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                                                           July 2001

Definitions of Managed Objects for HDSL2 and SHDSL Lines
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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.

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Table of Contents

1. 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) [18] and
   Single-Pair High-Speed Digital Subscriber Line (SHDSL) interfaces
   [19].

   This document specifies a MIB module in a manner that is both
   compliant to the SMIv2 (STD 58 [5, 6, 7]), and semantically
   identical to the peer SMIv1 definitions (STD 16 [2, 3]).

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 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], STD 58, RFC 2579 [6] and STD 58, RFC 2580 [7].

   o   Message protocols for transferring management information. The

first version of the SNMP message protocol is called SNMPv1 and
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 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 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
    ...
    }
```

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                  hdsl2(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

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.

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
      - hdsl2ShdslPerfLOSWSThresh
      - 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.
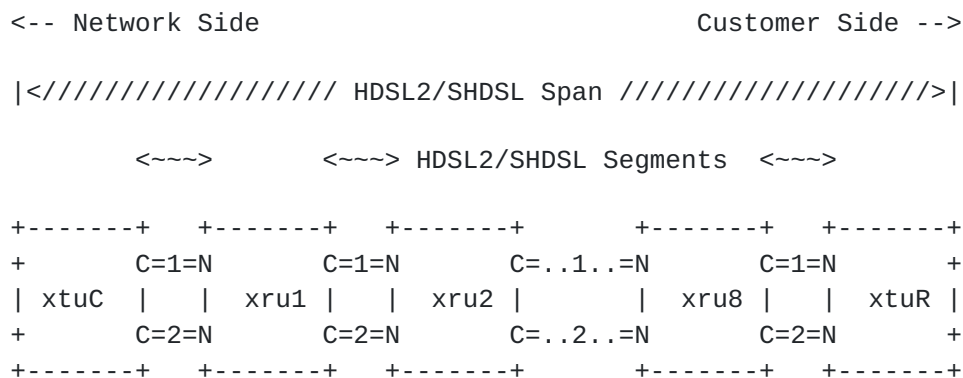
```
 <-- Network Side                            Customer Side -->

 |<////////////////// HDSL2/SHDSL Span //////////////////>|

         <~~~>        <~~~> HDSL2/SHDSL Segments  <~~~>

   +-------+   +-------+   +-------+        +-------+   +-------+
   +       C=1=N        C=1=N        C=..1..=N        C=1=N       +
   | xtuC  |   | xru1 |   | xru2 |        | xru8 |   | xtuR |
   +       C=2=N        C=2=N        C=..2..=N        C=2=N       +
   +-------+   +-------+   +-------+        +-------+   +-------+

   Key:  <////> HDSL2/SHDSL Span
         <~~~~> HDSL2/SHDSL Segment
         =1=    HDSL2/SHDSL    wire-pair-1
         =2=    SHDSL optional wire-pair-2 (Not applicable to HDSL2)
```

```
          C        Customer Side Segment Endpoint (modem)
          N        Network  Side Segment Endpoint (modem)
```

Figure 2: General topology for an HDSL2/SHDSL Line

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, hdsl2Shdsl15MinIntervalTable, is
indexed by { ifIndex, hdsl2ShdslInvIndex, hdsl2ShdslEndpointSide,
hdsl2ShdslEndpointWirePair, hdsl2Shdsl15MinIntervalNumber}. If
interval 12 is determined to be invalid but intervals 11 and 13
are valid, a Get Next operation on the indices .1.1.1.1.11 would
return indices .1.1.1.1.13.

There is no requirement for an agent to ensure a fixed relationship
between the start of a fifteen minute 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 is 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, however, 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 hdsl2ShdslEndpointAlarmConfProfile and
hdsl2ShdslSpanConfProfile 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 hdsl2ShdslEndpointCurrStatus 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 hdsl2ShdslEndpointThreshSNRMargin and
hdsl2ShdslEndpointThreshLoopAttenuation found in the
hdsl2ShdslEndpointAlarmConfProfileTable. 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 are reset to 0 every
15 minutes, 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 hdsl2ShdslSpanInvalidNumRepeaters notification may be generated
following completion of the discovery phase if the number of

repeaters discovered on the line differs from the number of repeaters
specified in hdsl2ShdslSpanConfNumRepeaters. For those conditions
where the number of provisioned repeaters is greater than those
encountered during span discovery, all table entries associated with
the nonexistant 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:

```
hdsl2ShdslSpanConfGroup
hdsl2ShdslSpanStatusGroup
hdsl2ShdslInventoryGroup
hdsl2ShdslEndpointConfGroup
hdsl2Shdsl15MinIntervalGroup
hdsl2Shdsl1DayIntervalGroup
hdsl2ShdslMaintenanceGroup
hdsl2ShdslEndpointAlarmConfGroup
hdsl2ShdslNotificationGroup
```

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

```
hdsl2ShdslSpanConfProfileGroup
hdsl2ShdslSpanShdslStatusGroup
```

6. Definitions

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

IMPORTS
MODULE-IDENTITY,
OBJECT-TYPE,
Counter32,
Gauge32,
NOTIFICATION-TYPE,
Integer32,
transmission                 FROM SNMPv2-SMI
RowStatus,
TEXTUAL-CONVENTION           FROM SNMPv2-TC
ifIndex                      FROM IF-MIB
PerfCurrentCount,
PerfIntervalCount            FROM PerfHist-TC-MIB
SnmpAdminString              FROM SNMP-FRAMEWORK-MIB
MODULE-COMPLIANCE,
OBJECT-GROUP,
NOTIFICATION-GROUP           FROM SNMPv2-CONF;
```

```
hdsl2ShdslMIB MODULE-IDENTITY
     LAST-UPDATED "200107190000Z" -- July 19, 2001
     ORGANIZATION "ADSLMIB Working Group"
```

```
     CONTACT-INFO "WG-email:  XDSLMIB@LISTSERV.ECIRALEIGH.COM
                  Subscribe: LISTSERV@LISTSERV.ECIRALEIGH.COM
                           In Body: subscribe/signoff XDSLMIB
                           Archive: index XDSLMIB/get <archivename>

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   DESCRIPTION
       "This MIB module defines a collection of objects for managing
        HDSL2/SHDSL lines.  An agent may reside at either end of the
        line, however the MIB is designed to require no management
        communication between the modems beyond that inherent in the
        low-level EOC line protocol as defined in ANSI T1E1.4/2000-006
        (for HDSL2 lines), or in ITU G.991.2 (for SHDSL lines)."
    REVISION "200107190000Z" -- July 19, 2001
    DESCRIPTION "Initial version, published as RFC xxxx."

    ::= { transmission xxxx } -- to be assigned by IANA

  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
       Hdsl2Shdsl1DayIntevalCount, and the current interval counter
       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 counter is equal to the value of the current
       day counter, 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   INTEGER(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    INTEGER(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)
                 }

   -- Span Configuration Group
   --

   hdsl2ShdslSpanConfTable OBJECT-TYPE
      SYNTAX      SEQUENCE OF Hdsl2ShdslSpanConfEntry
      MAX-ACCESS not-accessible
      STATUS      current
      DESCRIPTION
        "This table supports overall configuration of HDSL2/SHDSL
         Spans.  Entries in this table MUST be maintained in a
         persistent manner."
      ::= { hdsl2ShdslMibObjects 1 }

   hdsl2ShdslSpanConfEntry OBJECT-TYPE
      SYNTAX      Hdsl2ShdslSpanConfEntry
      MAX-ACCESS  not-accessible
      STATUS      current
      DESCRIPTION
        "An entry in the hdsl2ShdslSpanConfTable.  Each entry
         represents the complete Span in a single HDSL2/SHDSL line.
         It is indexed by the ifIndex of the associated HDSL2/SHDSL
         line."
      INDEX { ifIndex }
      ::= { hdsl2ShdslSpanConfTable 1 }

   Hdsl2ShdslSpanConfEntry ::=
      SEQUENCE
      {
      hdsl2ShdslSpanConfNumRepeaters          INTEGER,
      hdsl2ShdslSpanConfProfile               SnmpAdminString,
      hdsl2ShdslSpanConfAlarmProfile          SnmpAdminString
      }

   hdsl2ShdslSpanConfNumRepeaters OBJECT-TYPE
      SYNTAX      INTEGER(0..8)
      MAX-ACCESS  read-write
      STATUS      current
      DESCRIPTION
        "This object provisions the number of repeaters/regenerators
         in this HDSL2/SHDSL Span."
      ::= { hdsl2ShdslSpanConfEntry 1 }

   hdsl2ShdslSpanConfProfile 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 hdsl2ShdslSpanConfProfileTable, which applies to this span.
          The value of this object is the index of the referenced profile
          in the hdsl2ShdslSpanConfProfileTable. 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,
          hdsl2ShdslSpanConfProfileTable, MUST be rejected."
       ::= { hdsl2ShdslSpanConfEntry 2 }

   hdsl2ShdslSpanConfAlarmProfile 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 hdsl2ShdslEndpointAlarmConfProfileTable. The value of this
          object is the index of the referenced profile in the
          hdsl2ShdslEndpointAlarmConfProfileTable. 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 hdsl2ShdslEndpointConfTable. 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,
          hdsl2ShdslEndpointAlarmConfProfileTable, MUST be rejected."
       ::= { hdsl2ShdslSpanConfEntry 3 }

   -- Span Status Group
   --

   hdsl2ShdslSpanStatusTable OBJECT-TYPE
       SYNTAX   SEQUENCE OF Hdsl2ShdslSpanStatusEntry
       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."
       ::= { hdsl2ShdslMibObjects 2 }

   hdsl2ShdslSpanStatusEntry OBJECT-TYPE

