SCTE·ISBE

STANDARDS

Network Operations Subcommittee

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**HMS Common Inside Plant
Management Information Base(MIB)
SCTE-HMS-HE-OPTICAL-SWITCH-MIB**

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SCOPE

This document is identical to SCTE 85-4 2009 except for informative components which may have been updated such as the title page, NOTICE text, headers and footers. No normative changes have been made to this document.

This document provides MIB definitions for HMS optical switch equipment present in the headend (or indoor) and is supported by a SNMP agent.

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NORMATIVE REFERENCE

IETF RFC 1907 SNMPv2-MIB
IETF RFC 2578 SNMPv2-SMI
IETF RFC 2579 SNMPv2-TC
IETF RFC 2580 SNMPv2-CONF
IETF RFC 2737 ENTITY-MIB
SCTE 36 SCTE-ROOT
SCTE 37 SCTE-HMS-ROOTS
SCTE 38-11 SCTE-HMS-HEADENDIDENT-MIB
SCTE 83-1 SCTE-HMS-HE-OPTIC-MIB
SCTE 38-1 SCTE-HMS-HE-PROPERTY-MIB
SCTE 84-1 SCTE-HMS-HE-COMMON-MIB

INFORMATIVE REFERENCE

None

TERMS AND DEFINITIONS

This document defines the following terms:

Management Information Base (MIB) – the specification of information in a manner that allows standard access through a network management protocol.

REQUIREMENTS

This section defines the mandatory syntax of the SCTE-HMS-HE-OPTICAL-SWITCH-MIB. It follows the IETF Simple Network Management Protocol (SNMP) for defining managed objects.

The syntax is given below.

SCTE-HMS-HE-OPTICAL-SWITCH-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-COMPLIANCE, OBJECT-GROUP
        FROM SNMPv2-CONF
    OBJECT-TYPE, MODULE-IDENTITY, Unsigned32, Integer32
      FROM SNMPv2-SMI
    DisplayString
      FROM SNMPv2-TC
    entPhysicalIndex
      FROM ENTITY-MIB
    HeFaultStatus,HeHundredthNanoMeter,
    HeTenthdB, HeTenthdBm, HeOnOffControl
      FROM SCTE-HMS-HEADENDIDENT-MIB
    heOpticalSwitchGroup
      FROM SCTE-HMS-HE-OPTICS-MIB;

heOpticalSwitchMIB MODULE-IDENTITY
    LAST-UPDATED "200310090000Z" -- Oct 9, 2003
    ORGANIZATION "SCTE HMS Working Group"
    CONTACT-INFO
        "SCTE HMS Subcommittee, Chairman
         mailto: standards@SCTE.org"

     DESCRIPTION
         "The MIB module for the HMS HE Optical Switch module
                             entities.

                    This MIB module is for representing optical
                    switch equipment present in the headend (or indoor)
                    and is supported by a SNMP agent.

                    This MIB is limited in its scope and intended to
                    describe an A-B (2 input and 1 output) or a crossbar
                    optical switch. Up to 2 optical inputs and 2 outputs
                    are supported. Any devices with more than 2 optical
                    inputs or outputs shall be covered by another MIB.

                    This MIB does not intend to dictate all of the nuances
                    involved in changing control settings (automatic or
                    manual mode, changing switch controls in each possible
                    mode combination). The most common desired behaviors
                    are noted but specific switch operation and behavior
                    are left to the optical switch vendors.

                    Not all control enumerations must be supported. This
                    is noted in the variables that have optional
                    enumerations.

                    Refer to the associated notes for information on what
                    SNMP responses should be returned for unsupported
                    enumerations."

    ::= { heOpticalSwitchGroup 1 }

heOpSwitchMIBObjects OBJECT IDENTIFIER ::= { heOpticalSwitchMIB 1}

-- Every optical switch is modeled by the tables presented
-- in this MIB module. These tables extend the entPhysicalTable
-- according to RFC 2737. The extension index entPhysicalIndex uniquely
-- identifies the optical switch.

