



Alcatel-Lucent 7705

SERVICE AGGREGATION ROUTER OS | RELEASE 5.0
BASIC SYSTEM CONFIGURATION GUIDE

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About This Guide

This guide describes system concepts and provides configuration explanations and examples to configure the 7705 SAR boot option file (BOF) and perform system and file management functions.

This guide 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 guide is intended for network administrators who are responsible for configuring 7705 SAR routers. It is assumed that the network administrators have an understanding of networking principles and configurations. Protocols, standards, and processes described in this guide include the following:

- CLI concepts
- file system concepts
- boot option, configuration, image loading, and initialization procedures
- basic system management functions such as the system name, router location and coordinates, and CLLI code, time zones, Network Time Protocol (NTP), Simple Network Time Protocol (SNTP), and synchronization properties

List of Technical Publications

The 7705 SAR OS documentation set is composed of the following guides:

- **7705 SAR OS Basic System Configuration Guide**
This guide describes basic system configurations and operations.
- **7705 SAR OS System Management Guide**
This guide describes system security and access configurations as well as event logging and accounting logs.
- **7705 SAR OS Interface Configuration Guide**
This guide describes card and port provisioning.
- **7705 SAR OS Router Configuration Guide**
This guide describes logical IP routing interfaces, IP-based filtering, and routing policies.
- **7705 SAR OS MPLS Guide**
This guide describes how to configure Multiprotocol Label Switching (MPLS), Resource Reservation Protocol for Traffic Engineering (RSVP-TE), and Label Distribution Protocol (LDP).
- **7705 SAR OS Services Guide**
This guide describes how to configure service parameters such as service access points (SAPs), service destination points (SDPs), customer information, and user services.
- **7705 SAR OS Quality of Service Guide**
This guide describes how to configure Quality of Service (QoS) policy management.
- **7705 SAR OS Routing Protocols Guide**
This guide provides an overview of dynamic routing concepts and describes how to configure them.
- **7705 SAR OS OAM and Diagnostics Guide**
This guide provides information on Operations, Administration and Maintenance (OAM) tools.
- **7705 SAR OS Firewall Configuration Guide**
This guide provides overview information about firewalls and describes how to configure them.

Technical Support

If you purchased a service agreement for your 7705 SAR 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 at:

Web: <http://support.alcatel-lucent.com>

About This Guide

Getting Started

In This Chapter

This chapter provides process flow information to configure basic router and system parameters, perform operational functions with directory and file management, and perform boot option tasks.

Alcatel-Lucent 7705 SAR System Configuration Process

[Table 1](#) lists the tasks necessary to perform system and file management functions and to configure boot option files (BOF).

Each chapter in this book 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: Basic Configuration Process

Area	Task	Chapter
CLI Usage	Learning the CLI structure	CLI Usage
	Basic CLI commands	Basic CLI Commands
	Configure environment commands	CLI Environment Commands
	Configure monitor commands	CLI Monitor Commands
Operational functions	Directory and file management	File System Management
Boot options	Configure boot option files (BOF)	Boot Options

Table 1: Basic Configuration Process (Continued)

Area	Task	Chapter
System configuration	Configure system functions, including host name, address, domain name, and time parameters	System Management
Reference	List of IEEE, IETF, and other proprietary entities	Standards and Protocol Support

In This Chapter

This chapter provides information about using the Command Line Interface (CLI).

Topics in this chapter include:

- [CLI Structure](#)
- [Navigating in the CLI](#)
 - [CLI Contexts](#)
 - [Basic CLI Commands](#)
 - [CLI Environment Commands](#)
 - [CLI Monitor Commands](#)
- [Getting Help in the CLI](#)
- [The CLI Command Prompt](#)
- [Displaying Configuration Contexts](#)
- [EXEC Files](#)
- [Entering CLI Commands](#)
 - [Command Completion](#)
 - [Unordered Parameters](#)
 - [Editing Keystrokes](#)
 - [Absolute Paths](#)
 - [History](#)
 - [Entering Numerical Ranges](#)
 - [Pipe/Match](#)
 - [Redirection](#)
- [Basic Command Reference](#)

CLI Structure

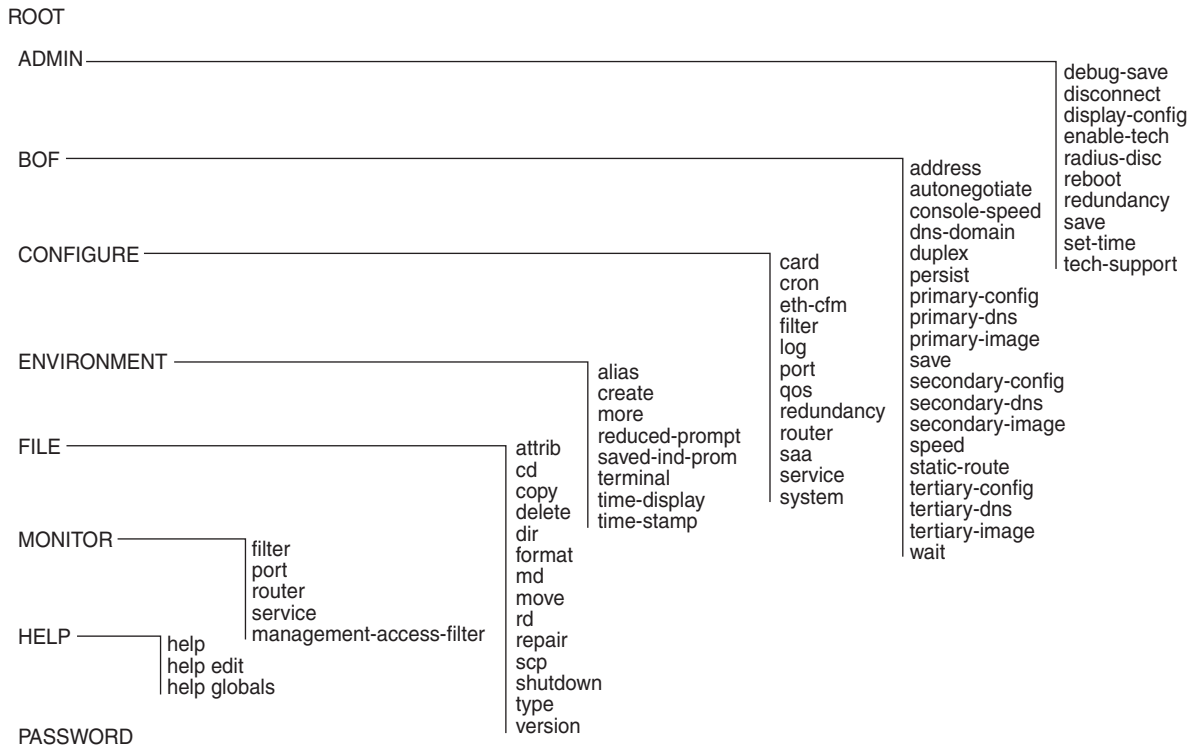
The Alcatel-Lucent 7705 SAR Operating System (OS) CLI is a command-driven interface accessible through the console, Telnet, and secure shell (SSH). The CLI can be used for configuration and management of 7705 SAR routers.

The 7705 SAR CLI command tree is a hierarchical inverted tree. At the highest level is the ROOT level. Below this level are other tree levels with the major command groups; for example, configuration commands and show commands are levels below ROOT.

The CLI is organized so that related commands with the same scope are at the same level or in the same context. Sublevels or subcontexts have related commands with a more refined scope.

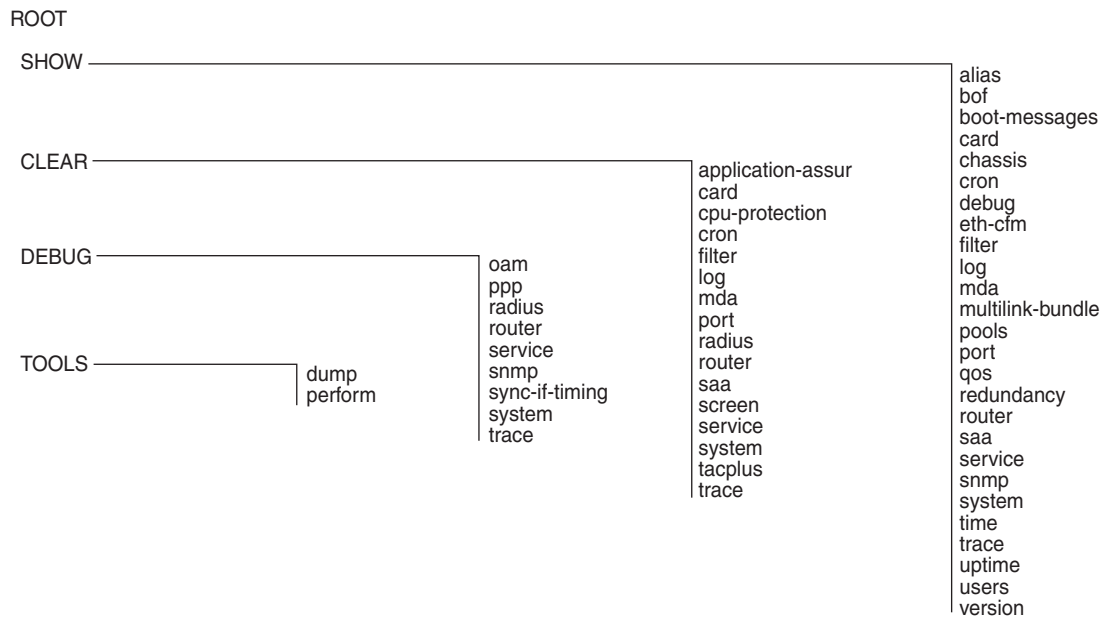
Figure 1 and Figure 2 display the major contexts for router configuration.

Figure 1: Root Commands



21699

Figure 2: Operational Root Commands



21700

Navigating in the CLI

The following sections describe additional navigational and syntax information:

- [CLI Contexts](#)
- [Basic CLI Commands](#)
- [CLI Environment Commands](#)
- [CLI Monitor Commands](#)

CLI Contexts

Use the CLI to access, configure, and manage Alcatel-Lucent 7705 SAR routers. CLI commands are entered at the command line prompt. Access to specific CLI commands is controlled by the permissions set by your system administrator. Entering a CLI command makes navigation possible from one command context (or level) to another. When you initially enter a CLI session, you are in the ROOT context. Navigate to another level by entering the name of successively lower contexts. For example, enter either the `configure` or `show` commands at the ROOT context to navigate to the `config` or `show` context, respectively. For example, at the command prompt, enter `config`. The active CSM slot displays in the command prompt at the beginning of the CLI context.

```
A:ALU-12# config
A:ALU-12>config#
```

In a given CLI context, you can enter commands at that context level by simply entering the text. It is also possible to include a command in a lower context as long as the command is formatted in the proper command and parameter syntax.

The following example shows two methods of navigating to a service SDP ingress level:

Method 1: Enter all commands on a single line.

```
A:ALU-12# configure service cpipe 6 spoke-sdp 2:6 ingress
*A:ALU-12>config>service>cpipe>spoke-sdp>ingress#
```

Method 2: Enter each command on a separate line.

```
A:ALU-12>config# service
A:ALU-12>config>service# cpipe 6
*A:ALU-12>config>service>cpipe# spoke-sdp 2:6
*A:ALU-12>config>service>cpipe>spoke-sdp# ingress
*A:ALU-12>config>service>cpipe>spoke-sdp>ingress#
```

The CLI returns an error message if the syntax is incorrect.

```
*A:ALU-12>config# router
Error: Bad command.
```

Basic CLI Commands

The console control commands are the commands that are used for navigating within the CLI and displaying information about the console session.

Most of these commands are implemented as global commands. They can be entered at any level in the CLI hierarchy, with the exception of the `password` command, which must be entered at the ROOT level. The console control commands are listed in [Table 2](#).

Table 2: Console Control Commands

Command	Description	Page
<Ctrl-c>	Aborts the pending command	—
<Ctrl-z>	Terminates the pending command line and returns to the ROOT context	—
back	Navigates the user to the parent context	46
clear	Clears statistics for a specified entity or clears and resets the entity	46
echo	Echoes the text that is typed in. Primary use is to display messages to the screen within an exec file.	47
exec	Executes the contents of a text file as if they were CLI commands entered at the console	47
exit	Returns the user to the previous higher context	48
exit all	Returns the user to the ROOT context	48
help	Displays help in the CLI	49
?	Displays all available options	—
history	Displays a list of the most recently entered commands	50
info	Displays the running configuration for a configuration context	51
logout	Terminates the CLI session	52

Table 2: Console Control Commands (Continued)

Command	Description	Page
oam	Provides OAM test suite options. See the 7705 SAR OS OAM and Diagnostics Guide.	—
password	Changes the user CLI login password. The password can only be changed at the ROOT level.	52
ping	Verifies the reachability of a remote host	53
pwc	Displays the present or previous working context of the CLI session	55
sleep	Causes the console session to pause operation (sleep) for 1 second or for the specified number of seconds. Primary use is to introduce a pause within the execution of an exec file.	55
ssh	Opens a secure shell connection to a host	56
telnet	Telnets to a host	56
traceroute	Determines the route to a destination address	57
tree	Displays a list of all commands at the current level and all sublevels	58
write	Sends a console message to a specific user or to all users with active console sessions	58

The list of all system global commands is displayed by entering `help globals` in the CLI. For example:

```
*A:ALU-12>config>service# help globals
back          - Go back a level in the command tree
echo          - Echo the text that is typed in
enable-admin  - Enable the user to become a system administrator
exec          - Execute a file - use -echo to show the commands and
prompts on the screen
exit          - Exit to intermediate mode - use option all to exit to
root prompt
help          - Display help
history       - Show command history
info         - Display configuration for the present node
logout       - Log off this system
oam          + OAM Test Suite
ping         - Verify the reachability of a remote host
pwc          - Show the present working context
sleep        - Sleep for specified number of seconds
ssh          - SSH to a host
telnet       - Telnet to a host
traceroute   - Determine the route to a destination address
```



```

tree          - Display command tree structure from the context of
               execution
write        - Write text to another user
*A:ALU-12>config>service#

```

Table 3 lists command syntax symbols. Where the syntax differs between the CLI and the Command Reference sections of the 7705 SAR guides is noted in the table.

