Management via SNMP

This chapter provides information about using Simple Network Management Protocol (SNMP) commands for remote system monitoring and control. This system recognizes SNMP v1 and v2c commands.

Introduction

Simple network management protocol (SNMP) is an ISO standard communication protocol widely used by network and element management systems to monitor network devices for both alarms and other significant conditions.

SNMP accesses information about network devices through management information base (MIB) objects. MIBs are hierarchical tree-structured descriptions used to define database elements. SNMP is used to manage individual data elements and the values assigned to MIB objects.

SNMP addresses a single MIB object using a numeric string called an object identifier (OID). The OID defines a branching path through the hierarchy to the location of the object. In addition to the OID, a MIB object is identified by its object descriptor. Both are unique to each MIB object.

Also defined for each MIB object is the access that SNMP can afford to the object data value. For example, if a MIB object has read-write access, SNMP can be used to both get (retrieve) and set (define or change) the value of the object. If an object is read-only, SNMP can be used to get the object value, and cannot change it.

MIBs Used in the iNode

MIBs used in the iNode are listed in the following table. There are not any proprietary MIBs in the iNode; only standard MIBs are supported.

HMS MIBs and Related MIBs -- MODULE	Load and Compile Order
Prerequisites	SNMPv2-SMI, SNMPv2-TC, SNMPv2-CONF, SNMPv2-MIB, INET-ADDRESS-MIB
HMS028 - SCTE-ROOT	SCTE-ROOT
HMS072 - SCTE-HMS-ROOTS	SCTE-ROOT, SCTE-HMS-ROOTS
HMS025 - SCTE-HMS-FIBERNODE-MIB	SCTE-ROOT, SCTE-HMS-ROOTS, RFC1215-MIB, SCTE-HMS-FIBERNODE-MIB
HMS024 - SCTE-HMS-COMMON-MIB	SCTE-ROOT, SCTE-HMS-ROOTS, RFC1215-MIB, SCTE-HMS-COMMON-MIB
HMS023 - SCTE-HMS-ALARMS-MIB	SCTE-ROOT, SCTE-HMS-ROOTS, RFC1215-MIB, SCTE-HMS-COMMON-MIB, SCTE-HMS-ALARMS-MIB
HMS026 - SCTE-HMS-PROPERTY-MIB	SCTE-ROOT, SCTE-HMS-ROOTS, SCTE-HMS-PROPERTY-MIB
SNMP-TARGET-MIB	SNMP-FRAMEWORK-MIB, SNMP-TARGET-MIB
SNMP-FRAMEWORK-MIB	SNMP-FRAMEWORK-MIB
SNMP-NOTIFICATION-MIB	SNMP-FRAMEWORK-MIB, SNMP-TARGET-MIB, SNMP-NOTIFICATION-MIB

The following access codes (Code) are used in the MIB tables in this chapter.

Code	Description	
RO	Read Only	Data is displayed for reading.
RW	Read-Write	Data can be read and changed.
na	Not Applicable	Data is not applicable to the equipment.

SNMP Community String

You should change the SNMP community string only using the LCS or iNode Manager. It is an alphanumeric string of not more than 32 characters.

MIB-2 System MIB

The System MIB gives an overview for the iNode. By default, sysContact, sysName, and sysLocation can be changed. All three are saved in nonvolatile memory.

Note The iNode does not have a Real Time Clock (RTC). Therefore, sysUpTime is only a time estimate.

HMS MIB Specifications

SCTE-HMS-PROPERTY-MIB

The Property MIB consists of the following tables:

- analog properties table
- discrete alarms table
- current alarms table

Note Information contained in the current alarms table can be determined by studying the other Property MIB tables.

Analog Property Table

The analog property table allows you to adjust certain alarm thresholds, hysteresis values, and settings with respect to alarm and trap generation. The thresholds displayed by the property MIB fall into two categories.

1. Thresholds that cannot be changed (na and RO in the following table). These parameters are informational and cannot be changed. Since the MIB itself has read-write access, you can edit the table. However, if an edited value has read-only access in the module, information coming from the module on the next polling cycle will overwrite your edits for that particular setting.
2. Threshold values that represent alarm thresholds (Alarm). These are used to generate a trap if the monitored value crosses one of these thresholds.