-- Every optical switch is also modeled by the following tables:
--   entPhysicalEntry - 1 row; (defined in document: RFC2737)
--   heCommonEntry   - 1 row. (defined in document: HMS111)

-- Every optical switch module will have its alarms modeled by the table:
--   propertyEntry - x rows; (defined in document: HMS026)
--   (where x is the nos. of alarmable analog properties supported
--   by the optical switch)

--   discretePropertyEntry - y rows; (defined in document: HMS026)
--   (where y is the nos. of alarmable digital properties supported by
--   the optical switch)

-- Every optical switch module will have a list of currently active
-- alarms modeled by the table:
--   currentAlarmEntry - z rows; (defined in document: HMS026)
--   (where z is the nos. of current active alarms in the optical
--   switch)

-- Thus, an A-B optical switch (2 optical inputs and one optical output)
-- will be represented by one row in entPhysicalTable, one row in
-- heCommonTable, one row in heOpSwitchUnitTable, two rows in
-- heOpSwitchInputTable and one row in heOpSwitchOutputTable.

-- Additionally, a crossbar optical switch (2 inputs and 2 outputs)
-- will be represented by one row in entPhysicalTable, one row in
-- heCommonTable, one row in heOpSwitchUnitTable, two rows
-- in heOpSwitchInputTable and two rows in heOpSwitchOutputTable.

-- Correlation of outputs and inputs are indicated by the heOpSwitchState
-- variable. Correlation of physical inputs and outputs to
-- heOpSwitchInputTable and heOpSwitchOutputTables rows is indicated
-- by the heOpSwitchInputDescription and heOpSwitchOutputDescription
-- variables.

--   the Optical Switch Unit Table
heOpSwitchUnitTable OBJECT-TYPE
   SYNTAX   SEQUENCE OF HeOpSwitchUnitEntry
   MAX-ACCESS not-accessible
   STATUS   current
   DESCRIPTION
       "A table containing information about Optical Switch used
       in an indoor environment."
   ::= { heOpSwitchMIBObjects 1 }

heOpSwitchUnitEntry OBJECT-TYPE

```
    SYNTAX              HeOpSwitchUnitEntry
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
      "List of information about each optical switch."
  INDEX { entPhysicalIndex }
    ::= { heOpSwitchUnitTable 1 }


HeOpSwitchUnitEntry ::= SEQUENCE {
  heOpSwitchMode                                          INTEGER,
  heOpSwitchControl           INTEGER,
  heOpSwitchRevertEnable         HeOnOffControl,
  heOpSwitchState             INTEGER,
  heOpSwitchFailoverStatus        HeFaultStatus,
  heOpSwitchBothInputStatus        HeFaultStatus,
  heOpSwitchSelectWavelength              HeHundredthNanoMeter,
  heOpSwitchHysteresis         HeTenthdB,
  heOpSwitchWaitToRestoreTime      Integer32
}

heOpSwitchMode OBJECT-TYPE
  SYNTAX    INTEGER {
    automatic(1),
    manual(2)
  }
  MAX-ACCESS            read-write
  STATUS       current
  DESCRIPTION
      "This controls and/or reports the switching mode.  If
                  automatic(1), the optical switch will evaluate the optical
                  input status and make the decision to affect the switch state.
                  If set to manual(2), the optical switch will not affect the
                  switch state itself."


    ::= { heOpSwitchUnitEntry 1 }


heOpSwitchControl OBJECT-TYPE
  SYNTAX    INTEGER {
    pathA(1),
    pathB(2),
    cross(3),
    bar(4),
    bothA(5),
    bothB(6)
  }
  MAX-ACCESS            read-write
  STATUS       current
  DESCRIPTION
      "Sets the intended state of the Optical Switch. The effect
                  of this control will depend on the value of heOpSwitchMode.
                  If heOpSwitchMode is set to automatic, the value this
                  control is set to will be the preferred setting.  If it is
                  set to manual, the switch will assume this setting.  Actual
                  switch operation while changing switch control value(s)
                  is up to the equipment vendor. For example, if the switch
```

is in manual mode and the operator tries to connect the output to an invalid input, the switch may or may not change state.

