

Network Working Group  
Internet-Draft  
Expires: November 27, 2005

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May 26, 2005

Definitions of Managed Objects for High Bit-Rate DSL - 2nd generation (HDSL2) and Single-Pair High-Speed Digital Subscriber Line (SHDSL) Lines  
[draft-ietf-adslmib-gshdslbis-11.txt](#)

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#### Abstract

This document defines a Management Information Base (MIB) module for use with network management protocols in the Internet community. In particular, it describes objects used for managing High Bit-Rate Digital Subscriber Line (DSL) - 2nd generation (HDSL2) and Single-

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Pair High-Speed Digital Subscriber Line (SHDSL) interfaces. This document introduces extensions to several objects and textual conventions defined in HDSL2-SHDSL-Line MIB ([RFC 3276](#)). This document obsoletes [RFC 3276](#).

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## 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].

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](#) [RFC2119].

## 2. Overview

This document defines a Management Information Base (MIB) module for use with network management protocols in the Internet community for the purpose of managing HDSL2/SHDSL Lines.

The MIB module described in [RFC 3276](#) [RFC3276] describes objects used for managing High Bit-Rate DSL - 2nd generation (HDSL2) [T1E1.4] and Single-Pair High-Speed Digital Subscriber Line (SHDSL) interfaces [G.991.2]. These object descriptions are based upon the specifications for the HDSL2 and SHDSL Embedded Operations Channel (EOC) as defined in American National Standards Institute (ANSI) T1E1.4/2000-006 [T1E1.4] and International Telecommunication Union (ITU) G.991.2 [G.991.2].

This document obsoletes [RFC 3276](#) [RFC3276] which supports G.shdsl in that the MIB module described herein supports G.shdsl.bis as

described in the G.991.2 [[G.991.2](#)]. In addition, objects have been added to improve the management of SHDSL lines.

The MIB module is located in the MIB tree under MIB 2 transmission, as discussed in the MIB-2 Integration ([RFC 2863](#) [[RFC2863](#)]) section of this document.

## [2.1](#) Relationship to other MIBs

This section outlines the relationship of this MIB module with other MIB modules described in RFCs. Specifically, IF-MIB as presented in [RFC 2863](#) [[RFC2863](#)] is discussed.

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### [2.1.1](#) General IF-MIB Integration ([RFC 2863](#))

The HDSL2/SHDSL Line MIB specifies the detailed attributes of a data interface. As such, it needs to integrate with [RFC 2863](#) [[RFC2863](#)]. The IANA has assigned the following ifTypes to HDSL2 and SHDSL:

```
IANAifType ::= TEXTUAL-CONVENTION
    ...
    SYNTAX INTEGER {
        ...
        hdsl2 (168), -- High Bit-Rate DSL, 2nd generation
        shdsl (169), -- Multirate HDSL2
        ...
    }
```

Note that the `ifFixedLengthGroup` from [RFC 2863](#) [[RFC2863](#)] MUST be supported and that the `ifRcvAddressGroup` does not apply to this MIB module.

### [2.1.2](#) Usage of `ifTable`

The MIB branch identified by this `ifType` contains tables appropriate for this interface type. Most such tables extend the `ifEntry` table, and are indexed by `ifIndex`. For interfaces in systems implementing this MIB module, those table entries indexed by `ifIndex` MUST be persistent.

The following attributes are part of the mandatory `ifGeneralInformationGroup` in [RFC 2863](#) [[RFC2863](#)], and are not

duplicated in the HDSL2/SHDSL Line MIB.

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ifIndex	Interface index.
ifDescr	See interfaces MIB [ <a href="#">RFC2863</a> ].
ifType	hdl2(168) or shdsl(169).
ifSpeed	Set as appropriate. (This is fixed at 1552000 for HDSL2 lines)
ifPhysAddress	This object MUST 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> ].

ifAlias	See interfaces MIB [ <a href="#">RFC2863</a> ].
ifLinkUpDownTrapEnable	Default to enabled(1).
ifHighSpeed	Set as appropriate. (For HDSL2 lines, this is fixed at 2)
ifConnectorPresent	Set as appropriate.

=====

Figure 1: Use of ifTable Objects

## [2.2](#) IANA Considerations

The HDSL2-SHDSL-LINE-MIB module requires the allocation of a single object identifier for its MODULE-IDENTITY. The IANA has allocated this object identifier in the transmission subtree (48), defined in the SNMPv2-SMI MIB module.

The assignment was in fact done when [RFC 3276](#) was published, and this revision of the RFC does not require any new action from IANA.

## [2.3](#) Conventions used in the MIB Module

### [2.3.1](#) Naming Conventions

- A. xtuC refers to a central site terminal unit; H2TU-C for HDSL2, or STU-C for SHDSL.
- B. xtuR refers to a remote site terminal unit; H2TU-R for HDSL2, or STU-R for SHDSL.
- C. xtu refers to a terminal unit; either an xtuC or xtuR.
- D. xru refer to a regenerator unit; H2RU for HDSL2, or SRU for SHDSL.
- E. xU refers to any HDSL2/SHDSL unit; either an xtu or xru.
- F. CRC is cyclic redundancy check [[G.991.2](#)].
- G. ES means errored second [[G.991.2](#)].
- J. LOSW means loss of sync word [[G.991.2](#)].

- I. LOSWS means LOSW seconds [[G.991.2](#)].
- J. SES means severely errored second [[G.991.2](#)].
- K. SNR means signal-to-noise ratio [[G.991.2](#)].
- L. UAS means unavailable second [[G.991.2](#)].

### [2.3.2](#) Textual Conventions

The following textual conventions are defined to reflect the line topology in the MIB module (further discussed in the following section) and to define the behavior of the statistics to be maintained by an agent.

- o Hdsl2ShdslUnitId:

Attributes with this syntax uniquely identify each unit in a HDSL2/SHDSL span. It mirrors the EOC addressing mechanism:

xtuC(1)	- central office (CO) terminal unit
xtuR(2)	- customer premises equipment (CPE) terminal unit
xru1(3) .. xru8(10)	- regenerators, numbered from central office side

- o Hdsl2ShdslUnitSide:

Attributes with this syntax reference the two sides of a unit:

networkSide(1)	- N in figure 2, below
customerSide(2)	- C in figure 2, below

- o Hdsl2ShdslWirePair:

Attributes with this syntax reference the wire pairs connecting

the units:

wirePair1(1)	- First pair for HDSL2/SHDSL.
wirePair2(2)	- Optional second pair for SHDSL only.
wirePair3(3)	- Optional third pair for SHDSL.bis only.
wirePair4(4)	- Optional fourth pair for SHDSL.bis only.

- o Hdsl2ShdslTransmissionModeType:

Attributes with this syntax specify the regional setting for a SHDSL line. Specified as a BITS construct, the two mode types are:

region1 - ITU-T G.991.2 Annex A  
region2 - ITU-T G.991.2 Annex B

o Hdsl2ShdslPerfCurrDayCount:

Attributes with this syntax define the behavior of the 1-day (24 hour) gauges found in the MIB module.

o Hdsl2Shdsl1DayIntervalCount:

Attributes with this syntax define the behavior of the 1-day (24 hour) interval counters found in the MIB module.

o Hdsl2ShdslPerfTimeElapsed:

Attributes with this syntax define the behavior of the elapsed time counters found in the MIB module.

o Hdsl2ShdslPerfIntervalThreshold:

Attributes with this syntax define the behavior of the alarm thresholds found in the MIB module.

o Hdsl2ShdslClockReferenceType:

Attributes with this syntax define the clock references for the HDSL2/SHDSL span.

## [2.4](#) Structure

The MIB module is structured into following MIB groups:

o Span Configuration Group:

This group supports MIB objects for configuring parameters for the

HDSL2/SHDSL span. It contains the following table:

- hdsl2ShdslSpanConfTable
- o Span Status Group:

This group supports MIB objects for retrieving span status information. It contains the following table:

  - hdsl2ShdslSpanStatusTable
- o Unit Inventory Group:

This group supports MIB objects for retrieving unit inventory information about units in HDSL2/SHDSL lines via the EOC. It contains the following table:

  - hdsl2ShdslInventoryTable
- o Segment Endpoint Configuration Group:

This group supports MIB objects for configuring parameters for the HDSL2/SHDSL segment endpoints. It contains the following table:

  - hdsl2ShdslEndpointConfTable
- o Segment Endpoint Current Status/Performance Group:

This group supports MIB objects that provide the current status/performance information relating to segment endpoints. It contains the following table:

  - hdsl2ShdslEndpointCurrTable
- o Segment Endpoint 15-Minute Interval Status/Performance Group:

This group supports MIB objects that provide historic status/performance information relating to segment endpoints in 15-minute intervals. It contains the following table:

  - hdsl2Shdsl15MinIntervalTable
- o Segment Endpoint 1-Day Interval Status/Performance Group:

This group supports MIB objects that provide historic status/performance information relating to segment endpoints in 1-day intervals. It contains the following table:

- hdsl2Shdsl1DayIntervalTable

- o Maintenance Group:

This group supports MIB objects for performing maintenance operations such as loopbacks for HDSL2/SHDSL lines. It contains the following table(s):

- hdsl2ShdslEndpointMaintTable
- hdsl2ShdslUnitMaintTable

- o Span Configuration Profile Group:

This group supports MIB objects for defining configuration profiles for HDSL2/SHDSL Spans. It contains the following table:

- hdsl2ShdslSpanConfProfileTable

- o Segment Endpoint Alarm Configuration Profile Group:

This group supports MIB objects for defining alarm configuration profiles for HDSL2/SHDSL Segment Endpoints. It contains the following table:

- hdsl2ShdslEndpointAlarmConfProfileTable

- o Notifications Group:

This group defines the notifications supported for HDSL2/SHDSL lines:

- hdsl2ShdslLoopAttenCrossing
- hdsl2ShdslSNRMarginCrossing
- hdsl2ShdslPerfESThresh
- hdsl2ShdslPerfSESThresh
- hdsl2ShdslPerfCRCAnomaliesThresh
- hdsl2ShdslPerfLOSWSThresh
- hdsl2ShdslPerfUASThresh
- hdsl2ShdslSpanInvalidNumRepeaters
- hdsl2ShdslLoopbackFailure
- hdsl2ShdslpowerBackoff
- hdsl2ShdsldeviceFault
- hdsl2ShdsldcContinuityFault
- hdsl2ShdslconfigInitFailure
- hdsl2ShdslprotocolInitFailure
- hdsl2ShdslnoNeighborPresent

o SHDSL Wire Pair Group:

This group supports MIB objects which provide status of the SHDSL-specific wire pairs.

- hdsl2ShdslEndpointCurrTipRingReversal
- hdsl2ShdslEndpointCurrActivationState

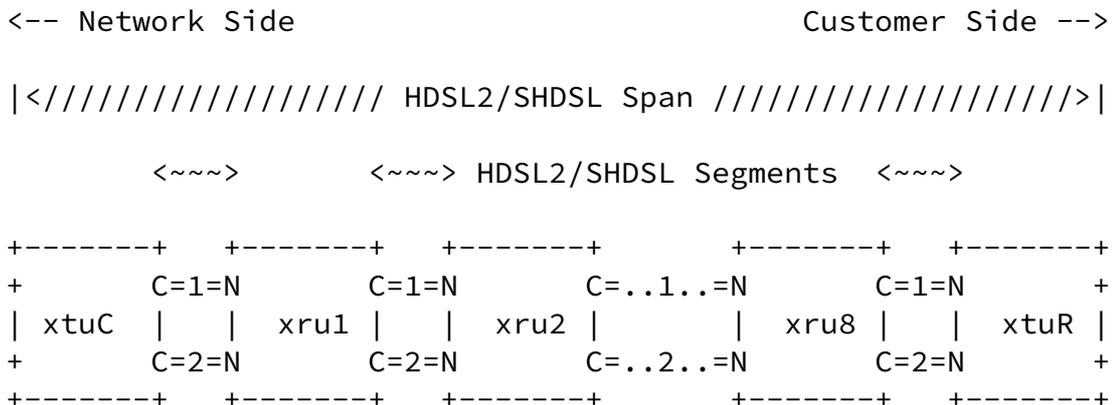
o Payload Group:

This group supports MIB objects for retrieving payload rates which excludes any framing overhead.

- hdsl2ShdslStatusMaxAttainablePayloadRate
- hdsl2ShdslStatusActualPayloadRate

[2.5](#) Line Topology

An HDSL2/SHDSL Line consists of a minimum of two units - xtuC (the central termination unit) and an xtuR (the remote termination unit). The line may optionally support up to 8 repeater/regenerator units (xru) as shown in the figure below.



Key: <////> HDSL2/SHDSL Span  
 <~~~> HDSL2/SHDSL Segment

=1= HDSL2/SHDSL wire-pair-1  
=2= SHDSL optional wire-pair-2 (Not applicable to HDSL2)  
C Customer Side Segment Endpoint (modem)  
N Network Side Segment Endpoint (modem)

Figure 2: General topology for an HDSL2/SHDSL Line

## [2.6](#) Counters, Interval Buckets and Thresholds

For SNR Margin, Loop Attenuation, ES, SES, CRC anomalies, LOSW, and UAS, there are event counters, current 15-minute and 0 to 96 15-minute history bucket(s) of "interval-counters", as well as current and 0 to 30 previous 1-day interval-counter(s). Each current 15-minute event bucket has an associated threshold notification.

Unlike [RFC 3593](#) [[RFC3593](#)] and [RFC 2662](#) [[RFC2662](#)], there is no representation in the MIB module for invalid buckets. In those cases where the data for an interval is suspect or known to be invalid, the agent MUST NOT report the interval. If the current 15-minute event bucket is determined to be invalid, notifications based upon the value of the event bucket MUST NOT be generated.

Not reporting an interval will result in holes in the associated table. For example, the table, `hdsl2Shdsl15MinIntervalTable`, is indexed by { `ifIndex`, `hdsl2ShdslInvIndex`, `hdsl2ShdslEndpointSide`, `hdsl2ShdslEndpointWirePair`, `hdsl2Shdsl15MinIntervalNumber`}. If interval 12 is determined to be invalid but intervals 11 and 13 are valid, a Get Next operation on the indices `.1.1.1.1.11` would return indices `.1.1.1.1.13`.

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

Counters are not reset when an xU is reinitialized, only when the agent is reset or reinitialized (or under specific request outside the scope of this MIB module).

## [2.7](#) Profiles

As a managed node can handle a large number of xUs, (e.g., hundreds or perhaps thousands of lines), provisioning every parameter on every xU may become burdensome. Moreover, most lines are provisioned identically with the same set of parameters. To simplify the provisioning process, this MIB module makes use of profiles. A profile is a set of parameters that can be shared by multiple lines using the same configuration.

