

**Definitions of Managed Objects  
for the DS3/E3 Interface Type**

Sun April 4 11:52:50 EDT 2004

[draft-ietf-atommib-rfc2496bis-06.txt](#)

Orly Nicklass (editor)  
RAD Data Communications, Ltd.  
Orly\_n@rad.com

## Status of this Memo

This document is an Internet-Draft and is in full conformance with all provisions of [Section 10 of RFC2026](#). Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet- Drafts as reference material or to cite them other than as "work in progress."

The list of current Internet-Drafts can be accessed at <http://www.ietf.org/ietf/1id-abstracts.txt>.

The list of Internet-Draft Shadow Directories can be accessed at <http://www.ietf.org/shadow.html>.

## Copyright Notice

Copyright (C) The Internet Society (2004). All Rights Reserved.

## Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes objects used for managing DS3 and E3 interfaces. This document is a companion to the documents that define Managed Objects for the DS0, DS1/E1/DS2/E2 and Synchronous Optical Network/Synchronous Digital Hierarchy (SONET/SDH) Interface

Types.

This document obsoletes [RFC 2496](#).

## **1. The Internet Standard Management Framework**

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to [section 7 of RFC 3410](#) [[RFC3410](#)].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIV2, which is described in STD 58, [RFC 2578](#) [[RFC2578](#)], STD 58, [RFC 2579](#) [[RFC2579](#)] and STD 58, [RFC 2580](#) [[RFC2580](#)].

### **1.1. Changes from [RFC2496](#)**

The changes from [RFC2496](#) are the following:

- (1) The dsx3FracIfIndex SYNTAX matches the description range.
- (2) Reference was added to Circuit Identifier object.
- (3) Usage of ifStackTable section was updated.
- (4) Align the DESCRIPTION clauses of few statistic objects with the near end definition, the far end definition and with [RFC3593](#).
- (5) Add new value, dsx3M13, to dsx3LineType.

### **1.2. Changes from [RFC1407](#)**

The changes from [RFC1407](#) are the following:

- (1) The Fractional Table has been deprecated.

- (2) This document uses SMIV2.
- (3) Values are given for ifTable and ifXTable.
- (4) Example usage of ifStackTable is included.
- (5) dsx3IfIndex has been deprecated.
- (6) The definition of valid intervals has been clarified for the case where the agent proxied for other devices. In particular, the treatment of missing intervals has been clarified.
- (7) An inward loopback has been added.
- (8) Additional lineStatus bits have been added for Near End in Unavailable Signal State, Carrier Equipment Out of Service.
- (9) A read-write line Length object has been added.
- (10) Added a lineStatus last change, trap and enabler.
- (11) Textual Conventions for statistics objects have been used.
- (12) A new object, dsx3LoopbackStatus, has been introduced to reflect the loopbacks established on a DS3/E3 interface and the source to the requests. dsx3LoopbackConfig continues to be the desired loopback state while dsx3LoopbackStatus reflects the actual state.
- (13) A dual loopback has been added to allow the setting of an inward loopback and a line loopback at the same time.
- (14) An object has been added to indicate whether or not this is a channelized DS3/E3.
- (15) A new object has been added to indicate which DS1 is to set for remote loopback.

## 2. 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-T1.102](#)], ANSI T1.107-1988 [[ANSI-T1.107](#)], ANSI T1.107a-1990 [[ANSI-T1.107a](#)], and ANSI T1.404-1989 [[ANSI-T1.404](#)]. The E3 definitions contained herein are based on the E3 specifications in CCITT G.751 [[CCITT-G.751](#)].

### 2.1. Use of ifTable for DS3 Layer

Only the ifGeneralInformationGroup needs to be supported.

ifTable Object	Use for DS3 Layer
ifIndex	Interface index.
ifDescr	See interfaces MIB [ <a href="#">RFC2863</a> ]
ifType	ds3(30)
ifSpeed	Speed of line rate DS3 - 44736000 E3 - 34368000
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	See interfaces MIB [ <a href="#">RFC2863</a> ]
ifOperStatus	See interfaces MIB [ <a href="#">RFC2863</a> ]
ifLastChange	See interfaces MIB [ <a href="#">RFC2863</a> ]
ifName	See interfaces MIB [ <a href="#">RFC2863</a> ]
ifLinkUpDownTrapEnable	Set to enabled(1).

ifHighSpeed	Speed of line in Mega-bits per second (either 45 or 34)
ifConnectorPresent	Set to true(1) normally, except for cases such as DS3/E3 over AAL1/ATM where false(2) is appropriate

## **2.2. Usage Guidelines**

### **2.2.1. Usage of ifStackTable**

The object dsx3IfIndex has been deprecated. This object previously allowed a very special proxy situation to exist for Routers and CSUs. This section now describes how to use ifStackTable to represent this relationship.

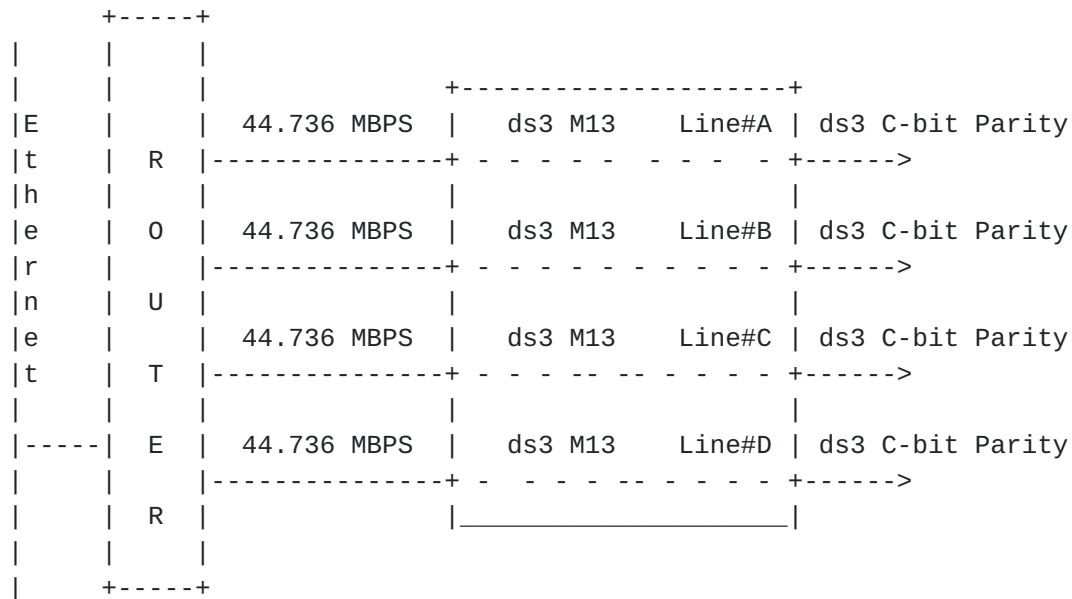
The paragraphs discussing dsx3IfIndex and dsx3LineIndex have been preserved in [Appendix A](#) for informational purposes.

The ifStackTable is used in the proxy case to represent the association between pairs of interfaces, e.g. this DS3 is attached to that DS3. This use is consistent with the use of the ifStackTable to show the association between various sub-layers of an interface. In both cases entire PDUs are exchanged between the interface pairs - in the case of a DS3, entire DS3 frames are exchanged; in the case of PPP and HDLC, entire HDLC frames are exchanged. This usage is not meant to suggest the use of the ifStackTable to represent Time Division Multiplexing (TDM) connections in general.

External&Internal interface scenario: the SNMP Agent resides on a host external from the device supporting DS3/E3 interfaces (e.g., a router). The Agent represents both the host and the DS3/E3 device.

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:



The assignment of the index values could for example be:

ifIndex	Description
1	Ethernet
2	Line#A Router
3	Line#B Router
4	Line#C Router
5	Line#D Router
6	Line#A CSU Router
7	Line#B CSU Router
8	Line#C CSU Router
9	Line#D CSU Router
10	Line#A CSU Network
11	Line#B CSU Network
12	Line#C CSU Network
13	Line#D CSU Network

The ifStackTable is then used to show the relationships between the various DS3 interfaces.

#### ifStackTable Entries

HigherLayer	LowerLayer
2	6
3	7
4	8
5	9

6	10
7	11
8	12
9	13

If the CSU shelf is managed by itself by a local SNMP Agent, the situation would be identical, except the Ethernet and the 4 router interfaces are deleted. Interfaces would also be numbered from 1 to 8.

ifIndex	Description
1	Line#A CSU Router
2	Line#B CSU Router
3	Line#C CSU Router
4	Line#D CSU Router
5	Line#A CSU Network
6	Line#B CSU Network
7	Line#C CSU Network
8	Line#D CSU Network

#### ifStackTable Entries

HigherLayer	LowerLayer
1	5
2	6
3	7
4	8

### **2.2.2. Usage of Channelization for DS3, DS1, DS0**

An example is given here to explain the channelization objects in the DS3, DS1, and DS0 MIBs to help the implementor use the objects correctly. Treatment of E3 and E1 would be similar, with the number of DS0s being different depending on the framing of the E1.

Assume that a DS3 (with ifIndex 1) is Channelized into DS1s (without DS2s). The object dsx3Channelization is set to enabledDs1. When this object is set to enabledDS1, 28 ifEntries of type DS1 will be created by the agent. If dsx3Channelization is set to disabled, then the DS1s are destroyed.

