



# Quantum Scalar *i2000* / *i6000* Library

# Scalar Library

Scalar i2000 / i6000 Basic SNMP Guide, 6-01159-04, May 2010, Made in USA.

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## About This Guide and Your Product

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This reference guide describes the basic usage of the Simple Network Management Protocol (SNMP) to acquire alert information from the Scalar® i2000 / i6000 library. Focus is placed on the most critical information available through Traps and Management Information Base (MIB) queries. For information about the Scalar i2000 / i6000 library, itself, refer to the *Scalar i6000 User's Guide*. For information on integrating MIBs into a SNMP management application, contact your software vendor.

The information presented in this document represents the most commonly requested MIB objects and SNMP Traps needed to monitor the Scalar i2000 / i6000 from a network management tool. For more information about the Scalar i2000 / i6000 MIBs, contact technical support.

This basic SNMP reference is written for library customers, partners, third party management software developers, and other parties interested in integrating the Scalar i2000 / i6000 library with commercial management frameworks.

This document assumes the reader has a working knowledge of SNMP. The reader should be able to compile a MIB on their specific framework application, perform SNMP GET operations, as well as understand how to collect Traps and filter them for information.

## Explanation of Symbols and Notes

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The following symbols appear throughout this document to highlight important information.



**WARNING**

**INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR BODILY INJURY.**



**CAUTION**

**Indicates a situation that may cause possible damage to equipment, loss of data, or interference with other equipment.**



**Note**

Indicates important information that helps you make better use of your system.

## Other Documents you Might Need

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The following documents are also available for this product. These documents can be found on the product CD or at [www.quantum.com/support](http://www.quantum.com/support).

- *Scalar i6000 User's Guide (6-00421-xx)*



### Note

Release Notes are also available for this product. The Release Notes describe changes to your system or firmware since the last release, provide compatibility information, and discuss any known issues and workarounds. The Release Notes can be found in the product box or at [www.quantum.com/support](http://www.quantum.com/support)

## Getting More Information or Help

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More information about this product is available on the Service and Support website at [www.quantum.com/support](http://www.quantum.com/support). The Service and Support Website contains a collection of information, including answers to frequently asked questions (FAQs). You can also access software, firmware, and drivers through this site.

For further assistance, or if training is desired, contact Quantum:

Global Call Handling:

1-800-284-5101

For additional contact information:

[www.quantum.com/support](http://www.quantum.com/support)

To open a Service Request:

[www.quantum.com/osr](http://www.quantum.com/osr)

For the most updated information on Quantum Global Services, please visit: [www.quantum.com/support](http://www.quantum.com/support)





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## Description

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SNMP is a light-weight protocol designed for remote management and monitoring of infrastructure devices. On the Scalar i2000 / i6000, SNMP support is included for alert monitoring by means of framework applications. SNMP should be used as an initial check for library events.

In-depth monitoring and alert management are handled using the Library Management Console (LMC). The LMC provides access to descriptions of subsystem status and to the RAS ticket system, which gives administrators the ability to diagnose specific subsystem events.

### SNMP Functionality Available to External Applications

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The Scalar i2000 / i6000 provides standard SNMP functionality for monitoring library status. This includes GET queries and unicast Traps (sent only to registered recipients). SET commands are not currently enabled on the Scalar i2000 / i6000.

The MIB variables described in this document are the only ones supported by Quantum for external management of the library. All other variables in the MIB are for internal use only.

Specific Scalar i2000 / i6000 SNMP characteristics include:

- Support for SNMP v1 and v2c
- Usage of well known ports for GETs (161)
- Default community read/Trap strings: *publicCmtyStr*
- Trap Registration interface in the LMC to configure application IP addresses and user-configurable UDP port numbers to receive Traps

The MIB files can be retrieved using the Scalar i2000 / i6000 LMC option **Tools > Retrieve MIBs**.