The following profiles are used in this MIB module:

- o Span Configuration Profiles - Span configuration profiles contain parameters for configuring HDSL2/SHDSL spans. They are defined in the `hdsl2ShdslSpanConfProfileTable`. Since span configuration

parameters are only applicable for SHDSL, the support for span configuration profiles are optional for HDSL2 interfaces.

Note that the configuration of the span dictates the behavior for each individual segment endpoint in the span. If a different configuration is provisioned for any given segment endpoint within the span, the new configuration for this segment endpoint will override the span configuration for this segment endpoint only.

- o Segment Endpoint Alarm Configuration Profiles - These profiles contain parameters for configuring alarm thresholds for HDSL2/SHDSL segment endpoints. These profiles are defined in the `hdsl2ShdslEndpointAlarmConfProfileTable`.

The index value for this profile is a locally-unique administratively assigned name for the profile having the textual convention 'SnmpAdminString' ([RFC 3411](#) [[RFC3411](#)]).

One or more lines may be configured to share parameters of a single profile (e.g., `hdsl2ShdslEndpointAlarmConfProfile = 'silver'`) by setting its `hdsl2ShdslEndpointAlarmConfProfile` objects to the value of this profile. If a change is made to the profile, all lines that refer to it will be reconfigured to the changed parameters. Before a profile can be deleted or taken out of service it must be first unreferenced from all associated lines.

Implementations MUST provide a default profile whose name is 'DEFVAL' for each profile type. The values of the associated parameters will be vendor specific unless otherwise indicated in this document. Before a line's profiles have been set, these profiles will be automatically used by setting `hdl2ShdslEndpointAlarmConfProfile` and `hdl2ShdslSpanConfProfile` to 'DEFVAL' where appropriate. This default profile name, 'DEFVAL', is considered reserved in the context of profiles defined in this MIB module.

Profiles are created, assigned, and deleted dynamically using the profile name and profile row status in each of the four profile tables.

Profile changes MUST take effect immediately. These changes MAY result in a restart (hard reset or soft restart) of the units on the line.

## [2.8](#) Notifications

The ability to generate the SNMP notifications `coldStart/WarmStart` (per [RFC3418](#)) which are per agent (e.g., per Digital Subscriber Line Access Multiplexer, or DSLAM, in such a device), and `linkUp/`

`linkDown` (per [RFC2863](#)) which are per interface (i.e., HDSL2/SHDSL line) is required.

A `linkDown` notification MAY be generated whenever any of ES, SES, CRC Anomaly, LOSW, or UAS event occurs. The corresponding `linkUp` notification MAY be sent when all link failure conditions are cleared.

The notifications defined in this MIB module are for initialization failure and for the threshold crossings associated with the following events: ES, SES, CRC Anomaly, LOSW, and UAS. Each threshold has its own enable/threshold value. When that value is 0, the notification is disabled.

The `hdl2ShdslEndpointCurrStatus` is a bitmask representing all outstanding error conditions associated with a particular Segment Endpoint. Note that since status of remote endpoints is obtained via the EOC, this information may be unavailable for units that are

unreachable via EOC during a line error condition. Therefore, not all conditions may always be included in its current status. Notifications corresponding to the bit fields in this object are defined.

Two alarm conditions, SNR Margin Alarm and Loop Attenuation Alarm, are organized in a manner slightly different from that implied in the EOC specifications. In the MIB module, these alarm conditions are tied to the two thresholds `hdsl2ShdslEndpointThreshSNRMargin` and `hdsl2ShdslEndpointThreshLoopAttenuation` found in the `hdsl2ShdslEndpointAlarmConfProfileTable`. In the EOC, the alarm conditions associated with these thresholds are per-unit. In the MIB module, these alarm conditions are per-endpoint. For terminal units, this has no impact. For repeaters, this implies an implementation variance where the agent in the terminal unit is responsible for detecting a threshold crossing. As the reporting of a repeater detected alarm condition to the polling terminal unit occurs in the same EOC message as the reporting of the current SNR Margin and Loop Attenuation values, it is anticipated that this will have very little impact on agent implementation.

A threshold notification occurs whenever the corresponding current 15-minute interval error counter becomes equal to, or exceeds the threshold value. Only one notification SHOULD be sent per interval per interface. Since the current 15-minute counter is reset to 0 every 15 minutes, and if the condition persists, the notification may recur as often as every 15 minutes. For example, to get a notification whenever a "loss of" event occurs (but at most once every 15 minutes), set the corresponding threshold to 1. The agent will generate a notification when the event originally occurs.

Notifications, other than the threshold notifications listed above, SHOULD be rate limited (throttled) such that there is at least a one-minute gap between the generation of consecutive notification of the same event. When notifications are rate limited, they are dropped and not queued for sending at a future time. This is intended to be a general rate-limiting statement for notifications that have no explicit rate limiting assertions in this document otherwise.

Note that the Network Management System, or NMS, may receive a `linkDown` notification, as well, if enabled (via `ifLinkUpDownTrapEnable` [[RFC2863](#)]). At the beginning of the next 15

minute interval, the counter is reset. When the first second goes by and the event occurs, the current interval bucket will be 1, which equals the threshold, and the notification will be sent again.

A `hdsl2ShdslSpanInvalidNumRepeaters` notification may be generated following completion of the discovery phase if the number of repeaters discovered on the line differs from the number of repeaters specified in `hdsl2ShdslSpanConfNumRepeaters`. For those conditions where the number of provisioned repeaters is greater than those encountered during span discovery, all table entries associated with the nonexistent repeaters are to be discarded. For those conditions where the number of provisioned repeaters is less than those encountered during span discovery, additional table entries are to be created using the default span configuration profile.

### 3. Definitions

```
HDSL2-SHDSL-LINE-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    MODULE-IDENTITY,  
    OBJECT-TYPE,  
    Counter32,  
    Unsigned32,  
    Gauge32,  
    NOTIFICATION-TYPE,  
    Integer32,  
    transmission  
        FROM SNMPv2-SMI  
    RowStatus,  
    TEXTUAL-CONVENTION  
        FROM SNMPv2-TC  
    ifIndex  
        FROM IF-MIB  
    PerfCurrentCount,  
    PerfIntervalCount  
        FROM PerfHist-TC-MIB
```

```
    SnmpAdminString  
        FROM SNMP-FRAMEWORK-MIB  
    MODULE-COMPLIANCE,  
    OBJECT-GROUP,
```

NOTIFICATION-GROUP  
FROM SNMPv2-CONF;

hdsl2ShdslMIB MODULE-IDENTITY

LAST-UPDATED "200505260000Z" -- May 26, 2005

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DESCRIPTION

"This MIB module defines a collection of objects for managing HDSL2/SHDSL lines. An agent may reside at either end of the line, however the MIB module is designed to require no management communication between the modems beyond that inherent in the low-level EOC line protocol as defined in ANSI T1E1.4/2000-006 (for HDSL2 lines), or in ITU G.991.2 (for SHDSL lines).

Copyright (C) The Internet Society (2005). This version of this MIB module is part of RFC xxxx; see the RFC itself for full legal notices."

REVISION "200505260000Z" -- May 26, 2005

DESCRIPTION "This version, published as RFC xxxx.

The following changes have been made in this version:

1. Added a 3rd and 4th wire pair.
2. Modified all rates such that their rates are only constrained by an unsigned 32-bit value and not by what today's perceived technology limitations are.
3. Clarified that the rates from [RFC 3276](#) include payload and any applicable framing and added objects for payload-only rates.
4. Added an object to indicate whether or not the tip and ring are reversed on a wire pair.
5. Added an object to display the activation state of a wire pair.
6. Added references as necessary for clarification.
7. Added display hints to textual conventions as necessary.
8. Updated conformance statements as necessary.
9. Some changes were due to IETF requirements and RFC generation tools."

REVISION "200205090000Z" -- May 9, 2002

DESCRIPTION "Initial version, published as [RFC 3276](#)."

::= { transmission 48 }

hds12Shds1MibObjects OBJECT IDENTIFIER ::= { hds12Shds1MIB 1 }

-- Textual Conventions used in this MIB module

--

Hds12Shds1PerfCurrDayCount ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"A gauge associated with interface performance measurements in

a current 1-day (24 hour) measurement interval.

The value of this gauge starts at zero at the beginning of an interval and is increased when associated events occur, until the end of the 1-day interval. At that time the value of the gauge is stored in the previous 1-day history interval, as defined in a companion object of type `Hdsl2Shdsl1DayIntevalCount`, and the current interval gauge is restarted at zero.

In the case where the agent has no valid data available for this interval the corresponding object instance is not available and upon a retrieval request a corresponding error message shall be returned to indicate that this instance does not exist. Please note that zero is a valid value."

SYNTAX Gauge32

`Hdsl2Shdsl1DayIntervalCount ::= TEXTUAL-CONVENTION`

`DISPLAY-HINT "d"`

`STATUS current`

`DESCRIPTION`

"A counter associated with interface performance measurements during the most previous 1-day (24 hour) measurement interval. The value of this gauge is equal to the value of the current day gauge, as defined in a companion object of type `Hdsl2ShdslPerfCurrDayCount`, at the end of its most recent interval.

In the case where the agent has no valid data available for this interval the corresponding object instance is not available and upon a retrieval request a corresponding error message shall be returned to indicate that this instance does not exist."

SYNTAX Gauge32

`Hdsl2ShdslPerfTimeElapsed ::= TEXTUAL-CONVENTION`

`DISPLAY-HINT "d"`

`STATUS current`

`DESCRIPTION`

"The number of seconds that have elapsed since the beginning of

the current measurement period. If, for some reason, such as an adjustment in the system's time-of-day clock or the addition of a leap second, the current interval exceeds the maximum value, the agent will return the maximum value.

For 15 minute intervals, the range is limited to (0..899).  
For 24 hour intervals, the range is limited to (0..86399)."

SYNTAX Unsigned32(0..86399)

Hdsl2ShdslPerfIntervalThreshold ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"This convention defines a range of values that may be set in a fault threshold alarm control. As the number of seconds in a 15-minute interval numbers at most 900, objects of this type may have a range of 0...900, where the value of 0 disables the alarm."

SYNTAX Unsigned32(0..900)

Hdsl2ShdslUnitId ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"This is the unique identification for all units in a HDSL2/SHDSL Span. It is based on the EOC unit addressing scheme with reference to the xtuC."

SYNTAX INTEGER

```
{
  xtuC(1),
  xtuR(2),
  xru1(3),
  xru2(4),
  xru3(5),
  xru4(6),
  xru5(7),
  xru6(8),
  xru7(9),
  xru8(10)
}
```

Hdsl2ShdslUnitSide ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"This is the referenced side of a HDSL2/SHDSL unit - Network or Customer side. The side facing the Network is the Network side, while the side facing the Customer is the Customer side."

SYNTAX     INTEGER  
          {  
          networkSide(1),  
          customerSide(2)  
          }

Hdsl2ShdslWirePair ::= TEXTUAL-CONVENTION

STATUS     current

DESCRIPTION

"This is the referenced pair of wires in a HDSL2/SHDSL Segment. HDSL2 only supports a single pair (wirePair1 or two wire),

SHDSL lines support an optional second pair (wirePair2 or four wire), and G.shdsl.bis support an optional third pair (wirePair3 or six wire) and an optional fourth pair (wirePair4 or eight wire)."

SYNTAX     INTEGER  
          {  
          wirePair1(1),     -- two wire  
          wirePair2(2),     -- four wire  
          wirePair3(3),     -- six wire  
          wirePair4(4)     -- eight wire  
          }

Hdsl2ShdslTransmissionModeType ::= TEXTUAL-CONVENTION

STATUS     current

DESCRIPTION

"Contains the regional setting of the HDSL2/SHDSL span, represented as a bit-map of possible settings. The various bit positions are:

Bit	Meaning	Description
1	region 1	Indicates ITU-T G.991.2 Annex A.
2	region 2	Indicates ITU-T G.991.2 Annex B."

SYNTAX     BITS  
          {  
          region1(0),  
          region2(1)

```

    }

Hdsl2ShdslClockReferenceType ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "The various STU-C symbol clock references for the
        HDSL2/SHDSL span, represented as an enumeration."
    SYNTAX      INTEGER
        {
            localClk(1),          -- Mode-1 per G991.2
            networkClk(2),        -- Mode-2 per G991.2
            dataOrNetworkClk(3),  -- Mode-3a per G991.2
            dataClk(4)            -- Mode-3b per G991.2
        }

```

```

-- Span Configuration Group
--

```

```

hdl2ShdslSpanConfTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Hdsl2ShdslSpanConfEntry
    MAX-ACCESS  not-accessible
    STATUS      current

```

```

DESCRIPTION
    "This table supports overall configuration of HDSL2/SHDSL
    Spans.  Entries in this table MUST be maintained in a
    persistent manner."
 ::= { hdsl2ShdslMibObjects 1 }

```

```

hdl2ShdslSpanConfEntry OBJECT-TYPE
    SYNTAX      Hdsl2ShdslSpanConfEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry in the hdsl2ShdslSpanConfTable.  Each entry
        represents the complete Span in a single HDSL2/SHDSL line.
        It is indexed by the ifIndex of the associated HDSL2/SHDSL
        line."
    INDEX { ifIndex }
    ::= { hdsl2ShdslSpanConfTable 1 }

```

```

Hdsl2ShdslSpanConfEntry ::=

```

```

SEQUENCE
{
hds12Shds1SpanConfNumRepeaters           Unsigned32,
hds12Shds1SpanConfProfile                 SnmpAdminString,
hds12Shds1SpanConfAlarmProfile           SnmpAdminString
}

```

hds12Shds1SpanConfNumRepeaters OBJECT-TYPE

SYNTAX Unsigned32(0..8)

UNITS "repeaters"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object provisions the number of repeaters/regenerators in this HDSL2/SHDSL Span."

::= { hds12Shds1SpanConfEntry 1 }

hds12Shds1SpanConfProfile OBJECT-TYPE

SYNTAX SnmpAdminString (SIZE(1..32))

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object is a pointer to a span configuration profile in the hds12Shds1SpanConfProfileTable, which applies to this span. The value of this object is the index of the referenced profile in the hds12Shds1SpanConfProfileTable. Note that span configuration profiles are only applicable to SHDSL lines.

HDSL2 lines MUST reference the default profile, 'DEFVAL'.

By default, this object will have the value 'DEFVAL' (the index of the default profile).

