

Value for x for SONET/SDH Line SES Definition

Rate	x	Minimum Bit Error Rate
OC-1	12	2 x 10^-7
0C-3	32	2 x 10^-7
OC-9	94	2 x 10^-7
OC-12	124	2 x 10^-7
OC-18	186	2 x 10^-7
OC-24	248	2 x 10^-7
OC-36	370	2 x 10^-7
OC-48	494	2 x 10^-7

Value for x for SONET/SDH STS-Path SES Definition

Rate	x	Minimum Bit Error Rate
STS-1	9	1.5 x 10^-7
STS-3	16	1 x 10^-7

Value for x for SONET/SDH VT-Path SES Definition

Rate	x	Minimum Bit Error Rate
VT1.5	4	2 x 10^-6
VT2	6	2 x 10^-6
VT3	8	2 x 10^-6
VT6	14	2 x 10^-6

4. Object Definitions

```
SONET-MIB DEFINITIONS ::= BEGIN


IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, Counter32, Gauge32,
    Integer32,
          FROM SNMPv2-SMI
    TEXTUAL-CONVENTION, DisplayString
          FROM SNMPv2-TC
    MODULE-COMPLIANCE, OBJECT-GROUP
          FROM SNMPv2-CONF
    ifIndex, transmission
          FROM RFC-1213;

--  This is the MIB module for the SMDS Interface objects.


sonetMIB MODULE-IDENTITY
    LAST-UPDATED "9401030000Z"
    ORGANIZATION "IETF AToM MIB Working Group"
    CONTACT-INFO
      "         Tracy Brown

        Postal: Bell Communications Research
                331 Newman Springs Road
                P.O. Box 7020
                Red Bank, NJ  07701-7020
                US

           Tel: +1 908 758 2107
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```

              E-mail: kaj@cc.bellcore.com"
            DESCRIPTION
                "The MIB module to describe
                 SONET/SDH interfaces objects."
            ::= { transmission 39 }

        --   This is the MIB module for the SONET/SDH objects

        sonetObjects   OBJECT IDENTIFIER ::= { sonetMIB 1 }

        sonetObjectsPath   OBJECT IDENTIFIER ::= { sonetMIB 2 }

        sonetObjectsVT   OBJECT IDENTIFIER ::= { sonetMIB 3 }

        -- groups in the SONET/SDH MIB module

        sonetMedium   OBJECT IDENTIFIER ::= { sonetObjects 1 }

        sonetSection   OBJECT IDENTIFIER ::= { sonetObjects 2 }

        sonetLine   OBJECT IDENTIFIER ::= { sonetObjects 3 }

        sonetFarEndLine   OBJECT IDENTIFIER ::= { sonetObjects 4 }

        sonetPath   OBJECT IDENTIFIER ::= { sonetObjectsPath 1 }

        sonetFarEndPath   OBJECT IDENTIFIER ::= { sonetObjectsPath 2 }

        sonetVT   OBJECT IDENTIFIER ::= { sonetObjectsVT 1 }

        sonetFarEndVT   OBJECT IDENTIFIER ::= { sonetObjectsVT 2 }

        -- the SONET/SDH Medium group

        -- SONET/SDH interfaces for some applications may be
        -- electrical interfaces and not optical interfaces.
        -- This group handles the configuration information for
        -- both optical SONET/SDH interfaces and electrical
        -- SONET/SDH interfaces.

        sonetMediumTable OBJECT-TYPE
            SYNTAX   SEQUENCE OF SonetMediumEntry
            MAX-ACCESS not-accessible
            STATUS   current
            DESCRIPTION

```
                     "The SONET/SDH Medium table."
                ::= { sonetMedium 1 }

        sonetMediumEntry OBJECT-TYPE
            SYNTAX   SonetMediumEntry
            MAX-ACCESS  not-accessible
            STATUS   current
            DESCRIPTION
               "An entry in the SONET/SDH Medium table."
            INDEX   { ifIndex }
             ::= { sonetMediumTable 1 }

        SonetMediumEntry ::=
            SEQUENCE {
                 sonetMediumType                INTEGER,
                 sonetMediumTimeElapsed         Integer32,
                 sonetMediumValidIntervals      Integer32,
                 sonetMediumLineCoding          INTEGER,
                 sonetMediumLineType            INTEGER,
                 sonetMediumCircuitIdentifier   DisplayString
            }


        sonetMediumType OBJECT-TYPE
            SYNTAX   INTEGER  {
                        sonet(1),
                        sdh(2)
                    }
            MAX-ACCESS  read-only
            STATUS   current
            DESCRIPTION
               "This variable identifies whether a SONET
                or a SDH signal is used across this interface."
            ::= { sonetMediumEntry 1 }

        sonetMediumTimeElapsed OBJECT-TYPE
            SYNTAX   Integer32 (1..900)
            MAX-ACCESS  read-only
            STATUS   current
            DESCRIPTION
               "The number of seconds, including partial
                seconds, that have elapsed since the beginning of
                the current error-measurement period."
            ::= { sonetMediumEntry 2 }

        sonetMediumValidIntervals OBJECT-TYPE
            SYNTAX   Integer32 (0..96)
            MAX-ACCESS  read-only
```

```
        STATUS  current
        DESCRIPTION
           "The number of previous intervals for which valid
           data has been stored.  A SONET device must support
           at least n intervals.
           The minimum value of n is 4.
           The default of n is 32.
           The maximum value of n is 96.
           The value of this object will be n unless
           the device was brought online within the last
           (nx15) minutes, in which case the value will be the
           number of complete 15 minute intervals the device has
           been online."
        ::= { sonetMediumEntry 3 }

    sonetMediumLineCoding OBJECT-TYPE
        SYNTAX  INTEGER {
                    sonetMediumOther(1),
                    sonetMediumB3ZS(2),
                    sonetMediumCMI(3),
                    sonetMediumNRZ(4),
                    sonetMediumRZ(5)
                }
        MAX-ACCESS  read-only
        STATUS  current
        DESCRIPTION
           "This variable describes the line coding for
           this interface. The B3ZS and CMI are used for
           electrical SONET/SDH signals (STS-1 and STS-3).
           The Non-Return to Zero (NRZ) and the Return
           to Zero are used for optical SONET/SDH signals."
        ::= { sonetMediumEntry 4 }

    sonetMediumLineType OBJECT-TYPE
        SYNTAX  INTEGER {
                    sonetOther(1),
                    sonetShortSingleMode(2),
                    sonetLongSingleMode(3),
                    sonetMultiMode(4),
                    sonetCoax(5),
                    sonetUTP(6)
                }
        MAX-ACCESS  read-only
        STATUS  current
        DESCRIPTION
           "This variable describes the line type for
           this interface. The line types are
           Short and Long Range
```

             Single Mode fiber or Multi-Mode fiber interfaces,
             and coax and UTP for electrical interfaces. The
             value sonetOther should be used when the Line Type is
             not one of the listed values."
          ::= { sonetMediumEntry 5 }

      sonetMediumCircuitIdentifier OBJECT-TYPE
          SYNTAX DisplayString (SIZE (0..255))
          MAX-ACCESS read-only
          STATUS current
          DESCRIPTION
             "This variable contains the transmission
             vendor's circuit identifier, for the
             purpose of facilitating troubleshooting."
          ::= { sonetMediumEntry 6 }

      -- the SONET/SDH Section group

      -- this group consists of 2 tables:
      -- - the SONET/SDH Section Current Table
      -- - the SONET/SDH Section Interval Table

      -- the SONET/SDH Section Current Table

      -- The SONET/SDH Section
      -- current table contains various statistics
      -- being collected for the current 15 minute interval.

      sonetSectionCurrentTable OBJECT-TYPE
          SYNTAX SEQUENCE OF SonetSectionCurrentEntry
          MAX-ACCESS not-accessible
          STATUS current
          DESCRIPTION
             "The SONET/SDH Section Current table."
           ::= { sonetSection 1 }

      sonetSectionCurrentEntry OBJECT-TYPE
          SYNTAX SonetSectionCurrentEntry
          MAX-ACCESS not-accessible
          STATUS current
          DESCRIPTION
             "An entry in the SONET/SDH Section Current table."
          INDEX   { ifIndex }
           ::= { sonetSectionCurrentTable 1 }

```
        SonetSectionCurrentEntry ::=
            SEQUENCE {
                sonetSectionCurrentStatus    Integer32,
                sonetSectionCurrentESs       Gauge32,
                sonetSectionCurrentSESs      Gauge32,
                sonetSectionCurrentSEFSs     Gauge32,
                sonetSectionCurrentCVs       Gauge32
            }


        sonetSectionCurrentStatus OBJECT-TYPE
            SYNTAX   Integer32 (1..6)
            MAX-ACCESS   read-only
            STATUS   current
            DESCRIPTION
               "This variable indicates the
               status of the interface.
               The sonetSectionCurrentStatus
               is a bit map represented
               as a sum, therefore,
               it can represent multiple defects
               simultaneously.
               The sonetSectionNoDefect should be
               set if and only if
               no other flag is set.

