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Definitions of Managed Objects for G.shdsl.bis Lines
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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-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. Introduction

This document defines a Management Information Base (MIB) module for use with network management protocols in the Internet community. 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](#)]. 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.

2. 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](#)].

3. Introduction

This document describes an SNMP MIB for managing HDSL2/SHDSL Lines. These definitions 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](#)].

The MIB is located in the MIB tree under MIB 2 transmission, as discussed in the MIB-2 Integration ([RFC 3418](#) [[RFC3418](#)] and [RFC 2863](#) [[RFC2863](#)]) section of this document.

3.1 Relationship of the HDSL2/SHDSL Line MIB to other MIBs

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

[3.1.1](#) 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.

[3.1.2](#) 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, 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.

=====	
ifIndex	Interface index.
ifDescr	See interfaces MIB [RFC2863].
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 [RFC2863].
ifOperStatus	See interfaces MIB [RFC2863].
ifLastChange	See interfaces MIB [RFC2863].
ifName	See interfaces MIB [RFC2863].
ifAlias	See interfaces MIB [RFC2863].
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

3.2 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.

4. Conventions used in the MIB

4.1 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](#)].

4.2 Textual Conventions

The following textual conventions are defined to reflect the line topology in the MIB (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.

o Hdsl2Shdsl1DayIntervalCount:

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

o Hdsl2ShdslPerfTimeElapsed:

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

o Hdsl2ShdslPerfIntervalThreshold:

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

o Hdsl2ShdslClockReferenceType:

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

4.3 Structure

The MIB 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
- hdsl2ShdslPerfLOSSThresh
- hdsl2ShdslPerfUASThresh
- hdsl2ShdslSpanInvalidNumRepeaters
- hdsl2ShdslLoopbackFailure
- hdsl2ShdslpowerBackoff
- hdsl2ShdsldeviceFault
- hdsl2ShdslcdcContinuityFault
- hdsl2ShdslconfigInitFailure
- hdsl2ShdslprotocolInitFailure
- hdsl2ShdslnoNeighborPresent
- hdsl2ShdslLocalPowerLoss

o SHDSL Wire Pair Group:

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

- hds12ShdslEndpointCurrTipRingReversal
- hds12ShdslEndpointCurrActivationState

o Payload Group:

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

- hds12ShdslStatusMaxAttainablePayloadRate
- hds12ShdslStatusActualPayloadRate

4.3.1 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.

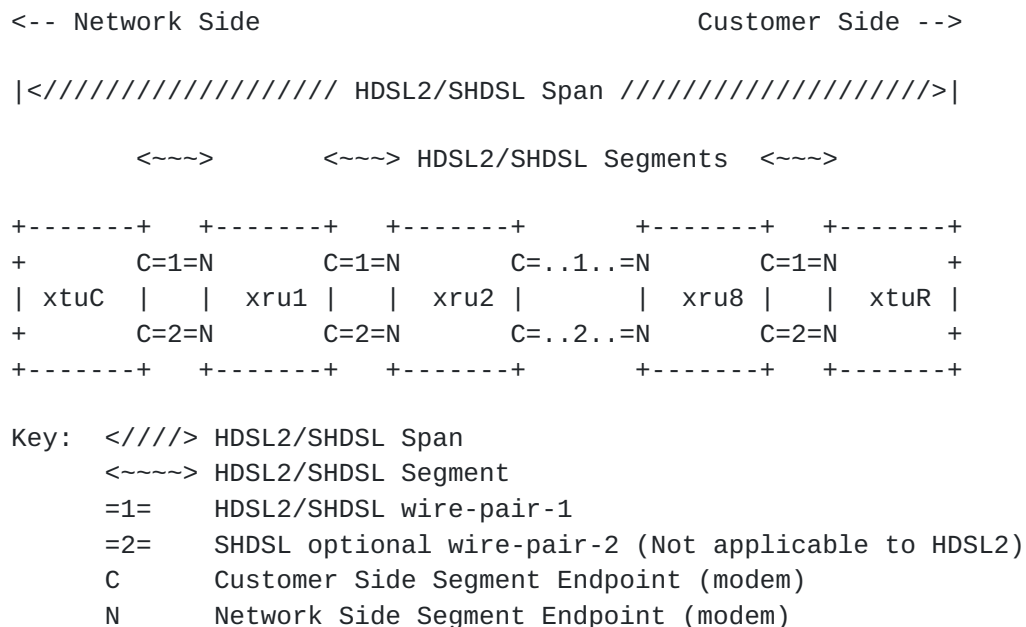


Figure 2: General topology for an HDSL2/SHDSL Line

4.4 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 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, `hds12Shdsl15MinIntervalTable`, is indexed by { `ifIndex`, `hds12ShdslInvIndex`, `hds12ShdslEndpointSide`, `hds12ShdslEndpointWirePair`, `hds12Shdsl15MinIntervalNumber`}. 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).

4.5 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 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:

- o Span Configuration Profiles - Span configuration profiles contain parameters for configuring HDSL2/SHDSL spans. They are defined in the `hds12ShdslSpanConfProfileTable`. 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 `hdl2ShdslEndpointAlarmConfProfileTable`.

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., `hdl2ShdslEndpointAlarmConfProfile = 'silver'`) by setting its `hdl2ShdslEndpointAlarmConfProfile` 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.

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.

[4.6](#) 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 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 hds12ShdslEndpointCurrStatus 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, these alarm conditions are tied to the two thresholds hds12ShdslEndpointThreshSNRMargin and hds12ShdslEndpointThreshLoopAttenuation found in the hds12ShdslEndpointAlarmConfProfileTable. In the EOC, the alarm conditions associated with these thresholds are per-unit. In the MIB, 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 `hds12ShdslSpanInvalidNumRepeaters` 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 `hds12ShdslSpanConfNumRepeaters`. 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.

5. Conformance and Compliance

For both HDSL2 and SHDSL lines, the following group(s) are mandatory:

- `hds12ShdslSpanConfGroup`
- `hds12ShdslSpanStatusGroup`
- `hds12ShdslInventoryGroup`
- `hds12ShdslEndpointConfGroup`
- `hds12Shdsl15MinIntervalGroup`
- `hds12Shdsl1DayIntervalGroup`
- `hds12ShdslMaintenanceGroup`
- `hds12ShdslEndpointAlarmConfGroup`
- `hds12ShdslNotificationGroup`
- `hds12ShdslWirePairGroup`
- `hds12ShdslPayloadRateGroup`

For HDSL2 lines, the following group(s) are optional:

- `hds12ShdslSpanConfProfileGroup`
- `hds12ShdslSpanShdslStatusGroup`
- `hds12ShdslWirePairGroup`

hdsl2ShdslPayloadRateGroup

6. 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
SnmAdminString
FROM SNMP-FRAMEWORK-MIB
MODULE-COMPLIANCE,
OBJECT-GROUP,
NOTIFICATION-GROUP
FROM SNMPv2-CONF;

hds12Shds1MIB MODULE-IDENTITY

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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 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 "200502210000Z" -- February 21, 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 }

hdsl2ShdslMibObjects OBJECT IDENTIFIER ::= { hdsl2ShdslMIB 1 }

-- Textual Conventions used in this MIB

--

Hdsl2ShdslPerfCurrDayCount ::= 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 Hdsl2Shdsl1DayIntervalCount, 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 HDSSL2/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 hdl2ShdslSpanConfTable. 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

{

hdl2ShdslSpanConfNumRepeaters Unsigned32,

hdl2ShdslSpanConfProfile SnmpAdminString,


```
hds12ShdslSpanConfAlarmProfile      SnmpAdminString
}
```

hds12ShdslSpanConfNumRepeaters 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."