Assume the entries in the ifTable for the DS1s are created in channel order and the ifIndex values are 2 through 29. In the DS1 MIB, there will be an entry in the dsx1ChanMappingTable for each ds1. The entries will be as follows:

## dsx1ChanMappingTable Entries

ifIndex	dsx1Ds1ChannelNumber	dsx1ChanMappedIfIndex
1	1	2
1	2	3
.....		
1	28	29

In addition, the DS1s are channelized into DS0s. The object dsx1Channelization is set to enabledDS0 for each DS1. There will be 24 DS0s in the ifTable for each DS1. Assume the entries in the ifTable are created in channel order and the ifIndex values for the DS0s in the first DS1 are 30 through 53. In the DS0 MIB, there will be an entry in the dsx0ChanMappingTable for each DS0. The entries will be as follows:

## dsx0ChanMappingTable Entries

ifIndex	dsx0Ds0ChannelNumber	dsx0ChanMappedIfIndex
2	1	30
2	2	31
.....		
2	24	53

**2.2.3. Usage of Channelization for DS3, DS2, DS1**

An example is given here to explain the channelization objects in the DS3 and DS1 MIBs to help the implementor use the objects correctly.

Assume that a DS3 (with ifIndex 1) is Channelized into DS2s. The object dsx3Channelization is set to enabledDs2. There will be 7 DS2s (ifType of DS1) in the ifTable. Assume the entries in the ifTable for the DS2s are created in channel order and the ifIndex values are 2 through 8. In the DS1 MIB, there will be an entry in the dsx1ChanMappingTable for each DS2. The entries will be as follows:

## dsx1ChanMappingTable Entries

ifIndex	dsx1Ds1ChannelNumber	dsx1ChanMappedIfIndex
1	1	2
1	2	3
.....		
1	7	8



In addition, the DS2s are channelized into DS1s. The object `dsx1Channelization` is set to `enabledDS1` for each DS2. There will be 4 DS1s in the `ifTable` for each DS2. Assume the entries in the `ifTable` are created in channel order and the `ifIndex` values for the DS1s in the first DS2 are 9 through 12, then 13 through 16 for the second DS2, and so on. In the DS1 MIB, there will be an entry in the `dsx1ChanMappingTable` for each DS1. The entries will be as follows:

`dsx1ChanMappingTable` Entries

<code>ifIndex</code>	<code>dsx1Ds1ChannelNumber</code>	<code>dsx1ChanMappedIfIndex</code>
2	1	9
2	2	10
2	3	11
2	4	12
3	1	13
3	2	14
...		
8	4	36

#### **2.2.4. Usage of Loopbacks**

This section discusses the behaviour of objects related to loopbacks.

The object `dsx3LoopbackConfig` represents the desired state of loopbacks on this interface. Using this object a Manager can request:

```

LineLoopback
PayloadLoopback (if ESF framing)
InwardLoopback
DualLoopback (Line + Inward)
NoLoopback

```

The remote end can also request lookbacks either through the FDL channel if ESF or inband if D4. The loopbacks that can be requested this way are:

```

LineLoopback
PayloadLoopback (if ESF framing)
NoLoopback

```

To model the current state of loopbacks on a DS3 interface, the object `dsx3LoopbackStatus` defines which loopback is currently applied to an interface. This object, which is a bitmap, will have bits turned on which reflect the currently active loopbacks on the interface as well as the source of those loopbacks.

The following restrictions/rules apply to loopbacks:

The far end cannot undo loopbacks set by a manager.

A manager can undo loopbacks set by the far end.

Both a line loopback and an inward loopback can be set at the same time. Only these two loopbacks can co-exist and either one may be set by the manager or the far end. A LineLoopback request from the far end is incremental to an existing Inward loopback established by a manager. When a NoLoopback is received from the far end in this case, the InwardLoopback remains in place.

### **2.3. 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.

### **2.4. 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 late but not final draft of what became the ANSI T1.231 standard [ANSI-T1.231]. If the definition in this document does not match the definition in the ANSI T1.231 document, the implementer should follow the definition described in this document.

#### **2.4.1. 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 (See T1.231 [section 7.1.1.1.1](#)).

##### **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 (See T1.231 [section 7.1.1.1.2](#)).

#### 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. (Also known as CV-L. See T1.231 [section 7.4.1.1](#).)

#### 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 (See T1.231 [section 7.1.1.2.1](#)).

#### 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 (See T1.231 [section 7.1.1.2.2](#)).

### **2.4.2. 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.

Performance parameters are of types PerfCurrentCount, PerfIntervalCount and PerfTotalCount. These textual conventions are all Gauge32, and they are used because it is possible for these objects to decrease. Objects may decrease when Unavailable Seconds occurs across a fifteen minutes interval boundary. See Unavailable Seconds discussion later in this section.

**Line Errored Seconds (LES)**

A Line Errored Second is a second in which one or more CV occurred OR one or more LOS defects. (Also known as ES-L. See T1.231 [section 7.4.1.2.](#))

**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. (Also known as ESP-P. See T1.231 [section 7.4.2.2.](#))

**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. (Also known as SESP-P. See T1.231 [section 7.4.2.5.](#))

**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. (Also known as ESCP-P. See T1.231 [section 7.4.2.2.](#))

**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. (Also known as SESCP-P. See T1.231 [section 7.4.2.5.](#))

**Severely Errored Framing Seconds (SEFS)**

A SEFS is a second with one or more Out of Frame defects OR a detected incoming AIS. This item is not incremented during unavailable seconds. (Also known as SAS-P. See T1.231 [section 7.4.2.6.](#))

**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 PSESSs, 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 PSESSs, then the DS3 interface unavailability starts from the onset of these

PSEs. Once unavailable, and if no failure is present, the DS3 interface becomes available at the onset of 10 contiguous seconds with no PSEs. Once unavailable, and if a failure is present, the DS3 interface becomes available at the onset of 10 contiguous seconds with no PSEs, 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 PSEs, 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.

Note that this definition implies that the agent cannot determine until after a ten second interval has passed whether a given one-second interval belongs to available or unavailable time. If the agent chooses to update the various performance statistics in real time then it must be prepared to retroactively reduce the PES, PSES, CES, and CSES counts by 10 and increase the UAS count by 10 when it determines that available time has been entered. It must also be prepared to adjust the PCV, CCV, and SEFS count as necessary since these parameters are not accumulated during unavailable time. It must be similarly prepared to retroactively decrease the UAS count by 10 and increase the PES, CES, PCV, and CCV counts as necessary upon entering available time. A special case exists when the 10 second period leading to available or unavailable time crosses a 900 second statistics window boundary, as the foregoing description implies that the PCV, CCV, PES, CES, PSES, CSEC, SEFS, and UAS counts for the PREVIOUS interval must be adjusted. In this case successive GETs of the affected dsx3IntervalPSEs and dsx3IntervalUASs objects will return differing values if the first GET occurs during the first few seconds of the window.

The agent may instead choose to delay updates to the various statistics by 10 seconds in order to avoid retroactive adjustments to the counters. A way to do this is sketched in [Appendix B](#).

In any case, a linkDown trap shall be sent only after the agent has determined for certain that the unavailable state has been entered,

but the time on the trap will be that of the first UAS (i.e., 10 seconds earlier). A linkUp trap shall be handled similarly.

According to ANSI T1.231 unavailable time begins at the `_onset_` of 10 contiguous severely errored seconds -- that is, unavailable time starts with the `_first_` of the 10 contiguous SESs. Also, while an interface is deemed unavailable all counters for that interface are frozen except for the UAS count. It follows that an implementation which strictly complies with this standard must `_not_` increment any counters other than the UAS count -- even temporarily -- as a result of anything that happens during those 10 seconds. Since changes in the signal state lag the data to which they apply by 10 seconds, an ANSI-compliant implementation must pass the the one-second statistics through a 10-second delay line prior to updating any counters. That can be done by performing the following steps at the end of each one second interval.

- i) Read near/far end CV counter and alarm status flags from the hardware.
- ii) Accumulate the CV counts for the preceding second and compare them to the ES and SES threshold for the layer in question. Update the signal state and shift the one-second CV counts and ES/SES flags into the 10-element delay line. Note that far-end one-second statistics are to be flagged as "absent" during any second in which there is an incoming defect at the layer in question or at any lower layer.
- iii) Update the current interval statistics using the signal state from the `_previous_` update cycle and the one-second CV counts and ES/SES flags shifted out of the 10-element delay line.

This approach is further described in [Appendix B](#).

#### **2.4.3. 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 [ANSI-T1.107a]. 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 the Far End Alarm Channel. See [[ANSI-T1.107](#)]. 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. (Also known as SASCP-PFE. See T1.231 [section 7.4.4.2.6](#))

#### 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. (See T1.231 [section 7.1.2.2.1](#))

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. (See T1.231 [section 7.1.2.1.1](#))

#### 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. (See T1.231 [section 7.1.2.2.3](#))

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.

#### [2.4.4.](#) 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 (see M.1400 [[ITU-T-M.1400](#)] for additional information).

##### Proxy

In this document, the word proxy is meant to indicate an application which receives SNMP messages and replies to them on behalf of the devices which implement the actual DS3/E3 interfaces. The proxy may have already collected the information about the DS3/E3 interfaces into its local database and may not necessarily forward the requests to the actual DS3/E3 interface. It is expected in such an application that there are periods of time where the proxy is not communicating with the DS3/E3 interfaces. In these instances the proxy will not necessarily have up-to-date configuration information and will most likely have missed the collection of some statistics data. Missed statistics data collection will result in invalid data in the interval table.



