7210 SAS OS
Interface Configuration Guide

Software Version: 7210 SAS OS 1.0 Rev. 03
March 2009
Document Part Number: 93-0221-01-02

TABLE OF CONTENTS

Table of Contents

LIST OF TABLES

THIS PAGE LEFT INTENTIONALLY BLANK

LIST OF FIGURES

7210 SAS-Series Interfaces

THIS PAGE LEFT INTENTIONALLY BLANK

Preface

About This Guide

This guide describes system concepts and provides configuration examples to provision input/ output and ports.

This document is organized into functional chapters and provides concepts and descriptions of the implementation flow, as well as Command Line Interface (CLI) syntax and command usage.

Audience

This manual is intended for network administrators who are responsible for configuring the 7210 SAS-Series routers. It is assumed that the network administrators have an understanding of networking principles and configurations, routing processes, and protocols and standards, including:

- CLI concepts
- IOM, MDA, and port configuration
- QoS policies
- Services

List of Technical Publications

The 7210-SAS E OS documentation set is composed of the following books:

- 7210-SAS E OS Basic System Configuration Guide

  This guide describes basic system configurations and operations.

- 7210-SAS E OS System Management Guide

  This guide describes system security and access configurations as well as event logging and accounting logs.

- 7210-SAS E OS Interface Configuration Guide

  This guide describes card, Media Dependent Adapter (MDA), and port provisioning.

- 7210-SAS E OS OS Router Configuration Guide

  This guide describes logical IP routing interfaces and associated attributes such as an IP address, port, link aggregation group (LAG) as well as IP and MAC-based filtering.

- 7210-SAS E OS Services Guide

  This guide describes how to configure service parameters such as customer information and user services.

- 7210-SAS E OS OAM and Diagnostic Guide

  This guide describes how to configure features such as service mirroring and Operations, Administration and Management (OAM) tools.

- 7210-SAS E OS Quality of Service Guide

  This guide describes how to configure Quality of Service (QoS) policy management.

Technical Support

If you purchased a service agreement for your 7210 SAS E-series router and related products from a distributor or authorized reseller, contact the technical support staff for that distributor or reseller for assistance. If you purchased an Alcatel-Lucent service agreement, contact your welcome center:

Web: http://www1.alcatel-lucent.com/comps/pages/carrier_support.jhtml

THIS PAGE LEFT INTENTIONALLY BLANK

GETTING STARTED

In This Chapter

This chapter provides process flow information to configure cards and ports.

Alcatel-Lucent 7210 SAS E-Series Router Configuration Process

Table 1 lists the tasks necessary to provision input/output control and ports.

This guide is presented in an overall logical configuration flow. Each section describes a software area and provides CLI syntax and command usage to configure parameters for a functional area.

Table 1: Configuration Process

Area	Task	Chapter
Provisioning	Chassis slots and cards	Chassis Slots and Cards on page 16
	Ports	Ports on page 17
Reference	List of IEEE, IETF, and other proprietary entities.	Standards and Protocol Support on page 129

THIS PAGE LEFT INTENTIONALLY BLANK

7210 SAS-Series Interfaces

In This Chapter

This chapter provides information about configuring chassis slots, cards, and ports. Topics in this chapter include:

Configuration Overview

Alcatel-Lucent 7210 SAS devices provide the capability to configure chassis slots to accept specific MDA types and set the relevant configurations before the equipment is actually installed. The preprovisioning ability allows you to plan your configurations as well as monitor and manage your router hardware inventory. Ports and interfaces can also be preprovisioned. When the functionality is needed, the card(s) can be inserted into the appropriate chassis slots when required.

The term “auto equipped” is used in the context of IOM and MDA cards that are fixed in the chassis. These are always inserted or equipped on booting. These cards may not be physically differentiated externally.

The term “auto provision” is used in the context of IOM and MDA cards that are preprovisioned by default during bootup. Auto equipped IOM and MDA cards are auto provisioned unless explicitly mentioned.

The following sections are discussed.

Chassis Slots and Cards

To pre-provision a chassis slot, the line card type must be specified as well as the MDA type. System administrators or network operators can enter card type information for each slot, allowing a range of card types in particular slots. From the range of card types, a card and accompanying MDAs are specified. When a card is installed in a slot and enabled, the system verifies that the installed card type matches the allowed card type. If the parameters do not match, the card remains offline. A preprovisioned slot can remain empty without conflicting with populated slots.

Ports

Port Types

Before a port can be configured, the slot must be provisioned with a card type and MDA type specified.

The Alcatel-Lucent 7210 SAS routers support the following port types:

- Ethernet — Supported Ethernet port types include10/100/1000 BaseT and 100/1000 fiber ports. Access uplink ports must be configured as access uplink. The default is access.
  - → Access ports — Configured for customer facing traffic on which services are configured. If a Service Access Port (SAP) is to be configured on the port, it must be configured as an access port. When a port is configured for access mode, the appropriate encapsulation type must be configured to distinguish the services on the port. Once a port has been configured for access mode, one or more services can be configured on the port depending on the encapsulation value.
  - → Access uplink ports — Configured for network facing traffic. These ports participate in the service provider transport or infrastructure network. QinQ is supported on access uplink ports. These ports are similar to network mode ports configured in the Alcatel-Lucent's 7750 SR,7710 SR, and 7450 ESS service routers, and in some aspects, like ingress QoS policies apply per port for access uplink ports.

LAG Features

LAG

Based on the IEEE 802.3ad standard, Link Aggregation Groups (LAGs) can be configured to increase the bandwidth available between two network devices, depending on the number of links installed (from 1 to 2). LAG also provides redundancy in the event that one or more links participating in the LAG fail. All physical links in a given LAG links combine to form one logical interface.

Packet sequencing must be maintained for any given session. The hashing algorithm deployed by Alcatel-Lucent routers is based on the type of traffic transported to ensure that all traffic in a flow remains in sequence while providing effective load sharing across the links in the LAG.

LAGs must be statically configured or formed dynamically with Link Aggregation Control Protocol (LACP). The optional marker protocol described in IEEE 802.3ad is not implemented. LAGs can be configured on access uplink and access ports.

LAG Features

Hardware capabilities:

- The LAG load sharing is executed in hardware, which provides line rate forwarding for all port types.

Software capabilities:

- Conforms to the IEEE LAG implementation.

Configuring LAGs

LAG configuration guidelines include:

- A maximum of 6 LAGS, 2 ports in each, can be configured on the 7210 SAS-Series.
- Ports can be added or removed from the LAG while the LAG and its ports (other than the port being removed) remain operational. When ports to and/or from the LAG are added or removed, the hashing algorithm is adjusted for the new port count.
- `show` commands display physical port statistics on a port-by-port basis or the entire LAG can be displayed.
- LAG is supported on Ethernet ports.
- Ports of a particular LAG can be of different types but they must be the same speed and duplex. To guarantee the same port speed is used for all ports in a LAG, autonegotiation must be disabled or in limited mode to ensure only a specific speed is advertised.

Figure 1 displays traffic routed between ALA-1 and ALA-2 as a LAG consisting of four ports.

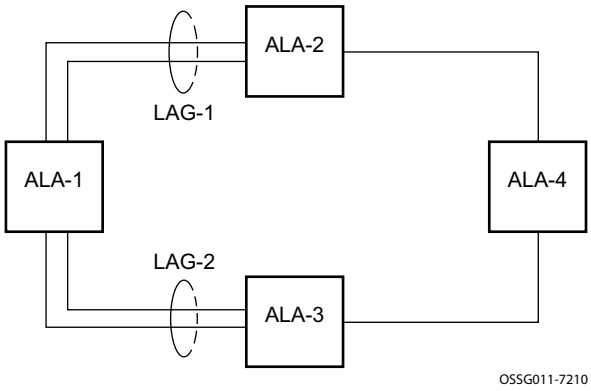

Figure 1: LAG Configuration

LAG Hashing

When a requirement exists to increase the available bandwidth for a logical link that exceeds the physical bandwidth or add redundancy for a physical link, typically one of the methods is applied; Link Aggregation (LAG). The 7210 SAS E supports two ports per LAG.

To avoid out-of-sequence packets the algorithm for selecting the next hop in LAG must be deterministic.

Depending on the type of traffic that needs to be distributed into LAG, different variables are used as input to the hashing algorithm that determines the port to be used. There are several traffic types to consider:

- VPLS known unicast traffic. This is hashed based on the IP source, destination addresses and if Layer 4 traffic, hash will include (TCP or UDP) source and destination port information, or for non-IP traffic, MAC source, destination addresses, VLAN, Ethertype and port of entry are considered for hash.
- VPLS multicast, broadcast and unknown unicast traffic transmitted on a LAG SAP is hashed based on MAC source, destination address and port of entry.
- VLL traffic transmitted on a LAG SAP is hashed based on MAC source and destination address and port of entry.
- IP multicast is sprayed over LAG based on the IP source and destination address and port of entry.
- IP multicast Layer 4 UDP/TCP traffic will not be hashed.

LAG on Access

QoS policies are handled differently for LAG on access. For more information about QoS Policies on LAG, refer to LAG and QoS Policies on page 21.

LAG and QoS Policies

In the 7210 SAS E, an ingress QoS policy is applied to the aggregate traffic that enters the traffic through all the ports of the system. For example, if an ingress policy is configured with a policier of PIR 100Mb, for a SAP configured on a LAG with two ports, then the policer limits the traffic entering the system through the two ports to a maximum of 100Mb.

In the 7210 SAS E, egress QoS policy shaper parameters are applied to all the ports that are members of the LAG (all ports get the full SLA). For example, if an egress policy is configured with a policer of PIR 100Mb, each port would get a PIR of 100 Mb. The advantage of this method over a scheme where the PIR is divided equally among all the member ports of the LAG, is that a single flow can consume the entire SLA. The disadvantage is that the overall SLA can be exceeded if the flows span multiple ports.

Port Link Damping

Hold time controls enable port link damping timers that reduce the number of link transitions reported to upper layer protocols.

The 7210 SAS OS port link damping feature guards against excessive port transitions. Any initial port transition is immediately advertised to upper layer protocols, but any subsequent port transitions are not advertised to upper layer protocols until a configured timer has expired.

An “up” timer controls the dampening timer for link up transitions, and a “down” timer controls the dampening timer for link down transitions.

LACP

Generally, link aggregation is used for two purposes: provide an increase in bandwidth and/or provide redundancy. Both aspects are addressed by aggregating several Ethernet links in a single LAG.

LACP enhancements allow active lag-member selection based on particular constrains. The mechanism is based on the IEEE 802.3ad standard so interoperability is ensured.

Multi-Chassis LAG

This section describes the Multi-Chassis LAG (MC-LAG) concept. MC-LAG is an extension of a LAG concept that provides node-level redundancy in addition to link-level redundancy provided by “regular LAG”.

Typically, MC-LAG is deployed in a network-wide scenario providing redundant connection between different end points. The whole scenario is then built by combination of different mechanisms (for example, MC-LAG and redundant pseudowire to provide e2e redundant p2p connection or dual homing of DSLAMs in Layer 2 TPSDA).

The 7210 SAS supports the capability which enables it to connect to an MC-LAG-enabled node. In particular, the 7210 SAS, allows for provisioning of links into sub-groups in a LAG and supports active/standby links. Note that the MC-LAG solution can be achieved with or without subgroups configured.

NOTE: The 7210 SAS cannot peer with an MC-LAG-enabled node since it does not implement MC-LAG protocol.

802.1x Network Access Control

The Alcatel-Lucent 7210 SAS supports network access control of client devices (PCs, STBs, etc.) on an Ethernet network using the IEEE. 802.1x standard. 802.1x is known as Extensible Authentication Protocol (EAP) over a LAN network or EAPOL.

802.1x Modes

The Alcatel-Lucent 7210 SAS supports port-based network access control for Ethernet ports only. Every Ethernet port can be configured to operate in one of three different operation modes, controlled by the port-control parameter:

- `force-auth` — Disables 802.1x authentication and causes the port to transition to the authorized state without requiring any authentication exchange. The port transmits and receives normal traffic without requiring 802.1x-based host authentication. This is the default setting.
- `force-unauth` — Causes the port to remain in the unauthorized state, ignoring all attempts by the hosts to authenticate. The switch cannot provide authentication services to the host through the interface.
- `auto` — Enables 802.1x authentication. The port starts in the unauthorized state, allowing only EAPOL frames to be sent and received through the port. Both the router and the host can initiate an authentication procedure as described below. The port will remain in un-authorized state (no traffic except EAPOL frames is allowed) until the first client is authenticated successfully. After this, traffic is allowed on the port for all connected hosts.

802.1x Basics

- The supplicant — This is the end-user device that requests access to the network.
- The authenticator — Controls access to the network. Both the supplicant and the authenticator are referred to as Port Authentication Entities (PAEs).
- The authentication server — Performs the actual processing of the user information.

The authentication exchange is carried out between the supplicant and the authentication server, the authenticator acts only as a bridge. The communication between the supplicant and the authenticator is done via the Extended Authentication Protocol (EAP) over LANs (EAPOL). On the back end, the communication between the authenticator and the authentication server is done with the RADIUS protocol. The authenticator is thus a RADIUS client, and the authentication server a RADIUS server.

The router will initiate the procedure when the Ethernet port becomes operationally up, by sending a special PDU called EAP-Request/ID to the client. The client can also initiate the exchange by sending an EAPOL-start PDU, if it doesn't receive the EAP-Request/ID frame during bootup. The client responds on the EAP-Request/ID with a EAP-Response/ID frame, containing its identity (typically username + password).

After receiving the EAP-Response/ID frame, the router will encapsulate the identity information into a RADIUS AccessRequest packet, and send it off to the configured RADIUS server.

The RADIUS server checks the supplied credentials, and if approved will return an Access Accept message to the router. The router notifies the client with an EAP-Success PDU and puts the port in authorized state.

802.1x Timers

The 802.1x authentication procedure is controlled by a number of configurable timers and scalars. There are two separate sets, one for the EAPOL message exchange and one for the RADIUS message exchange.

EAPOL timers:

- `transit-period` — Indicates how many seconds the Authenticator will listen for an EAP-Response/ID frame. If the timer expires, a new EAP-Request/ID frame will be sent and the timer restarted. The default value is 60. The range is 1-3600 seconds.
- `supplicant-timeout` — This timer is started at the beginning of a new authentication procedure (transmission of first EAP-Request/ID frame). If the timer expires before an EAP-Response/ID frame is received, the 802.1x authentication session is considered as having failed. The default value is 30. The range is 1 — 300.
- `quiet-period` — Indicates number of seconds between authentication sessions It is started after logoff, after sending an EAP-Failure message or after expiry of the supplicant-timeout timer. The default value is 60. The range is 1 — 3600.

RADIUS timer and scaler:

- `max-auth-req` — Indicates the maximum number of times that the router will send an authentication request to the RADIUS server before the procedure is considered as having failed. The default value is value 2. The range is 1 — 10.
- `server-timeout` — Indicates how many seconds the authenticator will wait for a RADIUS response message. If the timer expires, the access request message is sent again, up to *max-auth-req* times. The default value is 60. The range is 1 — 3600 seconds.

The router can also be configured to periodically trigger the authentication procedure automatically. This is controlled by the enable re-authentication and reauth-period parameters. Reauth-period indicates the period in seconds (since the last time that the authorization state was confirmed) before a new authentication procedure is started. The range of reauth-period is 1 — 9000 seconds (the default is 3600 seconds, one hour). Note that the port stays in an authorized state during the re-authentication procedure.