               The various bit positions are:
                       1    sonetSectionNoDefect
                       2    sonetSectionLOS
                       4    sonetSectionLOF"
             ::= { sonetSectionCurrentEntry 1 }

        sonetSectionCurrentESs OBJECT-TYPE
            SYNTAX   Gauge32
            MAX-ACCESS   read-only
            STATUS   current
            DESCRIPTION
               "The counter associated with the number of Errored
               Seconds encountered by a SONET/SDH
               Section in the current 15 minute interval."
             ::= { sonetSectionCurrentEntry 2 }

        sonetSectionCurrentSESs OBJECT-TYPE
            SYNTAX   Gauge32
            MAX-ACCESS   read-only
            STATUS   current
            DESCRIPTION
               "The counter associated with the number of
```

```
              Severely Errored Seconds
              encountered by a SONET/SDH Section in the current 15
              minute interval."
            ::= { sonetSectionCurrentEntry 3 }

       sonetSectionCurrentSEFSs OBJECT-TYPE
           SYNTAX  Gauge32
           MAX-ACCESS  read-only
           STATUS  current
           DESCRIPTION
              "The counter associated with the number of
              Severely Errored Framing Seconds
              encountered by a SONET/SDH Section in the current
              15 minute interval."
           ::= { sonetSectionCurrentEntry 4 }

       sonetSectionCurrentCVs OBJECT-TYPE
           SYNTAX  Gauge32
           MAX-ACCESS  read-only
           STATUS  current
           DESCRIPTION
              "The counter associated with the number of Coding
              Violations encountered by a
              SONET/SDH Section in the current 15 minute interval."
            ::= { sonetSectionCurrentEntry 5 }


       -- the SONET/SDH Section Interval Table

       -- The SONET/SDH Section Interval Table
       -- contains various statistics
       -- collected by each system over a maximum
       -- of the previous 24 hours of
       -- operation.  The past 24 hours may be broken into 96
       -- completed 15 minute intervals.
       -- A system is required to store at
       -- least 4 completed 15 minute interval.
       -- The default value is 32 intervals.

       sonetSectionIntervalTable OBJECT-TYPE
           SYNTAX   SEQUENCE OF SonetSectionIntervalEntry
           MAX-ACCESS  not-accessible
           STATUS  current
           DESCRIPTION
              "The SONET/SDH Section Interval table."
            ::= { sonetSection 2 }

       sonetSectionIntervalEntry OBJECT-TYPE
```

```
            SYNTAX   SonetSectionIntervalEntry
            MAX-ACCESS   not-accessible
            STATUS   current
            DESCRIPTION
               "An entry in the SONET/SDH Section Interval table."
            INDEX   { ifIndex,
                       sonetSectionIntervalNumber }
             ::= { sonetSectionIntervalTable 1 }

        SonetSectionIntervalEntry ::=
            SEQUENCE {
                sonetSectionIntervalNumber  Integer32,
                sonetSectionIntervalESs     Gauge32,
                sonetSectionIntervalSESs    Gauge32,
                sonetSectionIntervalSEFSs   Gauge32,
                sonetSectionIntervalCVs     Gauge32
            }


        sonetSectionIntervalNumber OBJECT-TYPE
            SYNTAX   Integer32 (1..96)
            MAX-ACCESS   not-accessible
            STATUS   current
            DESCRIPTION
               "A number between 1 and 96, which identifies the
               interval for which the set of statistics is available.
               The interval identified by 1 is the most recently
               completed 15 minute interval,
               and the interval identified
               by N is the interval immediately preceding the
               one identified
               by N-1."
             ::= { sonetSectionIntervalEntry 1 }

        sonetSectionIntervalESs OBJECT-TYPE
            SYNTAX   Gauge32
            MAX-ACCESS   read-only
            STATUS   current
            DESCRIPTION
               "The counter associated with the number of
               Errored Seconds encountered
               by a SONET/SDH Section in a
               particular 15-minute interval
               in the past 24 hours."
             ::= { sonetSectionIntervalEntry 2 }

        sonetSectionIntervalSESs OBJECT-TYPE
            SYNTAX   Gauge32
```

```
        MAX-ACCESS  read-only
        STATUS  current
        DESCRIPTION
           "The counter associated with the number of
           Severely Errored Seconds
           encountered by a SONET/SDH Section in a
           particular 15-minute interval
           in the past 24 hours."
        ::= { sonetSectionIntervalEntry 3 }

    sonetSectionIntervalSEFSs OBJECT-TYPE
        SYNTAX  Gauge32
        MAX-ACCESS  read-only
        STATUS  current
        DESCRIPTION
           "The counter associated with the number of
           Severely Errored Framing Seconds
           encountered by a SONET/SDH Section in a
           particular 15-minute interval
           in the past 24 hours."
        ::= { sonetSectionIntervalEntry 4 }

    sonetSectionIntervalCVs OBJECT-TYPE
        SYNTAX  Gauge32
        MAX-ACCESS  read-only
        STATUS  current
        DESCRIPTION
           "The counter associated with the number of Coding
           Violations encountered by a
           SONET/SDH Section in a particular 15-minute interval
           in the past 24 hours."
        ::= { sonetSectionIntervalEntry 5 }


    -- the SONET/SDH Line group

    -- this group consists of 2 tables:
    -- - the SONET/SDH Line Current Table
    -- - the SONET/SDH Line Interval Table


    -- the SONET/SDH Line Current Table

    -- The SONET/SDH Line
    -- current table contains various statistics
    -- being collected for the current 15 minute interval.

    sonetLineCurrentTable OBJECT-TYPE
```

```
        SYNTAX   SEQUENCE OF SonetLineCurrentEntry
        MAX-ACCESS  not-accessible
        STATUS   current
        DESCRIPTION
          "The SONET/SDH Line Current table."
        ::= { sonetLine 1 }

    sonetLineCurrentEntry OBJECT-TYPE
        SYNTAX   SonetLineCurrentEntry
        MAX-ACCESS  not-accessible
        STATUS   current
        DESCRIPTION
          "An entry in the SONET/SDH Line Current table."
        INDEX   { ifIndex }
        ::= { sonetLineCurrentTable 1 }

    SonetLineCurrentEntry ::=
        SEQUENCE {
            sonetLineCurrentStatus    Integer32,
            sonetLineCurrentESs       Gauge32,
            sonetLineCurrentSESs      Gauge32,
            sonetLineCurrentCVs       Gauge32,
            sonetLineCurrentUASs      Gauge32
         }


    sonetLineCurrentStatus OBJECT-TYPE
        SYNTAX   Integer32 (1..6)
        MAX-ACCESS  read-only
        STATUS   current
        DESCRIPTION
           "This variable indicates the
           status of the interface.
           The sonetLineCurrentStatus
           is a bit map represented
           as a sum, therefore,
           it can represent multiple defects
           simultaneously.
           The sonetLineNoDefect should be
           set if and only if
           no other flag is set.

