

Definitions of Managed Objects for High Bit-Rate DSL - 2nd generation
(HDSL2) and Single-Pair High-Speed Digital Subscriber
Line (SHDSL) Lines

Status of this Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

Copyright Notice

Copyright (C) The Internet Society (2002). All Rights Reserved.

Abstract

This document defines a portion of the 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 DSL - 2nd generation (HDSL2) and Single-Pair High-Speed Digital Subscriber Line (SHDSL) interfaces.

Table of Contents

1.	Introduction	2
2.	The SNMP Network Management Framework	2
3.	Introduction	3
3.1	Relationship of the HDSL2/SHDSL Line MIB to other MIBs ...	3
3.2	IANA Considerations	5
4.	Conventions used in the MIB	5
4.1	Naming Conventions	5
4.2	Textual Conventions	6
4.3	Structure	7
4.4	Counters, Interval Buckets and Thresholds	10
4.5	Profiles	11
4.6	Notifications	12
5.	Conformance and Compliance	14
6.	Definitions	14
7.	Security Considerations	60

8.	Acknowledgments	62
9.	References	63
10.	Intellectual Property Notice	65
11.	Authors' Addresses	65
12.	Full Copyright Statement	66

1. Introduction

This document defines a portion of the 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 DSL - 2nd generation (HDSL2) [18] and Single-Pair High-Speed Digital Subscriber Line (SHDSL) interfaces [19].

2. The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

- o An overall architecture, described in RFC 2571 [1].
- o Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIV1 and is described in STD 16, RFC 1155 [2], STD 16, RFC 1212 [3], and RFC 1215 [4]. The second version, called SMIV2, is described in STD 58, RFC 2578 [5], RFC 2579 [6], and RFC 2580 [7].
- o Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and is described in STD 15, RFC 1157 [8]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in RFC 1901 [9] and RFC 1906 [10]. The third version of the message protocol is called SNMPv3 and is described in RFC 1906 [10], RFC 2572 [11], and RFC 2574 [12].
- o Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, RFC 1157 [8]. A second set of protocol operations and associated PDU formats is described in RFC 1905 [13].
- o A set of fundamental applications described in RFC 2573 [14] and the view-based access control mechanism described in RFC 2575 [15].

A more detailed introduction to the current SNMP Management Framework can be found in RFC 2570 [16].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the mechanisms defined in the SMI.

This memo specifies a MIB module that is compliant to the SMIV2. A MIB conforming to the SMIV1 can be produced through the appropriate translations. The resulting translated MIB must be semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIV2 will be converted into textual descriptions in SMIV1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.

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 [17].

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 ANSI T1E1.4/2000-006 [18] and ITU G.991.2 [19].

The MIB is located in the MIB tree under MIB 2 transmission, as discussed in the MIB-2 Integration (RFC 1213 [20] and RFC 2863 [21]) 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 [21] 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 [21]. 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 [21] 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 `ifGeneral` group in RFC 2863 [21], and are not duplicated in the HDSL2/SHDSL Line MIB.

=====	
ifIndex	Interface index.
ifDescr	See interfaces MIB [21].
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 [21].
ifOperStatus	See interfaces MIB [21].
ifLastChange	See interfaces MIB [21].
ifName	See interfaces MIB [21].
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.

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 [19].
- G. ES means errored second [19].
- H. LOSW means loss of sync word [19].
- I. LOSWS means LOSW seconds [19].
- J. SES means severely errored second [19].
- K. SNR means signal-to-noise ratio [19].
- L. UAS means unavailable second [19].

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)	- CO terminal unit
xtuR(2)	- 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.

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
- hdsl2ShdsldcContinuityFault
- hdsl2ShdslconfigInitFailure
- hdsl2ShdslprotocolInitFailure
- hdsl2ShdslnoNeighborPresent
- hdsl2ShdslLocalPowerLoss

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.