Not all enumerations must be supported. For example, an A-B optical switch may support only the pathA and pathB enumerations while a cross-bar switch may support cross, bar, bothA or bothB or only cross and bar but not pathA and pathB enumerations. See the note below about the expected SNMP response.

A value pathA(1) connects the switch output to side A
(first input) of the switch. This enumeration is intended for use by an A-B switch.

A value pathB(2) connects the switch output to side B
(second input) of the switch. This enumeration is intended for use by an A-B switch.

A value cross(3) connects the switch outputs to the inputs
as follows:
Side A (first or primary) output is connected to side B (second or alternate) input.
Side B (second or alternate) output is connected to side A (first or primary) input.
This enumeration is intended for use by a cross-bar switch.
A value bar(4) connects the switch outputs to the inputs as
follows:
Side A (first or primary) output is connected to side A (first or primary) input.
Side B (second or alternate) output is connected to side B (second or alternate) input.
This enumeration is intended for use by a cross-bar switch.

A value bothA(5) connects the switch outputs to the inputs as
follows:
Side A (first or primary) output is connected to side A (first or primary) input.
Side B (second or alternate) output is connected to side A (first or primary) input.
This enumeration is intended for use by a cross-bar switch.

A value bothB(6) connects the switch outputs to the inputs
as follows:
Side A (first or primary) output is connected to side B (second or alternate) input.
Side B (second or alternate) output is connected to side B (second or alternate) input.
This enumeration is intended for use by a cross-bar switch.

*** IMPORTANT ***
It is NOT required that an optical switch support all enumerations. A SET request for an unsupported value shall yield a badValue(3) error by an SNMPv1 agent or an inconsistentValue(12) by an SNMPv2 agent."

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```
   ::= { heOpSwitchUnitEntry 2 }


heOpSwitchRevertEnable OBJECT-TYPE
   SYNTAX      HeOnOffControl
   MAX-ACCESS           read-write
   STATUS      current
   DESCRIPTION
       "This controls the use of revertive switching.


               If set to on, the switch will attempt to go back to the
               preferred settings indicated by heOpSwitchControl if
               heOpSwitchMode is set to automatic, and the input status
               of the preferred input is normal.  The switch will not
               attempt to revert to the settings indicated by
               heOpSwitchControl until heOpSwitchWaitToRestoreTime
               (if supported) has expired since the preferred input was
               restored to normal levels.


               If set to off, the switch will not attempt to go back to
               the preferred settings indicated by heOpSwitchControl if
               heOpSwitchMode is set to automatic, and the input status
               of the preferred input is normal.
               "

   ::= { heOpSwitchUnitEntry 3 }


heOpSwitchState OBJECT-TYPE
   SYNTAX      INTEGER {
     pathA(1),
     pathB(2),
               cross(3),
               bar(4),
               bothA(5),
               bothB(6)
   }
   MAX-ACCESS  read-only
   STATUS      current
   DESCRIPTION

       "Reports the state of the Optical Switch.  Not all enumerations
                   must be supported.  For example, an A-B optical switch may
                   support only the pathA and pathB enumerations while a
                   cross-bar switch may support cross, bar, bothA or bothB or
                   only cross and bar but not pathA and pathB enumerations.

       A value pathA(1) indicates that the switch output is being
       fed by side A (first input) of the switch.  This enumeration
                   is intended for use by an A-B switch.