           The various bit positions are:
            1   sonetLineNoDefect
            2   sonetLineAIS
            4   sonetLineRDI"
         ::= { sonetLineCurrentEntry 1 }
```

```
        sonetLineCurrentESs OBJECT-TYPE
            SYNTAX  Gauge32
            MAX-ACCESS  read-only
            STATUS  current
            DESCRIPTION
             "The counter associated with the number of Errored
              Seconds encountered by a SONET/SDH
              Line in the current 15 minute interval."
            ::= { sonetLineCurrentEntry 2 }

        sonetLineCurrentSESs OBJECT-TYPE
            SYNTAX  Gauge32
            MAX-ACCESS  read-only
            STATUS  current
            DESCRIPTION
             "The counter associated with the number of
              Severely Errored Seconds
              encountered by a SONET/SDH Line in the current 15
              minute
              interval."
            ::= { sonetLineCurrentEntry 3 }

        sonetLineCurrentCVs OBJECT-TYPE
            SYNTAX  Gauge32
            MAX-ACCESS  read-only
            STATUS  current
            DESCRIPTION
             "The counter associated with the number of Coding
              Violations encountered by a
              SONET/SDH Line in the current 15 minute interval."
            ::= { sonetLineCurrentEntry 4 }

        sonetLineCurrentUASs OBJECT-TYPE
            SYNTAX  Gauge32
            MAX-ACCESS  read-only
            STATUS  current
            DESCRIPTION
             "The counter associated with the number of
              Unavailable Seconds
              encountered by a SONET/SDH Line in the current 15
              minute
              interval."
             ::= { sonetLineCurrentEntry 5 }


        -- the SONET/SDH Line Interval Table

        -- The SONET/SDH Line Interval Table
```

```
        -- contains various statistics
        -- collected by each system over a maximum
        -- of the previous 24 hours of
        -- operation.  The past 24 hours may be broken into 96
        -- completed 15 minute intervals.
        -- A system is required to store at
        -- least 4 completed 15 minute interval.
        -- The default value is 32 intervals.

        sonetLineIntervalTable OBJECT-TYPE
            SYNTAX   SEQUENCE OF SonetLineIntervalEntry
            MAX-ACCESS  not-accessible
            STATUS   current
            DESCRIPTION
               "The SONET/SDH Line Interval table."
             ::= { sonetLine 2 }

        sonetLineIntervalEntry OBJECT-TYPE
            SYNTAX   SonetLineIntervalEntry
            MAX-ACCESS  not-accessible
            STATUS   current
            DESCRIPTION
               "An entry in the SONET/SDH Line Interval table."
            INDEX   { ifIndex,
                       sonetLineIntervalNumber }
           ::= { sonetLineIntervalTable 1 }

        SonetLineIntervalEntry ::=
            SEQUENCE {
                sonetLineIntervalNumber     Integer32,
                sonetLineIntervalESs        Gauge32,
                sonetLineIntervalSESs       Gauge32,
                sonetLineIntervalCVs        Gauge32,
                sonetLineIntervalUASs       Gauge32
            }


        sonetLineIntervalNumber OBJECT-TYPE
            SYNTAX   Integer32 (1..96)
            MAX-ACCESS  not-accessible
            STATUS   current
            DESCRIPTION
                "A number between 1 and 96, which identifies the
                interval for which the set of statistics is available.
                The interval identified by 1 is the most recently
                completed 15 minute interval,
                and the interval identified
                by N is the interval immediately preceding the
```

```
                     one identified
                       by N-1."
                   ::= { sonetLineIntervalEntry 1 }

            sonetLineIntervalESs OBJECT-TYPE
                SYNTAX  Gauge32
                MAX-ACCESS  read-only
                STATUS  current
                DESCRIPTION
                   "The counter associated with the number of
                    Errored Seconds encountered
                    by a SONET/SDH Line in a
                    particular 15-minute interval
                    in the past 24 hours."
                  ::= { sonetLineIntervalEntry 2 }

            sonetLineIntervalSESs OBJECT-TYPE
                SYNTAX  Gauge32
                MAX-ACCESS  read-only
                STATUS  current
                DESCRIPTION
                   "The counter associated with the number of
                    Severely Errored Seconds
                    encountered by a SONET/SDH Line in a
                    particular 15-minute interval
                    in the past 24 hours."
                  ::= { sonetLineIntervalEntry 3 }

            sonetLineIntervalCVs OBJECT-TYPE
                SYNTAX  Gauge32
                MAX-ACCESS  read-only
                STATUS  current
                DESCRIPTION
                  "The counter associated with the number of Coding
                   Violations encountered by a
                   SONET/SDH Line in a
                   particular 15-minute interval
                   in the past 24 hours."
                ::= { sonetLineIntervalEntry 4 }

            sonetLineIntervalUASs OBJECT-TYPE
                SYNTAX  Gauge32
                MAX-ACCESS  read-only
                STATUS  current
                DESCRIPTION
                  "The counter associated with the
                   number of Unavailable Seconds
                   encountered by a SONET/SDH Line in
```

              a particular 15-minute interval
              in the past 24 hours."
           ::= { sonetLineIntervalEntry 5 }

         -- The SONET/SDH Far End Line group.
         -- This group may only be implemented by SONET/SDH (LTEs)
         -- systems that provide for a far end block error (FEBE)
         -- information at the SONET/SDH Line Layer.

         -- This group consists of two tables:
         --   SONET/SDH Far End Line Current Table
         --   SONET/SDH Far End Line Interval Table

         -- The SONET/SDH Far End Line Current Table

         -- The SONET/SDH Far End Line Current table contains
         -- various statistics being
         -- collected for the current 15 minute interval.
         -- The statistics are collected from the far end
         -- block error code (FEBE)
         -- within the third Z2 byte of the Line Overhead
         -- in Broadband ISDN applications.
         -- The definitions are the same as described for
         -- the near-end information.

         sonetFarEndLineCurrentTable OBJECT-TYPE
             SYNTAX   SEQUENCE OF SonetFarEndLineCurrentEntry
             MAX-ACCESS not-accessible
             STATUS   current
             DESCRIPTION
               "The SONET/SDH Far End Line Current table."
             ::= { sonetFarEndLine 1 }

         sonetFarEndLineCurrentEntry OBJECT-TYPE
             SYNTAX   SonetFarEndLineCurrentEntry
             MAX-ACCESS not-accessible
             STATUS   current
             DESCRIPTION
               "An entry in the SONET/SDH Far End Line Current table."
             INDEX   { ifIndex }
             ::= { sonetFarEndLineCurrentTable 1 }

         SonetFarEndLineCurrentEntry ::=
             SEQUENCE {
                 sonetFarEndLineCurrentESs   Gauge32,

```
                     sonetFarEndLineCurrentSESs      Gauge32,
                     sonetFarEndLineCurrentCVs       Gauge32,
                     sonetFarEndLineCurrentUASs      Gauge32
                  }


          sonetFarEndLineCurrentESs OBJECT-TYPE
             SYNTAX  Gauge32
             MAX-ACCESS  read-only
             STATUS  current
             DESCRIPTION
                "The counter associated with the number of Far
                Far End Errored Seconds encountered by a SONET/SDH
                interface in the current 15 minute interval."
             ::= { sonetFarEndLineCurrentEntry 1 }

          sonetFarEndLineCurrentSESs OBJECT-TYPE
             SYNTAX  Gauge32
             MAX-ACCESS  read-only
             STATUS  current
             DESCRIPTION
                "The counter associated with the number of
                Far End Severely Errored Seconds
                encountered by a SONET/SDH Medium/Section/Line
                interface in the current 15 minute
                interval."
             ::= { sonetFarEndLineCurrentEntry 2 }

          sonetFarEndLineCurrentCVs OBJECT-TYPE
             SYNTAX  Gauge32
             MAX-ACCESS  read-only
             STATUS  current
             DESCRIPTION
                "The counter associated with the number of
                Far End Coding Violations reported via
                the far end block error count
                encountered by a
                SONET/SDH Medium/Section/Line
                interface in the current 15 minute interval."
             ::= { sonetFarEndLineCurrentEntry 3 }

          sonetFarEndLineCurrentUASs OBJECT-TYPE
             SYNTAX  Gauge32
             MAX-ACCESS  read-only
             STATUS  current
             DESCRIPTION
                "The counter associated with the number of
                Far End Unavailable Seconds
```