Equipment	Parameter OID	Thresholds Changed	Code
LinePowerVoltage	fnLinePowerVoltage	na	RO
nodeTemperature	commonInternalTemperature	Alarm	RW
Transmitter	fnReturnLaserOpticalPower	na	RO
Receiver	fnOpticalReceiverPower	na	RO

Equipment	Parameter OID	Thresholds Changed	Code
Power Supply	fnDCPowerVoltage	Alarm	RW

The following table indicates the default values for the analog properties table.

Name	Major Hi	Minor Hi	Minor Lo	Major Lo	Dead band	Units
fnLinePowerVoltage	95	90	45	40	1	VAC
commonInternalTemperature	70	65	-35	-40	2	degC
fnReturnLaserOpticalPower	-30	-50	-120	-150	10	mW
fnOpticalReceiverPower	16	13	2	1	1	mW
fnDCPowerVoltage (-6Vb)	-46	-48	-64	-66	1	0.1 VDC
fnDCPowerVoltage (5Vb)	72	70	53	51	1	0.1 VDC
fnDCPowerVoltage (8Vb)	99	97	81	79	2	0.1 VDC
fnDCPowerVoltage (24Vb)	265	263	241	239	1	0.1 VDC

Current Alarm Table Sample

Instance	currentAlarmOID	currentAlarmAlarmState	currentAlarmVal
12.1.3.6.1.4.1.5591.1.3.1.12.0	commonTamperStatus	caasDiscreteMajor(6)	2

Discrete Property Table

The discrete property table alerts you when a specific monitored value changes state. The alarms are set up to send a trap when a value changes from a nominal state to alarm state. Some are also set up to signal other states. The following table provides an overview of discrete property parameters and the values that may cause trap generation.

Equipment	Parameter OID	discreteAlarmValue
TamperSwitch	commonTamperStatus	Compromised(2)

SCTE-HMS-ALARMS-MIB

The alarm MIB keeps a copy of the last 50 alarms generated when a monitored value crosses an alarm threshold. The alarmLogTable contains the alarmLogInformation OID with values defined in the properties of the OID. Significant is the fifth octet that describes the Alarm Type as an enumeration representing one of the following:

1. Nominal

2. HiHi
3. Hi
4. Lo
5. LoLo
6. Discrete Major
7. Discrete Minor

Starting with octet seven until the value at the end, the OID of the monitored value causing the alarm state displays. Finally, the actual value shows in the last few octets. Traps are similar to the logged alarms.

Table 1: Alarm Table Sample

Ins	alarmLogIndex	alarmLogInformation
11	11	5A.7B.5A.FB.06.08.0C.2B.06.01.04.01.AB.57.01.03.01.0C.00.02.02.00.02

In the preceding sample, the commonTamperStatus, with a numeric OID of 1.3.6.1.4.1.5591.1.3.1.12.0 or hexadecimal 2B.06.01.04.01.AB.57.01.03.01.0C.00, is in an alarm state of 6 (Discrete Major) with a value of 2 (compromised) or 00.02 in hexadecimal. The commonTamperStatus, has a positive value. However, if the value of a monitored item is negative then the hex value would display like the following example. For the decimal value of -242, the hexadecimal equivalent is FF.0E. The 12 (or hex 0C) at the start of the OID in the current alarm table instance is the number of octets in the OID that follows.

Table 2: Alarm Log Example Shown With Decimal and OID Equivalents

	Alarm Type	OID	Value	Value
Octet	5	7-m	n-z	decimal
Hex	06	06.01.04.01.AB.57.01.03.01.0C.00	00.02	2
Decimal	6	1.3.6.1.4.1.5591.1.3.1.12.0		
OID		SCTE-HMS-COMMON-MIB:: commonTamperStatus.0		

SCTE-HMS-COMMON-MIB

The Common MIB is self-explanatory. A few significant OIDs are highlighted here. The iNode's serial number is found in commonSerialNumber, the iNode's software version is found at commonVendorInfo, while the MAC address is found in commonPhysAddress. Set commonReset to 1 to reboot the iNode. This triggers a software upgrade, if a newer image exists (see Software Upgrade).

SCTE-HMS-FIBERNODE-MIB

The fibernode MIB displays data related to the transmitters, receivers, redundancy, and power supplies.