802.1x Configuration and Limitations

Configuration of 802.1x network access control on the router consists of two parts:

- Generic parameters, which are configured under `config>security>dot1x`
- Port-specific parameters, which are configured under `config>port>ethernet>dot1x`

801.x authentication:

- Provides access to the port for any device, even if only a single client has been authenticated;
- Can only be used to gain access to a pre-defined Service Access Point (SAP). It is not possible to dynamically select a service (e.g., a VPLS) depending on the 802.1x authentication information;

802.3ah OAM

802.3ah Clause 57 (EFM OAM) defines the Operations, Administration, and Maintenance (OAM) sub-layer, which provides mechanisms useful for monitoring link operation such as remote fault indication and remote loopback control. In general, OAM provides network operators the ability to monitor the health of the network and quickly determine the location of failing links or fault conditions. EFM OAM described in this clause provides data link layer mechanisms that complement applications that may reside in higher layers.

OAM information is conveyed in slow protocol frames called OAM protocol data units (OAMPDUs). OAMPDUs contain the appropriate control and status information used to monitor, test and troubleshoot OAM-enabled links. OAMPDUs traverse a single link, being passed between peer OAM entities, and as such, are not forwarded by MAC clients (like bridges or switches).

The following EFM OAM functions are supported:

- EFM OAM capability discovery.
- Active and passive modes.
- Remote failure indication — Handling of critical link events (link fault)
- Loopback — A mechanism is provided to support a data link layer frame-level loopback mode. Both remote and local loopback modes are supported.
- EFM OAMPDU tunneling.
- Timer for EFM OAM in 500ms interval (minimum).

OAM Events

EFM OAM defines a set of events that may impact link operation. The following events are supported:

- Critical link events (defined in 802.3ah clause 57.2.10.1)
  - → Link fault: the PHY has determined a fault has occurred in the receive direction of the local DTE.

Remote Loopback

EFM OAM provides a link-layer frame loopback mode that can be remotely controlled.

To initiate remote loopback, the local EFM OAM client sends a loopback control OAM PDU by enabling the OAM remote-loopback command. After receiving the loopback control OAM PDU, the remote OAM client puts the remote port into local loopback mode.

To exit remote loopback, the local EFM OAM client sends a loopback control OAM PDU by disabling the OAM remote-loopback command. After receiving the loopback control OAM PDU, the remote OAM client puts the port back into normal forwarding mode.

Note that during remote loopback test operation, all frames except EFM OAM PDUs are dropped at the local port for the receive direction, where remote loopback is enabled. If local loopback is enabled, then all frames except EFM OAM PDUs are dropped at the local port for both the receive and transmit directions. This behavior may result in many protocols (e.g., STP, LAG) resetting their state machines.

Note that when a port is in loopback mode, service mirroring will not work if the port is a mirror-source or a mirror-destination.

802.3ah OAM PDU Tunneling for Epipe Service

The 7210 SAS routers support 802.3ah. Customers who subscribe to Epipe service treat the Epipe as a wire, so they demand the ability to run 802.3ah between their devices which are located at each end of the Epipe.

Note: This feature only applies to port-based Epipe SAPs because 802.3ah runs at port level not VLAN level. Hence, such ports must be configured as null encapsulated SAPs.

When OAM PDU tunneling is enabled, 802.3ah OAM PDUs received at one end of an Epipe are forwarded through the Epipe. 802.3ah can run between devices that are located at each end of the Epipe. When OAM PDU tunneling is disabled (by default), OAM PDUs are dropped or processed locally according to the **efm-oam** configuration (shutdown or not shutdown).

Note that by enabling 802.3ah for a specific port and enabling OAM PDU tunneling for the same port are mutually exclusive.

MTU Configuration Guidelines

Observe the following general rules when planning your physical MTU configurations:

The 7210 SAS must contend with MTU limitations at many service points. The physical (access and access uplink) port, MTU values must be individually defined.

- Identify the ports that are designated as access uplink ports as these are intended to carry service traffic.
- MTU values should not be modified frequently.
- MTU values must conform to the following conditions:
  - → The access uplink port MTU must be greater than or equal to the access port MTU plus the overhead added by the system (for example, typically 4 bytes of VLAN tag are added when a packet is transmitted using the QinQ access uplink).

Default MTU Values

Table 2 displays the default MTU values which are dependent upon the (sub-) port type, mode, and encapsulation.

Table 2: MTU Default Values

Port Type	Mode	Encap Type	Default (bytes)
Ethernet	access	null	1514
Ethernet	access	dot1q	1518
Fast Ethernet	uplink	—	1522
Other Ethernet	uplink	—	9212*

*The default MTU for Ethernet ports other than Fast Ethernet is actually the lesser of 9212 and any MTU limitations imposed by hardware which is typically 9728 bytes.

Modifying MTU Defaults

MTU parameters can be modified on the port level.

- The port-level MTU parameters configure the maximum payload MTU size for an Ethernet port that is part of a multilink bundle or LAG.

The default MTU values should be modified to ensure that packets are not dropped due to frame size limitations.

Configuration Example

In order for the maximum length service frame to successfully travel from a local ingress SAP to a remote egress SAP, the MTU values configured on the port on which the local ingress SAP is provisioned and the port on which egress SAP is provisioned must be coordinated to accept the maximum frame size the service can forward. For example, the targeted MTU values to configure for an Epipe service (ALA-A and ALA-B) are displayed in Figure 2.

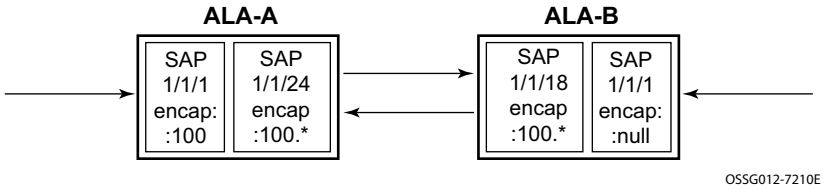

Figure 2: MTU Configuration Example

Since ALA-A uses dot1q encapsulation, the port 1/1/1 MTU must be set to 1518 to be able to accept a 1514-byte service frame (seeTable 3 for MTU default values). Each of the access uplink port's MTU must be set to at least 1518 as well. Finally, the MTU of ALA-B's SAP (access port 1/1/2) must be at least 1514, as it uses null encapsulation.

Table 3: MTU Configuration Example Values

	ALA-A		ALA-B	
	Access (SAP)	**Access Uplink (SAP)**	**Access Uplink (SAP)**	**Access (SAP)**
Port (slot/MDA/port)	1/1/1	1/1/24	1/1/18	1/1/2
Mode type	access (dot1q)	access-uplink (QinQ)	access-uplink (QinQ)	access (null)
MTU	1518	1518	1518	1514

Instead, if ALA-A uses a dot1p-preserve SAP on port 1/1/1, then port 1/1/1 MTU must be set to 1518 to be able to accept a 1514-byte service frame (see Table 4 for MTU default values). Each of the access uplink port's MTU must be set to at least 1522 as well. Finally, the MTU of ALA-B's SAP (access port 1/1/2) must be at least 1518, as it uses Dot1q encapsulation.

Table 4: MTU Configuration Example Values

	ALA-A		ALA-B	
	Access (SAP)	**Access Uplink (SAP)**	**Access Uplink (SAP)**	**Access (SAP)**
Port (slot/MDA/port)	1/1/1	1/1/24	1/1/18	1/1/2
Mode type	access (dot1q-preserve)	access-uplink (QinQ)	access-uplink (QinQ)	access (dot1q-preserve)
MTU	1518	1522	1522	1518

Deploying Preprovisioned Components

Cards and MDAs are auto-provisioned by the system and does not need to be provisioned by the user.

Configuration Notes

The following information describes provisioning caveats:

- Ports can be provisioned without provisioning slot, card and MDA type, since these are auto-provisioned.

Configuring Physical Ports with CLI

This section provides information to configure cards, MDAs, and ports.

Topics in this section include:

Preprovisioning Guidelines

7210 SAS routers have a console port to connect terminals to the router. The 7210 SAS does not support a management port.

Configure parameters from a system console connected to a console port, using Telnet to access a remotely or SSH to open a secure shell connection.

Predefining Entities

The 7210 SAS auto-provisions card and MDA types.

Preprovisioning a Port

Some recommendations to configure a port include:

- Ethernet

  → Configure an access port for customer facing traffic on which services are configured.

  An encapsulation type may be specified in order to distinguish services on the port or channel. Encapsulation types are not required for network ports.

  To configure an Ethernet access port, refer to Configuring Ethernet Port Parameters on page 41.

Basic Configuration

The most basic configuration must have the following:

- Identify chassis slot.
- Specify line card type (must be an allowed card type).
- Identify MDA slot.
- Specify MDA type (must be an allowed MDA type).
- Identify specific port to configure.

Common Configuration Tasks

The following sections are basic system tasks that must be performed.

Configuring Ports

The following example displays the default port pool configurations.

```
*A:card-1>config>port# info detail
----------------------------------------------
        description "10/100/Gig Ethernet SFP"
        access
            egress
                pool default
                    resv-cbs default
                    slope-policy "default"
                exit
            exit
            uplink
                egress
                    pool default
                        resv-cbs default
                        slope-policy "default"
                    exit
                exit
            exit
        exit
...
----------------------------------------------
*A:card-1>config>port#
```

Configuring Ethernet Port Parameters

Ethernet Access Uplink Port

An access uplink port is network facing and participates in the service provider transport or infrastructure network processes. This is similar to a network port concept, except that the 7210 SAS E does not allow IP interfaces nor runs routing protocols.

A SAP can be created when a port is configured in access uplink mode. When a port is configured in access uplink mode, then the encapsulation type of the port is set to QinQ.

The following example displays a network port configuration:

```
A:ALA-B>config>port# info
----------------------------------------------
description "Ethernet Access Uplink port"
----------------------------------------------
        ethernet
            mode access uplink
        exit
        no shutdown
----------------------------------------------------
A:ALA-B>config>port#
```

Ethernet Access Port

Services are configured on access ports used for customer-facing traffic. If a Service Access Port (SAP) is to be configured on a port, it must be configured as access mode or access uplink mode. When a port is configured for access mode, the appropriate encapsulation type can be specified to distinguish the services on the port. Once a port has been configured for access mode, multiple services may be configured on the port.

The following example displays an Ethernet access port configuration:

```
A:ALA-A>config>port# info
----------------------------------------------
        description "Ethernet access port"
        access
            egress
                pool
                    slope-policy "slopePolicy1"
                exit
            exit
        exit
        ethernet
            mode access
            encap-type dot1q
        exit
        no shutdown
----------------------------------------------
A:ALA-A>config>port#
```

Configuring 802.1x Authentication Port Parameters

The following example displays an 802.1x port configuration:

```
A:ALA-A>config>port>ethernet>dot1x# info detail
----------------------------------------------
                port-control auto
                radius-plcy dot1xpolicy
                re-authentication
                re-auth-period 3600
                max-auth-req 2
                transmit-period 30
                quiet-period 60
                supplicant-timeout 30
                server-timeout 30
----------------------------------------------
A:ALA-A>config>port>ethernet>dot1x#
```

Configuring LAG Parameters

LAG configurations should include at least two ports. Other considerations include:

- A maximum of two ports can be included in a LAG. All ports in the LAG must share the same characteristics (speed, duplex, hold-timer, etc.). The port characteristics are inherited from the primary port.
- Autonegotiation must be disabled or set limited mode for ports that are part of a LAG to guarantee a specific port speed.
- Ports in a LAG must be configured as full duplex.

The following example displays LAG configuration output:

```
A:ALA-A>config>lag# info detail
----------------------------------------------
        description "LAG2"
        mac 04:68:ff:00:00:01
        port  1/1/1
        port  1/3/1
----------------------------------------------
A:ALA-A>config>lag#
```

Service Management Tasks

This section discusses basic procedures of the following service management tasks:

To change an MDA type already provisioned for a specific slot/card, first you must shut down the slot/MDA/port configuration and then delete the MDA from the configuration. Modify and delete operations can be performed only on the MDAs that are not auto equipped or auto provisioned.

Use the following CLI syntax to modify an MDA:

CLI Syntax:
```
config> port port-id
 shutdown
```

CLI Syntax:
```
config> card slot-number
    shutdown
  [no] mda mda-number
    [no] mda-type mda-type
    shutdown
```

Modifying a Card Type

The modify operation cannot be performed on an IOM card that is auto equipped and auto provisioned during bootup and is fixed.

Deleting a Card

The modify operation cannot be performed on an IOM card that is auto equipped and auto provisioned during bootup and is fixed.

Deleting Port Parameters

Use the following CLI syntax to delete a port provisioned for a specific card:

CLI Syntax:
```
config>port port-id
 shutdown
 no port port-id
```

THIS PAGE LEFT INTENTIONALLY BLANK

Card, MDA, and Port Command Reference

Command Hierarchies

Card and MDA Configuration Commands

Hardware Commands

config
- [**no**] **card** *slot-number*
  - **card-type** *card-type*
    - [**no**] **shutdown**
  - [**no**] **mda** *mda-slot*
    - **mda-type** *mda-type*
    - **no mda-type**
    - [**no**] **shutdown**
  - [**no**] **shutdown**

Port Configuration Commands

config
- — **port**
- — **no port**
  - — **access**
    - — **egress**
      - — [**no**] **pool** [*name*]
        - — **slope-policy** *name*
        - — **no slope-policy**
    - — **uplink**
      - — **egress**
        - — [**no**] **pool** [*name*]
          - — **slope-policy** *name*
          - — **no slope-policy**
  - — **description** *long-description-string*
  - — **no description**
  - — [**no**] **shutdown**
  - — **split-horizon-group** ***g****roup-name*
  - — **no split-horizon-group**

Ethernet Commands

config
- [**no**] **port** {*port-id*}
  - **ethernet**
    - **access**
      - **egress**
        - **qos** *policy-id*
        - **no qos**
      - **uplink**
        - **accounting-policy** *acct-policy-id*
        - **no accounting-policy**
        - [**no**] **collect-stats**
        - **qos** *policy-id*
        - **no qos**
        - **queue-policy** *name*
        - **no queue-policy**
    - **autonegotiate** [**limited**]
    - [**no**] **autonegotiate**
    - **dot1x**
      - **max-auth-req** *max-auth-request*
      - **port-control** {**auto** | **force-auth** | **force-unauth**}
      - **quiet-period** *seconds*
      - **radius-plcy** *name*
      - **re-auth-period** *seconds*
      - [**no**] **re-authentication**
      - **server-timeout** *seconds*
      - **no server-timeout**
      - **supplicant-timeout** *seconds*
      - **no supplicant-timeout**
      - **transmit-period** *seconds*
      - **no transmit-period**
    - **down-when-looped**
      - **keep-alive** *timer*
      - **no keep-alive**
      - **retry-timeout** *timer*
      - **no retry-timeout**
      - [**no**] **shutdown**
    - **duplex** {**full** | **half**}
    - **efm-oam**
      - [**no**] **accept-remote-loopback**
      - **mode** {**active** | **passive**}
      - [**no**] **shutdown**
      - [**no**] **transmit-interval** *interval* [**multiplier** *multiplier*]
      - [**no**] **tunneling**
    - **egress-scheduler-policy** *port-scheduler-policy-name*
    - **no egress-scheduler-policy**
    - **encap-type** {**dot1q** | **null** | **qinq**}
    - **no encap-type**
    - **hold-time** {[**up** *hold-time up*] [**down** *hold-time down*]}
    - **no hold-time**
    - **mac** *ieee-address*
    - **no mac**
    - **mode** {**access**} [**uplink**]

— **no mode**
— **mtu** *mtu-bytes*
— **no mtu**
— **speed** {**10** | **100** | **1000**}

LAG Commands

config
- [**no**] **lag** [*lag-id*]
  - **description** *long-description-string*
  - **no description**
  - **encap-type** {**dot1q** | **null** | **qinq**}
  - **no encap-type**
  - **hold-time down** *hold-down-time*
  - **no hold-time**
  - **lacp** [*mode*] [**administrative-key** *admin-key*]
  - **no lacp**
  - **lacp-xmit-interval** {**slow** | **fast**}
  - **no lacp-xmit-interval**
  - [**no**] **lacp-xmit-stdby**
  - **mac** *ieee-address*
  - **no mac**
  - **mode access** [**uplink**]
  - **no mode**
  - **port** *port-id* [*port-id* …up to 8 total] [**priority** *priority*] [**sub-group** *sub-group-id*]
  - **no port** *port-id* [*port-id* …up to 8 total]
  - **selection-criteria** [**highest-count** | **highest-weight**] [**slave-to-partner**]
  - **no selection-criteria**
  - [**no**] **shutdown**
  - [**no**] **split-horizon-group g***roup-name*

Split Horizon Group Commands

config
- [**no**] **split-horizon-group g***roup-name*

Show Commands

show

- **chassis** [**environment**] [**power-supply**]
- **card** [*slot-number*] [**detail**]
- **card state**
- **pools** *mda-id*[*/port*][*access-app* [*pool-name* | **service** *service-id*]]
- **pools** *mda-id*[*/port*] [*access-uplink-app* [*pool-name*]]
- **lag** [*lag-id*] [**detail**] [**statistics**]
- **lag** *lag-id* **associations**
- **port** *port-id* [**count**] [**detail**]
- **port** *port-id* **description**
- **port** *port-id* **associations**
- **port** *port-id* **dot1x** [**detail**]
- **port** *port-id* **ethernet** [**efm-oam** | **detail**]

Monitor Commands

Monitor

- **port** ***port-id*** [*port-id*...(up to 5 max)] [**interval** *seconds*] [**repeat** *repeat*] [**absolute** | **rate**] [**multiclass**]

Clear Commands

clear

- **lag** *lag-id* **statistics**
- **port** *port-id* **statistics**

Debug Commands

debug

- **lag** [**lag-id** *lag-id* **port** *port-id*] [**all**]
- **lag** [**lag-id** *lag-id* **port** *port-id*] [**sm**] [**pkt**] [**cfg**] [**red**] [**iom-upd**] [**port-state**] [**timers**] [**sel-logic**]
- **no lag** [**lag-id** *lag-id*]

THIS PAGE LEFT INTENTIONALLY BLANK

Configuration Commands

Generic Commands

description

Syntax **description** *description-string*
no description

Context config>port
config>lag
config>split-horizon-group

Description This command creates a text description for a configuration context to help identify the content in the configuration file.