### 3. Object Definitions

```
DS3-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    MODULE-IDENTITY, OBJECT-TYPE,  
    NOTIFICATION-TYPE, transmission          FROM SNMPv2-SMI  
    DisplayString, TimeStamp, TruthValue     FROM SNMPv2-TC  
    MODULE-COMPLIANCE, OBJECT-GROUP,  
    NOTIFICATION-GROUP                      FROM SNMPv2-CONF  
    InterfaceIndex                         FROM IF-MIB  
    PerfCurrentCount, PerfIntervalCount,  
    PerfTotalCount                         FROM PerfHist-TC-MIB;
```

```
ds3 MODULE-IDENTITY
```

```
    LAST-UPDATED "200404040000Z"
```

```
    ORGANIZATION "IETF ATOM MIB Working Group"
```

```
    CONTACT-INFO
```

```
        "WG charter:
```

```
            http://www.ietf.org/html.charters/atommib-charter.html
```

```
        Mailing Lists:
```

```
            General Discussion: atommib@research.telcordia.com
```

```
            To Subscribe: atommib-request@research.telcordia.com
```

```
        Editor: Orly Nicklass
```

```
        Postal: RAD Data Communications, Ltd.
```

```
                Ziv Tower, 24 Roul Walenberg
```

```
                Tel Aviv, Israel, 69719
```

```
                Tel: +9723 765 9969
```

```
        E-mail: orly_n@rad.com"
```

```
DESCRIPTION
```

```
    "The is the MIB module that describes  
    DS3 and E3 interfaces objects.
```

```
    Copyright (c) The Internet Society (2003). This  
    version of this MIB module is part of RFC yyyy;  
    see the RFC itself for full legal notices."
```

```
-- RFC Ed.: replace yyyy with actual RFC number & remove this notice
```

```
REVISION "200404040000Z"
```

## DESCRIPTION

"The RFC yyyy version of this MIB module.

-- RFC Ed.: replace yyyy with actual RFC number & remove this notice

The key changes made to this MIB module  
since its publication in [RFC 2496](#) are as follows:

- (1) The dsx3FracIfIndex SYNTAX matches the description range.
- (2) Reference was added to Circuit Identifier object.
- (3) Usage of ifStackTable section was updated.
- (4) Align the DESCRIPTION clauses of few statistic objects with thenear end definition, the far end definition and with [RFC3593](#).
- (5) Add new value, dsx3M13, to dsx3LineType."

REVISION "199808012130Z"

## DESCRIPTION

"The [RFC 2496](#) version of this MIB module.

The key changes made to this MIB module  
since its publication in [RFC 1407](#) are as follows:

- (1) The Fractional Table has been deprecated.
- (2) This document uses SMIV2.
- (3) Values are given for ifTable and ifXTable.
- (4) Example usage of ifStackTable is included.
- (5) dsx3IfIndex has been deprecated.
- (6) The definition of valid intervals has been clarified for the case where the agent proxied for other devices.  
  
particular, the treatment of missing intervals has been clarified.
- (7) An inward loopback has been added.
- (8) Additional lineStatus bits have been added for Near End in Unavailable Signal State, Carrier Equipment Out of Service.

In

- (9) A read-write line Length object has been added.
- (10) Added a lineStatus last change, trap and enabler.
- (11) Textual Conventions for statistics objects have been used.
- (12) A new object, dsx3LoopbackStatus, has been introduced to reflect the loopbacks established on a DS3/E3 interface
- and
- continues
- dsx3LoopbackStatus
- the source to the requests. dsx3LoopbackConfig
- to be the desired loopback state while
- reflects the actual state.
- (13) A dual loopback has been added to allow the setting of
- an
- inward loopback and a line loopback at the same time.
- (14) An object has been added to indicated whether or not
- this
- is a channelized DS3/E3.
- (15) A new object has been added to indicate which DS1 is to
- set
- for remote loopback."

REVISION "199301252028Z"

DESCRIPTION

"Initial version, published as [RFC 1407](#)."

::= { transmission 30 }



-- The DS3/E3 Near End Group

-- 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 Table

dsx3ConfigTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dsx3ConfigEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The DS3/E3 Configuration table."

::= { ds3 5 }

dsx3ConfigEntry OBJECT-TYPE

SYNTAX Dsx3ConfigEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the DS3/E3 Configuration table."

INDEX { dsx3LineIndex }

::= { dsx3ConfigTable 1 }

Dsx3ConfigEntry ::=

SEQUENCE {

dsx3LineIndex	InterfaceIndex,
dsx3IfIndex	InterfaceIndex,
dsx3TimeElapsed	INTEGER,
dsx3ValidIntervals	INTEGER,
dsx3LineType	INTEGER,
dsx3LineCoding	INTEGER,
dsx3SendCode	INTEGER,
dsx3CircuitIdentifier	DisplayString,
dsx3LoopbackConfig	INTEGER,
dsx3LineStatus	INTEGER,
dsx3TransmitClockSource	INTEGER,
dsx3InvalidIntervals	INTEGER,
dsx3LineLength	INTEGER,
dsx3LineStatusLastChange	TimeStamp,
dsx3LineStatusChangeTrapEnable	INTEGER,
dsx3LoopbackStatus	INTEGER,

```
        dsx3Channelization          INTEGER,
        dsx3Ds1ForRemoteLoop       INTEGER
    }

dsx3LineIndex OBJECT-TYPE
    SYNTAX  InterfaceIndex
    MAX-ACCESS  read-only  -- read-only since originally an
                           -- SMIV1 index

    STATUS  current
    DESCRIPTION
        "This object should be made equal to ifIndex.  The
        next paragraph describes its previous usage.
        Making the object equal to ifIndex allows proper
        use of ifStackTable.

        Previously, this object was 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
        dsx3LineIndices with a 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."
    ::= { dsx3ConfigEntry 1 }

dsx3IfIndex OBJECT-TYPE
    SYNTAX  InterfaceIndex
    MAX-ACCESS  read-only
    STATUS  deprecated
    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)
    MAX-ACCESS  read-only
    STATUS  current
    DESCRIPTION
```

"The number of seconds that have elapsed since the beginning of the near end current error-measurement period. If, for some reason, such as an adjustment in the system's time-of-day clock, the current interval exceeds the maximum value, the agent will return the maximum value."

::= { dsx3ConfigEntry 3 }

dsx3ValidIntervals OBJECT-TYPE

SYNTAX INTEGER (0..96)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of previous near end intervals for which 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. In the case where the agent is a proxy, it is possible that some intervals are unavailable. In this case, this interval is the maximum interval number for which data is available."

::= { dsx3ConfigEntry 4 }

dsx3LineType OBJECT-TYPE

SYNTAX INTEGER {

dsx3other(1),  
dsx3M23(2),  
dsx3SYNTRAN(3),  
dsx3CbitParity(4),  
dsx3ClearChannel(5),  
e3other(6),  
e3Framed(7),  
e3Plcp(8),  
dsx3M13(9)

}

MAX-ACCESS read-write

STATUS current

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-1990
dsx3ClearChannel	ANSI T1.102-1987
e3Framed	CCITT G.751
e3Plcp	ETSI T/NA(91)18
dsx3M13	ANSI T1.107a-1990."

#### REFERENCE

"American National Standard for telecommunications  
 - digital hierarchy -  
 formats specification, ANSI T1.107- 1988.  
 ANSI T1.107a-1990.  
 American National Standard for telecommunications  
 - digital hierarchy -  
 electrical interfaces, ANSI T1.102- 1987.  
 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  
 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."

::= { dsx3ConfigEntry 5 }

dsx3LineCoding OBJECT-TYPE

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

MAX-ACCESS read-write

STATUS current

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)  
}

MAX-ACCESS read-write

STATUS current

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.) Setting this variable causes the interface to begin sending the code requested.  
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. The DS1/E1 is  
    indicated in dsx3Ds1ForRemoteLoop.

dsx3SendTestPattern  
    sending a test pattern."

```
::= { dsx3ConfigEntry 7 }
```

dsx3CircuitIdentifier OBJECT-TYPE

SYNTAX DisplayString (SIZE (0..255))

MAX-ACCESS read-write

STATUS current

DESCRIPTION

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

REFERENCE "ITU-T M.1400"

```
::= { dsx3ConfigEntry 8 }
```

dsx3LoopbackConfig OBJECT-TYPE

SYNTAX INTEGER {

dsx3NoLoop(1),  
dsx3PayloadLoop(2),  
dsx3LineLoop(3),  
dsx3OtherLoop(4),  
dsx3InwardLoop(5),  
dsx3DualLoop(6)

}

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This variable represents the desired 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 its 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.

**dsx3InwardLoop**

The sent signal at this interface is looped back through the device.

**dsx3DualLoop**

Both dsx1LineLoop and dsx1InwardLoop will be active simultaneously."

::= { dsx3ConfigEntry 9 }

**dsx3LineStatus OBJECT-TYPE**

SYNTAX INTEGER (1..4095)

MAX-ACCESS read-only

STATUS current

**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 must be set if and only if no other flag is set.

If the dsx3loopbackState bit is set, the loopback in effect can be determined from the dsx3loopbackConfig object.

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
1024	dsx3UnavailSigState	Near End in Unavailable Signal State

```
2048      dsx3NetEquip00S      Carrier Equipment Out of Service"
 ::= { dsx3ConfigEntry 10 }
```

dsx3TransmitClockSource OBJECT-TYPE

```
SYNTAX  INTEGER {
            loopTiming(1),
            localTiming(2),
            throughTiming(3)
        }
```

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The source of Transmit Clock.

loopTiming indicates that the recovered receive clock is used as the transmit clock.

localTiming indicates that a local clock source is used or that an external clock is attached to the box containing the interface.

throughTiming indicates that transmit clock is derived from the recovered receive clock of another DS3 interface."

```
::= { dsx3ConfigEntry 11 }
```

dsx3InvalidIntervals OBJECT-TYPE

```
SYNTAX  INTEGER (0..96)
```

MAX-ACCESS read-only

STATUS current

DESCRIPTION

" The number of intervals in the range from 0 to dsx3ValidIntervals for which no data is available. This object will typically be zero except in cases where the data for some intervals are not available (e.g., in proxy situations)."

```
::= { dsx3ConfigEntry 12 }
```

dsx3LineLength OBJECT-TYPE

```
SYNTAX  INTEGER (0..64000)
```

UNITS "meters"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The length of the ds3 line in meters. This

object provides information for line build out circuitry if it exists and can use this object to adjust the line build out."