Table 3: Command Syntax Symbols

Symbol	Description	Example
	A vertical line (pipe) indicates that one of the parameters within the brackets or braces is required	tcp-ack {true false}
[]	Brackets indicate optional parameters	router [router-name]
< >	Angle brackets indicate that the user must enter a value for the parameter inside the brackets (Note: angle brackets are not used in the Command Reference section but are used on the CLI; italics are used in the Command Reference section to indicate the same rule)	interface <interface-name>
{ }	Braces indicate that one of the parameters must be selected	default-action {drop forward}
[{ }]	Braces within square brackets indicate that the parameters are optional, but if one is selected, the information within the braces is required; for example, if you select the peer parameter, you must enter the keyword “peer” (ip-address is optional)	discovery [{peer [ip-address]} {interface [ip-int-name]}]
Bold	In the Command Reference section (not on the CLI), bold indicates commands and keywords that the user must enter exactly as shown	scope {inclusive template}
<i>Italic</i>	In the Command Reference section (not on the CLI), italics indicate parameters that the user must enter a value for	dscp <i>dscp-name</i>
n/a	In the Command Reference section, n/a in the Default field of a command indicates that a default value is not applicable for the command	—

CLI Environment Commands

The CLI `environment` commands are found in the `root>environment` context of the CLI tree. These commands control session preferences for a single CLI session. The CLI environment commands are listed in [Table 4](#).

Table 4: CLI Environment Commands

Command	Description	Page
<code>alias</code>	Enables the substitution of a command line by an alias	59
<code>create</code>	Enables or disables the use of a create parameter check	59
<code>more</code>	Configures whether CLI output should be displayed one screen at a time awaiting user input to continue	60
<code>reduced-prompt</code>	Configures the maximum number of higher-level CLI context nodes to display by name in the CLI prompt for the current CLI session	60
<code>saved-ind-prompt</code>	Saves the indicator in the prompt	61
<code>terminal</code>	Configures the terminal screen length for the current CLI session	61
<code>time-display</code>	Specifies whether time should be displayed in local time or UTC	62
<code>time-stamp</code>	Specifies whether a timestamp should be displayed before the prompt	62

CLI Monitor Commands

The CLI `monitor` commands are found in the `root>monitor` context of the CLI tree. Monitor commands display specified statistical information related to the monitor subject (such as filter, port, router, and service) at a configurable interval until a count is reached.

The `monitor` command output displays a snapshot of the current statistics. The output display refreshes with subsequent statistical information at each configured interval and is displayed as a delta to the previous display.

The <Ctrl-c> keystroke interrupts a monitoring process. Monitor command configurations cannot be saved. You must enter the command for each monitoring session. If the maximum limits are configured, you can monitor the statistical information for a maximum of 60×999 s (approximately 1000 minutes, or 16.6 hours).

The CLI monitor commands are listed in [Table 5](#).

Table 5: CLI Monitor Commands

Command	Description	Page
filter	Enables IP and MAC filter monitoring at a configurable interval until that count is reached	63
management-access-filter	Monitors commands for management access filters	65
port	Enables port traffic monitoring. The specified port(s) statistical information displays at the configured interval until the configured count is reached.	67
router	Enables virtual router instance monitoring at a configurable interval until that count is reached	69
service	Monitors commands for a particular service	74

Getting Help in the CLI

The `help` system commands and the `?` key display different types of help in the CLI. [Table 6](#) lists the help commands.

Table 6: Online Help Commands

Command	Description
<code>?</code>	Lists all commands in the current context
<code>string ?</code>	Lists all commands available in the current context that start with <i>string</i>
<code>command ?</code>	Displays the command's syntax and associated keywords
<code>command keyword ?</code>	Lists the associated arguments for <i>keyword</i> in <i>command</i>
<code>string<Tab></code> <code>string<Space></code>	Completes a partial command name (auto-completion) or lists available commands that match <i>string</i>

The `tree` and `tree detail` system commands are help commands that are useful when searching for a command in a lower-level context.

[Figure 3](#) displays a partial list of the `tree` and `tree detail` command output entered at the `config` level.

Figure 3: CLI Display for CLI Tree Help

```

*A:ALU-12>config# tree
configure
+---card
| +---card-type
| | +---mda
| | | +---clock-mode
| | | +---mda-type
| | | +---network
| | | | +---ingress
| | | | +---queue-policy
| | | +---shutdown
| | +---shutdown
+---cron
| +---action
| | +---expire-time
| | +---lifetime
| | +---max-completed
| | +---results
| | +---script
| | +---shutdown
| | +---schedule
| | | +---action
| | | +---count
| | | +---day-of-month
| | | +---description
| | | +---end-time
| | | +---hour
| | | +---interval
| | | +---minute
| | | +---month
| | | +---shutdown
| | | +---type
| | | +---weekday
| | +---script
| | | +---description
| | | +---location
| | | +---shutdown
+---filter
| +---ip-filter
| | +---default-action
| | +---description
| | | +---entry
| | | | +---action
| | | | +---description
| | | | +---match
| | | | | +---dst-ip
| | | | | +---dst-port
| | | | | +---icmp-code
| | | | | +---icmp-type
| | | | | +---src-ip
| | | | | +---src-port
| | | +---renum
| | +---scope

```

```

*A:ALU-12>config# tree detail
configure
+---card <slot-number>
| no card <slot-number>
| +---card-type <card-type>
| | no card-type
| +---mda <mda-slot>
| | no mda <mda-slot>
| | +---clock-mode adaptive
| | +---mda-type <mda-type>
| | | no mda-type
| | +---network
| | | +---ingress
| | | | +---no queue-policy
| | | | | queue-policy <name>
| | | +---no shutdown
| | | shutdown
| | +---no shutdown
| | shutdown
+---cron
| +---action <action-name> [owner <action-owner>]
| | no action <action-name> [owner <action-owner>]
| | | +---expire-time {<seconds>|forever}
| | | +---lifetime {<seconds>|forever}
| | | +---max-completed <unsigned>
| | | +---no results
| | | | results <file-url>
| | | +---no script
| | | | script <script-name> [owner <script-owner>]
| | | +---no shutdown
| | | | shutdown
| | +---no schedule <schedule-name> [owner <schedule-owner>]
| | schedule <schedule-name> [owner <schedule-owner>]
| | | +---action <action-name> [owner <action-owner>]
| | | | no action
| | | +---count <number>
| | | | no count
| | | +---day-of-month {<day-number> [..<day-number>]}|all}
| | | | no day-of-month
| | | +---description <description-string>
| | | | no description
| | | +---end-time [<date>|<day-name>] <time>
| | | | no end-time
| | | +---hour {<hour-number> [..<hour-number>]}|all}
| | | | no hour
| | | +---interval <seconds>
| | | | no interval
| | | +---minute {<minute-number> [..<minute-number>]}|all}
| | | | no minute

```

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The CLI Command Prompt

By default, the CLI command prompt indicates the device being accessed and the current CLI context. For example, the prompt `A:ALU-1>config>router#` indicates that the active CSM is CSM A, the user is on the device with hostname `ALU-1`, and the current context is `configure router`. In the prompt, the separator used between contexts is the “>” symbol.

At the end of the prompt, there is either a pound sign (#) or a dollar sign (\$) . A # at the end of the prompt indicates that the context is an existing context. A \$ at the end of the prompt indicates that the context has been newly created. New contexts are newly created for logical entities when the user first navigates into the context.

Since there can be a large number of sublevels in the CLI, the system command `reduced-prompt #_of_levels` allows the user to control the number of levels displayed in the prompt.

All special characters (#, \$, and so on) must be enclosed within double quotes; otherwise, the character is seen as a comment character and all characters on the command line following the # are ignored. For example:

```
*A:ALU-1>config>router>mpls# authentication-key "router#1"
```

This example shows a security configuration over a network link. Because the string “router#1” is enclosed within double quotes, it is recognized as a password for the link.

When changes are made to the configuration file, a “*” appears in the prompt string (`*A:ALU-1`), indicating that the changes have not been saved. When an admin `save` command is executed, the “*” disappears. This behavior is controlled in the `saved-ind-prompt` command in the environment context.

Displaying Configuration Contexts

The `info` and `info detail` commands display the configuration for the current level. The `info` command displays non-default configurations. The `info detail` command displays the entire configuration for the current level, including defaults. The following example shows the output that displays using the `info` command and the output that displays using the `info detail` command.

```
*A:ALU-1>config>router# interface system
*A:ALU-1>config>router>if# info
-----
                address 10.221.221.72/32
-----
*A:ALU-1>config>router>if#

*A:ALU-1>config>router>if# info detail
-----
                address 10.221.221.72/32
                no description
                no arp-timeout
                icmp
                    mask-reply
                    unreachable 100 10
                    ttl-expired 100 10
                exit
                no ntp-broadcast
                no shutdown
                no bfd
-----
*A:ALU-1>config>router>if#
```

EXEC Files

The `exec` command allows you to execute a text file of CLI commands as if it were typed at a console device.

The `exec` command and the associated `exec` files can be used to conveniently execute a number of commands that are always executed together in the same order. For example, an `exec` command can be used to define a set of commonly used standard command aliases.

The `echo` command can be used within an `exec` command file to display messages on screen while the file executes.

Entering CLI Commands

The following sections describe additional information on entering CLI commands:

- [Command Completion](#)
- [Unordered Parameters](#)
- [Editing Keystrokes](#)
- [Absolute Paths](#)
- [History](#)
- [Entering Numerical Ranges](#)
- [Pipe/Match](#)
- [Redirection](#)

Command Completion

The CLI supports both command abbreviation and command completion. If the keystrokes entered are enough to match a valid command, the CLI displays the remainder of the command syntax when the <Tab> key or spacebar is pressed. When typing a command, the <Tab> key or spacebar invokes auto-completion. If the keystrokes entered are sufficient to identify a specific command, auto-completion completes the command. If the letters are not sufficient to identify a specific command, pressing the <Tab> key or spacebar displays commands matching the letters entered.

System commands are available in all CLI context levels.

Unordered Parameters

In a given context, the CLI accepts command parameters in any order as long as the command is formatted in the proper command keyword and parameter syntax. Command completion will still work as long as enough recognizable characters of the command are entered.

The following output shows different `static-route` command syntax and an example of the command usage.

```
*A:ALU-12>config>router# static-route ?
- [no] static-route {<ip-prefix/prefix-length> | <ip-prefix> <netmask>} [metric
<metric>] [enable | disable] next-hop <ip-address | ip-int-name> [bfd-enable]
- [no] static-route {<ip-prefix/mask> | <ip-prefix> <netmask>} [preference
<preference>] [metric <metric>] [tag <tag>] [enable | disable] indirect <ip-address>
[ldp [disallow-igp]]
```

Entering CLI Commands

```
- [no] static-route {<ip-prefix/mask> | <ip-prefix> <netmask>} [preference  
<preference>] [metric <metric>] [tag <tag>] [enable | disable] black-hole  
*A:ALU-12>config>router# static-route preference 1 10.1.0.0/16 metric
```

Editing Keystrokes

When entering a command, special keystrokes allow for editing of the command. [Table 7](#) lists the command editing keystrokes.

Table 7: Command Editing Keystrokes

Editing Action	Keystrokes
Delete current character	<Ctrl-d>
Delete text up to cursor	<Ctrl-u>
Delete text after cursor	<Ctrl-k>
Move to beginning of line	<Ctrl-a>
Move to end of line	<Ctrl-e>
Get prior command from history	<Ctrl-p>
Get next command from history	<Ctrl-n>
Move cursor left	<Ctrl-b>
Move cursor right	<Ctrl-f>
Move back one word	<Esc>
Move forward one word	<Esc><f>
Convert rest of word to uppercase	<Esc><c>
Convert rest of word to lowercase	<Esc><l>
Delete remainder of word	<Esc><d>
Delete word up to cursor	<Ctrl-w>
Transpose current and previous character	<Ctrl-t>
Enter command and return to root prompt	<Ctrl-z>
Refresh input line	<Ctrl-l>

Absolute Paths

CLI commands can be executed in any context by specifying the full path from the CLI root. To execute an out-of-context command, enter a forward slash “/” or backward slash “\” at the beginning of the command line. The commands are interpreted as absolute paths. Spaces between the slash and the first command will return an error.

```
*A:ALU-12# configure router
*A:ALU-12>config>router# interface system address 1.2.3.4
*A:ALU-12>config>router# /admin save
A:ALU-12>config>router# \clear router bfd session all
A:ALU-12>config>router#
```

The command may or may not change the current context depending on whether or not it is a leaf command. This is the same behavior the CLI performs when CLI commands are entered individually, for example:

```
*A:ALU-12# admin
*A:ALU-12>admin# save
```

or

```
*A:ALU-12# admin save
*A:ALU-12#
```

History

The CLI maintains a history of the most recently entered commands. The `history` command displays the most recently entered CLI commands.

```
*A:ALU-1# history
 1 environment terminal length 48
 2 show version
 3 configure port 1/1/1
 4 info
 5 show port 1/1/1
 6 \con port 1/1/1
 7 \configure router mpls
 8 info
 9 \configure system login-control
10 info
11 history
*A:ALU-1# !2
*A:ALU-1# show version
TiMOS-B-0.0.I322 both/hops ALCATEL SAR 7705
Copyright (c) 2000-2008 Alcatel-Lucent.All rights reserved.
All use subject to applicable license agreements.
Built on Wed Jan 16 01:05:13 EST 2008 by csabuild in /rel0.0/I322/panos/main
*A:ALU-1#
```

Entering Numerical Ranges

The 7705 SAR OS CLI allows the use of a single numerical range as an argument in the command line. A range in a CLI command is limited to positive integers and is denoted with two numbers enclosed in square brackets with two periods (“.”) between the numbers [x.. y] where *x* and *y* are positive integers and *y-x* is less than 1000.

For example, it is possible to shut down ports 1 through 10 on MDA 1. A port is denoted by *slot/mda/port*, where *slot* identifies the IOM card slot ID (always 1), *mda* is the MDA number and *port* is the port number. To shut down ports 1 through 10 on Slot 1 and MDA 1, the command is entered as follows:

```
configure port 1/1/[1..10] shutdown
```

<Ctrl-c> can be used to abort the execution of a range command.

