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Definitions of Managed Objects for the DS3/E3 Interface Type

Status of this Memo

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

Abstract

This memo defines an extension to the Management Information Base (MIB) for use with network management protocols in TCP/IP-based internets. In particular, it defines objects for managing DS3 and E3 Interfaces. This document is a companion document with Definitions of Managed Objects for the DS1 Interface Type.

This document entirely replaces RFC 1233, which contains a fundamental error: many objects are encoded as Counters that must be encoded as INTEGERS or Gauges. The magnitude of the change required is sufficient that virtually every object changed. Therefore, the MIB documented in RFC 1233 should not be implemented.

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1. The Network Management Framework

The Internet-standard Network Management Framework consists of three components. They are:

STD 16/RFC 1155 which defines the SMI, the mechanisms used for describing and naming objects for the purpose of management. STD 16/RFC 1212 defines a more concise description mechanism, which is wholly consistent with the SMI.

RFC 1156 which defines MIB-I, the core set of managed objects for the Internet suite of protocols. STD 17/RFC 1213, defines MIB-II, an evolution of MIB-I based on implementation experience and new operational requirements.

STD 15/RFC 1157 which defines the SNMP, the protocol used for network access to managed objects.

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

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 [3] 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 STD 16, RFC 1212 [13].

2.2. Changes from RFC 1233

This MIB obsoletes RFC 1233. The changes from RFC 1233 are the following:

- This MIB module contains information to manage an E3 interface, also.
- This MIB module contains three groups:
 - DS3/E3 Near End Group which is mandatory,
 - DS3 Far End Group which is optional, and
 - DS3 Fractional Group which is optional.
- The DS3 Far End Group is a new group and contains configuration information and statistics that are collected from the far end DS3/E3 interface. Presently, the Far End Group may only be implemented by DS3 systems that use C-bit Parity or SYNTRAN.
- The DS3 Fractional Group is a new group and is modeled after the DS1 Fractional Group.
- ds3CSUIndex has been redefined and renamed to dsx3LineIndex. This object is the identifier of a DS3/E3 Interface on a device. On a CSU, a single DS3/E3 data stream will cross two DS3/E3 interfaces, which have separate dsx3LineIndex values.

- ds3Index has been redefined and renamed to dsx3IfIndex. This value for this object is equal to the value of ifIndex from the Interfaces table of MIB II (STD 17, RFC 1213).
- The ACCESS for objects in the dsx3ConfigTable has been set to read-write for items that are configurable.
- The dsx3ZeroCoding has been renamed to dsx3LineCoding.
- A new object has been added called dsx3LoopbackConfig, which better describes the loopback capabilities of a DS3/E3 interface on a device.
- The dsx3SendCode object has been updated to reflect different types of loopback messages.
- A new object has been added called dsx3LineStatus. This object better describes the status (e.g., failure state and loopback state) of a DS3/E3 interface.
- A new object has been added called dsx3TransmitClockSource. This object identifies the source for the transmit clock.
- All Counters have been changed to Gauges.
- A Line Errored Seconds object has been added to all near end tables.
- Line Coding Violations are counted instead of Bipolar Violations.
- A new Coding Violation counter has been added to count coding violations reported via the C-bits of SYNTRAN and C-bit Parity DS3 applications. The original Coding Violation counter has been renamed to PCV to mean coding violations reported via the P-bits. This count is also added for symmetry with the far end statistics.
- A new Errored Second counter and Severely Errored Second counter has been added to count these performance events via the C-bits of the SYNTRAN and C-bit Parity DS3 applications. The original ES and SES counters have been renamed to PES and PSES to mean reported via the P-bits. These counts are also added for symmetry with the far end statistics.

3. Overview

These objects are used when the particular media being used to realize an interface is a DS3/E3 interface. At present, this applies to these values of the ifType variable in the Internet-standard MIB:

ds3 (30)

The DS3 definitions contained herein are based on the DS3 specifications in ANSI T1.102-1987, ANSI T1.107-1988, ANSI T1.107a-1990, and ANSI T1.404-1989 [9,10,10a,11]. The E3 definitions contained herein are based on the E3 specifications in CCITT G.751 [14].

3.1. Binding between ifIndex and DS3/E3 Interfaces

Different physical configurations for the support of SNMP with DS3/E3 equipment exist. To accommodate these scenarios, two different indices for DS3/E3 interfaces are introduced in this MIB. These indices are dsx3IfIndex and dsx3LineIndex.

External interface scenario: the SNMP Agent represents all managed DS3/E3 lines as external interfaces (for example, an Agent residing on the device supporting DS3/E3 interfaces directly):

For this scenario, all interfaces are assigned an integer value equal to ifIndex, and the following applies:

ifIndex=dsx3IfIndex=dsx3LineIndex for all interfaces.

The dsx3IfIndex column of the DS3/E3 Configuration table relates each DS3/E3 interface to its corresponding interface (ifIndex) in the Internet-standard MIB (MIB-II STD 17, RFC 1213).

External&Internal interface scenario: the SNMP Agents resides on an host external from the device supporting DS3/E3 interfaces (e.g., a router). The Agent represents both the host and the DS3/E3 device. The index dsx3LineIndex is used to not only represent the DS3/E3 interfaces external from the host/DS3/E3-device combination, but also the DS3/E3 interfaces connecting the host and the DS3/E3 device. The index dsx3IfIndex is always equal to ifIndex.

Example:

A shelf full of CSUs connected to a Router. An SNMP Agent residing on the router proxies for itself and the CSU. The router has also an Ethernet interface:

Ethernet	+-----+			+-----+		
	R	44.736 MBPS	ds3 M13	Line#A	ds3 C-bit Parity	
	O	44.736 MBPS	ds3 M13	Line#B	ds3 C-bit Parity	
	U	44.736 MBPS	ds3 M13	Line#C	ds3 C-bit Parity	
	T	44.736 MBPS	ds3 M13	Line#D	ds3 C-bit Parity	
	E	44.736 MBPS	ds3 M13	Line#D	ds3 C-bit Parity	
	R					
	+-----+			+-----+		

The assignment of the index values could for example be:

ifIndex (= dsx3IfIndex)			dsx3LineIndex
1		NA	NA (Ethernet)
2	Line#A	Router Side	6
2	Line#A	Network Side	7
3	Line#B	Router Side	8
3	Line#B	Network Side	9
4	Line#C	Router Side	10
4	Line#C	Network Side	11
5	Line#D	Router Side	12
5	Line#D	Network Side	13

For this example, ifNumber is equal to 5. Note the following description of dsx3LineIndex: the dsx3LineIndex identifies a DS3/E3 Interface on a managed device. If there is an ifEntry that is directly associated with this and only this DS3/E3 interface, it should have the same value as ifIndex. Otherwise, number the dsx3LineIndices with an unique identifier following the rules of choosing a number greater than ifNumber and numbering inside interfaces (e.g., equipment side) with even numbers and outside interfaces (e.g., network side) with odd numbers.

If the CSU shelf is managed by itself by a local SNMP Agent, the situation would be:

ifIndex (= dsx3IfIndex)			dsx3LineIndex
1	Line#A	Network Side	1
2	Line#A	RouterSide	2
3	Line#B	Network Side	3
4	Line#B	RouterSide	4
5	Line#C	Network Side	5
6	Line#C	Router Side	6
7	Line#D	Network Side	7
8	Line#D	Router Side	8

3.2. Objectives of this MIB Module

There are numerous things that could be included in a MIB for DS3/E3 signals: the management of multiplexors, CSUs, DSUs, and the like. The intent of this document is to facilitate the common management of all devices with DS3/E3 interfaces. As such, a design decision was made up front to very closely align the MIB with the set of objects that can generally be read from DS3/E3 devices that are currently deployed.