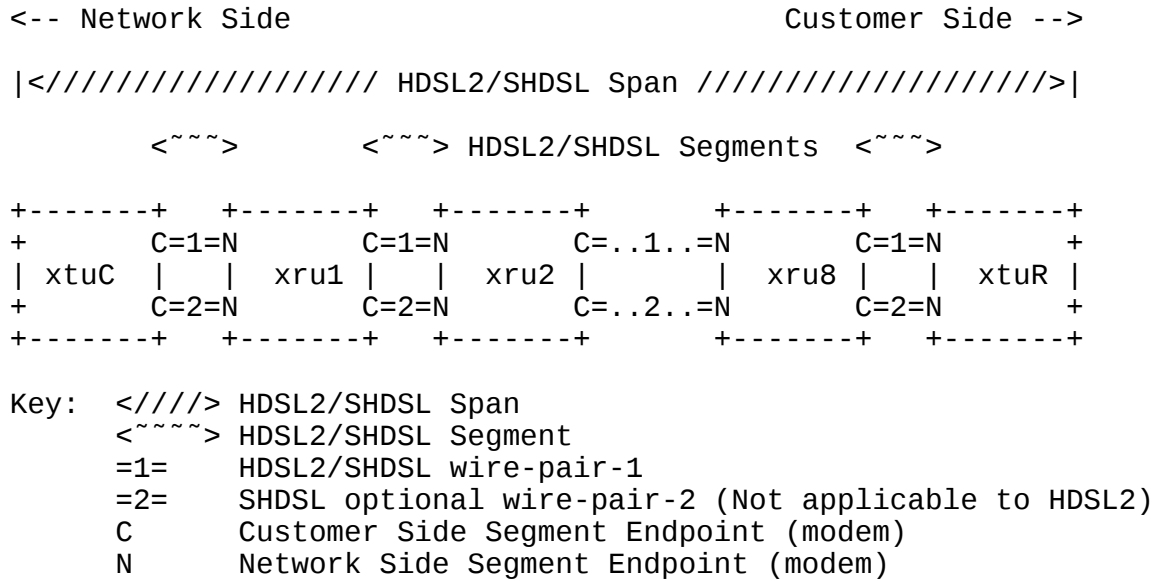


Figure 2: General topology for an HDSL2/SHDSL Line

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 2493 [22] and RFC 2662 [23], 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, `hdl2Shdsl15MinIntervalTable`, is indexed by { `ifIndex`, `hdl2ShdslInvIndex`, `hdl2ShdslEndpointSide`, `hdl2ShdslEndpointWirePair`, `hdl2Shdsl15MinIntervalNumber`}. 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 `hdsl2ShdslSpanConfProfileTable`. Since span configuration parameters are only applicable for SHDSL, the support for span configuration profiles are optional for HDSL2 interfaces.

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

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

The index value for this profile is a locally-unique administratively assigned name for the profile having the textual convention 'SnmpAdminString' (RFC 2571 [1]).

One or more lines may be configured to share parameters of a single profile (e.g., `hdsl2ShdslEndpointAlarmConfProfile` = 'silver') by setting its `hdsl2ShdslEndpointAlarmConfProfile` objects to the value of this profile. If a change is made to the profile, all lines that

refer to it will be reconfigured to the changed parameters. Before a profile can be deleted or taken out of service it must be first unreferenced from all associated lines.

Implementations MUST provide a default profile whose name is 'DEFVAL' for each profile type. The values of the associated parameters will be vendor specific unless otherwise indicated in this document. Before a line's profiles have been set, these profiles will be automatically used by setting `hds12ShdslEndpointAlarmConfProfile` and `hds12ShdslSpanConfProfile` 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 [21]) which are per agent (e.g., per Digital Subscriber Line Access Multiplexer, or DSLAM, in such a device), and `linkUp`/`linkDown` (per [21]) 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. One notification may 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.

Note that the Network Management System, or NMS, may receive a `linkDown` notification, as well, if enabled (via `ifLinkUpDownTrapEnable` [21]). 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
```

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

```
hds12ShdslSpanConfProfileGroup
hds12ShdslSpanShdslStatusGroup
```

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;
```

hds12ShdslMIB MODULE-IDENTITY

LAST-UPDATED "200205090000Z" -- May 9, 2002

ORGANIZATION "ADSLMIB Working Group"

CONTACT-INFO "WG-email: adslmib@ietf.org"

Info: <https://www1.ietf.org/mailman/listinfo/adslmib>

Chair: Mike Sneed

Postal: P.O. Box 37324
 Raleigh NC 27627-7324
 Email: sneedmike@hotmail.com

Co-editor: Bob Ray
 PESA Switching Systems, Inc.
 Postal: 330-A Wynn Drive
 Huntsville, AL 35805 USA
 Email: rray@pesa.com
 Phone: +1 256 726 9200 ext. 142

Co-editor: Rajesh Abbi
 Alcatel USA
 Postal: 2912 Wake Forest Road
 Raleigh, NC 27609-7860 USA

Email: Rajesh.Abbi@alcatel.com
 Phone: +1 919 850 6194

"

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)."

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

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

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

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

STATUS current

DESCRIPTION

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

SYNTAX Unsigned32(0..900)

Hdsl2ShdslUnitId ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

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

SYNTAX INTEGER

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

Hdsl2ShdslUnitSide ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

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

SYNTAX INTEGER

```
{
    networkSide(1),
    customerSide(2)
}
```

Hdsl2ShdslWirePair ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"This is the referenced pair of wires in a HDSL2/SHDSL Segment. HDSL2 only supports a single pair (wirePair1), while SHDSL supports an optional second pair (wirePair2)."

SYNTAX INTEGER

```
{
    wirePair1(1),
    wirePair2(2)
}
```

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."

