



Optelecom 9000 Series Installation and Operation Manual

Model 9900-SNMP

9900-SNMP software includes Optelecom's enterprise MIB files. These files are used with SNMP management software. *The MIB files **do not** include SNMP management software.* The MIB files contain information associated with the Optelecom plug-in cards for the Optelecom Series 9000 chassis that is required for an SNMP management package to communicate with the 9942A Management Card via Ethernet.

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Functional Description

The 9900-SNMP Management Software Interface package includes TKH Security USA's enterprise MIB files. These files are used with SNMP management software. The MIB files contain information associated with the TKH Security USA plug-in cards for the Series 9000 chassis that is required for an SNMP management package to communicate with the TKH Security USA management cards via Ethernet.

NOTE: *This package **does not** include the SNMP management software.*

Operation of SNMP Management Software

Note: This section requires a basic understanding of SNMP protocol and management concepts.

Use of the SNMP software requires the installation of 9942A management cards in each chassis to be managed via SNMP. The 9942A SNMP management card monitors and manages cards on one or more Series 9000 chassis via Ethernet connections to the PC running the SNMP manager software.

The 9942A SNMP agent communicates with any off-the-shelf SNMP Manager software that supports the SNMPv1 or SNMPv2c standards. Examples of such software applications include SNMPc, MGSoft, and HP OpenView. The details of the SNMP manager configuration vary from one vendor's implementation to another. You should refer to the manual of your SNMP manager software as you read the procedures described in this section.

SET UP AND OPERATION CONSISTS OF THESE STEPS:

1. Configure each 9942A in your system for Ethernet operation. Refer to the 9942A manual for instructions on configuration for SNMP operation.
2. If required, run the Management Upgrade Utility (MUU). Details can be found in the 9942A manual (see the "Management Upgrade using the Management Upgrade Utility (MUU)" section).

Operation of SNMP Manager Software

Normally, the SNMP manager needs to be configured to operate with the TKH Security USA equipment using the following generic steps:

- Load and compile the TKH Security USA MIB files (OPTC-SMI.txt and OPTC-CHASSIS-MIB.txt) into your SNMP manager application. *NOTE: You may need to change the file extension from '.txt' to something that your SNMP manager recognizes. For example, when using SNMPc, you should change MIB filenames to OPTC-SMI.mib and OPTC-CHASSIS-MIB.mib.*
- Create an SNMP-entity node in the manager to identify the Series 9000 chassis (with the 9942A card) that you wish to manage. Enter node properties such as IP address, SNMP version (SNMPv1 or SNMPv2c) and community string ("public").
- Browse the standard MIBs under MIB-II and the various TKH Security USA MIB objects using the MIB browser tools included in your SNMP manager software. You can view data items individually or in tabular format.

Using the SNMP Agent

The following sections describe the MIB data supported by the 9942A SNMP agent and how to use the data to manage the cards in an TKH Security USA Series 9000 chassis.

SNMP MIB DATA

The 9942A SNMP agent software provides management data that consists of both standard MIB data as well as private enterprise MIB data.

STANDARD MIBS

The 9942A SNMP agent supports the following standard MIBs under MIB-II (RFC1213):

- *system*
- *snmp*
- *interfaces*
- *ip, icmp*
- *tcp*
- *udp*

TKH SECURITY USA SERIES 9000 CHASSIS MIB

The 9942A SNMP agent supports an TKH Security USA private enterprise MIB, the TKH Security USA Series 9000 Chassis MIB. This MIB provides the following management data:

Chassis Data

- Chassis model number
- Alarm level
- Trap destination configuration

Generic Card Data

- Card identification and overall alarm level
- Applicable analog parameter information
- Applicable status parameter information
- Applicable control parameter information

Specific Card Data

- Information specific to particular card models such as 9984 Fiber Monitor & Switch Card (FMSC) configuration information

Event Data

SNMP trap definitions for:

- Chassis test trap event (to test SNMP sink configuration)
- Card insertion/removal
- Analog and status parameter alarm level events
- Specific card events

The following subsections describe the major components of the TKH Security USA Series 9000 Chassis MIB.