3.3. DS3/E3 Terminology

The terminology used in this document to describe error conditions on a DS3 interface as monitored by a DS3 device are based on the definitions from the ANSI T1M1.3/92-005R1 draft standard [12]. If the definition in this document does not match the definition in the ANSI T1M1.3/92-005R1 draft document, the implementer should follow the definition described in this document.

3.3.1. Error Events

Bipolar Violation (BPV) Error Event

A bipolar violation error event, for B3ZS(HDB3)-coded signals, is the occurrence of a pulse of the same polarity as the previous pulse without being part of the zero substitution code, B3ZS(HDB3). For B3ZS(HDB3)-coded signals, a bipolar violation error event may also include other error patterns such as: three(four) or more consecutive zeros and incorrect polarity.

Excessive Zeros (EXZ) Error Event

An EXZ is the occurrence of any zero string length equal to or greater than 3 for B3ZS, or greater than 4 for HDB3.

Line Coding Violation (LCV) Error Event

This parameter is a count of both BPVs and EXZs occurring over the accumulation period. An EXZ

increments the LCV by one regardless of the length of the zero string.

P-bit Coding Violation (PCV) Error Event

For all DS3 applications, a coding violation error event is a P-bit

Parity Error event. A P-bit Parity Error event is the occurrence of a received P-bit code on the DS3 M-frame that is not identical to the corresponding locally-calculated code.

C-bit Coding Violation (CCV) Error Event

For C-bit Parity and SYNTRAN DS3 applications, this is the count of coding violations reported via the C-bits.

For C-bit Parity, it is a count of CP-bit parity errors occurring in the accumulation interval. For SYNTRAN, it is a count of CRC-9 errors occurring in the accumulation interval.

3.3.2. Performance Parameters

All performance parameters are accumulated in fifteen minute intervals and up to 96 intervals (24 hours worth) are kept by an agent. Fewer than 96 intervals of data will be available if the agent has been restarted within the last 24 hours. In addition, there is a rolling 24-hour total of each performance parameter.

There is no requirement for an agent to ensure fixed relationship between the start of a fifteen minute interval and any wall clock; however some agents may align the fifteen minute intervals with quarter hours.

Line Errored Seconds (LES)

A Line Errored Second is a second in which one or more CVs occurred OR one or more LOS defects.

P-bit Errored Seconds (PES)

An PES is a second with one or more PCVs OR one or more Out of Frame defects OR a detected incoming AIS. This gauge is not incremented when UASs are counted.

P-bit Severely Errored Seconds (PSES)

A PSES is a second with 44 or more PCVs OR one or more Out of Frame defects OR a detected incoming AIS. This gauge is not incremented when UASs are counted.

C-bit Errored Seconds (CES)

An CES is a second with one or more CCVs OR

one or more Out of Frame defects OR a detected incoming AIS. This count is only for the SYNTRAN and C-bit Parity DS3 applications. This gauge is not incremented when UASs are counted.

C-bit Severely Errored Seconds (CSES)

A CSES is a second with 44 or more CCVs OR one or more Out of Frame defects OR a detected incoming AIS. This count is only for the SYNTRAN and C-bit Parity DS3 applications. This gauge is not incremented when UASs are counted.

Severely Errored Framing Seconds (SEFS)

A SEFS is a second with one or more Out of Frame defects OR a detected incoming AIS.

Unavailable Seconds (UAS)

UAS are calculated by counting the number of seconds that the interface is unavailable. The DS3 interface is said to be unavailable from the onset of 10 contiguous PSEss, or the onset of the condition leading to a failure (see Failure States). If the condition leading to the failure was immediately preceded by one or more contiguous PSEss, then the DS3 interface unavailability starts from the onset of these PSEss. Once unavailable, and if no failure is present, the DS3 interface becomes available at the onset of 10 contiguous seconds with no PSEss. Once unavailable, and if a failure is present, the DS3 interface becomes available at the onset of 10 contiguous seconds with no PSEss, if the failure clearing time is less than or equal to 10 seconds. If the failure clearing time is more than 10 seconds, the DS3 interface becomes available at the onset of 10 contiguous seconds with no PSEss, or the onset period leading to the successful clearing condition, whichever occurs later. With respect to the DS3 error counts, all counters are incremented while the DS3 interface is deemed available. While the interface is deemed unavailable, the only count that is incremented is UASs.

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 PSES and UAS counters must be adjusted when the Unavailable Signal State is entered. Clearly, successive GETs of the affected dsx3IntervalPSEss and dsx3IntervalUASs 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.

3.3.3. Performance Defects

Failure States:

The Remote Alarm Indication (RAI) failure, in SYNTRAN applications, is declared after detecting the Yellow Alarm Signal on the alarm channel. See ANSI T1.107a-1990 [10]. The Remote Alarm Indication failure, in C-bit Parity DS3 applications, is declared as soon as the presence of either one or two alarm signals are detected on then Far End Alarm Channel. See [10]. The Remote Alarm Indication failure may also be declared after detecting the far-end SEF/AIS defect (aka yellow). The Remote Alarm Indication failure is cleared as soon as the presence of the any of the above alarms are removed.

Also, the incoming failure state is declared when a defect persists for at least 2-10 seconds. The defects are the following: Loss of Signal (LOS), an Out of Frame (OOF) or an incoming Alarm Indication Signal (AIS). The Failure State is cleared when the defect is absent for less than or equal to 20 seconds.

Far End SEF/AIS defect (aka yellow)

A Far End SEF/AIS defect is the occurrence of the two X-bits in a M-frame set to zero. The Far End SEF/AIS defect is terminated when the two X-bits in a M-frame are set to one.

Out of Frame (OOF) defect

A DS3 OOF defect is detected when any three or more errors in sixteen or fewer consecutive F-bits occur within a DS3 M-frame. An OOF defect may also be called a Severely Errored Frame (SEF) defect. An OOF defect is cleared when reframe occurs. A DS3 Loss of Frame (LOF) failure is declared when the DS3 OOF defect is consistent for 2 to 10 seconds. The DS3 OOF defect ends when reframe occurs. The DS3 LOF failure is cleared when the DS3 OOF defect is absent for 10 to 20 seconds.

An E3 OOF defect is detected when four consecutive frame alignment signals have been incorrectly received in there predicted positions in an E3 signal. E3 frame alignment occurs when the presence of three consecutive frame alignment signals have been detected.

Loss of Signal (LOS) defect

The DS3 LOS defect is declared upon observing 175 +/- 75 contiguous pulse positions with no pulses of either positive or negative polarity.

The DS3 LOS defect is terminated upon observing an average pulse density of at least 33% over a period of 175 +/- 75 contiguous pulse positions starting with the receipt of a pulse.

Alarm Indication Signal (AIS) defect

The DS3 AIS is framed with "stuck stuffing." This implies that it has a valid M-subframe alignment bits, M-frame alignment bits, and P bits. The information bits are set to a 1010... sequence, starting with a one (1) after each M-subframe alignment bit, M-frame alignment bit, X bit, P bit, and C bit. The C bits are all set to zero giving what is called "stuck stuffing." The X bits are set to one. The DS3 AIS defect is declared after DS3 AIS is present in contiguous M-frames for a time equal to or greater than T, where $0.2 \text{ ms} \leq T \leq 100 \text{ ms}$.