::= { hds12ShdslMibObjects 1 }

hdl2ShdslSpanConfEntry OBJECT-TYPE

SYNTAX Hdsl2ShdslSpanConfEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the hds12ShdslSpanConfTable. 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 }
 ::= { hds12ShdslSpanConfTable 1 }

```

```

Hds12ShdslSpanConfEntry ::=
SEQUENCE
{
  hds12ShdslSpanConfNumRepeaters      Unsigned32,
  hds12ShdslSpanConfProfile           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 HDSL2/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 HDSL2/SHDSL line. It is indexed by the ifIndex of the associated HDSL2/SHDSL line."

INDEX { ifIndex }

::= { hds12ShdslSpanStatusTable 1 }

Hds12ShdslSpanStatusEntry ::=

SEQUENCE

{

hds12ShdslStatusNumAvailRepeaters Unsigned32,

hds12ShdslStatusMaxAttainableLineRate Unsigned32,

hds12ShdslStatusActualLineRate Unsigned32,

hds12ShdslStatusTransmissionModeCurrent
Hds12ShdslTransmissionModeType

```
}
```

```
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."
    ::= { hds12ShdslSpanStatusEntry 1 }
```

```
hds12ShdslStatusMaxAttainableLineRate OBJECT-TYPE
    SYNTAX      Unsigned32(0..4112000)
    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."
    ::= { hds12ShdslSpanStatusEntry 2 }
```

```
hds12ShdslStatusActualLineRate OBJECT-TYPE
    SYNTAX      Unsigned32(0..4112000)
    UNITS        "bps"
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "Contains the actual line rate in this HDSL2/SHDSL span. This
         should equal ifSpeed."
    ::= { hds12ShdslSpanStatusEntry 3 }
```

```
hds12ShdslStatusTransmissionModeCurrent OBJECT-TYPE
    SYNTAX      Hds12ShdslTransmissionModeType
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "Contains the current Power Spectral Density (PSD) regional
         setting of the HDSL2/SHDSL span."
    ::= { hds12ShdslSpanStatusEntry 4 }
```

```
-- Unit Inventory Group
--
```

```
hds12ShdslInventoryTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Hds12ShdslInventoryEntry
    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."

::= { hds12ShdslMibObjects 3 }

hds12ShdslInventoryEntry OBJECT-TYPE

SYNTAX Hds12ShdslInventoryEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the hds12ShdslInventoryTable. 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 Hds12ShdslUnitId 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."
```

```
::= { 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."
```

```
::= { 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."
```

```
::= { hds12ShdslInventoryEntry 4 }
```

```
hds12ShdslInvVendorEOCSoftwareVersion OBJECT-TYPE
```

```
SYNTAX      Integer32
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "Vendor EOC version as reported in a Discovery Response  
    message."
```

```
::= { 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."
::= { 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."
::= { hds12ShdslInventoryEntry 7 }

hds12ShdslInvVendorIssueNumber OBJECT-TYPE

SYNTAX OCTET STRING(SIZE(2))
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Vendor issue number as reported in an Inventory Response
message."
::= { hds12ShdslInventoryEntry 8 }

hds12ShdslInvVendorSoftwareVersion OBJECT-TYPE

SYNTAX OCTET STRING(SIZE(6))
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Vendor software version as reported in an Inventory Response
message."
::= { hds12ShdslInventoryEntry 9 }

hds12ShdslInvEquipmentCode 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."
::= { hds12ShdslInventoryEntry 10 }

hds12ShdslInvVendorOther OBJECT-TYPE

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

DESCRIPTION

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

::= { 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
}	

hds12ShdslEndpointSide OBJECT-TYPE

SYNTAX Hds12ShdslUnitSide

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The side of the unit associated with this segment endpoint - Network/Customer side - as per the Hds12ShdslUnitSide textual convention."

::= { hds12ShdslEndpointConfEntry 1 }

hds12ShdslEndpointWirePair OBJECT-TYPE

SYNTAX Hds12ShdslWirePair

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The wire-pair of the modem associated with this segment endpoint as per the Hds12ShdslWirePair textual convention."

::= { hds12ShdslEndpointConfEntry 2 }

hds12ShdslEndpointAlarmConfProfile 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 hds12ShdslEndpointAlarmConfProfileTable, 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 hds12ShdslSpanConfAlarmProfile object in the hds12ShdslSpanConfTable. 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, hds12ShdslEndpointAlarmConfProfileTable, MUST be rejected."

::= { hds12ShdslEndpointConfEntry 3 }

-- Segment Endpoint Current Status/Performance Group

--

hds12ShdslEndpointCurrTable OBJECT-TYPE

SYNTAX SEQUENCE OF Hds12ShdslEndpointCurrEntry

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 }
```

hdl2ShdslEndpointCurrEntry OBJECT-TYPE

```
SYNTAX      Hdsl2ShdslEndpointCurrEntry
```

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

```
STATUS      current
```

DESCRIPTION

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

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

```
::= { hdsl2ShdslEndpointCurrTable 1 }
```