Specifying a range in the CLI does have limitations. These limitations are summarized in [Table 8](#).

Table 8: CLI Range Use Limitations

Limitation	Description
Only a single range can be specified	It is not possible to shut down ports 1 through 10 on MDA 1 and MDA 2, as the command would look like <pre>configure port 1/[1..2]/[1..10]</pre> and requires two ranges in the command: [1..2] for the MDA and [1..10] for the port number
Ranges within quotation marks are interpreted literally	In the 7705 SAR OS CLI, enclosing a string in quotation marks (“string”) causes the string to be treated literally and as a single parameter. For example, several commands in the 7705 SAR OS CLI allow the configuration of a descriptive string. If the string is more than one word and includes spaces, it must be enclosed in quotation marks. A range that is enclosed in quotes is also treated literally. For example, <pre>configure router interface "A[1..10]" no shutdown</pre> creates a single router interface with the name “A[1..10]”. However, a command such as: <pre>configure router interface A [1..10] no shutdown</pre> creates 10 interfaces with names A1, A2 .. A10.

Table 8: CLI Range Use Limitations (Continued)

Limitation	Description
The range cannot cause a change in contexts	Commands should be formed in such a way that there is no context change upon command completion. For example, <code>configure port 1/1/[1..10]</code> will attempt to change 10 different contexts. When a range is specified in the CLI, the commands are executed in a loop. On the first loop execution, the command changes contexts, but the new context is no longer valid for the second iteration of the range loop. A “Bad Command” error is reported and the command aborts.
Command completion may cease to work when entering a range	After entering a range in a CLI command, command and key completion, which normally occurs by pressing the <Tab> or spacebar, may cease to work. If the command line entered is correct and unambiguous, the command works properly; otherwise, an error is returned.

Pipe/Match

The 7705 SAR OS supports the pipe feature to search one or more files for a given character string or pattern.

Match syntax:

```
match [ignore-case] [invert-match] [post-lines num-lines]
[max-count num-matches] [expression] pattern
```

where:

num-lines: 1 to 2147483647

num-matches: 1 to 2147483647

pattern: string or regular expression

Entering CLI Commands

For example:

```
A:Dut-C# show log log-id 98 | match ignore-case "sdp bind"
>Status of SDP Bind 101:1002 in service 1001 (customer 1) changed to admin=up oper=u
p
flags="
"Processing of a SDP state change event is finished and the status of all affected S
DP
Bindings on SDP 101 has been updated."

A:Dut-C# show log log-id 98 | match max-count 1 "service 1001"
>Status of service 1001 (customer 1) changed to administrative state: up, operationa
l
state: up"

*A:ALU-1# admin display-config | match post-lines 5 max-count 2 expression "snmp"

snmp
exit
login-control
idle-timeout disable
pre-login-message "csasim2 - " name
exit
snmp
view "testview" subtree "1"
mask ff
exit
view "testview" subtree "1.3.6.1.2"
mask ff type excluded

*A:ALU-1#
```

[Table 9](#) describes regular expression symbols and interpretation (similar to what is used for route policy regexp matching).

Table 9: Pipe/Match Characters

String	Description
.	Matches any single character
[]	Matches a single character that is contained within the brackets [abc] matches “a”, “b”, or “c” [a-z] matches any lowercase letter [A-Z] matches any uppercase letter [0-9] matches any number
[^]	Matches a single character that is not contained within the brackets [^abc] matches any character other than “a”, “b”, or “c” [^a-z] matches any single character that is not a lowercase letter
^	Matches the start of the line (or any line, when applied in multiline mode)

Table 9: Pipe/Match Characters (Continued)

String	Description
\$	Matches the end of the line (or any line, when applied in multiline mode)
()	Define a “marked subexpression” Every matched instance will be available to the next command as a variable
*	A single character expression followed by “*” matches zero or more copies of the expression
{m,n}	Matches least <i>m</i> and at most <i>n</i> repetitions of the term
{m}	Matches exactly <i>m</i> repetitions of the term
{m,}	Matches <i>m</i> or more repetitions of the term
?	The preceding item is optional and matched at most once
+	The preceding item is matched one or more times
-	Used between start and end of a range
\	An escape character to indicate that the following character is a match criteria and not a grouping delimiter

Table 10 identifies the special character options.

Table 10: Special Characters

Options	Similar to	Description
[:upper:]	[A-Z]	uppercase letters
[:lower:]	[a-z]	lowercase letters
[:alpha:]	[A-Za-z]	uppercase and lowercase letters
\w	[A-Za-z_]	word characters
[:alnum:]	[A-Za-z0-9]	digits, uppercase and lowercase letters
[:digit:]	[0-9]	digits
\d	[0-9]	digits
[:xdigit:]	[0-9A-Fa-f]	hexadecimal digits
[:punct:]	[.,!?:...]	punctuation
[:blank:]	[\t]	space and TAB

Table 10: Special Characters (Continued)

Options	Similar to	Description
[:space:]	[\t\n\r\f\v]	blank characters
\s	[\t\n\r\f\v]	blank characters

Redirection

The 7705 SAR OS supports redirection (“>”) which allows the operator to store the output of a CLI command as a local or remote file. Redirection of output can be used to automatically store results of commands in files (both local and remote).

```
'ping <customer_ip> > cf3:/ping/result.txt'  
'ping <customer_ip> > ftp://ron@ftp.alcatel.com/ping/result.txt'
```

In some cases only part of the output might be applicable. The pipe/match and redirection commands can be combined:

```
ping 10.0.0.1 | match expression "time.\d+" > cf3:/ping/time.txt
```

This records only the RTT portion (including the word “time”).

Basic Command Reference

Command Hierarchies

- [Basic CLI Commands](#)
- [Environment Commands](#)
- [Monitor Commands](#)
- [Show Commands](#)

Basic CLI Commands

- **back**
- **clear**
- **echo** [*text-to-echo*] [*extra-text-to-echo*] [*more-text*]
- **exec** [-**echo**] [-**syntax**] {*filename* | <<[*eof-marker-string*]}
- **enable-admin**
- **exit** [**all**]
- **help**
- **help** **edit**
- **help** **globals**
- **help** **special-characters**
- **history**
- **info** [**detail**]
- **logout**
- **password**
- **ping** {*ip-address* | *dns-name*} [**rapid** | **detail**] [**ttl** *time-to-live*] [**tos** *type-of-service*] [**size** *bytes*] [**pattern** *pattern*] [**source** *ip-address*] [**interval** *seconds*] [{**next-hop** *ip-address*} | {**interface** *interface-name*}] [**bypass-routing**] [**count** *requests*] [**do-not-fragment**] [**router** *router-instance*] [**timeout** *timeout*]
- **pwc** [**previous**]
- **sleep** [**seconds**]
- **ssh** [*ip-addr* | *dns-name* | *username@ip-addr*] [-**I** *username*] [-**v** *SSH-version*] [**router** *router-instance*]
- **telnet** [*ip-address* | *dns-name*] [*port*] [**router** *router-instance*]
- **traceroute** {*ip-address* | *dns-name*} [**ttl** *ttl*] [**wait** *milliseconds*] [**no-dns**] [**source** *ip-address*] [**tos** *type-of-service*] [**router** *router-instance*]
- **tree** [**detail**]
- **write** {*user* | **broadcast**} *message-string*

Environment Commands

- <root>
- **environment**
 - **alias** *alias-name* *alias-command-name*
 - **no** **alias** *alias-name*
 - [**no**] **create**
 - [**no**] **more**
 - **reduced-prompt** [*no-of-nodes-in-prompt*]
 - **no** **reduced-prompt**
 - [**no**] **saved-ind-prompt**
 - **terminal**
 - **length** *lines*
 - **time-display** {*local* | *utc*}
 - [**no**] **time-stamp**

Monitor Commands

- ```

monitor
 — filter
 — ip ip-filter-id entry entry-id [interval seconds] [repeat repeat] [absolute | rate]
 — ipv6 ip-filter-id entry entry-id [interval seconds] [repeat repeat] [absolute | rate]
 — management-access-filter
 — ip entry entry-id [interval seconds] [repeat repeat] [absolute | rate]
 — port port-id [port-id...(up to 5 max)] [interval seconds] [repeat repeat] [absolute | rate]
 — router router-instance
 — ldp
 — session ldp-id [ldp-id...(up to 5 max)] [interval seconds] [repeat repeat] [absolute | rate]
 — statistics [interval seconds] [repeat repeat] [absolute | rate]
 — service
 — id service-id
 — sap sap-id [interval seconds] [repeat repeat] [absolute | rate]
 — sap-aggregation-group group-id [interval seconds] [repeat repeat] [absolute | rate]
 — sdp {sdp-id | far-end ip-address} [interval seconds] [repeat repeat] [absolute | rate]

```

## Show Commands

- ```

show
  — alias

```

Command Descriptions

- [Basic CLI Commands](#)
- [Environment Commands](#)
- [Monitor CLI Commands](#)
- [Show Commands](#)

Basic CLI Commands

enable-admin

Syntax	enable-admin
Context	<global>
Description	See the description for the admin-password command. If the admin-password is configured in the config>system>security>password context, then any user can enter a special administrative mode by entering the enable-admin command.

The **enable-admin** command is in the default profile. By default, all users are given access to this command.

Once the **enable-admin** command is entered, the user is prompted for a password. If the password matches, the user is given unrestricted access to all the commands.

The minimum length of the password is determined by the **minimum-length** command. The complexity requirements for the password is determined by the **complexity** command.

The following displays an example of the password command usage.

Example:

```

config>system>security#password
security>password# admin-password test1234 hash
security>password# aging 365
security>password# minimum-length 8
security>password# attempts 5 time 5 lockout 20
security>password# authentication-order radius tacplus
    local
security>password# enable-admin
Password: test1234
security>password#

```

The following example displays the password configuration:

```

ALU-1>config>system>security# info
-----
...
aging 365
minimum-length 8
attempts 5 time 5 lockout 20
admin-password "rUYUz9XMo6I" hash
...
-----
ALU-1>config>system>security#

```

Basic Command Reference

There are two ways to verify that a user is in the **enable-admin** mode:

- **show users** – administrator can learn which users are in this mode
- enter the **enable-admin** command again at the root prompt and an error message will be returned

```
A:ALU-1# show users
=====
User          Type      Login time                               Idle time
  From
=====
admin         Console   --                                       0d 19:42:22
--
admin         Telnet    08APR2008 08:35:23                       0d 00:00:00
  138.120.141.147
-----
Number of users : 2
=====
A:ALU-1#
A:ALU-1# enable-admin
MINOR: CLI Already in admin mode.
A:ALU-1#
```

back

Syntax	back
Context	<global>
Description	This command moves the context back one level of the command hierarchy. For example, if the current level is the config router mpls context, the back command moves the cursor to the config router context level.

clear

Syntax	clear
Context	<global>
Description	This command clears statistics for a specified entity or clears and resets the entity.
Parameters	card — reinitializes an I/O module in a specified slot cron — clears CRON history filter — clears IP filter counters log — closes and reinitializes the log specified by log-id mda — reinitializes the specified MDA in a particular slot port — clears port statistics

radius — clears the RADIUS server state

router — clears router commands affecting the router instance in which they are entered

Values arp, authentication, bfd, forwarding-table, interface, ldp, mpls

saa — clears the SAA test results

screen — clears the console or Telnet screen

service — clears service ID and statistical entities

system — clears (re-enables) a previously failed reference

tacplus — clears the TACACS+ server state

trace — clears the trace log

echo

Syntax **echo** [*text-to-echo*] [*extra-text-to-echo*] [*more-text*]

Context <global>

Description This command echoes arguments on the command line. The primary use of this command is to allow messages to be displayed to the screen in files executed with the **exec** command.

Parameters *text-to-echo* — specifies a text string to be echoed, up to 256 characters
extra-text-to-echo — specifies more text to be echoed, up to 256 characters
more-text — specifies more text to be echoed, up to 256 characters

exec

Syntax **exec** [-echo] [-syntax] {*filename* | <<[*eof-marker-string*]}

Context <global>

Description This command executes the contents of a text file as if they were CLI commands entered at the console.

Exec commands do not have **no** versions.

Related commands are:

- [boot-good-exec](#)
Use this command to configure a URL for a CLI script to exec following a successful configuration boot.
- [boot-bad-exec](#)
Use this command to configure a URL for a CLI script to exec following a failed configuration boot.