The **no** form of this command removes any description string from the context.

Default No description is associated with the configuration context.

Parameters *long-description-string* — The description character string. Strings can be up to 160 characters long composed of printable, 7-bit ASCII characters. If the string contains special characters (#, $, spaces, etc.), the entire string must be enclosed within double quotes.

shutdown

Syntax [**no**] **shutdown**

Context config>card
config>card>mda
config>port
config>port>ethernet

config>lag

Description This command administratively disables an entity. When disabled, an entity does not change, reset, or remove any configuration settings or statistics.

The operational state of the entity is disabled as well as the operational state of any entities contained within.

The **no** form of this command administratively enables an entity.

Special Cases **card —** The default state for a card is **no shutdown**.

mda — The default state for a mda is **no shutdown**.

lag — The default state for a Link Aggregation Group (LAG) is **shutdown**.

port — The default state for a port is **shutdown**.

Card Commands

card

Syntax **card** *slot-number*

Context config

Description This mandatory command enables access to the chassis card Input/Output Module (IOM), slot, and MDA CLI context.

The **no** form of this command cannot be used on fixed IOM and MDA cards that are auto equipped and auto provisioned.

Default The IOM card is equipped and provisioned for slot 1.

Parameters *slot-number* — The slot number of the card in the chassis.

card-type

Syntax **card-type** *card-type*

Context config>card

Description This mandatory command adds a to the device configuration for the slot. The card type can be preprovisioned, meaning that the card does not need to be installed in the chassis.

A card must be provisioned before an MDA or port can be configured.

A card can only be provisioned in a slot that is vacant, meaning no other card can be provisioned (configured) for that particular slot.

A card can only be provisioned in a slot if the card type is allowed in the slot. An error message is generated if an attempt is made to provision a card type that is not allowed.

A high severity alarm is raised if an administratively enabled card is removed from the chassis. The alarm is cleared when the correct card type is installed or the configuration is modified. A low severity trap is issued when a card is removed that is administratively disabled.

An appropriate alarm is raised if a partial or complete card failure is detected. The alarm is cleared when the error condition ceases.

The **no** form of this command cannot be used as the IOM card is fixed.

Default The IOM card is equipped and preprovisioned for slot 1.

Parameters *card-type* — The type of card to be configured and installed in that slot.

MDA Commands

mda

Syntax **mda** *mda-slot*
no mda *mda-slot*

Context config>card

Description This mandatory command enables access to a card's MDA CLI context to configure MDAs.

Default No MDA slots are configured by default.

Parameters *mda-slot* — The MDA slot number to be configured. Fixed ports on the panel of the chassis belong to MDA 1. Cards inserted in expansion slots are numbered 2 and 3.

Values 1, 2, 3

mda-type

Syntax **mda-type** *mda-type*
no mda-type

Context config>card>mda

Description This mandatory command provisions a specific MDA type to the device configuration for the slot. The MDA can be preprovisioned but an MDA must be provisioned before ports can be configured. Ports can be configured once the MDA is properly provisioned.

A maximum of three MDAs can be provisioned on an IOM. Only one MDA can be provisioned per IOM MDA slot. To modify an MDA slot, shut down all port associations.

An alarm is raised if partial or complete MDA failure is detected. The alarm is cleared when the error condition ceases.

MDA 1 does not need to be configured as is provisioned automatically during bootup.

The **no** form of this command deletes the MDA from the configuration. The MDA must be administratively shut down before it can be deleted from the configuration. A fixed MDA that is auto equipped and auto provisioned cannot be deleted. An error message is shown in case the **no** form of command is performed on fixed MDAs.

Default MDA 1 is equipped and provisioned by default during bootup.

Parameters *mda-type* — The type of MDA selected for the slot postion.

Interface QoS Commands

access

Syntax **access**

Context config>card>mda
config>port

Description This command enables the access context to configure egress and ingress pool policy parameters.

uplink

Syntax **uplink**

Context config>port>access

Description This command enables the network context to configure egress pool policy parameters.

egress

Syntax **egress**

Context config>port>access
config>port>access>uplink

Description This command enables the context to specify the slope policy that is configured in the **config**>**qos**>**slope-policy** context.

pool

Syntax [**no**] **pool** [*name*]

Context config>port>access>egress
config>port>access>uplink>egress

Description This command configures pool policies.

Default default

Parameters *name* — Specifies the pool name, a string up to 32 characters long composed of printable, 7-bit ASCII characters. If the string contains special characters (#, $, spaces, etc.), the entire string must be enclosed within double quotes.

slope-policy

Syntax **slope-policy** *name*
no slope-policy

Context config>port>access>egress>pool
config>port>access uplink>egress>pool

Description This command specifies an existing slope policy which defines high and low priority RED slope parameters. The policy is defined in the **config**>**qos**>**slope-policy** context.

qos

Syntax **qos** *policy-id*
no qos

Context config>port>ethernet>access>egress
config>port>ethernet>access>uplink

Description This command associates a QoS policy to the port.

Parameters *policy-id* — Specifies an existing QoS policy to be assigned to the port.

Values 1 — 65535

General Port Commands

port

Syntax **port**
no port

Context config

Description This command enables access to the context to configure ports. Before a port can be configured, the chassis slot must be provisioned with a valid card type and the MDA parameter must be provisioned with a valid MDA type. (See **card** and **mda** commands.)

Default No ports are configured. All ports must be explicitly configured and enabled.

Parameters *port-id* — Specifies the physical port ID in the *slot/mda/port* format.

egress-scheduler-policy

Syntax **egress-scheduler-policy** *port-scheduler-policy-name*
no egress-scheduler-policy

Context config>port>ethernet

Description The default scheduling done for a port is strict scheduling. When a port-scheduler-policy is applied to the port, the scheduling behavior changes to the one specified in the policy (Strict, RR, WRR, WDRR, WRR/WDRR + Strict).

The **no** form of the command removes the policy from the port and makes the scheduling scheme of the port to strict.

mode

Syntax **mode** {**access**} [**uplink**]
no mode

Context config>port>ethernet

Description This command configures an Ethernet port for **access** or **access uplink** mode operation.

An **access** port is used for customer facing traffic on which services are configured. A Service Access Point (SAP) can only be configured on an access port or channel. When a port is configured for access mode, the appropriate **encap-type** must be specified to distinguish the services on the port. Once an Ethernet port has been configured for access mode, multiple services can be configured on the Ethernet port.

The **no** form of this command restores the default.

Default **access** — Configures the Ethernet port for transport access use.

Parameters **access —** Configures the Ethernet portas service access.

access uplink — Configures the Ethernet port for transport access uplink use.

mac

Syntax **mac** *ieee-address*
no mac

Context config>port>ethernet
config>port>sonet-sdh>path
config>lag

Description This command assigns a specific MAC address to an Ethernet port, Link Aggregation Group (LAG) or BCP-enabled port or sub-port.

Only one MAC address can be assigned to a port. When multiple **mac** commands are entered, the last command overwrites the previous command. When the command is issued while the port is operational, IP will issue an ARP, if appropriate, and BPDU's are sent with the new MAC address.

The **no** form of this command returns the MAC address to the default value.

Default A default MAC address is assigned by the system.

Parameters *ieee-address* — Specifies the 48-bit MAC address in the form aa:bb:cc:dd:ee:ff or aa-bb-cc-dd-ee-ff where aa, bb, cc, dd, ee and ff are hexadecimal numbers. Allowed values are any non-broadcast, non-multicast MAC and non-IEEE reserved MAC addresses.

mtu

Syntax **mtu** *mtu-bytes*
no mtu

Context config>port>ethernet

Description This command configures the maximum payload MTU size for an Ethernet port port. The Ethernet port level MTU parameter indirectly defines the largest physical packet the port can transmit or the far-end Ethernet port can receive. Packets received larger than the MTU will be discarded. Packets that cannot be fragmented at egress and exceed the MTU are discarded.

The value specified for the MTU includes the destination MAC address, source MAC address, the Ethertype or Length field and the complete Ethernet payload. The MTU value does not include the preamble, start of frame delimiter or the trailing CRC.

The **no** form of this command restores the default values.

Default The default MTU value depends on the (sub-)port type, mode and encapsulation and are listed in the following table:

Type	Mode	Encap Type	Default (Bytes)
10/100, Gig	Access	null	1514
10/100, Gig	Access	dot1q	1518
10/100, Gig	Access	q-in-q	1522
10/100 or 100FX Ethernet	Network	null	1514
10/100 or 100FX Ethernet	Network	dot1q	1518

Parameters *mtu-bytes* — Sets the maximum allowable size of the MTU, expressed as an integer.

Values 512 — 9212

	Range
config>port>ethernet	512 — 9212

Ethernet Port Commands

ethernet

Syntax **ethernet**

Context config>port

Description This command enables access to the context to configure access parameters.

This context can only be used when configuring Ethernet LAN ports on an appropriate MDA.

access

Syntax **access**

Context config>port>ethernet

Description This command configures Ethernet access port parameters.

egress

Syntax **egress**

Context config>port>ethernet>access

Description This command configures Ethernet access egress port parameters.

autonegotiate

Syntax **autonegotiate** [**limited**]
[**no**] **autonegotiate**

Context config>port>ethernet

Description This command enables speed and duplex autonegotiation on Fast Ethernet ports and enables far-end fault indicator support on gigabit ports.

There are three possible settings for autonegotiation:

- “on” or enabled with full port capabilities advertised
- “off” or disabled where there are no autonegotiation advertisements
- “limited” where a single speed/duplex is advertised.

When autonegotiation is enabled on a port, the link attempts to automatically negotiate the link speed and duplex parameters. If autonegotiation is enabled, the configured duplex and speed parameters are ignored.

When autonegotiation is disabled on a port, the port does not attempt to autonegotiate and will only operate at the **speed** and **duplex** settings configured for the port. Note that disabling autonegotiation on gigabit ports is not allowed as the IEEE 802.3 specification for gigabit Ethernet requires autonegotiation be enabled for far end fault indication.

If the **autonegotiate limited** keyword option is specified the port will autonegotate but will only advertise a specific speed and duplex. The speed and duplex advertised are the **speed** and **duplex** settings configured for the port. One use for limited mode is for multispeed gigabit ports to force gigabit operation while keeping autonegotiation enabled for compliance with IEEE 801.3.

7210 SAS requires that autonegotiation be disabled or limited for ports in a Link Aggregation Group to guarantee a specific port speed.

The **no** form of this command disables autonegotiation on this port.

Default autonegotiate

Parameters **limited —** The Ethernet interface will automatically negotiate link parameters with the far end, but will only advertise the speed and duplex mode specified by the Ethernet **speed** and **duplex** commands.

duplex

Syntax **duplex** {**full** | **half**}

Context config>port>ethernet

Description This command configures the duplex of a Fast Ethernet port when autonegotiation is disabled.

This configuration command allows for the configuration of the duplex mode of a Fast Ethernet port. If the port is configured to autonegotiate this parameter is ignored.

Default **full**

Parameters **full —** Sets the link to full duplex mode.

half — Sets the link to half duplex mode.

efm-oam

Syntax **efm-oam**

Context config>port>ethernet

Description This command configures EFM-OAM attributes.

accept-remote-loopback

Syntax [**no**] **accept-remote-loopback**

Context config>port>ethernet>efm-oam

Description This command enables reactions to loopback control OAM PDUs from peers.

The **no** form of this command disables reactions to loopback control OAM PDUs.

Default no accept-remote-loopback

mode

Syntax **mode** {**active** | **passive**}

Context config>port>ethernet>efm-oam

Description This command configures the mode of OAM operation for this Ethernet port. These two modes differ in that active mode causes the port to continually send out efm-oam info PDUs while passive mode waits for the peer to initiate the negotiation process. A passive mode port cannot initiate monitoring activites (such as loopback) with the peer.

Default active

Parameters **active —** Provides capability to initiate negotiation and monitoring activities.

passive — Relies on peer to initiate negotiation and monitoring activities.

transmit-interval

Syntax [**no**] **transmit-interval** *interval* [**multiplier** *multiplier*]

Context config>port>ethernet>efm-oam

Description This command configures the transmit interval of OAM PDUs.

Default transmit-interval 10 multiplier 5

Parameters *interval* — Specifies the transmit interval.

Values 5 — 600 (in 100 milliseconds)

multiplier *multiplier* **—** Specifies the multiplier for transmit-interval to set local link down timer.

Values 2 — 5

tunneling

Syntax [**no**] **tunneling**

Context config>port>ethernet>efm-oam

Description This command enables EFM OAM PDU tunneling. Enabling tunneling will allow a port mode Epipe SAP to pass OAM frames through the pipe to the far end.

The **no** form of the command disables tunneling.

Default no tunneling

encap-type

Syntax **encap-type** {**dot1q** | **null** | **qinq**}
no encap-type

Context config>port>ethernet

Description This command configures the encapsulation method used to distinguish customer traffic on an Ethernet access port, or different VLANs on a port. In the 7210 SAS E, QinQ encap-type can be specified only for access uplink ports and null and the Dot1q encap-type can be specified only for access ports.

The **no** form of this command restores the default.

Default null

Parameters **dot1q —** Ingress frames carry 802.1Q tags where each tag signifies a different service.

null — Ingress frames will not use any tags to delineate a service. As a result, only one service can be configured on a port with a null encapsulation type.

qinq — Specifies QinQ encapsulation.

hold-time

Syntax **hold-time** {[**up** *hold-time up*] [**down** *hold-time down*]}
no hold-time

Context config>port>ethernet

Description This command configures port link dampening timers which reduce the number of link transitions reported to upper layer protocols.

The **hold-time** value is used to dampen interface transitions.