       A value pathB(2) indicates that the switch output is being
       fed by side B (second input) of the switch. This enumeration
                   is intended for use by an A-B switch.
```

A value cross(3) indicates that the switch outputs are fed as
    follows:
     Side A (first or primary) output is connected to side B
     (second or alternate) input.
     Side B (second or alternate) output is connected to side A
     (first or primary) input.
     This enumeration is intended for use by a cross-bar switch.

A value bar(4) indicates that the switch outputs are fed as
    follows:
     Side A (first or primary) output is connected to side A
     (first or primary) input.
     Side B (second or alternate) output is connected to side B
     (second or alternate) input.
     This enumeration is intended for use by a cross-bar switch.

A value bothA(5) indicates that the switch outputs are fed as
    follows:
     Side A (first or primary) output is connected to side A
     (first or primary) input.
     Side B (second or alternate) output is connected to side A
     (first or primary) input.
     This enumeration is intended for use by a cross-bar switch.

A value bothB(6) indicates that the switch outputs are fed as
    follows:
     Side A (first or primary) output is connected to side B
     (second or alternate) input.
     Side B (second or alternate) output is connected to side B
     (second or alternate) input.
     This enumeration is intended for use by a cross-bar switch."

 ::= { heOpSwitchUnitEntry 4 }

heOpSwitchFailoverStatus OBJECT-TYPE
 SYNTAX HeFaultStatus
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
  "The integral status of both inputs.

  A value is fault(2), if current switch state heOpSwitchState
     is different than the preferred setting heOpSwitchControl,
     otherwise, it is normal(1).

  This object must provide for the alarm management capabilities
  with a corresponding entry in the discretePropertyTable of
  SCTE-HMS-PROPERTY-MIB (HMS026).

  An alarm shall be recorded as an entry in the currentAlarmTable
  of SCTE-HMS-PROPERTY-MIB (HMS026).

  A log record shall be added as an entry in the heCommonLogTable.

  An heCommonAlarmEvent notification shall be sent."

::= { heOpSwitchUnitEntry 5 }

heOpSwitchBothInputStatus OBJECT-TYPE
  SYNTAX   HeFaultStatus
  MAX-ACCESS read-only
  STATUS   current
  DESCRIPTION
     "The integral status of both inputs.

     A value is fault(2), if both input levels are below
     the nominal value; otherwise, it is normal(1).

     This object must provide for the alarm management capabilities
     with a corresponding entry in the discretePropertyTable of
     SCTE-HMS-PROPERTY-MIB (HMS026).

     An alarm shall be recorded as an entry in the currentAlarmTable
     of SCTE-HMS-PROPERTY-MIB (HMS026).

     A log record shall be added as an entry in the heCommonLogTable.

     An heCommonAlarmEvent notification shall be sent."

  ::= { heOpSwitchUnitEntry 6 }

heOpSwitchSelectWavelength OBJECT-TYPE
  SYNTAX   HeHundredthNanoMeter
  UNITS   "0.01 nm"
  MAX-ACCESS read-write
  STATUS   current
  DESCRIPTION
     "Wavelength feeding the particular input of the optical switch.
     Typical values might be 131000 (1310 nm) and 155000 (1550 nm)."
  ::= { heOpSwitchUnitEntry 7 }

heOpSwitchHysteresis OBJECT-TYPE
  SYNTAX   HeTenthdB (-20..20)
  UNITS   "0.1 dB"
  MAX-ACCESS read-write
  STATUS   current
  DESCRIPTION
     "Controls switch input hysteresis amount. The amount of hysteresis