Any attempt to set this object to a value that is not the value of the index for an active entry in the profile table, hds12Shds1SpanConfProfileTable, MUST be rejected."

::= { hds12Shds1SpanConfEntry 2 }

hds12Shds1SpanConfAlarmProfile OBJECT-TYPE

SYNTAX SnmpAdminString (SIZE(1..32))

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object is a pointer to an Alarm configuration profile in the hds12Shds1EndpointAlarmConfProfileTable. The value of this object is the index of the referenced profile in the hds12Shds1EndpointAlarmConfProfileTable. The alarm threshold configuration in the referenced profile will be used by default for all segment endpoints in this span. Individual endpoints may override this profile by explicitly specifying some other profile in the hds12Shds1EndpointConfTable. By default, this object will have the value 'DEFVAL' (the index of the default profile).

Any attempt to set this object to a value that is not the value of the index for an active entry in the profile table, hds12Shds1EndpointAlarmConfProfileTable, MUST be rejected."  
 ::= { hds12Shds1SpanConfEntry 3 }

-- Span Status Group

--

hds12Shds1SpanStatusTable OBJECT-TYPE

SYNTAX SEQUENCE OF Hds12Shds1SpanStatusEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table provides overall status information of HDSL2/SHDSL spans. This table contains live data from equipment. As such, it is NOT persistent."

::= { hds12Shds1MibObjects 2 }

hds12Shds1SpanStatusEntry OBJECT-TYPE

SYNTAX Hds12Shds1SpanStatusEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the hds12Shds1SpanStatusTable. Each entry represents the complete span in a single HDSL2/SHDSL line. It is indexed by the ifIndex of the associated HDSL2/SHDSL line."

INDEX { ifIndex }

```

 ::= { hds12Shds1SpanStatusTable 1 }

Hds12Shds1SpanStatusEntry ::=
SEQUENCE
{
hds12Shds1StatusNumAvailRepeaters      Unsigned32,
hds12Shds1StatusMaxAttainableLineRate  Unsigned32,
hds12Shds1StatusActualLineRate        Unsigned32,
hds12Shds1StatusTransmissionModeCurrent
                                         Hds12Shds1TransmissionModeType,
hds12Shds1StatusMaxAttainablePayloadRate Unsigned32,
hds12Shds1StatusActualPayloadRate      Unsigned32
}

hds12Shds1StatusNumAvailRepeaters OBJECT-TYPE
SYNTAX      Unsigned32(0..8)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Contains the actual number of repeaters/regenerators
    discovered in this HDSL2/SHDSL span."
 ::= { hds12Shds1SpanStatusEntry 1 }

hds12Shds1StatusMaxAttainableLineRate OBJECT-TYPE
SYNTAX      Unsigned32(0..4294967295)
UNITS       "bps"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Contains the maximum attainable line rate in this HDSL2/SHDSL
    span. This object provides the maximum rate the line is
    capable of achieving. This is based upon measurements made
    during line probing. This rate includes payload (user data)
    and any applicable framing overhead."
 ::= { hds12Shds1SpanStatusEntry 2 }

hds12Shds1StatusActualLineRate OBJECT-TYPE
SYNTAX      Unsigned32(0..4294967295)
UNITS       "bps"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Contains the actual line rate in this HDSL2/SHDSL span. This

```

SHOULD equal ifSpeed. This rate includes payload (user data) and any applicable framing overhead"  
 ::= { hdsl2ShdslSpanStatusEntry 3 }

hdl2ShdslStatusTransmissionModeCurrent OBJECT-TYPE

SYNTAX Hdsl2ShdslTransmissionModeType

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Contains the current Power Spectral Density (PSD) regional setting of the HDSL2/SHDSL span."

::= { hdsl2ShdslSpanStatusEntry 4 }

hdl2ShdslStatusMaxAttainablePayloadRate OBJECT-TYPE

SYNTAX Unsigned32(0..4294967295)

UNITS "bps"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Contains the maximum attainable payload (user data) line rate in this HDSL2/SHDSL span. This object provides the maximum rate the line is capable of achieving. This is based upon measurements made during line probing. Any framing overhead is not included."

::= { hdsl2ShdslSpanStatusEntry 5 }

hdl2ShdslStatusActualPayloadRate OBJECT-TYPE

SYNTAX Unsigned32(0..4294967295)

UNITS "bps"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Contains the actual line rate in this HDSL2/SHDSL span. Any framing overhead is not included."

::= { hdsl2ShdslSpanStatusEntry 6 }

-- Unit Inventory Group

--

hdl2ShdslInventoryTable OBJECT-TYPE

SYNTAX SEQUENCE OF Hdsl2ShdslInventoryEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table supports retrieval of unit inventory information available via the EOC from units in a HDSL2/SHDSL line."

Entries in this table are dynamically created during the

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line discovery process. The life cycle for these entries is as follows:

- xtu discovers a device, either a far-end xtu or an xru
- an inventory table entry is created for the device
- the line goes down for whatever reason
- inventory table entries for unreachable devices are destroyed.

As these entries are created/destroyed dynamically, they are NOT persistent."

```
::= { hdsl2ShdslMibObjects 3 }
```

```
hdlsl2ShdslInventoryEntry OBJECT-TYPE
```

```
SYNTAX      Hdsl2ShdslInventoryEntry
```

```
MAX-ACCESS  not-accessible
```

```
STATUS      current
```

```
DESCRIPTION
```

```
"An entry in the hdsl2ShdslInventoryTable. Each entry represents inventory information for a single unit in a HDSL2/SHDSL line. It is indexed by the ifIndex of the HDSL2/SHDSL line and the Hdsl2ShdslUnitId of the associated unit."
```

```
INDEX { ifIndex, hdsl2ShdslInvIndex }
```

```
::= { hdsl2ShdslInventoryTable 1 }
```

```
Hdsl2ShdslInventoryEntry ::=
```

```
SEQUENCE
```

```
{
```

```
hdlsl2ShdslInvIndex          Hdsl2ShdslUnitId,
```

```
hdlsl2ShdslInvVendorID      OCTET STRING,
```

```
hdlsl2ShdslInvVendorModelNumber OCTET STRING,
```

```
hdlsl2ShdslInvVendorSerialNumber OCTET STRING,
```

```
hdlsl2ShdslInvVendorEOCSoftwareVersion Integer32,
```

```
hdlsl2ShdslInvStandardVersion Integer32,
```

```
hdlsl2ShdslInvVendorListNumber OCTET STRING,
```

```
hdlsl2ShdslInvVendorIssueNumber OCTET STRING,
```

```
hdlsl2ShdslInvVendorSoftwareVersion OCTET STRING,
```

```
hdlsl2ShdslInvEquipmentCode OCTET STRING,
```

```
hdlsl2ShdslInvVendorOther OCTET STRING,
```

```
hdlsl2ShdslInvTransmissionModeCapability
```

```
          Hdsl2ShdslTransmissionModeType
```

}

hdl2ShdslInvIndex OBJECT-TYPE  
SYNTAX Hdsl2ShdslUnitId  
MAX-ACCESS not-accessible  
STATUS current

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DESCRIPTION

"Each entry in this table corresponds to a physical element in a HDSL2/SHDSL Span. It is based on the EOC unit addressing scheme with reference to the xtuC."

::= { hdsl2ShdslInventoryEntry 1 }

hdl2ShdslInvVendorID OBJECT-TYPE

SYNTAX OCTET STRING(SIZE(8))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Vendor ID as reported in an Inventory Response message."

REFERENCE

"G.991.2, [Section 9.5.5.7.4](#), Inventory response - Message ID 130, Octets 25-32."

::= { hdsl2ShdslInventoryEntry 2 }

hdl2ShdslInvVendorModelNumber OBJECT-TYPE

SYNTAX OCTET STRING(SIZE(12))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Vendor model number as reported in an Inventory Response message."

REFERENCE

"G.991.2, [Section 9.5.5.7.4](#), Inventory response - Message ID 130, Octets 33-44."

::= { hdsl2ShdslInventoryEntry 3 }

hdl2ShdslInvVendorSerialNumber OBJECT-TYPE

SYNTAX OCTET STRING(SIZE(12))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Vendor serial number as reported in an Inventory Response

message."  
REFERENCE  
"G.991.2, [Section 9.5.5.7.4](#), Inventory response - Message ID  
130, Octets 45-56."  
 ::= { hdsl2ShdslInventoryEntry 4 }

hdsl2ShdslInvVendorEOCSoftwareVersion OBJECT-TYPE  
SYNTAX Integer32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Vendor EOC version as reported in a Discovery Response  
message."

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REFERENCE  
"G.991.2, [Section 9.5.5.7.2](#), Discovery response - Message ID  
130, Octet 12."  
 ::= { hdsl2ShdslInventoryEntry 5 }

hdsl2ShdslInvStandardVersion OBJECT-TYPE  
SYNTAX Integer32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Version of the HDSL2/SHDSL standard implemented, as reported  
in an Inventory Response message."

REFERENCE  
"G.991.2, [Section 9.5.5.7.4](#), Inventory response - Message ID  
130, Octet 2."  
 ::= { hdsl2ShdslInventoryEntry 6 }

hdsl2ShdslInvVendorListNumber OBJECT-TYPE  
SYNTAX OCTET STRING(SIZE(3))  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Vendor list number as reported in an Inventory Response  
message."  
REFERENCE  
"G.991.2, [Section 9.5.5.7.4](#), Inventory response - Message ID  
130, Octets 3-5."  
 ::= { hdsl2ShdslInventoryEntry 7 }

hdsl2ShdslInvVendorIssueNumber OBJECT-TYPE  
SYNTAX OCTET STRING(SIZE(2))  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Vendor issue number as reported in an Inventory Response  
message."  
REFERENCE  
"G.991.2, [Section 9.5.5.7.4](#), Inventory response - Message ID  
130, Octets 6-7."  
 ::= { hdsl2ShdslInventoryEntry 8 }

hdsl2ShdslInvVendorSoftwareVersion OBJECT-TYPE  
SYNTAX OCTET STRING(SIZE(6))  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Vendor software version as reported in an Inventory Response  
message."

REFERENCE  
"G.991.2, [Section 9.5.5.7.4](#), Inventory response - Message ID  
130, Octets 8-13."  
 ::= { hdsl2ShdslInventoryEntry 9 }

hdsl2ShdslInvEquipmentCode OBJECT-TYPE  
SYNTAX OCTET STRING(SIZE(10))  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Equipment code conforming to ANSI T1.213, Coded Identification  
of Equipment Entities."  
REFERENCE  
"G.991.2, [Section 9.5.5.7.4](#), Inventory response - Message ID  
130, Octets 14-23."  
 ::= { hdsl2ShdslInventoryEntry 10 }

hdsl2ShdslInvVendorOther OBJECT-TYPE  
SYNTAX OCTET STRING(SIZE(12))  
MAX-ACCESS read-only  
STATUS current

DESCRIPTION

"Other vendor information as reported in an Inventory Response message."

REFERENCE

"G.991.2, [Section 9.5.5.7.4](#), Inventory response - Message ID 130, Octets 57-68."

::= { hdsl2ShdslInventoryEntry 11 }

hdl2ShdslInvTransmissionModeCapability OBJECT-TYPE

SYNTAX Hdsl2ShdslTransmissionModeType

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Contains the transmission mode capability of the SHDSL unit."

::= { hdsl2ShdslInventoryEntry 12 }

-- Segment Endpoint Configuration Group

--

hdl2ShdslEndpointConfTable OBJECT-TYPE

SYNTAX SEQUENCE OF Hdsl2ShdslEndpointConfEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table supports configuration parameters for segment endpoints in a HDSL2/SHDSL line. As this table is indexed by ifIndex, it MUST be maintained in a persistent manner."

::= { hdsl2ShdslMibObjects 4 }

hdl2ShdslEndpointConfEntry OBJECT-TYPE

SYNTAX Hdsl2ShdslEndpointConfEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the hdsl2ShdslEndpointConfTable. Each entry represents a single segment endpoint in a HDSL2/SHDSL line. It is indexed by the ifIndex of the HDSL2/SHDSL line, the UnitId of the associated unit, the side of the unit, and the wire pair of the associated modem."

INDEX { ifIndex, hdsl2ShdslInvIndex, hdsl2ShdslEndpointSide, hdsl2ShdslEndpointWirePair }

```
::= { hdsl2ShdslEndpointConfTable 1 }
```

```
Hdsl2ShdslEndpointConfEntry ::=
SEQUENCE
{
hdsl2ShdslEndpointSide           Hdsl2ShdslUnitSide,
hdsl2ShdslEndpointWirePair      Hdsl2ShdslWirePair,
hdsl2ShdslEndpointAlarmConfProfile SnmpAdminString
}
```

```
hdsl2ShdslEndpointSide OBJECT-TYPE
SYNTAX          Hdsl2ShdslUnitSide
MAX-ACCESS      not-accessible
STATUS          current
DESCRIPTION
    "The side of the unit associated with this segment endpoint -
    Network/Customer side - as per the Hdsl2ShdslUnitSide textual
    convention."
 ::= { hdsl2ShdslEndpointConfEntry 1 }
```

```
hdsl2ShdslEndpointWirePair OBJECT-TYPE
SYNTAX          Hdsl2ShdslWirePair
MAX-ACCESS      not-accessible
STATUS          current
DESCRIPTION
    "The wire pair of the modem associated with this segment
    endpoint as per the Hdsl2ShdslWirePair textual convention."
 ::= { hdsl2ShdslEndpointConfEntry 2 }
```

```
hdsl2ShdslEndpointAlarmConfProfile OBJECT-TYPE
SYNTAX          SnmpAdminString (SIZE(0..32))
MAX-ACCESS      read-write
STATUS          current
DESCRIPTION
```

"This object configures the alarm threshold values to be used for this segment endpoint. The values are obtained from the alarm configuration profile referenced by this object. The value of this object is the index of the referenced profile in the hdsl2ShdslEndpointAlarmConfProfileTable, or NULL (a zero-length SnmpAdminString). If the value is a zero-length SnmpAdminString, the endpoint uses the default Alarm

Configuration Profile for the associated span as per the hdsl2ShdslSpanConfAlarmProfile object in the hdsl2ShdslSpanConfTable. The default value of this object is a zero-length SnmpAdminString.

Any attempt to set this object to a value that is not the value of the index for an active entry in the profile table, hdsl2ShdslEndpointAlarmConfProfileTable, MUST be rejected."  
 ::= { hdsl2ShdslEndpointConfEntry 3 }

-- Segment Endpoint Current Status/Performance Group  
--

hdlsl2ShdslEndpointCurrTable OBJECT-TYPE

SYNTAX SEQUENCE OF Hdsl2ShdslEndpointCurrEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains current status and performance information for segment endpoints in HDSL2/SHDSL Lines. As with other tables in this MIB module indexed by ifIndex, entries in this table MUST be maintained in a persistent manner."