::= { dsx3ConfigEntry 13 }

dsx3LineStatusLastChange OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of MIB II's sysUpTime object at the time this DS3/E3 entered its current line status state. If the current state was entered prior to the last re-initialization of the proxy-agent, then this object contains a zero value."

::= { dsx3ConfigEntry 14 }

dsx3LineStatusChangeTrapEnable OBJECT-TYPE

SYNTAX INTEGER {  
enabled(1),  
disabled(2)  
}

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Indicates whether dsx3LineStatusChange traps should be generated for this interface."

DEFVAL { disabled }

::= { dsx3ConfigEntry 15 }

dsx3LoopbackStatus OBJECT-TYPE

SYNTAX INTEGER (1..127)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This variable represents the current state of the loopback on the DS3 interface. It contains information about loopbacks established by a manager and remotely from the far end.

The dsx3LoopbackStatus is a bit map represented as a sum, therefore it can represent multiple loopbacks simultaneously.

The various bit positions are:

```
1 dsx3NoLoopback
2 dsx3NearEndPayloadLoopback
4 dsx3NearEndLineLoopback
8 dsx3NearEndOtherLoopback
16 dsx3NearEndInwardLoopback
32 dsx3FarEndPayloadLoopback
64 dsx3FarEndLineLoopback"
```

```
::= { dsx3ConfigEntry 16 }
```

dsx3Channelization OBJECT-TYPE

```
SYNTAX      INTEGER {
                disabled(1),
                enabledDs1(2),
                enabledDs2(3)
            }
```

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Indicates whether this ds3/e3 is channelized or unchannelized. The value of enabledDs1 indicates that this is a DS3 channelized into DS1s. The value of enabledDs3 indicated that this is a DS3 channelized into DS2s. Setting this object will cause the creation or deletion of DS2 or DS1 entries in the ifTable. "

```
::= { dsx3ConfigEntry 17 }
```

dsx3Ds1ForRemoteLoop OBJECT-TYPE

```
SYNTAX      INTEGER (0..29)
```

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Indicates which DS1/E1 on this DS3/E3 will be indicated in the remote ds1 loopback request. A value of 0 means no DS1 will be looped. A value of 29 means all DS1s/E1s will be looped."

```
::= { dsx3ConfigEntry 18 }
```

-- the DS3/E3 Current Table

```
dsx3CurrentTable OBJECT-TYPE
    SYNTAX  SEQUENCE OF Dsx3CurrentEntry
    MAX-ACCESS not-accessible
    STATUS   current
    DESCRIPTION
        "The DS3/E3 current table contains various
        statistics being collected for the current 15
        minute interval."
    ::= { ds3 6 }
```

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

```
Dsx3CurrentEntry ::=
    SEQUENCE {
        dsx3CurrentIndex      InterfaceIndex,
        dsx3CurrentPESs       PerfCurrentCount,
        dsx3CurrentPSESSs     PerfCurrentCount,
        dsx3CurrentSEFSs      PerfCurrentCount,
        dsx3CurrentUASs       PerfCurrentCount,
        dsx3CurrentLCVs       PerfCurrentCount,
        dsx3CurrentPCVs       PerfCurrentCount,
        dsx3CurrentLESSs      PerfCurrentCount,
        dsx3CurrentCCVs       PerfCurrentCount,
        dsx3CurrentCESS       PerfCurrentCount,
        dsx3CurrentCSESS      PerfCurrentCount
    }
```

```
dsx3CurrentIndex OBJECT-TYPE
    SYNTAX  InterfaceIndex
    MAX-ACCESS read-only -- read-only since originally an
                        -- SMiv1 index
    STATUS   current
    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 PerfCurrentCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The counter associated with the number of P-bit Errored Seconds."

::= { dsx3CurrentEntry 2 }

dsx3CurrentPSEsS OBJECT-TYPE

SYNTAX PerfCurrentCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The counter associated with the number of P-bit Severely Errored Seconds."

::= { dsx3CurrentEntry 3 }

dsx3CurrentSEFSs OBJECT-TYPE

SYNTAX PerfCurrentCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The counter associated with the number of Severely Errored Framing Seconds."

::= { dsx3CurrentEntry 4 }

dsx3CurrentUASS OBJECT-TYPE

SYNTAX PerfCurrentCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The counter associated with the number of Unavailable Seconds."

::= { dsx3CurrentEntry 5 }

dsx3CurrentLCVs OBJECT-TYPE

SYNTAX PerfCurrentCount

MAX-ACCESS read-only



STATUS current  
DESCRIPTION  
    "The counter associated with the number of Line  
    Coding Violations."  
 ::= { dsx3CurrentEntry 6 }

dsx3CurrentPCVs OBJECT-TYPE  
SYNTAX PerfCurrentCount  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
    "The counter associated with the number of P-bit  
    Coding Violations."  
 ::= { dsx3CurrentEntry 7 }

dsx3CurrentLESSs OBJECT-TYPE  
SYNTAX PerfCurrentCount  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
    "The number of Line Errored Seconds."  
 ::= { dsx3CurrentEntry 8 }

dsx3CurrentCCVs OBJECT-TYPE  
SYNTAX PerfCurrentCount  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
    "The number of C-bit Coding Violations."  
 ::= { dsx3CurrentEntry 9 }

dsx3CurrentCESSs OBJECT-TYPE  
SYNTAX PerfCurrentCount  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
    "The number of C-bit Errored Seconds."  
 ::= { dsx3CurrentEntry 10 }

dsx3CurrentCSESSs OBJECT-TYPE  
SYNTAX PerfCurrentCount  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
    "The number of C-bit Severely Errored Seconds."

```
::= { dsx3CurrentEntry 11 }
```

-- the DS3/E3 Interval Table

dsx3IntervalTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dsx3IntervalEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"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. Each row in this table represents one such interval (identified by dsx3IntervalNumber) and for one specific interface (identified by dsx3IntervalIndex)."

::= { ds3 7 }

dsx3IntervalEntry OBJECT-TYPE

SYNTAX Dsx3IntervalEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

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

INDEX { dsx3IntervalIndex, dsx3IntervalNumber }

::= { dsx3IntervalTable 1 }

Dsx3IntervalEntry ::=

SEQUENCE {

dsx3IntervalIndex	InterfaceIndex,
dsx3IntervalNumber	INTEGER,
dsx3IntervalPESS	PerfIntervalCount,
dsx3IntervalPSESS	PerfIntervalCount,
dsx3IntervalSEFSS	PerfIntervalCount,
dsx3IntervalUASS	PerfIntervalCount,
dsx3IntervalLCVs	PerfIntervalCount,
dsx3IntervalPCVs	PerfIntervalCount,
dsx3IntervalLESS	PerfIntervalCount,
dsx3IntervalCCVs	PerfIntervalCount,
dsx3IntervalCESS	PerfIntervalCount,
dsx3IntervalCSESS	PerfIntervalCount,
dsx3IntervalValidData	TruthValue

}

dsx3IntervalIndex OBJECT-TYPE

```
SYNTAX  InterfaceIndex
MAX-ACCESS  read-only  -- read-only since originally an
                        -- SMIV1 index
```

```
STATUS  current
```

```
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)
```

```
MAX-ACCESS  read-only  -- read-only since originally an
                        -- SMIV1 index
```

```
STATUS  current
```

```
DESCRIPTION
```

```
    "A number between 1 and 96, where 1 is the most
    recently completed 15 minute interval and 96 is
    the 15 minutes interval completed 23 hours and 45
    minutes prior to interval 1."
```

```
::= { dsx3IntervalEntry 2 }
```

```
dsx3IntervalPESSs OBJECT-TYPE
```

```
SYNTAX  PerfIntervalCount
```

```
MAX-ACCESS  read-only
```

```
STATUS  current
```

```
DESCRIPTION
```

```
    "The counter associated with the number of P-bit
    Errored Seconds."
```

```
::= { dsx3IntervalEntry 3 }
```

```
dsx3IntervalPSESSs OBJECT-TYPE
```

```
SYNTAX  PerfIntervalCount
```

```
MAX-ACCESS  read-only
```

```
STATUS  current
```

```
DESCRIPTION
```

```
    "The counter associated with the number of P-bit
    Severely Errored Seconds."
```

```
::= { dsx3IntervalEntry 4 }
```

```
dsx3IntervalSEFSSs OBJECT-TYPE
```

```
SYNTAX  PerfIntervalCount
```

MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
    "The counter associated with the number of  
        Severely Errored Framing Seconds."  
::= { dsx3IntervalEntry 5 }

dsx3IntervalUASs OBJECT-TYPE  
    SYNTAX PerfIntervalCount  
    MAX-ACCESS read-only  
    STATUS current  
    DESCRIPTION  
        "The counter associated with the number of  
            Unavailable Seconds. This object may decrease if  
            the occurrence of unavailable seconds occurs across  
            an interval boundary."  
    ::= { dsx3IntervalEntry 6 }

dsx3IntervalLCVs OBJECT-TYPE  
    SYNTAX PerfIntervalCount  
    MAX-ACCESS read-only  
    STATUS current  
    DESCRIPTION  
        "The counter associated with the number of Line  
            Coding Violations."  
    ::= { dsx3IntervalEntry 7 }

dsx3IntervalPCVs OBJECT-TYPE  
    SYNTAX PerfIntervalCount  
    MAX-ACCESS read-only  
    STATUS current  
    DESCRIPTION  
        "The counter associated with the number of P-bit  
            Coding Violations."  
    ::= { dsx3IntervalEntry 8 }

dsx3IntervalLESSs OBJECT-TYPE  
    SYNTAX PerfIntervalCount  
    MAX-ACCESS read-only  
    STATUS current  
    DESCRIPTION  
        "The number of Line Errored Seconds (BPVs or  
            illegal zero sequences)."  
    ::= { dsx3IntervalEntry 9 }