```
        SYNTAX      Hdsl2ShdslSpanStatusEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION
```

```
     "An entry in the hdsl2ShdslSpanStatusTable.  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 }
   ::= { hdsl2ShdslSpanStatusTable 1 }

Hdsl2ShdslSpanStatusEntry ::=
   SEQUENCE
   {
   hdsl2ShdslStatusNumAvailRepeaters       INTEGER,
   hdsl2ShdslStatusMaxAttainableLineRate   INTEGER,
   hdsl2ShdslStatusActualLineRate          INTEGER,
   hdsl2ShdslStatusTransmissionModeCurrent
             Hdsl2ShdslTransmissionModeType
   }

hdsl2ShdslStatusNumAvailRepeaters OBJECT-TYPE
   SYNTAX      INTEGER(0..8)
   MAX-ACCESS  read-only
   STATUS      current
   DESCRIPTION
     "Contains the actual number of repeaters/regenerators
      discovered in this HDSL2/SHDSL span."
   ::= { hdsl2ShdslSpanStatusEntry 1 }

hdsl2ShdslStatusMaxAttainableLineRate OBJECT-TYPE
   SYNTAX      INTEGER(0..4112000)
   UNITS       "bps"
   MAX-ACCESS  read-only
   STATUS      current
   DESCRIPTION
     "Contains the maximum attainable line rate in this HDSL2/SHDSL
      span."
   ::= { hdsl2ShdslSpanStatusEntry 2 }

hdsl2ShdslStatusActualLineRate OBJECT-TYPE
   SYNTAX      INTEGER(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."
   ::= { hdsl2ShdslSpanStatusEntry 3 }

hdsl2ShdslStatusTransmissionModeCurrent OBJECT-TYPE
   SYNTAX       Hdsl2ShdslTransmissionModeType
   MAX-ACCESS  read-only
```

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

```
     ::= { hdsl2ShdslSpanStatusEntry 4 }

 -- Unit Inventory Group
 --

 hdsl2ShdslInventoryTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF Hdsl2ShdslInventoryEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
      "This table supports retrieval of unit inventory information
       available via the EOC from units in a HDSL2/SHDSL line.

       Entries in this table are dynamically created during the
       line discovery process.  The life cycle for these entries
       is as follows:

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

       As these entries are created/destroyed dynamically, they
       are NOT persistent."
    ::= { hdsl2ShdslMibObjects 3 }

 hdsl2ShdslInventoryEntry OBJECT-TYPE
    SYNTAX     Hdsl2ShdslInventoryEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
      "An entry in the hdsl2ShdslInventoryTable.  Each entry
       represents inventory information for a single unit in a
       HDSL2/SHDSL line.  It is indexed by the ifIndex of the
       HDSL2/SHDSL line and the Hdsl2ShdslUnitId of the
       associated unit."
    INDEX { ifIndex, hdsl2ShdslInvIndex }
    ::= { hdsl2ShdslInventoryTable 1 }

 Hdsl2ShdslInventoryEntry ::=
    SEQUENCE
    {
    hdsl2ShdslInvIndex                     Hdsl2ShdslUnitId,
    hdsl2ShdslInvVendorID                  OCTET STRING,
    hdsl2ShdslInvVendorModelNumber         OCTET STRING,
    hdsl2ShdslInvVendorSerialNumber        OCTET STRING,
    hdsl2ShdslInvVendorEOCSoftwareVersion  Integer32,
    hdsl2ShdslInvStandardVersion           Integer32,
```

```
        hdsl2ShdslInvVendorListNumber          OCTET STRING,
        hdsl2ShdslInvVendorIssueNumber         OCTET STRING,
        hdsl2ShdslInvVendorSoftwareVersion     OCTET STRING,
        hdsl2ShdslInvEquipmentCode             OCTET STRING,
```

```
      hdsl2ShdslInvVendorOther                OCTET STRING,
      hdsl2ShdslInvTransmissionModeCapability
                            Hdsl2ShdslTransmissionModeType
      }

  hdsl2ShdslInvIndex OBJECT-TYPE
      SYNTAX      Hdsl2ShdslUnitId
      MAX-ACCESS  read-only
      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."
      ::= { hdsl2ShdslInventoryEntry 1 }

  hdsl2ShdslInvVendorID OBJECT-TYPE
      SYNTAX      OCTET STRING(SIZE(8))
      MAX-ACCESS  read-only
      STATUS      current
      DESCRIPTION
        "Vendor ID as reported in an Inventory Response message."
      ::= { hdsl2ShdslInventoryEntry 2 }

  hdsl2ShdslInvVendorModelNumber OBJECT-TYPE
      SYNTAX      OCTET STRING(SIZE(12))
      MAX-ACCESS  read-only
      STATUS      current
      DESCRIPTION
        "Vendor model number as reported in an Inventory Response
         message."
      ::= { hdsl2ShdslInventoryEntry 3 }

  hdsl2ShdslInvVendorSerialNumber OBJECT-TYPE
      SYNTAX      OCTET STRING(SIZE(12))
      MAX-ACCESS  read-only
      STATUS      current
      DESCRIPTION
        "Vendor serial number as reported in an Inventory Response
         message."
      ::= { hdsl2ShdslInventoryEntry 4 }

  hdsl2ShdslInvVendorEOCSoftwareVersion OBJECT-TYPE
      SYNTAX      Integer32
      MAX-ACCESS  read-only
      STATUS      current
      DESCRIPTION
        "Vendor EOC version as reported in a Discovery Response
         message."
      ::= { hdsl2ShdslInventoryEntry 5 }
```

```
     hdsl2ShdslInvStandardVersion OBJECT-TYPE
        SYNTAX       Integer32
        MAX-ACCESS   read-only
```

           STATUS   current
           DESCRIPTION
             "Version of the HDSL2/SHDSL standard implemented, as reported
              in an Inventory Response message."
           ::= { hdsl2ShdslInventoryEntry 6 }

     hdsl2ShdslInvVendorListNumber OBJECT-TYPE
           SYNTAX   OCTET STRING(SIZE(3))
           MAX-ACCESS read-only
           STATUS   current
           DESCRIPTION
             "Vendor list number as reported in an Inventory Response
              message."
           ::= { hdsl2ShdslInventoryEntry 7 }

     hdsl2ShdslInvVendorIssueNumber OBJECT-TYPE
           SYNTAX   OCTET STRING(SIZE(2))
           MAX-ACCESS read-only
           STATUS   current
           DESCRIPTION
             "Vendor issue number as reported in an Inventory Response
              message."
           ::= { hdsl2ShdslInventoryEntry 8 }

     hdsl2ShdslInvVendorSoftwareVersion OBJECT-TYPE
           SYNTAX   OCTET STRING(SIZE(6))
           MAX-ACCESS read-only
           STATUS   current
           DESCRIPTION
             "Vendor software version as reported in an Inventory Response
              message."
           ::= { hdsl2ShdslInventoryEntry 9 }

     hdsl2ShdslInvEquipmentCode OBJECT-TYPE
           SYNTAX   OCTET STRING(SIZE(10))
           MAX-ACCESS read-only
           STATUS   current
           DESCRIPTION
             "Equipment code conforming to ANSI T1.213, Coded Identification
              of Equipment Entities."
           ::= { hdsl2ShdslInventoryEntry 10 }

     hdsl2ShdslInvVendorOther OBJECT-TYPE
           SYNTAX   OCTET STRING(SIZE(12))
           MAX-ACCESS read-only
           STATUS   current
           DESCRIPTION
             "Other vendor information as reported in an Inventory Response
              message."