Basic Command Reference

- Parameters**
- echo** — echoes the contents of the **exec** file to the session screen as it executes
 - Default** echo disabled
 - syntax** — performs a syntax check of the file without executing the commands. Syntax checking will be able to find invalid commands and keywords, but it will not be able to validate erroneous user-supplied parameters.
 - Default** execute file commands
- filename* — the text file with CLI commands to execute
- << — Stdin can be used as the source of commands for the **exec** command. When **stdin** is used as the **exec** command input, the command list is terminated with <Ctrl-c>, “EOF<Return>” or “*eof_string*<Return>”.
- If an error occurs entering an **exec** file sourced from **stdin**, all commands after the command returning the error will be silently ignored. The **exec** command will indicate the command error line number when the **stdin** input is terminated with an end-of-file input.
- eof-marker-string* — The ASCII printable string used to indicate the end of the **exec** file when **stdin** is used as the **exec** file source. <Ctrl-c> and “EOF” can always be used to terminate an **exec** file sourced from **stdin**.
- Default** <Ctrl-c>, EOF

exit

- Syntax** **exit [all]**
- Context** <global>
- Description** This command returns to the context from which the current level was entered. For example, if you navigated to the current level on a context by context basis, then the **exit** command only moves the cursor back one level.

```
ALU-1# configure
ALU-1>config# router
ALU-1>config>router# mpls
ALU-1>config>router>mpls# exit
ALU-1>config>router# exit
ALU-1>config# exit
```

If you navigated to the current level by entering a command string, then the **exit** command returns the cursor to the context in which the command was initially entered.

```
ALU-1# configure router mpls
ALU-1>config>router>mpls# exit
ALU-1#
```


The **exit all** command moves the cursor all the way back to the root level.

```
ALU-1# configure
ALU-1>config# router
ALU-1>config>router# mpls
ALU-1>config>router>mpls# exit all
ALU-1#
```

Parameters **all** — exits back to the root CLI context

help

Syntax **help**
help edit
help globals
help special-characters

Context <global>

Description This command provides a brief description of the help system. The following information displays:

```
Help may be requested at any point by hitting a question mark '?'.
In case of an executable node, the syntax for that node will be displayed with an
explanation of all parameters.
In case of sub-commands, a brief description is provided.
Global Commands:
    Help on global commands can be observed by issuing "help globals" at any time.
Editing Commands:
    Help on editing commands can be observed by issuing "help edit" at any time.
```

Parameters **help** — displays a brief description of the help system

help edit — displays help on editing

Available editing keystrokes:

```
Delete current character.....Ctrl-d
Delete text up to cursor.....Ctrl-u
Delete text after cursor.....Ctrl-k
Move to beginning of line.....Ctrl-a
Move to end of line.....Ctrl-e
Get prior command from history.....Ctrl-p
Get next command from history.....Ctrl-n
Move cursor left.....Ctrl-b
Move cursor right.....Ctrl-f
Move back one word.....Esc-b
Move forward one word.....Esc-f
Convert rest of word to uppercase.....Esc-c
Convert rest of word to lowercase.....Esc-l
Delete remainder of word.....Esc-d
Delete word up to cursor.....Ctrl-w
Transpose current and previous character.....Ctrl-t
Enter command and return to root prompt.....Ctrl-z
Refresh input line.....Ctrl-l
```

Basic Command Reference

help globals — displays help on global commands

Available global commands:

```
back          - Go back a level in the command tree
echo          - Echo the text that is typed in
enable-admin  - Enables the user to become a system administrator
exec          - Execute a file - use -echo to show the commands and
               prompts on the screen
exit          - Exit to intermediate mode - use option all to exit to
               root prompt
help          - Display help
history       - Show command history
info          - Display configuration for the present node
logout        - Log off this system
oam           + OAM Test Suite
ping          - Verify the reachability of a remote host
pwc           - Show the present working context
sleep         - Sleep for specified number of seconds
ssh           - SSH to a host
telnet        - Telnet to a host
traceroute    - Determine the route to a destination address
tree          - Display command tree structure from the context of
               execution
write         - Write text to another user
```

help special-characters — displays help on special characters

Use the following CLI commands to display more information about commands and command syntax:

? — lists all commands in the current context

string? — lists all commands available in the current context that start with the string

command ? — display command's syntax and associated keywords

string<Tab> or string<Space> — complete a partial command name (auto-completion) or list available commands that match the string

history

Syntax	history
Context	<global>
Description	This command lists the last 30 commands entered in this session.

Re-execute a command in the history with the **!**n**** command, where **n** is the line number associated with the command in the history output.

For example:

```
ALU-1# history
   68 info
   69 exit
   70 info
```

```

71 filter
72 exit all
73 configure
74 router
75 info
76 interface "test"
77 exit
79 info
80 interface "test"
81 exit all
82 configure router
83 interface
84 info
85 interface "test"
86 info
87 exit all
88 configure
89 card 1
91 exit
92 router
93 exit
94 history
ALU-1# !88
ALU-1# configure
ALU-1>config#

```

info

Syntax	info [detail]
Context	<global>
Description	This command displays the running configuration for the configuration context.

The output of this command is similar to the output of a show config command. This command, however, lists the configuration of the context where it is entered and all branches below that context level.

For example:

```

ALU-1>config>router>mpls# info
-----
mpls
    interface "system"
    exit
    interface "to_1/2/1"
        label-map 131
        pop
        no shutdown
    exit
    static-lsp "to121"
        to 10.8.8.8
        push 121 nexthop 10.1.3.1
        no shutdown
    exit

```

Basic Command Reference

```
        no shutdown
        exit
    exit
-----
ALU-1>config>router>mpls#
```

By default, the command only enters the configuration parameters that vary from the default values. The **detail** keyword causes all configuration parameters to be displayed.

Parameters **detail** — displays all configuration parameters, including parameters at their default values

logout

Syntax **logout**

Context <global>

Description This command logs out of the router session.

When the **logout** command is issued from the console, the login prompt is displayed and any log IDs directed to the console are discarded. When the console session resumes (regardless of the user), the log output to the console resumes.

When a Telnet session is terminated from a **logout** command, all log IDs directed to the session are removed. When a user logs back in, the log IDs must be recreated.

password

Syntax **password**

Context <ROOT>

Description This command changes a user CLI login password.

When a user logs in after the administrator forces a **new-password-at-login**, or the password has expired (**aging**), then this command is automatically invoked.

When invoked, the user is prompted to enter the old password, the new password, and then the new password again to verify the correct input.

If a user fails to create a new password after the administrator forces a **new-password-at-login** or after the password has expired, the user is not allowed access to the CLI.

ping

Syntax	ping { <i>ip-address</i> <i>dns-name</i> } [rapid detail] [ttl <i>time-to-live</i>] [tos <i>type-of-service</i>] [size <i>bytes</i>] [pattern <i>pattern</i>] [source <i>ip-address</i>] [interval <i>seconds</i>] [{ next-hop <i>ip-address</i> } { interface <i>interface-name</i> }] bypass-routing] [count <i>requests</i>] [do-not-fragment] [router <i>router-instance</i>] [timeout <i>timeout</i>]																					
Context	<global>																					
Description	This command is the TCP/IP utility to verify IP reachability.																					
Parameters	<p><i>ip-address</i> — the IP address of the remote host to ping</p> <table border="0"> <tr> <td style="padding-right: 10px;">Values</td> <td><i>ipv4-address</i></td> <td>a.b.c.d (host bits must be 0)</td> </tr> <tr> <td></td> <td><i>ipv6-address</i></td> <td>x:x:x:x:x:x:x:x (eight 16-bit pieces)</td> </tr> <tr> <td></td> <td></td> <td>x:x:x:x:x:d.d.d.d</td> </tr> <tr> <td></td> <td></td> <td>x: [0 to FFFF]H</td> </tr> <tr> <td></td> <td></td> <td>d: [0 to 255]D</td> </tr> </table> <p><i>dns-name</i> — the DNS name (if DNS name resolution is configured) of the remote host to ping</p> <table border="0"> <tr> <td style="padding-right: 10px;">Values</td> <td>128 characters maximum</td> </tr> </table> <p>rapid detail — the rapid parameter specifies to send ping requests rapidly. The results are reported in a single message, not in individual messages for each ping request. By default, five ping requests are sent before the results are reported. To change the number of requests, include the count option.</p> <p>The detail parameter includes in the output the interface on which the ping reply was received.</p> <pre>ALU-1# ping 192.168.xx.xx4 detail PING 192.168.xx.xx4: 56 data bytes 64 bytes from 192.168.xx.xx4 via fei0: icmp_seq=0 ttl=64 time=0.000 ms. 64 bytes from 192.168.xx.xx4 via fei0: icmp_seq=1 ttl=64 time=0.000 ms. 64 bytes from 192.168.xx.xx4 via fei0: icmp_seq=2 ttl=64 time=0.000 ms. 64 bytes from 192.168.xx.xx4 via fei0: icmp_seq=3 ttl=64 time=0.000 ms. 64 bytes from 192.168.xx.xx4 via fei0: icmp_seq=4 ttl=64 time=0.000 ms. ---- 192.168.xx.xx4 PING Statistics ---- 5 packets transmitted, 5 packets received, 0.00% packet loss round-trip min/avg/max/stddev = 0.000/0.000/0.000/0.000 ms ALU-1#</pre> <p><i>time-to-live</i> — the IP Time To Live (TTL) value to include in the ping request, expressed as a decimal integer</p> <table border="0"> <tr> <td style="padding-right: 10px;">Values</td> <td>0 to 128</td> </tr> </table> <p><i>type-of-service</i> — the type-of-service (TOS) bits in the IP header of the ping packets, expressed as a decimal integer</p> <table border="0"> <tr> <td style="padding-right: 10px;">Values</td> <td>0 to 255</td> </tr> </table>	Values	<i>ipv4-address</i>	a.b.c.d (host bits must be 0)		<i>ipv6-address</i>	x:x:x:x:x:x:x:x (eight 16-bit pieces)			x:x:x:x:x:d.d.d.d			x: [0 to FFFF]H			d: [0 to 255]D	Values	128 characters maximum	Values	0 to 128	Values	0 to 255
Values	<i>ipv4-address</i>	a.b.c.d (host bits must be 0)																				
	<i>ipv6-address</i>	x:x:x:x:x:x:x:x (eight 16-bit pieces)																				
		x:x:x:x:x:d.d.d.d																				
		x: [0 to FFFF]H																				
		d: [0 to 255]D																				
Values	128 characters maximum																					
Values	0 to 128																					
Values	0 to 255																					

Basic Command Reference

bytes — the size in bytes of the ping request packets

Values 0 to 65507

Default 56 bytes (actually 64 bytes because 8 bytes of ICMP header data are added to the packet)

pattern — 16-bit pattern string to include in the ping packet, expressed as a decimal integer

Values 0 to 65535

source ip-address — the source IP address to use in the ping requests in dotted-decimal notation

Values 0.0.0.0 to 255.255.255.255

Default the IP address of the egress IP interface

seconds — the interval in seconds between consecutive ping requests, expressed as a decimal integer

Values 1 to 10000

Default 1

next-hop ip-address — this option disregards the routing table and will send this packet to the specified next hop address. This address must be on an adjacent router that is attached to a subnet that is common between this and the next-hop router.

Values a valid IP next hop IP address

Default per the routing table

interface-name — specifies the interface name

bypass-routing — sends the ping request to a host on a directly attached network bypassing the routing table. The host must be on a directly attached network or an error is returned.

requests — the number of ping requests to send to the remote host, expressed as a decimal integer

Values 1 to 10000

Default 5

do-not-fragment — specifies that the request frame should not be fragmented. This option is particularly useful in combination with the size parameter for maximum MTU determination.

router-instance — specifies the router name or service ID

Values *router-name:* Base, management

service-id: 1 to 2147483647

Default Base

timeout — specifies the timeout in seconds

Values 1 to 10

Default 5

pwc

Syntax	pwc [previous]
Context	<global>
Description	This command displays the present or previous working context of the CLI session.

The **pwc** command provides a user who is in the process of dynamically configuring a chassis a way to display the current or previous working context of the CLI session. The **pwc** command displays a list of the CLI nodes that hierarchically define the current context of the CLI instance of the user.

For example:

```
A:ALU>config>router>mpls# pwc
-----
Present Working Context :
-----
<root>
  configure
  router "Base"
  mpls
-----
A:ALU>config>router>mpls#
```

When the **previous** keyword is specified, the previous context displays. This is the context entered by the CLI parser upon execution of the **exit** command. The current context of the CLI is not affected by the **pwc** command.

Parameters	previous — displays the previous working context
-------------------	---

sleep

Syntax	sleep [<i>seconds</i>]
Context	<global>
Description	This command causes the console session to pause operation (sleep) for 1 second (default) or for the specified number of seconds.
Parameters	<i>seconds</i> — specifies the number of seconds for the console session to sleep, expressed as a decimal integer
Values	1 to 100
Default	1

Basic Command Reference

ssh

Syntax	ssh [<i>ip-addr</i> <i>dns-name</i> <i>username@ip-addr</i>] [- <i>I username</i>] [- <i>v SSH-version</i>] [router <i>router-instance</i>]									
Context	<global>									
Description	<p>This command opens a Secure Shell (SSH) session with another host.</p> <p>This command initiates a client SSH session with the remote host and is independent from the administrative or operational state of the SSH server. However, to be the target of an SSH session, the SSH server must be operational.</p> <p>Quitting SSH while in the process of authentication is accomplished by either executing a <Ctrl-c> or "~." (tilde and dot) assuming the "~" is the default escape character for the SSH session.</p>									
Parameters	<p><i>ip-addr</i> <i>dns-name</i> <i>username@ip-addr</i> — the remote host to open an SSH session with. The IP address, DNS name (providing DNS name resolution is configured), or the user name at the IP address can be specified.</p> <p>-<i>I username</i> — the user name to use when opening the SSH session</p> <p>-<i>v SSH-version</i> — the version of the SSH session to use, 1, 2 or 1-2</p> <p><i>router-instance</i> — the router name or service ID</p> <table><tr><td>Values</td><td><i>router-name:</i></td><td>Base, management</td></tr><tr><td></td><td><i>service-id:</i></td><td>1 to 2147483647</td></tr><tr><td>Default</td><td></td><td>Base</td></tr></table>	Values	<i>router-name:</i>	Base, management		<i>service-id:</i>	1 to 2147483647	Default		Base
Values	<i>router-name:</i>	Base, management								
	<i>service-id:</i>	1 to 2147483647								
Default		Base								

telnet

Syntax	telnet [<i>ip-address</i> <i>dns-name</i>] [<i>port</i>] [router <i>router-instance</i>]															
Context	<global>															
Description	<p>This command opens a Telnet session to a remote host.</p> <p>Telnet servers in 7705 SAR networks limit a Telnet client to three retries to log in. The Telnet server disconnects the Telnet client session after three retries. The number of retry attempts for a Telnet client session is not user-configurable.</p>															
Parameters	<p><i>ip-address</i> — the IP address of the remote host</p> <table><tr><td>Values</td><td><i>ipv4-address</i></td><td>a.b.c.d (host bits must be 0)</td></tr><tr><td></td><td><i>ipv6-address</i></td><td>x:x:x:x:x:x:x (eight 16-bit pieces)</td></tr><tr><td></td><td></td><td>x:x:x:x:x.d.d.d.d</td></tr><tr><td></td><td></td><td>x: [0 to FFFF]H</td></tr><tr><td></td><td></td><td>d: [0 to 255]D</td></tr></table> <p><i>dns-name</i> — the DNS name (if DNS name resolution is configured) of the remote host</p>	Values	<i>ipv4-address</i>	a.b.c.d (host bits must be 0)		<i>ipv6-address</i>	x:x:x:x:x:x:x (eight 16-bit pieces)			x:x:x:x:x.d.d.d.d			x: [0 to FFFF]H			d: [0 to 255]D
Values	<i>ipv4-address</i>	a.b.c.d (host bits must be 0)														
	<i>ipv6-address</i>	x:x:x:x:x:x:x (eight 16-bit pieces)														
		x:x:x:x:x.d.d.d.d														
		x: [0 to FFFF]H														
		d: [0 to 255]D														