When an interface transitions from an up state to a down state, it is immediately advertised to the rest of the system if the hold-time down interval is zero, but if the hold-time down interval is greater than zero, interface down transitions are not advertised to upper layers until the hold-time down interval has expired. Likewise, an interface is immediately advertised as up to the rest of the system if the

hold-time up interval is zero, but if the hold-time up interval is greater than zero, up transitions are not advertised until the hold-time up interval has expired.

The **no** form of this command reverts to the default values.

Default **down 0** — No port link down dampening is enabled; link down transitions are immediately reported to upper layer protocols.

up 0 — No port link up dampening is enabled; link up transitions are immediately reported to upper layer protocols.

Parameters **up** *hold-time up* **—** **—** The delay, in seconds, to notify the upper layers after an interface transitions from a down state to an up state.

Values 0 — 5

down *hold-time down* **—** The delay, in seconds, to notify the upper layers after an interface transitions from an up state to a down state.

Values 0 — 5

speed

Syntax **speed** {**10** | **100** | **1000**}

Context config>port>ethernet

Description This command configures the port speed of a Fast Ethernet port when autonegotiation is disabled.

If the port is configured to autonegotiate this parameter is ignored. Speed cannot be configured for ports that are part of a Link Aggregation Group (LAG).

Default **100**

Parameters **10 —** Sets the link to 10 mbps speed.

100 — Sets the link to 100 mbps speed.

1000 — Sets the link to 1000 mbps speed.

802.1x Port Commands

max-auth-req

Syntax **max-auth-req** *max-auth-request*

Context config>port>ethernet>dot1x

Description This command configures the maximum number of times that the 7210 SAS will send an access request RADIUS message to the RADIUS server. If a reply is not received from the RADIUS server after the specified *number* attempts, the 802.1x authentication procedure is considered to have failed.

The **no** form of this command returns the value to the default.

Default 2

Parameters *max-auth-request* — The maximum number of RADIUS retries.

Values 1 — 10

port-control

Syntax **port-control** [**auto | force-auth | force-unauth**]

Context config>port>ethernet>dot1x

Description This command configures the 802.1x authentication mode.

The **no** form of this command returns the value to the default.

Default force-auth

Parameters **force-auth —** Disables 802.1x authentication and causes the port to transition to the authorized state without requiring any authentication exchange. The port transmits and receives normal traffic without requiring 802.1x-based host authentication.

force-unauth — Causes the port to remain in the unauthorized state, ignoring all attempts by the hosts to authenticate. The switch cannot provide authentication services to the host through the interface.

auto — Enables 802.1x authentication. The port starts in the unauthorized state, allowing only EAPOL frames to be sent and received through the port. Both the 7210 SAS and the host can initiate an authentication procedure. The port will remain in un-authorized state (no traffic except EAPOL frames is allowed) until the first client is authenticated successfully. After this, traffic is allowed on the port for all connected hosts.

quiet-period

Syntax **quiet-period** *seconds*
no quiet-period

Context config>port>ethernet>dot1x

Description This command configures the period between two authentication sessions during which no EAPOL frames are sent by the 7210 SAS.

The **no** form of this command returns the value to the default.

Default 30

Parameters *seconds* — Specifies the quiet period in seconds.

Values 1 — 3600

radius-plcy

Syntax **radius-plcy** *name*
no radius-plcy

Context config>port>ethernet>dot1x

Description This command configures the RADIUS policy to be used for 802.1x authentication. An 802.1x RADIUS policy must be configured (under config>security>dot1x) before it can be associated to a port. If the RADIUS policy-id does not exist, an error is returned. Only one 802.1x RADIUS policy can be associated with a port at a time.

The **no** form of this command removes the RADIUS policy association.

Default no radius-plcy

Parameters *name* — Specifies an existing 802.1x RADIUS policy name.

re-auth-period

Syntax **re-auth-period** *seconds*
no re-auth-period

Context config>port>ethernet>dot1x

Description This command configures the period after which re-authentication is performed. This value is only relevant if re-authentication is enabled.

The **no** form of this command returns the value to the default.

Default 3600

Parameters *seconds* — The re-authentication delay period in seconds.

Values 1 — 9000

re-authentication

Syntax [**no**] **re-authentication**

Context config>port>ethernet>dot1x

Description This command enables / disables periodic 802.1x re-authentication.

When re-authentication is enabled, the 7210 SAS will re-authenticate clients on the port every re-auth-period seconds.

The **no** form of the command returns the value to the default.

Default re-authentication

server-timeout

Syntax **server-timeout** *seconds*
no server-timeout

Context config>port>ethernet>dot1x

Description This command configures the period during which the 7210 SAS waits for the RADIUS server to responds to its access request message. When this timer expires, the 7210 SAS will re-send the access request message, up to the specified number times.

The **no** form of this command returns the value to the default.

Default 30

Parameters *seconds* — The server timeout period in seconds.

Values 1 — 300

supplicant-timeout

Syntax **supplicant-timeout** *seconds*
no supplicant-timeout

Context config>port>ethernet>dot1x

Description This command configures the period during which the 7210 SAS waits for a client to respond to its EAPOL messages. When the supplicant-timeout expires, the 802.1x authentication session is considered to have failed.

The **no** form of this command returns the value to the default.

Default 30

Parameters *seconds* — The server timeout period in seconds.

Values 1 — 300

transmit-period

Syntax **transmit-period** *seconds*
no transmit-period

Context config>port>ethernet>dot1x

Description This command configures the period after which the 7210 SAS sends a new EAPOL request message.

The **no** form of this command returns the value to the default.

Default 30

Parameters *seconds* — The server transmit period in seconds.

Values 1 — 300

down-when-looped

Syntax **down-when-looped**

Context config>port>ethernet

Description This command configures Ethernet loop detection attributes.

dot1x

Syntax **dot1x**

Context config>port>ethernet

Description This command enables access to the context to configure port-specific 802.1x authentication attributes. This context can only be used when configuring a Fast Ethernet, gigabit or 10Gig EthernetFast Ethernet, gigabit or 10Gig EthernetFast Ethernet or gigabit Ethernet LAN ports on an appropriate MDA.

keep-alive

Syntax **keep-alive** *timer*
no keep-alive

Context config>port>ethernet>dwl

Description This command configures the time interval between keep-alive PDUs.

Default no keep-alive

Parameters *timer* — Specifies the time interval, in seconds, between keep-alive PDUs.

Values 1 — 120

retry-timeout

Syntax **retry-timeout** timer
no retry-timeout

Context config>port>ethernet>dwl

Description This command configures the minimum wait time before re-enabling port after loop detection.

Default no retry-timeout

Parameters *timer* — Specifies the minimum wait time before re-enabling port after loop detection.

Values 0, 10 — 160

Access Uplink Port Commands

uplink

Syntax **uplink**

Context config>port>access

Description This command enables the context to configure access uplink egress port parameters.

accounting-policy

Syntax **accounting-policy** *policy-id*
no accounting-policy

Context config>port>ethernet>access>uplink

Description This command configures an accounting policy that can apply to an interface.

An accounting policy must be configured before it can be associated to an interface. If the accounting *policy-id* does not exist, an error is returned.

Accounting policies associated with service billing can only be applied to SAPs. Accounting policies associated with network ports can only be associated with interfaces.

Only one accounting policy can be associated with an interface at a time.

By default, no specific accounting policy is associated with the interface. If configured, the accounting policy configured as the default is used.

The **no** form of this command removes the accounting policy association from the network interface, and the acccounting policy reverts to the default.

policy-id — The accounting *policy-id* of an existing policy. Accounting policies record either service (access) or network information. A network accounting policy can only be associated with the network port configurations. Accounting policies are configured in the config>log>accounting-policy context.

Default No accounting policies are specified by default. You must explicitly specify a policy.

Values 1 — 99

collect-stats

Syntax [**no**] **collect-stats**

Context config>port>ethernet>access>uplink

Description This command enables the collection of accounting and statistical data for the network interface. When applying accounting policies, the data, by default, is collected in the appropriate records and written to the designated billing file.

When the **no collect-stats** command is issued, the statistics are still accumulated by the IOM cards, however, the CPU does not obtain the results and write them to the billing file.

If the **collect-stats** command is issued again (enabled), then the counters written to the billing file will include the traffic collected while the **no collect-stats** command was in effect.

Default no collect-stats

queue-policy

Syntax **queue-policy** *name*
no queue-policy

Context config>port>ethernet>access>uplink

Description This command specifies the existing network queue policy which defines queue parameters such as CIR and PIR rates, as well as forwarding-class to queue mappings. The network-queue policy is defined in the **config>qos>network-queue** context.

A default CBS is defined for the queues and this is not configurable.

Default default

Parameters *name* — Specifies an exisiting network-queue policy name.

It defines the reference **slot/mda cma/port** for the system clock as that of an incoming (optical) line signal. This source serves to drive an external office clock through the BITS/SSU out ports, or just to drive the system clock.

Sonet/SDH	LoopTimed	Default
OC-48	Yes	loop-timed
OC-12	No	node-timed
OC-3	No	node-timed

.

LAG Commands

lag

Syntax [**no**] **lag** [*lag-id*]

Context config

Description This command creates the context for configuring Link Aggregation Group (LAG) attributes.

A LAG can be used to group upto two ports into one logical link. The aggregation of multiple physical links allows for load sharing and offers seamless redundancy. If one of the links fails, traffic will be redistributed over the remaining links. Up to 2 links can be supported in a single LAG, up to 6 LAGs can be configured on a node.

NOTE: All ports in a LAG group must have autonegotiation set to Limited or Disabled.

There are three possible settings for autonegotiation:

- "on" or enabled with full port capabilities advertised
- "off" or disabled where there is no autonegotiation advertisements
- "limited" where a single speed/duplex is advertised.

When autonegotiation is enabled on a port, the link attempts to automatically negotiate the link speed and duplex parameters. If autonegotiation is enabled, the configured duplex and speed parameters are ignored.

When autonegotiation is disabled on a port, the port does not attempt to autonegotiate and will only operate at the **speed** and **duplex** settings configured for the port. Note that disabling autonegotiation on gigabit ports is not allowed as the IEEE 802.3 specification for gigabit Ethernet requires autonegotiation be enabled for far end fault indication.

If the **autonegotiate** **limited** keyword option is specified the port will autonegotate but will only advertise a specific speed and duplex. The speed and duplex advertised are the **speed** and **duplex** settings configured for the port. One use for limited mode is for multispeed gigabit ports to force gigabit operation while keeping autonegotiation is enabled for compliance with IEEE 801.3.

The system requires that autonegotiation be disabled or limited for ports in a Link Aggregation Group to guarantee a specific port speed.

The **no** form of this command deletes the LAG from the configuration. Deleting a LAG can only be performed while the LAG is administratively shut down. Any dependencies such as IP-Interfaces configurations must be removed from the configuration before issuing the **no lag** command.

Default No LAGs are defined.

Parameters *lag-id* — The LAG identifier, expressed as a decimal integer.

Values 1 — 6

encap-type

Syntax **encap-type** {**dot1q** | **null** | **qinq**}
no encap-type

Context config>lag

Description This command configures the encapsulation method used to distinguish customer traffic on a LAG. The encapsulation type is configurable on a LAG port. The LAG port and the port member encapsulation types must match when adding a port member.

If the encapsulation type of the LAG port is changed, the encapsulation type on all the port members will also change. The encapsulation type can be changed on the LAG port only if there is no interface associated with it. If the MTU is set to a non default value, it will be reset to the default value when the encap type is changed.

The **no** form of this command restores the default.

Default **null** — All traffic on the port belongs to a single service or VLAN.

Parameters **dot1q —** Ingress frames carry 802.1Q tags where each tag signifies a different service.

null — Ingress frames will not use any tags to delineate a service. As a result, only one service can be configured on a port with a null encapsulation type.

qinq — Specifies qinq encapsulation.

hold-time

Syntax **hold-time down** *hold-down-time*
no hold-time

Context config>lag

Description This command specifies the timer, in tenths of seconds, which controls the delay between detecting that a LAG is down (all active ports are down) and reporting it to the higher levels.

A non-zero value can be configured, for example, when active/standby signalling is used in a 1:1 fashion to avoid informing higher levels during the small time interval between detecting that the LAG is down and the time needed to activate the standby link.

Default 0

Parameters **down** *hold-down-time* **—** Specifies the hold-time for event reporting

Values 0 — 2000

lacp

Syntax **lacp** [*mode*] [**administrative-key** *admin-key*]
no lacp

Context config>lag

Description This command specifies the LACP mode for aggregated Ethernet interfaces only. This command enables the LACP protocol. Per the IEEE 802.3ad standard, the Link Aggregation Control Protocol (LACP) provides a standardized means for exchanging information between Partner Systems on a link to allow their Link Aggregation Control instances to reach agreement on the identity of the Link Aggregation Group to which the link belongs, move the link to that Link Aggregation Group, and enable its transmission and reception functions in an orderly manner. LACP can be enabled on a maximum of 256 ports.

Default no lacp

Parameters *mode* — Specifies the mode in which LACP will operate.

Values **passive** — Starts transmitting LACP packets only after receiving packets.
active — Initiates the transmission of LACP packets.

administrative-key *admin-key* **—** Specifies an administrative key value to identify the channel group on each port configured to use LACP. This value should be configured only in exceptional cases. If it is not specified, a random key is assigned.

Values 1 — 65535

lacp-xmit-interval

Syntax **lacp-xmit-interval** {**slow** | **fast**}

Context config>lag

Description This command sepcifies the interval signaled to the peer and tells the peer at which rate it should transmit.

Default fast

Parameters **slow —** Transmits packets every 30 seconds.

fast — Transmits packets every second.

lacp-xmit-stdby

Syntax [**no**] **lacp-xmit-stdby**

Context config>lag

Description This command enables LACP message transmission on standby links.

The **no** form of this command disables LACP message transmission. This command should be disabled for compatibility when using active/standby groups. This forces a timeout of the standby links by the peer. Use the **no** form if the peer does not implement the correct behavior regarding the lacp sync bit.

Default lacp-xmit-stdby

mode

Syntax **mode** {**access** | **network**}
no mode

Context config>lag

Description This command configures the mode of the Link Aggregation Group (LAG).

Parameters **access —** Configures the mode as access for the LAG.

network — Configures the mode as network for the LAG.

port

Syntax **port** *port-id* [*port-id …*up to 8 total] [**priority** *priority*] [**subgroup** *sub-group-id*]
no port *port-id* [*port-id …*up to 8 total]

Context config>lag *lag-id*

Description This command adds ports to a Link Aggregation Group (LAG).

The port configuration of the first port added to the LAG is used as a basis to compare to subsequently added ports. If a discrepancy is found with a newly added port, that port will be not added to the LAG.

Up to eight (space separated) ports can be added or removed from the LAG link assuming the maximum of 8 ports is not exceeded.

All ports, when added to a LAG, must share the same characteristics (speed, duplex, etc.). An error message will be displayed when adding ports that do not share the same characteristics. Hold-timers must be 0. Ports that are part of a LAG must be configured with autonegotiate limited or disabled.

The **no** form of this command removes ports from the LAG.

Default No ports are defined as members of a LAG.

Parameters *port-id* — The port ID configured or displayed in the *slot/mda/port* format.

priority *priority* — Port priority used by LACP. The port priority is also used to determine the primary port. The port with the highest priority is the primary port. In the event of a tie, the smallest port ID becomes the primary port.

Values 1 — 65535

subgroup *sub-group-id* **—** This parameter identifies a LAG subgroup. When using subgroups in a LAG, they should only be configured on one side of the LAG, not both. Only having one side perform the active/standby selection will guarantee a consistent selection and fast convergence. The active/standby selection will be signalled through LACP to the other side. The hold time should be configured when using subgroups to prevent the LAG going down when switching between active and standby links in case no links are usable for a short time, especially in case a subgroup consists of one member.