### Accessing SNMP Information

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SNMP information is accessed from the Scalar i2000 / i6000 through Traps and GET queries. Using the information contained in this guide, an administrator can configure their framework application to receive Scalar i2000 / i6000 SNMP information and generate alerts.

By default, SNMP information gathered will be an integer value (logical partition names will be string values). For instance, the return value of *Library Main Door* might be 2. As outlined in this manual, a return value of 2 would indicate that the library door is closed.

It is possible to have the framework return a status value and a description of the status. To accomplish this, the ADIC MIBs must be compiled and integrated with the framework application. In this case, the return value of Library Main Door might be *closed(2)*. The required MIBs are discussed in [MIBs Implemented](#) on page 17 and are available from your Quantum representative.

## SNMP Traps

Traps are automatically sent to registered hosts when specific events occur. You can only have one application per port listening for traps, so if you have more than one application, make sure that you specify a UDP port on which to send traps.

### To receive Traps, you must perform two steps:

- 1 Configure the framework application to collect Traps from the Scalar i2000 / i6000.
- 2 Using the LMC **Trap Registration** feature, register the host's IP address and UPD port number on the Scalar i2000 / i6000.

Registration informs the Scalar i2000 / i6000 that Traps should be sent to the host. For details on registering a host with the Scalar i2000 / i6000, see the *Scalar i6000 User's Guide* or the LMC online help.

## SNMP Queries

GET queries are initiated on a periodic basis by the framework application. By querying the MIB, hosts can gather status information about specific components of the library. Frequent MIB queries are not required, however, since the SNMP agent is event-driven.



### CAUTION

**As with any SNMP device, excessive MIB queries can result in performance degradation for the SNMP daemon, as well as for the network.**

GETs must also include an instance number. This instance ID tells the Scalar i2000 / i6000 what specific device to provide status information on. For example, to see if the 2nd logical library on a Scalar i2000 / i6000 was online, you would access the MIB variable for logical library online status and select the instance for logical library 2.

The format of each instance may vary depending on the subsystem component. This document provides a listing of the instance format for each MIB variable you may need to query. You will notice that almost every instance contains 8.0.0.0.0.1.0.59. This is the identifier for the Management Control Blade (MCB), the device that manages the Scalar i2000 / i6000.

Therefore, if you were querying logical library status, you might see the following two instances returned.

Instance	Number	Description
1	8.0.0.0.0.1.0.59.1	the first logical library
2	8.0.0.0.0.1.0.59.2	the second logical library

Selecting instance 8.0.0.0.0.1.0.59.2 would indicate if the second logical library was online or offline.



### Note

All Scalar i2000 / i6000 MCB's will have the same identifier: 8.0.0.0.0.1.0.59

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## Library Identification

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The two MIB variables below are available in the ADIC Intelligent Storage MIB from the *productAgentInfoGroup*. The *productAgentInfoGroup* is a group of scalar objects that contains information about the library as a whole. All objects in *productAgentInfoGroup* have instance ID “.0”. Unless otherwise noted, all variables are defined in the ADIC Management MIB.

### Product Name

---

**OID:** 1.3.6.1.4.1.3764.1.1.10.3

**Name:** productName (defined in the ADIC Intelligent Storage MIB)

**Type:** DisplayString

**Values:** Indicates the type of library.

**Instance:** There is one instance for this variable and it is unique for the entire library. Quantum recommends querying the **Product Name** so that the framework application will list the type of library being monitored.

### Logical Library Name

---

**OID:** 1.3.6.1.4.1.3764.1.1.200.20.90.20.1.3

**Name:** name

**Type:** DisplayString

**Values:** Returns the logical library name. Logical library is another name for a library partition.

**Instance:** There will be one instance for each partition configured on the library. Query the specific instance that you need to access.

Logical libraries are listed using the format:

- 8.0.0.0.0.0.1.0.59.1

The final number (1 in this instance) is the partition number.