Hdsl2ShdslEndpointCurrEntry ::=

SEQUENCE

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

```

                                Hdsl2ShdslPerfCurrDayCount,
    hds12ShdslEndpointCurr1DayUAS
                                Hdsl2ShdslPerfCurrDayCount
    }

```

hds12ShdslEndpointCurrAtn 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"
 ::= { hds12ShdslEndpointCurrEntry 1 }

```

hds12ShdslEndpointCurrSnrMgn 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"
 ::= { hds12ShdslEndpointCurrEntry 2 }

```

hds12ShdslEndpointCurrStatus 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
    bitmap of possible conditions. The various bit positions
    are:

```

noDefect	There 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 (LOSW) 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"

```
::= { hds12ShdslEndpointCurrEntry 8 }
```

```
hds12ShdslEndpointCurr15MinTimeElapsed OBJECT-TYPE
```

```
SYNTAX      Hdsl2ShdslPerfTimeElapsed
```

```
UNITS       "seconds"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

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

```
::= { hds12ShdslEndpointCurrEntry 9 }
```

```
hds12ShdslEndpointCurr15MinES 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"
```

```
::= { hds12ShdslEndpointCurrEntry 10 }
```

```
hds12ShdslEndpointCurr15MinSES 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"
```

```
::= { hds12ShdslEndpointCurrEntry 11 }
```

```
hds12ShdslEndpointCurr15MinCRCAnomalies 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"
```

```
::= { hds12ShdslEndpointCurrEntry 12 }
```

```
hds12ShdslEndpointCurr15MinLOSWS 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"

::= { hds12ShdslEndpointCurrEntry 13 }

hds12ShdslEndpointCurr15MinUAS 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"

::= { hds12ShdslEndpointCurrEntry 14 }

hds12ShdslEndpointCurr1DayTimeElapsed OBJECT-TYPE

SYNTAX Hds12ShdslPerfTimeElapsed

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of seconds that have elapsed since the beginning of the current 1-day interval."

::= { hds12ShdslEndpointCurrEntry 15 }

hds12ShdslEndpointCurr1DayES OBJECT-TYPE

SYNTAX Hds12ShdslPerfCurrDayCount

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Count of Errored Seconds (ES) during the current day as measured by hds12ShdslEndpointCurr1DayTimeElapsed."

REFERENCE "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"

::= { hds12ShdslEndpointCurrEntry 16 }

hds12ShdslEndpointCurr1DaySES OBJECT-TYPE

SYNTAX Hds12ShdslPerfCurrDayCount

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 }

hds12ShdslEndpointCurr1DayLOSWS OBJECT-TYPE

SYNTAX Hds12ShdslPerfCurrDayCount

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Count of Loss of Sync Word (LOSWS) 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 }

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

--

hds12Shdsl15MinIntervalTable OBJECT-TYPE

SYNTAX SEQUENCE OF Hds12Shdsl15MinIntervalEntry

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."

::= { hds12ShdslMibObjects 6 }

hds12Shdsl15MinIntervalEntry OBJECT-TYPE

SYNTAX Hds12Shdsl15MinIntervalEntry

```

MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
    "An entry in the hds12Shdsl15MinIntervalTable."
INDEX { ifIndex, hds12ShdslInvIndex, hds12ShdslEndpointSide,
        hds12ShdslEndpointWirePair, hds12Shdsl15MinIntervalNumber}
 ::= { hds12Shdsl15MinIntervalTable 1 }

```

```

Hds12Shdsl15MinIntervalEntry ::=
SEQUENCE
{
    hds12Shdsl15MinIntervalNumber          Unsigned32,
    hds12Shdsl15MinIntervalES              PerfIntervalCount,
    hds12Shdsl15MinIntervalSES              PerfIntervalCount,
    hds12Shdsl15MinIntervalCRCAnomalies     PerfIntervalCount,
    hds12Shdsl15MinIntervalLOSWS            PerfIntervalCount,
    hds12Shdsl15MinIntervalUAS              PerfIntervalCount
}

```

```

hds12Shdsl15MinIntervalNumber OBJECT-TYPE
SYNTAX      Unsigned32(1..96)
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "Performance Data Interval number. 1 is the 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 }

```

```

hds12Shdsl15MinIntervalSES 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"
 ::= { hds12Shdsl15MinIntervalEntry 5 }

hds12Shdsl15MinIntervalUAS 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"
 ::= { hds12Shdsl15MinIntervalEntry 6 }

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

hds12Shdsl1DayIntervalTable OBJECT-TYPE

SYNTAX SEQUENCE OF Hds12Shdsl1DayIntervalEntry
 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."
 ::= { hds12ShdslMibObjects 7 }

hds12Shdsl1DayIntervalEntry OBJECT-TYPE

SYNTAX Hds12Shdsl1DayIntervalEntry
 MAX-ACCESS not-accessible
 STATUS current

DESCRIPTION

"An entry in the hds12Shdsl1DayIntervalTable."