```
         ::= { hdsl2ShdslInventoryEntry 11 }

   hdsl2ShdslInvTransmissionModeCapability OBJECT-TYPE
      SYNTAX       Hdsl2ShdslTransmissionModeType
```

```
      MAX-ACCESS  read-only
      STATUS      current
      DESCRIPTION
        "Contains the transmission mode capability of the SHDSL unit."
      ::= { hdsl2ShdslInventoryEntry 12 }


   -- Segment Endpoint Configuration Group
   --

   hdsl2ShdslEndpointConfTable OBJECT-TYPE
      SYNTAX      SEQUENCE OF Hdsl2ShdslEndpointConfEntry
      MAX-ACCESS  not-accessible
      STATUS      current
      DESCRIPTION
        "This table supports configuration parameters for segment
         endpoints in a HDSL2/SHDSL line.  As this table is indexed
         by ifIndex, it MUST be maintained in a persistent manner."
      ::= { hdsl2ShdslMibObjects 4 }

   hdsl2ShdslEndpointConfEntry OBJECT-TYPE
      SYNTAX      Hdsl2ShdslEndpointConfEntry
      MAX-ACCESS  not-accessible
      STATUS      current
      DESCRIPTION
        "An entry in the hdsl2ShdslEndpointConfTable.  Each entry
         represents a single segment endpoint in a HDSL2/SHDSL line.
         It is indexed by the ifIndex of the HDSL2/SHDSL line, the
         UnitId of the associated unit, the side of the unit, and the
         wire-pair of the associated modem."
      INDEX { ifIndex, hdsl2ShdslInvIndex, hdsl2ShdslEndpointSide,
              hdsl2ShdslEndpointWirePair}
      ::= { hdsl2ShdslEndpointConfTable 1 }

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

   hdsl2ShdslEndpointSide OBJECT-TYPE
      SYNTAX      Hdsl2ShdslUnitSide
      MAX-ACCESS  read-only
      STATUS      current
      DESCRIPTION
        "The side of the unit associated with this segment endpoint -
         Network/Customer side - as per the Hdsl2ShdslUnitSide textual
         convention."
```

```
        ::= { hdsl2ShdslEndpointConfEntry 1 }

   hdsl2ShdslEndpointWirePair OBJECT-TYPE
      SYNTAX      Hdsl2ShdslWirePair
```

```
       MAX-ACCESS  read-only
       STATUS      current
       DESCRIPTION
         "The wire-pair of the modem associated with this segment
          endpoint as per the Hdsl2ShdslWirePair textual convention."
       ::= { hdsl2ShdslEndpointConfEntry 2 }

    hdsl2ShdslEndpointAlarmConfProfile OBJECT-TYPE
       SYNTAX      SnmpAdminString (SIZE(0..32))
       MAX-ACCESS  read-write
       STATUS      current
       DESCRIPTION
         "This object configures the alarm threshold values to be used
          for this segment endpoint.  The values are obtained from the
          alarm configuration profile referenced by this object.  The
          value of this object is the index of the referenced profile in
          the hdsl2ShdslEndpointAlarmConfProfileTable, or NULL (a zero-
          length SnmpAdminString).  If the value is a zero-length
          SnmpAdminString, the endpoint uses the default Alarm
          Configuration Profile for the associated span as per the
          hdsl2ShdslSpanConfAlarmProfile object in the
          hdsl2ShdslSpanConfTable.  The default value of this object is
          a zero-length SnmpAdminString.

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

    -- Segment Endpoint Current Status/Performance Group
    --

    hdsl2ShdslEndpointCurrTable OBJECT-TYPE
       SYNTAX      SEQUENCE OF Hdsl2ShdslEndpointCurrEntry
       MAX-ACCESS  not-accessible
       STATUS      current
       DESCRIPTION
         "This table contains current status and performance information
          for segment endpoints in HDSL2/SHDSL Lines.  As with other
          tables in this MIB indexed by ifIndex, entries in this table
          MUST be maintained in a persistent manner."
       ::= { hdsl2ShdslMibObjects 5 }

    hdsl2ShdslEndpointCurrEntry 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                  INTEGER,
   hdsl2ShdslEndpointCurrSnrMgn               INTEGER,
   hdsl2ShdslEndpointCurrStatus               BITS,
   hdsl2ShdslEndpointES                       Counter32,
   hdsl2ShdslEndpointSES                      Counter32,
   hdsl2ShdslEndpointCRCanomalies             Counter32,
   hdsl2ShdslEndpointLOSWS                     Counter32,
   hdsl2ShdslEndpointUAS                       Counter32,
   hdsl2ShdslEndpointCurr15MinTimeElapsed
                              Hdsl2ShdslPerfTimeElapsed,
   hdsl2ShdslEndpointCurr15MinES              PerfCurrentCount,
   hdsl2ShdslEndpointCurr15MinSES             PerfCurrentCount,
   hdsl2ShdslEndpointCurr15MinCRCanomalies  PerfCurrentCount,
   hdsl2ShdslEndpointCurr15MinLOSWS           PerfCurrentCount,
   hdsl2ShdslEndpointCurr15MinUAS             PerfCurrentCount,
   hdsl2ShdslEndpointCurr1DayTimeElapsed
                              Hdsl2ShdslPerfTimeElapsed,
   hdsl2ShdslEndpointCurr1DayES
                              Hdsl2ShdslPerfCurrDayCount,
   hdsl2ShdslEndpointCurr1DaySES
                              Hdsl2ShdslPerfCurrDayCount,
   hdsl2ShdslEndpointCurr1DayCRCanomalies
                              Hdsl2ShdslPerfCurrDayCount,
   hdsl2ShdslEndpointCurr1DayLOSWS
                              Hdsl2ShdslPerfCurrDayCount,
   hdsl2ShdslEndpointCurr1DayUAS
                              Hdsl2ShdslPerfCurrDayCount
   }

hdsl2ShdslEndpointCurrAtn OBJECT-TYPE
   SYNTAX       INTEGER(-127..128)
   UNITS        "dB"
   MAX-ACCESS   read-only
   STATUS       current
   DESCRIPTION
     "The current loop attenuation for this endpoint as reported in
      a Network or Customer Side Performance Status message."
   REFERENCE    "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
   ::= { hdsl2ShdslEndpointCurrEntry 1 }

hdsl2ShdslEndpointCurrSnrMgn OBJECT-TYPE
   SYNTAX       INTEGER(-127..128)
```

```
        UNITS         "dB"
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
```

          "The current SNR margin for this endpoint as reported in a
           Status Response/SNR message."
        REFERENCE   "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
        ::= { hdsl2ShdslEndpointCurrEntry 2 }

    hdsl2ShdslEndpointCurrStatus OBJECT-TYPE
        SYNTAX   BITS
                     {
                     noDefect(0),
                     powerBackoff(1),
                     deviceFault(2),
                     dcContinuityFault(3),
                     snrMarginAlarm(4),
                     loopAttenuationAlarm(5),
                     loswFailureAlarm(6),
                     configInitFailure(7),
                     protocolInitFailure(8),
                     noNeighborPresent(9),
                     loopbackActive(10)
                     }
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
          "Contains the current state of the endpoint. This is a
          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
                                 has dropped below 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 }

  hdsl2ShdslEndpointES 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 }

  hdsl2ShdslEndpointSES 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 }

  hdsl2ShdslEndpointCRCanomalies 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 }

```
hdsl2ShdslEndpointLOSWS 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 }

    hdsl2ShdslEndpointUAS OBJECT-TYPE
        SYNTAX        Counter32
        UNITS         "seconds"
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
          "Count of Unavailable Seconds (UAS) on this endpoint since
           the xU was last restarted."
        REFERENCE    "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
        ::= { hdsl2ShdslEndpointCurrEntry 8 }