::= { hdsl2ShdslMibObjects 5 }

hdlsl2ShdslEndpointCurrEntry OBJECT-TYPE

SYNTAX Hdsl2ShdslEndpointCurrEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the hdsl2ShdslEndpointCurrTable. Each entry contains status and performance information relating to a single segment endpoint. It is indexed by the ifIndex of the HDSL2/SHDSL line, the UnitId of the associated unit, the side of the unit, and the wire pair of the associated modem."

INDEX { ifIndex, hdsl2ShdslInvIndex, hdsl2ShdslEndpointSide, hdsl2ShdslEndpointWirePair }

::= { hdsl2ShdslEndpointCurrTable 1 }

Hdsl2ShdslEndpointCurrEntry ::=

SEQUENCE

{

```

hdsl2ShdslEndpointCurrAtn                Integer32,
hdsl2ShdslEndpointCurrSnrMgn            Integer32,
hdsl2ShdslEndpointCurrStatus            BITS,
hdsl2ShdslEndpointES                    Counter32,
hdsl2ShdslEndpointSES                    Counter32,
hdsl2ShdslEndpointCRCAnomalies          Counter32,
hdsl2ShdslEndpointLOSWS                  Counter32,
hdsl2ShdslEndpointUAS                    Counter32,
hdsl2ShdslEndpointCurr15MinTimeElapsed  Hdsl2ShdslPerfTimeElapsed,
hdsl2ShdslEndpointCurr15MinES            PerfCurrentCount,
hdsl2ShdslEndpointCurr15MinSES           PerfCurrentCount,
hdsl2ShdslEndpointCurr15MinCRCAnomalies PerfCurrentCount,
hdsl2ShdslEndpointCurr15MinLOSWS         PerfCurrentCount,
hdsl2ShdslEndpointCurr15MinUAS           PerfCurrentCount,
hdsl2ShdslEndpointCurr1DayTimeElapsed    Hdsl2ShdslPerfTimeElapsed,
hdsl2ShdslEndpointCurr1DayES             Hdsl2ShdslPerfCurrDayCount,
hdsl2ShdslEndpointCurr1DaySES            Hdsl2ShdslPerfCurrDayCount,
hdsl2ShdslEndpointCurr1DayCRCAnomalies   Hdsl2ShdslPerfCurrDayCount,
hdsl2ShdslEndpointCurr1DayLOSWS          Hdsl2ShdslPerfCurrDayCount,
hdsl2ShdslEndpointCurr1DayUAS            Hdsl2ShdslPerfCurrDayCount,
hdsl2ShdslEndpointCurrTipRingReversal    INTEGER,
hdsl2ShdslEndpointCurrActivationState     INTEGER
}

```

hdsl2ShdslEndpointCurrAtn OBJECT-TYPE

SYNTAX Integer32(-127..128)

UNITS "dB"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The current loop attenuation for this endpoint as reported in a Network or Customer Side Performance Status message."

REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"

::= { hdsl2ShdslEndpointCurrEntry 1 }

hdsl2ShdslEndpointCurrSnrMgn OBJECT-TYPE

SYNTAX Integer32(-127..128)

UNITS "dB"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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"The current SNR margin for this endpoint as reported in a Status Response/SNR message."

REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"

::= { hdsl2ShdslEndpointCurrEntry 2 }

hdlsl2ShdslEndpointCurrStatus OBJECT-TYPE

SYNTAX BITS  
{  
noDefect(0),  
powerBackoff(1),  
deviceFault(2),  
dcContinuityFault(3),  
snrMarginAlarm(4),  
loopAttenuationAlarm(5),  
loswFailureAlarm(6),  
configInitFailure(7),  
protocolInitFailure(8),  
noNeighborPresent(9),  
loopbackActive(10)  
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Contains the current state of the endpoint. This is a bit-map of possible conditions. The various bit positions are:

noDefect	There are no defects on the line.
powerBackoff	Indicates enhanced Power Backoff.
deviceFault	Indicates a vendor-dependent diagnostic or self-test fault has been detected.
dcContinuityFault	Indicates vendor-dependent conditions that interfere with span powering such as short and open circuits.
snrMarginAlarm	Indicates that the SNR margin has dropped below the alarm threshold.

loopAttenuationAlarm	Indicates that the loop attenuation exceeds the alarm threshold.
loswFailureAlarm	Indicates a forward LOSW alarm.

configInitFailure	Endpoint failure during initialization due to paired endpoint not able to support requested configuration.
protocolInitFailure	Endpoint failure during initialization due to incompatible protocol used by the paired endpoint.
noNeighborPresent	Endpoint failure during initialization due to no activation sequence detected from paired endpoint.
loopbackActive	A loopback is currently active at this Segment Endpoint.

This is intended to supplement ifOperStatus. Note that there is a 1:1 relationship between the status bits defined in this object and the notification thresholds defined elsewhere in this MIB module."

REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2ShdslEndpointCurrEntry 3 }

#### hdlsl2ShdslEndpointES OBJECT-TYPE

SYNTAX Counter32

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

#### DESCRIPTION

"Count of Errored Seconds (ES) on this endpoint since the xU was last restarted."

REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2ShdslEndpointCurrEntry 4 }

#### hdlsl2ShdslEndpointSES OBJECT-TYPE

SYNTAX Counter32

UNITS "seconds"

MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of Severely Errored Seconds (SES) on this endpoint  
since the xU was last restarted."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2ShdslEndpointCurrEntry 5 }

hdl2ShdslEndpointCRCAnomalies OBJECT-TYPE  
SYNTAX Counter32  
UNITS "detected CRC Anomalies"  
MAX-ACCESS read-only

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STATUS current  
DESCRIPTION  
"Count of CRC anomalies on this endpoint since the xU was  
last restarted."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2ShdslEndpointCurrEntry 6 }

hdl2ShdslEndpointLOSWS OBJECT-TYPE  
SYNTAX Counter32  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of Loss of Sync Word (LOSWS) Seconds on this endpoint  
since the xU was last restarted."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2ShdslEndpointCurrEntry 7 }

hdl2ShdslEndpointUAS OBJECT-TYPE  
SYNTAX Counter32  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of Unavailable Seconds (UAS) on this endpoint since  
the xU was last restarted."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2ShdslEndpointCurrEntry 8 }

hdsl2ShdslEndpointCurr15MinTimeElapsed OBJECT-TYPE  
SYNTAX Hdsl2ShdslPerfTimeElapsed  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Total elapsed seconds in the current 15-minute interval."  
 ::= { hdsl2ShdslEndpointCurrEntry 9 }

hdsl2ShdslEndpointCurr15MinES OBJECT-TYPE  
SYNTAX PerfCurrentCount  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of Errored Seconds (ES) in the current 15-minute interval."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2ShdslEndpointCurrEntry 10 }

hdsl2ShdslEndpointCurr15MinSES OBJECT-TYPE  
SYNTAX PerfCurrentCount  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of Severely Errored Seconds (SES) in the current 15-minute interval."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2ShdslEndpointCurrEntry 11 }

hdsl2ShdslEndpointCurr15MinCRCAnomalies OBJECT-TYPE  
SYNTAX PerfCurrentCount  
UNITS "detected CRC Anomalies"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of CRC anomalies in the current 15-minute interval."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2ShdslEndpointCurrEntry 12 }

hdsl2ShdslEndpointCurr15MinLOSWS OBJECT-TYPE

SYNTAX PerfCurrentCount  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of Loss of Sync Word (LOSW) Seconds in the current  
15-minute interval."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
::= { hdsl2ShdslEndpointCurrEntry 13 }

hdl2ShdslEndpointCurr15MinUAS OBJECT-TYPE

SYNTAX PerfCurrentCount  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of Unavailable Seconds (UAS) in the current 15-minute  
interval."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
::= { hdsl2ShdslEndpointCurrEntry 14 }

hdl2ShdslEndpointCurr1DayTimeElapsed OBJECT-TYPE

SYNTAX Hdsl2ShdslPerfTimeElapsed  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current

DESCRIPTION  
"Number of seconds that have elapsed since the beginning of  
the current 1-day interval."  
::= { hdsl2ShdslEndpointCurrEntry 15 }

hdl2ShdslEndpointCurr1DayES OBJECT-TYPE

SYNTAX Hdsl2ShdslPerfCurrDayCount  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of Errored Seconds (ES) during the current day as  
measured by hdsl2ShdslEndpointCurr1DayTimeElapsed."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
::= { hdsl2ShdslEndpointCurrEntry 16 }

hdsl2ShdslEndpointCurr1DaySES OBJECT-TYPE  
SYNTAX Hdsl2ShdslPerfCurrDayCount  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of Severely Errored Seconds (SES) during the current  
day as measured by hdsl2ShdslEndpointCurr1DayTimeElapsed."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2ShdslEndpointCurrEntry 17 }

hdsl2ShdslEndpointCurr1DayCRCAnomalies OBJECT-TYPE  
SYNTAX Hdsl2ShdslPerfCurrDayCount  
UNITS "detected CRC Anomalies"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of CRC anomalies during the current day as measured  
by hdsl2ShdslEndpointCurr1DayTimeElapsed."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2ShdslEndpointCurrEntry 18 }

hdsl2ShdslEndpointCurr1DayLOSWS OBJECT-TYPE  
SYNTAX Hdsl2ShdslPerfCurrDayCount  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of Loss of Sync Word (LOSW) Seconds during the current  
day as measured by hdsl2ShdslEndpointCurr1DayTimeElapsed."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2ShdslEndpointCurrEntry 19 }

hdsl2ShdslEndpointCurr1DayUAS OBJECT-TYPE  
SYNTAX Hdsl2ShdslPerfCurrDayCount  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of Unavailable Seconds (UAS) during the current day as  
measured by hdsl2ShdslEndpointCurr1DayTimeElapsed."

REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2ShdslEndpointCurrEntry 20 }

hdsl2ShdslEndpointCurrTipRingReversal OBJECT-TYPE

SYNTAX INTEGER  
 {  
 normal(1),  
 reversed(2)  
 }  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
 "This object indicates the state of the tip/ring for the  
 wire pair."  
 ::= { hdsl2ShdslEndpointCurrEntry 21 }

hdsl2ShdslEndpointCurrActivationState OBJECT-TYPE

SYNTAX INTEGER  
 {  
 preActivation(1), -- PreTrain  
 activation(2), -- Training  
 data(3) -- Trained  
 }  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
 "This object indicates the activation or training state of  
 the wire pair."  
REFERENCE "ITU-T G.991.2, [Section 6.2](#) PMD Activation Sequence"  
 ::= { hdsl2ShdslEndpointCurrEntry 22 }

-- Segment Endpoint 15-Minute Interval Status/Performance Group  
--

hdsl2Shdsl15MinIntervalTable OBJECT-TYPE

SYNTAX SEQUENCE OF Hdsl2Shdsl15MinIntervalEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
 "This table provides one row for each HDSL2/SHDSL endpoint

live data from equipment. As such, it is NOT persistent."  
 ::= { hdsl2ShdslMibObjects 6 }

hdsl2Shdsl15MinIntervalEntry OBJECT-TYPE  
SYNTAX Hdsl2Shdsl15MinIntervalEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
 "An entry in the hdsl2Shdsl15MinIntervalTable."  
INDEX { ifIndex, hdsl2ShdslInvIndex, hdsl2ShdslEndpointSide,  
 hdsl2ShdslEndpointWirePair, hdsl2Shdsl15MinIntervalNumber}  
 ::= { hdsl2Shdsl15MinIntervalTable 1 }

Hdsl2Shdsl15MinIntervalEntry ::=  
SEQUENCE  
{  
hdsl2Shdsl15MinIntervalNumber Unsigned32,  
hdsl2Shdsl15MinIntervalES PerfIntervalCount,  
hdsl2Shdsl15MinIntervalSES PerfIntervalCount,  
hdsl2Shdsl15MinIntervalCRCAnomalies PerfIntervalCount,  
hdsl2Shdsl15MinIntervalLOSWS PerfIntervalCount,  
hdsl2Shdsl15MinIntervalUAS PerfIntervalCount  
}

hdsl2Shdsl15MinIntervalNumber OBJECT-TYPE  
SYNTAX Unsigned32(1..96)  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
 "Performance Data Interval number. Interval 1 is the most  
 recent previous interval; interval 96 is 24 hours ago.  
 Intervals 2..96 are optional."  
 ::= { hdsl2Shdsl15MinIntervalEntry 1 }

hdsl2Shdsl15MinIntervalES OBJECT-TYPE  
SYNTAX PerfIntervalCount  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
 "Count of Errored Seconds (ES) during the interval."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2Shdsl15MinIntervalEntry 2 }

hdsl2Shdsl15MinIntervalSES OBJECT-TYPE  
SYNTAX PerfIntervalCount  
UNITS "seconds"

```
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
  "Count of Severely Errored Seconds (SES) during the interval."
REFERENCE     "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
 ::= { hdsl2Shdsl15MinIntervalEntry 3 }
```

hdsl2Shdsl15MinIntervalCRCAnomalies OBJECT-TYPE

```
SYNTAX        PerfIntervalCount
UNITS         "detected CRC Anomalies"
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
  "Count of CRC anomalies during the interval."
REFERENCE     "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
 ::= { hdsl2Shdsl15MinIntervalEntry 4 }
```

hdsl2Shdsl15MinIntervalLOSWS OBJECT-TYPE

```
SYNTAX        PerfIntervalCount
UNITS         "seconds"
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
  "Count of Loss of Sync Word (LOSW) Seconds during the
  interval."
REFERENCE     "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
 ::= { hdsl2Shdsl15MinIntervalEntry 5 }
```

hdsl2Shdsl15MinIntervalUAS OBJECT-TYPE

```
SYNTAX        PerfIntervalCount
UNITS         "seconds"
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
  "Count of Unavailable Seconds (UAS) during the interval."
REFERENCE     "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
 ::= { hdsl2Shdsl15MinIntervalEntry 6 }
```

```
-- Segment Endpoint 1-Day Interval Status/Performance Group
--
```

hdsl2Shdsl1DayIntervalTable OBJECT-TYPE

```
SYNTAX        SEQUENCE OF Hdsl2Shdsl1DayIntervalEntry
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
```

"This table provides one row for each HDSL2/SHDSL endpoint performance data collection interval. This table contains

live data from equipment. As such, it is NOT persistent."  
 ::= { hdsl2ShdslMibObjects 7 }

hdlsl2Shdsl1DayIntervalEntry OBJECT-TYPE

SYNTAX Hdsl2Shdsl1DayIntervalEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the hdsl2Shdsl1DayIntervalTable."