```
                encountered by a
                SONET/SDH Medium/Section/Line
                interface in the current 15 minute interval."
          ::= { sonetFarEndLineCurrentEntry 4 }


       -- The SONET/SDH Far End Line Interval Table

       -- The SONET/SDH Far End Line Interval Table
       -- contains various statistics
       -- collected by each system over a maximum
       -- of the previous 24 hours of
       -- operation.  The past 24 hours may be broken into 96
       -- completed 15 minute intervals.
       -- A system is required to store at
       -- least 4 completed 15 minute interval.
       -- The default value is 32 intervals.

       sonetFarEndLineIntervalTable OBJECT-TYPE
          SYNTAX   SEQUENCE OF SonetFarEndLineIntervalEntry
          MAX-ACCESS  not-accessible
          STATUS  current
          DESCRIPTION
            "The SONET/SDH Far End Line Interval table."
          ::= { sonetFarEndLine 2 }

       sonetFarEndLineIntervalEntry OBJECT-TYPE
          SYNTAX   SonetFarEndLineIntervalEntry
          MAX-ACCESS  not-accessible
          STATUS  current
          DESCRIPTION
            "An entry in the SONET/SDH Far
            End Line Interval table."
          INDEX   { ifIndex,
                    sonetFarEndLineIntervalNumber }
          ::= { sonetFarEndLineIntervalTable 1 }

       SonetFarEndLineIntervalEntry ::=
           SEQUENCE {
               sonetFarEndLineIntervalNumber     Integer32,
               sonetFarEndLineIntervalESs        Gauge32,
               sonetFarEndLineIntervalSESs       Gauge32,
               sonetFarEndLineIntervalCVs        Gauge32,
               sonetFarEndLineIntervalUASs       Gauge32
           }


       sonetFarEndLineIntervalNumber OBJECT-TYPE
```

```
        SYNTAX   Integer32 (1..96)
        MAX-ACCESS  not-accessible
        STATUS   current
        DESCRIPTION
             "A number between 1 and 96, which identifies the
             interval for which the set of statistics is available.
             The interval identified by 1 is the most recently
             completed 15 minute interval,
             and the interval identified
             by N is the interval immediately preceding the
             one identified
             by N-1."
        ::= { sonetFarEndLineIntervalEntry 1 }

    sonetFarEndLineIntervalESs OBJECT-TYPE
       SYNTAX  Gauge32
       MAX-ACCESS  read-only
       STATUS   current
       DESCRIPTION
             "The counter associated with the number of
             Far End Errored Seconds encountered
             by a SONET/SDH Line
             interface in a particular 15-minute interval
             in the past 24 hours."
      ::= { sonetFarEndLineIntervalEntry 2 }

    sonetFarEndLineIntervalSESs OBJECT-TYPE
       SYNTAX  Gauge32
       MAX-ACCESS  read-only
       STATUS   current
       DESCRIPTION
             "The counter associated with the number of
             Far End Severely Errored Seconds
             encountered by a SONET/SDH Line
             interface in a particular 15-minute interval
             in the past 24 hours."
      ::= { sonetFarEndLineIntervalEntry 3 }

    sonetFarEndLineIntervalCVs OBJECT-TYPE
        SYNTAX  Gauge32
       MAX-ACCESS  read-only
       STATUS   current
       DESCRIPTION
             "The counter associated with the number of
             Far End Coding Violations reported via
             the far end block error count
             encountered by a
             SONET/SDH Line
```

                interface in a particular 15-minute interval
                in the past 24 hours."
           ::= { sonetFarEndLineIntervalEntry 4 }

        sonetFarEndLineIntervalUASs OBJECT-TYPE
           SYNTAX Gauge32
           MAX-ACCESS read-only
           STATUS current
           DESCRIPTION
               "The counter associated with the number of
               Far End Unavailable Seconds
               encountered by a
               SONET/SDH Line
               interface in a particular 15-minute interval
               in the past 24 hours."
           ::= { sonetFarEndLineIntervalEntry 5 }

        -- the SONET/SDH Path group

        -- this group consists of 2 tables:
        -- - the SONET/SDH Path Current Table
        -- - the SONET/SDH Path Interval Table

        -- the SONET/SDH Path Current Table

        -- The SONET/SDH Path
        -- current table contains various statistics
        -- being collected for the current 15 minute interval.

        sonetPathCurrentTable OBJECT-TYPE
            SYNTAX   SEQUENCE OF SonetPathCurrentEntry
            MAX-ACCESS not-accessible
            STATUS current
            DESCRIPTION
             "The SONET/SDH Path Current table."
        ::= { sonetPath 1 }

        sonetPathCurrentEntry OBJECT-TYPE
            SYNTAX   SonetPathCurrentEntry
            MAX-ACCESS not-accessible
            STATUS current
            DESCRIPTION
             "An entry in the SONET/SDH Path Current table."
            INDEX   { ifIndex }
        ::= { sonetPathCurrentTable 1 }

```
        SonetPathCurrentEntry ::=
            SEQUENCE {
                sonetPathCurrentWidth         INTEGER,
                sonetPathCurrentStatus        Integer32,
                sonetPathCurrentESs           Gauge32,
                sonetPathCurrentSESs          Gauge32,
                sonetPathCurrentCVs           Gauge32,
                sonetPathCurrentUASs          Gauge32
            }


        sonetPathCurrentWidth OBJECT-TYPE
            SYNTAX   INTEGER  {
                    sts1(1),
                    sts3cSTM1(2),
                    sts12cSTM4(3),
                    sts24c(4),
                    sts48cSTM16(5)
             }
            MAX-ACCESS  read-write
            STATUS   current
            DESCRIPTION
             "A value that indicates the type of the SONET/SDH
              Path.  For SONET, the assigned types are
              the STS-Nc SPEs, where N = 1, 3, 12, 24, and 48.
              STS-1 is equal to 51.84 Mbps.  For SDH, the assigned
              types are the STM-Nc VCs, where N = 1, 4, and 16."
        ::= { sonetPathCurrentEntry 1 }

        sonetPathCurrentStatus OBJECT-TYPE
            SYNTAX   Integer32 (1..14)
            MAX-ACCESS  read-only
            STATUS   current
            DESCRIPTION
              "This variable indicates the
               status of the interface.
               The sonetPathCurrentStatus
               is a bit map represented
               as a sum, therefore,
               it can represent multiple defects
               simultaneously.
               The sonetPathNoDefect should be
               set if and only if
               no other flag is set.

               The various bit positions are:
                   1    sonetPathNoDefect
                   2    sonetPathSTSLOP
```

```
                 4     sonetPathSTSAIS
                 8     sonetPathSTSRDI
                16     sonetPathUnequipped
                32     sonetPathSignalLabelMismatch"
         ::= { sonetPathCurrentEntry 2 }

         sonetPathCurrentESs OBJECT-TYPE
             SYNTAX  Gauge32
             MAX-ACCESS  read-only
             STATUS  current
             DESCRIPTION
              "The counter associated with the number of Errored
               Seconds encountered by a SONET/SDH
               Path in the current 15 minute interval."
         ::= { sonetPathCurrentEntry 3 }

         sonetPathCurrentSESs OBJECT-TYPE
             SYNTAX  Gauge32
             MAX-ACCESS  read-only
             STATUS  current
             DESCRIPTION
              "The counter associated with the number of
               Severely Errored Seconds
               encountered by a SONET/SDH Path in the current 15
               minute
               interval."
         ::= { sonetPathCurrentEntry 4 }

         sonetPathCurrentCVs OBJECT-TYPE
             SYNTAX  Gauge32
             MAX-ACCESS  read-only
             STATUS  current
             DESCRIPTION
              "The counter associated with the number of Coding
               Violations encountered by a
               SONET/SDH Path in the current 15 minute interval."
         ::= { sonetPathCurrentEntry 5 }