INDEX { ifIndex, hds12ShdslInvIndex, hds12ShdslEndpointSide,
hds12ShdslEndpointWirePair, hds12Shdsl1DayIntervalNumber }
::= { hds12Shdsl1DayIntervalTable 1 }

Hds12Shdsl1DayIntervalEntry ::=

SEQUENCE

```
{
  hds12Shdsl1DayIntervalNumber      Unsigned32,
  hds12Shdsl1DayIntervalMoniSecs    Hds12ShdslPerfTimeElapsed,
  hds12Shdsl1DayIntervalES          Hds12Shdsl1DayIntervalCount,
  hds12Shdsl1DayIntervalSES         Hds12Shdsl1DayIntervalCount,
  hds12Shdsl1DayIntervalCRCAnomalies Hds12Shdsl1DayIntervalCount,
  hds12Shdsl1DayIntervalLOSWS       Hds12Shdsl1DayIntervalCount,
  hds12Shdsl1DayIntervalUAS         Hds12Shdsl1DayIntervalCount
}
```

hds12Shdsl1DayIntervalNumber OBJECT-TYPE

SYNTAX Unsigned32(1..30)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

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

::= { hds12Shdsl1DayIntervalEntry 1 }

hds12Shdsl1DayIntervalMoniSecs OBJECT-TYPE

SYNTAX Hds12ShdslPerfTimeElapsed

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 }

hds12Shdsl1DayIntervalSES OBJECT-TYPE

SYNTAX Hdsl2Shdsl1DayIntervalCount
 UNITS "seconds"
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "Count of Severely Errored Seconds (SES) during the 1-day
 interval as measured by hds12Shdsl1DayIntervalMoniSecs."
 REFERENCE "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
 ::= { hds12Shdsl1DayIntervalEntry 4 }

hds12Shdsl1DayIntervalCRCAnomalies OBJECT-TYPE

SYNTAX Hdsl2Shdsl1DayIntervalCount
 UNITS "detected CRC Anomalies"
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "Count of CRC anomalies during the 1-day interval as
 measured by hds12Shdsl1DayIntervalMoniSecs."
 REFERENCE "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
 ::= { hds12Shdsl1DayIntervalEntry 5 }

hds12Shdsl1DayIntervalLOSWS OBJECT-TYPE

SYNTAX Hdsl2Shdsl1DayIntervalCount
 UNITS "seconds"
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "Count of Loss of Sync Word (LOSW) Seconds during the 1-day
 interval as measured by hds12Shdsl1DayIntervalMoniSecs."
 REFERENCE "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
 ::= { hds12Shdsl1DayIntervalEntry 6 }

hds12Shdsl1DayIntervalUAS OBJECT-TYPE

SYNTAX Hdsl2Shdsl1DayIntervalCount
 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 (eg. 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      Hds12ShdslEndpointMaintEntry
```

```
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 }
```

```
Hds12ShdslEndpointMaintEntry ::=
```

```
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."
 ::= { hdsl2ShdslMibObjects 9 }

```

```

hdlsl2ShdslUnitMaintEntry OBJECT-TYPE
SYNTAX        Hdsl2ShdslUnitMaintEntry
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
    "An entry in the hdsl2ShdslUnitMaintTable. Each entry
    corresponds to a single unit, and is indexed by the ifIndex
    of the HDSL2/SHDSL line and the UnitId of the associated
    unit."
INDEX { ifIndex, hdsl2ShdslInvIndex }
 ::= { hdsl2ShdslUnitMaintTable 1 }

```

```

Hdsl2ShdslUnitMaintEntry ::=
SEQUENCE
{
    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."
 ::= { hds12ShdslUnitMaintEntry 2 }

-- Span Configuration Profile Group
--

hds12ShdslSpanConfProfileTable OBJECT-TYPE
    SYNTAX          SEQUENCE OF Hds12ShdslSpanConfProfileEntry
    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)
            }

```

```

MAX-ACCESS  read-create
STATUS      current

```

DESCRIPTION

"This object configures the two-wire or optional four-wire operation for SHDSL Lines."

```
DEFVAL      { twoWire }
```

```
::= { hds12ShdslSpanConfProfileEntry 2 }
```

hds12ShdslSpanConfMinLineRate OBJECT-TYPE

```

SYNTAX      Unsigned32(0..4112000)
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). 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 }
```

hdl2ShdslSpanConfMaxLineRate OBJECT-TYPE

SYNTAX Unsigned32(0..4112000)

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). If the minimum line rate equals the maximum line rate (hdl2ShdslSpanMaxLineRate), 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 }

::= { hdl2ShdslSpanConfProfileEntry 4 }

hdl2ShdslSpanConfPSD 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 }

::= { hdl2ShdslSpanConfProfileEntry 5 }

hdl2ShdslSpanConfTransmissionMode OBJECT-TYPE

SYNTAX Hdsl2ShdslTransmissionModeType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object specifies the regional setting for the SHDSL line."

DEFVAL { { region1 } }

::= { hdl2ShdslSpanConfProfileEntry 6 }

hdl2ShdslSpanConfRemoteEnabled OBJECT-TYPE

SYNTAX INTEGER