Values 1 — 8 identifies a LAG subgroup.
The **auto-iom** subgroup is defined based on the IOM (all ports of the same IOM are assigned to the same subgroup).
The **auto-mda** subgroup is defined based on the MDA.

selection-criteria

Syntax **selection-criteria** [**highest-count** | **highest-weight**] [**slave-to-partner**]
no selection-criteria

Context config>lag

Description This command specifies which selection criteria should be used to select the active sub-group.

Default highest-count

Parameters **highest-count —** Specifies sub-group with the highest number of eligible members.

highest-weight — Specifies sub-group with the highest aggregate weight.

slave-to-partner — The slave-to-partner keyword specifies that it, together with the selection criteria, should be used to select the active sub-group. An eligible member is a lag-member link which can potentially become active. This means it is operationally up (not disabled) for use by the remote side. The **slave-to-partner** parameter can be used to control whether or not this latter condition is taken into account.

split-horizon-group

Syntax **split-horizon-group** *group-name*
no split-horizon-group

Context config>lag
config>port

Description This command associates a split horizon group to which this port or LAG belongs. For LAGs, all the member ports of the LAG are added to the split horizon group. The split-horizon-group must be configured in the **config** context.

The **no** form of this command removes the port or all member ports of the LAG from the split horizon group.

Configuring or removing the association of the port requires the following conditions to be satisfied:

- There are no applications associated with the port/lag (like SAPs on the port, etc.).
- The port or LAG should be administratively shutdown.
- The port should not be part of a LAG.
- To change split horizon group of a port or LAG, the old split horizon group should be first removed from the port or LAG, and then the new split horizon group can be configured.

The **no** form of this command removes the port or all member ports of the LAG from the split horizon group.

Parameters *group-name* — Specifies the name of the split horizon group up to 32 characters in length. The string must be composed of printable, 7-bit ASCII characters. If the string contains special characters (#, $, spaces, etc.), the entire string must be enclosed within double quotes.

split-horizon-group

Syntax [**no**] **split-horizon-group** *name-string*

Context config

Description This command creates a split horizon group to be applied on ports and LAGs.

The **no** form of the command removes the split horizon group. The user can remove a split horizon group only when there are no ports or LAGs associated with this split horizon group.

Default none

Parameters *name-string* — Creates the name of the split horizon group up to 32 characters in length. The string must be composed of printable, 7-bit ASCII characters. If the string contains special characters (#, $, spaces, etc.), the entire string must be enclosed within double quotes.

THIS PAGE LEFT INTENTIONALLY BLANK

Show Commands

Hardware Commands

chassis

Syntax **chassis** [**environment**] [**power-supply**]

Context show

Description This command displays general chassis status information.

Parameters **environment —** Displays chassis environmental status information.

Default Displays all chassis information.

power-supply — Displays chassis power supply status information.

Default Displays all chassis information.

Default Displays all chassis information.

Output **Chassis Output —** The following table describes chassis output fields.

Label	Description
Name	The system name for the router.
Type	Displays the device model number.
Location	The system location for the device.
Coordinates	A user-configurable string that indicates the Global Positioning System (GPS) coordinates for the location of the chassis. For example: N 45 58 23, W 34 56 12 N37 37' 00 latitude, W122 22' 00 longitude N36*39.246' W121*40.121'
CLLI Code	The Common Language Location Identifier (CLLI) that uniquely identifies the geographic location of places and certain functional categories of equipment unique to the telecommunications industry.
Number of slots	The number of slots in this chassis that are available for plug-in cards. The total number includes the IOM slot and the CPM slots.
Number of ports	The total number of ports currently installed in this chassis. This count does not include the Ethernet ports on the that are used for management access.

Label	Description (Continued)
Critical LED state	The current state of the Critical LED in this chassis.
Major LED state	The current state of the Major LED in this chassis.
Minor LED state	The current state of the Minor LED in this chassis.
Base MAC address	The base chassis Ethernet MAC address.
Admin chassis mode	The configured chassis mode.
Oper chassis mode	The current chassis mode.
Part number	The part number.
CLEI code	The code used to identify the router.
Serial number	The part number. Not user modifiable.
Manufacture date	The chassis manufacture date. Not user modifiable.
Manufacturing string	Factory-inputted manufacturing text string. Not user modifiable.
Administrative state	Up – The card is administratively up. Down – The card is administratively down.
Operational state	Up – The card is operationally up.
	Down – The card is operationally down.
Time of last boot	The date and time the most recent boot occurred.
Current alarm state	Displays the alarm conditions for the specific board.
Number of fan trays	The total number of fan trays installed in this chassis.
Number of fans	The total number of fans installed in this chassis.
Operational status	Current status of the fan tray.
Fan speed	Half speed – The fans are operating at half speed.
	Full speed – The fans are operating at full speed.
Number of power supplies	The number of power supplies installed in the chassis.

Label	Description (Continued)
Power supply number	The ID for each power supply installed in the chassis.
AC power	Within range — AC voltage is within range.
	Out of range — AC voltage is out of range.
DC power	Within range — DC voltage is within range.
	Out of range — DC voltage is out of range.
Over temp	Within range — The current temperature is within the acceptable range.
	Out of range — The current temperature is above the acceptable range.
Status	Up — The specified power supply is up.
	Down — The specified power supply is down

Sample Output

```
A:ALA-4# show chassis environment
===============================================================================
Chassis Information
===============================================================================
A:ALA-4#


A:ALA-4# show chassis power-supply
===============================================================================
Chassis Information
===============================================================================
Power Supply Information
    Number of power supplies      : 2

    Power supply number           : 1
    Defaulted power supply type   : dc
    Status                        : up

    Power supply number           : 2
    Defaulted power supply type   : dc
    Status                        : up
===============================================================================
A:ALA-4#
```

card

Syntax **card** [*slot-number*] [**detail**]

card state

Context show

Description This command displays card information.

If no command line parameters are specified, a card summary for all cards is displayed.

Parameters *slot-number* — Displays information for the specified card slot.

Default Displays all cards.

Values

state — Displays provisioned and equipped card and MDA information.

detail — Displays detailed card information.

Default Displays summary information only.

Output **Show Card Output —** The following table describes show card output fields.

Label	Description
Slot	The slot number of the card in the chassis.
Provisioned Card-type	The card type that is configured for the slot.
Equipped Card-type	The card type that is actually populated in the slot.
Admin State	Up — The card is administratively up.
	Down — The card is administratively down.
Operational State	Up — The card is operationally up.
	Down — The card is operationally down.

Sample Output

Show Card State Output — The following table describes show card state output fields.

Label	Description
Slot/MDA	The slot number of the card in the chassis.
Provisioned Type	The card type that is configured for the slot.
Equipped Type	The card type that is actually populated in the slot.
Admin State	Up — The card is administratively up.
	Down — The card is administratively down.

Label	Description (Continued)
Operational State	Up — The card is operationally up.
	provisioned — There is no card in the slot but it has been pre-configured.
Num Ports	The number of ports available on the MDA.
Num MDA	The number of MDAs installed.
Comments	Indicates whether the is the active or standby.

Sample Output

Show Card Detail Output — The following table describes detailed card output fields.

Label	Description
Clock source	The system's clock source.
Available MDA slots	The number of MDA slots available on the .
Installed MDAs	The number of MDAs installed on the .
Part number	The part number.
CLEI code	The Common Language Location Identifier (CLLI) code string for the router.
Serial number	The serial number. Not user modifiable.
Manufacture date	The chassis manufacture date. Not user modifiable.
Manufacturing string	Factory-inputted manufacturing text string. Not user modifiable.
Manufacturing deviations	Displays a record of changes by manufacturing to the hardware or software and which is outside the normal revision control process.
Administrative state	Up — The card is administratively up.
	Down — The card is administratively down.
Operational state	Up — The card is operationally up.
	Down — The card is operationally down.
Temperature	Internal chassis temperature.

Label	Description (Continued)
Temperature threshold	The value above which the internal temperature must rise in order to indicate that the temperature is critical.
Software boot version	The version of the boot image.
Software version	The software version number.
Time of last boot	The date and time the most recent boot occurred.
Current alarm state	Displays the alarm conditions for the specific board.
Base MAC address	Displays the base MAC address of the hardware component.
Memory Capacity	Displays the memory capacity of the card.

Sample Output

CPM Output — The following table describes the output fields for a CPM card.

Label	Description
Slot	The slot of the card in the chassis.
Card Provisioned	The SF/CPM type that is configured for the slot.
Card Equipped	The SF/CPM type that is actually populated in the slot.
Admin State	Up — The SF/CPM is administratively up.
	Down — The SF/CPM is administratively down.
Operational State	Up — The SF/CPM is operationally up.
	Down — The SF/CPM is operationally down.
BOF last modified	The date and time of the most recent BOF modification.
Config file version	The configuration file version.
Config file last modified	The date and time of the most recent config file modification.
Config file last modified	The date and time of the most recent config file modification.
Config file last saved	The date and time of the most recent config file save.

Label	Description (Continued)
CPM card status	active – The card is acting as the primary (active) CPM in a redundant system. standby – The card is acting as the standby (secondary) CPM in a redundant system.
Administrative state	Up – The CPM is administratively up. Down – The CPM is administratively down.
Operational state	Up – The CPM is operationally up. Down – The CPM is operationally down.
Serial number	The compact flash part number. Not user modifiable.
Firmware revision	The firmware version. Not user modifiable.
Model number	The compact flash model number. Not user modifiable.
Size	The amount of space available on the compact flash card.
Free space	The amount of space remaining on the compact flash card.
Part number	The SF/CPM part number.
CLEI code	The code used to identify the router.
Serial number	The SF/CPM part number. Not user modifiable.
Manufacture date	The chassis manufacture date. Not user modifiable.
Manufacturing string	Factory-inputted manufacturing text string. Not user modifiable.
Administrative state	Up – The card is administratively up. Down – The card is administratively down.
Operational state	Up – The card is operationally up. Down – The card is operationally down.
Time of last boot	The date and time the most recent boot occurred.
Current alarm state	Displays the alarm conditions for the specific board.
Status	Displays the current status.
Temperature	Internal chassis temperature.
Temperature threshold	The value above which the internal temperature must rise in order to indicate that the temperature is critical.

Label	Description (Continued)
Software boot version	The version of the boot image.
Memory capacity	The total amount of memory.

mda

Syntax **mda** [*slot* [**/***mda*]] [**detail**]

Context show

Description This command displays MDA information.

If no command line options are specified, a summary output of all MDAs is displayed in table format.

Parameters *slot* — The slot number for which to display MDA information.

Values 1

mda — The MDA number in the slot for which to display MDA information.

Values 1 — 3

detail — Displays detailed MDA information.

Output **MDA Output —** The following table describes MDA output fields.

Label	Description
Slot	The chassis slot number.
MDA	The MDA slot number.
Provisioned MDA-type	The MDA type provisioned.
Equipped MDA-type	The MDA type actually installed.
Admin State	Up — Administratively up.
	Down — Administratively down.
Ops State	Up — Operationally up.
	Down — Operationally down.

Sample Output

MDA Detailed Output — The following table describes detailed MDA output fields.

Label	Description
Slot	The chassis slot number.
Slot	The MDA slot number.
Provisioned Provisioned-type	The provisioned MDA type.
Equipped Mda-type	The MDA type that is physically inserted into this slot in this chassis.
Admin State	Up — The MDA is administratively up.
	Down — The MDA is administratively down.
Operational State	Up — The MDA is operationally up.
	Down — The MDA is operationally down.
Maximum port count	The maximum number of ports that can be equipped on the MDA card.
Number of ports equipped	The number of ports that are actually equipped on the MDA.
Transmit timing selected	The transmit timing method which is presently selected and being used by this MDA.
Sync Interface timing status	Indicates the status of the synchronous equipment timing subsystem.
Network Ingress Queue Policy	Specifies the network queue policy applied to the MDA to define the queueing structure for this object.
Capabilities	Specifies the minimum size of the port that can exist on the MDA.
Part number	The hardware part number.
CLEI code	The code used to identify the MDA.
Serial number	The MDA part number. Not user modifiable.
Manufacture date	The MDA manufacture date. Not user modifiable.
Manufacturing string	Factory-inputted manufacturing text string. Not user modifiable.
Administrative state	Up — The MDA is administratively up.
	Down — The MDA is administratively down.
Operational state	Up — The MDA is operationally up.

Label	Description (Continued)
	Down — The MDA is operationally down.
Time of last boot	The date and time the most recent boot occurred.
Current alarm state	Displays the alarm conditions for the specific MDA.
Base MAC address	The base chassis Ethernet MAC address. Special purpose MAC addresses used by the system software are constructed as offsets from this base address.

Sample Output

```
B:Dut-D# show mda 1/1 detail
===============================================================================
MDA 1/1 detail
===============================================================================
Slot  Mda   Provisioned           Equipped              Admin     Operational
            Mda-type              Mda-type              State     State
-------------------------------------------------------------------------------
1     1     m10-1gb-sfp           m10-1gb-sfp           up        up

MDA Specific Data
    Maximum port count            : 10
    Number of ports equipped      : 10
    Network ingress queue policy  : default
    Capabilities                  : Ethernet

Hardware Data
    Part number                   : 3HE00026AAAC01
    CLEI code                     :
    Serial number                 : NS042800525
    Manufacture date              : 07082004
    Manufacturing string          :
    Manufacturing deviations      :
    Administrative state          : up
    Operational state             : up
    Temperature                   : 42C
    Temperature threshold         : 75C
    Time of last boot             : 2007/04/11 09:37:52
    Current alarm state           : alarm cleared
    Base MAC address              : 00:03:fa:0e:9e:03
===============================================================================
B:Dut-D#
```

pools

Syntax **pools** *mda-id* [*/port*] [**access-app** [*pool-name* | **service** *service-id*]] [*access-app* [*pool-name* | **service** *service-id*]]
pools *mda-id* [*/port*] [**network-app** [*[pool-name*]][*access-uplink-app* [*pool-name*]]

Context show

Description This command displays pool information.

Parameters *mda-id*[*/port*] — Displays the pool information of the specified MDA.

access-app pool-name — Displays the pool information of the specified QoS policy.

Output **Show Pool Output —** The following table describes show pool output fields.

Label	Description
Type	Specifies the pool type.
ID	Specifies the card/mda or card/MDA/port designation.
Application/Type	Specifies the nature of usage the pool would be used for. The pools could be used for access or access uplink at egress.
Pool Name	Specifies the name of the pool being used.
Resv CBS	Specifies the percentage of pool size reserved for CBS.
Utilization	Specifies the type of the slope policy.
State	The administrative status of the port.
Start-Threshold	Specifies the percentage of the buffer utilized after which the drop probability starts to rise above 0.
Actual ResvCBS	Specifies the actual percentage of pool size reserved for CBS.
Admin ResvCBS	Specifies the percentage of pool size reserved for CBS.
Pool Total	Displays the total pool size.
Pool Shared	Displays the amount of the pool which is shared.
Pool Resv	Specifies the percentage of reserved pool size.
Pool Total In Use	Displays the total amount of the pool which is in use.
Pool Shared In Use	Displays the amount of the pool which is shared that is in use.