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

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

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

```
    hdsl2ShdslEndpointCurr15MinCRCanomalies OBJECT-TYPE
        SYNTAX        PerfCurrentCount
        UNITS         "detected CRC Anomalies"
```

```
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
          "Count of CRC anomalies in the current 15-minute interval."
        REFERENCE    "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
        ::= { hdsl2ShdslEndpointCurrEntry 12 }

    hdsl2ShdslEndpointCurr15MinLOSWS OBJECT-TYPE
        SYNTAX       PerfCurrentCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
          "Count of Loss of Sync Word (LOSW) Seconds in the current
           15-minute interval."
        REFERENCE    "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
        ::= { hdsl2ShdslEndpointCurrEntry 13 }

    hdsl2ShdslEndpointCurr15MinUAS OBJECT-TYPE
        SYNTAX       PerfCurrentCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
          "Count of Unavailable Seconds (UAS) in the current 15-minute
           interval."
        REFERENCE    "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
        ::= { hdsl2ShdslEndpointCurrEntry 14 }

    hdsl2ShdslEndpointCurr1DayTimeElapsed OBJECT-TYPE
        SYNTAX       Hdsl2ShdslPerfTimeElapsed
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
          "Number of seconds that have elapsed since the beginning of
           the current 1-day interval."
        ::= { hdsl2ShdslEndpointCurrEntry 15 }

    hdsl2ShdslEndpointCurr1DayES OBJECT-TYPE
        SYNTAX       Hdsl2ShdslPerfCurrDayCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
          "Count of Errored Seconds (ES) during the current day as
           measured by hdsl2ShdslEndpointCurr1DayTimeElapsed."
        REFERENCE    "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
        ::= { hdsl2ShdslEndpointCurrEntry 16 }
```

```
hdsl2ShdslEndpointCurr1DaySES OBJECT-TYPE
   SYNTAX        Hdsl2ShdslPerfCurrDayCount
   UNITS         "seconds"
```

```
      MAX-ACCESS    read-only
      STATUS        current
      DESCRIPTION
        "Count of Severely Errored Seconds (SES) during the current
         day as measured by hdsl2ShdslEndpointCurr1DayTimeElapsed."
      REFERENCE    "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
      ::= { hdsl2ShdslEndpointCurrEntry 17 }

   hdsl2ShdslEndpointCurr1DayCRCanomalies OBJECT-TYPE
      SYNTAX        Hdsl2ShdslPerfCurrDayCount
      UNITS         "detected CRC Anomalies"
      MAX-ACCESS    read-only
      STATUS        current
      DESCRIPTION
        "Count of CRC anomalies during the current day as measured
         by hdsl2ShdslEndpointCurr1DayTimeElapsed."
      REFERENCE    "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
      ::= { hdsl2ShdslEndpointCurrEntry 18 }

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

   hdsl2ShdslEndpointCurr1DayUAS OBJECT-TYPE
      SYNTAX        Hdsl2ShdslPerfCurrDayCount
      UNITS         "seconds"
      MAX-ACCESS    read-only
      STATUS        current
      DESCRIPTION
        "Count of Unavailable Seconds (UAS) during the current day as
         measured by hdsl2ShdslEndpointCurr1DayTimeElapsed."
      REFERENCE    "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
      ::= { hdsl2ShdslEndpointCurrEntry 20 }

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

   hdsl2Shdsl15MinIntervalTable OBJECT-TYPE
      SYNTAX        SEQUENCE OF Hdsl2Shdsl15MinIntervalEntry
      MAX-ACCESS    not-accessible
      STATUS        current
      DESCRIPTION
```

```
        "This table provides one row for each HDSL2/SHDSL endpoint
         performance data collection interval.  This table contains
         live data from equipment.  As such, it is NOT persistent."
    ::= { hdsl2ShdslMibObjects 6 }
```

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

    Hdsl2Shdsl15MinIntervalEntry ::=
       SEQUENCE
       {
       hdsl2Shdsl15MinIntervalNumber        INTEGER,
       hdsl2Shdsl15MinIntervalES            PerfIntervalCount,
       hdsl2Shdsl15MinIntervalSES           PerfIntervalCount,
       hdsl2Shdsl15MinIntervalCRCanomalies  PerfIntervalCount,
       hdsl2Shdsl15MinIntervalLOSWS         PerfIntervalCount,
       hdsl2Shdsl15MinIntervalUAS           PerfIntervalCount
       }

    hdsl2Shdsl15MinIntervalNumber OBJECT-TYPE
       SYNTAX       INTEGER(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."
       ::= { hdsl2Shdsl15MinIntervalEntry 1 }

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

    hdsl2Shdsl15MinIntervalSES OBJECT-TYPE
       SYNTAX       PerfIntervalCount
       UNITS        "seconds"
       MAX-ACCESS  read-only
       STATUS       current
       DESCRIPTION
         "Count of Severely Errored Seconds (SES) during the interval."
```

```
        REFERENCE   "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
        ::= { hdsl2Shdsl15MinIntervalEntry 3 }

    hdsl2Shdsl15MinIntervalCRCanomalies OBJECT-TYPE
```

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

   hdsl2Shdsl15MinIntervalLOSWS OBJECT-TYPE
      SYNTAX       PerfIntervalCount
      UNITS        "seconds"
      MAX-ACCESS   read-only
      STATUS       current
      DESCRIPTION
         "Count of Loss of Sync Word (LOSW) Seconds during the
          interval."
      REFERENCE    "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
      ::= { hdsl2Shdsl15MinIntervalEntry 5 }

   hdsl2Shdsl15MinIntervalUAS OBJECT-TYPE
      SYNTAX       PerfIntervalCount
      UNITS        "seconds"
      MAX-ACCESS   read-only
      STATUS       current
      DESCRIPTION
         "Count of Unavailable Seconds (UAS) during the interval."
      REFERENCE    "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
      ::= { hdsl2Shdsl15MinIntervalEntry 6 }

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

   hdsl2Shdsl1DayIntervalTable OBJECT-TYPE
      SYNTAX       SEQUENCE OF Hdsl2Shdsl1DayIntervalEntry
      MAX-ACCESS   not-accessible
      STATUS       current
      DESCRIPTION
         "This table provides one row for each HDSL2/SHDSL endpoint
          performance data collection interval.  This table contains
          live data from equipment.  As such, it is NOT persistent."
      ::= { hdsl2ShdslMibObjects 7 }

   hdsl2Shdsl1DayIntervalEntry OBJECT-TYPE
      SYNTAX       Hdsl2Shdsl1DayIntervalEntry
      MAX-ACCESS   not-accessible
      STATUS       current
      DESCRIPTION
         "An entry in the hdsl2Shdsl1DayIntervalTable."
```

```
       INDEX { ifIndex, hdsl2ShdslInvIndex, hdsl2ShdslEndpointSide,
               hdsl2ShdslEndpointWirePair, hdsl2Shdsl1DayIntervalNumber }
       ::= { hdsl2Shdsl1DayIntervalTable 1 }
```

```
    Hdsl2Shdsl1DayIntervalEntry ::=
       SEQUENCE
       {
       hdsl2Shdsl1DayIntervalNumber          INTEGER,
       hdsl2Shdsl1DayIntervalMoniSecs        Hdsl2ShdslPerfTimeElapsed,
       hdsl2Shdsl1DayIntervalES              Hdsl2Shdsl1DayIntervalCount,
       hdsl2Shdsl1DayIntervalSES             Hdsl2Shdsl1DayIntervalCount,
       hdsl2Shdsl1DayIntervalCRCanomalies    Hdsl2Shdsl1DayIntervalCount,
       hdsl2Shdsl1DayIntervalLOSWS           Hdsl2Shdsl1DayIntervalCount,
       hdsl2Shdsl1DayIntervalUAS             Hdsl2Shdsl1DayIntervalCount
       }

    hdsl2Shdsl1DayIntervalNumber OBJECT-TYPE
       SYNTAX      INTEGER(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."
       ::= { hdsl2Shdsl1DayIntervalEntry 1 }

    hdsl2Shdsl1DayIntervalMoniSecs OBJECT-TYPE
       SYNTAX      Hdsl2ShdslPerfTimeElapsed
       UNITS       "seconds"
       MAX-ACCESS  read-only
       STATUS      current
       DESCRIPTION
         "The amount of time in the 1-day interval over which the
          performance monitoring information is actually counted.
          This value will be the same as the interval duration except
          in a situation where performance monitoring data could not
          be collected for any reason."
       ::= { hdsl2Shdsl1DayIntervalEntry 2 }

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

    hdsl2Shdsl1DayIntervalSES OBJECT-TYPE
       SYNTAX      Hdsl2Shdsl1DayIntervalCount
       UNITS       "seconds"
```

```
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
          "Count of Severely Errored Seconds (SES) during the 1-day
```

        interval as measured by hdsl2Shdsl1DayIntervalMoniSecs."
        REFERENCE   "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
        ::= { hdsl2Shdsl1DayIntervalEntry 4 }

    hdsl2Shdsl1DayIntervalCRCanomalies OBJECT-TYPE
        SYNTAX   Hdsl2Shdsl1DayIntervalCount
        UNITS   "detected CRC Anomalies"
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
          "Count of CRC anomalies during the 1-day interval as
           measured by hdsl2Shdsl1DayIntervalMoniSecs."
        REFERENCE   "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
        ::= { hdsl2Shdsl1DayIntervalEntry 5 }

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

    hdsl2Shdsl1DayIntervalUAS OBJECT-TYPE
        SYNTAX   Hdsl2Shdsl1DayIntervalCount
        UNITS   "seconds"
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
          "Count of Unavailable Seconds (UAS) during the 1-day interval
           as measured by hdsl2Shdsl1DayIntervalMoniSecs."
        REFERENCE   "HDSL2 Section 7.5.3.7; SHDSL Section 9.5.5.7"
        ::= { hdsl2Shdsl1DayIntervalEntry 7 }