          used and the ability to change it is to be determined by
          the vendor."
  ::= { heOpSwitchUnitEntry 8 }

heOpSwitchWaitToRestoreTime OBJECT-TYPE
  SYNTAX   Integer32
  UNITS   "1 sec"
  MAX-ACCESS read-write
  STATUS   current
  DESCRIPTION
     "Controls hysteresis time in sec.

     If in automatic switching mode and revert mode is enabled,

　　　　　　　　　　　　a switch back to the original side will be delayed for
　　　　　　　　　　　　the time specified by this object."
　::= { heOpSwitchUnitEntry 9 }

-- 　 the Optical Switch Input Table
heOpSwitchInputTable OBJECT-TYPE
　SYNTAX　　SEQUENCE OF HeOpSwitchInputEntry
　MAX-ACCESS　not-accessible
　STATUS　　current
　DESCRIPTION
　　　"A table containing information about each Optical Switch
　　　　　　　　　input used in an indoor environment."
　::= { heOpSwitchMIBObjects 2 }

heOpSwitchInputEntry OBJECT-TYPE
　SYNTAX HeOpSwitchInputEntry
　MAX-ACCESS not-accessible
　STATUS current
　DESCRIPTION
　　　"List of information about each optical switch input."
　INDEX { entPhysicalIndex, heOpSwitchInputIndex }
　　::= { heOpSwitchInputTable 1 }

HeOpSwitchInputEntry ::= SEQUENCE
{
　heOpSwitchInputIndex　　　　　　　　Unsigned32,
　heOpSwitchInputOpticalLevel　　HeTenthdBm,
　heOpSwitchSetInputPowerThreshold　HeTenthdBm,
　heOpSwitchInputStatus　　　　HeFaultStatus,
　heOpSwitchInputDescription　　　DisplayString
}

heOpSwitchInputIndex OBJECT-TYPE
　SYNTAX　　Unsigned32
　MAX-ACCESS　not-accessible
　STATUS　　current
　DESCRIPTION
　　　"Index number corresponding to the Optical Input."
　::= { heOpSwitchInputEntry 1 }

heOpSwitchInputOpticalLevel OBJECT-TYPE
　SYNTAX　　HeTenthdBm
　UNITS　　"0.1 dBm"
　MAX-ACCESS　read-only
　STATUS　　current
　DESCRIPTION
　　　"The measured optical input power for the optical switch."
　::= { heOpSwitchInputEntry 2 }

heOpSwitchSetInputPowerThreshold OBJECT-TYPE
　SYNTAX　　HeTenthdBm
　UNITS　　"0.1 dBm"
　MAX-ACCESS　read-write
　STATUS　　current

DESCRIPTION
"Input power switchover point for this input."
::= { heOpSwitchInputEntry 3 }

heOpSwitchInputStatus OBJECT-TYPE
  SYNTAX   HeFaultStatus
  MAX-ACCESS read-only
  STATUS   current
  DESCRIPTION
    "The integral status of the input.

    A value is fault(2), if the input levels are not in
    the nominal range; otherwise, it is normal(1).

    This object must provide for the alarm management capabilities
    with a corresponding entry in the discretePropertyTable of
    SCTE-HMS-PROPERTY-MIB (HMS026).

    An alarm shall be recorded as an entry in the currentAlarmTable
    of SCTE-HMS-PROPERTY-MIB (HMS026).

    A log record shall be added as an entry in the heCommonLogTable.

    An heCommonAlarmEvent notification shall be sent."

  ::= { heOpSwitchInputEntry 4 }

heOpSwitchInputDescription OBJECT-TYPE
    SYNTAX   DisplayString (SIZE (0..32))
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
        "A description of the switch input. The description text is
        to be determined by the equipment manufacturer. For example,
        Input A or Side B."
  ::= { heOpSwitchInputEntry 5 }

--   the Optical Switch Output Table
heOpSwitchOutputTable OBJECT-TYPE
  SYNTAX   SEQUENCE OF HeOpSwitchOutputEntry
  MAX-ACCESS not-accessible
  STATUS   current
  DESCRIPTION
    "A table containing information about each Optical Switch
                    output used in an indoor environment."
  ::= { heOpSwitchMIBObjects 3 }

heOpSwitchOutputEntry OBJECT-TYPE
  SYNTAX   HeOpSwitchOutputEntry
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
    "List of information about each optical switch output."
  INDEX { entPhysicalIndex, heOpSwitchOutputIndex }