Values 128 characters maximum

port — the TCP port number to use to Telnet to the remote host, expressed as a decimal integer

Values 1 to 65535

Default 23

router-instance — the router name or service ID

Values *router-name:* Base, management

service-id: 1 to 2147483647

Default Base

traceroute

Syntax **traceroute** [*ip-address* | *dns-name*] [**tll** *tll*] [**wait** *milliseconds*] [**no-dns**] [**source** *ip-address*] [**tos** *type-of-service*] [**router** *router-instance*]

Context <global>

Description The TCP/IP traceroute utility determines the route to a destination address. Note that aborting a traceroute with the <Ctrl-c> command could require issuing a second <Ctrl-c> command before the prompt is returned.

```
ALU-1# traceroute 192.168.xx.xx4
traceroute to 192.168.xx.xx4, 30 hops max, 40 byte packets
 1 192.168.xx.xx4 0.000 ms 0.000 ms 0.000 ms
ALU-1#
```

Parameters *ip-address* — the IP address to trace

Values *ipv4-address* a.b.c.d (host bits must be 0)
ipv6-address x:x:x:x:x:x:x (eight 16-bit pieces)
x:x:x:x:x:d.d.d.d
x: [0 to FFFF]H
d: [0 to 255]D

dns-name — the DNS name (if DNS name resolution is configured)

Values 128 characters maximum

tll — the maximum Time-To-Live (TTL) value to include in the traceroute request, expressed as a decimal integer

Values 1 to 255

milliseconds — the time in milliseconds to wait for a response to a probe, expressed as a decimal integer

Values 1 to 60000

Default 5000

Basic Command Reference

no-dns — when the **no-dns** keyword is specified, a DNS lookup for the specified host name will not be performed

Default DNS lookups are performed

source *ip-address* — the source IP address to use as the source of the probe packets in dotted-decimal notation. If the IP address is not one of the device's interfaces, an error is returned.

type-of-service — the type-of-service (TOS) bits in the IP header of the probe packets, expressed as a decimal integer

Values 0 to 255

router-instance — the router name or service ID

Values *router-name:* Base, management
service-id: 1 to 2147483647

Default Base

tree

Syntax	tree [detail]
Context	<global>
Description	This command displays the command hierarchy structure from the present working context.
Parameters	detail — includes parameter information for each command displayed in the tree output

write

Syntax	write {user broadcast} message-string
Context	<global>
Description	This command sends a console message to a specific user or to all users with active console sessions.
Parameters	<i>user</i> — the name of a user with an active console session to which to send a console message Values any valid CLI username broadcast — specifies that the <i>message-string</i> is to be sent to all users logged in to the router <i>message-string</i> — the message string to send, up to 250 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.

Environment Commands

alias

Syntax	alias <i>alias-name</i> <i>alias-command-name</i> no alias <i>alias-name</i>
Context	environment
Description	<p>This command enables the substitution of a command line by an alias.</p> <p>Use the alias command to create alternative names for an entity or command string that are easier to understand and remember. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes. Only a single command can be present in the command string.</p> <p>The alias command can be entered in any context but must be created in the root>environment context.</p> <p>For example, to create an alias named soi to display MPLS interfaces, enter:</p> <pre>alias soi "show router mpls interface"</pre>
Parameters	<p><i>alias-name</i> — the alias name. Do not use a valid command string for the alias. If the alias specified is an actual command, this causes the command to be replaced by the alias.</p> <p><i>alias-command-name</i> — the command line to be associated</p>

create

Syntax	[no] create
Context	environment
Description	<p>By default, the create command is required to create a new OS entity.</p> <p>The no form of the command disables requiring the create keyword.</p>
Default	create

Basic Command Reference

more

Syntax	[no] more
Context	environment
Description	<p>This command enables per-screen CLI output, meaning that the output is displayed on a screen-by- screen basis. The terminal screen length can be modified with the terminal command.</p> <p>The following prompt appears at the end of each screen of paginated output:</p> <pre>Press any key to continue (Q to quit)</pre> <p>The no form of the command displays the output all at once. If the output length is longer than one screen, the entire output will be displayed, which may scroll the screen.</p>
Default	more

reduced-prompt

Syntax	reduced-prompt [<i>no-of-nodes-in-prompt</i>] no reduced-prompt
Context	environment
Description	<p>This command configures the maximum number of higher CLI context levels to display in the CLI prompt for the current CLI session. This command is useful when configuring features that are several node levels deep, which can cause the CLI prompt to become too long.</p> <p>By default, the CLI prompt displays the system name and the complete context in the CLI.</p> <p>The number of nodes specified indicates the number of higher-level contexts that can be displayed in the prompt.</p> <p>For example, if reduced-prompt is set to 2, the two highest contexts from the present working context are displayed by name with the hidden (reduced) contexts compressed into a ellipsis (“...”).</p> <pre>ALU-1>environment# reduced-prompt 2 ALU-1>config>router# interface to-103 ALU-1>...router>if#</pre> <p>Note that the setting is not saved in the configuration. It must be reset for each CLI session or stored in an exec script file.</p> <p>The no form of the command reverts to the default.</p>
Default	no reduced-prompt

Parameters *no-of-nodes-in-prompt* — the maximum number of higher-level nodes displayed by name in the prompt, expressed as a decimal integer

Values 0 to 15

Default 2

saved-ind-prompt

Syntax **[no] saved-ind-prompt**

Context environment

Description This command enables a saved indicator in the prompt. When changes are made to the configuration file, a “*” appears in the prompt string indicating that the changes have not been saved. When an admin **save** command is executed, the “*” disappears.

```
*A:ALU-48# admin save
Writing file to ftp://128.251.10.43/./sim48/sim48-config.cfg
Saving configuration .... Completed.
A:ALU-48
```

terminal

Syntax **terminal**

Context environment

Description This command enables the context to configure the terminal screen length for the current CLI session.

length

Syntax **length lines**

Context environment>terminal

Description This command sets the terminal screen length (number of lines).

Default 24 — terminal dimensions are set to 24 lines long by 80 characters wide

Parameters *lines* — the number of lines for the terminal screen length, expressed as a decimal integer

Values 1 to 512

Basic Command Reference

time-display

Syntax	time-display {local utc}
Context	environment
Description	<p>This command displays timestamps in the CLI session based on local time or Coordinated Universal Time (UTC).</p> <p>The system keeps time internally in UTC and is capable of displaying the time in either UTC or local time based on the time zone configured.</p> <p>This configuration command is only valid for times displayed in the current CLI session. This includes displays of event logs, traps and all other places where a timestamp is displayed.</p> <p>In general, all timestamps are shown in the time selected. This includes log entries destined for console/session, memory, or SNMP logs. Log files on compact flash are maintained and displayed in UTC format.</p>
Default	time-display local

time-stamp

Syntax	[no] time-stamp
Context	environment
Description	<p>This command displays timestamps before the CLI prompt, indicating the last time that the command was completed. The date and time are displayed; the time format is either local or UTC, depending on how it was set with the time-display command.</p>
Default	no time-stamp

Monitor CLI Commands

filter

Syntax	filter
Context	monitor
Description	This command enables the context to configure criteria to monitor IP filter statistics.

ip

Syntax	ip <i>ip-filter-id</i> entry <i>entry-id</i> [<i>interval seconds</i>] [<i>repeat repeat</i>] [<i>absolute</i> <i>rate</i>]
Context	monitor>filter
Description	<p>This command enables IP filter monitoring. The statistical information for the specified IP filter entry displays at the configured interval until the configured count is reached.</p> <p>The first screen displays the current statistics related to the specified IP filter. The subsequent statistical information listed for each interval is displayed as a delta to the previous display.</p> <p>When the keyword rate is specified, the “rate per second” for each statistic is displayed instead of the delta.</p> <p>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.</p>
Parameters	<p><i>ip-filter-id</i> — displays detailed information for the specified filter ID and its filter entries</p> <p>Values 1 to 65535</p> <p><i>entry-id</i> — displays information on the specified filter entry ID for the specified filter ID only</p> <p>Values 1 to 65535</p> <p><i>seconds</i> — configures the interval for each display in seconds</p> <p>Values 3 to 60</p> <p>Default 10</p> <p><i>repeat</i> — configures how many times the command is repeated</p> <p>Values 1 to 999</p> <p>Default 10</p> <p>absolute — displays raw statistics, without processing. No calculations are performed on the delta or rate statistics.</p>

Basic Command Reference

rate — displays the rate per second for each statistic instead of the delta

Output The following output is an example of statistical information for the specified IP filter entry.

Sample Output

```
ALU-1>monitor# filter ip 10 entry 1 interval 3 repeat 3 absolute
=====
Monitor statistics for IP filter 10 entry 1
=====
-----
At time t = 0 sec (Base Statistics)
-----
Ing. Matches : 0
Egr. Matches : 0
-----
At time t = 3 sec (Mode: Absolute)
-----
Ing. Matches : 0
Egr. Matches : 0
-----
At time t = 6 sec (Mode: Absolute)
-----
Ing. Matches : 0
Egr. Matches : 0
-----
At time t = 9 sec (Mode: Absolute)
-----
Ing. Matches : 0
Egr. Matches : 0
=====
ALU-1>monitor#

ALU-1>monitor# filter ip 10 entry 1 interval 3 repeat 3 rate
=====
Monitor statistics for IP filter 10 entry 1
=====
-----
At time t = 0 sec (Base Statistics)
-----
Ing. Matches : 0
Egr. Matches : 0
-----
At time t = 3 sec (Mode: Rate)
-----
Ing. Matches : 0
Egr. Matches : 0
-----
At time t = 6 sec (Mode: Rate)
-----
Ing. Matches : 0
Egr. Matches : 0
-----
At time t = 9 sec (Mode: Rate)
-----
Ing. Matches : 0
Egr. Matches : 0
```


ipv6

Syntax	ipv6 <i>ipv6-filter-id</i> entry <i>entry-id</i> [interval <i>seconds</i>] [repeat <i>repeat</i>] [absolute rate]
Context	monitor>filter
Description	<p>This command enables IPv6 filter monitoring. The statistical information for the specified IPv6 filter entry displays at the configured interval until the configured count is reached.</p> <p>The first screen displays the current statistics related to the specified IPv6 filter. The subsequent statistical information listed for each interval is displayed as a delta to the previous display.</p> <p>When the keyword rate is specified, the “rate per second” for each statistic is displayed instead of the delta.</p> <p>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.</p>
Parameters	<p><i>ipv6-filter-id</i> — displays detailed information for the specified filter ID and its filter entries</p> <p>Values 1 to 65535</p> <p><i>entry-id</i> — displays information on the specified filter entry ID for the specified filter ID only</p> <p>Values 1 to 65535</p> <p><i>seconds</i> — configures the interval for each display in seconds</p> <p>Values 3 to 60</p> <p>Default 10</p> <p><i>repeat</i> — configures how many times the command is repeated</p> <p>Values 1 to 999</p> <p>Default 10</p> <p>absolute — displays raw statistics, without processing. No calculations are performed on the delta or rate statistics.</p> <p>rate — displays the rate per second for each statistic instead of the delta</p>

management-access-filter

Syntax	management-access-filter
Context	monitor
Description	<p>This command enables the context to configure criteria to monitor management access filters. Management access filters control all traffic. They can be used to restrict management of the 7705 SAR by other nodes outside specific (sub)networks or through designated ports.</p>

Basic Command Reference

ip

Syntax	ip entry <i>entry-id</i> [interval <i>seconds</i>] [repeat <i>repeat</i>] [absolute rate]
Context	monitor>management-access-filter
Description	<p>This command enables IP filter monitoring. The statistical information for the specified IP filter entry displays at the configured interval until the configured count is reached.</p> <p>The first screen displays the current statistics related to the specified IP filter. The subsequent statistical information listed for each interval is displayed as a delta to the previous display.</p> <p>When the keyword rate is specified, the “rate per second” for each statistic is displayed instead of the delta.</p> <p>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.</p>
Parameters	<p><i>entry-id</i> — displays information on the specified filter entry ID for the specified filter ID only</p> <p>Values 1 to 9999</p> <p><i>seconds</i> — configures the interval for each display in seconds</p> <p>Values 3 to 60</p> <p>Default 10</p> <p><i>repeat</i> — configures how many times the command is repeated</p> <p>Values 1 to 999</p> <p>Default 10</p> <p>absolute — displays raw statistics, without processing. No calculations are performed on the delta or rate statistics.</p> <p>rate — displays the rate per second for each statistic instead of the delta</p>

port

Syntax	port <i>port-id</i> [<i>port-id...</i> (up to 5 max)] [interval <i>seconds</i>] [repeat <i>repeat</i>] [absolute rate]
Context	monitor
Description	<p>This command enables port traffic monitoring. The specified port(s) statistical information displays at the configured interval until the configured count is reached.</p> <p>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.</p>

When the keyword **rate** is specified, the “rate per second” for each statistic is displayed instead of the delta. The percentage of the port being utilized is also displayed. For Ethernet ports, the utilization includes inter-frame gap and preamble.

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-id — specifies up to 5 port IDs

Values *port-id*: slot/mda/port[.channel]

seconds — configures the interval for each display in seconds

Values 3 to 60

Default 10

repeat — configures how many times the command is repeated

Values 1 to 999

Default 10

absolute — displays raw statistics, without processing. No calculations are performed on the delta or rate statistics.

rate — displays the rate per second for each statistic instead of the delta

Output

The following output is an example of statistical information about the port.