::= { hds12ShdslSpanConfEntry 1 }

hds12ShdslSpanConfProfile 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 hds12ShdslSpanConfProfileTable, which applies to this
span. The value of this object is the index of the referenced
profile in the hds12ShdslSpanConfProfileTable. 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,
hds12ShdslSpanConfProfileTable, MUST be rejected."

::= { hds12ShdslSpanConfEntry 2 }

hds12ShdslSpanConfAlarmProfile 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 hds12ShdslEndpointAlarmConfProfileTable. The value of
this object is the index of the referenced profile in the
hds12ShdslEndpointAlarmConfProfileTable. 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
hds12ShdslEndpointConfTable. 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, hds12ShdslEndpointAlarmConfProfileTable, MUST be rejected."
 ::= { hds12ShdslSpanConfEntry 3 }

-- Span Status Group
 --

hds12ShdslSpanStatusTable OBJECT-TYPE

SYNTAX SEQUENCE OF Hds12ShdslSpanStatusEntry
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "This table provides overall status information of HDLSL2/SHDSL spans. This table contains live data from equipment. As such, it is NOT persistent."
 ::= { hds12ShdslMibObjects 2 }

hds12ShdslSpanStatusEntry OBJECT-TYPE

SYNTAX Hds12ShdslSpanStatusEntry
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "An entry in the hds12ShdslSpanStatusTable. Each entry represents the complete span in a single HDLSL2/SHDSL line. It is indexed by the ifIndex of the associated HDLSL2/SHDSL line."
 INDEX { ifIndex }
 ::= { hds12ShdslSpanStatusTable 1 }

Hds12ShdslSpanStatusEntry ::

SEQUENCE
 {
 hds12ShdslStatusNumAvailRepeaters Unsigned32,
 hds12ShdslStatusMaxAttainableLineRate Unsigned32,
 hds12ShdslStatusActualLineRate Unsigned32,
 hds12ShdslStatusTransmissionModeCurrent
 Hds12ShdslTransmissionModeType,
 hds12ShdslStatusMaxAttainablePayloadRate Unsigned32,
 hds12ShdslStatusActualPayloadRate Unsigned32
 }

hds12ShdslStatusNumAvailRepeaters 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."

::= { hdsl2ShdslSpanStatusEntry 1 }

hdlsl2ShdslStatusMaxAttainableLineRate 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."

::= { hdsl2ShdslSpanStatusEntry 2 }

hdlsl2ShdslStatusActualLineRate 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 }

hdlsl2ShdslStatusTransmissionModeCurrent 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 }

hdlsl2ShdslStatusMaxAttainablePayloadRate 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 }

hdlsl2ShdslStatusActualPayloadRate 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
--

hdlsl2ShdslInventoryTable 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
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, hds12ShdslInvIndex }  
 ::= { hds12ShdslInventoryTable 1 }
```

Hds12ShdslInventoryEntry ::

```
SEQUENCE  
{  
  hds12ShdslInvIndex                Hds12ShdslUnitId,  
  hds12ShdslInvVendorID             OCTET STRING,  
  hds12ShdslInvVendorModelNumber    OCTET STRING,  
  hds12ShdslInvVendorSerialNumber   OCTET STRING,  
  hds12ShdslInvVendorEOCSoftwareVersion Integer32,  
  hds12ShdslInvStandardVersion      Integer32,  
  hds12ShdslInvVendorListNumber     OCTET STRING,  
  hds12ShdslInvVendorIssueNumber    OCTET STRING,  
  hds12ShdslInvVendorSoftwareVersion OCTET STRING,  
  hds12ShdslInvEquipmentCode        OCTET STRING,  
  hds12ShdslInvVendorOther          OCTET STRING,  
  hds12ShdslInvTransmissionModeCapability  
                                   Hds12ShdslTransmissionModeType  
}
```

hds12ShdslInvIndex OBJECT-TYPE

```
SYNTAX      Hds12ShdslUnitId  
MAX-ACCESS  not-accessible  
STATUS      current  
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."

```
::= { hds12ShdslInventoryEntry 1 }
```

hds12ShdslInvVendorID 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."

```
::= { hds12ShdslInventoryEntry 2 }
```

hds12ShdslInvVendorModelNumber 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."
    ::= { hds12ShdslInventoryEntry 3 }

hds12ShdslInvVendorSerialNumber 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."
    ::= { hds12ShdslInventoryEntry 4 }

hds12ShdslInvVendorEOCSoftwareVersion OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Vendor EOC version as reported in a Discovery Response
        message."
    REFERENCE
        "G.991.2, Section 9.5.5.7.2, Discovery response - Message ID
        130, Octet 12."
    ::= { hds12ShdslInventoryEntry 5 }

hds12ShdslInvStandardVersion 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."
    ::= { hds12ShdslInventoryEntry 6 }

hds12ShdslInvVendorListNumber 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 }

hdlsl2ShdslInvVendorIssueNumber 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 }

hdlsl2ShdslInvVendorSoftwareVersion 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 }

hdlsl2ShdslInvEquipmentCode 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 }

hdlsl2ShdslInvVendorOther 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."
 ::= { hds12ShdslInventoryEntry 11 }

hds12ShdslInvTransmissionModeCapability OBJECT-TYPE
    SYNTAX      Hds12ShdslTransmissionModeType
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "Contains the transmission mode capability of the SHDSL unit."
    ::= { hds12ShdslInventoryEntry 12 }

-- Segment Endpoint Configuration Group
--

hds12ShdslEndpointConfTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Hds12ShdslEndpointConfEntry
    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."
    ::= { hds12ShdslMibObjects 4 }

hds12ShdslEndpointConfEntry OBJECT-TYPE
    SYNTAX      Hds12ShdslEndpointConfEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "An entry in the hds12ShdslEndpointConfTable. 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, hds12ShdslInvIndex, hds12ShdslEndpointSide,
            hds12ShdslEndpointWirePair}
    ::= { hds12ShdslEndpointConfTable 1 }