The DS3 AIS defect is terminated after AIS is absent in contiguous M-frames for a time equal to or greater than T.

The E3 binary content of the AIS is nominally a continuous stream of ones. AIS detection and the application of consequent actions, should be completed within a time limit of 1 ms.

3.3.4. Other Terms

Circuit Identifier

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

4. Object Definitions

```
RFC1407-MIB DEFINITIONS ::= BEGIN

IMPORTS
    Gauge
        FROM RFC1155-SMI
    DisplayString, transmission
        FROM RFC1213-MIB
    OBJECT-TYPE
        FROM RFC-1212;

-- This MIB module uses the extended OBJECT-TYPE macro
-- as defined in RFC 1212.

    ds3 OBJECT IDENTIFIER ::= { transmission 30 }

-- The DS3/E3 Near End Group

-- Implementation of this group is mandatory for all
-- systems that attach to a DS3/E3 Interface.

-- The DS3/E3 Near End Group consists of four tables:
--     DS3/E3 Configuration
--     DS3/E3 Current
--     DS3/E3 Interval
--     DS3/E3 Total

-- the DS3/E3 Configuration

dsx3ConfigTable OBJECT-TYPE
    SYNTAX SEQUENCE OF Dsx3ConfigEntry
    ACCESS not-accessible
    STATUS mandatory
    DESCRIPTION
        "The DS3/E3 Configuration table."
    ::= { ds3 5 }

dsx3ConfigEntry OBJECT-TYPE
    SYNTAX Dsx3ConfigEntry
    ACCESS not-accessible
    STATUS mandatory
    DESCRIPTION
        "An entry in the DS3/E3 Configuration table."
    INDEX { dsx3LineIndex }
    ::= { dsx3ConfigTable 1 }
```

```

Ds3ConfigEntry ::=
    SEQUENCE {
        ds3LineIndex
            INTEGER,
        ds3IfIndex
            INTEGER,
        ds3TimeElapsed
            INTEGER,
        ds3ValidIntervals
            INTEGER,
        ds3LineType
            INTEGER,
        ds3LineCoding
            INTEGER,
        ds3SendCode
            INTEGER,
        ds3CircuitIdentifier
            DisplayString,
        ds3LoopbackConfig
            INTEGER,
        ds3LineStatus
            INTEGER,
        ds3TransmitClockSource
            INTEGER
    }

```

```

ds3LineIndex OBJECT-TYPE
    SYNTAX  INTEGER (1..65535)
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION

```

"This object is the identifier of a DS3/E3 Interface on a managed device. If there is an ifEntry that is directly associated with this and only this DS3/E3 interface, it should have the same value as ifIndex. Otherwise, number the ds3LineIndices with an unique identifier following the rules of choosing a number that is greater than ifNumber and numbering the inside interfaces (e.g., equipment side) with even numbers and outside interfaces (e.g, network side) with odd numbers."

```

::= { ds3ConfigEntry 1 }

```

```

ds3IfIndex OBJECT-TYPE
    SYNTAX  INTEGER (1..65535)
    ACCESS  read-only
    STATUS  mandatory

```

DESCRIPTION

"This value for this object is equal to the value of ifIndex from the Interfaces table of MIB II (RFC 1213)."

::= { dsx3ConfigEntry 2 }

dsx3TimeElapsed OBJECT-TYPE

SYNTAX INTEGER (0..899)

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The number of seconds that have elapsed since the beginning of the near end current error-measurement period."

::= { dsx3ConfigEntry 3 }

dsx3ValidIntervals OBJECT-TYPE

SYNTAX INTEGER (0..96)

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The number of previous near end intervals for which valid data was collected. The value will be 96 unless the interface was brought online within the last 24 hours, in which case the value will be the number of complete 15 minute near end intervals since the interface has been online."

::= { dsx3ConfigEntry 4 }

dsx3LineType OBJECT-TYPE

SYNTAX INTEGER {
 dsx3other(1),
 dsx3M23(2),
 dsx3SYNTRAN(3),
 dsx3CbitParity(4),
 dsx3ClearChannel(5),
 e3other(6),
 e3Framed(7),
 e3Plcp(8)
 }

ACCESS read-write

STATUS mandatory

DESCRIPTION

"This variable indicates the variety of DS3 C-bit or E3 application implementing this interface. The type of interface affects the interpretation of the usage and error statistics."

The rate of DS3 is 44.736 Mbps and E3 is 34.368 Mbps.
 The dsx3ClearChannel value means that the C-bits are not used except for sending/receiving AIS.

The values, in sequence, describe:

TITLE:	SPECIFICATION:
dsx3M23	ANSI T1.107-1988
dsx3SYNTRAN	ANSI T1.107-1988
dsx3CbitParity	ANSI T1.107a-1989
dsx3ClearChannel	ANSI T1.102-1987
e3Framed	CCITT G.751
e3Plcp	ETSI T/NA(91)18."

::= { dsx3ConfigEntry 5 }

dsx3LineCoding OBJECT-TYPE

SYNTAX INTEGER {
 dsx30ther(1),
 dsx3B3ZS(2),
 e3HDB3(3)
 }

ACCESS read-write

STATUS mandatory

DESCRIPTION

"This variable describes the variety of Zero Code Suppression used on this interface, which in turn affects a number of its characteristics.

dsx3B3ZS and e3HDB3 refer to the use of specified patterns of normal bits and bipolar violations which are used to replace sequences of zero bits of a specified length."

::= { dsx3ConfigEntry 6 }

dsx3SendCode OBJECT-TYPE

SYNTAX INTEGER {
 dsx3SendNoCode(1),
 dsx3SendLineCode(2),
 dsx3SendPayloadCode(3),
 dsx3SendResetCode(4),
 dsx3SendDS1LoopCode(5),
 dsx3SendTestPattern(6)
 }

ACCESS read-write

STATUS mandatory

DESCRIPTION

"This variable indicates what type of code is being sent across the DS3/E3 interface by the device. (These are optional for E3 interfaces.) The values mean:

dsx3SendNoCode
 sending looped or normal data

dsx3SendLineCode
 sending a request for a line loopback

dsx3SendPayloadCode
 sending a request for a payload loopback
 (i.e., all DS1/E1s in a DS3/E3 frame)

dsx3SendResetCode
 sending a loopback deactivation request

dsx3SendDS1LoopCode
 requesting to loopback a particular DS1/E1
 within a DS3/E3 frame

dsx3SendTestPattern
 sending a test pattern."

::= { dsx3ConfigEntry 7 }

dsx3CircuitIdentifier OBJECT-TYPE

SYNTAX DisplayString (SIZE (0..255))

ACCESS read-write

STATUS mandatory

DESCRIPTION

"This variable contains the transmission vendor's circuit identifier, for the purpose of facilitating troubleshooting."

::= { dsx3ConfigEntry 8 }

dsx3LoopbackConfig OBJECT-TYPE

SYNTAX INTEGER {
 dsx3NoLoop(1),
 dsx3PayloadLoop(2),
 dsx3LineLoop(3),
 dsx3OtherLoop(4)
}

ACCESS read-write

STATUS mandatory

DESCRIPTION

"This variable represents the loopback configuration of the DS3/E3 interface.

