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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.

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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].

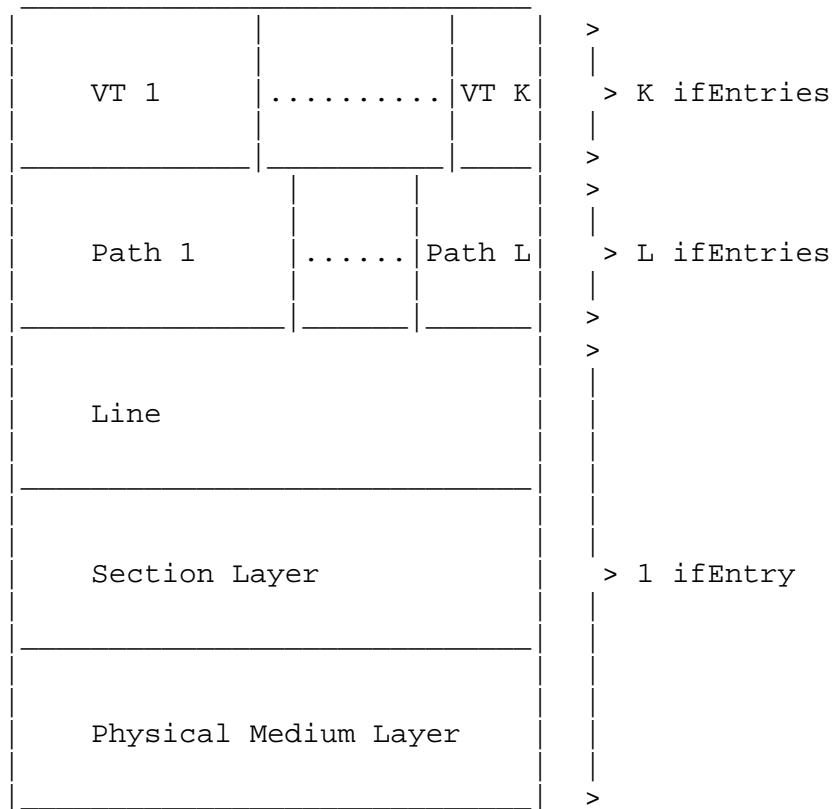
3.1. Use of the ifTable

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:



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 word 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 SESSs. The 10 SESSs are included in unavailable time. Once unavailable, the SONET/SDH interface becomes available at the onset of 10 contiguous seconds with no SESSs. The 10 seconds with no SESSs 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	1.5×10^{-7}
OC-3	16	1×10^{-7}
OC-9	47	1×10^{-7}
OC-12	63	1×10^{-7}
OC-18	94	1×10^{-7}
OC-24	125	1×10^{-7}
OC-36	187	1×10^{-7}
OC-48	249	1×10^{-7}

Value for x for SONET/SDH Line SES Definition

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

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

Rate	x	Minimum Bit Error Rate
=====		
STS-1	9	1.5×10^{-7}
STS-3	16	1×10^{-7}

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

Rate	x	Minimum Bit Error Rate
=====		
VT1.5	4	2×10^{-6}
VT2	6	2×10^{-6}
VT3	8	2×10^{-6}
VT6	14	2×10^{-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
        Fax: +1 908 758 4177
```

```
        E-mail: tacox@mail.bellcore.com
```

```
        Kaj Tesink
```

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

```
        Tel: +1 908 758 5254
        Fax: +1 908 758 4196
```

```
        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,
        sonetSectionCurrentESSs        Gauge32,
        sonetSectionCurrentSESSs       Gauge32,
        sonetSectionCurrentSEFSSs      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 }

```

```

sonetSectionCurrentESSs 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 }

```

```

sonetSectionCurrentSESSs 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,
    sonetSectionIntervaleESs    Gauge32,
    sonetSectionIntervalSESSs   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 }

sonetSectionIntervaleESs 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 }

sonetSectionIntervalSESSs 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,
        sonetLineIntervalESSs        Gauge32,
        sonetLineIntervalSESSs       Gauge32,
        sonetLineIntervalCVs         Gauge32,
        sonetLineIntervalUASSs       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 }

sonetLineIntervaleSSs 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 }

sonetLineIntervalSESSs 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 }

sonetLineIntervalUASSs 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,
        sonetFarEndLineIntervaleSSs        Gauge32,
        sonetFarEndLineIntervaleSESSs      Gauge32,
        sonetFarEndLineIntervalCVs         Gauge32,
        sonetFarEndLineIntervalUASSs       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 }

sonetFarEndLineIntervaleSSs 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 }

sonetFarEndLineIntervaleSESSs 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,
        sonetPathIntervaleSSs        Gauge32,
        sonetPathIntervalSESSs       Gauge32,
        sonetPathIntervalCVs         Gauge32,
        sonetPathIntervalUASSs       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 }
```

sonetPathIntervaleSSs 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 }

sonetPathIntervalSESSs 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 {
        sonetFarEndPathCurrentESSs      Gauge32,
        sonetFarEndPathCurrentSESSs     Gauge32,
        sonetFarEndPathCurrentCVs       Gauge32,
        sonetFarEndPathCurrentUASSs     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 }

sonetFarEndPathCurrentSESSs 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 }

sonetFarEndPathCurrentUASSs 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,
        sonetFarEndPathIntervaleSESS       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 }
```

sonetFarEndPathIntervaleSSs 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 }
```

sonetFarEndPathIntervalSESSs 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,
        sonetVTIntervaleSSs        Gauge32,
        sonetVTIntervalSESSs       Gauge32,
        sonetVTIntervalCVs         Gauge32,
        sonetVTIntervalUASSs       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 }

sonetVTIntervaleSSs 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 }

sonetVTIntervalSESSs 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,
        sonetFarEndVTIntervaleSSs        Gauge32,
        sonetFarEndVTIntervalSESSs       Gauge32,
        sonetFarEndVTIntervalCVs         Gauge32,
        sonetFarEndVTIntervalUASSs       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 }

sonetFarEndVTIntervaleSSs 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 }

sonetFarEndVTIntervaleSSs 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,