Hds12ShdslEndpointConfEntry ::
    SEQUENCE
    {
        hds12ShdslEndpointSide          Hds12ShdslUnitSide,
        hds12ShdslEndpointWirePair      Hds12ShdslWirePair,
        hds12ShdslEndpointAlarmConfProfile SnmpAdminString
    }
```


hdl2ShdslEndpointSide 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 }

hdl2ShdslEndpointWirePair 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 }

hdl2ShdslEndpointAlarmConfProfile 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
hdl2ShdslSpanConfAlarmProfile object in the
hdl2ShdslSpanConfTable. 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,
hdl2ShdslEndpointAlarmConfProfileTable, MUST be rejected."

::= { hdsl2ShdslEndpointConfEntry 3 }

-- Segment Endpoint Current Status/Performance Group

--

hdl2ShdslEndpointCurrTable 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 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

```
{
```

hdlsl2ShdslEndpointCurrAtn Integer32,

hdlsl2ShdslEndpointCurrSnrMgn Integer32,

hdlsl2ShdslEndpointCurrStatus BITS,

hdlsl2ShdslEndpointES Counter32,

hdlsl2ShdslEndpointSES Counter32,

hdlsl2ShdslEndpointCRCAnomalies Counter32,

hdlsl2ShdslEndpointLOSWs Counter32,

hdlsl2ShdslEndpointUAS Counter32,

hdlsl2ShdslEndpointCurr15MinTimeElapsed

Hdsl2ShdslPerfTimeElapsed,

hdlsl2ShdslEndpointCurr15MinES PerfCurrentCount,

hdlsl2ShdslEndpointCurr15MinSES PerfCurrentCount,

hdlsl2ShdslEndpointCurr15MinCRCAnomalies PerfCurrentCount,

hdlsl2ShdslEndpointCurr15MinLOSWs PerfCurrentCount,

hdlsl2ShdslEndpointCurr15MinUAS PerfCurrentCount,

hdlsl2ShdslEndpointCurr1DayTimeElapsed

Hdsl2ShdslPerfTimeElapsed,

hdlsl2ShdslEndpointCurr1DayES

Hdsl2ShdslPerfCurrDayCount,

hdlsl2ShdslEndpointCurr1DaySES

Hdsl2ShdslPerfCurrDayCount,

hdlsl2ShdslEndpointCurr1DayCRCAnomalies

Hdsl2ShdslPerfCurrDayCount,

hdlsl2ShdslEndpointCurr1DayLOSWs


```

                                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
    "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 }

```

hdsl2ShdslEndpointCurrStatus 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."

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 }

hdlsl2ShdslEndpointCRCAnomalies OBJECT-TYPE

SYNTAX Counter32
UNITS "detected CRC Anomalies"
MAX-ACCESS read-only
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 }

hdlsl2ShdslEndpointLOSWS 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 }

hdlsl2ShdslEndpointUAS 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 }

hdlsl2ShdslEndpointCurr15MinTimeElapsed OBJECT-TYPE

SYNTAX Hdsl2ShdslPerfTimeElapsed

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Total elapsed seconds in the current 15-minute interval."

::= { hdsl2ShdslEndpointCurrEntry 9 }

hdlsl2ShdslEndpointCurr15MinES 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 }

hdlsl2ShdslEndpointCurr15MinSES 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 }

hdlsl2ShdslEndpointCurr15MinCRCAnomalies 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 }

hdlsl2ShdslEndpointCurr15MinLOSWS 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 }

hdlsl2ShdslEndpointCurr15MinUAS 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 }

hdlsl2ShdslEndpointCurr1DayTimeElapsed 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 }

hdlsl2ShdslEndpointCurr1DayES 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 }

hdlsl2ShdslEndpointCurr1DaySES 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 hds12ShdslEndpointCurr1DayTimeElapsed."

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

::= { hds12ShdslEndpointCurrEntry 17 }

hds12ShdslEndpointCurr1DayCRCAnomalies OBJECT-TYPE

SYNTAX Hds12ShdslPerfCurrDayCount

UNITS "detected CRC Anomalies"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Count of CRC anomalies during the current day as measured by hds12ShdslEndpointCurr1DayTimeElapsed."

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

::= { hds12ShdslEndpointCurrEntry 18 }

hds12ShdslEndpointCurr1DayLOSW OBJECT-TYPE

SYNTAX Hds12ShdslPerfCurrDayCount

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Count of Loss of Sync Word (LOSW) Seconds during the current day as measured by hds12ShdslEndpointCurr1DayTimeElapsed."

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

::= { hds12ShdslEndpointCurrEntry 19 }

hds12ShdslEndpointCurr1DayUAS OBJECT-TYPE

SYNTAX Hds12ShdslPerfCurrDayCount

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Count of Unavailable Seconds (UAS) during the current day as measured by hds12ShdslEndpointCurr1DayTimeElapsed."

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

::= { hds12ShdslEndpointCurrEntry 20 }

hds12ShdslEndpointCurrTipRingReversal 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 }
```

hdlsl2ShdslEndpointCurrActivationState 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

--

hdlsl2Shdsl15MinIntervalTable OBJECT-TYPE

SYNTAX SEQUENCE OF Hdsl2Shdsl15MinIntervalEntry

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 6 }
```

hdlsl2Shdsl15MinIntervalEntry 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,
```



```
hds12Shdsl15MinIntervalUAS          PerfIntervalCount
}
```

hds12Shdsl15MinIntervalNumber 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."

::= { hds12Shdsl15MinIntervalEntry 1 }

hds12Shdsl15MinIntervaleS 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](#)"

::= { hds12Shdsl15MinIntervalEntry 2 }

hds12Shdsl15MinIntervaleSES 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](#)"

::= { hds12Shdsl15MinIntervalEntry 3 }

hds12Shdsl15MinIntervalCRCAnomalies 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](#)"

::= { hds12Shdsl15MinIntervalEntry 4 }

hds12Shdsl15MinIntervalLOSWS 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 }

hdlsl2Shdsl15MinIntervalUAS 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

--

hdlsl2Shdsl1DayIntervalTable 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,
hdlsl2ShdslEndpointWirePair, hdsl2Shdsl1DayIntervalNumber }

::= { hdsl2Shdsl1DayIntervalTable 1 }

Hdsl2Shdsl1DayIntervalEntry ::

SEQUENCE

```
{
  hdsl2Shdsl1DayIntervalNumber      Unsigned32,
  hdsl2Shdsl1DayIntervalMoniSecs    Hdsl2ShdslPerfTimeElapsed,
  hdsl2Shdsl1DayIntervalES          Hdsl2Shdsl1DayIntervalCount,
  hdsl2Shdsl1DayIntervalSES          Hdsl2Shdsl1DayIntervalCount,
  hdsl2Shdsl1DayIntervalCRCAnomalies Hdsl2Shdsl1DayIntervalCount,
  hdsl2Shdsl1DayIntervalLOSWS       Hdsl2Shdsl1DayIntervalCount,
```



```
hds12Shdsl1DayIntervalUAS          Hds12Shdsl1DayIntervalCount
}
```

hds12Shdsl1DayIntervalNumber 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."

::= { hds12Shdsl1DayIntervalEntry 1 }

hds12Shdsl1DayIntervalMoniSecs OBJECT-TYPE

SYNTAX Hds12Shdsl1PerfTimeElapsed

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."