```
{
    enabled(1),
    disabled(2)
}
```

MAX-ACCESS read-create

```

STATUS      current
DESCRIPTION
  "This object enables/disables support for remote management
  of the units in a SHDSL line from the STU-R via the EOC."
DEFVAL      { enabled }
 ::= { 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 }
 ::= { hds12ShdslSpanConfProfileEntry 8 }

```

hds12ShdslSpanConfCurrCondTargetMarginDown 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 }
 ::= { hds12ShdslSpanConfProfileEntry 9 }

```

hds12ShdslSpanConfWorstCaseTargetMarginDown 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 }
 ::= { hds12ShdslSpanConfProfileEntry 10 }

```

hds12ShdslSpanConfCurrCondTargetMarginUp 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

"Contains 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      Hds12ShdslClockReferenceType
    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 HDSL2/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

Hds12ShdslPerfIntervalThreshold,

hds12ShdslEndpointThreshSES

Hds12ShdslPerfIntervalThreshold,

hds12ShdslEndpointThreshCRCAnomalies Integer32,

hds12ShdslEndpointThreshLOSWS

Hds12ShdslPerfIntervalThreshold,

hds12ShdslEndpointThreshUAS

Hds12ShdslPerfIntervalThreshold,

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      Hdsl2ShdslPerfIntervalThreshold
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 }

```

hds12ShdslEndpointThreshLOSWS OBJECT-TYPE

```

SYNTAX      Hdsl2ShdslPerfIntervalThreshold
UNITS       "seconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This object configures the threshold for the number of
    Loss of Sync Word (LSOW) Seconds within any given 15-minute
    performance data collection interval.  If the value of LSOW
    in a particular 15-minute collection interval reaches/exceeds
    this value, a hds12ShdslPerfLOSWSThresh MAY be generated.
    At most one notification will be sent per interval per
    endpoint."
DEFVAL      { 0 }
 ::= { hds12ShdslEndpointAlarmConfProfileEntry 7 }

```

hds12ShdslEndpointThreshUAS OBJECT-TYPE

```

SYNTAX      Hdsl2ShdslPerfIntervalThreshold
UNITS       "seconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This object configures the threshold for the number of
    unavailable seconds (UAS) within any given 15-minute
    performance data collection interval.  If the value of UAS
    in a particular 15-minute collection interval reaches/exceeds
    this value, a 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 HDSL2/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
        {
            hds12ShdslEndpointCurrStatus
        }
    STATUS      current
    DESCRIPTION
        "This notification indicates that the bit setting for
         protocolInitFailure in the hds12ShdslEndpointCurrStatus
         object for this endpoint has changed."
    ::= { hds12ShdslNotifications 14 }

hds12ShdslnoNeighborPresent NOTIFICATION-TYPE
    OBJECTS
        {
            hds12ShdslEndpointCurrStatus
        }
    STATUS      current
    DESCRIPTION
        "This notification indicates that the bit setting for
         noNeighborPresent in the hds12ShdslEndpointCurrStatus object
         for this endpoint has changed."
    ::= { hds12ShdslNotifications 15 }

hds12ShdslLocalPowerLoss NOTIFICATION-TYPE
    OBJECTS
        {
            hds12ShdslInvVendorID
        }
    STATUS      current
    DESCRIPTION
        "This notification indicates impending unit failure due to
         loss of local power (last gasp)."
```

```

    ::= { hds12ShdslNotifications 16 }

-- conformance information
--

hds12ShdslConformance OBJECT IDENTIFIER ::= { hds12ShdslMIB 3 }
hds12ShdslGroups      OBJECT IDENTIFIER ::=
```

```

        { hds12Shds1Conformance 1 }
hds12Shds1Compliances OBJECT IDENTIFIER ::=
        { hds12Shds1Conformance 2 }

-- agent compliance statements

hds12Shds1LineMibCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "The section outlines compliance requirements for this MIB."
    MODULE
    MANDATORY-GROUPS
    {
        hds12Shds1SpanConfGroup,
        hds12Shds1SpanStatusGroup,
        hds12Shds1InventoryGroup,
        hds12Shds1EndpointConfGroup,
        hds12Shds1EndpointCurrGroup,
        hds12Shds115MinIntervalGroup,
        hds12Shds11DayIntervalGroup,
        hds12Shds1MaintenanceGroup,
        hds12Shds1EndpointAlarmConfGroup,
        hds12Shds1NotificationGroup
    }

GROUP hds12Shds1InventoryShds1Group
    DESCRIPTION
        "Support for this group is only required for implementations
        supporting SHDSL lines."

GROUP hds12Shds1SpanShds1StatusGroup
    DESCRIPTION
        "Support for this group is only required for implementations
        supporting SHDSL lines."

GROUP hds12Shds1SpanConfProfileGroup
    DESCRIPTION
        "Support for this group is only required for implementations
        supporting SHDSL lines."

    ::= { hds12Shds1Compliances 1 }

-- units of conformance
--

hds12Shds1SpanConfGroup OBJECT-GROUP
    OBJECTS
    {