The values mean:

dsx3NoLoop

Not in the loopback state. A device that is not capable of performing a loopback on the interface shall always return this as it's value.

dsx3PayloadLoop

The received signal at this interface is looped through the device.

Typically the received signal is looped back for retransmission after it has passed through the device's framing function.

dsx3LineLoop

The received signal at this interface does not go through the device (minimum penetration) but is looped back out.

dsx3OtherLoop

Loopbacks that are not defined here."

::= { dsx3ConfigEntry 9 }

dsx3LineStatus OBJECT-TYPE

SYNTAX INTEGER (1..1023)

ACCESS read-only

STATUS mandatory

DESCRIPTION

"This variable indicates the Line Status of the interface. It contains loopback state information and failure state information. The dsx3LineStatus is a bit map represented as a sum, therefore, it can represent multiple failures and a loopback (see dsx3LoopbackConfig object for the type of loopback) simultaneously. The dsx3NoAlarm should be set if and only if no other flag is set.

The various bit positions are:

- | | | |
|---|-------------------|---|
| 1 | dsx3NoAlarm | No alarm present |
| 2 | dsx3RcvRAIFailure | Receiving Yellow/Remote Alarm Indication |
| 4 | dsx3XmitRAIAlarm | Transmitting Yellow/Remote Alarm Indication |

8	dsx3RcvAIS	Receiving AIS failure state
16	dsx3XmitAIS	Transmitting AIS
32	dsx3LOF	Receiving LOF failure state
64	dsx3LOS	Receiving LOS failure state
128	dsx3LoopbackState	Looping the received signal
256	dsx3RcvTestCode	Receiving a Test Pattern
512	dsx3OtherFailure	any line status not defined here"

```

 ::= { dsx3ConfigEntry 10 }

dsx3TransmitClockSource OBJECT-TYPE
    SYNTAX  INTEGER {
                loopTiming(1),
                localTiming(2),
                throughTiming(3)
            }
    ACCESS  read-write
    STATUS  mandatory
    DESCRIPTION
        "The source of Transmit Clock.
         is derived from the recovered receive clock of
         another DS3 interface."
    ::= { dsx3ConfigEntry 11 }

-- the DS3/E3 Current

-- The DS3/E3 current table contains various statistics being
-- collected for the current 15 minute interval.

dsx3CurrentTable OBJECT-TYPE
    SYNTAX  SEQUENCE OF Dsx3CurrentEntry
    ACCESS  not-accessible
    STATUS  mandatory
    DESCRIPTION
        "The DS3/E3 Current table."
    ::= { ds3 6 }

dsx3CurrentEntry OBJECT-TYPE
    SYNTAX  Dsx3CurrentEntry
    ACCESS  not-accessible
    STATUS  mandatory
    DESCRIPTION
        "An entry in the DS3/E3 Current table."
    INDEX   { dsx3CurrentIndex }
    ::= { dsx3CurrentTable 1 }

```

```

Dsx3CurrentEntry ::=
  SEQUENCE {
    dsx3CurrentIndex
      INTEGER,
    dsx3CurrentPESs
      Gauge,
    dsx3CurrentPSESSs
      Gauge,
    dsx3CurrentSEFSSs
      Gauge,
    dsx3CurrentUASs
      Gauge,
    dsx3CurrentLCVs
      Gauge,
    dsx3CurrentPCVs
      Gauge,
    dsx3CurrentLESSs
      Gauge,
    dsx3CurrentCCVs
      Gauge,
    dsx3CurrentCESs
      Gauge,
    dsx3CurrentCSESSs
      Gauge
  }

```

dsx3CurrentIndex OBJECT-TYPE

SYNTAX INTEGER (1..65535)

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The index value which uniquely identifies the DS3/E3 interface to which this entry is applicable. The interface identified by a particular value of this index is the same interface as identified by the same value an dsx3LineIndex object instance."

::= { dsx3CurrentEntry 1 }

dsx3CurrentPESs OBJECT-TYPE

SYNTAX Gauge

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The counter associated with the number of P-bit Errored Seconds, encountered by a DS3 interface in the current 15 minute interval."

::= { dsx3CurrentEntry 2 }

dsx3CurrentPSESS OBJECT-TYPE

SYNTAX Gauge

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The counter associated with the number of P-bit Severely Errored Seconds, encountered by a DS3 interface in the current 15 minute interval."

::= { dsx3CurrentEntry 3 }

dsx3CurrentSEFSS OBJECT-TYPE

SYNTAX Gauge

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The counter associated with the number of Severely Errored Framing Seconds, encountered by a DS3/E3 interface in the current 15 minute interval."

::= { dsx3CurrentEntry 4 }

dsx3CurrentUASS OBJECT-TYPE

SYNTAX Gauge

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The counter associated with the number of Unavailable Seconds, encountered by a DS3 interface in the current 15 minute interval."

::= { dsx3CurrentEntry 5 }

dsx3CurrentLCVs OBJECT-TYPE

SYNTAX Gauge

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The counter associated with the number of Line Coding Violations encountered by a DS3/E3 interface in the current 15 minute interval."

::= { dsx3CurrentEntry 6 }

dsx3CurrentPCVs OBJECT-TYPE

SYNTAX Gauge

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The counter associated with the number of P-bit Coding Violations, encountered by a DS3 interface

```

        in the current 15 minute interval."
 ::= { dsx3CurrentEntry 7 }

```

dsx3CurrentLESSs OBJECT-TYPE

```

SYNTAX  Gauge
ACCESS  read-only
STATUS  mandatory
DESCRIPTION
    "The number of Line Errored Seconds encountered by
     a DS3/E3 interface in the current 15 minute
     interval."
 ::= { dsx3CurrentEntry 8 }

```

dsx3CurrentCCVs OBJECT-TYPE

```

SYNTAX  Gauge
ACCESS  read-only
STATUS  mandatory
DESCRIPTION
    "The number of C-bit Coding Violations encountered
     by a DS3 interface in the current 15 minute
     interval."
 ::= { dsx3CurrentEntry 9 }

```

dsx3CurrentCESSs OBJECT-TYPE

```

SYNTAX  Gauge
ACCESS  read-only
STATUS  mandatory
DESCRIPTION
    "The number of C-bit Errored Seconds encountered
     by a DS3 interface in the current 15 minute
     interval."
 ::= { dsx3CurrentEntry 10 }

```

dsx3CurrentCSESSs OBJECT-TYPE

```

SYNTAX  Gauge
ACCESS  read-only
STATUS  mandatory
DESCRIPTION
    "The number of C-bit Severely Errored Seconds
     encountered by a DS3 interface in the current 15
     minute interval."
 ::= { dsx3CurrentEntry 11 }