::= { hds12Shdsl1DayIntervalEntry 2 }

hds12Shdsl1DayIntervales OBJECT-TYPE

SYNTAX Hds12Shdsl1DayIntervalCount

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Count of Errored Seconds (ES) during the 1-day interval as measured by hds12Shdsl1DayIntervalMoniSecs."

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

::= { hds12Shdsl1DayIntervalEntry 3 }

hds12Shdsl1DayIntervaleses OBJECT-TYPE

SYNTAX Hds12Shdsl1DayIntervalCount

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Count of Severely Errored Seconds (SES) during the 1-day interval as measured by hds12Shdsl1DayIntervalMoniSecs."

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

::= { hds12Shdsl1DayIntervalEntry 4 }

hds12Shdsl1DayIntervalCRCAnomalies OBJECT-TYPE

SYNTAX Hds12Shdsl1DayIntervalCount

UNITS "detected CRC Anomalies"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Count of CRC anomalies during the 1-day interval as measured by hds12Shdsl1DayIntervalMoniSecs."

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

::= { hds12Shdsl1DayIntervalEntry 5 }

hds12Shdsl1DayIntervalLOSWS OBJECT-TYPE

SYNTAX Hds12Shdsl1DayIntervalCount

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Count of Loss of Sync Word (LOSWS) Seconds during the 1-day interval as measured by hds12Shdsl1DayIntervalMoniSecs."

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

::= { hds12Shdsl1DayIntervalEntry 6 }

hds12Shdsl1DayIntervalUAS OBJECT-TYPE

SYNTAX Hds12Shdsl1DayIntervalCount

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Count of Unavailable Seconds (UAS) during the 1-day interval as measured by hds12Shdsl1DayIntervalMoniSecs."

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

::= { hds12Shdsl1DayIntervalEntry 7 }

-- Maintenance Group

--

hds12ShdslEndpointMaintTable OBJECT-TYPE

SYNTAX SEQUENCE OF Hds12ShdslEndpointMaintEntry

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."

::= { hds12ShdslMibObjects 8 }

hds12ShdslEndpointMaintEntry OBJECT-TYPE

SYNTAX Hdsl2ShdslEndpointMaintEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "An entry in the hds12ShdslEndpointMaintTable. 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, hds12ShdslInvIndex, hds12ShdslEndpointSide }
::= { hds12ShdslEndpointMaintTable 1 }

Hdsl2ShdslEndpointMaintEntry ::
SEQUENCE
{
 hds12ShdslMaintLoopbackConfig INTEGER,
 hds12ShdslMaintTipRingReversal INTEGER,
 hds12ShdslMaintPowerBackOff INTEGER,
 hds12ShdslMaintSoftRestart INTEGER
}

hds12ShdslMaintLoopbackConfig 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 hds12ShdslEndpointCurrStatus object."
::= { hds12ShdslEndpointMaintEntry 1 }

hds12ShdslMaintTipRingReversal 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."
::= { hds12ShdslEndpointMaintEntry 2 }

hds12ShdslMaintPowerBackOff 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."

::= { hds12ShdslEndpointMaintEntry 3 }

hds12ShdslMaintSoftRestart 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."

::= { hds12ShdslEndpointMaintEntry 4 }

hds12ShdslUnitMaintTable OBJECT-TYPE

SYNTAX SEQUENCE OF Hds12ShdslUnitMaintEntry

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."

::= { hds12ShdslMibObjects 9 }

hds12ShdslUnitMaintEntry OBJECT-TYPE

SYNTAX Hds12ShdslUnitMaintEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the hds12ShdslUnitMaintTable. 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
{
  hdsl2ShdslMaintLoopbackTimeout      Integer32,
  hdsl2ShdslMaintUnitPowerSource      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

--

hdlsl2ShdslSpanConfProfileTable OBJECT-TYPE

```
SYNTAX      SEQUENCE OF Hdsl2ShdslSpanConfProfileEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "This table supports definitions of span configuration
   profiles for SHDSL lines. HDSL2 does not support these
   configuration options. This table MUST be maintained
```


in a persistent manner."
 ::= { hds12ShdslMibObjects 10 }

hds12ShdslSpanConfProfileEntry OBJECT-TYPE

SYNTAX Hds12ShdslSpanConfProfileEntry

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 hds12ShdslSpanConfProfile object). Profiles may be created/deleted using the row creation/deletion mechanism via hds12ShdslSpanConfProfileRowStatus. If an active entry is referenced in hds12ShdslSpanConfProfile, the entry MUST remain active until all references are removed."

INDEX { IMPLIED hds12ShdslSpanConfProfileName }

::= { hds12ShdslSpanConfProfileTable 1 }

Hds12ShdslSpanConfProfileEntry ::

SEQUENCE

```
{
  hds12ShdslSpanConfProfileName          SnmpAdminString,
  hds12ShdslSpanConfWireInterface        INTEGER,
  hds12ShdslSpanConfMinLineRate          Unsigned32,
  hds12ShdslSpanConfMaxLineRate          Unsigned32,
  hds12ShdslSpanConfPSD                  INTEGER,
  hds12ShdslSpanConfTransmissionMode     Hds12ShdslTransmissionModeType,
  hds12ShdslSpanConfRemoteEnabled         INTEGER,
  hds12ShdslSpanConfPowerFeeding          INTEGER,
  hds12ShdslSpanConfCurrCondTargetMarginDown Integer32,
  hds12ShdslSpanConfWorstCaseTargetMarginDown Integer32,
  hds12ShdslSpanConfCurrCondTargetMarginUp Integer32,
  hds12ShdslSpanConfWorstCaseTargetMarginUp Integer32,
  hds12ShdslSpanConfUsedTargetMargins     BITS,
  hds12ShdslSpanConfReferenceClock        Hds12ShdslClockReferenceType,
  hds12ShdslSpanConfLineProbeEnable       INTEGER,
  hds12ShdslSpanConfProfileRowStatus      RowStatus
}
```

hds12ShdslSpanConfProfileName 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
hds12ShdslSpanConfProfile in Hds12ShdslSpanConfEntry."
::= { hds12ShdslSpanConfProfileEntry 1 }

hds12ShdslSpanConfWireInterface 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 }
::= { hds12ShdslSpanConfProfileEntry 2 }

hds12ShdslSpanConfMinLineRate OBJECT-TYPE

SYNTAX Unsigned32(0..4294967295)
UNITS "bps"
MAX-ACCESS read-create
STATUS current
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
(hds12ShdslSpanMaxLineRate), 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 }
::= { hds12ShdslSpanConfProfileEntry 3 }

hds12ShdslSpanConfMaxLineRate 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

