



**INSTRUCTION MANUAL**  
**FOR**  
**MODEL IOC450**  
**SNMP MANAGEMENT MODULE**

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## CHAPTER I OVERVIEW

### 1. OVERVIEW

This IOC450 SNMP Management Module for the AL2873 Chassis provides 10/100/1000 Ethernet remote control over the chassis and all installed modules. All commands and parameters that are available through our standard remote control interface are available to the IOC450. The SNMP Management Module provides secure remote control interactions between the AL2873 Chassis and the user via SSH and SNMPv3. Also available as a remote control interface is a Telnet server that is disabled by default. The IOC450 provides the ability to add and remove users, as well as set different permissions for specific users.

The SNMP functionality of the IOC450 supports versions 1, 2c and 3 as they are defined by the Internet Engineering Task Force (IETF). The Management Information Bases (MIBs) for the AL2873 chassis and all modules supported by the AL2873 are available to the user on the CD that accompanies the IOC450. The MIBs describe the structure of the management data of each device and also contain the Object Identifiers (OIDs) for easy integration into your Network Management System (NMS).

For more information about SNMP, MIBs, and OIDs visit: [www.ietf.org](http://www.ietf.org).

For more information about the AL2873 and available modules visit: [www.apogeelabs.com](http://www.apogeelabs.com).

## CHAPTER II SPECIFICATIONS

### 2 SPECIFICATIONS

#### Ethernet Interfaces:

- 10/100/1000 Mbps Ethernet Connectivity
- Protocols Supported
  - SNMP v1, v2c, v3
  - SSH
  - Telnet
  - TCP/IP
  - ARP

#### Remote Control:

- SNMP – versions 1, 2c, and 3
- SSH – Secure Shell
- Telnet – Unix/Linux Telnet and Microsoft Telnet Supported (Subset of functionality)
- NNAT Compatible
- User Level Access Control

#### Environment:

- Operating Temperature: 0° C to +50° C
- Storage Temperature: -40° C to +70° C
- Relative Humidity: up to 95% non-condensing

#### Mechanical:

- Single Slot Module (6" x 3" x 0.9")

## CHAPTER III INSTALLATION

### 3. INSTALLATION

To install the IOC450 SNMP Management Module, remove power from the AL2873 chassis and install the IOC450 into slot 14. (NOTE: The IOC450 **must** be installed in slot 14, if the module is installed in any other slot, it will not be able to control any other installed modules) Attach the IOC450 to a switch or router and reconnect power to the AL2873.

To setup the IP configuration of the IOC450, go to the setup page for the module on the front panel of the AL2873. To access slot 14, press the exit button, then press 1, then press 4. The IP configuration settings take effect as soon as they are entered.

## CHAPTER IV REMOTE CONTROL OVERVIEW

### 4. REMOTE CONTROL OVERVIEW

All control interfaces have the same set of commands and parameters. These commands and parameters will be shown in the next chapters. The interface used to show the commands and parameters is Mozilla Firefox, followed by descriptions of each parameter. The commands, parameters, and values described in the next sections are valid through each interface. All commands in this document are denoted by **BOLD** font, all parameters in this document are denoted by ***BOLD ITALIC*** font, and all values in this document are denoted by ***BOLD ITALIC COURIER*** font.

The currently available remote control servers on the IOC450 are Telnet, SSH and SNMP. Please refer to the following sections for how to connect to each server with different clients.

#### 4.1 Compatible Clients

##### 4.1.1 Windows Clients

For Windows the following clients have been tested on the IOC450:

- Telnet Clients
  - Command Line Telnet
  - Putty
- SSH Clients
  - Putty
- SNMP Clients

##### 4.1.2 Linux/Unix Clients

The following Linux/Unix Clients have been tested on the IOC450:

- Telnet Clients
  - Command Line Telnet
- SSH Clients
  - OpenSSH Clients
- SNMP Clients
  - OpenNMS
  - Net-SNMP Clients, snmpget, snmpset, snmpwalk

## 4.2 User Created Software

For information on how to create compatible software, please see Application Note AP-30 on <http://www.apogeelabs.com/> . User created software is the sole responsibility of the creator, of said software, and Apogee Labs is not responsible for the support of non-Apogee Labs software.