INDEX { ifIndex, hdsl2ShdslInvIndex, hdsl2ShdslEndpointSide,  
 hdsl2ShdslEndpointWirePair, hdsl2Shdsl1DayIntervalNumber }

::= { hdsl2Shdsl1DayIntervalTable 1 }

Hdsl2Shdsl1DayIntervalEntry ::=

SEQUENCE

{

hdlsl2Shdsl1DayIntervalNumber Unsigned32,

hdlsl2Shdsl1DayIntervalMoniSecs Hdsl2ShdslPerfTimeElapsed,

hdlsl2Shdsl1DayIntervalES Hdsl2Shdsl1DayIntervalCount,

hdlsl2Shdsl1DayIntervalSES Hdsl2Shdsl1DayIntervalCount,

hdlsl2Shdsl1DayIntervalCRCAnomalies Hdsl2Shdsl1DayIntervalCount,

hdlsl2Shdsl1DayIntervalLOSWS Hdsl2Shdsl1DayIntervalCount,

hdlsl2Shdsl1DayIntervalUAS Hdsl2Shdsl1DayIntervalCount

}

hdlsl2Shdsl1DayIntervalNumber OBJECT-TYPE

SYNTAX Unsigned32(1..30)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"History Data Interval number. Interval 1 is the most recent previous day; interval 30 is 30 days ago. Intervals 2..30 are optional."

::= { hdsl2Shdsl1DayIntervalEntry 1 }

hdlsl2Shdsl1DayIntervalMoniSecs OBJECT-TYPE

SYNTAX Hdsl2ShdslPerfTimeElapsed

UNITS "seconds"

MAX-ACCESS read-only

STATUS current  
DESCRIPTION  
"The amount of time in the 1-day interval over which the performance monitoring information is actually counted. This value will be the same as the interval duration except in a situation where performance monitoring data could not be collected for any reason."  
 ::= { hdsl2Shdsl1DayIntervalEntry 2 }

hdsl2Shdsl1DayIntervalES OBJECT-TYPE  
SYNTAX Hdsl2Shdsl1DayIntervalCount  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of Errored Seconds (ES) during the 1-day interval as measured by hdsl2Shdsl1DayIntervalMoniSecs."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2Shdsl1DayIntervalEntry 3 }

hdsl2Shdsl1DayIntervalSES OBJECT-TYPE  
SYNTAX Hdsl2Shdsl1DayIntervalCount  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of Severely Errored Seconds (SES) during the 1-day interval as measured by hdsl2Shdsl1DayIntervalMoniSecs."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2Shdsl1DayIntervalEntry 4 }

hdsl2Shdsl1DayIntervalCRCAnomalies OBJECT-TYPE  
SYNTAX Hdsl2Shdsl1DayIntervalCount  
UNITS "detected CRC Anomalies"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of CRC anomalies during the 1-day interval as measured by hdsl2Shdsl1DayIntervalMoniSecs."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2Shdsl1DayIntervalEntry 5 }

hdsl2Shdsl1DayIntervalLOSWS OBJECT-TYPE  
SYNTAX Hdsl2Shdsl1DayIntervalCount  
UNITS "seconds"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Count of Loss of Sync Word (LOSW) Seconds during the 1-day  
interval as measured by hdsl2Shdsl1DayIntervalMoniSecs."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2Shdsl1DayIntervalEntry 6 }

hdsl2Shdsl1DayIntervalUAS OBJECT-TYPE  
SYNTAX Hdsl2Shdsl1DayIntervalCount  
UNITS "seconds"  
MAX-ACCESS read-only

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STATUS current  
DESCRIPTION  
"Count of Unavailable Seconds (UAS) during the 1-day interval  
as measured by hdsl2Shdsl1DayIntervalMoniSecs."  
REFERENCE "HDSL2 [Section 7.5.3.7](#); SHDSL [Section 9.5.5.7](#)"  
 ::= { hdsl2Shdsl1DayIntervalEntry 7 }

-- Maintenance Group  
--

hdsl2ShdslEndpointMaintTable OBJECT-TYPE  
SYNTAX SEQUENCE OF Hdsl2ShdslEndpointMaintEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
"This table supports maintenance operations (e.g. loopbacks)  
to be performed on HDSL2/SHDSL segment endpoints. This table  
contains live data from equipment. As such, it is NOT  
persistent."  
 ::= { hdsl2ShdslMibObjects 8 }

hdsl2ShdslEndpointMaintEntry OBJECT-TYPE  
SYNTAX Hdsl2ShdslEndpointMaintEntry  
MAX-ACCESS not-accessible  
STATUS current

DESCRIPTION

"An entry in the hds12Shds1EndpointMaintTable. Each entry corresponds to a single segment endpoint, and is indexed by the ifIndex of the HDSL2/SHDSL line, the UnitId of the associated unit and the side of the unit."

INDEX { ifIndex, hds12Shds1InvIndex, hds12Shds1EndpointSide }  
 ::= { hds12Shds1EndpointMaintTable 1 }

Hds12Shds1EndpointMaintEntry ::=  
SEQUENCE  
{  
hds12Shds1MaintLoopbackConfig       INTEGER,  
hds12Shds1MaintTipRingReversal     INTEGER,  
hds12Shds1MaintPowerBackOff        INTEGER,  
hds12Shds1MaintSoftRestart         INTEGER  
}

hds12Shds1MaintLoopbackConfig OBJECT-TYPE

SYNTAX        INTEGER  
              {  
              noLoopback(1),  
              normalLoopback(2),  
              specialLoopback(3)  
              }

              }  
MAX-ACCESS   read-write  
STATUS       current  
DESCRIPTION  
              "This object controls configuration of loopbacks for the  
              associated segment endpoint. The status of the loopback  
              is obtained via the hds12Shds1EndpointCurrStatus object."  
 ::= { hds12Shds1EndpointMaintEntry 1 }

hds12Shds1MaintTipRingReversal OBJECT-TYPE

SYNTAX        INTEGER  
              {  
              normal(1),  
              reversed(2)  
              }  
MAX-ACCESS   read-only  
STATUS       current  
DESCRIPTION

"This object indicates the state of the tip/ring pair at the associated segment endpoint."  
 ::= { hdsl2ShdslEndpointMaintEntry 2 }

hdsl2ShdslMaintPowerBackOff OBJECT-TYPE

SYNTAX INTEGER  
 {  
 default(1),  
 enhanced(2)  
 }

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object configures the receiver at the associated segment endpoint to operate in default or enhanced power backoff mode."

::= { hdsl2ShdslEndpointMaintEntry 3 }

hdsl2ShdslMaintSoftRestart OBJECT-TYPE

SYNTAX INTEGER  
 {  
 ready(1),  
 restart(2)  
 }

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object enables the manager to trigger a soft restart of the modem at the associated segment endpoint. The manager may only set this object to the 'restart(2)'

value, which initiates a restart. The agent will perform a restart after approximately 5 seconds. Following the 5 second period, the agent will restore the object to the 'ready(1)' state."

::= { hdsl2ShdslEndpointMaintEntry 4 }

hdsl2ShdslUnitMaintTable OBJECT-TYPE

SYNTAX SEQUENCE OF Hdsl2ShdslUnitMaintEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table supports maintenance operations for units in a HDSL2/SHDSL line. Entries in this table MUST be maintained in a persistent manner."

```
::= { hdsl2ShdslMibObjects 9 }
```

hdlsl2ShdslUnitMaintEntry OBJECT-TYPE

SYNTAX Hdsl2ShdslUnitMaintEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the hdsl2ShdslUnitMaintTable. Each entry corresponds to a single unit, and is indexed by the ifIndex of the HDSL2/SHDSL line and the UnitId of the associated unit."

INDEX { ifIndex, hdsl2ShdslInvIndex }

```
::= { hdsl2ShdslUnitMaintTable 1 }
```

Hdsl2ShdslUnitMaintEntry ::=

SEQUENCE

{

hdlsl2ShdslMaintLoopbackTimeout Integer32,

hdlsl2ShdslMaintUnitPowerSource INTEGER

}

hdlsl2ShdslMaintLoopbackTimeout OBJECT-TYPE

SYNTAX Integer32(0..4095)

UNITS "minutes"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object configures the timeout value for loopbacks initiated at segments endpoints contained in the associated unit. A value of 0 disables the timeout."

```
::= { hdsl2ShdslUnitMaintEntry 1 }
```

hdlsl2ShdslMaintUnitPowerSource OBJECT-TYPE

SYNTAX INTEGER

```
{  
  local(1),  
  span(2)  
}
```

```

MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "This object indicates the DC power source being used by the
    associated unit."
 ::= { hdsl2ShdslUnitMaintEntry 2 }

-- Span Configuration Profile Group
--

hdsl2ShdslSpanConfProfileTable OBJECT-TYPE
SYNTAX SEQUENCE OF Hdsl2ShdslSpanConfProfileEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
    "This table supports definitions of span configuration
    profiles for SHDSL lines. HDLSL2 does not support these
    configuration options. This table MUST be maintained
    in a persistent manner."
 ::= { hdsl2ShdslMibObjects 10 }

hdsl2ShdslSpanConfProfileEntry OBJECT-TYPE
SYNTAX Hdsl2ShdslSpanConfProfileEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
    "Each entry corresponds to a single span configuration
    profile. Each profile contains a set of span configuration
    parameters. The configuration parameters in a profile are
    applied to those lines referencing that profile (see the
    hdsl2ShdslSpanConfProfile object). Profiles may be
    created/deleted using the row creation/deletion mechanism
    via hdsl2ShdslSpanConfProfileRowStatus. If an active
    entry is referenced in hdsl2ShdslSpanConfProfile, the
    entry MUST remain active until all references are removed."
INDEX { IMPLIED hdsl2ShdslSpanConfProfileName }
 ::= { hdsl2ShdslSpanConfProfileTable 1 }

Hdsl2ShdslSpanConfProfileEntry ::=
SEQUENCE
{
    hdsl2ShdslSpanConfProfileName SnmpAdminString,
    hdsl2ShdslSpanConfWireInterface INTEGER,
    hdsl2ShdslSpanConfMinLineRate Unsigned32,

```

```

hds12Shds1SpanConfMaxLineRate      Unsigned32,
hds12Shds1SpanConfPSD              INTEGER,
hds12Shds1SpanConfTransmissionMode
                                     Hds12Shds1TransmissionModeType,
hds12Shds1SpanConfRemoteEnabled    INTEGER,
hds12Shds1SpanConfPowerFeeding     INTEGER,
hds12Shds1SpanConfCurrCondTargetMarginDown Integer32,
hds12Shds1SpanConfWorstCaseTargetMarginDown Integer32,
hds12Shds1SpanConfCurrCondTargetMarginUp Integer32,
hds12Shds1SpanConfWorstCaseTargetMarginUp Integer32,
hds12Shds1SpanConfUsedTargetMargins BITS,
hds12Shds1SpanConfReferenceClock
                                     Hds12Shds1ClockReferenceType,
hds12Shds1SpanConfLineProbeEnable  INTEGER,
hds12Shds1SpanConfProfileRowStatus RowStatus
}

```

#### hds12Shds1SpanConfProfileName OBJECT-TYPE

```

SYNTAX      SnmpAdminString (SIZE(1..32))
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "This object is the unique index associated with this profile.
     Entries in this table are referenced via the object
     hds12Shds1SpanConfProfile in Hds12Shds1SpanConfEntry."
 ::= { hds12Shds1SpanConfProfileEntry 1 }

```

#### hds12Shds1SpanConfWireInterface OBJECT-TYPE

```

SYNTAX      INTEGER
            {
              twoWire(1),
              fourWire(2),
              sixWire(3),
              eightWire(4)
            }
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This object configures the two-wire or optional four-wire,
     six-wire, or eight-wire operation for SHDSL Lines."
DEFVAL      { twoWire }
 ::= { hds12Shds1SpanConfProfileEntry 2 }

```

#### hds12Shds1SpanConfMinLineRate OBJECT-TYPE

```

SYNTAX      Unsigned32(0..4294967295)
UNITS       "bps"
MAX-ACCESS  read-create

```

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DESCRIPTION

"This object configures the minimum transmission rate for the associated SHDSL Line in bits-per-second (bps) and includes both payload (user data) and any applicable framing overhead. If the minimum line rate equals the maximum line rate (hdsl2ShdslSpanMaxLineRate), the line rate is considered 'fixed'. If the minimum line rate is less than the maximum line rate, the line rate is considered 'rate-adaptive'."

DEFVAL { 1552000 }

::= { hdsl2ShdslSpanConfProfileEntry 3 }

hdsl2ShdslSpanConfMaxLineRate OBJECT-TYPE

SYNTAX Unsigned32(0..4294967295)

UNITS "bps"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object configures the maximum transmission rate for the associated SHDSL Line in bits-per-second (bps) and includes both payload (user data) and any applicable framing overhead. If the minimum line rate equals the maximum line rate (hdsl2ShdslSpanMaxLineRate), the line rate is considered 'fixed'. If the minimum line rate is less than the maximum line rate, the line rate is considered 'rate-adaptive'."