Sample Output

```
ALU-12>monitor# port 1/1/4 interval 3 repeat 3 absolute
=====
Monitor statistics for Port 1/1/4
=====

```

	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)		

Basic Command Reference

```
-----  
Octets                                0                                0  
Packets                               39                               175  
Errors                                 0                                0  
=====
```

ALU-12>monitor#

```
ALU-12>monitor# port 1/1/4 interval 3 repeat 3 rate  
=====
```

Monitor statistics for Port 1/1/4

```
=====
```

	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
Utilisation (% of port capacity)	0.00	0.00

At time t = 6 sec (Mode: Rate)		

Octets	0	0
Packets	0	0
Errors	0	0
Utilisation (% of port capacity)	0.00	0.00

At time t = 9 sec (Mode: Rate)		

Octets	0	0
Packets	0	0
Errors	0	0
Utilisation (% of port capacity)	0.00	0.00
=====		

```
ALU-12>monitor#
```

router

Syntax	router <i>router-instance</i>
Context	monitor
Description	This command enables the context to configure criteria to monitor statistical information for LDP and MPLS protocols.
Parameters	<i>router-instance</i> — specifies the router name or service ID
Values	<i>router-name:</i> Base, management <i>service-id:</i> 1 to 2147483647
Default	Base

session

Syntax	session <i>ldp-id</i> [<i>ldp-id...</i> (up to 5 max)] [interval <i>seconds</i>] [repeat <i>repeat</i>] [absolute rate]
Context	monitor>router>ldp
Description	<p>This command displays statistical information for LDP sessions at the configured interval until the configured count is reached.</p> <p>The first screen displays the current statistics related to the specified LDP session(s). The subsequent statistical information listed for each interval is displayed as a delta to the previous display.</p> <p>When the keyword rate is specified, the “rate per second” for each statistic is displayed instead of the delta.</p> <p>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.</p>
Parameters	<p><i>ldp-id</i> — specifies the IP address of the LDP session to display</p> <p>Values ip-address[:label-space] ip-address — a.b.c.d label-space — [0..65535]</p> <p><i>seconds</i> — configures the interval for each display in seconds</p> <p>Values 3 to 60</p> <p>Default 10</p> <p>repeat — configures how many times the command is repeated</p> <p>Values 1 to 999</p> <p>Default 10</p>

Basic Command Reference

absolute — displays raw statistics, without processing. No calculations are performed on the delta or rate statistics.

rate — displays the rate per second for each statistic instead of the delta

Output The following output is an example of statistical information the LDP session.

Sample Output

```
ALU-103>monitor>router>ldp# session 10.10.10.104 interval 3 repeat 3 absolute
=====
Monitor statistics for LDP Session 10.10.10.104
=====
```

	Sent	Received

At time t = 0 sec (Base Statistics)		

FECs	1	2
Hello	5288	5289
Keepalive	8225	8225
Init	1	1
Label Mapping	1	4
Label Request	0	0
Label Release	0	0
Label Withdraw	0	0
Label Abort	0	0
Notification	0	0
Address	1	1
Address Withdraw	0	0

At time t = 3 sec (Mode: Absolute)		

FECs	1	2
Hello	5288	5289
Keepalive	8226	8226
Init	1	1
Label Mapping	1	4
Label Request	0	0
Label Release	0	0
Label Withdraw	0	0
Label Abort	0	0
Notification	0	0
Address	1	1
Address Withdraw	0	0

At time t = 6 sec (Mode: Absolute)		

FECs	1	2
Hello	5288	5290
Keepalive	8226	8226
Init	1	1
Label Mapping	1	4
Label Request	0	0
Label Release	0	0
Label Withdraw	0	0
Label Abort	0	0
Notification	0	0
Address	1	1

```

Address Withdraw          0                      0
-----
At time t = 9 sec (Mode: Absolute)
-----
FECs                      1                      2
Hello                    5288                    5290
Keepalive                 8226                    8226
Init                      1                      1
Label Mapping             1                      4
Label Request             0                      0
Label Release             0                      0
Label Withdraw           0                      0
Label Abort              0                      0
Notification              0                      0
Address                   1                      1
Address Withdraw         0                      0
=====
ALU-12>monitor>router>ldp#

ALU-12>monitor>router>ldp# session 10.10.10.104 interval 3 repeat 3 rate
=====
Monitor statistics for LDP Session 10.10.10.104
=====
                          Sent                      Received
-----
At time t = 0 sec (Base Statistics)
-----
FECs                      1                      2
Hello                    5289                    5290
Keepalive                 8227                    8227
Init                      1                      1
Label Mapping             1                      4
Label Request             0                      0
Label Release             0                      0
Label Withdraw           0                      0
Label Abort              0                      0
Notification              0                      0
Address                   1                      1
Address Withdraw         0                      0
-----
At time t = 3 sec (Mode: Rate)
-----
FECs                      0                      0
Hello                    0                      0
Keepalive                 0                      0
Init                      0                      0
Label Mapping             0                      0
Label Request             0                      0
Label Release             0                      0
Label Withdraw           0                      0
Label Abort              0                      0
Notification              0                      0
Address                   0                      0
Address Withdraw         0                      0
-----
At time t = 6 sec (Mode: Rate)
-----
FECs                      0                      0
Hello                    0                      0

```

Basic Command Reference

```
Keepalive                0                0
Init                     0                0
Label Mapping            0                0
Label Request            0                0
Label Release            0                0
Label Withdraw           0                0
Label Abort              0                0
Notification             0                0
Address                  0                0
Address Withdraw         0                0
-----
At time t = 9 sec (Mode: Rate)
-----
FECs                     0                0
Hello                   0                0
Keepalive                0                0
Init                     0                0
Label Mapping            0                0
Label Request            0                0
Label Release            0                0
Label Withdraw           0                0
Label Abort              0                0
Notification             0                0
Address                  0                0
Address Withdraw         0                0
=====
ALU-12>monitor>router>ldp#
```

statistics

Syntax **statistics** [*interval seconds*] [*repeat repeatf*] [*absolute | rate*]

Context monitor>router>ldp

Description This command displays statistics for an LDP instance at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the LDP statistics. 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 *seconds* — configures the interval for each display in seconds

Values 3 to 60

Default 10

repeat — configures how many times the command is repeated

Values 1 to 999

Default 10

absolute — displays raw statistics, without processing. No calculations are performed on the delta or rate statistics.

rate — displays the rate per second for each statistic instead of the delta

Output The following output is an example of statistics for an LDP instance.

Sample Output

```

ALU-12>monitor>router>ldp# statistics interval 3 repeat 3 absolute
=====
Monitor statistics for LDP instance
=====
At time t = 0 sec (Base Statistics)
-----
Addr FECs Sent      : 0                Addr FECs Recv      : 0
Serv FECs Sent      : 1                Serv FECs Recv      : 2
...
-----
At time t = 3 sec (Mode: Absolute)
-----
Addr FECs Sent      : 0                Addr FECs Recv      : 0
Serv FECs Sent      : 1                Serv FECs Recv      : 2
...
-----
At time t = 6 sec (Mode: Absolute)
-----
Addr FECs Sent      : 0                Addr FECs Recv      : 0
Serv FECs Sent      : 1                Serv FECs Recv      : 2
...
-----
At time t = 9 sec (Mode: Absolute)
-----
Addr FECs Sent      : 0                Addr FECs Recv      : 0
Serv FECs Sent      : 1                Serv FECs Recv      : 2
...
=====
ALU-12>monitor>router>ldp#

ALU-12>monitor>router>ldp# statistics interval 3 repeat 3 rate
=====
Monitor statistics for LDP instance
=====
At time t = 0 sec (Base Statistics)
-----
Addr FECs Sent      : 0                Addr FECs Recv      : 0
Serv FECs Sent      : 1                Serv FECs Recv      : 2
...
-----
At time t = 3 sec (Mode: Rate)
-----
Addr FECs Sent      : 0                Addr FECs Recv      : 0

```

Basic Command Reference

```
Serv FECs Sent      : 0                      Serv FECs Recv      : 0
...
-----
At time t = 6 sec (Mode: Rate)
-----
Addr FECs Sent      : 0                      Addr FECs Recv      : 0
Serv FECs Sent      : 0                      Serv FECs Recv      : 0
...
-----
At time t = 9 sec (Mode: Rate)
-----
Addr FECs Sent      : 0                      Addr FECs Recv      : 0
Serv FECs Sent      : 0                      Serv FECs Recv      : 0
...
=====
ALU-12>monitor>router>ldp#
```

service

- Syntax** `service`
- Context** `monitor`
- Description** This command enables the context to configure criteria to monitor specific service SAP criteria.

id

- Syntax** `id service-id`
- Context** `monitor>service`
- Description** This command displays statistics for a specific service, specified by the service-id, at the configured interval until the configured count is reached.
- The first screen displays the current statistics related to the service-id. 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** `service-id` — identifies the service in the service domain

sap

Syntax `sap sap-id [interval seconds] [repeat repeat] [absolute | rate]`

Context monitor>service>id

Description This command displays statistics for a SAP associated with this service.

This command displays statistics for a specific SAP, identified by the port-id and encapsulation value, at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the SAP. 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 *sap-id* — specifies the physical port identifier portion of the SAP definition

The *sap-id* can be configured in one of the following formats:

Table 11: SAP ID Formats

Type	Syntax	Example
port-id	<i>slot/mda/port[channel]</i>	1/1/5
null	<i>[port-id bundle-id]</i>	<i>port-id:</i> 1/1/3 <i>bundle-id:</i> bundle-ppp-1/1.1
dot1q	<i>[port-id bundle-id]:qtag1</i>	<i>port-id:qtag1:</i> 1/1/3:100 <i>bundle-id:</i> bundle-ppp-1/1.1
atm	<i>[port-id bundle-id][:vpi/vci vpi]</i>	<i>port-id:</i> 1/1/1.1 <i>bundle-id:</i> bundle-ima-1/1.1 bundle-ppp-1/1.1 <i>vpi/vci:</i> 16/26 <i>vpi:</i> 16
cem	slot/mda/port.channel	1/1/1.3

Basic Command Reference

Values	sap-id:	null	[<i>port-id</i> <i>bundle-id</i>]
		dot1q	[<i>port-id</i> <i>bundle-id</i>]: <i>qtag1</i>
		atm	[<i>port-id</i> <i>bundle-id</i>][:vpi/vci vpi vpi1.vpi2]
		port-id	<i>slot/mda/port</i> [. <i>channel</i>]
		bundle-type-slot/mda.bundle-num	
		bundle	keyword
		type	ima, ppp
		bundle-num	1 to 128
		qtag1	0 to 4094
		vpi	NNI 0 to 4095 UNI 0 to 255
	vci	1, 2, 5 to 65535	

port-id — specifies the physical port ID in the slot/mda/port format

If the card in the slot has an adapter card installed, the *port-id* must be in the slot_number/MDA_number/port_number format. For example 1/2/3 specifies port 3 on MDA 2 in slot 1.

The *port-id* must reference a valid port type. When the *port-id* parameter represents TDM channels, the port ID must include the channel ID. A period “.” separates the physical port from the *channel-id*. The port must be configured as an access port.

bundle-id — specifies the multilink bundle to be associated with this IP interface. The **bundle** keyword must be entered at the beginning of the parameter. The command syntax must be configured as follows:

bundle-id: **bundle**-type-slot-id/mda-slot.bundle-num

bundle-id value range: 1 to 128

For example:

```
*A:ALU-12>config# port bundle-ppp-5/1.1
*A:ALU-12>config>port# multilink-bundle
```

qtag1 — specifies the encapsulation value used to identify the SAP on the port or sub-port. If this parameter is not specifically defined, the default value is 0.

Values qtag1: 0 to 4094

The values depend on the encapsulation type configured for the interface. The following table describes the allowed values for the port and encapsulation types.

Table 12: Allowed Values for Port and Encapsulation Types

Port Type	Encap-Type	Allowed Values	Comments
Ethernet	Null	0	The SAP is identified by the port.
Ethernet	Dot1q	0 to 4094	The SAP is identified by the 802.1Q tag on the port. Note that a 0 qtag1 value also accepts untagged packets on the dot1q port.

seconds — configures the interval for each display in seconds

Values 11 to 60

Default 11

repeat — configures how many times the command is repeated

Values 1 to 999

Default 10

absolute — displays the absolute rate per second value for each statistic

rate — displays the rate per second for each statistic instead of the delta.

sap-aggregation-group

Syntax **sap-aggregation-group** *group-id* [**interval** *seconds*] [**repeat** *repeat*] [**absolute** | **rate**]

Context monitor>service>id

Description This command displays the statistics for the specified SAP aggregation group that is associated with the service.

Parameters *group-id* — specifies the identifier for the SAP aggregation group

Values 1 to 32 characters

seconds — configures the interval for each display in seconds

Values 11 to 60

Default 11

repeat — configures how many times the command is repeated

Values 1 to 999

Default 10

absolute — displays the absolute rate per second value for each statistic

rate — displays the rate per second for each statistic instead of the delta

Basic Command Reference

Output The following output is an example of statistics for a SAP aggregation group.