To determine the number of partitions, query the MIB variable:

- 1.3.6.1.4.1.3764.1.1.200.20.90.10.1.2

Query **Logical Library Name** so that the framework application will list the specific partition that is monitored.



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## Library Status and Health

You can poll the variables below to get library status and health information.

### Drive Online/Offline Status

**OID:** 1.3.6.1.4.1.3764.1.1.200.20.80.110.1.29

**Name:** phDriveOnlineStatus

**Type:** INTEGER

**Values:** online(1), offline(2), shutdown(3). Currently the drive object never returns shutdown(3)

**Description:** This variable indicates whether a drive is varied on or varied off.

**Instance:** There will be one instance for every physical drive in the library. Query the specific instance that you need to access. Drives are listed in sequential order.

See [Table 1](#) for details on interpreting the format of a drive instance ID.

**Table 1** Drive Instance ID Format

Instance Information									Description
8.0.0.0.0.0.1.0.59.4.2.0.0.0.3.0.0									If this is the full instance name...
8.0.0.0.0.0.1.0.59	-	-	-	-	-	-	-	-	Identifies the library MCB
	4	-	-	-	-	-	-	-	Media domain
	-	2	-	-	-	-	-	-	Media type
	-	-	0	-	-	-	-	-	Aisle
	-	-	-	0	-	-	-	-	Frame
	-	-	-	-	0	-	-	-	Rack
	-	-	-	-	-	3	-	-	Section
	-	-	-	-	-	-	0	-	Column
	-	-	-	-	-	-	-	0	Row

The numbers associated with the aisle, frame, rack, section, column, and row combine to form a location coordinate. For more about the library location coordinates and how they can tell you where a drive is located in the physical library, refer to the *Scalar i6000 User's Guide*.

**Alerted by Trap:** 403

## Drive Overall Health

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**OID:** 1.3.6.1.4.1.3764.1.1.200.20.80.110.1.31

**Name:** phDriveRasStatus

**Type:** INTEGER

**Values:** good(1), failed(2), degraded(3), warning(4), informational(5), unknown(6), invalid(7)

**Description:** The overall health of the drive is indicated by the phDriveRasStatus object.

**Instance:** There will be one instance for every physical drive in the library. Query the specific instance that you need to access. Drives are listed in sequential order. See [Table 1](#) on the previous page for details on interpreting the format of a drive instance ID.

**Alerted by Trap:** 403

## Physical Library Online/Offline State

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**OID:** 1.3.6.1.4.1.3764.1.1.200.20.80.10.1.5

**Name:** onlineStatus

**Type:** INTEGER

**Values:** online(1), offline(2), shutdown(3)

**Description:** The online/offline state of the entire library is returned by the onlineStatus object.

**Instance:** There will be one instance for the Scalar i2000 / i6000, 8.0.0.0.0.1.0.59.

**Alerted by Trap:** 101

## Robotics Readiness

---

**OID:** 1.3.6.1.4.1.3764.1.1.200.20.80.10.1.6

**Name:** readiness

**Type:** INTEGER

**Values:** ready(1) or notReady(2).

**Description:** The readiness state of the library robotics is returned by the readiness object.

**Instance:** There will be one instance for the Scalar i2000 / i6000, 8.0.0.0.0.1.0.59.

**Alerted by Traps:** 110, 111

## Library Main Door Status

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**OID:** 1.3.6.1.4.1.3764.1.1.200.20.80.10.1.16

**Name:** physLibDoorStatus

**Type:** INTEGER

**Values:** open(1), closed(2), closedAndLocked(3), closedAndUnlocked(4), controllerFailed(5).

**Description:** The state of the library's main door is returned by the physLibDoorStatus object.

**Instance:** There will be one instance for the Scalar i2000 / i6000, 8.0.0.0.0.1.0.59. This refers to a front door on any module.