DEFVAL { 1552000 }

::= { hdsl2ShdslSpanConfProfileEntry 4 }

hdsl2ShdslSpanConfPSD OBJECT-TYPE

SYNTAX INTEGER

{  
symmetric(1),  
asymmetric(2)  
}

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object configures use of symmetric/asymmetric PSD (Power Spectral Density) Mask for the associated SHDSL Line. Support

for symmetric PSD is mandatory for all supported data rates.  
Support for asymmetric PSD is optional."  
DEFVAL { symmetric }  
::= { hdsl2ShdslSpanConfProfileEntry 5 }

hdl2ShdslSpanConfTransmissionMode OBJECT-TYPE  
SYNTAX Hdsl2ShdslTransmissionModeType  
MAX-ACCESS read-create

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STATUS current  
DESCRIPTION  
"This object specifies the regional setting for the SHDSL  
line."  
DEFVAL { { region1 } }  
::= { hdsl2ShdslSpanConfProfileEntry 6 }

hdl2ShdslSpanConfRemoteEnabled OBJECT-TYPE  
SYNTAX INTEGER  
{  
enabled(1),  
disabled(2)  
}  
MAX-ACCESS read-create  
STATUS current  
DESCRIPTION  
"This object enables/disables support for remote management  
of the units in a SHDSL line from the STU-R via the EOC."  
DEFVAL { enabled }  
::= { hdsl2ShdslSpanConfProfileEntry 7 }

hdl2ShdslSpanConfPowerFeeding OBJECT-TYPE  
SYNTAX INTEGER  
{  
noPower(1),  
powerFeed(2),  
wettingCurrent(3)  
}  
MAX-ACCESS read-create  
STATUS current  
DESCRIPTION  
"This object enables/disables support for optional power  
feeding in a SHDSL line."

```
DEFVAL      { noPower }
 ::= { hdsl2ShdslSpanConfProfileEntry 8 }
```

hdsl2ShdslSpanConfCurrCondTargetMarginDown OBJECT-TYPE

```
SYNTAX      Integer32(-10..21)
```

```
UNITS       "dB"
```

```
MAX-ACCESS  read-create
```

```
STATUS      current
```

```
DESCRIPTION
```

"This object specifies the downstream current condition target SNR margin for a SHDSL line. The SNR margin is the difference between the desired SNR and the actual SNR. Target SNR margin is the desired SNR margin for a unit."

```
DEFVAL      { 0 }
```

```
::= { hdsl2ShdslSpanConfProfileEntry 9 }
```

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hdsl2ShdslSpanConfWorstCaseTargetMarginDown OBJECT-TYPE

```
SYNTAX      Integer32(-10..21)
```

```
UNITS       "dB"
```

```
MAX-ACCESS  read-create
```

```
STATUS      current
```

```
DESCRIPTION
```

"This object specifies the downstream worst case target SNR margin for a SHDSL line. The SNR margin is the difference between the desired SNR and the actual SNR. Target SNR margin is the desired SNR margin for a unit."

```
DEFVAL      { 0 }
```

```
::= { hdsl2ShdslSpanConfProfileEntry 10 }
```

hdsl2ShdslSpanConfCurrCondTargetMarginUp OBJECT-TYPE

```
SYNTAX      Integer32(-10..21)
```

```
UNITS       "dB"
```

```
MAX-ACCESS  read-create
```

```
STATUS      current
```

```
DESCRIPTION
```

"This object specifies the upstream current condition target SNR margin for a SHDSL line. The SNR margin is the difference between the desired SNR and the actual SNR. Target SNR margin is the desired SNR margin for a unit."

```
DEFVAL      { 0 }
```

```
::= { hdsl2ShdslSpanConfProfileEntry 11 }
```

hdl2ShdslSpanConfWorstCaseTargetMarginUp OBJECT-TYPE

SYNTAX Integer32(-10..21)

UNITS "dB"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object specifies the upstream worst case target SNR margin for a SHDSL line. The SNR margin is the difference between the desired SNR and the actual SNR. Target SNR margin is the desired SNR margin for a unit."

DEFVAL { 0 }

::= { hdl2ShdslSpanConfProfileEntry 12 }

hdl2ShdslSpanConfUsedTargetMargins OBJECT-TYPE

SYNTAX BITS

```
{  
  currCondDown(0),  
  worstCaseDown(1),  
  currCondUp(2),  
  worstCaseUp(3)  
}
```

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"Indicates whether a target SNR margin is enabled or disabled. This is a bit-map of possible settings. The various bit positions are:

currCondDown - current condition downstream target SNR margin enabled

worstCaseDown - worst case downstream target SNR margin enabled

currCondUp - current condition upstream target SNR margin enabled

worstCaseUp - worst case upstream target SNR margin enabled."

DEFVAL { { currCondDown } }

::= { hdl2ShdslSpanConfProfileEntry 13 }

```
hdsl2ShdslSpanConfReferenceClock OBJECT-TYPE
    SYNTAX      Hdsl2ShdslClockReferenceType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object configures the clock reference for the STU-C
        in a SHDSL Line."
    DEFVAL      { localClk }
    ::= { hdsl2ShdslSpanConfProfileEntry 14 }
```

```
hdsl2ShdslSpanConfLineProbeEnable OBJECT-TYPE
    SYNTAX      INTEGER
                {
                    disable(1),
                    enable(2)
                }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object enables/disables support for Line Probe of
        the units in a SHDSL line. When Line Probe is enabled, the
        system performs Line Probing to find the best possible
        rate. If Line probe is disabled, the rate adaptation phase
        is skipped to shorten set up time."
    DEFVAL      { disable }
    ::= { hdsl2ShdslSpanConfProfileEntry 15 }
```

```
hdsl2ShdslSpanConfProfileRowStatus OBJECT-TYPE
```

```
SYNTAX      RowStatus
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
```

```
    "This object controls creation/deletion of the associated
    entry in this table per the semantics of RowStatus. If an
    active entry is referenced in hdsl2ShdslSpanConfProfile, the
    entry MUST remain active until all references are removed."
    ::= { hdsl2ShdslSpanConfProfileEntry 16 }
```

```
-- Segment Endpoint Alarm Configuration Profile group
--
```

hdsl2ShdslEndpointAlarmConfProfileTable OBJECT-TYPE  
 SYNTAX SEQUENCE OF Hdsl2ShdslEndpointAlarmConfProfileEntry  
 MAX-ACCESS not-accessible  
 STATUS current  
 DESCRIPTION  
 "This table supports definitions of alarm configuration profiles for HDSL2/SHDSL segment endpoints. This table MUST be maintained in a persistent manner."  
 ::= { hdsl2ShdslMibObjects 11 }

hdsl2ShdslEndpointAlarmConfProfileEntry OBJECT-TYPE  
 SYNTAX Hdsl2ShdslEndpointAlarmConfProfileEntry  
 MAX-ACCESS not-accessible  
 STATUS current  
 DESCRIPTION  
 "Each entry corresponds to a single alarm configuration profile. Each profile contains a set of parameters for setting alarm thresholds for various performance attributes monitored at HDSL2/SHDSL segment endpoints. Profiles may be created/deleted using the row creation/deletion mechanism via hdsl2ShdslEndpointAlarmConfProfileRowStatus. If an active entry is referenced in either hdsl2ShdslSpanConfAlarmProfile or hdsl2ShdslEndpointAlarmConfProfile, the entry MUST remain active until all references are removed."  
 INDEX { IMPLIED hdsl2ShdslEndpointAlarmConfProfileName }  
 ::= { hdsl2ShdslEndpointAlarmConfProfileTable 1 }

Hdsl2ShdslEndpointAlarmConfProfileEntry ::= SEQUENCE  
 {  
 hdsl2ShdslEndpointAlarmConfProfileName SnmpAdminString,  
 hdsl2ShdslEndpointThreshLoopAttenuation Integer32,  
 hdsl2ShdslEndpointThreshSNRMargin Integer32,  
 hdsl2ShdslEndpointThreshES  
 Hdsl2ShdslPerfIntervalThreshold,

hdsl2ShdslEndpointThreshSES  
 Hdsl2ShdslPerfIntervalThreshold,  
 hdsl2ShdslEndpointThreshCRCAnomalies Integer32,  
 hdsl2ShdslEndpointThreshLOSWS  
 Hdsl2ShdslPerfIntervalThreshold,

```
hdsl2ShdslEndpointThreshUAS
                                Hdsl2ShdslPerfIntervalThreshold,
hdsl2ShdslEndpointAlarmConfProfileRowStatus RowStatus
}
```

```
hdsl2ShdslEndpointAlarmConfProfileName OBJECT-TYPE
SYNTAX      SnmpAdminString (SIZE(1..32))
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "This object is the unique index associated with this profile."
 ::= { hdsl2ShdslEndpointAlarmConfProfileEntry 1 }
```

```
hdsl2ShdslEndpointThreshLoopAttenuation OBJECT-TYPE
SYNTAX      Integer32(-127..128)
UNITS       "dB"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This object configures the loop attenuation alarm threshold.
    When the current value of hdsl2ShdslEndpointCurrAtn reaches
    or exceeds this threshold, a hdsl2ShdslLoopAttenCrossing
    MAY be generated."
DEFVAL      { 0 }
 ::= { hdsl2ShdslEndpointAlarmConfProfileEntry 2 }
```

```
hdsl2ShdslEndpointThreshSNRMargin OBJECT-TYPE
SYNTAX      Integer32(-127..128)
UNITS       "dB"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This object configures the SNR margin alarm threshold.
    When the current value of hdsl2ShdslEndpointCurrSnrMgn
    reaches or drops below this threshold, a
    hdsl2ShdslSNRMarginCrossing MAY be generated."
DEFVAL      { 0 }
 ::= { hdsl2ShdslEndpointAlarmConfProfileEntry 3 }
```

```
hdsl2ShdslEndpointThreshES OBJECT-TYPE
SYNTAX      Hdsl2ShdslPerfIntervalThreshold
UNITS       "seconds"
MAX-ACCESS  read-create
```

STATUS current

DESCRIPTION

"This object configures the threshold for the number of errored seconds (ES) within any given 15-minute performance data collection interval. If the value of errored seconds in a particular 15-minute collection interval reaches/exceeds this value, a hds12Shds1PerfESThresh MAY be generated. At most one notification will be sent per interval per endpoint."

DEFVAL { 0 }

::= { hds12Shds1EndpointAlarmConfProfileEntry 4 }

hds12Shds1EndpointThreshSES OBJECT-TYPE

SYNTAX Hds12Shds1PerfIntervalThreshold

UNITS "seconds"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object configures the threshold for the number of severely errored seconds (SES) within any given 15-minute performance data collection interval. If the value of severely errored seconds in a particular 15-minute collection interval reaches/exceeds this value, a hds12Shds1PerfSESThresh MAY be generated. At most one notification will be sent per interval per endpoint."

DEFVAL { 0 }

::= { hds12Shds1EndpointAlarmConfProfileEntry 5 }

hds12Shds1EndpointThreshCRCAnomalies OBJECT-TYPE

SYNTAX Integer32

UNITS "detected CRC Anomalies"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object configures the threshold for the number of CRC anomalies within any given 15-minute performance data collection interval. If the value of CRC anomalies in a particular 15-minute collection interval reaches/exceeds this value, a hds12Shds1PerfCRCAnomaliesThresh MAY be generated. At most one notification will be sent per interval per endpoint."

DEFVAL { 0 }

::= { hds12Shds1EndpointAlarmConfProfileEntry 6 }

hds12Shds1EndpointThreshLOSWS OBJECT-TYPE

SYNTAX Hds12Shds1PerfIntervalThreshold

UNITS "seconds"

MAX-ACCESS read-create

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STATUS current

## DESCRIPTION

"This object configures the threshold for the number of Loss of Sync Word (LOSW) Seconds within any given 15-minute performance data collection interval. If the value of LOSW in a particular 15-minute collection interval reaches/exceeds this value, a hdsl2ShdslPerfLOSWSThresh MAY be generated. At most one notification will be sent per interval per endpoint."

DEFVAL { 0 }

::= { hdsl2ShdslEndpointAlarmConfProfileEntry 7 }

## hdlsl2ShdslEndpointThreshUAS OBJECT-TYPE

SYNTAX Hdsl2ShdslPerfIntervalThreshold

UNITS "seconds"

MAX-ACCESS read-create

STATUS current

## DESCRIPTION

"This object configures the threshold for the number of unavailable seconds (UAS) within any given 15-minute performance data collection interval. If the value of UAS in a particular 15-minute collection interval reaches/exceeds this value, a hdsl2ShdslPerfUASThresh MAY be generated. At most one notification will be sent per interval per endpoint."

DEFVAL { 0 }

::= { hdsl2ShdslEndpointAlarmConfProfileEntry 8 }

## hdlsl2ShdslEndpointAlarmConfProfileRowStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

## DESCRIPTION

"This object controls creation/deletion of the associated entry in this table as per the semantics of RowStatus. If an active entry is referenced in either hdsl2ShdslSpanConfAlarmProfile or hdsl2ShdslEndpointAlarmConfProfile, the entry MUST remain active until all references are removed."

::= { hdsl2ShdslEndpointAlarmConfProfileEntry 9 }

-- Notifications Group

--

hdl2ShdslNotifications OBJECT IDENTIFIER ::= { hdl2ShdslMIB 0 }

hdl2ShdslLoopAttenCrossing NOTIFICATION-TYPE  
OBJECTS

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```
{
hdl2ShdslEndpointCurrAtn,
hdl2ShdslEndpointThreshLoopAttenuation
}
STATUS      current
DESCRIPTION
  "This notification indicates that the loop attenuation
  threshold (as per the hdl2ShdslEndpointThreshLoopAttenuation
  value) has been reached/exceeded for the HDSL2/SHDSL segment
  endpoint."
 ::= { hdl2ShdslNotifications 1 }
```

hdl2ShdslSNRMarginCrossing NOTIFICATION-TYPE  
OBJECTS

```
{
hdl2ShdslEndpointCurrSnrMgn,
hdl2ShdslEndpointThreshSNRMargin
}
STATUS      current
DESCRIPTION
  "This notification indicates that the SNR margin threshold (as
  per the hdl2ShdslEndpointThreshSNRMargin value) has been
  reached/exceeded for the HDSL2/SHDSL segment endpoint."
 ::= { hdl2ShdslNotifications 2 }
```

hdl2ShdslPerfESThresh NOTIFICATION-TYPE  
OBJECTS

```
{
hdl2ShdslEndpointCurr15MinES,
hdl2ShdslEndpointThreshES
}
STATUS      current
DESCRIPTION
  "This notification indicates that the errored seconds
  threshold (as per the hdl2ShdslEndpointThreshES value)
```

has been reached/exceeded for the HDSL2/SHDSL segment endpoint."  
 ::= { hdsl2ShdslNotifications 3 }

hdl2ShdslPerfSESThresh NOTIFICATION-TYPE

OBJECTS

{  
 hdsl2ShdslEndpointCurr15MinSES,  
 hdsl2ShdslEndpointThreshSES  
 }

STATUS current

DESCRIPTION

"This notification indicates that the severely errored seconds

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threshold (as per the hdsl2ShdslEndpointThreshSES value) has been reached/exceeded for the HDSL2/SHDSL Segment Endpoint."  
 ::= { hdsl2ShdslNotifications 4 }

hdl2ShdslPerfCRCAnomaliesThresh NOTIFICATION-TYPE

OBJECTS

{  
 hdsl2ShdslEndpointCurr15MinCRCAnomalies,  
 hdsl2ShdslEndpointThreshCRCAnomalies  
 }

STATUS current

DESCRIPTION

"This notification indicates that the CRC anomalies threshold (as per the hdsl2ShdslEndpointThreshCRCAnomalies value) has been reached/exceeded for the HDSL2/SHDSL Segment Endpoint."  
 ::= { hdsl2ShdslNotifications 5 }

hdl2ShdslPerfLOSWSThresh NOTIFICATION-TYPE

OBJECTS

{  
 hdsl2ShdslEndpointCurr15MinLOSWS,  
 hdsl2ShdslEndpointThreshLOSWS  
 }

STATUS current

DESCRIPTION

"This notification indicates that the LOSW seconds threshold (as per the hdsl2ShdslEndpointThreshLOSWS value) has been reached/exceeded for the HDSL2/SHDSL segment endpoint."