Sample Output

```
*A:SYS28# monitor service id 1570 sap-aggregation-group SAG repeat 2
```

```
=====
Monitor statistics for Service 1570 SAP Aggregation Group SAG
=====
```

```
-----
At time t = 0 sec (Base Statistics)
-----
```

```
-----
Sap Aggregation Group Statistics
-----
```

```
Last Cleared Time      : N/A
```

```
Dropped Egress Cells (unconfigured vpi/vci): 14
```

	Packets	Octets
Forwarding Engine Stats		
Dropped	: 0	n/a
Off. HiPrio	: 205557	n/a
Off. LowPrio	: n/a	n/a

Queueing Stats(Ingress QoS Policy 1)		
Dro. HiPrio	: 0	n/a
Dro. LowPrio	: n/a	n/a
For. InProf	: 0	0
For. OutProf	: 205557	68605598

Queueing Stats(Egress QoS Policy 1)		
Dro. InProf	: 0	n/a
Dro. OutProf	: n/a	n/a
For. InProf	: 202446	63083956
For. OutProf	: n/a	n/a

```
-----
Sap Aggregation Group per Queue Stats
-----
```

	Packets	Octets
Ingress Queue 1 (Priority)		
Off. HiPrio	: 205557	n/a
Off. LoPrio	: n/a	n/a
Dro. HiPrio	: 0	n/a
Dro. LoPrio	: n/a	n/a
For. InProf	: 0	0
For. OutProf	: 205557	68605598

Egress Queue 1		
For. InProf	: 202446	63083956
For. OutProf	: n/a	n/a
Dro. InProf	: 0	n/a
Dro. OutProf	: n/a	n/a

```
-----
At time t = 11 sec (Mode: Delta)
-----
```

```
-----
Sap Aggregation Group Statistics
-----
```

```
Last Cleared Time      : N/A
```

```
Dropped Egress Cells (unconfigured vpi/vci): 14
```

	Packets	Octets
Forwarding Engine Stats		
Dropped	: 0	n/a
Off. HiPrio	: 233	n/a
Off. LowPrio	: n/a	n/a

```
Queueing Stats(Ingress QoS Policy 1)
```

Dro. HiPrio	: 0	n/a
Dro. LowPrio	: n/a	n/a
For. InProf	: 0	0
For. OutProf	: 233	77822

```
Queueing Stats(Egress QoS Policy 1)
```

Dro. InProf	: 0	n/a
Dro. OutProf	: n/a	n/a
For. InProf	: 232	72384
For. OutProf	: n/a	n/a

```
-----
Sap Aggregation Group per Queue Stats
-----
```

	Packets	Octets
Ingress Queue 1 (Priority)		
Off. HiPrio	: 233	n/a
Off. LoPrio	: n/a	n/a
Dro. HiPrio	: 0	n/a
Dro. LoPrio	: n/a	n/a
For. InProf	: 0	0
For. OutProf	: 233	77822

```
Egress Queue 1
```

For. InProf	: 232	72384
For. OutProf	: n/a	n/a
Dro. InProf	: 0	n/a
Dro. OutProf	: n/a	n/a

```
-----
At time t = 22 sec (Mode: Delta)
-----
```

```
-----
Sap Aggregation Group Statistics
-----
```

```
Last Cleared Time      : N/A
```

```
Dropped Egress Cells (unconfigured vpi/vci): 14
```

	Packets	Octets
Forwarding Engine Stats		
Dropped	: 0	n/a
Off. HiPrio	: 232	n/a
Off. LowPrio	: n/a	n/a

Basic Command Reference

```
Queueing Stats(Ingress QoS Policy 1)
Dro. HiPrio      : 0          n/a
Dro. LowPrio    : n/a       n/a
For. InProf     : 0          0
For. OutProf    : 232       77488
```

```
Queueing Stats(Egress QoS Policy 1)
Dro. InProf     : 0          n/a
Dro. OutProf    : n/a       n/a
For. InProf     : 233       72696
For. OutProf    : n/a       n/a
```

Sap Aggregation Group per Queue Stats

	Packets	Octets
Ingress Queue 1 (Priority)		
Off. HiPrio	: 232	n/a
Off. LoPrio	: n/a	n/a
Dro. HiPrio	: 0	n/a
Dro. LoPrio	: n/a	n/a
For. InProf	: 0	0
For. OutProf	: 232	77488
Egress Queue 1		
For. InProf	: 233	72696
For. OutProf	: n/a	n/a
Dro. InProf	: 0	n/a
Dro. OutProf	: n/a	n/a

sdp

Syntax **sdp** {*sdp-id* | *far-end ip-address*} [*interval seconds*] [*repeat repeat*] [*absolute* | *rate*]

Context monitor>service>id

Description This command displays statistics for an SDP binding associated with this service.

Parameters *sdp-id* — specifies the SDP identifier

Values 1 to 17407

ip-address — the system address of the far-end 7705 SAR for the SDP in dotted-decimal notation

seconds — configures the interval for each display in seconds

Values 11 to 60

Default 11

repeat — configures how many times the command is repeated

Values 1 to 999

Default 10

absolute — displays raw statistics, without processing. No calculations are performed on the delta or rate statistics

rate — displays the rate per second for each statistic instead of the delta

Output The following output is an example of statistics for the SDP binding associated with the service.

Sample Output

```
ALU-12# monitor service id 100 sdp 10 repeat 2
=====
Monitor statistics for Service 100 SDP binding 10
=====
-----
At time t = 0 sec (Base Statistics)
-----
I. Fwd. Pkts.   : 0                      I. Dro. Pkts.   : 0
E. Fwd. Pkts.   : 0                      E. Fwd. Octets  : 0
-----
At time t = 11 sec (Mode: Delta)
-----
I. Fwd. Pkts.   : 0                      I. Dro. Pkts.   : 0
E. Fwd. Pkts.   : 0                      E. Fwd. Octets  : 0
-----
At time t = 22 sec (Mode: Delta)
-----
I. Fwd. Pkts.   : 0                      I. Dro. Pkts.   : 0
E. Fwd. Pkts.   : 0                      E. Fwd. Octets  : 0
-----
=====
ALU-12#
```

Show Commands

alias

- Syntax** **alias**
- Context** show
- Description** This command displays a list of existing aliases.
- Output** The following output is an example of alias information, and [Table 13](#) describes the fields.

Sample Output

```
ALU-103>config>system# show alias
=====
Alias-Name                Alias-command-name
=====
sri                        show router interface
sse                        show service service-using cpipe
ssvll                      show service service-using vll
=====
Number of aliases : 3
=====
ALU-103>config>system#
```

Table 13: Show Alias Output Fields

Label	Description
Alias-Name	Displays the name of the alias
Alias-command-name	The command and parameter syntax that define the alias
Number of aliases	The total number of aliases configured on the router

File System Management

In This Chapter

This chapter provides information about file system management.

Topics in this chapter include:

- [The File System](#)
 - [Compact Flash Device](#)
 - [URLs](#)
 - [Wildcards](#)
- [Common Configuration Tasks](#)
 - [Modifying File Attributes](#)
 - [Creating and Navigating Directories](#)
 - [Copying Files](#)
 - [Moving Files](#)
 - [Deleting Files and Removing Directories](#)
 - [Displaying Directory and File Information](#)
 - [Repairing the File System](#)
- [File System Command Reference](#)

The File System

The 7705 SAR OS file system is used to store files used and generated by the system; for example, image files, configuration files, logging files, and accounting files.

The `file` commands allow you to copy, create, move, and delete files and directories, navigate to a different directory, and display file or directory contents and the image version.

Compact Flash Device

The file system is based on a DOS file system. On the 7705 SAR, each CSM has an integrated compact flash device. The names for these devices are:

- `cf3:`
- `cf3-A:`
- `cf3-B:`

The first device name above (`cf3:`) is a relative device name in that it refers to the device local to the control processor on the CSM running the current console session. As in the DOS file system, the colon (":") at the end of the name indicates that it is a device.

The second and third device names (`cf3-A:` and `cf3-B:`) are absolute device names that refer directly to the device on CSM A or CSM B.

On the 7705 SAR-18, `cf3:` is used to store the software image required for system startup and operation, including the application load. The 7705 SAR-18 CSM also has two optional compact flash slots for two compact flash devices (`cf1:` and `cf2:`). These compact flash devices are also referred to as `cf1-A:/cf1-B:` and `cf2-A:/cf2-B:` to indicate whether they are on CSM A or CSM B. All the compact flash devices can be used to store software upgrades, statistics, logging files, accounting files, scripts, and configuration data.

The device `cf3-B:` does not apply to the 7705 SAR-F, the 7705 SAR-M (all variants), or the 7705 SAR-H because they do not have redundant CSMs.

With the exception of `cf3:` on the 7705 SAR-F, all compact flash devices are field-replaceable and have an administrative state (shutdown/no shutdown).



Note: To prevent corruption of open files in the file system, compact flashes should be removed only when they are administratively shut down. The 7705 SAR OS gracefully closes any open files on the device so that it can be safely removed.

URLs

The arguments for the 7705 SAR OS file commands are modeled after the standard universal resource locator (URL).

A URL can refer to a file (a *file-url*) or a directory (a *directory-url*).

The 7705 SAR OS supports operations on both the local file system and on remote files. For the purposes of categorizing the applicability of commands to local and remote file operations, URLs are divided into three types of URLs: local, ftp, and tftp.

The syntax for each of the URL types is listed in [Table 14](#).

Table 14: URL Types and Syntax

URL Type	Syntax	Notes
<i>local-url</i>	<code>[cflash-id:\]path</code>	<i>cflash-id</i> is the compact flash device name Values: cf3: (for all platforms), cf1: and cf2: (for the 7705 SAR-18 only)
<i>ftp-url</i>	<code>ftp://[username[:password]@]host/path</code>	An absolute ftp path from the root of the remote file system: <i>username</i> is the ftp user name <i>password</i> is the ftp user password <i>host</i> is the remote host <i>path</i> is the path to the directory or file
	<code>ftp://[username[:password]@]host./path</code>	A relative ftp path from the user's home directory. Note the period and slash ("./") in this syntax, as compared to the absolute path.
<i>tftp-url</i>	<code>tftp://host[/path]/filename</code>	tftp is only supported for operations on file-urls

[Table 15](#) lists the commands that are supported both locally and remotely.

Table 15: File Command Local and Remote File System Support

Command	local-url	ftp-url	tftp-url
attrib	X		
cd	X	X	
copy	X	X	X

Table 15: File Command Local and Remote File System Support (Continued)

Command	local-url	ftp-url	tftp-url
delete	X	X	
dir	X	X	
md		X	
move	X	X	
rd		X	
repair			
scp	source only		
type	X	X	X
version	X	X	X

The 7705 SAR OS accepts either forward slash (“/”) or backslash (“\”) characters to delimit directory and/or filenames in URLs. Similarly, the 7705 SAR OS SCP client application can use either slash or backslash characters, but not all SCP clients treat backslash characters as equivalent to slash characters. In particular, UNIX systems will often interpret the backslash character as an “escape” character. This can cause problems when using an external SCP client application to send files to the 7705 SAR OS SCP server. If the external system treats the backslash like an escape character, the backslash delimiter will get stripped by the parser and will not be transmitted to the 7705 SAR OS SCP server.

For example, a destination directory specified as “cf3:\dir1\file1” will be transmitted to the 7705 SAR OS SCP server as “cf3:dir1file1” where the backslash escape characters are stripped by the SCP client system before transmission. On systems where the client treats the backslash like an “escape” character, a double backslash “\\” or the forward slash “/” can typically be used to properly delimit directories and the filename.

Wildcards

The 7705 SAR supports the standard DOS wildcard characters. The asterisk (*) can represent zero or more characters in a string of characters, and the question mark (?) can represent any one character.

Example:

```
ALU-1>file cf3:\ # copy test*.cfg siliconvalley
cf3:\testfile.cfg
1 file(s) copied.
ALU-1>file cf3:\ # cd siliconvalley
ALU-1>file cf3:\siliconvalley\ # dir
Volume in drive cf3 on slot A has no label.
Directory of cf3:\siliconvalley\
05/10/2006 11:32p      <DIR>          .
05/10/2006 11:14p      <DIR>          ..
05/10/2006 11:32p                    7597 testfile.cfg
      1 File(s)                        7597 bytes.
      2 Dir(s)                        1082368 bytes free.
ALU-1>file cf3:\siliconvalley\ #
```

As in a DOS file system, the 7705 SAR wildcard characters can only be used in some of the file commands.

Common Configuration Tasks

The following sections describe the basic system tasks that can be performed.

- [Modifying File Attributes](#)
- [Creating and Navigating Directories](#)
- [Copying Files](#)
- [Moving Files](#)
- [Deleting Files and Removing Directories](#)
- [Displaying Directory and File Information](#)
- [Repairing the File System](#)



Note: When a file system operation is performed with a command that can potentially delete or overwrite a file system entry (such as a `copy`, `delete`, `move`, `rd`, or `scp` command), a prompt appears to confirm the action. The `force` keyword performs the copy, delete, move, rd, or scp action without displaying the confirmation prompt.

Modifying File Attributes

The system administrator can change the read-only attribute in the local file. Enter the `attrib` command with no options to display the contents of the directory and the file attributes.

Use the CLI syntax displayed below to modify file attributes:

CLI Syntax: `file>`
`attrib [+r | -r] file-url`

The following displays an example of the command syntax:

Example:

```
# file
file cf3:\ # attrib
file cf3:\ # attrib +r BOF.SAV
file cf3:\ # attrib
```

The following displays the file configuration:

```
ALU-1>file cf3:\ # attrib
cf3:\bootlog.txt
cf3:\bof.cfg
cf3:\boot.ldr
cf3:\bootlog_prev.txt
```



```

cf3:\BOF.SAV
ALU-1>file cf3:\ # attrib +r BOF.SAV
ALU-1>file cf3:\ # attrib
cf3:\bootlog.txt
cf3:\bof.cfg
cf3:\boot.ldr
cf3:\bootlog_prev.txt
R cf3:\BOF.SAV

```

Creating and Navigating Directories

Use the `md` command to create a new directory in the local file system, one level at a time.

Use the `cd` command to navigate to different directories.

Use the CLI syntax displayed below to create a new directory:

```

CLI Syntax:  file>
                  md file-url

```

The following displays an example of the command syntax:

```

Example:     file cf3:\ # md test1
                  file cf3:\ # cd test1
                  file cf3:\test1\ # md test2
                  file cf3:\test1\ # cd test2
                  file cf3:\test1\test2\ # md test3
                  file cf3:\test1\test2\ # cd test3
                  file cf3:\test1\test2\test3 #

```

Copying Files

Use the `copy` command to upload or download an image file, configuration file, or other file types to or from a flash card or a TFTP server.

The `scp` command copies files between hosts on a network. It uses SSH for data transfer, and uses the same authentication and provides the same security as SSH.

The source file for the `scp` command must be local. The file must reside on the 7705 SAR router. The destination file must be in the format: `user@host:file-name`. The destination does not need to be local.

Common Configuration Tasks

Use the CLI syntax displayed below to copy files:

CLI Syntax: `file>`
`copy source-file-url dest-file-url [force]`
`scp local-file-url destination-file-url [router`
`router name | service-id] [force]`

The following displays an example of the `copy` command syntax:

Example:

```
ALU-1>file cf3::\ # copy 104.cfg cf3::\test1\test2\test3\test.cfg
ALU-1>file cf3::\ # scp file1 admin@192.168.x.x:cf3::\file1
ALU-1>file cf3::\ # scp file2 user2@192.168.x.x:/user2/file2
ALU-1>file cf3::\ # scp cf3:/file3 admin@192.168.x.x:cf3::\file3
```

Moving Files

Use the `move` command to move a file or directory from one location to another.