         sonetPathCurrentUASs OBJECT-TYPE
             SYNTAX  Gauge32
             MAX-ACCESS  read-only
             STATUS  current
             DESCRIPTION
              "The counter associated with the number of
               Unavailable Seconds
               encountered by a Path in the current
               15 minute, interval."
         ::= { sonetPathCurrentEntry 6 }
```

          -- the SONET/SDH Path Interval Table

          -- The SONET/SDH Path Interval Table
          -- contains various statistics
          -- collected by each system over a maximum
          -- of the previous 24 hours of
          -- operation. The past 24 hours may be broken into 96
          -- completed 15 minute intervals.
          -- A system is required to store at
          -- least 4 completed 15 minute interval.
          -- The default value is 32 intervals.

          sonetPathIntervalTable OBJECT-TYPE
              SYNTAX   SEQUENCE OF SonetPathIntervalEntry
              MAX-ACCESS not-accessible
              STATUS   current
              DESCRIPTION
               "The SONET/SDH Path Interval table."
          ::= { sonetPath 2 }

          sonetPathIntervalEntry OBJECT-TYPE
              SYNTAX   SonetPathIntervalEntry
              MAX-ACCESS not-accessible
              STATUS   current
              DESCRIPTION
               "An entry in the SONET/SDH Path Interval table."
              INDEX   { ifIndex,
                        sonetPathIntervalNumber }
          ::= { sonetPathIntervalTable 1 }

          SonetPathIntervalEntry ::=
              SEQUENCE {
                  sonetPathIntervalNumber   Integer32,
                  sonetPathIntervalESs   Gauge32,
                  sonetPathIntervalSESs   Gauge32,
                  sonetPathIntervalCVs   Gauge32,
                  sonetPathIntervalUASs   Gauge32
              }

          sonetPathIntervalNumber OBJECT-TYPE
              SYNTAX   Integer32 (1..96)
              MAX-ACCESS not-accessible
              STATUS   current
              DESCRIPTION
                 "A number between 1 and 96, which identifies the
                 interval for which the set of statistics is available.

         The interval identified by 1 is the most recently
         completed 15 minute interval,
         and the interval identified
         by N is the interval immediately preceding the
         one identified
         by N-1."
    ::= { sonetPathIntervalEntry 1 }

    sonetPathIntervalESs OBJECT-TYPE
        SYNTAX Gauge32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
         "The counter associated with the number of
         Errored Seconds encountered
         by a SONET/SDH Path in a
         particular 15-minute interval
         in the past 24 hours."
    ::= { sonetPathIntervalEntry 2 }

    sonetPathIntervalSESs OBJECT-TYPE
        SYNTAX Gauge32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
         "The counter associated with the number of
         Severely Errored Seconds
         encountered by a SONET/SDH Path in
         a particular 15-minute interval
         in the past 24 hours."
    ::= { sonetPathIntervalEntry 3 }

    sonetPathIntervalCVs OBJECT-TYPE
        SYNTAX Gauge32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
         "The counter associated with the number of Coding
         Violations encountered by a
         SONET/SDH Path in a particular 15-minute interval
         in the past 24 hours."
    ::= { sonetPathIntervalEntry 4 }

    sonetPathIntervalUASs OBJECT-TYPE
        SYNTAX Gauge32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION

```
        "The counter associated with the number of
        Unavailable Seconds
        encountered by a Path in a
        particular 15-minute interval
        in the past 24 hours."
    ::= { sonetPathIntervalEntry 5 }


    -- The SONET/SDH Far End Path group

    -- This group consists of two tables:
    --  - SONET/SDH Far End Path Current Table
    --  - SONET/SDH Far End Path Interval Table

    -- The SONET/SDH Far End Path Current Table

    -- The SONET/SDH Far End Path Current table
    -- contains various statistics
    -- being collected for the current 15 minute interval.
    -- The statistics are collected from
    -- the far end block error code
    -- (FEBE) within the G1 byte of the Path Overhead.
    -- The definitions are the same as described for
    -- the near-end information.

    sonetFarEndPathCurrentTable OBJECT-TYPE
        SYNTAX   SEQUENCE OF SonetFarEndPathCurrentEntry
        MAX-ACCESS  not-accessible
        STATUS   current
        DESCRIPTION
            "The SONET/SDH Far End Path Current table."
        ::= { sonetFarEndPath 1 }

    sonetFarEndPathCurrentEntry OBJECT-TYPE
        SYNTAX   SonetFarEndPathCurrentEntry
        MAX-ACCESS  not-accessible
        STATUS   current
        DESCRIPTION
            "An entry in the SONET/SDH Far End Path Current table."
        INDEX   { ifIndex }
        ::= { sonetFarEndPathCurrentTable 1 }

    SonetFarEndPathCurrentEntry ::=
        SEQUENCE {
            sonetFarEndPathCurrentESs        Gauge32,
            sonetFarEndPathCurrentSESs       Gauge32,
            sonetFarEndPathCurrentCVs        Gauge32,
            sonetFarEndPathCurrentUASs       Gauge32
```

```
            }


        sonetFarEndPathCurrentESs OBJECT-TYPE
            SYNTAX   Gauge32
            MAX-ACCESS   read-only
            STATUS   current
            DESCRIPTION
                 "The counter associated with the number of Far
                  Far End Errored Seconds encountered by a SONET/SDH
                  interface in the current 15 minute interval."
            ::= { sonetFarEndPathCurrentEntry 1 }


        sonetFarEndPathCurrentSESs OBJECT-TYPE
            SYNTAX   Gauge32
            MAX-ACCESS   read-only
            STATUS   current
            DESCRIPTION
                 "The counter associated with the number of
                  Far End Severely Errored Seconds
                  encountered by a SONET/SDH Path
                  interface in the current 15 minute
                  interval."
            ::= { sonetFarEndPathCurrentEntry 2 }


        sonetFarEndPathCurrentCVs OBJECT-TYPE
            SYNTAX   Gauge32
            MAX-ACCESS   read-only
            STATUS   current
            DESCRIPTION
                 "The counter associated with the number of
                  Far End Coding Violations reported via
                  the far end block error count
                  encountered by a
                  SONET/SDH Path interface in
                  the current 15 minute interval."
             ::= { sonetFarEndPathCurrentEntry 3 }


        sonetFarEndPathCurrentUASs OBJECT-TYPE
           SYNTAX   Gauge32
           MAX-ACCESS   read-only
           STATUS   current
           DESCRIPTION
               "The counter associated with the number of
                Far End Unavailable Seconds
                encountered by a
                SONET/SDH Path interface in
                the current 15 minute interval."
```

```
             ::= { sonetFarEndPathCurrentEntry 4 }


        -- The SONET/SDH Far End Path Interval Table

        -- The SONET/SDH Far End Path Interval Table
        -- contains various statistics
        -- collected by each system over a maximum
        -- of the previous 24 hours of
        -- operation.  The past 24 hours may be broken into 96
        -- completed 15 minute intervals.
        -- A system is required to store at
        -- least 4 completed 15 minute interval.
        -- The default value is 32 intervals.

        sonetFarEndPathIntervalTable OBJECT-TYPE
            SYNTAX   SEQUENCE OF SonetFarEndPathIntervalEntry
            MAX-ACCESS  not-accessible
            STATUS   current
            DESCRIPTION
                "The SONET/SDH Far End Path Interval table."
            ::= { sonetFarEndPath 2 }

        sonetFarEndPathIntervalEntry OBJECT-TYPE
            SYNTAX   SonetFarEndPathIntervalEntry
            MAX-ACCESS  not-accessible
            STATUS   current
            DESCRIPTION
                "An entry in the SONET/SDH Far
                End Path Interval table."
            INDEX    { ifIndex,
                       sonetFarEndPathIntervalNumber }
            ::= { sonetFarEndPathIntervalTable 1 }

        SonetFarEndPathIntervalEntry ::=
            SEQUENCE {
                sonetFarEndPathIntervalNumber      Integer32,
                sonetFarEndPathIntervalESs         Gauge32,
                sonetFarEndPathIntervalSESs        Gauge32,
                sonetFarEndPathIntervalCVs         Gauge32,
                sonetFarEndPathIntervalUASs        Gauge32
            }


        sonetFarEndPathIntervalNumber OBJECT-TYPE
            SYNTAX   Integer32 (1..96)
            MAX-ACCESS  not-accessible
            STATUS   current
```