```

```
-- the DS3/E3 Interval
```

```
-- The DS3/E3 Interval Table contains various statistics
-- collected by each DS3/E3 Interface over the previous 24
```

```
-- hours of operation. The past 24 hours are broken into 96
-- completed 15 minute intervals.
```

```
dsx3IntervalTable OBJECT-TYPE
```

```
SYNTAX SEQUENCE OF Dsx3IntervalEntry
```

```
ACCESS not-accessible
```

```
STATUS mandatory
```

```
DESCRIPTION
```

```
"The DS3/E3 Interval table."
```

```
::= { ds3 7 }
```

```
dsx3IntervalEntry OBJECT-TYPE
```

```
SYNTAX Dsx3IntervalEntry
```

```
ACCESS not-accessible
```

```
STATUS mandatory
```

```
DESCRIPTION
```

```
"An entry in the DS3/E3 Interval table."
```

```
INDEX { dsx3IntervalIndex, dsx3IntervalNumber }
```

```
::= { dsx3IntervalTable 1 }
```

```
Dsx3IntervalEntry ::=
```

```
SEQUENCE {
```

```
    dsx3IntervalIndex
```

```
    INTEGER,
```

```
    dsx3IntervalNumber
```

```
    INTEGER,
```

```
    dsx3IntervalPESS
```

```
    Gauge,
```

```
    dsx3IntervalPSESS
```

```
    Gauge,
```

```
    dsx3IntervalSEFSS
```

```
    Gauge,
```

```
    dsx3IntervalUASS
```

```
    Gauge,
```

```
    dsx3IntervalLCVs
```

```
    Gauge,
```

```
    dsx3IntervalPCVs
```

```
    Gauge,
```

```
    dsx3IntervalLESS
```

```
    Gauge,
```

```
    dsx3IntervalCCVs
```

```
    Gauge,
```

```
    dsx3IntervalCESS
```

```
    Gauge,
```

```
    dsx3IntervalCSESS
```

```
    Gauge
```

```
}
```

dsx3IntervalIndex OBJECT-TYPE

SYNTAX INTEGER (1..65535)

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The index value which uniquely identifies the DS3/E3 interface to which this entry is applicable. The interface identified by a particular value of this index is the same interface as identified by the same value an dsx3LineIndex object instance."

::= { dsx3IntervalEntry 1 }

dsx3IntervalNumber OBJECT-TYPE

SYNTAX INTEGER (1..96)

ACCESS read-only

STATUS mandatory

DESCRIPTION

"A number between 1 and 96, where 1 is the most recently completed 15 minute interval and 96 is the least recently completed 15 minutes interval (assuming that all 96 intervals are valid)."

::= { dsx3IntervalEntry 2 }

dsx3IntervalPESSs OBJECT-TYPE

SYNTAX Gauge

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The counter associated with the number of P-bit Errored Seconds, encountered by a DS3 interface in one of the previous 96, individual 15 minute, intervals."

::= { dsx3IntervalEntry 3 }

dsx3IntervalPSESSs OBJECT-TYPE

SYNTAX Gauge

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The counter associated with the number of P-bit Severely Errored Seconds, encountered by a DS3 interface in one of the previous 96, individual 15 minute, intervals."

::= { dsx3IntervalEntry 4 }

dsx3IntervalSEFSSs OBJECT-TYPE

SYNTAX Gauge

```

ACCESS    read-only
STATUS    mandatory
DESCRIPTION
    "The counter associated with the number of
    Severely Errored Framing Seconds, encountered by a
    DS3/E3 interface in one of the previous 96,
    individual 15 minute, intervals."
::= { dsx3IntervalEntry 5 }

```

dsx3IntervalUASSs OBJECT-TYPE

```

SYNTAX    Gauge
ACCESS    read-only
STATUS    mandatory
DESCRIPTION
    "The counter associated with the number of
    Unavailable Seconds, encountered by a DS3
    interface in one of the previous 96, individual 15
    minute, intervals."
::= { dsx3IntervalEntry 6 }

```

dsx3IntervalLCVs OBJECT-TYPE

```

SYNTAX    Gauge
ACCESS    read-only
STATUS    mandatory
DESCRIPTION
    "The counter associated with the number of Line
    Coding Violations encountered by a DS3/E3
    interface in one of the previous 96, individual 15
    minute, intervals."
::= { dsx3IntervalEntry 7 }

```

dsx3IntervalPCVs OBJECT-TYPE

```

SYNTAX    Gauge
ACCESS    read-only
STATUS    mandatory
DESCRIPTION
    "The counter associated with the number of P-bit
    Coding Violations, encountered by a DS3 interface
    in one of the previous 96, individual 15 minute,
    intervals."
::= { dsx3IntervalEntry 8 }

```

dsx3IntervalLESSs OBJECT-TYPE

```

SYNTAX    Gauge
ACCESS    read-only
STATUS    mandatory
DESCRIPTION
    "The number of Line Errored Seconds (BPVs or

```

```

        illegal zero sequences) encountered by a DS3/E3
        interface in one of the previous 96, individual
        15 minute, intervals."
 ::= { dsx3IntervalEntry 9 }

```

dsx3IntervalCCVs OBJECT-TYPE

```

SYNTAX  Gauge
ACCESS  read-only
STATUS  mandatory
DESCRIPTION
        "The number of C-bit Coding Violations encountered
        by a DS3 interface in one of the previous 96,
        individual 15 minute, intervals."
 ::= { dsx3IntervalEntry 10 }

```

dsx3IntervalCESSs OBJECT-TYPE

```

SYNTAX  Gauge
ACCESS  read-only
STATUS  mandatory
DESCRIPTION
        "The number of C-bit Errored Seconds encountered
        by a DS3 interface in one of the previous 96,
        individual 15 minute, intervals."
 ::= { dsx3IntervalEntry 11 }

```

dsx3IntervalCSESSs OBJECT-TYPE

```

SYNTAX  Gauge
ACCESS  read-only
STATUS  mandatory
DESCRIPTION
        "The number of C-bit Severely Errored Seconds
        encountered by a DS3 interface in one of the
        previous 96, individual 15 minute, intervals."
 ::= { dsx3IntervalEntry 12 }

```

-- the DS3/E3 Total

-- The DS3/E3 Total Table contains the cumulative sum of the
 -- various statistics for the 24 hour period preceding the
 -- current interval.

dsx3TotalTable OBJECT-TYPE

```

SYNTAX  SEQUENCE OF Dsx3TotalEntry
ACCESS  not-accessible
STATUS  mandatory
DESCRIPTION
        "The DS3/E3 Total table.  24 hour interval."

```

```
::= { ds3 8 }
```

```
dsx3TotalEntry OBJECT-TYPE
    SYNTAX  Dsx3TotalEntry
    ACCESS  not-accessible
    STATUS  mandatory
    DESCRIPTION
        "An entry in the DS3/E3 Total table."
    INDEX   { dsx3TotalIndex }
    ::= { dsx3TotalTable 1 }
```

```
Dsx3TotalEntry ::=
    SEQUENCE {
        dsx3TotalIndex
            INTEGER,
        dsx3TotalPESs
            Gauge,
        dsx3TotalPSESSs
            Gauge,
        dsx3TotalSEFSs
            Gauge,
        dsx3TotalUASs
            Gauge,
        dsx3TotalLCVs
            Gauge,
        dsx3TotalPCVs
            Gauge,
        dsx3TotalLESSs
            Gauge,
        dsx3TotalCCVs
            Gauge,
        dsx3TotalCESSs
            Gauge,
        dsx3TotalCSESSs
            Gauge
    }
```

```
dsx3TotalIndex OBJECT-TYPE
    SYNTAX  INTEGER (1..65535)
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "The index value which uniquely identifies the
        DS3/E3 interface to which this entry is
        applicable. The interface identified by a
        particular value of this index is the same
        interface as identified by the same value an
        dsx3LineIndex object instance."
```

```
 ::= { dsx3TotalEntry 1 }

dsx3TotalPESS OBJECT-TYPE
    SYNTAX  Gauge
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "The counter associated with the number of P-bit
        Errored Seconds, encountered by a DS3 interface in
        the previous 24 hour interval"
    ::= { dsx3TotalEntry 2 }

dsx3TotalPSESS OBJECT-TYPE
    SYNTAX  Gauge
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "The counter associated with the number of P-bit
        Severely Errored Seconds, encountered by a DS3
        interface in the previous 24 hour interval."
    ::= { dsx3TotalEntry 3 }

dsx3TotalSEFSS OBJECT-TYPE
    SYNTAX  Gauge
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "The counter associated with the number of
        Severely Errored Framing Seconds, encountered by a
        DS3/E3 interface in the previous 24 hour
        interval."
    ::= { dsx3TotalEntry 4 }

dsx3TotalUASS OBJECT-TYPE
    SYNTAX  Gauge
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "The counter associated with the number of
        Unavailable Seconds, encountered by a DS3
        interface in the previous 24 hour interval."
    ::= { dsx3TotalEntry 5 }

dsx3TotalLCVs OBJECT-TYPE
    SYNTAX  Gauge
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
```