Dumping concise pool information for all ports in the MDA:

```
*A:card-1>config# show pools 1/1
===============================================================================
Type    Id        App.    Pool Name                   Actual ResvCBS  PoolSize
                                                      Admin ResvCBS
-------------------------------------------------------------------------------
Port    1/1/1     Acc-Egr default                     0               0
                                                      Sum
Port    1/1/1     AUp-Egr default                     50              99
                                                      Sum
Port    1/1/2     Acc-Egr default                     26              79
                                                      Sum
Port    1/1/2     AUp-Egr default                     0               0
                                                      Sum
Port    1/1/3     Acc-Egr default                     26              79
                                                      Sum
Port    1/1/3     AUp-Egr default                     0               0
                                                      Sum
Port    1/1/4     Acc-Egr default                     26              79
```

```
                                                        Sum
...
                                                        Sum
Port    1/1/24    AUp-Egr default                       0                0
                                                        Sum
===============================================================================
*A:card-1>config#
```

Displays egress pool information for the access port:

```
*A:card-1>config#     show pools 1/1/5 access-egress
===============================================================================
Pool Information
===============================================================================
Port                 : 1/1/5
Application          : Acc-Egr           Pool Name          : default
Resv CBS             : Sum
-------------------------------------------------------------------------------
Utilization                   State       Start-Threshold
-------------------------------------------------------------------------------
High-Slope                    Down              75%
Low-Slope                     Down              50%
-------------------------------------------------------------------------------
Queue                     High Slope Drop Rate(%)       Low Slope Drop Rate(%)
-------------------------------------------------------------------------------
Queue 1                          6.250000               100.000000
Queue 2                          6.250000               100.000000
Queue 3                          6.250000               100.000000
Queue 4                          6.250000               100.000000
Queue 5                          6.250000               100.000000
Queue 6                          6.250000               100.000000
Queue 7                          6.250000               100.000000
Queue 8                          6.250000               100.000000

Pool Total           : 79 KB
Pool Shared          : 53 KB             Pool Resv          : 26 KB

Pool Total In Use    : 0 KB
Pool Shared In Use   : 0 KB              Pool Resv In Use   : 0 KB
-------------------------------------------------------------------------------
FC-Maps                          ID       CBS         Depth  A.CIR     A.PIR
                                                             O.CIR     O.PIR
-------------------------------------------------------------------------------
be                               1/1/5    3200        0      0         1000000
                                                               0         Max
l2                               1/1/5    3200        0      0         1000000
                                                               0         Max
af                               1/1/5    3200        0      0         1000000
                                                               0         Max
l1                               1/1/5    3200        0      0         1000000
                                                               0         Max
h2                               1/1/5    3200        0      0         1000000
                                                               0         Max
ef                               1/1/5    3200        0      0         1000000
                                                               0         Max
h1                               1/1/5    3200        0      0         1000000
                                                               0         Max
nc                               1/1/5    3200        0      0         1000000
```

```
                                                                    0         Max
===============================================================================
*A:card-1>config#
```

Displays egress pool information for access uplink port

```
*A:card-1>config#     show pools 1/1/1 access-uplink-egress
===============================================================================
Pool Information
===============================================================================
Port                : 1/1/1
Application         : AUp-Egr           Pool Name          : default
Resv CBS            : Sum
-------------------------------------------------------------------------------
Utilization                   State       Start-Threshold
-------------------------------------------------------------------------------
High-Slope                    Down              75%
Low-Slope                     Down              50%
-------------------------------------------------------------------------------
Queue                   High Slope Drop Rate(%)       Low Slope Drop Rate(%)
-------------------------------------------------------------------------------
Queue 1                        6.250000               100.000000
Queue 2                        6.250000               100.000000
Queue 3                        6.250000               100.000000
Queue 4                        6.250000               100.000000
Queue 5                        6.250000               100.000000
Queue 6                        6.250000               100.000000
Queue 7                        6.250000               100.000000
Queue 8                        6.250000               100.000000

Pool Total          : 99 KB
Pool Shared         : 49 KB             Pool Resv          : 50 KB

Pool Total In Use   : 0 KB
Pool Shared In Use  : 0 KB              Pool Resv In Use   : 0 KB
-------------------------------------------------------------------------------
FC-Maps                         ID       CBS          Depth  A.CIR     A.PIR
                                                             O.CIR     O.PIR
-------------------------------------------------------------------------------
be                              1/1/1    3557         0      0         1000000
                                                             0         Max
l2                              1/1/1    3557         0      250000    1000000
                                                             249984    Max
af                              1/1/1    10671        0      250000    1000000
                                                             249984    Max
l1                              1/1/1    3557         0      250000    1000000
                                                             249984    Max
h2                              1/1/1    10671        0      1000000   1000000
                                                             Max       Max
ef                              1/1/1    10671        0      1000000   1000000
                                                             Max       Max
h1                              1/1/1    3557         0      100000    1000000
                                                             100032    Max
nc                              1/1/1    3557         0      100000    1000000
                                                             100032    Max
===============================================================================
*A:card-1>config#
```

Port Show Commands

port

Syntax **port** *port-id* [**count**] [**detail**]
port *port-id* **description**
port *port-id* **associations**

port *port-id* **dot1x** [**detail**]
port *port-id* **ethernet** [**efm-oam** | **detail**]

Context show

Description This command displays port information.

If no command line options are specified, the command port displays summary information for all ports on provisioned MDAs.

Parameters *port-id* — Specifies the physical port ID in the form *slot/mda/port*.

Syntax port-id *slot*[/*mda*[/*port*]]

MDA Values 1, 2, 3

Port Values 1 — 60 (depending on the MDA type)

associations — Displays a list of current router interfaces to which the port is associated.

description — Displays port description strings.

dot1x — Displays information.about 802.1x status and statistics.

ethernet — Displays ethernet port information.

efm-oam — Displays EFM OAM information.

detail — Displays detailed information about the Ethernet port.

— **Output** **Port Output —** The following tables describe port output fields:

- General Port Output Fields on page 100
- Entering port ranges on page 101
- Specific Port Output Fields on page 102
- Detailed Port Output Fields on page 106
- Ethernet Output Fields on page 111
- Ethernet-Like Medium Statistics Output Fields on page 114
- Port Associations Output Fields on page 115

Label	Description
Port ID	The port ID configured or displayed in the *slot/mda/port* format.
Admin State	Up — The administrative state is up.
	Down — The administrative state is down.
Phy Link	Yes — A physical link is present.
	No — A physical link is not present.
Port State	Up — The port is physically present and has physical link present.
	Down — The port is physically present but does not have a link.
	Ghost — A port that is not physically present.
	None — The port is in its initial creation state or about to be deleted.
	Link Up — A port that is physically present and has physical link present.
	Link Down — A port that is physically present but does not have a link.
Cfg MTU	The configured MTU.
Oper MTU	The negotiated size of the largest packet which can be sent.
LAG ID	The LAG or multi-link trunk (MLT) that the port is assigned to.
Port Mode	network — The port is configured for transport network use.
	access — The port is configured for service access.
Port Encap	Null — Ingress frames will not use tags or labels to delineate a service.
	dot1q — Ingress frames carry 802.1Q tags where each tag signifies a different service.
Port Type	The type of port or optics installed.
SFP/MDI MDX	GIGE — Indicates the GigE SFP type.
	FASTE — Indicates the FastE SFP type.

Label	Description (Continued)
	MDI – Indicates that the Ethernet interface is of type MDI (Media Dependent Interface). MDX – Indicates that the Ethernet interface is of type MDX (Media Dependent Interface with crossovers).

Sample Output

```
A:ALA-12# show port 1/1
===============================================================================
Ports on Slot
===============================================================================
Port      Admin Phys Port    Cfg  Oper LAG/ Port Port Port   SFP/
Id        State Link State   MTU  MTU  Bndl Mode Encp Type   MDIMDX
-------------------------------------------------------------------------------
1/1/1     Up    Yes   Ghost   1578 1578    1 netw null gige
1/1/2     Up    Yes   Ghost   1522 1522    - accs qinq gige
1/1/3     Up    Yes   Ghost   1518 1518    - accs dotq gige
1/1/4     Up    Yes   Ghost   1518 1518    - accs dotq gige
1/1/5     Up    Yes   Ghost   1518 1518    - accs dotq gige
1/1/6     Up    Yes   Ghost   1518 1518    - accs dotq gige
1/1/7     Up    Yes   Ghost   1518 1518    - accs dotq gige
1/1/8     Up    Yes   Ghost   1518 1518    - accs dotq gige
1/1/9     Up    Yes   Ghost   1518 1518    - accs dotq gige
1/1/10    Up    Yes   Ghost   1518 1518    - accs dotq gige
===============================================================================
A:ALA-12#
```

Entering port ranges:

```
*A:ALU-1# configure port 1/1/[1..3] shut
*A:ALU-1# show port 1/1
===============================================================================
Ports on Slot 1
===============================================================================
Port        Admin Link Port    Cfg  Oper LAG/ Port Port Port   SFP/XFP/
Id          State      State   MTU  MTU  Bndl Mode Encp Type   MDIMDX
-------------------------------------------------------------------------------
1/1/1       Down  No   Down    1518 1518    1 accs dotq gige
1/1/2       Down  No   Down    1578 1578    - netw null gige
1/1/3       Down  No   Down    1578 1578    - netw null gige
1/1/4       Up    No   Down    1514 1514    - accs null gige
1/1/5       Up    No   Down    1578 1578    - netw null gige
===============================================================================
*A:ALU-1#
```

Specific Port Output — The following table describes port output fields for a specific port.

Label	Description
Description	A text description of the port.
Interface	The port ID displayed in the *slot/mda/port* format.
Speed	The speed of the interface.
Link-level	Ethernet – The port is configured as Ethernet.
MTU	The size of the largest packet which can be sent/received on the Ethernet physical interface, specified in octets.
Admin State	Up – The port is administratively up.
	Down – The port is administratively down.
Oper State	Up – The port is operationally up.
	Down – The port is operationally down.
Duplex	Full – The link is set to full duplex mode.
	Half – The link is set to half duplex mode.
Hold time up	The link up dampening time in seconds. The port link dampening timer value which reduces the number of link transitions reported to upper layer protocols.
Hold time down	The link down dampening time in seconds. The **down** timer controls the dampening timer for link down transitions.
Physical Link	Yes – A physical link is present.
	No – A physical link is not present.
IfIndex	Displays the interface's index number which reflects its initialization sequence.
Last State chg	Displays the system time moment that the peer is up.
Last State Change	isplays the system time moment that the MC-LAG group is up.
Configured Mode	network – The port is configured for transport network use.
	access – The port is configured for service access.
Dot1Q Ethertype	Indicates the Ethertype expected when the port's encapsulation type is Dot1Q.
QinQ Ethertype	Indicates the Ethertype expected when the port's encapsulation type is QinQ.

Label	Description (Continued)
Net. Egr. Queue Pol	Specifies the network egress queue policy or that the default policy is used.
Access Egr. Qos	Specifies the access egress policy or that the default policy 1 is in use
Egr. Sched. Pol	Specifies the port scheduler policy or that the default policy default is in use
Encap Type	Null – Ingress frames will not use any tags or labels to delineate a service. dot1q – Ingress frames carry 802.1Q tags where each tag signifies a different service.
Active Alarms	The number of alarms outstanding on this port.
Auto-negotiate	True – The link attempts to automatically negotiate the link speed and duplex parameters. False – The duplex and speed values are used for the link.
Alarm State	The current alarm state of the port.
Collect Stats	Enabled – The collection of accounting and statistical data for the network Ethernet port is enabled. When applying accounting policies the data by default will be collected in the appropriate records and written to the designated billing file. Disabled – Collection is disabled. Statistics are still accumulated by the cards, however, the CPU will not obtain the results and write them to the billing file.
Egress Rate	The maximum amount of egress bandwidth (in kilobits per second) that this Ethernet interface can generate.
Configured Address	The base chassis Ethernet MAC address.
Hardware Address	The interface's hardware or system assigned MAC address at its protocol sub-layer.
Transceiver Type	Type of the transceiver.
Model Number	The model number of the transceiver.
Transceiver Code	The code for the transmission media.
Laser Wavelength	The light wavelength transmitted by the transceiver's laser.
Connector Code	The vendor organizationally unique identifier field (OUI) contains the IEEE company identifier for the vendor.
Diag Capable	Indicates if the transceiver is capable of doing diagnostics.

Label	Description (Continued)
Vendor OUI	The vendor-specific identifier field (OUI) contains the IEEE company identifier for the vendor.
Manufacture date	The manufacturing date of the hardware component in the mmddyyyy ASCII format.
Media	The media supported for the SFP.
Serial Number	The vendor serial number of the hardware component.
Part Number	The vendor part number contains ASCII characters, defining the vendor part number or product name.
Input/Output	When the collection of accounting and statistical data is enabled, then octet, packet, and error statistics are displayed.
Errors Input/ Output	For packet-oriented interfaces, the number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol. For character-oriented or fixed-length interfaces, the number of inbound transmission units that contained errors preventing them from being deliverable to a higher-layer protocol. For packet-oriented interfaces, the number of outbound packets that could not be transmitted because of errors. For character-oriented or fixed-length interfaces, the number of outbound transmission units that could not be transmitted because of errors.
Unicast Packets Input/Output	The number of packets, delivered by this sub-layer to a higher (sub-) layer, which were not addressed to a multicast or broadcast address at this sub-layer. The total number of packets that higher-level protocols requested be transmitted, and which were not addressed to a multicast or broadcast address at this sub-layer, including those that were discarded or not sent.
Multicast Packets Input/Output	The number of packets, delivered by this sub-layer to a higher (sub-) layer, which were addressed to a multicast address at this sub-layer. For a MAC layer protocol, this includes both Group and Functional addresses. The total number of packets that higher-level protocols requested be transmitted, and which were addressed to a multicast address at this sub-layer, including those that were discarded or not sent. For a MAC layer protocol, this includes both Group and Functional addresses.
Broadcast Packets Input/Output	The number of packets, delivered by this sub-layer to a higher (sub-) layer, which were addressed to a broadcast address at this sub-layer. The total number of packets that higher-level protocols requested be transmitted, and which were addressed to a multicast address at this sub-layer, including those that were discarded or not sent. For a MAC layer protocol, this includes both Group and Functional addresses.

Label	Description (Continued)
Discards Input/ Output	The number of inbound packets chosen to be discarded to possibly free up buffer space.
Unknown Proto Discards Input/ Output	For packet-oriented interfaces, the number of packets received via the interface which were discarded because of an unknown or unsupported protocol. For character-oriented or fixed-length interfaces that support protocol multiplexing the number of transmission units received via the interface which were discarded because of an unknown or unsupported protocol. For any interface that does not support protocol multiplexing, this counter will always be 0.
Errors	This field displays the number of cells discarded due to uncorrectable HEC errors. Errors do not show up in the raw cell counts.

Detailed Port Output — The following table describes detailed port output fields.

Label	Description
Description	A text description of the port.
Interface	The port ID displayed in the *slot/mda/port* format.
Speed	The speed of the interface.
Link-level	Ethernet – The port is configured as Ethernet.
MTU	The size of the largest packet which can be sent/received on the Ethernet physical interface, specified in octets.
Admin State	Up – The port is administratively up.
	Down – The port is administratively down.
Oper State	Up – The port is operationally up.
	Down – The port is operationally down.
Duplex	Full – The link is set to full duplex mode.
	Half – The link is set to half duplex mode.
Hold time up	The link up dampening time in seconds. The port link dampening timer value which reduces the number of link transitions reported to upper layer protocols.
Hold time down	The link down dampening time in seconds. The **down** timer controls the dampening timer for link down transitions.
IfIndex	Displays the interface's index number which reflects its initialization sequence.
Phy Link	Yes – A physical link is present.
	No – A physical link is not present.
Configured Mode	network – The port is configured for transport network use.
	access – The port is configured for service access.
Network Qos Pol	The QoS policy ID applied to the port.
Access Egr. Qos	Specifies the access egress policy or that the default policy 1 is in use.
Egr. Sched. Pol	Specifies the port scheduler policy or that the default policy default is in use.
Encap Type	Null – Ingress frames will not use any tags or labels to delineate a service.