    -- Maintenance Group
    --

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

```
        ::= { hdsl2ShdslMibObjects 8 }

   hdsl2ShdslEndpointMaintEntry OBJECT-TYPE
       SYNTAX       Hdsl2ShdslEndpointMaintEntry
```

```
      MAX-ACCESS  not-accessible
      STATUS      current
      DESCRIPTION
        "An entry in the hdsl2ShdslEndpointMaintTable.  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, hdsl2ShdslInvIndex, hdsl2ShdslEndpointSide }
      ::= { hdsl2ShdslEndpointMaintTable 1 }

   Hdsl2ShdslEndpointMaintEntry ::=
      SEQUENCE
      {
      hdsl2ShdslMaintLoopbackConfig      INTEGER,
      hdsl2ShdslMaintTipRingReversal     INTEGER,
      hdsl2ShdslMaintPowerBackOff        INTEGER,
      hdsl2ShdslMaintSoftRestart         INTEGER
      }

   hdsl2ShdslMaintLoopbackConfig 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 hdsl2ShdslEndpointCurrStatus object."
      ::= { hdsl2ShdslEndpointMaintEntry 1 }

   hdsl2ShdslMaintTipRingReversal OBJECT-TYPE
      SYNTAX      INTEGER
                  {
                  normal(1),
                  reversed(2)
                  }
      MAX-ACCESS  read-only
      STATUS      current
      DESCRIPTION
        "This object indicates the state of the tip/ring pair at the
         associated segment endpoint."
      ::= { hdsl2ShdslEndpointMaintEntry 2 }

   hdsl2ShdslMaintPowerBackOff OBJECT-TYPE
      SYNTAX      INTEGER
```

```
{
default(1),
enhanced(2)
}
```

```
   MAX-ACCESS  read-write
   STATUS      current
   DESCRIPTION
     "This object configures the receiver at the associated
      segment endpoint to operate in default or enhanced power
      backoff mode."
   ::= { hdsl2ShdslEndpointMaintEntry 3 }

hdsl2ShdslMaintSoftRestart OBJECT-TYPE
   SYNTAX      INTEGER
               {
               ready(1),
               restart(2)
               }
   MAX-ACCESS  read-write
   STATUS      current
   DESCRIPTION
     "This object enables the manager to trigger a soft restart
      of the modem at the associated segment endpoint.  The manager
      may only set this object to the 'restart(2)' value, which
      initiates a restart.  The agent will perform a restart after
      approximately 5 seconds.  Following the 5 second period, the
      agent will restore the object to the 'ready(1)' state."
   ::= { hdsl2ShdslEndpointMaintEntry 4 }

hdsl2ShdslUnitMaintTable OBJECT-TYPE
   SYNTAX      SEQUENCE OF Hdsl2ShdslUnitMaintEntry
   MAX-ACCESS  not-accessible
   STATUS      current
   DESCRIPTION
     "This table supports maintenance operations for units in a
      HDSL2/SHDSL line.  Entries in this table MUST be maintained
      in a persistent manner."
   ::= { hdsl2ShdslMibObjects 9 }

hdsl2ShdslUnitMaintEntry 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
        }
```

```
hdsl2ShdslMaintLoopbackTimeout 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 }

hdsl2ShdslMaintUnitPowerSource OBJECT-TYPE
   SYNTAX      INTEGER
               {
               local(1),
               span(2)
               }
   MAX-ACCESS  read-only
   STATUS      current
   DESCRIPTION
     "This object indicates the DC power source being used by the
      associated unit."
   ::= { hdsl2ShdslUnitMaintEntry 2 }

-- Span Configuration Profile Group
--

hdsl2ShdslSpanConfProfileTable OBJECT-TYPE
   SYNTAX      SEQUENCE OF Hdsl2ShdslSpanConfProfileEntry
   MAX-ACCESS  not-accessible
   STATUS      current
   DESCRIPTION
     "This table supports definitions of span configuration
      profiles for SHDSL lines.  HDSL2 does not support these
      configuration options.  This table MUST be maintained
      in a persistent manner."
   ::= { hdsl2ShdslMibObjects 10 }

hdsl2ShdslSpanConfProfileEntry OBJECT-TYPE
   SYNTAX      Hdsl2ShdslSpanConfProfileEntry
   MAX-ACCESS  not-accessible
   STATUS      current
   DESCRIPTION
     "Each entry corresponds to a single span configuration
      profile.  Each profile contains a set of span configuration
      parameters.  The configuration parameters in a profile are
      applied to those lines referencing that profile (see the
      hdsl2ShdslSpanConfProfile object).  Profiles may be
```

created/deleted using the row creation/deletion mechanism
via hdsl2ShdslSpanConfProfileRowStatus. If an active
entry is referenced in hdsl2ShdslSpanConfProfile, the
entry MUST remain active until all references are removed."

```
     INDEX { IMPLIED hdsl2ShdslSpanConfProfileName }
     ::= { hdsl2ShdslSpanConfProfileTable 1 }

Hdsl2ShdslSpanConfProfileEntry ::=
   SEQUENCE
   {
   hdsl2ShdslSpanConfProfileName                SnmpAdminString,
   hdsl2ShdslSpanConfWireInterface          INTEGER,
   hdsl2ShdslSpanConfMinLineRate            INTEGER,
   hdsl2ShdslSpanConfMaxLineRate            INTEGER,
   hdsl2ShdslSpanConfPSD                    INTEGER,
   hdsl2ShdslSpanConfTransmissionMode
                                     Hdsl2ShdslTransmissionModeType,
   hdsl2ShdslSpanConfRemoteEnabled          INTEGER,
   hdsl2ShdslSpanConfPowerFeeding           INTEGER,
   hdsl2ShdslSpanConfCurrCondTargetMarginDown  INTEGER,
   hdsl2ShdslSpanConfWorstCaseTargetMarginDown INTEGER,
   hdsl2ShdslSpanConfCurrCondTargetMarginUp    INTEGER,
   hdsl2ShdslSpanConfWorstCaseTargetMarginUp   INTEGER,
   hdsl2ShdslSpanConfUsedTargetMargins      BITS,
   hdsl2ShdslSpanConfProfileRowStatus       RowStatus
   }

hdsl2ShdslSpanConfProfileName 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
      hdsl2ShdslSpanConfProfile in Hdsl2ShdslSpanConfEntry."
   ::= { hdsl2ShdslSpanConfProfileEntry 1 }

hdsl2ShdslSpanConfWireInterface 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 }
   ::= { hdsl2ShdslSpanConfProfileEntry 2 }

hdsl2ShdslSpanConfMinLineRate OBJECT-TYPE
   SYNTAX      INTEGER(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
          (hdsl2ShdslSpanMaxLineRate), the line rate is considered
          'fixed'.  If the minimum line rate is less than the maximum
          line rate, the line rate is considered 'rate-adaptive'."
      DEFVAL      { 1552000 }
      ::= { hdsl2ShdslSpanConfProfileEntry 3 }

   hdsl2ShdslSpanConfMaxLineRate OBJECT-TYPE
      SYNTAX      INTEGER(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
         (hdsl2ShdslSpanMaxLineRate), the line rate is considered
         'fixed'.  If the minimum line rate is less than the maximum
         line rate, the line rate is considered 'rate-adaptive'."
      DEFVAL      { 1552000 }
      ::= { hdsl2ShdslSpanConfProfileEntry 4 }

   hdsl2ShdslSpanConfPSD OBJECT-TYPE
      SYNTAX      INTEGER
                  {
                  symmetric(1),
                  asymmetric(2)
                  }
      MAX-ACCESS  read-create
      STATUS      current
      DESCRIPTION
        "This object configures use of symmetric/asymmetric PSD (Power
         Spectral Density) Mask for the associated SHDSL Line.  Support
         for symmetric PSD is mandatory for all supported data rates.
         Support for asymmetric PSD is optional."
      DEFVAL      { symmetric }
      ::= { hdsl2ShdslSpanConfProfileEntry 5 }

   hdsl2ShdslSpanConfTransmissionMode OBJECT-TYPE
      SYNTAX      Hdsl2ShdslTransmissionModeType
      MAX-ACCESS  read-create
      STATUS      current
      DESCRIPTION
        "This object specifies the regional setting for the SHDSL
         line."
      DEFVAL      { region1 }
      ::= { hdsl2ShdslSpanConfProfileEntry 6 }
```

```
       hdsl2ShdslSpanConfRemoteEnabled OBJECT-TYPE
          SYNTAX       INTEGER
                       {
```