## 4.3 Connecting to the Servers

### 4.3.1 Port Numbers

The following port numbers are user configurable, for more information see section 5.

Port Name	Default Port Number
SSH Port	22
Telnet Port	23
SNMP Server Port	161
SNMP Trap Port	162

### 4.3.2 Default User names and Passwords

The default user name is “admin” with the default password of “password”. See section 5.2 for more on user names, user levels and passwords.

## 4.4 SSH and Telnet Interface

After logging in, both the SSH and Telnet interfaces are virtually identical to the user. The following sections will further explain how to communicate to the unit using these two protocols. All remote controls are sent as simple ASCII packets. The format of these packets are:

COMMAND\r\n

COMMAND PARAMETER\r\n

COMMAND PARAMETER=VALUE\r\n

All packets should end with either a \r\n or \n, both are accepted. Both commands and parameters are case-insensitive and most values are also case-insensitive, with the exception of user parameters. All server responses will end with either an ACK (>) or NACK (?).



### 4.4.1 Read Commands

Read commands, combined with the parameter will return the current value of the parameter, i.e.:

```
Client – read PCM Input Rate\r\n
Server – PCM Input Rate=999,997\r\n>
```

### 4.4.2 Set Commands

Set commands require both the parameter and the new value. The server response will return the parameter, value and ACK if correct or the error response and a NACK.

```
Client – set interface=TTL\r\n
Server – Interface=TTL\r\n>

Client – set PCM Input Rate=10,000,000\r\n
Server – Unknown Parameter for Set\r\n?
```

### 4.4.3 Slot and List Slots Commands

In order to navigate between modules, the user must use the slot command to change the current number of the slot which is being controlled. To find the currently controlled slot, type slot\r\n, this will return the current slot number:

```
slot\r\n
Slot=14\r\n>
```

To change slots, type slot=NN\r\n, where NN is 0-16. The response, if valid is the same as the response to any set command. If the slot number is not valid, the response will report an error, i.e.:

```
Client – Slot=1\r\n
Server – Invalid slot\r\n?
```

To list the populated slots, use the list slots command, i.e.:

```
Client – list slots\r\n
Server – Slots\r\n
06 – IOC502TX, IOC502TX, A\r\n
07 – IOC504RX, IOC504RX, A\r\n
08 – IOC561TX, IOC561TX, A\r\n
09 – IOC561RX, IOC561RX, A\r\n
10 – IOC597TX, IOC597TX, A\r\n
11 – IOC597RX, IOC597RX, A\r\n
14 – IOC450, IOC450, 1.0.0\r\n>
```

Each of these commands are available regardless of which module is being controlled.

#### 4.4.4 Help Command

The **Help** command lists all the available commands for the module, showing which are READ/WRITE (RW) and which are READ-ONLY (RO). The **Help** response will have the following header:

```
<Module name> Ver. <Version Number><CR>>
```

The format of the following lines is:

```
<parameter name>: <parameter type>, <parameter attributes>, <parameter append>,  
<parameter value1>,..., <parameter valueN><CR>>
```

The <parameter type> is one of the following:

- DEC – Decimal
- TXT – Text
- STR – String
- HEX – Hex
- FLO – Float
- IP – IP address

The <parameter attributes> is one of the following:

- RO – read only
- RW – read write

The <parameter append> is a maximum of 10 characters long, this can be any value, i.e. ms, Mbps, kbps.

The <parameter values> is one of the following:

- <min>, <max> – for numerical ranges
- <value1>, <value2>,..., <valueN> – for text fields

Since all of the lines are returned in multiple buffers, the lines may be broken up into multiple lines. The second line always begins with a space.

#### 4.5 SNMP Interface

The SNMP OID for the AL2873 is .1.3.6.1.4.1.29609.2873 and the SNMP OID for the IOC450 is .1.3.6.1.4.1.29609.2873.1509376. Each module which can be installed in the AL2873 has a module-specific OID. The MIBs for modules will be supplied on a CD when receiving new systems or modules.