Label	Description (Continued)
	dot1q — Ingress frames carry 802.1Q tags where each tag signifies a different service.
Active Alarms	The number of alarms outstanding on this port.
Auto-negotiate	True — The link attempts to automatically negotiate the link speed and duplex parameters.
	False — The duplex and speed values are used for the link.
Alarm State	The current alarm state of the port.
Collect Stats	Enabled — The collection of accounting and statistical data for the network Ethernet port is enabled. When applying accounting policies the data by default will be collected in the appropriate records and written to the designated billing file.
	Disabled — Collection is disabled. Statistics are still accumulated by the cards, however, the CPU will not obtain the results and write them to the billing file.
Down-When-Looped	Shows whether the feature is enabled or disabled.
Egress Rate	The maximum amount of egress bandwidth (in kilobits per second) that this Ethernet interface can generate.
Configured Address	The base chassis Ethernet MAC address.
Hardware Address	The interface's hardware or system assigned MAC address at its protocol sub-layer.
Errors Input/ Output	For packet-oriented interfaces, the number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol. For character-oriented or fixed-length interfaces, the number of inbound transmission units that contained errors preventing them from being deliverable to a higher-layer protocol. For packet-oriented interfaces, the number of outbound packets that could not be transmitted because of errors. For character-oriented or fixed-length interfaces, the number of outbound transmission units that could not be transmitted because of errors.
Unicast Packets Input/Output	The number of packets, delivered by this sub-layer to a higher (sub-) layer, which were not addressed to a multicast or broadcast address at this sub-layer. The total number of packets that higher-level protocols requested be transmitted, and which were not addressed to a multicast or broadcast address at this sub-layer, including those that were discarded or not sent.

Label	Description (Continued)
Multicast Packets Input/Output	The number of packets, delivered by this sub-layer to a higher (sub-) layer, which were addressed to a multicast address at this sub-layer. For a MAC layer protocol, this includes both Group and Functional addresses. The total number of packets that higher-level protocols requested be transmitted, and which were addressed to a multicast address at this sub-layer, including those that were discarded or not sent. For a MAC layer protocol, this includes both Group and Functional addresses.
Broadcast Packets Input/Output	The number of packets, delivered by this sub-layer to a higher (sub-) layer, which were addressed to a broadcast address at this sub-layer. The total number of packets that higher-level protocols requested be transmitted, and which were addressed to a multicast address at this sub-layer, including those that were discarded or not sent. For a MAC layer protocol, this includes both Group and Functional addresses.
Discards Input/Output	The number of inbound packets chosen to be discarded to possibly free up buffer space.
Unknown Proto Discards Input/Output	For packet-oriented interfaces, the number of packets received via the interface which were discarded because of an unknown or unsupported protocol. For character-oriented or fixed-length interfaces that support protocol multiplexing the number of transmission units received via the interface which were discarded because of an unknown or unsupported protocol. For any interface that does not support protocol multiplexing, this counter will always be 0.
LLF Admin State	Displays the Link Loss Forwarding administrative state.
LLF Oper State	Displays the Link Loss Forwarding operational state.

Sample Output

```
*A:SN12345678# show port 1/1/15
===============================================================================
Ethernet Interface
===============================================================================
Description        : 10/100/Gig Ethernet TX
Interface          : 1/1/15                      Oper Speed       : 1 Gbps
Link-level         : Ethernet                    Config Speed     : 1 Gbps
Admin State        : up                          Oper Duplex      : full
Oper State         : up                          Config Duplex    : full
Physical Link      : Yes                         MTU              : 1522
IfIndex            : 36143104                    Hold time up     : 0 seconds
Last State Change  : 03/19/2001 21:21:07         Hold time down   : 0 seconds
Last Cleared Time  : N/A

Configured Mode    : access                      Encap Type       : QinQ
Dot1Q Ethertype    : 0x8100                      QinQ Ethertype   : 0x8100
Net. Egr. Queue Pol: default                     Access Egr. Qos *: n/a
Egr. Sched. Pol    : default                     Network Qos Pol  : 1
Auto-negotiate     : limited                     MDI/MDX          : MDI
Accounting Policy  : None                        Collect-stats    : Disabled
Egress Rate        : Default                     Ingress Rate     : Default
Uplink             : Yes

Down-when-looped   : Disabled                    Keep-alive       : 10
Loop Detected      : False                       Retry            : 120

Configured Address : 00:87:98:76:65:0e
Hardware Address   : 00:87:98:76:65:0e
Cfg Alarm          :
Alarm Status       :
===============================================================================
Traffic Statistics
===============================================================================
                                                    Input                Output
-------------------------------------------------------------------------------
Octets                                     2229540275006                     0
Packets                                       2177285416                     0
Errors                                                14                     0
===============================================================================
* indicates that the corresponding row element may have been truncated.

===============================================================================
Port Statistics
===============================================================================
                                                    Input                Output
-------------------------------------------------------------------------------
Unicast Packets                            2177285416                     0
Multicast Packets                                   0                     0
Broadcast Packets                                   0                     0
Discards                                            0                     0
Unknown Proto Discards                              0
===============================================================================
Ethernet-like Medium Statistics
===============================================================================
```

```
Alignment Errors :                    0  Sngl Collisions  :                    0
FCS Errors       :                   13  Mult Collisions  :                    0
SQE Test Errors  :                    0  Late Collisions  :                    0
CSE              :                    0  Excess Collisns  :                    0
Too long Frames  :                    0  Int MAC Tx Errs  :                    0
Symbol Errors    :                    0  Int MAC Rx Errs  :                    0
===============================================================================
*A:SN12345678#
*A:SN12345678#   show port 1/1/15 detail
===============================================================================
Ethernet Interface
===============================================================================
Description        : 10/100/Gig Ethernet TX
Interface          : 1/1/15                      Oper Speed       : 1 Gbps
Link-level         : Ethernet                    Config Speed     : 1 Gbps
Admin State        : up                          Oper Duplex      : full
Oper State         : up                          Config Duplex    : full
Physical Link      : Yes                         MTU              : 1522
IfIndex            : 36143104                    Hold time up     : 0 seconds
Last State Change  : 03/19/2001 21:21:07         Hold time down   : 0 seconds
Last Cleared Time  : N/A

Configured Mode    : access                      Encap Type       : QinQ
Dot1Q Ethertype    : 0x8100                      QinQ Ethertype   : 0x8100
Net. Egr. Queue Pol: default                     Access Egr. Qos *: n/a
Egr. Sched. Pol    : default                     Network Qos Pol  : 1
Auto-negotiate     : limited                     MDI/MDX          : MDI
Accounting Policy  : None                        Collect-stats    : Disabled
Egress Rate        : Default                     Ingress Rate     : Default
Uplink             : Yes

Down-when-looped   : Disabled                    Keep-alive       : 10
Loop Detected      : False                       Retry            : 120

Configured Address : 00:87:98:76:65:0e
Hardware Address   : 00:87:98:76:65:0e
Cfg Alarm          :
Alarm Status       :
===============================================================================
Traffic Statistics
===============================================================================
                                                  Input                 Output
-------------------------------------------------------------------------------
Octets                                   2199575527230                     0
Packets                                     2148022967                     0
Errors                                              14                     0
===============================================================================
Ethernet Statistics
===============================================================================

Broadcast Pckts  :                    0  Drop Events      :                    0
Multicast Pckts  :                    0  CRC/Align Errors :                   13
Undersize Pckts  :                    0  Fragments        :                    1
Oversize Pckts   :                    0  Jabbers          :                    0
Collisions       :                    0

Octets                          :       2199575527230
Packets                         :          2148022967
Packets of 64 Octets            :                   0
```

```
Packets of 65 to 127 Octets    :                   0
Packets of 128 to 255 Octets   :                   1
Packets of 256 to 511 Octets   :                   0
Packets of 512 to 1023 Octets  :                  12
Packets of 1024 to 1518 Octets :          2148022966
Packets of 1519 or more Octets :                   0
===============================================================================
* indicates that the corresponding row element may have been truncated.
===============================================================================
Port Statistics
===============================================================================
                                                 Input                  Output
-------------------------------------------------------------------------------
Unicast Packets                             2148272026                       0
Multicast Packets                                    0                       0
Broadcast Packets                                    0                       0
Discards                                             0                       0
Unknown Proto Discards                               0
===============================================================================
Ethernet-like Medium Statistics
===============================================================================
Alignment Errors :                   0  Sngl Collisions  :                   0
FCS Errors       :                  13  Mult Collisions  :                   0
SQE Test Errors  :                   0  Late Collisions  :                   0
CSE              :                   0  Excess Collisns  :                   0
Too long Frames  :                   0  Int MAC Tx Errs  :                   0
Symbol Errors    :                   0  Int MAC Rx Errs  :                   0
===============================================================================
Meter Statistics
===============================================================================

-------------------------------------------------------------------------------
                       Packets                 Octets
-------------------------------------------------------------------------------
Ingress Meter  1 (Unicast)
For. InProf           :         0                       0
For. OutProf          :         0                       0
Ingress Meter  9 (Multipoint)
For. InProf           :         0                       0
For. OutProf          :         0                       0
===============================================================================
*A:SN12345678#
```

Ethernet Output — The following table describes Ethernet output fields.

Label	Description
Broadcast Pckts	The number of packets, delivered by this sub-layer to a higher (sub-) layer, which were addressed to a broadcast address at this sub-layer. The total number of packets that higher-level protocols requested be transmitted, and which were addressed to a multicast address at this sub-layer, including those that were discarded or not sent. For a MAC layer protocol, this includes both Group and Functional addresses.
Multicast Pckets	The number of packets, delivered by this sub-layer to a higher (sub-) layer, which were addressed to a multicast address at this sub-layer. For a MAC layer protocol, this includes both Group and Functional addresses. The total number of packets that higher-level protocols requested be transmitted, and which were addressed to a multicast address at this sub-layer, including those that were discarded or not sent. For a MAC layer protocol, this includes both Group and Functional addresses.
Undersize Pckets	The total number of packets received that were less than 64 octets long (excluding framing bits, but including FCS octets) and were otherwise well formed.
Oversize Pckts	The total number of packets received that were longer than can be accepted by the physical layer of that port (9900 octets excluding framing bits, but including FCS octets for GE ports) and were otherwise well formed.
Collisions	The best estimate of the total number of collisions on this Ethernet segment.
Drop Events	The total number of events in which packets were dropped by the probe due to lack of resources. Note that this number is not necessarily the number of packets dropped; it is just the number of times this condition has been detected.
CRC Align Errors	The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
Fragments	The total number of packets received that were less than 64 octets in length (excluding framing bits but including FCS octets) and had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).

Label	Description (Continued)
Jabbers	The total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
Octets	The total number of octets received.
Packets	The total number of packets received.
Packets to	The number of packets received that were equal to or less than the displayed octet limit.

Sample Output

```
===============================================================================
Ethernet Statistics
===============================================================================
Broadcast Pckts  :               42621  Drop Events      :                   0
Multicast Pckts  :                   0  CRC/Align Errors :                   0
Undersize Pckts  :                   0  Fragments        :                   0
Oversize Pckts   :                   0  Jabbers          :                   0
Collisions       :                   0

Octets                          :             2727744
Packets                         :               42621
Packets of 64 Octets            :               42621
Packets of 65 to 127 Octets     :                   0
Packets of 128 to 255 Octets    :                   0
Packets of 256 to 511 Octets    :                   0
Packets of 512 to 1023 Octets   :                   0
Packets of 1024 to 1518 Octets  :                   0
Packets of 1519 or more Octets  :                   0
===============================================================================
Port Statistics
===============================================================================
                                                   Input                  Output
-------------------------------------------------------------------------------
Unicast Packets                                        0                       0
Multicast Packets                                      0                       0
Broadcast Packets                                  42621                       0
Discards                                               0                       0
Unknown Proto Discards                                 0
===============================================================================
...
```

Ethernet-like Medium Statistics Output — The following table describes Ethernet-like medium statistics output fields.

Label	Description
Alignment Errors	The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets.
FCS Errors	The number of frames received on a particular interface that are an integral number of octets in length but do not pass the FCS check.
SQE Errors	The number of times that the SQE TEST ERROR is received on a particular interface.
CSE	The number of times that the carrier sense condition was lost or never asserted when attempting to transmit a frame on a particular interface.
Too long Frames	The number of frames received on a particular interface that exceed the maximum permitted frame size.
Symbol Errors	For an interface operating at 100 Mb/s, the number of times there was an invalid data symbol when a valid carrier was present.
Sngl Collisions	The number of frames that are involved in a single collision, and are subsequently transmitted successfully.
Mult Collisions	The number of frames that are involved in more than one collision and are subsequently transmitted successfully.
Late Collisions	The number of times that a collision is detected on a particular interface later than one slotTime into the transmission of a packet.
Excess Collisns	The number of frames for which transmission on a particular interface fails due to excessive collisions.
Int MAC Tx Errs	The number of frames for which transmission on a particular interface fails due to an internal MAC sublayer transmit error,
Int MAC Rx Errs	The number of frames for which reception on a particular interface fails due to an internal MAC sublayer receive error.
Ingress Meter	Specifies themeter ID.
For. InProf	The number of in-profile packets and octets (rate below CIR) forwarded by the ingress meter.
For. OutProf	The number of out-of-profile packets and octets (rate below CIR) forwarded by the ingress meter.

Sample Output

```
A:ALA-48# show port 1/3/1 detail
===============================================================================
...
===============================================================================
Ethernet-like Medium Statistics
===============================================================================
Alignment Errors :                  0  Sngl Collisions  :                   0
FCS Errors       :                  0  Mult Collisions  :                   0
SQE Test Errors  :                  0  Late Collisions  :                   0
CSE              :                  0  Excess Collisns  :                   0
Too long Frames  :                  0  Int MAC Tx Errs  :                   0
Symbol Errors    :                  0  Int MAC Rx Errs  :                   0
===============================================================================
Meter Statistics
===============================================================================

-------------------------------------------------------------------------------
                        Packets                 Octets
-------------------------------------------------------------------------------
Ingress Meter  1 (Unicast)
For. InProf           :         0                       0
For. OutProf          :         0                       0
Ingress Meter  9 (Multipoint)
For. InProf           :         0                       0
For. OutProf          :         0                       0
 ...
===============================================================================
A:ALA-48#
```

Port Associations Output — The following table describes port associations output fields.

Label	Description
Svc ID	The service identifier.
Name	The name of the IP interface.
Encap Value	The dot1q or qinq encapsulation value on the port for this IP interface

Sample Output

```
A:ALA-1# show port 1/1/6 associations
===============================================================================
Interface Table
===============================================================================
Router/ServiceId               Name                            Encap Val
-------------------------------------------------------------------------------
Router: Base                   if1000                          1000
Router: Base                   if2000                          2000
-------------------------------------------------------------------------------
Interfaces
===============================================================================
A;ALA-1#
```

THIS PAGE LEFT INTENTIONALLY BLANK

LAG Commands

lag

Syntax **lag** [*lag-id*] [**detail**] [**statistics**]
lag *lag-id* **associations**

Context show

Description This command displays Link Aggregation Group (LAG) information.

If no command line options are specified, a summary listing of all LAGs is displayed.

Parameters *lag-id* — Displays only information on the specified LAG ID.

Default Display information for all LAG IDs.

detail — Displays detailed LAG information.

Default Displays summary information.

statistics — Displays LAG statistics information.

associations — Displays a list of current router interfaces to which the LAG is assigned.

Output **LAG Output —** The following table describes LAG output fields.

Label	Description
LAG ID	The LAG ID that the port is assigned to.
Adm	Up — The LAG is administratively up.
	Down — The LAG is administratively down.
Opr	Up — The LAG is operationally up.
	Down — The LAG is operationally down.
Port-Threshold	The number of operational links for the LAG at or below which the configured action will be invoked.
Up-Link-Count	The number of ports that are physically present and have physical links present.
MC Act/Stdby	Member port is selected as active or standby link.