**Alerted by Trap:** 102

## Import/Export Station Door Status

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**OID:** 1.3.6.1.4.1.3764.1.1.200.20.80.75.1.2

**Name:** physLibIStationDoorStatus

**Type:** INTEGER

**Values:** open(1), closed(2), closedAndLocked(3), closedAndUnlocked(4), controllerFailed(5).

**Description:** The state of the Import/Export station door is returned by the phleStationDoorStatus object.

**Instance:** There will be one instance for each frame of the library containing an I/E station. You will need to query for the instance. It will be of the format: 8.0.0.0.0.1.0.59.1.1.1.1

See [Table 2](#) for details on interpreting the format of an I/E station instance ID.

**Alerted by Trap:** 103

**Table 2** I/E Station Instance ID Format

Instance Information					Description
8.0.0.0.0.1.0.59.1.1.1.1					If this is the full instance name...
8.0.0.0.0.1.0.59	-	-	-	-	Identifies the library MCB
	1	-	-	-	Aisle coordinate
	-	1	-	-	Frame coordinate
	-	-	1	-	Rack coordinate
	-	-	-	1	I/E station ID number

## Partition Online/Offline Status

---

**OID:** 1.3.6.1.4.1.3764.1.1.200.20.90.20.1.12

**Values:** online(1), offline(2)

**Instance:** There will be one instance for every logical partition defined on the library. Query the specific instance that you need to access. Partitions are listed using the format: 8.0.0.0.0.1.0.59.1

Where the final number (1 in this instance) is the partition number. To determine the number of partitions, query the MIB variable: 1.3.6.1.4.1.3764.1.1.200.20.90.10.1.2. Names of the partitions can be found using OID 1.3.6.1.4.1.3764.1.1.200.20.90.20.1.3. Refer to [Logical Library Name](#) on page 7 for more information.

**Alerted by Trap:** 204

## Overall Library Health: RAS Subsystem Status

---

The Reliability, Availability and Serviceability (RAS) system status table provides a concise way to assess the health of the library's subsystems. The library functionality is divided into six status groups: connectivity, control, cooling, drives and media, power, and robotics.

Querying this variable will give the status of the last state transition (i.e. a subsystem has changed its status to good.) Determining the precise reason for a status setting other than "good" can be accomplished using the LMC and accessing the subsystem RAS tickets.

**OID:** 1.3.6.1.4.1.3764.1.1.200.20.100.10.1.2

**Values:** good(1), failed(2), degraded(3), warning(4), informational(5), unknown(6), invalid(7)

**Instance:** There will be one instance for each of the 6 key subsystems monitored by the library. Query the specific instance that you need to access. Subsystem instances are listed using the format:

8.0.0.0.0.1.0.59.1

Where the final number (1 in this example) is the subsystem. connectivity(1), control(2), cooling(3), drives and media(4), power(5), robotics(6)

**Alerted by Traps:** 400, 401, 402, 403, 404, 405

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## SNMP Traps

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This section describes the basic set of SNMP system status traps issued by the Scalar i2000 / i6000. These traps present the physical library point of view, not that of a particular partition.

### ADIC Intelligent Storage MIB

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Traps defined in the Intelligent Storage MIB are issued with enterprise OID “intelligent”, which resolves to 1.3.6.1.4.1.3764.1.1.

#### **Trap # 500: startupSequenceCompleted**

This trap indicates that the library has completed its boot sequence.

#### **Trap # 501: shutdownSequenceInitiated**

This trap indicates that the library has started its shutdown sequence, which includes reboot and shutdown.

### ADIC Management MIB

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These informational traps are defined in the ADIC Management MIB. Each is issued with enterprise OID “management”, which resolves to 1.3.6.1.4.1.3764.1.1.200.20.

#### **Trap # 101: physLibraryOnlineStatusChange**

This trap is issued when the physical library is brought online or taken offline.