### 4.5.1 SNMP Traps

The IOC450 automatically creates traps for Read-Only parameters for all modules installed in the AL2873 Chassis.

## CHAPTER V REMOTE CONTROL PARAMETERS

### 5 REMOTE CONTROL PARAMETERS

The following remote control parameters are specific to the IOC450 module. The heading for each is the SSH and Telnet character string for each parameter. Under each section the following information is defined: the SNMP Name (according to the MIB), the attributes (Read-only or Read/Write), the possible values for the parameter, its default value, and a description of the parameter.

#### 5.1 IP Setup Parameters

##### 5.1.1 IP Address

**SNMP Name:** alloc450IpAddr

**Attributes:** Read/Write

**Values:** 0.0.0.1 – 255.255.255.255

**Default:** 192.168.0.5

**Description:**

Valid IP addresses are in the form of xxx.xxx.xxx.xxx, where xxx is a number from 0-255. Invalid addresses include 0.0.0.0, 127.0.0.1 and 255.255.255.255. When the IP Configuration is in DHCP mode, the IP Address will contain the address received from the DHCP server.

##### 5.1.2 Netmask

**SNMP Name:** alloc450Netmask

**Attributes:** Read/Write

**Values:** 0.0.0.1 – 255.255.255.255

**Default:** 255.255.255.0

**Description:**

A valid netmask is in the form of xxx.xxx.xxx.xxx, where xxx is a number from 0-255. Common netmasks are 255.255.255.0, 255.255.254.0, and 255.255.255.224. When in DHCP mode the netmask will default to the netmask of the DHCP server.

##### 5.1.3 Gateway

**SNMP Name:** alloc450Gateway

**Attributes:** Read/Write

**Values:** 0.0.0.1 – 255.255.255.255

**Default:** 192.168.0.1

**Description:**

The gateway address is the address the node uses to reach another network. This address is

typically the first address in the range of available IP addresses on the network. For example, if the network is setup to support 192.168.0.1 to 192.168.0.255, the gateway will usually be found at 192.168.0.1. Usually the DHCP server's IP address is also the gateway address.

#### 5.1.4 PHY Status

**SNMP Name:** allIoc450PhyStatus

**Attributes:** Read-Only

**Values:** 1000FD, 100FD, 100HD, 10FD, 10HD

**Default:** 1000FD

**Description:**

The PHY Status reports the current negotiated link speed between the module and the network.

#### 5.1.5 Ethernet Bytes Sent

**SNMP Name:** allIoc450TxBytes

**Attributes:** Read Only

**Values:** 0 – 2,147,483,647

**Default:** 0

**Description:**

The *Ethernet Bytes Sent* is the total number of bytes sent across the network, including the bytes in the PCM data packets and any communication bytes.

#### 5.1.6 Ethernet Bytes Received

**SNMP Name:** allIoc450RxBytes

**Attributes:** Read Only

**Values:** 0 – 2,147,483,647

**Default:** 0

**Description:**

The *Ethernet Bytes Received* is the total number of bytes received from the network, including the bytes in the PCM data packets and any communication bytes.

#### 5.1.7 Dropped Packets

**SNMP Name:** allIoc450DroppedPackets

**Attributes:** Read Only

**Values:** 0 – 2,147,483,647

**Default:** 0

**Description:**

The **Dropped Packets** parameter shows the number of packets that have been dropped during transmission over the network. If dropped packets are seen, contact an IT expert to evaluate the network infrastructure to ensure there are no problems.

### 5.1.8 Commit

**SNMP Name:** This parameter is not available via SNMP

**Attributes:** Command

**Values:** None

**Default:** None

**Description:**

**Commit** is a command which will restart all network interfaces and make any changes to the IP configuration take place.

### 5.1.9 Clear

**SNMP Name:** This parameter is not available via SNMP

**Attributes:** Command

**Values:** None

**Default:** None

**Description:**

**Clear** is a command which will clear all IP statuses, specifically Ethernet Bytes Sent, Ethernet Bytes Received, and Dropped Packets.