```
dsx3IntervalCCVs OBJECT-TYPE
    SYNTAX  PerfIntervalCount
    MAX-ACCESS  read-only
    STATUS  current
    DESCRIPTION
        "The number of C-bit Coding Violations."
    ::= { dsx3IntervalEntry 10 }

dsx3IntervalCESS OBJECT-TYPE
    SYNTAX  PerfIntervalCount
    MAX-ACCESS  read-only
    STATUS  current
    DESCRIPTION
        "The number of C-bit Errored Seconds."
    ::= { dsx3IntervalEntry 11 }

dsx3IntervalCSESS OBJECT-TYPE
    SYNTAX  PerfIntervalCount
    MAX-ACCESS  read-only
    STATUS  current
    DESCRIPTION
        "The number of C-bit Severely Errored Seconds."
    ::= { dsx3IntervalEntry 12 }

dsx3IntervalValidData OBJECT-TYPE
    SYNTAX  TruthValue
    MAX-ACCESS  read-only
    STATUS  current
    DESCRIPTION
        " This variable indicates if the data for this
        interval is valid."
    ::= { dsx3IntervalEntry 13 }
```

-- the DS3/E3 Total

```
dsx3TotalTable OBJECT-TYPE
    SYNTAX SEQUENCE OF Dsx3TotalEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "The DS3/E3 Total Table contains the cumulative
        sum of the various statistics for the 24 hour
        period preceding the current interval."
    ::= { ds3 8 }
```

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

```
Dsx3TotalEntry ::=
    SEQUENCE {
        dsx3TotalIndex      InterfaceIndex,
        dsx3TotalPESs       PerfTotalCount,
        dsx3TotalPSESSs     PerfTotalCount,
        dsx3TotalSEFSs      PerfTotalCount,
        dsx3TotalUASs       PerfTotalCount,
        dsx3TotalLCVs       PerfTotalCount,
        dsx3TotalPCVs       PerfTotalCount,
        dsx3TotalLESSs      PerfTotalCount,
        dsx3TotalCCVs       PerfTotalCount,
        dsx3TotalCESS       PerfTotalCount,
        dsx3TotalCSESS      PerfTotalCount
    }
```

```
dsx3TotalIndex OBJECT-TYPE
    SYNTAX InterfaceIndex
    MAX-ACCESS read-only -- read-only since originally an
                        -- SMiv1 index
    STATUS current
    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 PerfTotalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The counter associated with the number of P-bit Errored Seconds, encountered by a DS3 interface in the previous 24 hour interval. Invalid 15 minute intervals count as 0."

::= { dsx3TotalEntry 2 }

dsx3TotalPSESS OBJECT-TYPE

SYNTAX PerfTotalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The counter associated with the number of P-bit Severely Errored Seconds, encountered by a DS3 interface in the previous 24 hour interval. Invalid 15 minute intervals count as 0."

::= { dsx3TotalEntry 3 }

dsx3TotalSEFSS OBJECT-TYPE

SYNTAX PerfTotalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The counter associated with the number of Severely Errored Framing Seconds, encountered by a DS3/E3 interface in the previous 24 hour interval. Invalid 15 minute intervals count as 0."

::= { dsx3TotalEntry 4 }

dsx3TotalUASS OBJECT-TYPE

SYNTAX PerfTotalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The counter associated with the number of Unavailable Seconds, encountered by a DS3



```
        interface in the previous 24 hour interval.
        Invalid 15 minute intervals count as 0."
 ::= { dsx3TotalEntry 5 }
```

dsx3TotalLCVs OBJECT-TYPE

SYNTAX PerfTotalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The counter associated with the number of Line  
Coding Violations encountered by a DS3/E3  
interface in the previous 24 hour interval.  
Invalid 15 minute intervals count as 0."

```
 ::= { dsx3TotalEntry 6 }
```

dsx3TotalPCVs OBJECT-TYPE

SYNTAX PerfTotalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The counter associated with the number of P-bit  
Coding Violations, encountered by a DS3 interface  
in the previous 24 hour interval. Invalid 15  
minute intervals count as 0."

```
 ::= { dsx3TotalEntry 7 }
```

dsx3TotalLESSs OBJECT-TYPE

SYNTAX PerfTotalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of Line Errored Seconds (BPVs or  
illegal zero sequences) encountered by a DS3/E3  
interface in the previous 24 hour interval.  
Invalid 15 minute intervals count as 0."

```
 ::= { dsx3TotalEntry 8 }
```

dsx3TotalCCVs OBJECT-TYPE

SYNTAX PerfTotalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of C-bit Coding Violations encountered  
by a DS3 interface in the previous 24 hour  
interval. Invalid 15 minute intervals count as 0."

```
::= { dsx3TotalEntry 9 }
```

dsx3TotalCESS OBJECT-TYPE

SYNTAX PerfTotalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of C-bit Errored Seconds encountered  
by a DS3 interface in the previous 24 hour  
interval. Invalid 15 minute intervals count as 0."

```
::= { dsx3TotalEntry 10 }
```

dsx3TotalCSESS OBJECT-TYPE

SYNTAX PerfTotalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of C-bit Severely Errored Seconds  
encountered by a DS3 interface in the previous 24  
hour interval. Invalid 15 minute intervals count  
as 0."

```
::= { dsx3TotalEntry 11 }
```

-- The DS3 Far End Group

-- 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

dsx3FarEndConfigTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dsx3FarEndConfigEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

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

::= { ds3 9 }

dsx3FarEndConfigEntry OBJECT-TYPE

SYNTAX Dsx3FarEndConfigEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

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

INDEX { dsx3FarEndLineIndex }

::= { dsx3FarEndConfigTable 1 }

Dsx3FarEndConfigEntry ::=

SEQUENCE {

dsx3FarEndLineIndex InterfaceIndex,

dsx3FarEndEquipCode DisplayString,

dsx3FarEndLocationIDCode DisplayString,

dsx3FarEndFrameIDCode DisplayString,

dsx3FarEndUnitCode DisplayString,

dsx3FarEndFacilityIDCode DisplayString

}

dsx3FarEndLineIndex OBJECT-TYPE

SYNTAX InterfaceIndex

MAX-ACCESS read-only -- read-only since originally an  
-- SMIV1 index

STATUS current

## 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))

MAX-ACCESS read-write

STATUS current

## 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))

MAX-ACCESS read-write

STATUS current

## 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))

MAX-ACCESS read-write

STATUS current

## 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))

MAX-ACCESS read-write

STATUS current

## 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))

MAX-ACCESS read-write

STATUS current

## 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

## dsx3FarEndCurrentTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dsx3FarEndCurrentEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"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."

::= { ds3 10 }

## dsx3FarEndCurrentEntry OBJECT-TYPE

SYNTAX Dsx3FarEndCurrentEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

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

INDEX { dsx3FarEndCurrentIndex }

::= { dsx3FarEndCurrentTable 1 }

Dsx3FarEndCurrentEntry ::=

SEQUENCE {

dsx3FarEndCurrentIndex	InterfaceIndex,
dsx3FarEndTimeElapsed	INTEGER,
dsx3FarEndValidIntervals	INTEGER,
dsx3FarEndCurrentCESS	PerfCurrentCount,

```
        dsx3FarEndCurrentCSEss      PerfCurrentCount,
        dsx3FarEndCurrentCCVs       PerfCurrentCount,
        dsx3FarEndCurrentUASs       PerfCurrentCount,
        dsx3FarEndInvalidIntervals  INTEGER
    }
```

dsx3FarEndCurrentIndex OBJECT-TYPE

SYNTAX InterfaceIndex

MAX-ACCESS read-only -- read-only since originally an  
-- SMiv1 index

STATUS current

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 identical to the interface identified by the same value of dsx3LineIndex."

::= { dsx3FarEndCurrentEntry 1 }

dsx3FarEndTimeElapsed OBJECT-TYPE

SYNTAX INTEGER (0..899)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of seconds that have elapsed since the beginning of the far end current error-measurement period. If, for some reason, such as an adjustment in the system's time-of-day clock, the current interval exceeds the maximum value, the agent will return the maximum value."

::= { dsx3FarEndCurrentEntry 2 }

dsx3FarEndValidIntervals OBJECT-TYPE

SYNTAX INTEGER (0..96)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of previous far end intervals for which 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. In the case where the agent is a proxy, it is possible that some intervals are unavailable. In this case,

this interval is the maximum interval number for  
        which data is available."  
 ::= { dsx3FarEndCurrentEntry 3 }

dsx3FarEndCurrentCESS OBJECT-TYPE  
    SYNTAX PerfCurrentCount  
    MAX-ACCESS read-only  
    STATUS current  
    DESCRIPTION  
        "The counter associated with the number of Far Far  
        End C-bit Errored Seconds."  
 ::= { dsx3FarEndCurrentEntry 4 }

dsx3FarEndCurrentCSESS OBJECT-TYPE  
    SYNTAX PerfCurrentCount  
    MAX-ACCESS read-only  
    STATUS current  
    DESCRIPTION  
        "The counter associated with the number of Far End  
        C-bit Severely Errored Seconds."  
 ::= { dsx3FarEndCurrentEntry 5 }

dsx3FarEndCurrentCCVs OBJECT-TYPE  
    SYNTAX PerfCurrentCount  
    MAX-ACCESS read-only  
    STATUS current  
    DESCRIPTION  
        "The counter associated with the number of Far End  
        C-bit Coding Violations reported via the far end  
        block error count."  
 ::= { dsx3FarEndCurrentEntry 6 }

dsx3FarEndCurrentUASS OBJECT-TYPE  
    SYNTAX PerfCurrentCount  
    MAX-ACCESS read-only  
    STATUS current  
    DESCRIPTION  
        "The counter associated with the number of Far End  
        unavailable seconds."  
 ::= { dsx3FarEndCurrentEntry 7 }

dsx3FarEndInvalidIntervals OBJECT-TYPE  
    SYNTAX INTEGER (0..96)  
    MAX-ACCESS read-only  
    STATUS current

## DESCRIPTION

" The number of intervals in the range from 0 to dsx3FarEndValidIntervals for which no data is available. This object will typically be zero except in cases where the data for some intervals are not available (e.g., in proxy situations)."