"The counter associated with the number of Line Coding Violations encountered by a DS3/E3 interface in the previous 24 hour interval."
 ::= { dsx3TotalEntry 6 }

dsx3TotalPCVs OBJECT-TYPE

SYNTAX Gauge
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The counter associated with the number of P-bit Coding Violations, encountered by a DS3 interface in the previous 24 hour interval."
 ::= { dsx3TotalEntry 7 }

dsx3TotalLESSs OBJECT-TYPE

SYNTAX Gauge
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of Line Errored Seconds (BPVs or illegal zero sequences) encountered by a DS3/E3 interface in the previous 24 hour interval."
 ::= { dsx3TotalEntry 8 }

dsx3TotalCCVs OBJECT-TYPE

SYNTAX Gauge
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of C-bit Coding Violations encountered by a DS3 interface in the previous 24 hour interval."
 ::= { dsx3TotalEntry 9 }

dsx3TotalCESSs OBJECT-TYPE

SYNTAX Gauge
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of C-bit Errored Seconds encountered by a DS3 interface in the previous 24 hour interval."
 ::= { dsx3TotalEntry 10 }

dsx3TotalCSESSs OBJECT-TYPE

SYNTAX Gauge
ACCESS read-only

```

STATUS    mandatory
DESCRIPTION
    "The number of C-bit Severely Errored Seconds
    encountered by a DS3 interface in the previous 24
    hour interval."
 ::= { dsx3TotalEntry 11 }

-- The DS3 Far End Group

-- Implementation of this group is optional for all systems
-- that attach to a DS3 Interface.
-- However, only C-bit Parity and SYNTRAN DS3 applications
-- have the capability (option) of providing this information.

-- The DS3 Far End Group consists of four tables:
--   DS3 Far End Configuration
--   DS3 Far End Current
--   DS3 Far End Interval
--   DS3 Far End Total

-- The DS3 Far End Configuration Table contains
-- configuration information
-- reported in the C-bits from the remote end.

dsx3FarEndConfigTable OBJECT-TYPE
    SYNTAX  SEQUENCE OF Dsx3FarEndConfigEntry
    ACCESS  not-accessible
    STATUS  mandatory
    DESCRIPTION
        "The DS3 Far End Configuration table."
    ::= { ds3 9 }

dsx3FarEndConfigEntry OBJECT-TYPE
    SYNTAX  Dsx3FarEndConfigEntry
    ACCESS  not-accessible
    STATUS  mandatory
    DESCRIPTION
        "An entry in the DS3 Far End Configuration table."
    INDEX   { dsx3FarEndLineIndex }
    ::= { dsx3FarEndConfigTable 1 }

Dsx3FarEndConfigEntry ::=
    SEQUENCE {
        dsx3FarEndLineIndex
            INTEGER,
        dsx3FarEndEquipCode
    }

```

```

        DisplayString,
    dsx3FarEndLocationIDCode
        DisplayString,
    dsx3FarEndFrameIDCode
        DisplayString,
    dsx3FarEndUnitCode
        DisplayString,
    dsx3FarEndFacilityIDCode
        DisplayString
    }

dsx3FarEndLineIndex OBJECT-TYPE
    SYNTAX  INTEGER (1..65535)
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "The index value which uniquely identifies the
        DS3 interface
        to which this entry is applicable.  The
        interface identified by a particular value of
        this index is the same interface as identified
        by the same value an dsx3LineIndex object
        instance."
    ::= { dsx3FarEndConfigEntry 1 }

dsx3FarEndEquipCode OBJECT-TYPE
    SYNTAX  DisplayString (SIZE (0..10))
    ACCESS  read-write
    STATUS  mandatory
    DESCRIPTION
        "This is the Far End Equipment Identification code
        that describes the specific piece of equipment.
        It is sent within the Path
        Identification Message."
    ::= { dsx3FarEndConfigEntry 2 }

dsx3FarEndLocationIDCode OBJECT-TYPE
    SYNTAX  DisplayString (SIZE (0..11))
    ACCESS  read-write
    STATUS  mandatory
    DESCRIPTION
        "This is the Far End Location Identification code
        that describes the specific location of the
        equipment.
        It is sent within the Path
        Identification Message."
    ::= { dsx3FarEndConfigEntry 3 }

```

```

dsx3FarEndFrameIDCode OBJECT-TYPE
    SYNTAX  DisplayString (SIZE (0..10))
    ACCESS  read-write
    STATUS  mandatory
    DESCRIPTION
        "This is the Far End Frame Identification code
        that identifies where the equipment is located
        within a building at a given location.
        It is sent within the Path
        Identification Message."
    ::= { dsx3FarEndConfigEntry 4 }

dsx3FarEndUnitCode OBJECT-TYPE
    SYNTAX  DisplayString (SIZE (0..6))
    ACCESS  read-write
    STATUS  mandatory
    DESCRIPTION
        "This is the Far End code
        that identifies the equipment location within a bay.
        It is sent within the Path
        Identification Message."
    ::= { dsx3FarEndConfigEntry 5 }

dsx3FarEndFacilityIDCode OBJECT-TYPE
    SYNTAX  DisplayString (SIZE (0..38))
    ACCESS  read-write
    STATUS  mandatory
    DESCRIPTION
        "This code identifies a specific Far End DS3 path.
        It is sent within the Path
        Identification Message."
    ::= { dsx3FarEndConfigEntry 6 }

-- The DS3 Far End Current

-- The DS3 Far End Current table contains various statistics
-- being collected for the current 15 minute interval.
-- The statistics are collected from the far end block error
-- code within the C-bits.

dsx3FarEndCurrentTable OBJECT-TYPE
    SYNTAX  SEQUENCE OF Dsx3FarEndCurrentEntry
    ACCESS  not-accessible
    STATUS  mandatory
    DESCRIPTION
        "The DS3 Far End Current table."
    ::= { ds3 10 }

```

dsx3FarEndCurrentEntry OBJECT-TYPE

SYNTAX Dsx3FarEndCurrentEntry

ACCESS not-accessible

STATUS mandatory

DESCRIPTION

"An entry in the DS3 Far End Current table."

INDEX { dsx3FarEndCurrentIndex }

::= { dsx3FarEndCurrentTable 1 }

Dsx3FarEndCurrentEntry ::=

SEQUENCE {

dsx3FarEndCurrentIndex

INTEGER,

dsx3FarEndTimeElapsed

INTEGER,

dsx3FarEndValidIntervals

INTEGER,

dsx3FarEndCurrentCESS

Gauge,

dsx3FarEndCurrentCSESS

Gauge,

dsx3FarEndCurrentCCVs

Gauge,

dsx3FarEndCurrentUASS

Gauge

}

dsx3FarEndCurrentIndex OBJECT-TYPE

SYNTAX INTEGER (1..65535)

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The index value which uniquely identifies the DS3 interface

to which this entry is applicable. The interface identified by a particular value of this index is the same interface as identified by the same value an dsx3LineIndex object instance."