## 5.2 User Configuration Parameters

### 5.2.1 User Add

**SNMP Name:** This parameter is not available via SNMP

**Attributes:** Write-Only

**Values:** 8 – 16 ASCII Characters for user name and password

**Default:** None

**Description:**

This parameter is used to add a user. When adding a user, both the user name and password must be specified with a comma between the user name and password. For example, set user add=username,password. The default User Level for the user is Read-Only. Modify this by using the User Level parameter, if required. After a user is added, the user will have access to all of the enabled user interfaces.

### 5.2.2 User Remove

**SNMP Name:** This parameter is not available via SNMP

**Attributes:** Write-Only

**Values:** 8 – 16 ASCII Characters

**Default:** None

**Description:**

This parameter is used to remove a user and can only be called by a user with a User Level of Admin. To insure the correct user is being removed, the User Remove Commit parameter must be called with the same user name. The format for this command is set user remove=username. The only user which cannot be removed from the system is the admin user.

### 5.2.3 User Password

**SNMP Name:** This parameter is not available via SNMP

**Attributes:** Write-Only

**Values:** 8 – 16 ASCII Characters

**Default:** None

**Description:**

This parameter is used to modify a user's password. To modify the currently logged in client's password, type set user password=newpassword. In order to modify a different user's password, the currently logged in user must have an admin User Level. The format for this is set user password=username,newpassword. After calling this parameter, the user must then use the User Password Commit parameter in order for the password to be changed. The password on all user interfaces is the same for each user.

### 5.2.4 User Password Commit

**SNMP Name:** This parameter is not available via SNMP

**Attributes:** Write-Only

**Values:** 8 – 16 ASCII Characters

**Default:** None

**Description:**

This parameter is used to commit modifying the user password. The User Password parameter must be called before this parameter.

### 5.2.5 User Level

**SNMP Name:** This parameter is not available via SNMP

**Attributes:** Write-Only

**Values:** Read-Only, Read-Write, Admin

**Default:** None

**Description:**

This parameter is used to change the User Level for a user. The User Level is the same on all user interfaces. The format for this is:

set user level=username,<userlevel>

The Read-Only User Level is to allow for a user to read the current configuration and status of the installed modules.

The Read-Write User Level allows the reading of the configuration and status as well as being able to modify the configuration.

The Admin User Level has the same rights as the previous levels, but also allows for adding and removing users and modifying other users passwords and levels.

## 5.2.6 User List

**SNMP Name:** This parameter is not available via SNMP

**Attributes:** Read-Only

**Values:** List of users

**Default:** None

**Description:**

This parameter lists all users which are currently configured on the unit along with the corresponding User Level. The first response line is User: Level followed by each user and level. All users which are not the last in the list will have a comma after the line. An example response is:

```
User: Level
admin: Admin,
username: Read-Only
>
```

## 5.3 User Interface Parameters

### 5.3.1 Current Control Connections

**SNMP Name:** allIoc450CurrentNumUsers

**Attributes:** Read-Only

**Values:** 0 - 10

**Default:** 0

**Description:**

The Current Control Connections is the total number of users connected to the IOC450.

### 5.3.2 Maximum Control Connections

**SNMP Name:** allIoc450MaxNumUsers

**Attributes:** Read-Write



**Values:** 1 - 10

**Default:** 1

**Description:**

The Maximum Control Connections specifies the total number of users which can connect to the IOC450 at the same time, regardless of user interface.

### 5.3.3 SSH Port

**SNMP Name:** allIoc450SshPort

**Attributes:** Read-Write

**Values:** 1 – 65535

**Default:** 22

**Description:**

The SSH server's default port can be changed using this parameter. This can only be modified by a user with the Admin User Level.

### 5.3.4 Telnet

**SNMP Name:** allIoc450TelnetEnable

**Attributes:** Read-Write

**Values:** Enable, Disable

**Default:** Enable

**Description:**

The Telnet server can be enabled and disabled using this parameter. This can only be modified by a user with the Admin User Level.

### 5.3.5 Telnet Port

**SNMP Name:** allIoc450TelnetPort

**Attributes:** Read-Write

**Values:** 1 – 65535

**Default:** 23

**Description:**

The Telnet server's default port can be changed using this parameter. This parameter can only be modified by a user with the Admin User Level.