#### **Trap # 102: physLibraryDoorStatusChange**

This trap is issued when the physical library door has been opened, closed, closed and locked, closed and unlocked, or when the controller has failed.

#### **Trap # 103: ieStationDoorStatusChange**

This trap is issued when an I/E station door has been opened, closed, locked or unlocked.

### Trap # 110: rcuReady

This trap is issued whenever the i2000 / i6000 robotics transitions from the “not ready” state to the “ready” state.

### Trap # 111: rcuNotReady

This trap is issued whenever the i2000 / i6000 robotics transitions from the “ready” state to the “not ready” state. For example, this trap will be issued if the front door is opened or the robotics are disabled.

### Trap # 204: logicalLibraryOnlineStatusChange

This trap is issued when a logical library, also known as a partition, is brought online or taken offline.

## RAS System Status Change Traps

The i2000 / i6000 issues a trap whenever the aggregate state of one of the six RAS status groups changes. Listening for these traps is the preferred method of monitoring the health of the Scalar i2000 / i6000. The payload of each of these traps is very similar; it is summarized in the table below.

**Table 3** RAS System Status Change Trap Payload Description

Payload Element	Description
componentId	Identifies the management control blade which is hosting the RAS system. For i2000 / i6000, the varbind value is always set to 8.0.0.0.0.1.0.59.
trapSequenceNumber	This integer uniquely identifies the Trap.
trapSeverity	Not Used
trapSummaryText	Not Used
rasStatusGroupIndex	RAS group whose status has changed; connectivity(1), control(2), cooling(3), drivesAndMedia(4), power(5), and robotics(6)
rasStatusGroupStatus	New state; good(1), failed(2), degraded(3), warning(4), informational(5), unknown(6), or invalid(7)
rasTicketId	This is beyond the scope of this document.
rasReportId	This is beyond the scope of this document.

### Trap # 400: connectivityGroupStatusChange

The state of the connectivity hardware/software has changed.

### Trap # 401: controlGroupStatusChange

The state of the control hardware/software has changed.

### Trap # 402: coolingGroupStatusChange

The state of the cooling hardware/software has changed.

**Trap # 403: drivesAndMediaGroupStatusChange**

The state of the drives and media hardware/software has changed.

**Trap # 404: powerGroupStatusChange**

The state of the power hardware/software has changed.

**Trap # 405: roboticsGroupStatusChange**

The state of the robotics hardware/software has changed.





## MIBs Implemented

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The MIBs implemented with the Scalar i2000 / i6000 library include the ADIC Intelligent Storage MIB, ADIC Management MIB, and the SANMgr Proxy MIB.

### ADIC Intelligent Storage MIB

The ADIC Intelligent Storage MIB presents the following generic information that is applicable to almost any product:

- System identification (product name and serial number)
- Composition: a list of system components with identification and status for each
- Traps for a changed configuration (added and removed components)
- Library startup and shutdown traps

### ADIC Management MIB

The ADIC Management MIB contains the management details of the Scalar i2000 / i6000 tape library, including:

- Library online and offline status
- Library composition
  - Storage (cartridge capacity)
  - Drives
  - Media
- Library partitioning
- Advanced status information: Reliability, Availability and Serviceability (RAS) functionality

### SANMgr Proxy MIB

The SANMgr Proxy MIB is beyond the scope of this document, and so is not covered here.

- Connectivity blade information

## Reference MIBs

The Scalar i2000 / i6000 MIBs reference the following SNMP standard MIBs:

- RFC 1155-SMI
- RFC 1212
- RFC 1213-MIB
- RFC 1215

These MIBs are necessary for accurate compilation of the Scalar i2000 / i6000 MIBs, and should be included with your framework application.



## Variables and Traps Quick Reference

Use the two tables in this appendix to quickly see the MIB variables and Traps described in this document.

