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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 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."

::= { 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

```