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

    hdsl2ShdslSpanConfPowerFeeding OBJECT-TYPE
        SYNTAX      INTEGER
                    {
                    noPower(1),
                    powerFeed(2),
                    wettingCurrent(3)
                    }
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
          "This object enables/disables support for optional power
           feeding in a SHDSL line."
        DEFVAL      { noPower }
        ::= { hdsl2ShdslSpanConfProfileEntry 8 }

    hdsl2ShdslSpanConfCurrCondTargetMarginDown OBJECT-TYPE
        SYNTAX      INTEGER(-10..21)
        UNITS       "dB"
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
          "This object specifies the downstream current condition target
           SNR margin for a SHDSL line.  The SNR margin is the difference
           between the desired SNR and the actual SNR.  Target SNR margin
           is the desired SNR margin for a unit."
        DEFVAL      { 0 }
        ::= { hdsl2ShdslSpanConfProfileEntry 9 }

    hdsl2ShdslSpanConfWorstCaseTargetMarginDown OBJECT-TYPE
        SYNTAX      INTEGER(-10..21)
        UNITS       "dB"
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
          "This object specifies the downstream worst case target SNR
           margin for a SHDSL line.  The SNR margin is the difference
           between the desired SNR and the actual SNR.  Target SNR
           margin is the desired SNR margin for a unit."
```

```
    DEFVAL       { 0 }
    ::= { hdsl2ShdslSpanConfProfileEntry 10 }

hdsl2ShdslSpanConfCurrCondTargetMarginUp OBJECT-TYPE
```

```
      SYNTAX        INTEGER(-10..21)
      UNITS         "dB"
      MAX-ACCESS    read-create
      STATUS        current
      DESCRIPTION
        "This object specifies the upstream current condition target
         SNR margin for a SHDSL line.  The SNR margin is the difference
         between the desired SNR and the actual SNR.  Target SNR margin
         is the desired SNR margin for a unit."
      DEFVAL        { 0 }
      ::= { hdsl2ShdslSpanConfProfileEntry 11 }

   hdsl2ShdslSpanConfWorstCaseTargetMarginUp OBJECT-TYPE
      SYNTAX        INTEGER(-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 }
      ::= { hdsl2ShdslSpanConfProfileEntry 12 }

   hdsl2ShdslSpanConfUsedTargetMargins 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       { 0 }
     ::= { hdsl2ShdslSpanConfProfileEntry 13 }
```

    hdsl2ShdslSpanConfProfileRowStatus OBJECT-TYPE
       SYNTAX   RowStatus
       MAX-ACCESS read-create
       STATUS   current
       DESCRIPTION
         "This object controls creation/deletion of the associated
          entry in this table per the semantics of RowStatus. If an
          active entry is referenced in hdsl2ShdslSpanConfProfile, the
          entry MUST remain active until all references are removed."
       ::= { hdsl2ShdslSpanConfProfileEntry 14 }

    -- Segment Endpoint Alarm Configuration Profile group
    --

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

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

    Hdsl2ShdslEndpointAlarmConfProfileEntry ::=
       SEQUENCE
       {
       hdsl2ShdslEndpointAlarmConfProfileName   SnmpAdminString,
       hdsl2ShdslEndpointThreshLoopAttenuation   INTEGER,
       hdsl2ShdslEndpointThreshSNRMargin   INTEGER,
       hdsl2ShdslEndpointThreshES

```
                Hdsl2ShdslPerfIntervalThreshold,
        hdsl2ShdslEndpointThreshSES
                Hdsl2ShdslPerfIntervalThreshold,
        hdsl2ShdslEndpointThreshCRCanomalies        Integer32,
```

```
      hdsl2ShdslEndpointThreshLOSWS
                 Hdsl2ShdslPerfIntervalThreshold,
      hdsl2ShdslEndpointThreshUAS
                 Hdsl2ShdslPerfIntervalThreshold,
      hdsl2ShdslEndpointAlarmConfProfileRowStatus  RowStatus
      }

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

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

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

  hdsl2ShdslEndpointThreshES OBJECT-TYPE
      SYNTAX       Hdsl2ShdslPerfIntervalThreshold
      UNITS        "seconds"
      MAX-ACCESS   read-create
      STATUS       current
      DESCRIPTION
        "This object configures the threshold for the number of
         errored seconds (ES) within any given 15-minute performance
```

data collection interval. If the value of errored seconds
in a particular 15-minute collection interval reaches/
exceeds this value, a hdsl2ShdslPerfESThresh MAY be
generated. At most one notification will be sent per

```
     interval per endpoint."
   DEFVAL       { 0 }
   ::= { hdsl2ShdslEndpointAlarmConfProfileEntry 4 }

hdsl2ShdslEndpointThreshSES 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 hdsl2ShdslPerfSESThresh
      MAY be generated.  At most one notification will be sent per
      interval per endpoint."
   DEFVAL       { 0 }
   ::= { hdsl2ShdslEndpointAlarmConfProfileEntry 5 }

hdsl2ShdslEndpointThreshCRCanomalies 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 hdsl2ShdslPerfCRCanomaliesThresh MAY be
      generated.  At most one notification will be sent per
      interval per endpoint."
   DEFVAL       { 0 }
   ::= { hdsl2ShdslEndpointAlarmConfProfileEntry 6 }

hdsl2ShdslEndpointThreshLOSWS 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 (LOSW) Seconds within any given 15-minute
      performance data collection interval.  If the value of LOSW
      in a particular 15-minute collection interval reaches/exceeds
      this value, a hdsl2ShdslPerfLOSWSThresh MAY be generated.
      At most one notification will be sent per interval per
      endpoint."
```

```
        DEFVAL      { 0 }
        ::= { hdsl2ShdslEndpointAlarmConfProfileEntry 7 }

    hdsl2ShdslEndpointThreshUAS OBJECT-TYPE
```

```
      SYNTAX       Hdsl2ShdslPerfIntervalThreshold
      UNITS        "seconds"
      MAX-ACCESS   read-create
      STATUS       current
      DESCRIPTION
        "This object configures the threshold for the number of
         unavailable seconds (UAS) within any given 15-minute
         performance data collection interval.  If the value of UAS
         in a particular 15-minute collection interval reaches/exceeds
         this value, a hdsl2ShdslPerfUASThresh MAY be generated.
         At most one notification will be sent per interval per
         endpoint."
      DEFVAL       { 0 }
      ::= { hdsl2ShdslEndpointAlarmConfProfileEntry 8 }

   hdsl2ShdslEndpointAlarmConfProfileRowStatus OBJECT-TYPE
      SYNTAX       RowStatus
      MAX-ACCESS   read-create
      STATUS       current
      DESCRIPTION
        "This object controls creation/deletion of the associated
         entry in this table as per the semantics of RowStatus.
         If an active entry is referenced in either
         hdsl2ShdslSpanConfAlarmProfile or
         hdsl2ShdslEndpointAlarmConfProfile, the entry MUST remain
         active until all references are removed."
      ::= { hdsl2ShdslEndpointAlarmConfProfileEntry 9 }

   -- Notifications Group
   --

   hdsl2ShdslNotifications OBJECT IDENTIFIER ::= { hdsl2ShdslMIB 0 }

   hdsl2ShdslLoopAttenCrossing NOTIFICATION-TYPE
      OBJECTS
      {
      hdsl2ShdslEndpointCurrAtn,
      hdsl2ShdslEndpointThreshLoopAttenuation
      }
      STATUS    current
      DESCRIPTION
        "This notification indicates that the loop attenuation
         threshold (as per the hdsl2ShdslEndpointThreshLoopAttenuation
         value) has been reached/exceeded for the HDSL2/SHDSL segment
         endpoint."
      ::= { hdsl2ShdslNotifications 1 }

   hdsl2ShdslSNRMarginCrossing NOTIFICATION-TYPE
      OBJECTS
```

```
      {
      hdsl2ShdslEndpointCurrSnrMgn,
      hdsl2ShdslEndpointThreshSNRMargin
      }
```