Generic Card Table (optcGenCardTable)

The generic card table is indexed by 'Slot index'. The slot index corresponds to a slot in the Series 9000 chassis. Slot numbers in a Series 9000 chassis range from 0 to 20. Integer indices in SNMP are required to start from 1. Therefore, the 'Slot index' object ranges in value from 1 to 21. Each row in the generic card table contains the following information:

- Slot index
- Slot number
- Slot status (empty/occupied)
- Card width (number of slots occupied by the card)
- Card model number
- Card serial number
- Card hardware revision
- Card firmware revision
- Number of power cycles applied to the card
- Card uptime (in hours)
- Overall card alarm level
- *Configuration save state (control variable to save configuration to card's NVRAM)*
- *Use defaults (control variable to set configuration parameters to default values)*

Analog Table (optcAnalogTable)

The analog table contains information about analog parameters (if applicable) associated with cards present in the Series 9000 chassis. The analog table is indexed by {Slot index, Analog index}. The Analog index uniquely identifies an analog parameter among all analog parameters associated with a particular card. Each card can have up to 6 analog parameters. Therefore, the analog index can range in value from 1 to 6. Each row in the analog table contains the following information:

- Slot index
- Analog index
- Slot number
- Description of the analog parameter
- Value (current value of the parameter, typically a floating point value)
- *Minimum Threshold (an alarm is generated if the parameter value falls below this threshold)*
- *Maximum Threshold (an alarm is generated if the parameter value rises above this threshold)*
- *Admin Alarm Level (user configurable alarm level for the parameter; can be one of Disabled, Info, Minor, Major)*
- *Operational Alarm Level (current alarm level evaluated by comparing current value with minimum and maximum thresholds and checking the user-configured admin alarm level; can be one of Disabled, OK, Info, Minor, Major)*

Status Table (optcStatusTable)

The status table contains information about status parameters (if applicable) associated with cards present in the Series 9000 chassis. The status table is indexed by {Slot index, Status index}. The Status index uniquely identifies a status parameter among all status parameters associated with a particular card. Each card can have up to 12 status parameters. Therefore, the status index can range in value from 1 to 12. Each row in the status table contains the following information:

- Slot index
- Status index
- Slot number
- Description (of the status parameter)
- State (current state of the parameter, for example, Present/Not Present)
- *Admin Alarm Level (user configurable alarm level for the parameter; can be one of Disabled, Info, Minor, Major)*
- *Operational Alarm Level (current alarm level evaluated using current state and user-configured admin alarm level; can be one of Disabled, OK, Info, Minor, Major)*

Control Table (optcControlTable)

The control table contains information about control parameters (if applicable) associated with cards present in the Series 9000 chassis. The control table is indexed by {Slot index, Control index}. The Control index uniquely identifies a status parameter among all control parameters associated with a particular card. Each card can have up to 3 control parameters. Therefore, the control index can range in value from 1 to 3. Each row in the status table contains the following information:

- Slot index
- Control index
- Slot number
- Description (of the control parameter)
- *State (user-configurable current state: can be one of set/clear)*

Chassis Trap Sink Table

This MIB table allows the user to configure the destination (sink) and type of SNMP traps generated by the 9942A. Currently, the 9942A allows only one trap sink to be configured at a time. Therefore, the Trap Sink Table has only one entry. This entry contains the following read/writable items:

- IP address of the trap sink
- TRAP PDU version to generate (SNMPv1 or SNMPv2)
- *Control variable to save the above settings to 9942A flash memory*
- *Trigger variable to trigger the sending of a Chassis Test Event trap to the trap sink configured*

SNMP OPERATIONS

This section describes the various management operations you can perform using the SNMP MIB data described in the previous section.