```
        DESCRIPTION
              "A number between 1 and 96, which identifies the
              interval for which the set of statistics is available.
              The interval identified by 1 is the most recently
              completed 15 minute interval,
              and the interval identified
              by N is the interval immediately preceding the
              one identified
              by N-1."
        ::= { sonetFarEndPathIntervalEntry 1 }

   sonetFarEndPathIntervalESs OBJECT-TYPE
      SYNTAX  Gauge32
      MAX-ACCESS  read-only
      STATUS  current
      DESCRIPTION
              "The counter associated with the number of
              Far End Errored Seconds encountered
              by a SONET/SDH Path interface in a
              particular 15-minute interval
              in the past 24 hours."
        ::= { sonetFarEndPathIntervalEntry 2 }

   sonetFarEndPathIntervalSESs OBJECT-TYPE
      SYNTAX  Gauge32
      MAX-ACCESS  read-only
      STATUS  current
      DESCRIPTION
              "The counter associated with the number of
              Far End Severely Errored Seconds
              encountered by a SONET/SDH Path interface
              in a particular 15-minute interval
              in the past 24 hours."
        ::= { sonetFarEndPathIntervalEntry 3 }

   sonetFarEndPathIntervalCVs OBJECT-TYPE
       SYNTAX  Gauge32
       MAX-ACCESS  read-only
       STATUS  current
       DESCRIPTION
               "The counter associated with the number of
               Far End Coding Violations reported via
               the far end block error count
               encountered by a
               SONET/SDH Path interface
               in a particular 15-minute interval
               in the past 24 hours."
        ::= { sonetFarEndPathIntervalEntry 4 }
```

```
        sonetFarEndPathIntervalUASs OBJECT-TYPE
           SYNTAX   Gauge32
           MAX-ACCESS   read-only
           STATUS   current
           DESCRIPTION
               "The counter associated with the number of
               Far End Unavailable Seconds
               encountered by a
               SONET/SDH Path interface in
               a particular 15-minute interval
               in the past 24 hours."
           ::= { sonetFarEndPathIntervalEntry 5 }


        -- the SONET/SDH Virtual Tributary group

        -- this group consists of 2 tables:
        -- - the SONET/SDH VT Current Table
        -- - the SONET/SDH VT Interval Table

        -- For SDH signals, virtual tributaries are
        -- called VCs instead of VTs

        -- A VT1.5 = VC11
        -- A VT2 = VC12
        -- A VT3 = none
        -- A VT6 = VC3


        -- the SONET/SDH VT Current Table

        -- The SONET/SDH VT current table
        -- contains various statistics
        -- being collected for the
        -- current 15 minute interval.

        sonetVTCurrentTable OBJECT-TYPE
            SYNTAX   SEQUENCE OF SonetVTCurrentEntry
            MAX-ACCESS   not-accessible
            STATUS   current
            DESCRIPTION
             "The SONET/SDH VT Current table."
        ::= { sonetVT 1 }

        sonetVTCurrentEntry OBJECT-TYPE
            SYNTAX   SonetVTCurrentEntry
            MAX-ACCESS   not-accessible
            STATUS   current
```

```
        DESCRIPTION
         "An entry in the SONET/SDH VT Current table."
        INDEX   { ifIndex }
    ::= { sonetVTCurrentTable 1 }

    SonetVTCurrentEntry ::=
        SEQUENCE {
            sonetVTCurrentWidth       INTEGER,
            sonetVTCurrentStatus      Integer32,
            sonetVTCurrentESs         Gauge32,
            sonetVTCurrentSESs        Gauge32,
            sonetVTCurrentCVs         Gauge32,
            sonetVTCurrentUASs        Gauge32
        }


    sonetVTCurrentWidth OBJECT-TYPE
        SYNTAX   INTEGER {
                vtWidth15VC11(1),
                vtWidth2VC12(2),
                vtWidth3(3),
                vtWidth6VC2(4),
                vtWidth6c(5)
            }
        MAX-ACCESS  read-write
        STATUS   current
        DESCRIPTION
        "A value that indicates the type of the SONET
         VT and SDH VC.  Assigned widths are
         VT1.5/VC11, VT2/VC12, VT3, VT6/VC2, and VT6c."
    ::= { sonetVTCurrentEntry 1 }

    sonetVTCurrentStatus OBJECT-TYPE
        SYNTAX   Integer32 (1..30)
        MAX-ACCESS  read-only
        STATUS   current
        DESCRIPTION
          "This variable indicates the
           status of the interface.
           The sonetVTCurrentStatus
           is a bit map represented
           as a sum, therefore,
           it can represent multiple defects
           and failures
           simultaneously.
           The sonetVTNoDefect should be
           set if and only if
           no other flag is set.
```

            The various bit positions are:
                 1   sonetVTNoDefect
                 2   sonetVTLOP
                 4   sonetVTPathAIS
                 8   sonetVTPathRDI
                16   sonetVTPathRFI
                32   sonetVTUnequipped
                64   sonetVTSignalLabelMismatch"
        ::= { sonetVTCurrentEntry 2 }

        sonetVTCurrentESs OBJECT-TYPE
            SYNTAX   Gauge32
            MAX-ACCESS   read-only
            STATUS   current
            DESCRIPTION
             "The counter associated with the number of Errored
              Seconds encountered by a SONET/SDH
              VT in the current 15 minute interval."
        ::= { sonetVTCurrentEntry 3 }

        sonetVTCurrentSESs OBJECT-TYPE
            SYNTAX   Gauge32
            MAX-ACCESS   read-only
            STATUS   current
            DESCRIPTION
             "The counter associated with the number of
              Severely Errored Seconds
              encountered by a SONET/SDH VT in the current 15 minute
              interval."
        ::= { sonetVTCurrentEntry 4 }

        sonetVTCurrentCVs OBJECT-TYPE
            SYNTAX   Gauge32
            MAX-ACCESS   read-only
            STATUS   current
            DESCRIPTION
             "The counter associated with the number of Coding
              Violations encountered by a
              SONET/SDH VT in the current 15 minute interval."
        ::= { sonetVTCurrentEntry 5 }

        sonetVTCurrentUASs OBJECT-TYPE
            SYNTAX   Gauge32
            MAX-ACCESS   read-only
            STATUS   current
            DESCRIPTION
             "The counter associated with the number of
              Unavailable Seconds

```
          encountered by a VT in the current
          15 minute, interval."
       ::= { sonetVTCurrentEntry 6 }


       -- the SONET/SDH VT Interval Table

       -- The SONET/SDH VT Interval Table
       -- contains various statistics
       -- collected by each system over a maximum
       -- of the previous 24 hours of
       -- operation.  The past 24 hours may be broken into 96
       -- completed 15 minute intervals.
       -- A system is required to store at
       -- least 4 completed 15 minute interval.
       -- The default value is 32 intervals.

       sonetVTIntervalTable OBJECT-TYPE
           SYNTAX   SEQUENCE OF SonetVTIntervalEntry
           MAX-ACCESS  not-accessible
           STATUS  current
           DESCRIPTION
            "The SONET/SDH VT Interval table."
       ::= { sonetVT 2 }

       sonetVTIntervalEntry OBJECT-TYPE
           SYNTAX   SonetVTIntervalEntry
           MAX-ACCESS  not-accessible
           STATUS  current
           DESCRIPTION
            "An entry in the SONET/SDH VT Interval table."
           INDEX   { ifIndex,
                     sonetVTIntervalNumber }
       ::= { sonetVTIntervalTable 1 }

       SonetVTIntervalEntry ::=
           SEQUENCE {
               sonetVTIntervalNumber       Integer32,
               sonetVTIntervalESs          Gauge32,
               sonetVTIntervalSESs         Gauge32,
               sonetVTIntervalCVs          Gauge32,
               sonetVTIntervalUASs         Gauge32
           }


       sonetVTIntervalNumber OBJECT-TYPE
           SYNTAX   Integer32 (1..96)
           MAX-ACCESS  not-accessible
```