```
    ::= { heOpSwitchOutputTable 1 }

HeOpSwitchOutputEntry ::= SEQUENCE
{
  heOpSwitchOutputIndex                  Unsigned32,
  heOpSwitchOutputDescription    DisplayString
}

heOpSwitchOutputIndex OBJECT-TYPE
  SYNTAX     Unsigned32
  MAX-ACCESS  not-accessible
  STATUS     current
  DESCRIPTION
      "Index number corresponding to the Optical Output."
  ::= { heOpSwitchOutputEntry 1 }


heOpSwitchOutputDescription OBJECT-TYPE
        SYNTAX        DisplayString (SIZE (0..32))
        MAX-ACCESS            read-only
        STATUS        current
        DESCRIPTION
                "A description of the switch output.  The description text is
                to be determined by the equipment manufacturer.  For example,
                Output A or Secondary Output."
  ::= { heOpSwitchOutputEntry 2 }


-- conformance information
heOpSwitchMIBConformance OBJECT IDENTIFIER ::= { heOpticalSwitchMIB 2 }

heOpSwitchMIBCompliances OBJECT IDENTIFIER ::= { heOpSwitchMIBConformance 1 }

heOpSwitchMIBGroups     OBJECT IDENTIFIER ::= { heOpSwitchMIBConformance 2 }

heOpSwitchBasicCompliance MODULE-COMPLIANCE
  STATUS  current
  DESCRIPTION
      "The compliance statement for SNMP HMS Headend Optical
                        Switch entities which implement the SNMP
                        heOpticalSwitchMIB."
  MODULE  -- this module
    MANDATORY-GROUPS { heOpSwitchUnitMandatoryGroup,
                        heOpSwitchInputMandatoryGroup,
                                        heOpSwitchOutputMandatoryGroup

            }

  ::= { heOpSwitchMIBCompliances 1 }

heOpSwitchUnitMandatoryGroup OBJECT-GROUP
  OBJECTS {
                                heOpSwitchMode,
                                heOpSwitchControl,
                                heOpSwitchState,
                                heOpSwitchFailoverStatus
```

```
                              }
    STATUS  current
    DESCRIPTION
        "The main group defines heOpSwitchUnitTable objects which
                            are mandatory to all indoor optical switch modules."
    ::= { heOpSwitchMIBGroups 1 }


heOpSwitchInputMandatoryGroup OBJECT-GROUP
    OBJECTS {
            heOpSwitchInputStatus,
                                    heOpSwitchInputDescription
        }
    STATUS  current
    DESCRIPTION
        "The main group defines heOpSwitchInputTable objects which
                            are mandatory to all indoor optical switch modules."
    ::= { heOpSwitchMIBGroups 2 }

heOpSwitchOutputMandatoryGroup OBJECT-GROUP
    OBJECTS {
             heOpSwitchOutputDescription
        }
    STATUS  current
    DESCRIPTION
        "The main group defines heOpSwitchOutputTable objects which
                            are mandatory to all indoor optical switch modules."
    ::= { heOpSwitchMIBGroups 3 }


heOpSwitchUnitGroup OBJECT-GROUP
    OBJECTS {
                                    heOpSwitchRevertEnable,
                                    heOpSwitchBothInputStatus,
                                    heOpSwitchSelectWavelength,
                                    heOpSwitchHysteresis,
                                    heOpSwitchWaitToRestoreTime
        }
    STATUS  current
    DESCRIPTION
            "The collection of heOpSwitchUnitTable objects which are used to
                    represent the indoor optical switch module."
    ::= { heOpSwitchMIBGroups 4 }

heOpSwitchInputGroup OBJECT-GROUP
    OBJECTS {
                                    heOpSwitchInputOpticalLevel,
                                    heOpSwitchSetInputPowerThreshold
        }
    STATUS  current
    DESCRIPTION
            "The collection of heOpSwitchInputTable objects which are used to
                    represent the indoor optical switch module."
    ::= { heOpSwitchMIBGroups 5 }


END
```