::= { dsx3FarEndCurrentEntry 1 }

dsx3FarEndTimeElapsed OBJECT-TYPE

SYNTAX INTEGER (0..899)

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The number of seconds that have elapsed since the beginning of the far end current error-measurement period."

```
 ::= { dsx3FarEndCurrentEntry 2 }
```

dsx3FarEndValidIntervals OBJECT-TYPE

SYNTAX INTEGER (0..96)

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The number of previous far end intervals for which valid data was collected. The value will be 96 unless the interface was brought online within the last 24 hours, in which case the value will be the number of complete 15 minute far end intervals since the interface has been online."

```
 ::= { dsx3FarEndCurrentEntry 3 }
```

dsx3FarEndCurrentCESSs OBJECT-TYPE

SYNTAX Gauge

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The counter associated with the number of Far End C-bit Errored Seconds encountered by a DS3 interface in the current 15 minute interval."

```
 ::= { dsx3FarEndCurrentEntry 4 }
```

dsx3FarEndCurrentCSESSs OBJECT-TYPE

SYNTAX Gauge

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The counter associated with the number of Far End C-bit Severely Errored Seconds encountered by a DS3 interface in the current 15 minute interval."

```
 ::= { dsx3FarEndCurrentEntry 5 }
```

dsx3FarEndCurrentCCVs OBJECT-TYPE

SYNTAX Gauge

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The counter associated with the number of Far End C-bit Coding Violations reported via the far end block error count encountered by a DS3 interface in the current 15 minute interval."

```
 ::= { dsx3FarEndCurrentEntry 6 }
```

dsx3FarEndCurrentUASs OBJECT-TYPE

SYNTAX Gauge

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The counter associated with the number of
Far End unavailable seconds
encountered by a

DS3 interface in the current 15 minute interval."

::= { dsx3FarEndCurrentEntry 7 }

-- The DS3 Far End Interval

-- The DS3 Far End Interval Table contains various statistics
-- collected by each DS3 interface over the previous 24
-- hours of operation. The past 24 hours are broken into 96
-- completed 15 minute intervals.

dsx3FarEndIntervalTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dsx3FarEndIntervalEntry

ACCESS not-accessible

STATUS mandatory

DESCRIPTION

"The DS3 Far End Interval table."

::= { ds3 11 }

dsx3FarEndIntervalEntry OBJECT-TYPE

SYNTAX Dsx3FarEndIntervalEntry

ACCESS not-accessible

STATUS mandatory

DESCRIPTION

"An entry in the DS3 Far
End Interval table."

INDEX { dsx3FarEndIntervalIndex,
dsx3FarEndIntervalNumber }

::= { dsx3FarEndIntervalTable 1 }

Dsx3FarEndIntervalEntry ::=

SEQUENCE {

dsx3FarEndIntervalIndex

INTEGER,

dsx3FarEndIntervalNumber

INTEGER,

dsx3FarEndIntervalCESS

Gauge,

dsx3FarEndIntervalCSESS

Gauge,

```

        dsx3FarEndIntervalCCVs
            Gauge,
        dsx3FarEndIntervalUASS
            Gauge
    }

dsx3FarEndIntervalIndex OBJECT-TYPE
    SYNTAX  INTEGER (1..65535)
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "The index value which uniquely identifies the
        DS3 interface
        to which this entry is applicable.  The
        interface identified by a particular value of
        this index is the same interface as identified
        by the same value an dsx3LineIndex object
        instance."
    ::= { dsx3FarEndIntervalEntry 1 }

dsx3FarEndIntervalNumber OBJECT-TYPE
    SYNTAX  INTEGER (1..96)
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "A number between 1 and 96, where 1 is the most
        recently completed 15 minute interval and 96 is
        the least recently completed 15 minutes
        interval (assuming that all 96 intervals are
        valid)."
    ::= { dsx3FarEndIntervalEntry 2 }

dsx3FarEndIntervalCESSs OBJECT-TYPE
    SYNTAX  Gauge
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "The counter associated with the number of
        Far End C-bit Errored Seconds encountered
        by a DS3 interface in one of the previous 96,
        individual 15 minute, intervals."
    ::= { dsx3FarEndIntervalEntry 3 }

dsx3FarEndIntervalCSESSs OBJECT-TYPE
    SYNTAX  Gauge
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION

```

"The counter associated with the number of Far End C-bit Severely Errored Seconds encountered by a DS3 interface in one of the previous 96, individual 15 minute, intervals."
 ::= { dsx3FarEndIntervalEntry 4 }

dsx3FarEndIntervalCCVs OBJECT-TYPE

SYNTAX Gauge
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "The counter associated with the number of Far End C-bit Coding Violations reported via the far end block error count encountered by a DS3 interface in one of the previous 96, individual 15 minute, intervals."
 ::= { dsx3FarEndIntervalEntry 5 }

dsx3FarEndIntervalUASs OBJECT-TYPE

SYNTAX Gauge
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "The counter associated with the number of Far End unavailable seconds encountered by a DS3 interface in one of the previous 96, individual 15 minute, intervals."
 ::= { dsx3FarEndIntervalEntry 6 }

-- The DS3 Far End Total

-- The DS3 Far End Total Table contains the cumulative sum
 -- of the various statistics for the 24 hour period preceding
 -- the current interval.

dsx3FarEndTotalTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dsx3FarEndTotalEntry
 ACCESS not-accessible
 STATUS mandatory
 DESCRIPTION
 "The DS3 Far End Total table. 24 hour interval."
 ::= { ds3 12 }

dsx3FarEndTotalEntry OBJECT-TYPE

SYNTAX Dsx3FarEndTotalEntry

```

ACCESS    not-accessible
STATUS    mandatory
DESCRIPTION
    "An entry in the DS3 Far End Total table."
INDEX     { dsx3FarEndTotalIndex }
::= { dsx3FarEndTotalTable 1 }

Dsx3FarEndTotalEntry ::=
SEQUENCE {
    dsx3FarEndTotalIndex
        INTEGER,
    dsx3FarEndTotalCESSs
        Gauge,
    dsx3FarEndTotalCSESSs
        Gauge,
    dsx3FarEndTotalCCVs
        Gauge,
    dsx3FarEndTotalUASSs
        Gauge
}

dsx3FarEndTotalIndex OBJECT-TYPE
SYNTAX    INTEGER (1..65535)
ACCESS    read-only
STATUS    mandatory
DESCRIPTION
    "The index value which uniquely identifies the
    DS3 interface
    to which this entry is applicable.  The interface
    identified by a particular value of this index is
    the same interface as identified by the same value
    an dsx3LineIndex object instance."
::= { dsx3FarEndTotalEntry 1 }

dsx3FarEndTotalCESSs OBJECT-TYPE
SYNTAX    Gauge
ACCESS    read-only
STATUS    mandatory
DESCRIPTION
    "The counter associated with the number of Far
    End C-bit Errored Seconds encountered by a DS3
    interface in the previous 24 hour interval."
::= { dsx3FarEndTotalEntry 2 }

dsx3FarEndTotalCSESSs OBJECT-TYPE
SYNTAX    Gauge
ACCESS    read-only
STATUS    mandatory

```

DESCRIPTION

"The counter associated with the number of Far End C-bit Severely Errored Seconds encountered by a DS3 interface in the previous 24 hour interval."