```
::= { hdsl2ShdslNotifications 6 }
```

```
hdl2ShdslPerfUASThresh NOTIFICATION-TYPE  
OBJECTS
```

```
{  
hdl2ShdslEndpointCurr15MinUAS,  
hdl2ShdslEndpointThreshUAS  
}
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This notification indicates that the unavailable seconds  
threshold (as per the hdsl2ShdslEndpointThreshUAS value) has  
been reached/exceeded for the HDSL2/SHDSL segment endpoint."
```

```
::= { hdsl2ShdslNotifications 7 }
```

```
hdl2ShdslSpanInvalidNumRepeaters NOTIFICATION-TYPE  
OBJECTS
```

```
{  
hdl2ShdslSpanConfNumRepeaters  
}
```

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```
STATUS current
```

```
DESCRIPTION
```

```
"This notification indicates that a mismatch has been detected  
between the number of repeater/regenerator units configured  
for a HDSL2/SHDSL line via the hdsl2ShdslSpanConfNumRepeaters  
object and the actual number of repeater/regenerator units  
discovered via the EOC."
```

```
::= { hdsl2ShdslNotifications 8 }
```

```
hdl2ShdslLoopbackFailure NOTIFICATION-TYPE  
OBJECTS
```

```
{  
hdl2ShdslMaintLoopbackConfig  
}
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This notification indicates that an endpoint maintenance  
loopback command failed for an HDSL2/SHDSL segment."
```

```
::= { hdsl2ShdslNotifications 9 }
```

```
hdl2ShdslpowerBackoff NOTIFICATION-TYPE
```

OBJECTS  
{  
hds12Shds1EndpointCurrStatus  
}  
STATUS current  
DESCRIPTION  
"This notification indicates that the bit setting for  
powerBackoff in the hds12Shds1EndpointCurrStatus object for  
this endpoint has changed."  
::= { hds12Shds1Notifications 10 }

hds12Shds1deviceFault NOTIFICATION-TYPE  
OBJECTS  
{  
hds12Shds1EndpointCurrStatus  
}  
STATUS current  
DESCRIPTION  
"This notification indicates that the bit setting for  
deviceFault in the hds12Shds1EndpointCurrStatus object for  
this endpoint has changed."  
::= { hds12Shds1Notifications 11 }

hds12Shds1dcContinuityFault NOTIFICATION-TYPE  
OBJECTS  
{  
hds12Shds1EndpointCurrStatus

}  
STATUS current  
DESCRIPTION  
"This notification indicates that the bit setting for  
dcContinuityFault in the hds12Shds1EndpointCurrStatus object  
for this endpoint has changed."  
::= { hds12Shds1Notifications 12 }

hds12Shds1configInitFailure NOTIFICATION-TYPE  
OBJECTS  
{  
hds12Shds1EndpointCurrStatus  
}  
STATUS current

DESCRIPTION

"This notification indicates that the bit setting for configInitFailure in the hds12ShdslEndpointCurrStatus object for this endpoint has changed."

::= { hds12ShdslNotifications 13 }

hds12ShdslprotocolInitFailure NOTIFICATION-TYPE

OBJECTS

```
{
hds12ShdslEndpointCurrStatus
}
```

STATUS current

DESCRIPTION

"This notification indicates that the bit setting for protocolInitFailure in the hds12ShdslEndpointCurrStatus object for this endpoint has changed."

::= { hds12ShdslNotifications 14 }

hds12ShdslnoNeighborPresent NOTIFICATION-TYPE

OBJECTS

```
{
hds12ShdslEndpointCurrStatus
}
```

STATUS current

DESCRIPTION

"This notification indicates that the bit setting for noNeighborPresent in the hds12ShdslEndpointCurrStatus object for this endpoint has changed."

::= { hds12ShdslNotifications 15 }

hds12ShdslLocalPowerLoss NOTIFICATION-TYPE

OBJECTS

```
{
hds12ShdslInvVendorID
```

```
}
STATUS current
```

DESCRIPTION

"This notification indicates impending unit failure due to loss of local power (last gasp)."

::= { hds12ShdslNotifications 16 }

```

-- conformance information
--

hdsl2ShdslConformance OBJECT IDENTIFIER ::= { hdsl2ShdslMIB 3 }
hdsl2ShdslGroups      OBJECT IDENTIFIER ::=
    { hdsl2ShdslConformance 1 }
hdsl2ShdslCompliances OBJECT IDENTIFIER ::=
    { hdsl2ShdslConformance 2 }

-- agent compliance statements

hdsl2ShdslLineMibCompliance MODULE-COMPLIANCE
    STATUS deprecated
    DESCRIPTION
        "The compliance statement for SNMP entities which implement
        HDSL2 and SHDSL. The version of SHDSL supported in this
        compliance statement is g.shdsl.

        **** This compliance statement is deprecated. ****"
    MODULE
    MANDATORY-GROUPS
    {
        hdsl2ShdslSpanConfGroup,
        hdsl2ShdslSpanStatusGroup,
        hdsl2ShdslInventoryGroup,
        hdsl2ShdslEndpointConfGroup,
        hdsl2ShdslEndpointCurrGroup,
        hdsl2Shdsl15MinIntervalGroup,
        hdsl2Shdsl1DayIntervalGroup,
        hdsl2ShdslMaintenanceGroup,
        hdsl2ShdslEndpointAlarmConfGroup,
        hdsl2ShdslNotificationGroup
    }

    GROUP hdsl2ShdslInventoryShdslGroup
        DESCRIPTION
            "Support for this group is only required for implementations
            supporting SHDSL lines."

    GROUP hdsl2ShdslSpanShdslStatusGroup
        DESCRIPTION

```

"Support for this group is only required for implementations supporting SHDSL lines."

GROUP hdsl2ShdslSpanConfProfileGroup

DESCRIPTION

"Support for this group is only required for implementations supporting SHDSL lines."

OBJECT hdsl2ShdslSpanConfWireInterface

SYNTAX INTEGER

```
{  
    twoWire(1),  
    fourWire(2)  
}
```

DESCRIPTION

"An implementation only has to support the range as applicable for the original g.shdsl specification defined in [RFC 3276](#)."

OBJECT hdsl2ShdslStatusMaxAttainableLineRate

SYNTAX Unsigned32(0..4112000)

DESCRIPTION

"An implementation only has to support the range as applicable for the original g.shdsl specification defined in [RFC 3276](#)."

OBJECT hdsl2ShdslStatusActualLineRate

SYNTAX Unsigned32(0..4112000)

DESCRIPTION

"An implementation only has to support the range as applicable for the original g.shdsl specification defined in [RFC 3276](#)."

OBJECT hdsl2ShdslSpanConfMinLineRate

SYNTAX Unsigned32(0..4112000)

DESCRIPTION

"An implementation only has to support the range as applicable for the original g.shdsl specification defined in [RFC 3276](#)."

OBJECT hdsl2ShdslSpanConfMaxLineRate

SYNTAX Unsigned32(0..4112000)

DESCRIPTION

"An implementation only has to support the range as applicable for the original g.shdsl specification defined in [RFC 3276](#)."

::= { hdsl2ShdslCompliances 1 }

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hds12GshdslbisLineMibCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The compliance statement for SNMP entities which implement HDSL2 and SHDSL. The version of SHDSL supported in this compliance statement is g.shdsl.bis."

MODULE

MANDATORY-GROUPS

```
{
hds12ShdslSpanConfGroup,
hds12ShdslSpanStatusGroup,
hds12ShdslInventoryGroup,
hds12ShdslEndpointConfGroup,
hds12ShdslEndpointCurrGroup,
hds12Shdsl15MinIntervalGroup,
hds12Shdsl1DayIntervalGroup,
hds12ShdslMaintenanceGroup,
hds12ShdslEndpointAlarmConfGroup,
hds12ShdslNotificationGroup
}
```

GROUP hds12ShdslInventoryShdslGroup

DESCRIPTION

"Support for this group is only required for implementations supporting SHDSL lines."

GROUP hds12ShdslSpanShdslStatusGroup

DESCRIPTION

"Support for this group is only required for implementations supporting SHDSL lines."

GROUP hds12ShdslSpanConfProfileGroup

DESCRIPTION

"Support for this group is only required for implementations supporting SHDSL lines."

GROUP hds12ShdslWirePairGroup

DESCRIPTION

"Support for this group is only required for implementations supporting SHDSL lines."

GROUP hds12ShdslPayloadRateGroup

DESCRIPTION

"Support for this group is only required for implementations supporting SHDSL lines."

```
::= { hdsl2ShdslCompliances 2 }
```

```
-- units of conformance  
--
```

```
hdlsl2ShdslSpanConfGroup OBJECT-GROUP
```

```
OBJECTS
```

```
{  
  hdsl2ShdslSpanConfNumRepeaters,  
  hdsl2ShdslSpanConfProfile,  
  hdsl2ShdslSpanConfAlarmProfile  
}
```

```
STATUS      current
```

```
DESCRIPTION
```

```
  "This group supports objects for configuring span related  
  parameters for HDSL2/SHDSL lines."
```

```
::= { hdsl2ShdslGroups 1 }
```

```
hdlsl2ShdslSpanStatusGroup OBJECT-GROUP
```

```
OBJECTS
```

```
{  
  hdsl2ShdslStatusNumAvailRepeaters  
}
```

```
STATUS      current
```

```
DESCRIPTION
```

```
  "This group supports objects for retrieving span related  
  status for HDSL2/SHDSL lines."
```

```
::= { hdsl2ShdslGroups 2 }
```

```
hdlsl2ShdslInventoryShdslGroup OBJECT-GROUP
```

```
OBJECTS
```

```
{  
  hdsl2ShdslInvTransmissionModeCapability  
}
```

```
STATUS      current
```

```
DESCRIPTION
```

```
  "This group supports objects for retrieving SHDSL-specific  
  inventory information."
```

```
::= { hds12Shds1Groups 3 }
```

```
hds12Shds1SpanShds1StatusGroup OBJECT-GROUP  
OBJECTS
```

```
{  
hds12Shds1StatusMaxAttainableLineRate,  
hds12Shds1StatusActualLineRate,  
hds12Shds1StatusTransmissionModeCurrent  
}
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This group supports objects for retrieving SHDSL-specific
```

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```
span related status."
```

```
::= { hds12Shds1Groups 4 }
```

```
hds12Shds1InventoryGroup OBJECT-GROUP  
OBJECTS
```

```
{  
hds12Shds1InvVendorID,  
hds12Shds1InvVendorModelNumber,  
hds12Shds1InvVendorSerialNumber,  
hds12Shds1InvVendorEOCSoftwareVersion,  
hds12Shds1InvStandardVersion,  
hds12Shds1InvVendorListNumber,  
hds12Shds1InvVendorIssueNumber,  
hds12Shds1InvVendorSoftwareVersion,  
hds12Shds1InvEquipmentCode,  
hds12Shds1InvVendorOther  
}
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This group supports objects that provide unit inventory  
information about the units in HDSL2/SHDSL lines."
```

```
::= { hds12Shds1Groups 5 }
```

```
hds12Shds1EndpointConfGroup OBJECT-GROUP  
OBJECTS
```

```
{  
hds12Shds1EndpointCurrAtn  
}
```

```
STATUS current
```

DESCRIPTION

"This group supports objects for configuring parameters for segment endpoints in HDSL2/SHDSL lines."

::= { hdsl2ShdslGroups 6 }

hdl2ShdslEndpointCurrGroup OBJECT-GROUP

OBJECTS

```
{
hdl2ShdslEndpointCurrAtn,
hdl2ShdslEndpointCurrSnrMgn,
hdl2ShdslEndpointCurrStatus,
hdl2ShdslEndpointES,
hdl2ShdslEndpointSES,
hdl2ShdslEndpointCRCAnomalies,
hdl2ShdslEndpointLOSWS,
hdl2ShdslEndpointUAS,
hdl2ShdslEndpointCurr15MinTimeElapsed,
hdl2ShdslEndpointCurr15MinES,
hdl2ShdslEndpointCurr15MinSES,
```

```
hdl2ShdslEndpointCurr15MinCRCAnomalies,
hdl2ShdslEndpointCurr15MinLOSWS,
hdl2ShdslEndpointCurr15MinUAS,
hdl2ShdslEndpointCurr1DayTimeElapsed,
hdl2ShdslEndpointCurr1DayES,
hdl2ShdslEndpointCurr1DaySES,
hdl2ShdslEndpointCurr1DayCRCAnomalies,
hdl2ShdslEndpointCurr1DayLOSWS,
hdl2ShdslEndpointCurr1DayUAS
}
```

STATUS current

DESCRIPTION

"This group supports objects which provide current status and performance measurements relating to segment endpoints in HDSL2/SHDSL lines."

::= { hdsl2ShdslGroups 7 }

hdl2Shdsl15MinIntervalGroup OBJECT-GROUP

OBJECTS

```
{
hdl2Shdsl15MinIntervalES,
hdl2Shdsl15MinIntervalSES,
```

```
hds12Shds15MinIntervalCRCAnomalies,
hds12Shds15MinIntervalLOSWS,
hds12Shds15MinIntervalUAS
}
STATUS      current
DESCRIPTION
  "This group supports objects which maintain historic
  performance measurements relating to segment endpoints in
  HDSL2/SHDSL lines in 15-minute intervals."
 ::= { hds12Shds1Groups 8 }
```

```
hds12Shds1DayIntervalGroup OBJECT-GROUP
OBJECTS
{
hds12Shds1DayIntervalMoniSecs,
hds12Shds1DayIntervalES,
hds12Shds1DayIntervalSES,
hds12Shds1DayIntervalCRCAnomalies,
hds12Shds1DayIntervalLOSWS,
hds12Shds1DayIntervalUAS
}
STATUS      current
DESCRIPTION
  "This group supports objects which maintain historic
  performance measurements relating to segment endpoints in
  HDSL2/SHDSL lines in 1-day intervals."
```

```
 ::= { hds12Shds1Groups 9 }
```

```
hds12Shds1MaintenanceGroup OBJECT-GROUP
OBJECTS
{
hds12Shds1MaintLoopbackConfig,
hds12Shds1MaintTipRingReversal,
hds12Shds1MaintPowerBackOff,
hds12Shds1MaintSoftRestart,
hds12Shds1MaintLoopbackTimeout,
hds12Shds1MaintUnitPowerSource
}
STATUS      current
DESCRIPTION
  "This group supports objects that provide support for
```