```
        STATUS      current
        DESCRIPTION
          "This notification indicates that the SNR margin threshold (as
           per the hdsl2ShdslEndpointThreshSNRMargin value) has been
           reached/exceeded for the HDSL2/SHDSL segment endpoint."
        ::= { hdsl2ShdslNotifications 2 }

    hdsl2ShdslPerfESThresh NOTIFICATION-TYPE
        OBJECTS
        {
        hdsl2ShdslEndpointCurr15MinES,
        hdsl2ShdslEndpointThreshES
        }
        STATUS      current
        DESCRIPTION
          "This notification indicates that the errored seconds threshold
           (as per the hdsl2ShdslEndpointThreshES value) has been reached/
           exceeded for the HDSL2/SHDSL segment endpoint."
        ::= { hdsl2ShdslNotifications 3 }

    hdsl2ShdslPerfSESThresh NOTIFICATION-TYPE
        OBJECTS
        {
        hdsl2ShdslEndpointCurr15MinSES,
        hdsl2ShdslEndpointThreshSES
        }
        STATUS      current
        DESCRIPTION
          "This notification indicates that the severely errored seconds
           threshold (as per the hdsl2ShdslEndpointThreshSES value) has
           been reached/exceeded for the HDSL2/SHDSL Segment Endpoint."
        ::= { hdsl2ShdslNotifications 4 }

    hdsl2ShdslPerfCRCanomaliesThresh NOTIFICATION-TYPE
        OBJECTS
        {
        hdsl2ShdslEndpointCurr15MinCRCanomalies,
        hdsl2ShdslEndpointThreshCRCanomalies
        }
        STATUS      current
        DESCRIPTION
          "This notification indicates that the CRC anomalies threshold
           (as per the hdsl2ShdslEndpointThreshCRCanomalies value) has
           been reached/exceeded for the HDSL2/SHDSL Segment Endpoint."
        ::= { hdsl2ShdslNotifications 5 }

    hdsl2ShdslPerfLOSWSThresh NOTIFICATION-TYPE
        OBJECTS
        {
```

```
        hdsl2ShdslEndpointCurr15MinLOSWS,
        hdsl2ShdslEndpointThreshLOSWS
        }
        STATUS      current
```

      DESCRIPTION
        "This notification indicates that the LOSW seconds threshold
         (as per the hdsl2ShdslEndpointThreshLOSWS value) has been
         reached/exceeded for the HDSL2/SHDSL segment endpoint."
      ::= { hdsl2ShdslNotifications 6 }

  hdsl2ShdslPerfUASThresh NOTIFICATION-TYPE
      OBJECTS
      {
      hdsl2ShdslEndpointCurr15MinUAS,
      hdsl2ShdslEndpointThreshUAS
      }
      STATUS   current
      DESCRIPTION
        "This notification indicates that the unavailable seconds
         threshold (as per the hdsl2ShdslEndpointThreshUAS value) has
         been reached/exceeded for the HDSL2/SHDSL segment endpoint."
      ::= { hdsl2ShdslNotifications 7 }

  hdsl2ShdslSpanInvalidNumRepeaters NOTIFICATION-TYPE
      OBJECTS
      {
      hdsl2ShdslSpanConfNumRepeaters
      }
      STATUS   current
      DESCRIPTION
        "This notification indicates that a mismatch has been detected
         between the number of repeater/regenerator units configured
         for a HDSL2/SHDSL line via the hdsl2ShdslSpanConfNumRepeaters
         object and the actual number of repeater/regenerator units
         discovered via the EOC."
      ::= { hdsl2ShdslNotifications 8 }

  hdsl2ShdslLoopbackFailure NOTIFICATION-TYPE
      OBJECTS
      {
      hdsl2ShdslMaintLoopbackConfig
      }
      STATUS   current
      DESCRIPTION
        "This notification indicates that an endpoint maintenance
         loopback command failed for an HDSL2/SHDSL segment."
      ::= { hdsl2ShdslNotifications 9 }

  hdsl2ShdslpowerBackoff NOTIFICATION-TYPE
      OBJECTS
      {
      hdsl2ShdslEndpointCurrStatus
      }

```
    STATUS     current
    DESCRIPTION
       "This notification indicates that the bit setting for
        powerBackoff in the hdsl2ShdslEndpointCurrStatus object for
```

```
      this endpoint has changed."
   ::= { hdsl2ShdslNotifications 10 }

hdsl2ShdsldeviceFault NOTIFICATION-TYPE
   OBJECTS
   {
   hdsl2ShdslEndpointCurrStatus
   }
   STATUS    current
   DESCRIPTION
     "This notification indicates that the bit setting for
      deviceFault in the hdsl2ShdslEndpointCurrStatus object for
      this endpoint has changed."
   ::= { hdsl2ShdslNotifications 11 }

hdsl2ShdsldcContinuityFault NOTIFICATION-TYPE
   OBJECTS
   {
   hdsl2ShdslEndpointCurrStatus
   }
   STATUS    current
   DESCRIPTION
     "This notification indicates that the bit setting for
      dcContinuityFault in the hdsl2ShdslEndpointCurrStatus object
      for this endpoint has changed."
   ::= { hdsl2ShdslNotifications 12 }

hdsl2ShdslconfigInitFailure NOTIFICATION-TYPE
   OBJECTS
   {
   hdsl2ShdslEndpointCurrStatus
   }
   STATUS    current
   DESCRIPTION
     "This notification indicates that the bit setting for
      configInitFailure in the hdsl2ShdslEndpointCurrStatus object
      for this endpoint has changed."
   ::= { hdsl2ShdslNotifications 13 }

hdsl2ShdslprotocolInitFailure NOTIFICATION-TYPE
   OBJECTS
   {
   hdsl2ShdslEndpointCurrStatus
   }
   STATUS    current
   DESCRIPTION
     "This notification indicates that the bit setting for
      protocolInitFailure in the hdsl2ShdslEndpointCurrStatus
      object for this endpoint has changed."
```

```
         ::= { hdsl2ShdslNotifications 14 }

    hdsl2ShdslnoNeighborPresent NOTIFICATION-TYPE
        OBJECTS
```

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

   hdsl2ShdslLocalPowerLoss NOTIFICATION-TYPE
      OBJECTS
      {
      ifIndex,
      hdsl2ShdslInvIndex
      }
      STATUS    current
      DESCRIPTION
        "This notification indicates impending unit failure due to
         loss of local power (last gasp)."
      ::= { hdsl2ShdslNotifications 16 }

   -- conformance information
   --

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

   -- agent compliance statements

   hdsl2ShdslLineMibCompliance MODULE-COMPLIANCE
      STATUS  current
      DESCRIPTION
        "The section outlines compliance requirements for this MIB."
      MODULE
      MANDATORY-GROUPS
      {
      hdsl2ShdslSpanConfGroup,
      hdsl2ShdslSpanStatusGroup,
      hdsl2ShdslInventoryGroup,
      hdsl2ShdslEndpointConfGroup,
      hdsl2ShdslEndpointCurrGroup,
      hdsl2Shdsl15MinIntervalGroup,
      hdsl2Shdsl1DayIntervalGroup,
      hdsl2ShdslMaintenanceGroup,
      hdsl2ShdslEndpointAlarmConfGroup,
```

```
        hdsl2ShdslNotificationGroup
        }

    GROUP   hdsl2ShdslInventoryShdslGroup
```

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

      GROUP hdsl2ShdslSpanShdslStatusGroup
         DESCRIPTION
           "Support for this group is only required for implementations
           supporting SHDSL lines."

      GROUP hdsl2ShdslSpanConfProfileGroup
         DESCRIPTION
           "Support for this group is only required for implementations
           supporting SHDSL lines."

         ::= { hdsl2ShdslCompliances 1 }

     -- units of conformance
     --

     hdsl2ShdslSpanConfGroup OBJECT-GROUP
        OBJECTS
        {
        hdsl2ShdslSpanConfNumRepeaters,
        hdsl2ShdslSpanConfProfile,
        hdsl2ShdslSpanConfAlarmProfile
        }
        STATUS   current
        DESCRIPTION
          "This group supports objects for configuring span related
           parameters for HDSL2/SHDSL lines."
        ::= { hdsl2ShdslGroups 1 }

     hdsl2ShdslSpanStatusGroup OBJECT-GROUP
        OBJECTS
        {
        hdsl2ShdslStatusNumAvailRepeaters
        }
        STATUS   current
        DESCRIPTION
          "This group supports objects for retrieving span related
           status for HDSL2/SHDSL lines."
        ::= { hdsl2ShdslGroups 2 }