::= { dsx3FarEndTotalEntry 3 }

dsx3FarEndTotalCCVs OBJECT-TYPE

SYNTAX Gauge

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The counter associated with the number of Far End C-bit Coding Violations reported via the far end block error count encountered by a DS3 interface in the previous 24 hour interval."

::= { dsx3FarEndTotalEntry 4 }

dsx3FarEndTotalUASs OBJECT-TYPE

SYNTAX Gauge

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The counter associated with the number of Far End unavailable seconds encountered by a DS3 interface in the previous 24 hour interval."

::= { dsx3FarEndTotalEntry 5 }

-- the DS3/E3 Fractional Group

-- Implementation of this group is optional. It is designed
-- for those systems dividing a DS3/E3 into channels
-- containing different data streams that are of local
-- interest.

-- The DS3/E3 fractional table identifies which DS3/E3
-- channels associated with a CSU are being used to
-- support a logical interface, i.e., an entry in the
-- interfaces table from the Internet-standard MIB.

-- For example, consider a DS3 device with 4 high speed links
-- carrying router traffic, a feed for voice, a feed for
-- video, and a synchronous channel for a non-routed
-- protocol.
-- We might describe the allocation of channels, in the

-- dsx3FracTable, as follows:

-- dsx3FracIfIndex.2. 1 = 3	dsx3FracIfIndex.2.15 = 4
-- dsx3FracIfIndex.2. 2 = 3	dsx3FracIfIndex.2.16 = 6
-- dsx3FracIfIndex.2. 3 = 3	dsx3FracIfIndex.2.17 = 6
-- dsx3FracIfIndex.2. 4 = 3	dsx3FracIfIndex.2.18 = 6
-- dsx3FracIfIndex.2. 5 = 3	dsx3FracIfIndex.2.19 = 6
-- dsx3FracIfIndex.2. 6 = 3	dsx3FracIfIndex.2.20 = 6
-- dsx3FracIfIndex.2. 7 = 4	dsx3FracIfIndex.2.21 = 6
-- dsx3FracIfIndex.2. 8 = 4	dsx3FracIfIndex.2.22 = 6
-- dsx3FracIfIndex.2. 9 = 4	dsx3FracIfIndex.2.23 = 6
-- dsx3FracIfIndex.2.10 = 4	dsx3FracIfIndex.2.24 = 6
-- dsx3FracIfIndex.2.11 = 4	dsx3FracIfIndex.2.25 = 6
-- dsx3FracIfIndex.2.12 = 5	dsx3FracIfIndex.2.26 = 6
-- dsx3FracIfIndex.2.13 = 5	dsx3FracIfIndex.2.27 = 6
-- dsx3FracIfIndex.2.14 = 5	dsx3FracIfIndex.2.28 = 6

-- For dsx3M23, dsx3SYNTRAN, dsx3CbitParity, and
 -- dsx3ClearChannel there are 28 legal channels, numbered 1
 -- through 28.

-- For e3Framed there are 16 legal channels,
 -- numbered 1 through 16. The channels (1..16) correspond
 -- directly to the equivalently numbered time-slots.

dsx3FracTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dsx3FracEntry

ACCESS not-accessible

STATUS mandatory

DESCRIPTION

"The DS3 Fractional table."

::= { ds3 13 }

dsx3FracEntry OBJECT-TYPE

SYNTAX Dsx3FracEntry

ACCESS not-accessible

STATUS mandatory

DESCRIPTION

"An entry in the DS3 Fractional table."

INDEX { dsx3FracIndex, dsx3FracNumber }

::= { dsx3FracTable 1 }

Dsx3FracEntry ::=

SEQUENCE {

dsx3FracIndex

INTEGER,

dsx3FracNumber

INTEGER,

```
        dsx3FracIfIndex
            INTEGER
    }

dsx3FracIndex OBJECT-TYPE
    SYNTAX  INTEGER (1..'7fffffff'h)
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "The index value which uniquely identifies the
        DS3 interface to which this entry is applicable
        The interface identified by a particular
        value of this index is the same interface as
        identified by the same value an dsx3LineIndex
        object instance."
    ::= { dsx3FracEntry 1 }

dsx3FracNumber OBJECT-TYPE
    SYNTAX  INTEGER (1..31)
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "The channel number for this entry."
    ::= { dsx3FracEntry 2 }

dsx3FracIfIndex OBJECT-TYPE
    SYNTAX  INTEGER (1..'7fffffff'h)
    ACCESS  read-write
    STATUS  mandatory
    DESCRIPTION
        "An index value that uniquely identifies an
        interface. The interface identified by a particular
        value of this index is the same interface
        as identified by the same value an ifIndex
        object instance. If no interface is currently using
        a channel, the value should be zero. If a
        single interface occupies more than one time
        slot, that ifIndex value will be found in multiple
        time slots."
    ::= { dsx3FracEntry 3 }
```

END

5. Acknowledgments

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6. References

- [1] Cerf, V., "IAB Recommendations for the Development of Internet Network Management Standards", RFC 1052, NRI, April 1988.
- [2] Cerf, V., "Report of the Second Ad Hoc Network Management Review Group", RFC 1109, NRI, August 1989.
- [3] Rose M., and K. McCloghrie, "Structure and Identification of Management Information for TCP/IP-based internets", STD 16, RFC 1155, Performance Systems International, Hughes LAN Systems, May 1990.
- [4] McCloghrie K., and M. Rose, "Management Information Base for Network Management of TCP/IP-based internets", RFC 1156, Hughes LAN Systems, Performance Systems International, May 1990.
- [5] Case, J., Fedor, M., Schoffstall, M., and J. Davin, "Simple Network Management Protocol", STD 15, RFC 1157, SNMP Research, Performance Systems International, Performance Systems International, MIT Laboratory for Computer Science, May 1990.

- [6] McCloghrie K., and M. Rose, Editors, "Management Information Base for Network Management of TCP/IP-based internets", STD 17, RFC 1213, 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 - Electrical Interfaces, ANSI T1.102- 1987.
- [10] American National Standard for Telecommunications - Digital Hierarchy - Formats Specification, ANSI T1.107- 1988.
- [10a] ANSI T1.107a-1990.
- [11] American National Standard for Telecommunications - Carrier-to-Customer Installation - DS3 Metallic Interface, ANSI T1.404-1989.
- [12] American National Standard for Telecommunications -- Layer 1 In-Service Digital Transmission Performance Monitoring T1M1/92-0xx, T1M1.3/92-005R1, April 1992.
- [13] Rose, M., and K. McCloghrie, Editors, "Concise MIB Definitions", STD 16, RFC 1212, Performance Systems International, Hughes LAN Systems, March 1991.
- [14] CCITT - Digital Multiplex Equipment Operating at the Third Order Bit Rate of 34 368 Kbit/s and the Forth Order Bit Rate of 139 264 Kbit/s and Using Positive Justification, G.751.
- [15] European Telecommunications Standards Institute -- ETS "34M" -- Metropolitan Area Network Physical Convergence Layer Procedure for 34.368 Megabits per Second, T/NA(91)18, May 1991.

7. Security Considerations

Security issues are not discussed in this memo.

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