(hds12ShdslSpanMaxLineRate), 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 }
::= { hds12ShdslSpanConfProfileEntry 4 }

hds12ShdslSpanConfPSD 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 }
::= { hds12ShdslSpanConfProfileEntry 5 }

hds12ShdslSpanConfTransmissionMode OBJECT-TYPE

SYNTAX Hds12ShdslTransmissionModeType
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object specifies the regional setting for the SHDSL line."
DEFVAL { { region1 } }
::= { hds12ShdslSpanConfProfileEntry 6 }

hds12ShdslSpanConfRemoteEnabled 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 }
::= { hds12ShdslSpanConfProfileEntry 7 }

hds12ShdslSpanConfPowerFeeding 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 }

hdlsl2ShdslSpanConfCurrCondTargetMarginDown 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 }

hdlsl2ShdslSpanConfWorstCaseTargetMarginDown 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 }

hdlsl2ShdslSpanConfCurrCondTargetMarginUp 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 }

::= { hds12ShdslSpanConfProfileEntry 11 }

hds12ShdslSpanConfWorstCaseTargetMarginUp 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 }

::= { hds12ShdslSpanConfProfileEntry 12 }

hds12ShdslSpanConfUsedTargetMargins 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 } }

::= { hds12ShdslSpanConfProfileEntry 13 }

hds12ShdslSpanConfReferenceClock 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 }
::= { hds12ShdslSpanConfProfileEntry 14 }

hds12ShdslSpanConfLineProbeEnable 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 }
::= { hds12ShdslSpanConfProfileEntry 15 }

hds12ShdslSpanConfProfileRowStatus 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 hds12ShdslSpanConfProfile, the
 entry MUST remain active until all references are removed."
::= { hds12ShdslSpanConfProfileEntry 16 }

-- Segment Endpoint Alarm Configuration Profile group
--

hds12ShdslEndpointAlarmConfProfileTable OBJECT-TYPE

SYNTAX SEQUENCE OF Hds12ShdslEndpointAlarmConfProfileEntry
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."


```
::= { hds12ShdslMibObjects 11 }
```

hds12ShdslEndpointAlarmConfProfileEntry OBJECT-TYPE

SYNTAX Hds12ShdslEndpointAlarmConfProfileEntry

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 HDSSL2/SHDSL segment endpoints. Profiles may be created/deleted using the row creation/deletion mechanism via hds12ShdslEndpointAlarmConfProfileRowStatus. If an active entry is referenced in either hds12ShdslSpanConfAlarmProfile or hds12ShdslEndpointAlarmConfProfile, the entry MUST remain active until all references are removed."

INDEX { IMPLIED hds12ShdslEndpointAlarmConfProfileName }

```
::= { hds12ShdslEndpointAlarmConfProfileTable 1 }
```

Hds12ShdslEndpointAlarmConfProfileEntry ::

SEQUENCE

```
{
hds12ShdslEndpointAlarmConfProfileName      SnmpAdminString,
hds12ShdslEndpointThreshLoopAttenuation      Integer32,
hds12ShdslEndpointThreshSNRMargin            Integer32,
hds12ShdslEndpointThreshES                   Hdsl2ShdslPerfIntervalThreshold,
hds12ShdslEndpointThreshSES                   Hdsl2ShdslPerfIntervalThreshold,
hds12ShdslEndpointThreshCRCAnomalies          Integer32,
hds12ShdslEndpointThreshLOSWS                 Hdsl2ShdslPerfIntervalThreshold,
hds12ShdslEndpointThreshUAS                   Hdsl2ShdslPerfIntervalThreshold,
hds12ShdslEndpointAlarmConfProfileRowStatus RowStatus
}
```

hds12ShdslEndpointAlarmConfProfileName OBJECT-TYPE

SYNTAX SnmpAdminString (SIZE(1..32))

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object is the unique index associated with this profile."

```
::= { hds12ShdslEndpointAlarmConfProfileEntry 1 }
```

hds12ShdslEndpointThreshLoopAttenuation 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 hds12ShdslEndpointCurrAtn reaches
 or exceeds this threshold, a hds12ShdslLoopAttenCrossing
 MAY be generated."
DEFVAL { 0 }
::= { hds12ShdslEndpointAlarmConfProfileEntry 2 }

hds12ShdslEndpointThreshSNRMargin 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 hds12ShdslEndpointCurrSnrMgn
 reaches or drops below this threshold, a
 hds12ShdslSNRMarginCrossing MAY be generated."
DEFVAL { 0 }
::= { hds12ShdslEndpointAlarmConfProfileEntry 3 }

hds12ShdslEndpointThreshES OBJECT-TYPE

SYNTAX Hds12ShdslPerfIntervalThreshold
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 hds12ShdslPerfESThresh MAY be
 generated. At most one notification will be sent per
 interval per endpoint."
DEFVAL { 0 }
::= { hds12ShdslEndpointAlarmConfProfileEntry 4 }

hds12ShdslEndpointThreshSES OBJECT-TYPE

SYNTAX Hds12ShdslPerfIntervalThreshold
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 hds12ShdslPerfSESThresh MAY be generated. At most one notification will be sent per interval per endpoint."

DEFVAL { 0 }

::= { hds12ShdslEndpointAlarmConfProfileEntry 5 }

hds12ShdslEndpointThreshCRCAnomalies 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 hds12ShdslPerfCRCAnomaliesThresh MAY be generated. At most one notification will be sent per interval per endpoint."

DEFVAL { 0 }

::= { hds12ShdslEndpointAlarmConfProfileEntry 6 }

hds12ShdslEndpointThreshLOSW OBJECT-TYPE

SYNTAX Hds12ShdslPerfIntervalThreshold

UNITS "seconds"

MAX-ACCESS read-create

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 hds12ShdslPerfLOSWThresh MAY be generated. At most one notification will be sent per interval per endpoint."

DEFVAL { 0 }

::= { hds12ShdslEndpointAlarmConfProfileEntry 7 }

hds12ShdslEndpointThreshUAS OBJECT-TYPE

SYNTAX Hds12ShdslPerfIntervalThreshold

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 hds12ShdslPerfUASThresh MAY be generated. At most one notification will be sent per interval per endpoint."

DEFVAL { 0 }

::= { hds12ShdslEndpointAlarmConfProfileEntry 8 }

hds12ShdslEndpointAlarmConfProfileRowStatus 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

hds12ShdslSpanConfAlarmProfile or

hds12ShdslEndpointAlarmConfProfile, the entry MUST remain active until all references are removed."

::= { hds12ShdslEndpointAlarmConfProfileEntry 9 }

-- Notifications Group

--

hds12ShdslNotifications OBJECT IDENTIFIER ::= { hds12ShdslMIB 0 }

hds12ShdslLoopAttenCrossing NOTIFICATION-TYPE

OBJECTS

{

hds12ShdslEndpointCurrAtn,

hds12ShdslEndpointThreshLoopAttenuation

}

STATUS current

DESCRIPTION

"This notification indicates that the loop attenuation threshold (as per the hds12ShdslEndpointThreshLoopAttenuation value) has been reached/exceeded for the HDLS2/SHDSL segment endpoint."