::= { dsx3FarEndCurrentEntry 8 }

-- The DS3 Far End Interval Table

dsx3FarEndIntervalTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dsx3FarEndIntervalEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"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."

::= { ds3 11 }

dsx3FarEndIntervalEntry OBJECT-TYPE

SYNTAX Dsx3FarEndIntervalEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

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

INDEX { dsx3FarEndIntervalIndex,  
dsx3FarEndIntervalNumber }

::= { dsx3FarEndIntervalTable 1 }

Dsx3FarEndIntervalEntry ::=

SEQUENCE {

dsx3FarEndIntervalIndex	InterfaceIndex,
dsx3FarEndIntervalNumber	INTEGER,
dsx3FarEndIntervalCESS	PerfIntervalCount,
dsx3FarEndIntervalCSESS	PerfIntervalCount,
dsx3FarEndIntervalCCVs	PerfIntervalCount,
dsx3FarEndIntervalUASS	PerfIntervalCount,
dsx3FarEndIntervalValidData	TruthValue

}

dsx3FarEndIntervalIndex OBJECT-TYPE

SYNTAX InterfaceIndex



```
MAX-ACCESS read-only -- read-only since originally an
                        -- SMiv1 index
STATUS current
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 identical to the interface identified by
    the same value of dsx3LineIndex."
 ::= { dsx3FarEndIntervalEntry 1 }
```

```
dsx3FarEndIntervalNumber OBJECT-TYPE
SYNTAX INTEGER (1..96)
MAX-ACCESS read-only -- read-only since originally an
                        -- SMiv1 index
STATUS current
DESCRIPTION
    "A number between 1 and 96, where 1 is the most
    recently completed 15 minute interval and 96 is
    the 15 minutes interval completed 23 hours and 45
    minutes prior to interval 1."
 ::= { dsx3FarEndIntervalEntry 2 }
```

```
dsx3FarEndIntervalCESSs OBJECT-TYPE
SYNTAX PerfIntervalCount
MAX-ACCESS read-only
STATUS current
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. In the case where the agent is
    a proxy and data is not available, return
    noSuchInstance."
 ::= { dsx3FarEndIntervalEntry 3 }
```

```
dsx3FarEndIntervalCSESSs OBJECT-TYPE
SYNTAX PerfIntervalCount
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The counter associated with the number of Far End
    C-bit Severely Errored Seconds."
 ::= { dsx3FarEndIntervalEntry 4 }
```

**dsx3FarEndIntervalCCVs OBJECT-TYPE**

SYNTAX PerfIntervalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The counter associated with the number of Far End  
C-bit Coding Violations reported via the far end  
block error count."

::= { dsx3FarEndIntervalEntry 5 }

**dsx3FarEndIntervalUASs OBJECT-TYPE**

SYNTAX PerfIntervalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The counter associated with the number of Far End  
unavailable seconds."

::= { dsx3FarEndIntervalEntry 6 }

**dsx3FarEndIntervalValidData OBJECT-TYPE**

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

" This variable indicates if the data for this  
interval is valid."

::= { dsx3FarEndIntervalEntry 7 }

-- The DS3 Far End Total

**dsx3FarEndTotalTable OBJECT-TYPE**

SYNTAX SEQUENCE OF Dsx3FarEndTotalEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

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

::= { ds3 12 }

**dsx3FarEndTotalEntry OBJECT-TYPE**

SYNTAX Dsx3FarEndTotalEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

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

INDEX { dsx3FarEndTotalIndex }

::= { dsx3FarEndTotalTable 1 }

Dsx3FarEndTotalEntry ::=

SEQUENCE {

dsx3FarEndTotalIndex	InterfaceIndex,
dsx3FarEndTotalCESSs	PerfTotalCount,
dsx3FarEndTotalCSESSs	PerfTotalCount,
dsx3FarEndTotalCCVs	PerfTotalCount,
dsx3FarEndTotalUASSs	PerfTotalCount

}

dsx3FarEndTotalIndex OBJECT-TYPE

SYNTAX InterfaceIndex

MAX-ACCESS read-only -- read-only since originally an  
-- SMIV1 index

STATUS current

## 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 identical to the interface identified by the same value of dsx3LineIndex."

::= { dsx3FarEndTotalEntry 1 }

dsx3FarEndTotalCESSs OBJECT-TYPE

SYNTAX PerfTotalCount

MAX-ACCESS read-only

STATUS current

## 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. Invalid 15 minute intervals count as 0."

::= { dsx3FarEndTotalEntry 2 }

dsx3FarEndTotalCSESSs OBJECT-TYPE

SYNTAX PerfTotalCount

MAX-ACCESS read-only

STATUS current

## 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.  
Invalid 15 minute intervals count as 0."  
 ::= { dsx3FarEndTotalEntry 3 }

dsx3FarEndTotalCCVs OBJECT-TYPE

SYNTAX PerfTotalCount

MAX-ACCESS read-only

STATUS current

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. Invalid 15  
minute intervals count as 0."

::= { dsx3FarEndTotalEntry 4 }

dsx3FarEndTotalUASSs OBJECT-TYPE

SYNTAX PerfTotalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The counter associated with the number of Far End  
unavailable seconds encountered by a DS3 interface  
in the previous 24 hour interval. Invalid 15  
minute intervals count as 0."

::= { dsx3FarEndTotalEntry 5 }

-- the DS3/E3 Fractional Table

-- This table is deprecated.

dsx3FracTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dsx3FracEntry

MAX-ACCESS not-accessible

STATUS deprecated

DESCRIPTION

"This table is deprecated in favour of using  
ifStackTable.

Implementation of this table was optional. It was  
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, dsx3 SYNTRAN, 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."

::= { ds3 13 }

dsx3FracEntry OBJECT-TYPE

SYNTAX Dsx3FracEntry

MAX-ACCESS not-accessible

STATUS deprecated

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)

MAX-ACCESS read-only -- read-only since originally an  
-- SMiv1 index

STATUS deprecated

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)

MAX-ACCESS read-only -- read-only since originally an  
-- SMiv1 index

STATUS deprecated

DESCRIPTION

"The channel number for this entry."

```
::= { dsx3FracEntry 2 }
```

dsx3FracIfIndex OBJECT-TYPE

SYNTAX INTEGER (0..'7fffffff'h)

MAX-ACCESS read-write

STATUS deprecated

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 }
```

-- DS3 TRAPS

ds3Traps OBJECT IDENTIFIER ::= { ds3 15 }

dsx3LineStatusChange NOTIFICATION-TYPE

OBJECTS { dsx3LineStatus,  
          dsx3LineStatusLastChange }

STATUS current

DESCRIPTION

"A dsx3LineStatusChange trap is sent when the value of an instance of dsx3LineStatus changes. It can be utilized by an NMS to trigger polls. When the line status change results in a lower level line status change (i.e. ds1), then no traps for the lower level are sent."

::= { ds3Traps 0 1 }



```
-- conformance information
ds3Conformance OBJECT IDENTIFIER ::= { ds3 14 }

ds3Groups      OBJECT IDENTIFIER ::= { ds3Conformance 1 }
ds3Compliances OBJECT IDENTIFIER ::= { ds3Conformance 2 }


-- compliance statements

ds3Compliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "The compliance statement for DS3/E3 interfaces."
    MODULE -- this module
        MANDATORY-GROUPS { ds3NearEndConfigGroup,
                           ds3NearEndStatisticsGroup }

    GROUP ds3FarEndGroup
    DESCRIPTION
        "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."
    GROUP ds3NearEndOptionalTrapGroup
    DESCRIPTION
        "Implementation of this group is optional for all
        systems that attach to a DS3 Interface. If it is
        implemented then ds3NearEndOptionalConfigGroup
        should also be implemented."
    GROUP ds3NearEndOptionalConfigGroup
    DESCRIPTION
        "Implementation of this group is optional for all
        systems that attach to a DS3 interface."

    OBJECT dsx3LineType
    MIN-ACCESS read-only
    DESCRIPTION
        "Write access for the line type is not required."