```

```
hds12ShdslSpanConfNumRepeaters,
hds12ShdslSpanConfProfile,
hds12ShdslSpanConfAlarmProfile
}
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
    HDSL2/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
    HDSL2/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
    HDSL2/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."
 ::= { hds12ShdslGroups 10 }

```

```

hds12ShdslEndpointAlarmConfGroup OBJECT-GROUP
OBJECTS
{
hds12ShdslEndpointAlarmConfProfile,
hds12ShdslEndpointThreshLoopAttenuation,
hds12ShdslEndpointThreshSNRMargin,
hds12ShdslEndpointThreshES,
hds12ShdslEndpointThreshSES,
hds12ShdslEndpointThreshCRCAnomalies,
hds12ShdslEndpointThreshLOSWS,
hds12ShdslEndpointThreshUAS,
hds12ShdslEndpointAlarmConfProfileRowStatus
}
STATUS          current
DESCRIPTION
    "This group supports objects that allow configuration of alarm
      thresholds for various performance parameters for HDSL2/SHDSL
      lines."
 ::= { hds12ShdslGroups 11 }

```

```

hds12ShdslNotificationGroup NOTIFICATION-GROUP
NOTIFICATIONS
{
hds12ShdslLoopAttenCrossing,
hds12ShdslSNRMarginCrossing,
hds12ShdslPerfESThresh,
hds12ShdslPerfSESThresh,
hds12ShdslPerfCRCAnomaliesThresh,
hds12ShdslPerfLOSWSThresh,
hds12ShdslPerfUASThresh,
hds12ShdslSpanInvalidNumRepeaters,
hds12ShdslLoopbackFailure,
hds12ShdslpowerBackoff,
hds12ShdsldeviceFault,
hds12ShdslcdcContinuityFault,
hds12ShdslconfigInitFailure,

```

```

hds12ShdslprotocolInitFailure,
hds12ShdslnoNeighborPresent,
hds12ShdslLocalPowerLoss
}
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 }

```

END

7. Security Considerations

Blocking unauthorized access to the HDSL2-SHDSL MIB via the element management system is outside the scope of this document. It should be noted that access to the MIB permits the unauthorized entity to modify the profiles (section 6.4) such that both subscriber service and network operations can be interfered with. Subscriber service can be altered by modifying any of a number of service characteristics such as rate partitioning and maximum transmission rates. Network operations can be impacted by modification of notification thresholds such as SES thresholds.

There are a number of managed objects in this MIB that may be considered to contain sensitive information. 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.

These identifying objects in the inventory group are:

- hds12ShdslInvVendorID
- hds12ShdslInvVendorModelNumber
- hds12ShdslInvVendorSerialNumber
- hds12ShdslInvVendorEOCSoftwareVersion
- hds12ShdslInvStandardVersion
- hds12ShdslInvVendorListNumber
- hds12ShdslInvVendorIssueNumber
- hds12ShdslInvVendorSoftwareVersion
- hds12ShdslInvEquipmentCode
- hds12ShdslInvVendorOther
- hds12ShdslInvTransmissionModeCapability

Therefore, it may be important in some environments to control read access to these objects and possibly to even encrypt the values of these object when sending them over the network via SNMP. Not all versions of SNMP provide features for such a secure environment.

It is recommended that the implementors consider the security features as provided by the SNMPv3 framework. Specifically, the use of the User-based Security Model RFC 2574 [12] and the View-based Access Control Model RFC 2575 [15] are recommended.

It is then the customer/user's responsibility to ensure that the SNMP entity giving access to an instance of this MIB, is properly configured to give access to those objects only to those principals (users) that have legitimate rights to access them.

HDSL2-SHDSL layer connectivity from the xtuR will permit the subscriber to manipulate both the HDSL2-SHDSL link directly and the HDSL2-SHDSL embedded operations channel (EOC) for their own loop. For example, unchecked or unfiltered fluctuations initiated by the subscriber could generate sufficient notifications to potentially overwhelm either the management interface to the network or the element manager.

It should be noted that interface indices in this MIB are maintained persistently. VACM data relating to these should be stored persistently.

There are a number of management objects defined in this MIB that have 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.

8. Acknowledgments

The authors are deeply grateful to the authors of the ADSL LINE MIB (RFC 2662 [23]), Gregory Bathrick and Faye Ly, as much of the text and structure of this document originates in their documents.

The authors are also grateful to the authors of FR MFR MIB (RFC 3020 [24]), Prayson Pate, Bob Lynch, and Kenneth Rehbehn, as the majority of the Security Considerations section was lifted from their document.