     hdsl2ShdslInventoryShdslGroup OBJECT-GROUP
        OBJECTS
        {
        hdsl2ShdslInvTransmissionModeCapability
        }
        STATUS   current

```
        DESCRIPTION
          "This group supports objects for retrieving SHDSL-specific
           inventory information."
        ::= { hdsl2ShdslGroups 3 }
```

```
    hdsl2ShdslSpanShdslStatusGroup OBJECT-GROUP
        OBJECTS
        {
        hdsl2ShdslStatusMaxAttainableLineRate,
        hdsl2ShdslStatusActualLineRate,
        hdsl2ShdslStatusTransmissionModeCurrent
        }
        STATUS      current
        DESCRIPTION
          "This group supports objects for retrieving SHDSL-specific
           span related status."
        ::= { hdsl2ShdslGroups 4 }

    hdsl2ShdslInventoryGroup OBJECT-GROUP
        OBJECTS
        {
        hdsl2ShdslInvIndex,
        hdsl2ShdslInvVendorID,
        hdsl2ShdslInvVendorModelNumber,
        hdsl2ShdslInvVendorSerialNumber,
        hdsl2ShdslInvVendorEOCSoftwareVersion,
        hdsl2ShdslInvStandardVersion,
        hdsl2ShdslInvVendorListNumber,
        hdsl2ShdslInvVendorIssueNumber,
        hdsl2ShdslInvVendorSoftwareVersion,
        hdsl2ShdslInvEquipmentCode,
        hdsl2ShdslInvVendorOther
        }
        STATUS      current
        DESCRIPTION
          "This group supports objects that provide unit inventory
           information about the units in HDSL2/SHDSL lines."
        ::= { hdsl2ShdslGroups 5 }

    hdsl2ShdslEndpointConfGroup OBJECT-GROUP
        OBJECTS
        {
        hdsl2ShdslEndpointSide,
        hdsl2ShdslEndpointWirePair,
        hdsl2ShdslEndpointAlarmConfProfile
        }
        STATUS      current
        DESCRIPTION
          "This group supports objects for configuring parameters for
           segment endpoints in HDSL2/SHDSL lines."
        ::= { hdsl2ShdslGroups 6 }

    hdsl2ShdslEndpointCurrGroup OBJECT-GROUP
```

```
    OBJECTS
    {
    hdsl2ShdslEndpointSide,
    hdsl2ShdslEndpointWirePair,
```

```
      hdsl2ShdslEndpointCurrAtn,
      hdsl2ShdslEndpointCurrSnrMgn,
      hdsl2ShdslEndpointCurrStatus,
      hdsl2ShdslEndpointES,
      hdsl2ShdslEndpointSES,
      hdsl2ShdslEndpointCRCanomalies,
      hdsl2ShdslEndpointLOSWS,
      hdsl2ShdslEndpointUAS,
      hdsl2ShdslEndpointCurr15MinTimeElapsed,
      hdsl2ShdslEndpointCurr15MinES,
      hdsl2ShdslEndpointCurr15MinSES,
      hdsl2ShdslEndpointCurr15MinCRCanomalies,
      hdsl2ShdslEndpointCurr15MinLOSWS,
      hdsl2ShdslEndpointCurr15MinUAS,
      hdsl2ShdslEndpointCurr1DayTimeElapsed,
      hdsl2ShdslEndpointCurr1DayES,
      hdsl2ShdslEndpointCurr1DaySES,
      hdsl2ShdslEndpointCurr1DayCRCanomalies,
      hdsl2ShdslEndpointCurr1DayLOSWS,
      hdsl2ShdslEndpointCurr1DayUAS
      }
      STATUS      current
      DESCRIPTION
        "This group supports objects which provide current status and
         performance measurements relating to segment endpoints in
         HDSL2/SHDSL lines."
      ::= { hdsl2ShdslGroups 7 }

   hdsl2Shdsl15MinIntervalGroup OBJECT-GROUP
      OBJECTS
      {
      hdsl2Shdsl15MinIntervalES,
      hdsl2Shdsl15MinIntervalSES,
      hdsl2Shdsl15MinIntervalCRCanomalies,
      hdsl2Shdsl15MinIntervalLOSWS,
      hdsl2Shdsl15MinIntervalUAS
      }
      STATUS      current
      DESCRIPTION
        "This group supports objects which maintain historic
         performance measurements relating to segment endpoints in
         HDSL2/SHDSL lines in 15-minute intervals."
      ::= { hdsl2ShdslGroups 8 }

   hdsl2Shdsl1DayIntervalGroup OBJECT-GROUP
      OBJECTS
      {
      hdsl2Shdsl1DayIntervalMoniSecs,
      hdsl2Shdsl1DayIntervalES,
```

```
        hdsl2Shdsl1DayIntervalSES,
        hdsl2Shdsl1DayIntervalCRCanomalies,
        hdsl2Shdsl1DayIntervalLOSWS,
        hdsl2Shdsl1DayIntervalUAS
```

```
      }
      STATUS      current
      DESCRIPTION
        "This group supports objects which maintain historic
         performance measurements relating to segment endpoints in
         HDSL2/SHDSL lines in 1-day intervals."
      ::= { hdsl2ShdslGroups 9 }

   hdsl2ShdslMaintenanceGroup OBJECT-GROUP
      OBJECTS
      {
      hdsl2ShdslMaintLoopbackConfig,
      hdsl2ShdslMaintTipRingReversal,
      hdsl2ShdslMaintPowerBackOff,
      hdsl2ShdslMaintSoftRestart,
      hdsl2ShdslMaintLoopbackTimeout,
      hdsl2ShdslMaintUnitPowerSource
      }
      STATUS      current
      DESCRIPTION
        "This group supports objects that provide support for
         maintenance actions for HDSL2/SHDSL lines."
      ::= { hdsl2ShdslGroups 10 }

   hdsl2ShdslEndpointAlarmConfGroup OBJECT-GROUP
      OBJECTS
      {
      hdsl2ShdslEndpointThreshLoopAttenuation,
      hdsl2ShdslEndpointThreshSNRMargin,
      hdsl2ShdslEndpointThreshES,
      hdsl2ShdslEndpointThreshSES,
      hdsl2ShdslEndpointThreshCRCanomalies,
      hdsl2ShdslEndpointThreshLOSWS,
      hdsl2ShdslEndpointThreshUAS,
      hdsl2ShdslEndpointAlarmConfProfileRowStatus
      }
      STATUS      current
      DESCRIPTION
        "This group supports objects that allow configuration of alarm
         thresholds for various performance parameters for HDSL2/SHDSL
         lines."
      ::= { hdsl2ShdslGroups 11 }

   hdsl2ShdslNotificationGroup NOTIFICATION-GROUP
      NOTIFICATIONS
      {
      hdsl2ShdslLoopAttenCrossing,
      hdsl2ShdslSNRMarginCrossing,
      hdsl2ShdslPerfESThresh,
```

```
        hdsl2ShdslPerfSESThresh,
        hdsl2ShdslPerfCRCanomaliesThresh,
        hdsl2ShdslPerfLOSWSThresh,
        hdsl2ShdslPerfUASThresh,
```

```
        hdsl2ShdslSpanInvalidNumRepeaters,
        hdsl2ShdslLoopbackFailure,
        hdsl2ShdslpowerBackoff,
        hdsl2ShdsldeviceFault,
        hdsl2ShdsldcContinuityFault,
        hdsl2ShdslconfigInitFailure,
        hdsl2ShdslprotocolInitFailure,
        hdsl2ShdslnoNeighborPresent,
        hdsl2ShdslLocalPowerLoss
        }
        STATUS      current
        DESCRIPTION
          "This group supports notifications of significant conditions
           associated with HDSL2/SHDSL lines."
        ::= { hdsl2ShdslGroups 12 }

   hdsl2ShdslSpanConfProfileGroup OBJECT-GROUP
        OBJECTS
        {
        hdsl2ShdslSpanConfWireInterface,
        hdsl2ShdslSpanConfMinLineRate,
        hdsl2ShdslSpanConfMaxLineRate,
        hdsl2ShdslSpanConfPSD,
        hdsl2ShdslSpanConfTransmissionMode,
        hdsl2ShdslSpanConfRemoteEnabled,
        hdsl2ShdslSpanConfPowerFeeding,
        hdsl2ShdslSpanConfCurrCondTargetMarginDown,
        hdsl2ShdslSpanConfWorstCaseTargetMarginDown,
        hdsl2ShdslSpanConfCurrCondTargetMarginUp,
        hdsl2ShdslSpanConfWorstCaseTargetMarginUp,
        hdsl2ShdslSpanConfUsedTargetMargins,
        hdsl2ShdslSpanConfProfileRowStatus
        }
        STATUS      current
        DESCRIPTION
          "This group supports objects that constitute configuration
           profiles for configuring span related parameters in SHDSL
           lines."
        ::= { hdsl2ShdslGroups 13 }

   END
```

7. Security Considerations

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.

No managed objects in this MIB contain sensitive information.

SNMPv1 by itself is not a secure environment. Even if the network
itself is secure (for example by using IPSec), even then, there is no
control as to who on the secure network is allowed to access and
GET/SET (read/change/create/delete) the objects in this MIB.

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 (VACM) RFC 2575 [15] is recommended.

It is then a customer/user responsibility to ensure that the SNMP
entity giving access to an instance of this MIB, is properly
configured to give access to the objects only to those principals
(users) that have legitimate rights to indeed GET or SET
(change/create/delete) them.

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

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