    OBJECT dsx3LineCoding
    MIN-ACCESS read-only
    DESCRIPTION
        "Write access for the line coding is not
```

required."

OBJECT dsx3SendCode

MIN-ACCESS read-only

DESCRIPTION

"Write access for the send code is not required."

OBJECT dsx3LoopbackConfig

MIN-ACCESS read-only

DESCRIPTION

"Write access for loopbacks is not required."

OBJECT dsx3TransmitClockSource

MIN-ACCESS read-only

DESCRIPTION

"Write access for the transmit clock source is not required."

OBJECT dsx3LineLength

MIN-ACCESS read-only

DESCRIPTION

"Write access for the line length is not required."

OBJECT dsx3Channelization

MIN-ACCESS read-only

DESCRIPTION

"Write access for the channelization is not required."

::= { ds3Compliances 1 }

-- units of conformance

ds3NearEndConfigGroup OBJECT-GROUP

OBJECTS { dsx3LineIndex,  
dsx3TimeElapsed,  
dsx3ValidIntervals,  
dsx3LineType,  
dsx3LineCoding,  
dsx3SendCode,  
dsx3CircuitIdentifier,  
dsx3LoopbackConfig,  
dsx3LineStatus,

```
        dsx3TransmitClockSource,
        dsx3InvalidIntervals,
        dsx3LineLength,
        dsx3LoopbackStatus,
        dsx3Channelization,
        dsx3Ds1ForRemoteLoop}
STATUS    current
DESCRIPTION
    "A collection of objects providing configuration
    information applicable to all DS3/E3 interfaces."
 ::= { ds3Groups 1 }

ds3NearEndStatisticsGroup OBJECT-GROUP
OBJECTS { dsx3CurrentIndex,
          dsx3CurrentPEss,
          dsx3CurrentPSEss,
          dsx3CurrentSEFss,
          dsx3CurrentUAss,
          dsx3CurrentLCVs,
          dsx3CurrentPCVs,
          dsx3CurrentLEss,
          dsx3CurrentCCVs,
          dsx3CurrentCESS,
          dsx3CurrentCSEss,
          dsx3IntervalIndex,
          dsx3IntervalNumber,
          dsx3IntervalPEss,
          dsx3IntervalPSEss,
          dsx3IntervalSEFss,
          dsx3IntervalUAss,
          dsx3IntervalLCVs,
          dsx3IntervalPCVs,
          dsx3IntervalLEss,
          dsx3IntervalCCVs,
          dsx3IntervalCESS,
          dsx3IntervalCSEss,
          dsx3IntervalValidData,
          dsx3TotalIndex,
          dsx3TotalPEss,
          dsx3TotalPSEss,
          dsx3TotalSEFss,
          dsx3TotalUAss,
          dsx3TotalLCVs,
          dsx3TotalPCVs,
          dsx3TotalLEss,
```

```
        dsx3TotalCCVs,
        dsx3TotalCESSs,
        dsx3TotalCSESSs }
STATUS    current
DESCRIPTION
    "A collection of objects providing statistics
    information applicable to all DS3/E3 interfaces."
 ::= { ds3Groups 2 }

ds3FarEndGroup OBJECT-GROUP
OBJECTS { dsx3FarEndLineIndex,
          dsx3FarEndEquipCode,
          dsx3FarEndLocationIDCode,
          dsx3FarEndFrameIDCode,
          dsx3FarEndUnitCode,
          dsx3FarEndFacilityIDCode,
          dsx3FarEndCurrentIndex,
          dsx3FarEndTimeElapsed,
          dsx3FarEndValidIntervals,
          dsx3FarEndCurrentCESSs,
          dsx3FarEndCurrentCSESSs,
          dsx3FarEndCurrentCCVs,
          dsx3FarEndCurrentUASSs,
          dsx3FarEndInvalidIntervals,
          dsx3FarEndIntervalIndex,
          dsx3FarEndIntervalNumber,
          dsx3FarEndIntervalCESSs,
          dsx3FarEndIntervalCSESSs,
          dsx3FarEndIntervalCCVs,
          dsx3FarEndIntervalUASSs,
          dsx3FarEndIntervalValidData,
          dsx3FarEndTotalIndex,
          dsx3FarEndTotalCESSs,
          dsx3FarEndTotalCSESSs,
          dsx3FarEndTotalCCVs,
          dsx3FarEndTotalUASSs }
STATUS    current
DESCRIPTION
    "A collection of objects providing remote
    configuration and statistics information
    applicable to C-bit Parity and SYNTRAN DS3
    interfaces."
 ::= { ds3Groups 3 }

ds3DeprecatedGroup OBJECT-GROUP
```

```
OBJECTS { dsx3IfIndex,
          dsx3FracIndex,
          dsx3FracNumber,
          dsx3FracIfIndex }
STATUS deprecated
DESCRIPTION
    "A collection of obsolete objects that may be
    implemented for backwards compatibility."
 ::= { ds3Groups 4 }

ds3NearEndOptionalConfigGroup OBJECT-GROUP
OBJECTS { dsx3LineStatusLastChange,
          dsx3LineStatusChangeTrapEnable }

STATUS current
DESCRIPTION
    "A collection of objects that may be implemented
    on DS3/E3 interfaces."
 ::= { ds3Groups 5 }

ds3NearEndOptionalTrapGroup NOTIFICATION-GROUP
NOTIFICATIONS { dsx3LineStatusChange }
STATUS current
DESCRIPTION
    "A collection of notifications that may be
    implemented on DS3/E3 interfaces."
 ::= { ds3Groups 6 }

END
```

#### **4. Appendix A - Use of dsx3IfIndex and dsx3LineIndex**

This Appendix exists to document the previous use of dsx3IfIndex and dsx3LineIndex and to clarify the relationship of dsx3LineIndex as defined in [rfc1407](#) with the dsx3LineIndex as defined in this document.

The following shows the old and new definitions and the relationship:

[New Definition]: "This object should be made equal to ifIndex. The next paragraph describes its previous usage. Making the object equal to ifIndex allows proper use of ifStackTable.

[Old Definition]: "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 dsx3LineIndices with a 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."

When the "Old Definition" was created, it was described this way to allow a manager to treat the value \_as if\_ it were an ifIndex, i.e., the value would either be: 1) an ifIndex value or 2) a value that was guaranteed to be different from all valid ifIndex values.

The new definition is a subset of that definition, i.e. the value is always an ifIndex value.

The following is [Section 3.1](#) from [RFC1407](#):

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:

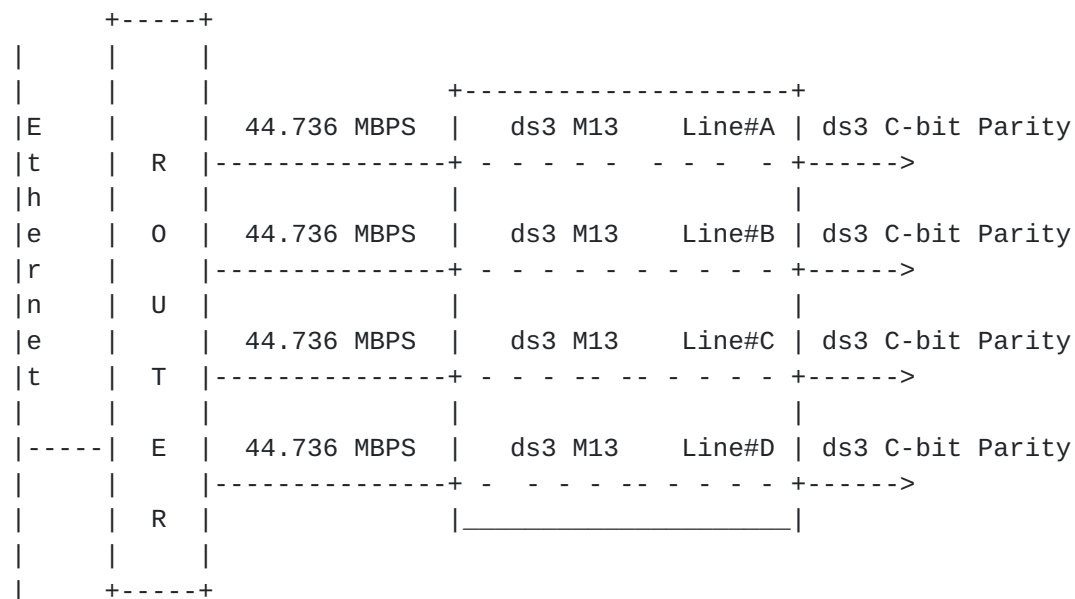
ifIndex=dsx3IfIndex=dsx3LineIndex for all interfaces.

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, [RFC1213](#)).

External&Internal interface scenario: the SNMP Agent resides on a 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:



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 a 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

## 5. [Appendix B](#) - The delay approach to Unavailable Seconds.

This procedure is illustrated below for a DS3 C-Bit parity application. Similar rules would apply for other interfaces covered by this MIB. The procedure guarantees that the statistical counters are correctly updated at all times, although they lag real time by 10 seconds. At the end of each 15 minutes interval the current interval counts are transferred to the most recent interval entry and each interval is shifted up by one position, with the oldest being discarded if necessary in order to make room. The current interval counts then start over from zero. Note, however, that the signal state calculation does not start afresh at each interval boundary; rather, signal state information is retained across interval boundaries.

+-----+   READ COUNTERS & STATUS INFO FROM HARDWARE   +-----+											
BPV	EXZ	LOS	PCV	CCV	AIS	SEF	OOF	LOF	FEBE	RAI	
+-----+											
V	V	V	V	V	V	V	V	V	V	V	V
+-----+											
ACCUM ONE-SEC STATS, CHK ERR THRESHOLDS, & UPDT SIGNAL STATE											
<----- NEAR END ----->   <---- FAR END ---->											



	LCV	LES	PCV	CCV	PES	CES	PSES	CSES	SEFS	A/U	CCV	CES	CSES	SEFS	A/U	
+-----+																
	V	V	V	V	V	V	V	V	V		V	V	V	V		
+-----+										+-----+						
	ONE-SEC DELAY										ONE-SEC DELAY					
	(1 OF 10)										(1 OF 10)					
+-----+										+-----+						
	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	V	V	V	V	V	V	V	V	V		V	V	V	V		
+-----+										+-----+						
	ONE-SEC DELAY										ONE-SEC DELAY					
	(10 OF 10)										(10 OF 10)					
+-----+										+-----+						
	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
+-----+																
	UPDATE STATISTICS COUNTERS															
	<----- NEAR END ----->   <---- FAR END ---->															
	LCV	LES	PCV	CCV	PES	CES	PSES	CSES	SEFS	UAS	CCV	CES	CSES	SEFS	UAS	
+-----+																

Note that if such a procedure is adopted there is no current interval data for the first ten seconds after a system comes up. `noSuchInstance` must be returned if a management station attempts to access the current interval counters during this time.

It is an implementation-specific matter whether an agent assumes that the initial state of the interface is available or unavailable.

## **6. Intellectual Property**

The IETF takes no position regarding the validity or scope of any intellectual property or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; neither does it represent that it

has made any effort to identify any such rights. Information on the IETF's procedures with respect to rights in standards-track and standards-related documentation can be found in [BCP-11](#). Copies of claims of rights made available for publication and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementors or users of this specification can be obtained from the IETF Secretariat.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights which may cover technology that may be required to practice this standard. Please address the information to the IETF Executive Director.

## **7. Full Copyright Statement**

Copyright (C) The Internet Society (2003). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

## **8. Acknowledgments**

This document was produced by the AToM MIB Working Group. The Editor would like to dedicate a special thanks to C. Mike Heard for providing a top notch doctor review and many helpful suggestions, and to acknowledge D. Fowler, Editor of [RFC 2496](#), T. Cox and K. Tesink Editors of [RFC 1407](#).

## **9. References**

### **9.1. Normative References**

[RFC2578]

McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Structure of Management Information Version 2 (SMIv2)", STD 58 [RFC 2578](#), April 1999.

[RFC2579]

McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Textual Conventions for SMIv2", STD 58 [RFC 2579](#), April 1999.

[RFC2580]

McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Conformance Statements for SMIv2", STD 58 [RFC 2580](#), April 1999.

[RFC2863]

McCloghrie, K. and F. Kastenholz, "The Interfaces Group MIB", [RFC 2863](#), June 2000.

[ANSI-T1.102]

American National Standard for telecommunications - digital hierarchy - electrical interfaces, ANSI T1.102-1987.

[ANSI-T1.107]

American National Standard for telecommunications - digital hierarchy - formats specification, ANSI T1.107- 1988.

[ANSI-T1.107a]

ANSI T1.107a-1990.

[ANSI-T1.404]

American National Standard for telecommunications - Carrier-to-Customer Installation - DS3 Metallic Interface, ANSI T1.404-1989.

[ANSI-T1.231]

American National Standard for Telecommunications -- Layer 1 In-Service Digital Transmission Performance Monitoring T1.231, Sept 1993.

[CCITT-G.751]

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

[ETSI-T/NA(91)18]

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.

[RFC3593]

Tesink, K., "Textual Conventions for MIB Modules Using Performance History Based on 15 Minute Intervals", [RFC3593](#), September 2003.

[ITU-T-M.1400]

ITU-T M.1400: Designation For Interconnections Among Network Operators, October 2001.

## 9.2. Informative References

[RFC1213]

Rose M., Editor, "Management Information Base for Network Management of TCP/IP-based internets: MIB-II", [RFC 1213](#), Performance Systems International, March 1991.

[RFC1407]

T. Cox, K. Tesink, "Definitions of Managed Objects for the DS3/E3 Interface Types", [RFC 1406](#), January 1993.

[RFC2495]

Fowler D., "Definitions of Managed Objects for the DS1, E1, DS2 and and E2 Interface Types", [RFC 2495](#), january 1999.