```
    maintenance actions for HDSL2/SHDSL lines."
 ::= { hdsl2ShdslGroups 10 }
```

```
hdsl2ShdslEndpointAlarmConfGroup OBJECT-GROUP
OBJECTS
```

```
{
hdsl2ShdslEndpointAlarmConfProfile,
hdsl2ShdslEndpointThreshLoopAttenuation,
hdsl2ShdslEndpointThreshSNRMargin,
hdsl2ShdslEndpointThreshES,
hdsl2ShdslEndpointThreshSES,
hdsl2ShdslEndpointThreshCRCAnomalies,
hdsl2ShdslEndpointThreshLOSWS,
hdsl2ShdslEndpointThreshUAS,
hdsl2ShdslEndpointAlarmConfProfileRowStatus
}
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This group supports objects that allow configuration of alarm
thresholds for various performance parameters for HDSL2/SHDSL
lines."
```

```
::= { hdsl2ShdslGroups 11 }
```

```
hdsl2ShdslNotificationGroup NOTIFICATION-GROUP
NOTIFICATIONS
```

```
{
hdsl2ShdslLoopAttenCrossing,
hdsl2ShdslSNRMarginCrossing,
hdsl2ShdslPerfESThresh,
hdsl2ShdslPerfSESThresh,
hdsl2ShdslPerfCRCAnomaliesThresh,
hdsl2ShdslPerfLOSWSThresh,
hdsl2ShdslPerfUASThresh,
}
```

```
hdsl2ShdslSpanInvalidNumRepeaters,
hdsl2ShdslLoopbackFailure,
hdsl2ShdslpowerBackoff,
hdsl2ShdsldeviceFault,
hdsl2ShdslcdcContinuityFault,
hdsl2ShdslconfigInitFailure,
hdsl2ShdslprotocolInitFailure,
hdsl2ShdslnoNeighborPresent,
```

```
hds12Shds1LocalPowerLoss
}
STATUS      current
DESCRIPTION
  "This group supports notifications of significant conditions
  associated with HDSL2/SHDSL lines."
 ::= { hds12Shds1Groups 12 }
```

```
hds12Shds1SpanConfProfileGroup OBJECT-GROUP
OBJECTS
{
hds12Shds1SpanConfWireInterface,
hds12Shds1SpanConfMinLineRate,
hds12Shds1SpanConfMaxLineRate,
hds12Shds1SpanConfPSD,
hds12Shds1SpanConfTransmissionMode,
hds12Shds1SpanConfRemoteEnabled,
hds12Shds1SpanConfPowerFeeding,
hds12Shds1SpanConfCurrCondTargetMarginDown,
hds12Shds1SpanConfWorstCaseTargetMarginDown,
hds12Shds1SpanConfCurrCondTargetMarginUp,
hds12Shds1SpanConfWorstCaseTargetMarginUp,
hds12Shds1SpanConfUsedTargetMargins,
hds12Shds1SpanConfReferenceClock,
hds12Shds1SpanConfLineProbeEnable,
hds12Shds1SpanConfProfileRowStatus
}
STATUS      current
DESCRIPTION
  "This group supports objects that constitute configuration
  profiles for configuring span related parameters in SHDSL
  lines."
 ::= { hds12Shds1Groups 13 }
```

```
hds12Shds1WirePairGroup OBJECT-GROUP
OBJECTS
{
hds12Shds1EndpointCurrTipRingReversal,
hds12Shds1EndpointCurrActivationState
}

```

DESCRIPTION

"This group supports objects which provide the status of SHDSL-specific wire pairs."

::= { hdsl2ShdslGroups 14 }

hdl2ShdslPayloadRateGroup OBJECT-GROUP

OBJECTS

```
{
hdl2ShdslStatusMaxAttainablePayloadRate,
hdl2ShdslStatusActualPayloadRate
}
```

STATUS current

DESCRIPTION

"This group supports object for retrieving payload rates which excludes any framing overhead."

::= { hdsl2ShdslGroups 15 }

END

#### 4. Implementation Analysis

A management application which supports [RFC 3276](#) could mistakenly flag a unit which responds with a rate or wire pair which exceeds the ranges and/or enumerations specified in [RFC 3276](#). For example, a G.shdsl.bis line with four wire pairs would report statistics for wire pairs that do not exist in [RFC 3276](#). That is, a GET-NEXT request issues with the object identifier:

```
hdl2ShdslEndpointCurrAtn.1.1.1.2
```

might return

```
hdl2ShdslEndpointCurrAtn.1.1.1.3 = 0
```

with a G.shdsl.bis unit and

```
hdl2ShdslEndpointCurrSnrMgn.1.1.1.1 = 0
```

with an HDSL2 unit as these objects are indexed by

```
INDEX { ifIndex, hdsl2ShdslInvIndex, hdsl2ShdslEndpointSide,
        hdsl2ShdslEndpointWirePair }
```

A management application intended to manage G.shdsl.bis agents SHOULD be modified to accept this sequence.

---

One should note that this same unmodified management application is still capable of managing G.shdsl.bis agents albeit to the degree of G.SHDSL (non-bis) limitations. That is, it can create and monitor configurations limited to two wire pairs with an upper rate limit of 4112000 bits/second.

## 5. Security Considerations

There are a number of management objects defined in this MIB module with a MAX-ACCESS clause of read-write and/or read-create. 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. These are the tables and objects and their sensitivity/vulnerability:

### o hdsl2ShdslSpanConfTable

The table consists of the following objects that support SET operations:

- \* hdsl2ShdslSpanConfNumRepeaters
- \* hdsl2ShdslSpanConfProfile
- \* hdsl2ShdslSpanConfAlarmProfile

Unauthorized changes to hdsl2ShdslSpanConfNumRepeaters could result in a hdsl2ShdslSpanInvalidNumRepeaters notification. Note the discussion on hdsl2ShdslSpanInvalidNumRepeaters in the Notifications Section above.

Unauthorized changes to hdsl2ShdslSpanConfProfile could have an adverse operational effect on a span. Reference the hdsl2ShdslSpanConfProfileTable discussion below.

Unauthorized changes to hdsl2ShdslSpanConfAlarmProfile could have a contrary effect on notifications. Reference the hdsl2ShdslEndpointAlarmConfProfileTable discussion below.

### o hdsl2ShdslEndpointConfTable

This table contains one object, hdsl2ShdslEndpointAlarmConfProfile, that supports SET operations. Unauthorized changes could have an undesirable notifications. Reference the hdsl2ShdslEndpointAlarmConfProfileTable discussion below.

- o hdsl2ShdslEndpointMaintTable

The table consists of the following objects that support SET operations:

- \* hdsl2ShdslMaintLoopbackConfig
- \* hdsl2ShdslMaintPowerBackoff
- \* hdsl2ShdslMaintSoftRestart

Unauthorized changes to hdsl2ShdslMaintLoopbackConfig could prevent end-to-end data transfer due to an activation of a loopback.

Unauthorized changes to hdsl2ShdslMaintPowerBackoff could result in an increased in bundle interference.

Unauthorized changes to hdsl2ShdslMaintSoftRestart could result in a temporary interruption of end-to-end data transfer as the result of the triggering of a soft restart.

- o hdsl2ShdslUnitMaintTable

This table contains one object, hdsl2ShdslMaintLoopbackTimeout, that supports SET operations. An unauthorized change to this object could result in the timeout value for loopbacks being increased, decreased, or disabled.

- o hdsl2ShdslSpanConfProfileTable

The table consists of the following objects that support SET operations:

- \* hdsl2ShdslSpanConfWireInterface
- \* hdsl2ShdslSpanConfMinLineRate
- \* hdsl2ShdslSpanConfMaxLineRate
- \* hdsl2ShdslSpanConfPSD
- \* hdsl2ShdslSpanConfTransmissionMode
- \* hdsl2ShdslSpanConfRemoteEnabled
- \* hdsl2ShdslSpanConfPowerFeeding

- \* hds12Shds1SpanConfCurrCondTargetMarginDown
- \* hds12Shds1SpanConfWorstCaseTargetMarginDown
- \* hds12Shds1SpanConfCurrCondTargetMarginUp
- \* hds12Shds1SpanConfWorstCaseTargetMarginUp
- \* hds12Shds1SpanConfUsedTargetMargins
- \* hds12Shds1SpanConfReferenceClock
- \* hds12Shds1SpanConfLineProbeEnable

- \* hds12Shds1SpanConfProfileRowStatus

Setting any of the objects to an incorrect value could have an adverse operational effect on a span.

Unauthorized changes to the hds12Shds1SpanConfWireInterface could result in the failure of a span to achieve activation to a state that would permit data flow. For example, setting this object to six-wire or eight-wire operation when one of the units in the span only supports two-wire or four-wire operation would likely prevent an expected end-to-end data transfer capability.

Unauthorized changes to hds12Shds1SpanConfMinLineRate or hds12Shds1SpanConfMaxLineRate could have an adverse effect on performance. The range of allowable line rates could be altered such that the span may not be able to train to a line rate that would permit any end-user data to traverse the span or the span could train to a line rate that is either greater than or less than the line rate that the provider has pledged.

Unauthorized changes to hds12Shds1SpanConfPSD or hds12Shds1SpanConfTransmissionMode could have a detrimental effect loop reach, performance, or spectral compatibility.

Unauthorized changes to hds12Shds1SpanConfRemoteEnable could alter the remote management ability of units.

Unauthorized changes to hds12Shds1SpanConfPowerFeeding could shutdown units that are expected to be feed power remotely. Changing the configuration such that wetting current is not supplied may result in corrosion of electrical contacts.

Unauthorized changes to `hdsl2ShdslSpanConfCurrCondTargetMarginDown`, `hdsl2ShdslSpanConfWorstCaseTargetMarginDown`, `hdsl2ShdslSpanConfCurrCondTargetMarginUp`, `hdsl2ShdslSpanConfWorstCaseTargetMarginUp`, or `hdsl2ShdslSpanConfUsedTargetMargins` could result in invalid parameters used to determine if a data rate can be supported under current and worst-case noise.

Unauthorized changes to `hdsl2ShdslSpanConfReferenceClock` could result in the selection of a clock source which might either prevent any data from being transferred or impair data transfer. In addition, an increase in CRC anomalies may be experienced.

Unauthorized changes to `hdsl2ShdslSpanConfLineProbeEnable` could have a negative effect on selecting the optimum rate or power

level based on current line conditions.

Unauthorized changes to row status could result in unwanted profiles being created or brought into service. Also, changes to the row status could result in profiles being inadvertently deleted or taken out of service.

o `hdsl2ShdslEndpointAlarmConfProfileTable`

The table consists of the following objects that support SET operations:

- \* `hdsl2ShdslEndpointThreshLoopAttenuation`
- \* `hdsl2ShdslEndpointThreshSNRMargin`
- \* `hdsl2ShdslEndpointThreshES`
- \* `hdsl2ShdslEndpointThreshSES`
- \* `hdsl2ShdslEndpointThreshCRCAnomalies`
- \* `hdsl2ShdslEndpointThreshLOSWS`
- \* `hdsl2ShdslEndpointThreshUAS`
- \* `hdsl2ShdslEndpointAlarmConfProfileRowStatus`

Increasing any of the threshold values could result a notification being suppressed or deferred. Setting a threshold to 0 could result in a notification being suppressed. Suppressing or deferring a notification could prevent the timely delivery of

important diagnostic information. Decreasing any of the threshold values could result in a notification being sent from the network falsely reporting a threshold crossing.

Changing a threshold value could also have an impact on the amount of notifications the agent sends. This document adds a paragraph, which was not in [RFC 3276](#) [RFC3276], to the Notifications Section which provides general guidance to the rate limiting of notifications. Agent implementations not adhering to the rate-limiting desires could result in notifications being generated at an uncontrolled rate. Unauthorized changes to a threshold value could result in an undesired notification rate.

Unauthorized changes to row status could result in unwanted profiles being created or brought into service. Also, changes to the row status could result in profiles being inadvertently deleted or taken out of service.

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over

the network via SNMP. These are the tables and objects and their sensitivity/vulnerability:

- o hdsl2ShdslInventoryTable

Access to these objects would allow an intruder to obtain information about which vendor's equipment is in use on the network. Further, such information is considered sensitive in many environments for competitive reasons.

- \* hdsl2ShdslInvVendorID
- \* hdsl2ShdslInvVendorModelNumber
- \* hdsl2ShdslInvVendorSerialNumber
- \* hdsl2ShdslInvVendorEOCSsoftwareVersion
- \* hdsl2ShdslInvStandardVersion
- \* hdsl2ShdslInvVendorListNumber
- \* hdsl2ShdslInvVendorIssueNumber
- \* hdsl2ShdslInvVendorSoftwareVersion

- \* hdsl2ShdslInvEquipmentCode
- \* hdsl2ShdslInvVendorOther
- \* hdsl2ShdslInvTransmissionModeCapability

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.

## [6.](#) Acknowledgments

The authors are deeply grateful to the authors of the ADSL LINE MIB ([RFC 2662](#) [[RFC2662](#)]), Gregory Bathrick and Faye Ly, as much of the text and structure of this document originates in their documents.

The authors are also grateful to the authors of FR MFR MIB ([RFC 3020](#)

[\[RFC3020\]](#)), Prayson Pate, Bob Lynch, and Kenneth Rehbehn, as the majority of the Security Considerations section was lifted from their document.

The authors also acknowledge the importance of the contributions and suggestions regarding interface indexing structures received from David Horton of CITR.

The authors are extremely thankful to Bert Wijnen, Randy Presuhn, and C. M. Heard for their extensive review and the many suggestions they provided.

Other contributions were received from the following:

Matt Beanland (Extel Communications)  
Philip Bergstresser (Adtran)  
Steve Blackwell (Centillium)  
Umberto Bonollo (NEC Australia)  
John Egan (Metalink BroadBand)  
Yagal Hachmon (RAD)  
Mark Johnson (Red Point)  
Sharon Mantin (Orckit)  
Moti Morgenstern (ECI)  
Raymond Murphy (Ericsson)  
Lee Nipper (Verilink)  
Randy Presuhn (BMC Software)  
Katy Sherman (Orckit)  
Mike Sneed (ECI)  
Jon Turney (DSL Solutions)  
Aron Wahl (Memotec)  
Jim Wilson (for Mindspeed)  
Bert Wijnen (Lucent)  
Michael Wrobel (Memotec)

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## Acknowledgment

Funding for the RFC Editor function is currently provided by the Internet Society.

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