```

```

        sonetFarEndLineCurrentUASSs,
        sonetFarEndLineIntervalESSs,
        sonetFarEndLineIntervalSESSs,
        sonetFarEndLineIntervalCVs,
        sonetFarEndLineIntervalUASSs }
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,
          sonetPathCurrentESSs,
          sonetPathCurrentSESSs,
          sonetPathCurrentCVs,
          sonetPathCurrentUASSs,
          sonetPathIntervalESSs,
          sonetPathIntervalSESSs,
          sonetPathIntervalCVs,
          sonetPathIntervalUASSs }
STATUS    current
DESCRIPTION
    "A collection of objects providing information
    specific to SONET/SDH Path interfaces."
::= { sonetGroups 5 }

sonetFarEndPathStuff    OBJECT-GROUP
OBJECTS { sonetFarEndPathCurrentESSs,
          sonetFarEndPathCurrentSESSs,
          sonetFarEndPathCurrentCVs,
          sonetFarEndPathCurrentUASSs,
          sonetFarEndPathIntervalESSs,
          sonetFarEndPathIntervalSESSs,
          sonetFarEndPathIntervalCVs,
          sonetFarEndPathIntervalUASSs }
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,
        sonetVTCurrentSESSs,
        sonetVTCurrentCVs,
        sonetVTCurrentUASs,
        sonetVTIntervaleSSs,
        sonetVTIntervalSESSs,
        sonetVTIntervalCVs,
        sonetVTIntervalUASS }
STATUS    current
DESCRIPTION
    "A collection of objects providing information
    specific to SONET/SDH VT interfaces."
::= { sonetGroups 7 }

sonetFarEndVTStuff    OBJECT-GROUP
    OBJECTS { sonetFarEndVTCurrentESs,
        sonetFarEndVTCurrentSESSs,
        sonetFarEndVTCurrentCVs,
        sonetFarEndVTCurrentUASs,
        sonetFarEndVTIntervaleSSs,
        sonetFarEndVTIntervalSESSs,
        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.

6. References

- [1] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Structure of Management Information for version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1442, SNMP Research, Inc., Hughes LAN Systems, Dover Beach Consulting, Inc., Carnegie Mellon University, April 1993.
- [2] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Textual Conventions for version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1443, SNMP Research, Inc., Hughes LAN Systems, Dover Beach Consulting, Inc., Carnegie Mellon University, April 1993.
- [3] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Conformance Statements for version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1444, SNMP Research, Inc., Hughes LAN Systems, Dover Beach Consulting, Inc., Carnegie Mellon University, April 1993.
- [4] Galvin, J., and K. McCloghrie, "Administrative Model for version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1445, Trusted Information Systems, Hughes LAN Systems, April 1993.
- [5] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Protocol Operations for version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1448, SNMP Research, Inc., Hughes LAN Systems, Dover Beach Consulting, Inc., Carnegie Mellon University, April 1993.
- [6] McCloghrie, K., and M. Rose, "Management Information Base for Network Management of TCP/IP-based internets: MIB-II", STD 17, RFC 1213, Hughes LAN Systems, Inc., Performance Systems International, March 1991.
- [7] Information processing systems - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1), International Organization for Standardization. International Standard 8824, (December, 1987).
- [8] Information processing systems - Open Systems Interconnection - Specification of Basic Encoding Rules for Abstract Notation One (ASN.1), International Organization for Standardization. International Standard 8825, (December, 1987).
- [9] American National Standard for Telecommunications - Digital Hierarchy - Optical Interface Rates and Formats Specification, ANSI T1.105-1988.

- [9a] ANSI T1.105-1991.
- [10] American National Standard for Telecommunications - Digital Hierarchy - Optical Interface Specification (Single-Mode), ANSI T1.106-1988.
- [11] American National Standard for Telecommunications -- Layer 1 In-Service Digital Transmission Performance Monitoring T1M1.3/93-005R2, July 1993.
- [12] McCloghrie, K., and F. Kastenholz, "Evolution of Interfaces Group of MIB-II", RFC 1573, Hughes LAN Systems, FTP Software, January 1994.
- [13] Cox, T., and K. Tesink, Editors, "Definitions of Managed Objects for the DS3/E3 Interface Type", RFC 1407, Bellcore, January 1993.
- [14] Baker, F., and J. Watt, Editors, "Definitions of Managed Objects for the DS1/E1 Interface Type", RFC 1406, Advanced Computer Communications, Newbridge Networks Corporation, January 1993.
- [15] CCITT Recommendation G.707, "Synchronous Digital Hierarchy Bit Rates", June 1992.
- [16] CCITT Recommendation G.708, "Network Node Interface for the Synchronous Digital Hierarchy", June 1992.
- [17] CCITT Recommendation G.709, "Synchronous Multiplexing Structure", June 1992.
- [18] CCITT Recommendation G.783, "Characteristics of Synchronous Digital Hierarchy (SDH) Multiplexing Equipment Functional Blocks", November 1992.

7. Security Considerations

Security issues are not discussed in this memo.

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