```
*****
* NOTE TO RFC Editor (to be removed prior to publication):*
* If <draft-ietf-atommib-rfc2495bis-06.txt> (or its          *
* successor) is to be published as an RFC concurrently    *
* with this document, please update this reference to     *
* point to that RFC, instead of RFC 2495, and change      *
* the reference tag [RFC2495] to match.                  *
*****
```

[RFC3592]

Brown, T., and Tesink, K., "Definitions of Managed Objects for the SONET/SDH Interface Type", [RFC 3592](#), September 2003.

## [RFC2494]

Fowler, D., "Definitions of Managed Objects for the Ds0 and DS0Bundle Interface Types", [RFC 2494](#), January 1999.

## [RFC3410]

Case, J., Mundy, R., Partain, D. and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework", [RFC 3410](#), December 2002.

## **10. Security Considerations**

There are a number of management objects defined in this MIB module with a MAX-ACCESS clause of read-write. Such objects may be considered sensitive or vulnerable in some network environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations. The specific the objects and their sensitivities/vulnerabilities are as follows.

Setting the following objects to incorrect values may result in traffic interruptions:

- dsx3LineType
- dsx3LineCoding
- dsx3SendCode
- dsx3LoopbackConfig
- dsx3TransmitClockSource
- dsx3LineLength
- dsx3Channelization
- dsx3Ds1ForRemoteLoop

In the case of dsx3LineType, for example, both ends of a DS3/E3 must have the same value in order for traffic to flow. In the case of dsx3SendCode and dsx3LoopbackConfig, for another example, traffic may stop transmitting when particular loopbacks are applied.

Setting the following objects to an incorrect value will result in the remote end receiving an incorrect Path Identification message, which may result in a connectivity inconsistency:

- dsx3FarEndEquipCode
- dsx3FarEndLocationIDCode
- dsx3FarEndFrameIDCode
- dsx3FarEndUnitCode
- dsx3FarEndFacilityIDCode

Setting the following object to an incorrect value will not harm the traffic, but it may cause a circuit to be mis-identified and thereby create difficulties for service personnel when attempting to troubleshoot a problem:

- dsx3CircuitIdentifier

Setting the following object can cause an increase in the number of

traps received by the network management station:

dsx3LineStatusChangeTrapEnable

The readable objects in this MIB module (i.e., the objects with a MAX-ACCESS other than not-accessible) may be considered sensitive in some environments since, collectively, they provide extensive information about the performance of interfaces in DS3/E3 equipment or networks and can reveal some aspects of their configuration. In such environments it is important to control even GET and NOTIFY access to these objects and possibly to encrypt the values of these objects when sending them over the network via SNMP.

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPSec), even then, there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB module.

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework (see [\[RFC3410\]](#), [section 8](#)), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

## **11. Author's Address**

Orly Nicklass (editor)  
RAD Data Communications, Ltd.  
Ziv Tower, 24 Roul Walenberg  
Tel Aviv, Israel, 69719

Phone: 9723-765-9969

e-Mail: orly\_n@rad.com



## Table of Contents

<a href="#">1</a>	The Internet Standard Management Framework .....	<a href="#">2</a>
<a href="#">1.1</a>	Changes from <a href="#">RFC2496</a> .....	<a href="#">2</a>
<a href="#">1.2</a>	Changes from <a href="#">RFC1407</a> .....	<a href="#">2</a>
<a href="#">2</a>	Overview .....	<a href="#">4</a>
<a href="#">2.1</a>	Use of ifTable for DS3 Layer .....	<a href="#">4</a>
<a href="#">2.2</a>	Usage Guidelines .....	<a href="#">5</a>
<a href="#">2.2.1</a>	Usage of ifStackTable .....	<a href="#">5</a>
<a href="#">2.2.2</a>	Usage of Channelization for DS3, DS1, DS0 .....	<a href="#">7</a>
<a href="#">2.2.3</a>	Usage of Channelization for DS3, DS2, DS1 .....	<a href="#">8</a>
<a href="#">2.2.4</a>	Usage of Loopbacks .....	<a href="#">9</a>
<a href="#">2.3</a>	Objectives of this MIB Module .....	<a href="#">10</a>
<a href="#">2.4</a>	DS3/E3 Terminology .....	<a href="#">10</a>
<a href="#">2.4.1</a>	Error Events .....	<a href="#">10</a>
<a href="#">2.4.2</a>	Performance Parameters .....	<a href="#">11</a>
<a href="#">2.4.3</a>	Performance Defects .....	<a href="#">14</a>
<a href="#">2.4.4</a>	Other Terms .....	<a href="#">16</a>
<a href="#">3</a>	Object Definitions .....	<a href="#">17</a>
<a href="#">4.1</a>	The DS3/E3 Near End Group .....	<a href="#">20</a>
<a href="#">4.1.1</a>	The DS3/E3 Configuration Table .....	<a href="#">20</a>
<a href="#">4.1.2</a>	The DS3/E3 Current Table .....	<a href="#">30</a>
<a href="#">4.1.3</a>	The DS3/E3 Interval Table .....	<a href="#">34</a>
<a href="#">4.1.4</a>	The DS3/E3 Total .....	<a href="#">38</a>
<a href="#">4.2</a>	The DS3 Far End Group .....	<a href="#">42</a>
<a href="#">4.2.1</a>	The DS3 Far End Configuration .....	<a href="#">42</a>
<a href="#">4.2.2</a>	The DS3 Far End Current .....	<a href="#">44</a>
<a href="#">4.2.3</a>	The DS3 Far End Interval Table .....	<a href="#">47</a>
<a href="#">4.2.4</a>	The DS3 Far End Total .....	<a href="#">49</a>
<a href="#">4.3</a>	The DS3/E3 Fractional Table .....	<a href="#">52</a>
<a href="#">4.4</a>	The DS3 Trap Group .....	<a href="#">55</a>
<a href="#">4.5</a>	Conformance Groups .....	<a href="#">56</a>
<a href="#">4</a>	<a href="#">Appendix A</a> - Use of dsx3IfIndex and dsx3LineIndex .....	<a href="#">60</a>
<a href="#">5</a>	<a href="#">Appendix B</a> - The delay approach to Unavailable Seconds. ....	<a href="#">63</a>
<a href="#">6</a>	Intellectual Property .....	<a href="#">64</a>
<a href="#">7</a>	Full Copyright Statement .....	<a href="#">65</a>
<a href="#">8</a>	Acknowledgments .....	<a href="#">66</a>
<a href="#">9</a>	References .....	<a href="#">67</a>
<a href="#">9.1</a>	Normative References .....	<a href="#">67</a>
<a href="#">9.2</a>	Informative References .....	<a href="#">68</a>
<a href="#">10</a>	Security Considerations .....	<a href="#">70</a>
<a href="#">11</a>	Author's Address .....	<a href="#">71</a>