**Table 4** Status MIB Variables

Because the front portion of the MIB variable object ID (OID), 1.3.6.1.4.1.3764.1.1, is the same for all variables defined in the ADIC MIBs, it is omitted in the OID column to save space. For example, the actual OID of the **Drive Online/Offline Status** variable is: 1.3.6.1.4.1.3764.1.1.200.20.80.110.1.29.

Event	OID	Description
<b>Drive Online / Offline Status</b>	...200.20.80.110.1.29	Indicates if the drive is online or offline. Use the LMC to confirm the drive is varied on. Also, check power.
<b>Drive Overall Health</b>	...200.20.80.110.1.31	Indicates the overall status of the drive. If the drive has a health status other than good, use the LMC to determine what RAS tickets have been generated for the drive.
<b>Physical Library Online / Offline Status</b>	...200.20.80.10.1.5	Indicates if the library is online or offline. Use the LMC to confirm the library is online and not being configured.
<b>Robotic Readiness</b>	...200.20.80.10.1.6	Indicates the status of the library robotics. Make sure the module door(s) are closed and the robotics are online.
<b>Library Main Door</b>	...200.20.80.10.1.16	Indicates if the front door(s) of the library modules(s) are closed and locked.
<b>IE Station Door Status</b>	...200.20.80.75.1.2	Indicates if a specific IE station door is closed and locked.
<b>Logical Partition Online / Offline Status</b>	...200.20.90.20.1.12	Indicates if a specific partition is online or offline. Use the LMC to confirm the partition is online and not being configured.
<b>RAS Subsystem Status</b>	...200.20.100.10.1.2	Indicates the status of a particular subsystem of the library. If the value returned is anything but good, use the LMC to determine what events have been logged in the RAS ticket system.

**Table 5** Status Traps

<b>Event</b>	<b>Trap ID</b>	<b>Description</b>
<b>Physical Library Online Status Change</b>	101	Issued when the physical library is brought online or taken offline.
<b>Physical Library Door Status Change</b>	102	Issued when the physical library door has been opened, closed, locked, or unlocked.
<b>I/E Station Door Status Change</b>	103	Issued when a partition has been brought online or taken offline.
<b>RCU Ready</b>	110	Issued when the robotics go from “not ready” to “ready” state.
<b>RCU Not Ready</b>	111	Issued when the robotics go from “ready” to “not ready” state. Traps 110 and 111 may occur as part of a startup or shutdown procedure. If seen at another time, it may indicate that the front door is open.
<b>Logical Library Online Status Change</b>	204	Issued when a logical library, also known as a partition, is brought online or taken offline.
<b>RAS Status Change: Connectivity</b>	400	Issued when the status of the connectivity subsystem changes, which includes the I/O management unit, I/O blades, and other components. This may indicate a change to “good” status, so check the return value for required action. If the return value shows an issue, use the LMC to determine the corrective actions.
<b>RAS Status Change: Control</b>	401	Issued when the status of the control subsystem changes, which includes system firmware, the operator panel, and the MCB, RCU, and other control blades. If the return value shows an issue, use the LMC to determine the corrective actions.
<b>RAS Status Change: Cooling</b>	402	Issued when the status of the cooling subsystem changes. If the return value shows an issue, use the LMC to determine the corrective actions.
<b>RAS Status Change: Drives and Media</b>	403	Issued when the status of the drives and/or media (including drive brick firmware) changes. If the return value shows an issue, use the LMC to determine the corrective actions.
<b>RAS Status Change: Power</b>	404	Issued when the status of the power subsystem changes. If the return value shows an issue, use the LMC to determine the corrective actions.
<b>RAS Status Change: Robotics</b>	405	Issued when the status of the robotics subsystem changes. If the return value shows an issue, use the LMC to determine the corrective actions.
<b>Startup Sequence Completed</b>	500	Indicates the library startup sequence has completed.
<b>Shutdown Sequence Completed</b>	501	Indicates the library shutdown sequence has completed.

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