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

Other contributions were received from the following:

- Philip Bergstresser (Adtran)
- Steve Blackwell (Centillium)
- Umberto Bonollo (NEC Australia)
- Yagal Hachmon (RAD)
- Mark Johnson (Red Point)
- Sharon Mantin (Orckit)
- Moti Morgenstern (ECI)
- Raymond Murphy (Ericsson)
- Lee Nipper (Verilink)
- Randy Presuhn (BMC Software)
- Katy Sherman (Orckit)
- Mike Sneed (ECI)
- Jon Turney (DSL Solutions)
- Aron Wahl (Memotec)
- Bert Wijnen (Lucent)
- Michael Wrobel (Memotec)

9. References

- [1] Harrington, D., Presuhn, R. and B. Wijnen, "An Architecture for Describing SNMP Management Frameworks", RFC 2571, April 1999.
- [2] Rose, M. and K. McCloghrie, "Structure and Identification of Management Information for TCP/IP-based Internets", STD 16, RFC 1155, May 1990.
- [3] Rose, M. and K. McCloghrie, "Concise MIB Definitions", STD 16, RFC 1212, March 1991.
- [4] Rose, M., "A Convention for Defining Traps for use with the SNMP", RFC 1215, March 1991.
- [5] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Structure of Management Information Version 2 (SMIv2)", STD 58, RFC 2578, April 1999.
- [6] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Textual Conventions for SMIv2", STD 58, RFC 2579, April 1999.
- [7] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Conformance Statements for SMIv2", STD 58, RFC 2580, April 1999.
- [8] Case, J., Fedor, M., Schoffstall, M. and J. Davin, "Simple Network Management Protocol", STD 15, RFC 1157, May 1990.
- [9] Case, J., McCloghrie, K., Rose, M. and S. Waldbusser, "Introduction to Community-based SNMPv2", RFC 1901, January 1996.
- [10] Case, J., McCloghrie, K., Rose, M. and S. Waldbusser, "Transport Mappings for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1906, January 1996.
- [11] Case, J., Harrington D., Presuhn, R. and B. Wijnen, "Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)", RFC 2572, April 1999.
- [12] Blumenthal, U. and B. Wijnen, "User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)", RFC 2574, April 1999.

- [13] Case, J., McCloghrie, K., Rose, M. and S. Waldbusser, "Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1905, January 1996.
- [14] Levi, D., Meyer, P. and B. Stewart, "SNMPv3 Applications", RFC 2573, April 1999.
- [15] Wijnen, B., Presuhn, R. and K. McCloghrie, "View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)", RFC 2575, April 1999.
- [16] Case, J., Mundy, R., Partain, D. and B. Stewart, "Introduction to Version 3 of the Internet-standard Network Management Framework", RFC 2570, April 1999.
- [17] Bradner, S., "Key Words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.
- [18] American National Standards Institute, ANSI T1E1.4/2000-006, February 2000.
- [19] Blackwell, S., Editor, "Single-Pair High-Speed Digital Subscriber Line (SHDSL) Transceivers", ITU-T Draft G.991.2, April 2000.
- [20] McCloghrie, K. and M. Rose, M., "Management Information Base for Network Management of TCP/IP-based internets: MIB-II", STD 17, RFC 1213, March 1991.
- [21] McCloghrie, K. and F. Kastenholtz, "The Interfaces Group MIB", RFC 2863, June 2000.
- [22] Tesink, K., "Textual Conventions for MIB Modules Using Performance History Based on 15 Minute Intervals", RFC 2493, January 1999.
- [23] Bathrick, G. and F. Ly, "Definitions of Managed Objects for the ADSL Lines", RFC 2662, August 1999.
- [24] Pate, P., Lynch, B. and K. Rehbehn, "Definitions of Managed Objects for Monitoring and Controlling the UNI/NNI Multilink Frame Relay Function", RFC 3020, December 2000.
- [25] American National Standards Institute, "Coded Identification of Equipment Entities of the North American Telecommunications System for the Purpose of Information Exchange", T1.213-2001.

10. Intellectual Property Notice

The IETF takes no position regarding the validity or scope of any intellectual property or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; neither does it represent that it has made any effort to identify any such rights. Information on the IETF's procedures with respect to rights in standards-track and standards-related documentation can be found in BCP-11. Copies of claims of rights made available for publication and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementors or users of this specification can be obtained from the IETF Secretariat.

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

11. Authors' Addresses

Bob Ray
PESA Switching Systems, Inc.
330-A Wynn Drive
Huntsville, AL 35805 USA

Phone: +1 256 726 9200 ext. 142
Fax: +1 256 726 9271
Email: rray@pesa.com

Rajesh Abbi
Alcatel USA
2912 Wake Forest Road
Raleigh, NC 27609-7860 USA

Phone: +1 919-850-6194
Fax: +1 919-850-6670
Email: Rajesh.Abbi@alcatel.com

12. Full Copyright Statement

Copyright (C) The Internet Society (2002). All Rights Reserved.

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

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

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

Acknowledgement

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