::= { hds12ShdslNotifications 1 }

hds12ShdslSNRMarginCrossing NOTIFICATION-TYPE

OBJECTS

{

hds12ShdslEndpointCurrSnrMgn,

hds12ShdslEndpointThreshSNRMargin

}

STATUS current

DESCRIPTION

"This notification indicates that the SNR margin threshold (as

per the hds12ShdslEndpointThreshSNRMargin value) has been reached/exceeded for the HDSL2/SHDSL segment endpoint."
::= { hds12ShdslNotifications 2 }

hds12ShdslPerfESThresh NOTIFICATION-TYPE

OBJECTS

```
{  
  hds12ShdslEndpointCurr15MinES,  
  hds12ShdslEndpointThreshES  
}
```

STATUS current

DESCRIPTION

"This notification indicates that the errored seconds threshold (as per the hds12ShdslEndpointThreshES value) has been reached/exceeded for the HDSL2/SHDSL segment endpoint."

::= { hds12ShdslNotifications 3 }

hds12ShdslPerfSESThresh NOTIFICATION-TYPE

OBJECTS

```
{  
  hds12ShdslEndpointCurr15MinSES,  
  hds12ShdslEndpointThreshSES  
}
```

STATUS current

DESCRIPTION

"This notification indicates that the severely errored seconds threshold (as per the hds12ShdslEndpointThreshSES value) has been reached/exceeded for the HDSL2/SHDSL Segment Endpoint."

::= { hds12ShdslNotifications 4 }

hds12ShdslPerfCRCAnomaliesThresh NOTIFICATION-TYPE

OBJECTS

```
{  
  hds12ShdslEndpointCurr15MinCRCAnomalies,  
  hds12ShdslEndpointThreshCRCAnomalies  
}
```

STATUS current

DESCRIPTION

"This notification indicates that the CRC anomalies threshold (as per the hds12ShdslEndpointThreshCRCAnomalies value) has been reached/exceeded for the HDSL2/SHDSL Segment Endpoint."

::= { hds12ShdslNotifications 5 }

hds12ShdslPerfLOSWSThresh NOTIFICATION-TYPE

OBJECTS

```
{  
  hds12ShdslEndpointCurr15MinLOSWS,
```



```
hds12ShdslEndpointThreshLOSWS
}
STATUS      current
DESCRIPTION
    "This notification indicates that the LOSW seconds threshold
      (as per the hds12ShdslEndpointThreshLOSWS value) has been
      reached/exceeded for the HDSL2/SHDSL segment endpoint."
::= { hds12ShdslNotifications 6 }
```

hds12ShdslPerfUASThresh NOTIFICATION-TYPE

```
OBJECTS
{
hds12ShdslEndpointCurr15MinUAS,
hds12ShdslEndpointThreshUAS
}
STATUS      current
DESCRIPTION
    "This notification indicates that the unavailable seconds
      threshold (as per the hds12ShdslEndpointThreshUAS value) has
      been reached/exceeded for the HDSL2/SHDSL segment endpoint."
::= { hds12ShdslNotifications 7 }
```

hds12ShdslSpanInvalidNumRepeaters NOTIFICATION-TYPE

```
OBJECTS
{
hds12ShdslSpanConfNumRepeaters
}
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 hds12ShdslSpanConfNumRepeaters
      object and the actual number of repeater/regenerator units
      discovered via the EOC."
::= { hds12ShdslNotifications 8 }
```

hds12ShdslLoopbackFailure NOTIFICATION-TYPE

```
OBJECTS
{
hds12ShdslMaintLoopbackConfig
}
STATUS      current
DESCRIPTION
    "This notification indicates that an endpoint maintenance
      loopback command failed for an HDSL2/SHDSL segment."
::= { hds12ShdslNotifications 9 }
```

hds12ShdslpowerBackoff NOTIFICATION-TYPE

OBJECTS

```
{  
hds12ShdslEndpointCurrStatus  
}
```

STATUS current

DESCRIPTION

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

::= { hds12ShdslNotifications 10 }

hds12ShdsldeviceFault NOTIFICATION-TYPE

OBJECTS

```
{  
hds12ShdslEndpointCurrStatus  
}
```

STATUS current

DESCRIPTION

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

::= { hds12ShdslNotifications 11 }

hds12ShdslcdcContinuityFault NOTIFICATION-TYPE

OBJECTS

```
{  
hds12ShdslEndpointCurrStatus  
}
```

STATUS current

DESCRIPTION

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

::= { hds12ShdslNotifications 12 }

hds12ShdslconfigInitFailure NOTIFICATION-TYPE

OBJECTS

```
{  
hds12ShdslEndpointCurrStatus  
}
```

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
{
  hdsl2ShdslEndpointCurrStatus
}
STATUS    current
DESCRIPTION
  "This notification indicates that the bit setting for
  protocolInitFailure in the hdsl2ShdslEndpointCurrStatus
  object for this endpoint has changed."
  ::= { hdsl2ShdslNotifications 14 }

hdlsl2ShdslNoNeighborPresent NOTIFICATION-TYPE
OBJECTS
{
  hdsl2ShdslEndpointCurrStatus
}
STATUS    current
DESCRIPTION
  "This notification indicates that the bit setting for
  noNeighborPresent in the hdsl2ShdslEndpointCurrStatus object
  for this endpoint has changed."
  ::= { hdsl2ShdslNotifications 15 }

hdlsl2ShdslLocalPowerLoss NOTIFICATION-TYPE
OBJECTS
{
  hdsl2ShdslInvVendorID
}
STATUS    current
DESCRIPTION
  "This notification indicates impending unit failure due to
  loss of local power (last gasp).\"
  ::= { hdsl2ShdslNotifications 16 }

-- conformance information
--

hdlsl2ShdslConformance OBJECT IDENTIFIER ::= { hdsl2ShdslMIB 3 }
hdlsl2ShdslGroups      OBJECT IDENTIFIER ::
    { hdsl2ShdslConformance 1 }
hdlsl2ShdslCompliances OBJECT IDENTIFIER ::
    { hdsl2ShdslConformance 2 }

-- agent compliance statements

hdlsl2ShdslLineMibCompliance MODULE-COMPLIANCE
STATUS    current
DESCRIPTION
```



```
"The section outlines compliance requirements for this MIB."
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."