GET CHASSIS STATUS

Chassis status includes the following information:

- Alarm level (overall alarm level of chassis)
- Model number
- Trap sink (destination) configuration table (see section "Chassis Trap Sink Table")

The above information can be obtained by doing SNMP Get operations on these objects. For example, *<snmpget> 192.168.0.80 public chassisModelNumber.0*

where,

<snmpget> is the SNMP get command for your SNMP manager
192.168.0.80 is the IP address of the 9942A
'public' is the community string
chassisModelNumber.0 is the Object Identifier

GET GENERIC CARD INFORMATION

Common information about each slot and card in the chassis is obtained from the genCardTable MIB table. You can view the entire table all at once using the appropriate command of your SNMP manager. If you want generic card information for only one slot/card, for example a card in slot 0, do an SNMP Get for that particular slot index (1).

To get the model number for the power supply card in slot 0:

<snmpget> 192.168.0.80 public genCardModel.1

To get how many slots the power supply card in slot 0 occupies:

<snmpget> 192.168.0.80 public genCardSlotWidth.1

GET ANALOG AND STATUS PARAMETER INFORMATION

A Series 9000 chassis compatible card typically has one or more analog and status parameters associated with it. You can retrieve this information from the Analog and Status MIB tables. For example, if you want to get the description of the first analog parameter of a card in slot 0, you can use the following command:

```
<snmpget> 192.168.0.80 public analogDesc.1.1
```

SET CONTROL PARAMETER VALUES

A Series 9000 chassis compatible card may have one or more control parameters associated with it. You can set the control parameters using the Control MIB Table. For example, if you want to set the value of the first control parameter of a card in slot 0, you can use the following command:

```
<snmpset> 192.168.0.80 public controlVal.1.1 = set
```

CONFIGURE ALARM LEVELS AND THRESHOLDS

Each analog and status parameter can be configured with an alarm level (Disabled, Info, Minor, Major). The user can set this alarm level using:

- *AnalogAdminAlarmLevel* object in the Analog MIB table for analog parameters
- *StatusAdminAlarmLevel* object in the Status MIB table for status parameters

Analog parameters also can be configured with corresponding minimum and maximum threshold values. When the analog parameter values cross these thresholds (with hysteresis boundaries of +/-3%), the 9942A SNMP agent generates traps. The thresholds can be configured using the following objects in the Analog MIB table:

- *AnalogValMinThresh*
- *AnalogValMaxThresh*

To save the alarm level and threshold values permanently in the corresponding card's NVRAM:

- Set the *genCardConfigSaveState* object in the Generic Card table to 'saving'
- Get the *genCardConfigSaveState*. The value should read 'save complete'

RECEIVE SNMP TRAPS

The 9942A supports both SNMPv1 and SNMPv2 trap Product Data Unit (PDU) generation. The following SNMP traps are generated by the 9942A:

1. Standard Traps

- Cold Start

2. TKH Security USA Enterprise Traps

- Chassis Test Event: user triggered trap to test configuration of trap sink (destination)
- Generic Card Events (*genCardInserted*, *genCardRemoved*): card insertion and removal from chassis
- Analog and Status Alarm Events: The 9942A SNMP agent generates traps corresponding to the alarm levels of the various analog and status parameters.

To receive traps, the user should configure the following objects in the *chassisTrapSinkTable*:

1. Set *trapSinkIpAddr.1* to the IP address of your SNMP manager that can receive and process SNMP trap PDUs
2. Set *trapSinkVersion.1* to 'v1' to receive SNMPv1 trap PDUs or 'v2' to receive SNMPv2 TRAP PDUs
3. Set *trapSinkDataSaveState.1* to 'saving'
4. Get *trapSinkDataSaveState.1*. The value should read 'save complete'
5. Set *trapSinkTestTrapTrigger.1* to 'send'. Your SNMP manager should receive an SNMP trap event called 'chassisTestEvent' from the 9942A.

Steps 3 and 4 configure the trap sink information in the 9942A SNMP agent and also save the information in 9942A flash memory.

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