```
                      STATUS  current
                      DESCRIPTION
                        "A number between 1 and 96, which identifies the
                        interval for which the set of statistics is available.
                        The interval identified by 1 is the most recently
                        completed 15 minute interval,
                        and the interval identified
                        by N is the interval immediately preceding the
                        one identified
                        by N-1."
                  ::= { sonetVTIntervalEntry 1 }

              sonetVTIntervalESs OBJECT-TYPE
                  SYNTAX  Gauge32
                  MAX-ACCESS  read-only
                  STATUS  current
                  DESCRIPTION
                    "The counter associated with the number of
                     Errored Seconds encountered
                     by a SONET/SDH VT in a particular 15-minute interval
                     in the past 24 hours."
                  ::= { sonetVTIntervalEntry 2 }

              sonetVTIntervalSESs OBJECT-TYPE
                  SYNTAX  Gauge32
                  MAX-ACCESS  read-only
                  STATUS  current
                  DESCRIPTION
                    "The counter associated with the number of
                     Severely Errored Seconds
                     encountered by a SONET/SDH VT
                     in a particular 15-minute interval
                     in the past 24 hours."
                  ::= { sonetVTIntervalEntry 3 }

              sonetVTIntervalCVs OBJECT-TYPE
                  SYNTAX  Gauge32
                  MAX-ACCESS  read-only
                  STATUS  current
                  DESCRIPTION
                    "The counter associated with the number of Coding
                     Violations encountered by a
                     SONET/SDH VT in a particular 15-minute interval
                     in the past 24 hours."
                  ::= { sonetVTIntervalEntry 4 }

              sonetVTIntervalUASs OBJECT-TYPE
                  SYNTAX  Gauge32
```

```
        MAX-ACCESS  read-only
        STATUS  current
        DESCRIPTION
         "The counter associated with the number of
          Unavailable Seconds
          encountered by a VT in a particular 15-minute interval
          in the past 24 hours."
     ::= { sonetVTIntervalEntry 5 }


    -- The SONET/SDH Far End VT group

    -- This group consists of two tables:
    --     SONET/SDH Far End VT Current Table
    --     SONET/SDH Far End VT Interval Table


    -- The SONET/SDH Far End VT Current

    -- The SONET/SDH Far End VT Current table
    -- contains various statistics
    -- being collected for the current 15 minute interval.
    -- The statistics are collected from
    -- the far end block error code
    -- (FEBE) within the G1 byte of the VT Overhead.
    -- The definitions are the same as described for
    -- the near-end information.

    sonetFarEndVTCurrentTable OBJECT-TYPE
        SYNTAX  SEQUENCE OF SonetFarEndVTCurrentEntry
        MAX-ACCESS  not-accessible
        STATUS  current
        DESCRIPTION
            "The SONET/SDH Far End VT Current table."
        ::= { sonetFarEndVT 1 }

    sonetFarEndVTCurrentEntry OBJECT-TYPE
        SYNTAX  SonetFarEndVTCurrentEntry
        MAX-ACCESS  not-accessible
        STATUS  current
        DESCRIPTION
            "An entry in the SONET/SDH Far End VT Current table."
        INDEX   { ifIndex }
        ::= { sonetFarEndVTCurrentTable 1 }

    SonetFarEndVTCurrentEntry ::=
        SEQUENCE {
            sonetFarEndVTCurrentESs        Gauge32,
```

```
                    sonetFarEndVTCurrentSESs        Gauge32,
                    sonetFarEndVTCurrentCVs         Gauge32,
                    sonetFarEndVTCurrentUASs        Gauge32
               }


         sonetFarEndVTCurrentESs OBJECT-TYPE
             SYNTAX  Gauge32
             MAX-ACCESS  read-only
             STATUS  current
             DESCRIPTION
                 "The counter associated with the number of Far
                 Far End Errored Seconds encountered by a SONET/SDH
                 interface in the current 15 minute interval."
         ::= { sonetFarEndVTCurrentEntry 1 }

         sonetFarEndVTCurrentSESs OBJECT-TYPE
             SYNTAX  Gauge32
             MAX-ACCESS  read-only
             STATUS  current
             DESCRIPTION
                 "The counter associated with the number of
                 Far End Severely Errored Seconds
                 encountered by a SONET/SDH VT interface
                 in the current 15 minute
                 interval."
             ::= { sonetFarEndVTCurrentEntry 2 }

         sonetFarEndVTCurrentCVs OBJECT-TYPE
             SYNTAX  Gauge32
             MAX-ACCESS  read-only
             STATUS  current
             DESCRIPTION
                 "The counter associated with the number of
                 Far End Coding Violations reported via
                 the far end block error count
                 encountered by a
                 SONET/SDH VT interface
                 in the current 15 minute interval."
             ::= { sonetFarEndVTCurrentEntry 3 }

         sonetFarEndVTCurrentUASs OBJECT-TYPE
            SYNTAX  Gauge32
            MAX-ACCESS  read-only
            STATUS  current
            DESCRIPTION
               "The counter associated with the number of
               Far End Unavailable Seconds
```

                 encountered by a
                 SONET/SDH VT interface
                 in the current 15 minute interval."
              ::= { sonetFarEndVTCurrentEntry 4 }

         -- The SONET/SDH Far End VT Interval Table

         -- The SONET/SDH Far End VT Interval Table
         -- contains various statistics
         -- collected by each system over a maximum
         -- of the previous 24 hours of
         -- operation. The past 24 hours may be broken into 96
         -- completed 15 minute intervals.
         -- A system is required to store at
         -- least 4 completed 15 minute interval.
         -- The default value is 32 intervals.

         sonetFarEndVTIntervalTable OBJECT-TYPE
             SYNTAX   SEQUENCE OF SonetFarEndVTIntervalEntry
             MAX-ACCESS not-accessible
             STATUS   current
             DESCRIPTION
                "The SONET/SDH Far End VT Interval table."
             ::= { sonetFarEndVT 2 }

         sonetFarEndVTIntervalEntry OBJECT-TYPE
             SYNTAX   SonetFarEndVTIntervalEntry
             MAX-ACCESS not-accessible
             STATUS   current
             DESCRIPTION
               "An entry in the SONET/SDH Far
               End VT Interval table."
             INDEX   { ifIndex,
                        sonetFarEndVTIntervalNumber }
             ::= { sonetFarEndVTIntervalTable 1 }

         SonetFarEndVTIntervalEntry ::=
             SEQUENCE {
                  sonetFarEndVTIntervalNumber   Integer32,
                  sonetFarEndVTIntervalESs   Gauge32,
                  sonetFarEndVTIntervalSESs   Gauge32,
                  sonetFarEndVTIntervalCVs   Gauge32,
                  sonetFarEndVTIntervalUASs   Gauge32
              }

         sonetFarEndVTIntervalNumber OBJECT-TYPE

```
                 SYNTAX  Integer32 (1..96)
                 MAX-ACCESS  not-accessible
                 STATUS  current
                 DESCRIPTION
                    "A number between 1 and 96, which identifies the
                    interval for which the set of statistics is available.
                    The interval identified by 1 is the most recently
                    completed 15 minute interval,
                    and the interval identified
                    by N is the interval immediately preceding the
                    one identified
                    by N-1."
                 ::= { sonetFarEndVTIntervalEntry 1 }

         sonetFarEndVTIntervalESs OBJECT-TYPE
                 SYNTAX  Gauge32
                 MAX-ACCESS  read-only
                 STATUS  current
                 DESCRIPTION
                        "The counter associated with the number of
                        Far End Errored Seconds encountered
                        by a SONET/SDH VT interface
                        in a particular 15-minute interval
                        in the past 24 hours."
                 ::= { sonetFarEndVTIntervalEntry 2 }

         sonetFarEndVTIntervalSESs OBJECT-TYPE
                 SYNTAX  Gauge32
                 MAX-ACCESS  read-only
                 STATUS  current
                 DESCRIPTION
                        "The counter associated with the number of
                        Far End Severely Errored Seconds
                        encountered by a SONET/SDH VT interface
                        in a particular 15-minute interval
                        in the past 24 hours."
                 ::= { sonetFarEndVTIntervalEntry 3 }

         sonetFarEndVTIntervalCVs OBJECT-TYPE
                 SYNTAX  Gauge32
                 MAX-ACCESS  read-only
                 STATUS  current
                 DESCRIPTION
                        "The counter associated with the number of
                        Far End Coding Violations reported via
                        the far end block error count
                        encountered by a
                        SONET/SDH VT interface in a
```

```
                    particular 15-minute interval
                    in the past 24 hours."
                ::= { sonetFarEndVTIntervalEntry 4 }


          sonetFarEndVTIntervalUASs OBJECT-TYPE
             SYNTAX   Gauge32
             MAX-ACCESS   read-only
             STATUS   current
             DESCRIPTION
                 "The counter associated with the number of
                 Far End Unavailable Seconds
                 encountered by a
                 SONET/SDH VT interface in a
                 particular 15-minute interval
                 in the past 24 hours."
             ::= { sonetFarEndVTIntervalEntry 5 }



          -- conformance information

          sonetConformance OBJECT IDENTIFIER ::= { sonetMIB 4 }

          sonetGroups      OBJECT IDENTIFIER ::= { sonetConformance 1 }
          sonetCompliances OBJECT IDENTIFIER ::= { sonetConformance 2 }


          -- compliance statements

          sonetCompliance MODULE-COMPLIANCE
             STATUS   current
             DESCRIPTION
                     "The compliance statement for SONET/SDH
                      interfaces."