OBJECT hds12ShdslSpanConfWireInterface
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 }

-- units of conformance

--

hdlsl2ShdslSpanConfGroup OBJECT-GROUP

OBJECTS

```
{
hdlsl2ShdslSpanConfNumRepeaters,
hdlsl2ShdslSpanConfProfile,
hdlsl2ShdslSpanConfAlarmProfile
}
```

STATUS current

DESCRIPTION

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


```
::= { hds12ShdslGroups 1 }
```

```
hds12ShdslSpanStatusGroup OBJECT-GROUP
```

```
OBJECTS
```

```
{
```

```
hds12ShdslStatusNumAvailRepeaters
```

```
}
```

```
STATUS current
```

```
DESCRIPTION
```

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

```
::= { hds12ShdslGroups 2 }
```

```
hds12ShdslInventoryShdslGroup OBJECT-GROUP
```

```
OBJECTS
```

```
{
```

```
hds12ShdslInvTransmissionModeCapability
```

```
}
```

```
STATUS current
```

```
DESCRIPTION
```

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

```
::= { hds12ShdslGroups 3 }
```

```
hds12ShdslSpanShdslStatusGroup OBJECT-GROUP
```

```
OBJECTS
```

```
{
```

```
hds12ShdslStatusMaxAttainableLineRate,
```

```
hds12ShdslStatusActualLineRate,
```

```
hds12ShdslStatusTransmissionModeCurrent
```

```
}
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This group supports objects for retrieving SHDSL-specific  
span related status."
```

```
::= { hds12ShdslGroups 4 }
```

```
hds12ShdslInventoryGroup OBJECT-GROUP
```

```
OBJECTS
```

```
{
```

```
hds12ShdslInvVendorID,
```

```
hds12ShdslInvVendorModelNumber,
```

```
hds12ShdslInvVendorSerialNumber,
```

```
hds12ShdslInvVendorEOCSoftwareVersion,
```

```
hds12ShdslInvStandardVersion,
```

```
hds12ShdslInvVendorListNumber,
```

```
hds12ShdslInvVendorIssueNumber,
```

```
hds12ShdslInvVendorSoftwareVersion,
```



```
hds12ShdslInvEquipmentCode,  
hds12ShdslInvVendorOther  
}  
STATUS      current  
DESCRIPTION  
    "This group supports objects that provide unit inventory  
    information about the units in HDSL2/SHDSL lines."  
::= { hds12ShdslGroups 5 }
```

```
hds12ShdslEndpointConfGroup OBJECT-GROUP  
OBJECTS  
{  
hds12ShdslEndpointCurrAtn  
}  
STATUS      current  
DESCRIPTION  
    "This group supports objects for configuring parameters for  
    segment endpoints in HDSL2/SHDSL lines."  
::= { hds12ShdslGroups 6 }
```

```
hds12ShdslEndpointCurrGroup OBJECT-GROUP  
OBJECTS  
{  
hds12ShdslEndpointCurrAtn,  
hds12ShdslEndpointCurrSnrMgn,  
hds12ShdslEndpointCurrStatus,  
hds12ShdslEndpointES,  
hds12ShdslEndpointSES,  
hds12ShdslEndpointCRCAnomalies,  
hds12ShdslEndpointLOSWS,  
hds12ShdslEndpointUAS,  
hds12ShdslEndpointCurr15MinTimeElapsed,  
hds12ShdslEndpointCurr15MinES,  
hds12ShdslEndpointCurr15MinSES,  
hds12ShdslEndpointCurr15MinCRCAnomalies,  
hds12ShdslEndpointCurr15MinLOSWS,  
hds12ShdslEndpointCurr15MinUAS,  
hds12ShdslEndpointCurr1DayTimeElapsed,  
hds12ShdslEndpointCurr1DayES,  
hds12ShdslEndpointCurr1DaySES,  
hds12ShdslEndpointCurr1DayCRCAnomalies,  
hds12ShdslEndpointCurr1DayLOSWS,  
hds12ShdslEndpointCurr1DayUAS  
}  
STATUS      current  
DESCRIPTION  
    "This group supports objects which provide current status and  
    performance measurements relating to segment endpoints in
```



```
    HDSSL2/SHDSL lines."  
    ::= { hds12ShdslGroups 7 }
```

```
hds12Shdsl15MinIntervalGroup OBJECT-GROUP
```

```
    OBJECTS
```

```
    {  
    hds12Shdsl15MinIntervalES,  
    hds12Shdsl15MinIntervalSES,  
    hds12Shdsl15MinIntervalCRCAnomalies,  
    hds12Shdsl15MinIntervalLOSWS,  
    hds12Shdsl15MinIntervalUAS  
    }
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "This group supports objects which maintain historic  
        performance measurements relating to segment endpoints in  
        HDSSL2/SHDSL lines in 15-minute intervals."
```

```
    ::= { hds12ShdslGroups 8 }
```

```
hds12Shdsl1DayIntervalGroup OBJECT-GROUP
```

```
    OBJECTS
```

```
    {  
    hds12Shdsl1DayIntervalMoniSecs,  
    hds12Shdsl1DayIntervalES,  
    hds12Shdsl1DayIntervalSES,  
    hds12Shdsl1DayIntervalCRCAnomalies,  
    hds12Shdsl1DayIntervalLOSWS,  
    hds12Shdsl1DayIntervalUAS  
    }
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "This group supports objects which maintain historic  
        performance measurements relating to segment endpoints in  
        HDSSL2/SHDSL lines in 1-day intervals."
```

```
    ::= { hds12ShdslGroups 9 }
```

```
hds12ShdslMaintenanceGroup OBJECT-GROUP
```

```
    OBJECTS
```

```
    {  
    hds12ShdslMaintLoopbackConfig,  
    hds12ShdslMaintTipRingReversal,  
    hds12ShdslMaintPowerBackOff,  
    hds12ShdslMaintSoftRestart,  
    hds12ShdslMaintLoopbackTimeout,  
    hds12ShdslMaintUnitPowerSource  
    }
```

```
    STATUS      current
```

```
    DESCRIPTION
```


"This group supports objects that provide support for
maintenance actions for HDSL2/SHDSL lines."
::= { hdsl2ShdslGroups 10 }

hdlsl2ShdslEndpointAlarmConfGroup OBJECT-GROUP
OBJECTS

```
{
hdlsl2ShdslEndpointAlarmConfProfile,
hdlsl2ShdslEndpointThreshLoopAttenuation,
hdlsl2ShdslEndpointThreshSNRMargin,
hdlsl2ShdslEndpointThreshES,
hdlsl2ShdslEndpointThreshSES,
hdlsl2ShdslEndpointThreshCRCAnomalies,
hdlsl2ShdslEndpointThreshLOSWS,
hdlsl2ShdslEndpointThreshUAS,
hdlsl2ShdslEndpointAlarmConfProfileRowStatus
}
```

STATUS current

DESCRIPTION

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

::= { hdsl2ShdslGroups 11 }

hdlsl2ShdslNotificationGroup NOTIFICATION-GROUP
NOTIFICATIONS

```
{
hdlsl2ShdslLoopAttenCrossing,
hdlsl2ShdslSNRMarginCrossing,
hdlsl2ShdslPerfESThresh,
hdlsl2ShdslPerfSESThresh,
hdlsl2ShdslPerfCRCAnomaliesThresh,
hdlsl2ShdslPerfLOSWSThresh,
hdlsl2ShdslPerfUASThresh,
hdlsl2ShdslSpanInvalidNumRepeaters,
hdlsl2ShdslLoopbackFailure,
hdlsl2ShdslpowerBackoff,
hdlsl2ShdsldeviceFault,
hdlsl2ShdsldcContinuityFault,
hdlsl2ShdslconfigInitFailure,
hdlsl2ShdslprotocolInitFailure,
hdlsl2ShdslnoNeighborPresent,
hdlsl2ShdslLocalPowerLoss
}
```