Sample Output

```
A:ALA-48>config# show lag
===============================================================================
Lag Data
===============================================================================
Lag-id         Adm     Opr     Port-Threshold   Up-Link-Count   MC Act/Stdby
-------------------------------------------------------------------------------
1              up      down    0                0               N/A
2              up      up      0                1               active
3              up      down    0                0               standby
4              up      down    0                0               standby
10             up      down    0                0               N/A
-------------------------------------------------------------------------------
Total Lag-ids: 5       Single Chassis: 2        MC Act: 1       MC Stdby: 2
===============================================================================
A:ALA-48>config# show lag
```

Detailed LAG Output — The following table describes detailed LAG output fields. The output is dependent on whether or not the LAG was configurd as a multi-chassis LAG.

Label	Description
LAG ID	The LAG or multi-link trunk (MLT) that the port is assigned to.
Adm	Up — The LAG is administratively up. Down — The LAG is administratively down.
Port Threshold	If the number of available links is equal or below this number, the threshold action is executed.
Thres. Last Cleared	The last time that keepalive stats were cleared.
Dynamic Cost	The OSPF costing of a link aggregation group based on the available aggregated, operational bandwidth.
Configured Address	The base chassis Ethernet MAC address.
Hardware Address	The hardware address.
Hold-Time Down	The timer, in tenths of seconds, which controls the delay between detecting that a LAG is down and reporting it to the higher levels.
LACP	Enabled — LACP is enabled. Down — LACP is disabled.
LACP Transmit Intvl	LACP timeout signalled to peer.
Selection Crite-ria	Configured subgroup selection criteria.

Label	Description (Continued)
Number of sub-groups	Total subgroups in LAG.
System ID	System ID used by actor in LACP messages.
Admin Key	Configured LAG key.
Oper Key	Key used by actor in LACP messages.
System Priority	System priority used by actor in LACP messages.
Prtr System ID	System ID used by partner in LACP messages.
Prtr Oper Key	Key used by partner in LACP messages.
Prtr System Pri-ority	System priority used by partner in LACP messages.
Mode	LAG in access or network mode.
Opr	Up – The LAG is operationally up. Down – The LAG is operationally down.
Port Threshold	Configured port threshold.
Thres. Exceeded Cnt	The number of times that the drop count was reached.
Threshold Action	Action to take when the number of available links is equal or below the port threshold.
Encap Type	The encapsulation method used to distinguish customer traffic on a LAG.
Lag-IFIndex	A box-wide unique number assigned to this interface.
Adapt QoS	Displays the configured QoS mode.
Port ID	The specific slot/MDA/port ID.
(LACP) Mode	LACP active or passive mode.
LACP xmit standby	LACP transmits on standby links enabled / disabled.
Slave-to-partner	Configured enabled/disabled.
Port-id	Displays the member port ID.
Adm	Displays the member port administrative state.
Active/stdby	Indicates that the member port is selected as the active or standby link.
Opr	Indicates that the member port operational state.

Label	Description (Continued)
Primary	Indicates that the member port is the primary port of the LAG.
Sub-group	Displays the member subgroup where the member port belongs to.
Priority	Displays the member port priority.

Sample Output

```
*A:ALA-48>show# lag  1 detail
===============================================================================
LAG Details
===============================================================================
Description:
-------------------------------------------------------------------------------
Details
-------------------------------------------------------------------------------
Lag-id              : 1                     Mode                : access
Adm                 : up                    Opr                 : down
Thres. Exceeded Cnt : 0                     Port Threshold      : 3
Thres. Last Cleared : 02/21/2007 12:39:36   Threshold Action    : dynamic cost
Dynamic Cost        : false                 Encap Type          : null
Configured Address  : 04:67:01:01:00:01     Lag-IfIndex         : 1342177281
Hardware Address    : 14:30:ff:00:01:41     Adapt Qos           : distribute
Hold-time Down      : 0.0 sec
LACP                : enabled               Mode                : active
LACP Transmit Intvl : fast                  LACP xmit stdby     : enabled
Selection Criteria  : highest-count         Slave-to-partner    : enabled
Number of sub-groups: 0                     Forced              : -
System Id           : 14:30:ff:00:00:00     System Priority     : 1
Admin Key           : 32768                 Oper Key            : 32666
Prtr System Id      :                       Prtr System Priority : 0
Prtr Oper Key       : 0

MC Peer Address     : 10.10.10.2            MC Peer Lag-id      : 1
MC System Id        : 00:00:00:33:33:33     MC System Priority  : 32888
MC Admin Key        : 32666                 MC Active/Standby   : active
MC Lacp ID in use   : true                  MC extended timeout : false
MC Selection Logic  : peer timed out (no route to peer), selected local
                      subgroup
MC Config Mismatch  : no mismatch
-------------------------------------------------------------------------------
Port-id        Adm    Act/Stdby Opr    Primary   Sub-group     Forced   Prio
-------------------------------------------------------------------------------
===============================================================================
*A:ALA-48>show#
```

LAG Statistics Output — The following table describes detailed LAG statistics output fields.

Label	Description
LAG ID	The LAG or multi-link trunk (MLT) that the port is assigned to.
Port ID	The port ID configured or displayed in the *slot/mda/port* format.
Input Bytes	The number of incoming bytes for the LAG on a per-port basis.
Input Packets	The number of incoming packets for the LAG on a per-port basis.
Output Bytes	The number of outbound bytes for the LAG on a per-port basis.
Output Packets	The number of outbound packets for the LAG on a per-port basis.
Input/Output Errors	For packet-oriented interfaces, the number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol. For character- oriented or fixed-length interfaces, the number of inbound transmission units that contained errors preventing them from being deliverable to a higher-layer protocol. For packet-oriented interfaces, the number of outbound packets that could not be transmitted because of errors. For character-oriented or fixed-length interfaces, the number of outbound transmission units that could not be transmitted because of errors.
Totals	Displays the column totals for bytes, packets, and errors.

Sample Output

```
ALA-1# show lag statistics
===============================================================================
LAG Statistics
===============================================================================
Description:
Lag-id Port-id   Input     Input      Output    Output     Input     Output
                 Bytes     Packets    Bytes     Packets    Errors    Errors
-------------------------------------------------------------------------------
1      1/1/3     0         1006       0         2494       0         0
       1/1/4     0         435        0         401        0         0
       1/1/5     0         9968       0         9833       0         0
-------------------------------------------------------------------------------
Totals           0         11409      0         12728      0         0
===============================================================================
ALA-1#
```

LAG Associations Output — The following table describes LAG associations output fields.

Label	Description
Service ID	The service associated with the LAG.
Name	The name of the IP interface.
Encap Val	The dot1q or qinq values of the port for the IP interface.

Sample Output

```
A:ALA-1# show lag 5 associations
===============================================================================
Interface Table
===============================================================================
Router/ServiceId               Name                            Encap Val
-------------------------------------------------------------------------------
Router: Base                   LAG2West                        0
-------------------------------------------------------------------------------
Interfaces
===============================================================================
A:ALA-1#
```

LAG Details with MC-LAG Output — The following example displays LAG output with MC LAG:

```
*A:pc5# show lag 2 detail
===============================================================================
LAG Details
===============================================================================
Description:
-------------------------------------------------------------------------------
Details
-------------------------------------------------------------------------------
Lag-id              : 2                     Mode                : access
Adm                 : up                    Opr                 : up
Thres. Exceeded Cnt : 2                     Port Threshold      : 0
Thres. Last Cleared : 04/11/2007 21:50:55   Threshold Action    : down
Dynamic Cost        : false                 Encap Type          : dot1q
Configured Address  : 8e:8b:ff:00:01:42     Lag-IfIndex         :
1342177282
Hardware Address    : 8e:8b:ff:00:01:42     Adapt Qos           :
distribute
Hold-time Down      : 0.0 sec
LACP                : enabled               Mode                : active
LACP Transmit Intvl : fast                  LACP xmit stdby     : enabled
Selection Criteria  : highest-count         Slave-to-partner    : disabled
Number of sub-groups: 2                     Forced              : -
System Id           : 8e:8b:ff:00:00:00     System Priority     : 32768
Admin Key           : 32768                 Oper Key            : 32768
Prtr System Id      : 8e:89:ff:00:00:00     Prtr System Priority : 32768
Prtr Oper Key       : 32768

MC Peer Address     : 10.10.10.101          MC Peer Lag-id      : 2
MC System Id        : 01:01:01:01:01:01     MC System Priority  : 2
```

```
MC Admin Key        : 1                    MC Active/Standby    : active
MC Lacp ID in use   : false                MC extended timeout  : false
MC Selection Logic  : waiting for peer info MC Config Mismatch  : no mismatch
-------------------------------------------------------------------------------
Port-id        Adm    Act/Stdby Opr    Primary   Sub-group     Forced
Prio
-------------------------------------------------------------------------------
1/1/1          up     active    up     yes       7             -        99
1/1/2          up     standby   down             8             -        100
-------------------------------------------------------------------------------
Port-id        Role      Exp   Def   Dist  Col   Syn   Aggr  Timeout
Activity
-------------------------------------------------------------------------------
1/1/1          actor     No    No    Yes   Yes   Yes   Yes   Yes      Yes
1/1/1          partner   No    No    Yes   Yes   Yes   Yes   Yes      Yes
1/1/2          actor     No    No    No    No    No    Yes   Yes      Yes
1/1/2          partner   No    No    No    No    Yes   Yes   Yes      Yes
===============================================================================
*A:pc5#
```

LAG Details without MC-LAG Output — The following example displays LAG output without MC LAG:

```
*A:pc5# show lag 2 detail
===============================================================================
LAG Details
===============================================================================
Description:
-------------------------------------------------------------------------------
Details
-------------------------------------------------------------------------------
Lag-id              : 2                    Mode                 : access
Adm                 : up                   Opr                  : up
Thres. Exceeded Cnt : 4                    Port Threshold       : 0
Thres. Last Cleared : 04/11/2007 02:03:49   Threshold Action     : down
Dynamic Cost        : false                Encap Type           : dot1q
Configured Address  : 8e:8b:ff:00:01:42    Lag-IfIndex          :
1342177282
Hardware Address    : 8e:8b:ff:00:01:42    Adapt Qos            :
distribute
Hold-time Down      : 0.0 sec
LACP                : enabled              Mode                 : active
LACP Transmit Intvl : fast                 LACP xmit stdby      : enabled
Selection Criteria  : highest-count        Slave-to-partner     : disabled
Number of sub-groups: 2                    Forced               : -
System Id           : 8e:8b:ff:00:00:00    System Priority      : 32768
Admin Key           : 32768                Oper Key             : 32768
Prtr System Id      : 8e:89:ff:00:00:00    Prtr System Priority : 32768
Prtr Oper Key       : 32768
-------------------------------------------------------------------------------
Port-id        Adm    Act/Stdby Opr    Primary   Sub-group     Forced
Prio
-------------------------------------------------------------------------------
1/1/1          up     active    up     yes       7             -        99
1/1/2          up     standby   down             8             -        100
-------------------------------------------------------------------------------
Port-id        Role      Exp   Def   Dist  Col   Syn   Aggr  Timeout
Activity
-------------------------------------------------------------------------------
```

```
1/1/1          actor     No    No    Yes   Yes   Yes   Yes   Yes      Yes
1/1/1          partner   No    No    Yes   Yes   Yes   Yes   Yes      Yes
1/1/2          actor     No    No    No    No    No    Yes   Yes      Yes
1/1/2          partner   No    No    No    No    Yes   Yes   Yes      Yes
===============================================================================
*A:pc5#
```

Port Monitor Commands

port

Syntax **port** *port-id* [*port-id*...(up to 5 max)] [**interval** *seconds*] [**repeat** *repeat*] [**absolute** | **rate**] [**multiclass**]

Context monitor

Description This command enables port traffic monitoring. The specified port(s) statistical information displays at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the specified port(s). The subsequent statistical information listed for each interval is displayed as a delta to the previous display.

When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters **port** *port-id* **—** Specify up to 5 port IDs. Port-IDs are only MLPPP bundles or bundle protection groups when the multiclass keyword is specified.

Syntax: *port-id* slot/mda/port

interval *seconds* **—** Configures the interval for each display in seconds.

Default 10 seconds

Values 3 — 60

repeat *repeat* **—** Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the **rate** keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

Sample Output

```
A:ALA-12>monitor# port /1/4 interval 3 repeat 3 absolute
===============================================================================
Monitor statistics for Port /1/4
===============================================================================
                                                Input                      Output
-------------------------------------------------------------------------------
```

```
At time t = 0 sec (Base Statistics)
-------------------------------------------------------------------------------
Octets                                            0                           0
Packets                                          39                         175
Errors                                            0                           0
-------------------------------------------------------------------------------
At time t = 3 sec (Mode: Absolute)
-------------------------------------------------------------------------------
Octets                                            0                           0
Packets                                          39                         175
Errors                                            0                           0
-------------------------------------------------------------------------------
At time t = 6 sec (Mode: Absolute)
-------------------------------------------------------------------------------
Octets                                            0                           0
Packets                                          39                         175
Errors                                            0                           0
-------------------------------------------------------------------------------
At time t = 9 sec (Mode: Absolute)
-------------------------------------------------------------------------------
Octets                                            0                           0
Packets                                          39                         175
Errors                                            0                           0
===============================================================================
A:ALA-12>monitor#

A:ALA-12>monitor# port /1/4 interval 3 repeat 3 rate
===============================================================================
Monitor statistics for Port /1/4
===============================================================================
                                                Input                      Output
-------------------------------------------------------------------------------
At time t = 0 sec (Base Statistics)
-------------------------------------------------------------------------------
Octets                                            0                           0
Packets                                          39                         175
Errors                                            0                           0
-------------------------------------------------------------------------------
At time t = 3 sec (Mode: Rate)
-------------------------------------------------------------------------------
Octets                                            0                           0
Packets                                           0                           0
Errors                                            0                           0
-------------------------------------------------------------------------------
At time t = 6 sec (Mode: Rate)
-------------------------------------------------------------------------------
Octets                                            0                           0
Packets                                           0                           0
Errors                                            0                           0
-------------------------------------------------------------------------------
At time t = 9 sec (Mode: Rate)
-------------------------------------------------------------------------------
Octets                                            0                           0
Packets                                           0                           0
Errors                                            0                           0
===============================================================================
A:ALA-12>monitor#
```

Clear Commands

Parameters

lag

Syntax **lag** *lag-id* **statistics**

Context clear

Description This command clears statistics for the specified LAG ID.

Parameters *lag-id* — The LAG ID to clear statistics.

statistics — Specifies to clear statistics for the specified LAG ID.

Debug Commands

lag

Syntax **lag** [**lag-id** *lag-id* [**port** *port-id*]] [**all**]
lag [**lag-id** *lag-id* [**port** *port-id*]] [**sm**] [**pkt**] [**cfg**] [**red**] [**iom-upd**] [**port-state**] [**timers**] [**sel-logic**]
no lag [**lag-id** *lag-id*]

Context debug

Description This command enables debugging for LAG.

Parameters *lag-id* — Specifies the link aggregation group ID.

port-id — Specifies the physical port ID.

Syntax: *slot/mda/port*

sm — Specifies to display trace LACP state machine.

pkt — Specifies to display trace LACP packets.

cfg — Specifies to display trace LAG configuration.

red — Specifies to display trace LAG high availability.

iom-upd — Specifies to display trace LAG IOM updates.

port-state — Specifies to display trace LAG port state transitions.

timers — Specifies to display trace LAG timers.

sel-logic — Specifies to display trace LACP selection logic.

Clear Commands

Parameters

lag

Syntax **lag** *lag-id* **statistics**

Context clear

Description This command clears statistics for the specified LAG ID.

Parameters *lag-id* — The LAG ID to clear statistics.

statistics — Specifies to clear statistics for the specified LAG ID.

port

Syntax **port** *port-id* **statistics**

clear **Context**

Description This command clears port statistics for the specified port(s).

Parameters *port-id* — The port identifier.

statistics — Specifies that port statistics will be cleared.

slot — The slot number.

Values 1

mda — The MDA number.

Default All MDAs.

Values 1, 2, 3

INDEX