             MODULE  -- this module
                 MANDATORY-GROUPS { sonetMediumStuff, sonetSectionStuff }

                 GROUP        sonetLineStuff
                 DESCRIPTION
                     "Implementation of this group is mandatory for all
                      SONET/SDH systems that terminate SONET/SDH Lines,
                      Paths or Virtual Tributaries."

                 GROUP        sonetFarEndLineStuff
                 DESCRIPTION
                     "Implementation of this group is optional for all
                      SONET/SDH systems that terminate SONET/SDH Lines,
                      Paths or Virtual Tributaries, and that
```

```
                    provide for a far end block error (FEBE)
                    information at the SONET/SDH Line Layer."

              GROUP         sonetPathStuff
              DESCRIPTION
                  "Implementation of this group is mandatory for all
                   SONET/SDH systems that terminate SONET/SDH
                   Paths or Virtual
                   Tributaries."

              OBJECT        sonetPathWidth
              MIN-ACCESS    read-only
              DESCRIPTION
                  "Write access is not required."

              GROUP         sonetFarEndPathStuff
              DESCRIPTION
                  "Implementation of this group is optional for all
                   SONET/SDH systems that terminate SONET/SDH
                   Paths or Virtual
                   Tributaries, and that process
                   Far End information."

              GROUP         sonetVTStuff
              DESCRIPTION
                  "Implementation of this group is mandatory for all
                   SONET/SDH systems that terminate SONET/SDH
                   Virtual Tributaries."

              OBJECT        sonetVTWidth
              MIN-ACCESS    read-only
              DESCRIPTION
                  "Write access is not required."

              GROUP         sonetFarEndVTStuff
              DESCRIPTION
                  "Implementation of this group is optional for
                   all SONET/SDH systems that terminate the
                   SONET/SDH floating Virtual Tributaries, and
                   that process Far End information."

          ::= { sonetCompliances 1 }

      -- units of conformance

      sonetMediumStuff    OBJECT-GROUP
          OBJECTS { sonetMediumType,
                    sonetMediumTimeElapsed,
```

```
                         sonetMediumValidIntervals,
                         sonetMediumLineCoding,
                         sonetMediumLineType,
                         sonetMediumCircuitIdentifier }
             STATUS   current
             DESCRIPTION
                     "A collection of objects providing configuration
                     information applicable to all SONET/SDH
                     interfaces."
             ::= { sonetGroups 1 }

        sonetSectionStuff    OBJECT-GROUP
            OBJECTS { sonetSectionCurrentStatus,
                         sonetSectionCurrentESs,
                         sonetSectionCurrentSESs,
                         sonetSectionCurrentSEFSs,
                         sonetSectionCurrentCVs,
                         sonetSectionIntervalESs,
                         sonetSectionIntervalSESs,
                         sonetSectionIntervalSEFSs,
                         sonetSectionIntervalCVs
          }
             STATUS   current
             DESCRIPTION
                     "A collection of objects providing information
                     specific to SONET/SDH Section interfaces."
             ::= { sonetGroups 2 }

        sonetLineStuff    OBJECT-GROUP
            OBJECTS { sonetLineCurrentStatus,
                         sonetLineCurrentESs,
                         sonetLineCurrentSESs,
                         sonetLineCurrentCVs,
                         sonetLineCurrentUASs,
                         sonetLineIntervalESs,
                         sonetLineIntervalSESs,
                         sonetLineIntervalCVs,
                         sonetLineIntervalUASs }
             STATUS   current
             DESCRIPTION
                     "A collection of objects providing information
                     specific to SONET/SDH Line interfaces."
             ::= { sonetGroups 3 }

        sonetFarEndLineStuff    OBJECT-GROUP
            OBJECTS { sonetFarEndLineCurrentESs,
                         sonetFarEndLineCurrentSESs,
                         sonetFarEndLineCurrentCVs,
```

```
                        sonetFarEndLineCurrentUASs,
                        sonetFarEndLineIntervalESs,
                        sonetFarEndLineIntervalSESs,
                        sonetFarEndLineIntervalCVs,
                        sonetFarEndLineIntervalUASs }
            STATUS   current
            DESCRIPTION
                    "A collection of objects providing information
                    specific to SONET/SDH Line interfaces,
                    and maintaining Line Far End information."
            ::= { sonetGroups 4 }

        sonetPathStuff    OBJECT-GROUP
            OBJECTS { sonetPathCurrentWidth,
                        sonetPathCurrentStatus,
                        sonetPathCurrentESs,
                        sonetPathCurrentSESs,
                        sonetPathCurrentCVs,
                        sonetPathCurrentUASs,
                        sonetPathIntervalESs,
                        sonetPathIntervalSESs,
                        sonetPathIntervalCVs,
                        sonetPathIntervalUASs }
            STATUS   current
            DESCRIPTION
                    "A collection of objects providing information
                    specific to SONET/SDH Path interfaces."
            ::= { sonetGroups 5 }

        sonetFarEndPathStuff    OBJECT-GROUP
            OBJECTS { sonetFarEndPathCurrentESs,
                        sonetFarEndPathCurrentSESs,
                        sonetFarEndPathCurrentCVs,
                        sonetFarEndPathCurrentUASs,
                        sonetFarEndPathIntervalESs,
                        sonetFarEndPathIntervalSESs,
                        sonetFarEndPathIntervalCVs,
                        sonetFarEndPathIntervalUASs }
            STATUS   current
            DESCRIPTION
                    "A collection of objects providing information
                    specific to SONET/SDH Path interfaces,
                    and maintaining Path Far End information."
            ::= { sonetGroups 6 }

        sonetVTStuff    OBJECT-GROUP
            OBJECTS { sonetVTCurrentWidth,
                        sonetVTCurrentStatus,
```

```
                        sonetVTCurrentESs,
                        sonetVTCurrentSESs,
                        sonetVTCurrentCVs,
                        sonetVTCurrentUASs,
                        sonetVTIntervalESs,
                        sonetVTIntervalSESs,
                        sonetVTIntervalCVs,
                        sonetVTIntervalUASs }
            STATUS  current
            DESCRIPTION
                    "A collection of objects providing information
                    specific to SONET/SDH VT interfaces."
            ::= { sonetGroups 7 }

        sonetFarEndVTStuff    OBJECT-GROUP
            OBJECTS { sonetFarEndVTCurrentESs,
                        sonetFarEndVTCurrentSESs,
                        sonetFarEndVTCurrentCVs,
                        sonetFarEndVTCurrentUASs,
                        sonetFarEndVTIntervalESs,
                        sonetFarEndVTIntervalSESs,
                        sonetFarEndVTIntervalCVs,
                        sonetFarEndVTIntervalUASs }
            STATUS  current
            DESCRIPTION
                    "A collection of objects providing information
                    specific to SONET/SDH VT interfaces,
                    and maintaining VT Far End information."
            ::= { sonetGroups 8 }


            END
```

5. Acknowledgments

    This specification is a product of the AToM MIB Working Group.

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7. Security Considerations

    Security issues are not discussed in this memo.

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