STATUS current

DESCRIPTION

"This group supports notifications of significant conditions
associated with HDSL2/SHDSL lines."


```
::= { hds12ShdslGroups 12 }
```

hds12ShdslSpanConfProfileGroup OBJECT-GROUP

OBJECTS

```
{
hds12ShdslSpanConfWireInterface,
hds12ShdslSpanConfMinLineRate,
hds12ShdslSpanConfMaxLineRate,
hds12ShdslSpanConfPSD,
hds12ShdslSpanConfTransmissionMode,
hds12ShdslSpanConfRemoteEnabled,
hds12ShdslSpanConfPowerFeeding,
hds12ShdslSpanConfCurrCondTargetMarginDown,
hds12ShdslSpanConfWorstCaseTargetMarginDown,
hds12ShdslSpanConfCurrCondTargetMarginUp,
hds12ShdslSpanConfWorstCaseTargetMarginUp,
hds12ShdslSpanConfUsedTargetMargins,
hds12ShdslSpanConfReferenceClock,
hds12ShdslSpanConfLineProbeEnable,
hds12ShdslSpanConfProfileRowStatus
}
```

STATUS current

DESCRIPTION

"This group supports objects that constitute configuration profiles for configuring span related parameters in SHDSL lines."

```
::= { hds12ShdslGroups 13 }
```

hds12ShdslWirePairGroup OBJECT-GROUP

OBJECTS

```
{
hds12ShdslEndpointCurrTipRingReversal,
hds12ShdslEndpointCurrActivationState
}
```

STATUS current

DESCRIPTION

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

```
::= { hds12ShdslGroups 14 }
```

hds12ShdslPayloadRateGroup OBJECT-GROUP

OBJECTS

```
{
hds12ShdslStatusMaxAttainablePayloadRate,
hds12ShdslStatusActualPayloadRate
}
```

STATUS current

DESCRIPTION


```
"This group supports object for retrieving payload rates
  which excludes any framing overhead."
 ::= { hds12ShdslGroups 15 }
```

END

7. 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:

```
hds12ShdslEndpointCurrAtn.1.1.1.2
```

might return

```
hds12ShdslEndpointCurrAtn.1.1.1.3 = 0
```

with a G.shdsl.bis unit and

```
hds12ShdslEndpointCurrSnrMgn.1.1.1.1 = 0
```

with an HDSL2 unit as these objects are indexed by

```
INDEX { ifIndex, hds12ShdslInvIndex, hds12ShdslendpointSide,
         hds12ShdslEndpointWirePair }
```

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.

8. 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 hds12ShdslSpanConfTable

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

- * hds12ShdslSpanConfNumRepeaters
- * hds12ShdslSpanConfProfile
- * hds12ShdslSpanConfAlarmProfile

Unauthorized changes to hds12ShdslSpanConfNumRepeaters could result in a hds12ShdslSpanInvalidNumRepeaters notification. Note the discussion on hds12ShdslSpanInvalidNumRepeaters in the Notifications Section above.

Unapproved changes to hds12ShdslSpanConfProfile could have an adverse operational effect on a span. Reference the hds12ShdslSpanConfProfileTable discussion below.

Unofficial changes to hds12ShdslSpanConfAlarmProfile could have a contrary effect on notifications. Reference the hds12ShdslEndpointAlarmConfProfileTable discussion below.

o hds12ShdslEndpointConfTable

This table contains one object, hds12ShdslEndpointAlarmConfProfile, that supports SET operations. Unauthorized changes could have an undesirable notifications. Reference the hds12ShdslEndpointAlarmConfProfileTable discussion below.

o hds12ShdslEndpointMaintTable

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

- * hds12ShdslMaintLoopbackConfig
- * hds12ShdslMaintPowerBackoff
- * hds12ShdslMaintSoftRestart

Unauthorized changes to hds12ShdslMaintLoopbackConfig could prevent end-to-end data transfer due to an activation of a loopback.

Illegitimate changes to hds12ShdslMaintPowerBackoff could result in an increased in bundle interference.

Unapproved changes to `hds12Shds1MaintSoftRestart` could result in a temporary interruption of end-to-end data transfer as the result of the triggering of a soft restart.

o `hds12Shds1UnitMaintTable`

This table contains one object, `hds12Shds1MaintLoopbackTimeout`, that supports SET operations. An unauthorized change to this object could result in the timeout value for loopbacks being increased, decreased, or disabled.

o `hds12Shds1SpanConfProfileTable`

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

- * `hds12Shds1SpanConfWireInterface`
- * `hds12Shds1SpanConfMinLineRate`
- * `hds12Shds1SpanConfMaxLineRate`
- * `hds12Shds1SpanConfPSD`
- * `hds12Shds1SpanConfTransmissionMode`
- * `hds12Shds1SpanConfRemoteEnabled`
- * `hds12Shds1SpanConfPowerFeeding`
- * `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.

Illegitimate 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.

Unapproved changes to hds12ShdslSpanConfPSD or hds12ShdslSpanConfTransmissionMode could have a detrimental effect loop reach, performance, or spectral compatibility.

Unofficial changes to hds12ShdslSpanConfRemoteEnable could alter the remote management ability of units.

Unsanctioned changes to hds12ShdslSpanConfPowerFeeding 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.

Unwarranted changes to hds12ShdslSpanConfCurrCondTargetMarginDown, hds12ShdslSpanConfWorstCaseTargetMarginDown, hds12ShdslSpanConfCurrCondTargetMarginUp, hds12ShdslSpanConfWorstCaseTargetMarginUp, or hds12ShdslSpanConfUsedTargetMargins could result in invalid parameters used to determine if a data rate can be supported under current and worst-case noise.

Illegal changes to hds12ShdslSpanConfReferenceClock 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.

Undesired changes to hds12ShdslSpanConfLineProbeEnable 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 hds12ShdslEndpointAlarmConfProfileTable

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

- * hds12ShdslEndpointThreshLoopAttenuation
- * hds12ShdslEndpointThreshSNRMargin
- * hds12ShdslEndpointThreshES
- * hds12ShdslEndpointThreshSES
- * hds12ShdslEndpointThreshCRCAnomalies
- * hds12ShdslEndpointThreshLOSWS
- * hds12ShdslEndpointThreshUAS
- * hds12ShdslEndpointAlarmConfProfileRowStatus

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. Illegitimate 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 hds12ShdslInventoryTable

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.

- * hds12ShdslInvVendorID
- * hds12ShdslInvVendorModelNumber
- * hds12ShdslInvVendorSerialNumber
- * hds12ShdslInvVendorEOCSoftwareVersion
- * hds12ShdslInvStandardVersion
- * hds12ShdslInvVendorListNumber
- * hds12ShdslInvVendorIssueNumber
- * hds12ShdslInvVendorSoftwareVersion
- * hds12ShdslInvEquipmentCode
- * hds12ShdslInvVendorOther

* hds12ShdslInvTransmissionModeCapability

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.

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