### 5.3.6 SNMP

**SNMP Name:** allIoc450SnmpEnable

**Attributes:** Read-Only

**Values:** Enable, Disable

**Default:** Enable

**Description:**

This parameter reports the current status of the SNMP server.

### 5.3.7 SNMP Port

**SNMP Name:** allOc450SnmPort

**Attributes:** Read-Write

**Values:** 1 – 65535

**Default:** 161

**Description:**

The SNMP server's default port can be changed using this parameter. This parameter can only be modified by a user with the Admin User Level.

### 5.3.8 SNMP RO Community

**SNMP Name:** allOc450SnmRoCommunity

**Attributes:** Read-Write

**Values:** 8 – 32 ASCII characters

**Default:** public

**Description:**

This parameter specifies the SNMP version 2c read-only community.

### 5.3.9 SNMP RW Community

**SNMP Name:** allOc450SnmRwCommunity

**Attributes:** Read-Write

**Values:** 8 – 32 ASCII characters

**Default:** private

**Description:**

This parameter specifies the SNMP version 2c read-write community.

### 5.3.10 SNMP SYS Location

**SNMP Name:** allOc450SnmSysLocation

**Attributes:** Read-Write

**Values:** 8 – 32 ASCII characters

**Default:** unknown

**Description:**

This parameter specifies the SNMP sys location response.

### 5.3.11 SNMP SYS Contact

**SNMP Name:** allOc450SnmpSysContact

**Attributes:** Read-Write

**Values:** 8 – 32 ASCII characters

**Default:** support@apogeelabs.com

**Description:**

This parameter specifies the SNMP sys contact response.

### 5.3.12 SNMP Trap Port

**SNMP Name:** allOc450SnmpTrapPort

**Attributes:** Read-Write

**Values:** 1 – 65535

**Default:** 162

**Description:**

The SNMP server's default trap port can be changed using this parameter. This parameter can only be modified by a user with the Admin User Level.

### 5.3.13 SNMP Trap Host

**SNMP Name:** allOc450SnmpTrapHost

**Attributes:** Read-Write

**Values:** 0.0.0.1 – 255.255.255.255

**Default:** 192.168.0.5

**Description:**

This parameter specifies the recipient of any SNMP traps.

### 5.3.14 SNMP Trap Timeout

**SNMP Name:** allOc450SnmpTrapTimeout

**Attributes:** Read-Write

**Values:** 1 – 3600

**Default:** 60

**Description:**

This parameter specifies the timeout between SNMP Traps.

## 5.4 Miscellaneous Parameters

### 5.4.1 Version

**SNMP Name:** alloc450CxVersion

**Attributes:** Read-Only

**Values:** 4 – 8 ASCII Characters

**Default:** None

**Description:**

This parameter specifies the current version of the IOC450 software.

### 5.4.2 Slot#

**SNMP Name:** alloc450Slot#Name (where # is 1 – 14)

**Attributes:** Read-Only

**Values:** 4 – 32 ASCII Characters

**Default:** None

**Description:**

This parameter returns the the module name and version of the card installed in slot #. If no module is installed in slot #, it will return “Unpopulated”.

## CHAPTER VI TROUBLESHOOTING

### 6. TROUBLESHOOTING

If an issue cannot be resolved by any of these troubleshooting steps, please contact customer service whose number is found in the contact section of this manual.

#### 6.1 Cannot login as admin to the IOC450

If the admin password to the IOC450 is unknown, there is a reset button on the back panel of the module. Press this button for 5 seconds and the module will reset the admin password to factory default.

#### 6.2 Finding Port Numbers

The IOC450 has one port open by default, the SSH port (default 22). The Telnet port can also be enabled (default 23). If the SSH port and/or Telnet port are changed to a port other than default and can not be found, a port sniffer such as nmap can be used to find the open ports. Nmap can be downloaded from <http://insecure.org/nmap/> for multiple operating systems. The command for nmap is:

```
nmap 192.168.0.5
```

Nmap will respond with a list of open ports.