Use the CLI syntax displayed below to move files:

CLI Syntax: `file>`
`move old-file-url new-file-url [force]`

The following displays an example of the command syntax:

Example:

```
ALU-1>file cf3::\test1\test2\test3\ # move test.cfg cf3::\test1
cf3::\test1\test2\test3\test.cfg
ALU-1>file cf3::\test1\test2\test3\ # cd ..
ALU-1>file cf3::\test1\test2\ # cd ..
ALU-1>file cf3::\test1\ # dir

Directory of cf3::\test1\
05/04/2006 07:58a <DIR>      .
05/04/2006 07:06a <DIR>      ..
05/04/2006 07:06a <DIR>      test2
05/04/2006 07:58a          25278 test.cfg
1 File(s)                25278 bytes.
3 Dir(s)                  1056256 bytes free.
ALU-1>file cf3::\test1\ #
```

Deleting Files and Removing Directories

Use the `delete` and `rd` commands to delete files and remove directories. Directories must be empty in order to remove them. When files or directories are deleted, they cannot be recovered.

Use the CLI syntax displayed below to delete files and remove directories:

```
CLI Syntax:  file>
                delete file-url [force]
                rd file-url [force]
```

The following displays an example of the command syntax:

```
ALU-1>file cf3::\test1\ # delete test.cfg
ALU-1>file cf3::\test1\ # delete abc.cfg
ALU-1>file cf3::\test1\test2\ # cd test3
ALU-1>file cf3::\test1\test2\test3\ # cd ..
ALU-1>file cf3::\test1\test2\ # rd test3
ALU-1>file cf3::\test1\test2\ # cd ..
ALU-1>file cf3::\test1\ # rd test2
ALU-1>file cf3::\test1\ # cd ..
ALU-1>file cf3::\ # rd test1
ALU-1>file cf3::\ #
```

Displaying Directory and File Information

Use the `dir` command to display a list of files on a file system.

Use the `type` command to display the contents of a file.

Use the `version` command to display the version of a 7705 SAR both.tim file.

Use the CLI syntax displayed below to display directory and file information:

```
CLI Syntax:  file>
                dir [file-url]
                type file-url
                version file-url
```

Common Configuration Tasks

The following displays an example of the command syntax:

```
A:ALU-1# file
A:ALU-1>file cf3:.\ # dir

Volume in drive cf3: on slot A has no label.

Volume in drive cf3: on slot A is formatted as FAT32.

Directory of cf3:.\

02/08/2008  11:23a                140584 boot.ldr
02/07/2008  12:19p                 786 bof.cfg
02/13/2008  05:42p                 2058 bootlog.txt
01/13/2008  05:42p                 2434 bootlog_pre.txt
01/30/2008  05:17p                 797 bof.cfg.arash
01/25/2008  04:11p                <DIR>      TXT
01/30/2008  11:36a                 787 bof.cfg.ftp
01/30/2008  01:11p                 736 bof.cfg.root
01/30/2008  11:35a                 886 bof.cfg.deep
01/30/2008  11:35a                 483 bof.cfg.JC
                8 File(s)                411097 bytes.
                1 Dir(s)                1043456 bytes free.
A:ALU-1>file cf3:.\ # type bof.cfg
# TiMOS-B-1.1.R1 both/hops ALCATEL-LUCENT SAR 7705
# Copyright (c) 2000-2008 Alcatel-Lucent.
# All rights reserved. All use subject to applicable license agreements.
# Built on Wed Apr 9 09:53:01 EDT 2008 by csabuild in /rel2.0/b1/R1/panos/main

# Generated WED APR 09 20:18:06 2008 UTC

primary-image      ftp://*:*@xxx.xxx.xxx.xx/home/csahwreg17/images/both.tim
primary-config     ftp://*:*@ xxx.xxx.xxx.xx /home/csahwreg17/images/dut-a.cfg
address            xxx.xxx.xxx.xx /24 active
address            xxx.xxx.xxx.xx /24 standby
primary-dns        xxx.xxx.xxx.xx
dns-domain         labs.ca.alcatel-lucent.com
static-route       xxx.xxx.0.0/16 next-hop xxx.xxx.xxx.x
autonegotiate
duplex             full
speed              100
wait               3
persist            off
console-speed      115200

A:ALU-1>file cf3:.\ #
```

Repairing the File System

Use the `repair` command to check a compact flash device for errors and repair any errors found.

Use the CLI syntax displayed below to check and repair a compact flash device:

CLI Syntax: `file`
 `repair [cflash-id]`

The following displays an example of the command syntax:

```
ALU-1>file cf3:\ # repair
Checking drive cf3: on slot A for errors...
Drive cf3: on slot A is OK.
```

Common Configuration Tasks

File System Command Reference

Command Hierarchy

Configuration Commands

- file**
- **attrib** [+r | -r] *file-url*
- **attrib**
- **cd** [*file-url*]
- **copy** *source-file-url dest-file-url* [**force**]
- **delete** *file-url* [**force**]
- **dir** [*file-url*]
- **format** [*cflash-id*] [**reliable**]
- **md** *file-url*
- **move** *old-file-url new-file-url* [**force**]
- **rd** *file-url* [**force**]
- **repair** [*cflash-id*]
- **scp** *local-file-url destination-file-url* [**router router-instance**] [**force**]
- [**no**] **shutdown** [**active**] [**standby**]
- [**no**] **shutdown** *cflash-id*
- **type** *file-url*
- **version** *file-url* [**check**]

Command Descriptions

- [Configuration Commands](#)

Configuration Commands

file

Syntax	file
Context	root
Description	<p>This command enters the context to perform file system operations.</p> <p>When entering the file context, the prompt changes to reflect the present working directory. Navigating the file system with the cd .. command results in a changed prompt.</p> <p>The exit all command leaves the file system/file operation context and returns to the <ROOT> CLI context. The state of the present working directory is maintained for the CLI session. Entering the file command returns the cursor to the working directory where the exit command was issued.</p>

attrib

Syntax	attrib [+r -r] file-url attrib
Context	file
Description	<p>This command sets or clears/resets the read-only attribute for a file in the local file system.</p> <p>To list all files and their current attributes, enter attrib or attrib x where x is either the filename or a wildcard (*).</p> <p>When an attrib command is entered to list a specific file or all files in a directory, the file's attributes are displayed with or without an "R" preceding the filename. The "R" implies that the +r is set and that the file is read-only. Files without the "R" designation imply that the -r is set and that the file is read-write-all. For example:</p>

```

ALU-1>file cf3:\ # attrib
          cf3:\bootlog.txt
          cf3:\bof.cfg
          cf3:\boot.ldr
          cf3:\sr1.cfg
          cf3:\test
          cf3:\bootlog_prev.txt
R        cf3:\BOF.SAV

```

File System Command Reference

Parameters *file-url* — the URL for the local file

Values *local-url* | *remote-url*: up to 255 characters
local-url: [cflash-id/][file-path]
remote-url: [ftp://login.pswd@remote-locn/]
[file-path]

The 7705 SAR-8 and the 7705 SAR-18 support cf3:, cf3-A:, and cf3-B:. In addition, the 7705 SAR-18 supports cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, and cf2-B:.

The 7705 SAR-F, the 7705 SAR-M (all variants), and the 7705 SAR-H support cf3: and cf3-A:.

+r — sets the read-only attribute on the specified file

-r — clears/resets the read-only attribute on the specified file

cd

Syntax **cd** [*file-url*]

Context file

Description This command displays or changes the current working directory in the local file system.

Parameters *file-url* — the URL for the local file

Values *local-url* | *remote-url*: up to 255 characters
local-url: [cflash-id/][file-path]
remote-url: {[ftp:// | tftp://}login.pswd@remote-locn/] [file-path]

The 7705 SAR-8 and the 7705 SAR-18 support cf3:, cf3-A:, and cf3-B:. In addition, the 7705 SAR-18 supports cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, and cf2-B:.

The 7705 SAR-F, the 7705 SAR-M (all variants), and the 7705 SAR-H support cf3: and cf3-A:.

<none> — displays the current working directory

.. — signifies the parent directory. This can be used in place of an actual directory name in a *directory-url*.

directory-url — the destination directory

copy

Syntax	copy <i>source-file-url</i> <i>dest-file-url</i> [force]
Context	file
Description	<p>This command copies a file or all files in a directory from a source URL to a destination URL. At least one of the specified URLs should be a local URL. The optional wildcard (*) can be used to copy multiple files that share a common (partial) prefix and/or (partial) suffix.</p> <p>When a file is copied to a destination with the same file name, the original file is overwritten by the new file specified in the operation. The following prompt appears if the destination file already exists:</p> <p>“Overwrite destination file (y/n)?”</p> <p>For example:</p> <p>To copy a file named <i>srcfile</i> in a directory called <i>test</i> on <i>cf3</i>: in slot CSM B to a file called <i>destfile</i> in a directory called <i>production</i> on <i>cf3</i>: in slot CSM A, the syntax is:</p> <pre>sr1>file cf3:\ # copy cf3-B:/test/srcfile cf3-A:/production/destfile</pre> <p>To FTP a file named <i>121201.cfg</i> in directory <i>mydir</i> stored on <i>cf3</i>: in slot CSM A to a network FTP server with IP address <i>131.12.31.79</i> in a directory called <i>backup</i> with a destination file name of <i>121201.cfg</i>, the FTP syntax is:</p> <pre>copy cf3-A:/mydir/121201.cfg 131.12.31.79/backup/121201.cfg</pre>
Parameters	<p><i>source-file-url</i> — the location of the source file or directory to be copied</p> <p><i>dest-file-url</i> — the destination of the copied file or directory</p> <p>force — forces an immediate copy of the specified file(s)</p> <p>file copy force executes the command without displaying a user prompt message</p>

delete

Syntax	delete <i>file-url</i> [force]
Context	file
Description	<p>This command deletes the specified file.</p> <p>The optional wildcard “*” can be used to delete multiple files that share a common (partial) prefix and/or (partial) suffix. When the wildcard is entered, the following prompt displays for each file that matches the wildcard:</p> <p>“Delete file <filename> (y/n)?”</p>

File System Command Reference

Parameters *file-url* — the file name to delete

Values *local-url* | *remote-url*: up to 255 characters
local-url: [*cflash-id*]/[*file-path*]
remote-url [ftp://*login.pswd@remote-locn*/]
[*file-path*]

The 7705 SAR-8 and the 7705 SAR-18 support cf3:, cf3-A:, and cf3-B:. In addition, the 7705 SAR-18 supports cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, and cf2-B:.

The 7705 SAR-F, the 7705 SAR-M (all variants), and the 7705 SAR-H support cf3: and cf3-A:.

force — forces an immediate deletion of the specified file(s)
file delete * force deletes all the wildcard matching files without displaying a user prompt message

dir

Syntax **dir** [*file-url*]

Context file

Description This command displays a list of files and subdirectories in a directory.

Parameters *file-url* — the path or directory name
Use the *file-url* with the optional wildcard (*) to reduce the number of files to list.

Default lists all files in the present working directory

format

Syntax **format** [*cflash-id*] [**reliable**]

Context file

Description This command formats the compact flash. The compact flash must be shut down before formatting.

Parameters *cflash-id* — the compact flash type

Values The 7705 SAR-8 and the 7705 SAR-18 support cf3:, cf3-A:, and cf3-B:. In addition, the 7705 SAR-18 supports cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, and cf2-B:.

The 7705 SAR-F, the 7705 SAR-M (all variants), and the 7705 SAR-H support cf3: and cf3-A:.

reliable — enables the reliance file system and disables the default DOS file system. This option is valid only on compact flashes 1 and 2.

md

Syntax	md <i>file-url</i>						
Context	file						
Description	This command creates a new directory in a file system. Directories can only be created one level at a time.						
Parameters	<i>file-url</i> — the directory name to be created						
Values	<table> <tr> <td><i>local-url</i> <i>remote-url</i>:</td> <td>up to 255 characters</td> </tr> <tr> <td><i>local-url</i>:</td> <td>[<i>cflash-id</i>/][<i>file-path</i>]</td> </tr> <tr> <td><i>remote-url</i>:</td> <td>[ftp://<i>login:pswd@remote-locn</i>/] [<i>file-path</i>]</td> </tr> </table> <p>The 7705 SAR-8 and the 7705 SAR-18 support cf3:, cf3-A:, and cf3-B:. In addition, the 7705 SAR-18 supports cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, and cf2-B:.</p> <p>The 7705 SAR-F, the 7705 SAR-M (all variants), and the 7705 SAR-H support cf3: and cf3-A:.</p>	<i>local-url</i> <i>remote-url</i> :	up to 255 characters	<i>local-url</i> :	[<i>cflash-id</i> /][<i>file-path</i>]	<i>remote-url</i> :	[ftp:// <i>login:pswd@remote-locn</i> /] [<i>file-path</i>]
<i>local-url</i> <i>remote-url</i> :	up to 255 characters						
<i>local-url</i> :	[<i>cflash-id</i> /][<i>file-path</i>]						
<i>remote-url</i> :	[ftp:// <i>login:pswd@remote-locn</i> /] [<i>file-path</i>]						

move

Syntax	move <i>old-file-url new-file-url</i> [force]						
Context	file						
Description	This command moves a local file, system file, or a directory. If the target already exists, the command fails and an error message displays. The following prompt appears if the destination file already exists: “Overwrite destination file (y/n)?”						
Parameters	<i>old-file-url</i> — the file or directory to be moved						
Values	<table> <tr> <td><i>local-url</i> <i>remote-url</i>:</td> <td>up to 255 characters</td> </tr> <tr> <td><i>local-url</i>:</td> <td>[<i>cflash-id</i>/][<i>file-path</i>]</td> </tr> <tr> <td><i>remote-url</i>:</td> <td>[ftp://<i>login:pswd@remote-locn</i>/] [<i>file-path</i>]</td> </tr> </table> <p>The 7705 SAR-8 and the 7705 SAR-18 support cf3:, cf3-A:, and cf3-B:. In addition, the 7705 SAR-18 supports cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, and cf2-B:.</p> <p>The 7705 SAR-F, the 7705 SAR-M (all variants), and the 7705 SAR-H support cf3: and cf3-A:.</p>	<i>local-url</i> <i>remote-url</i> :	up to 255 characters	<i>local-url</i> :	[<i>cflash-id</i> /][<i>file-path</i>]	<i>remote-url</i> :	[ftp:// <i>login:pswd@remote-locn</i> /] [<i>file-path</i>]
<i>local-url</i> <i>remote-url</i> :	up to 255 characters						
<i>local-url</i> :	[<i>cflash-id</i> /][<i>file-path</i>]						
<i>remote-url</i> :	[ftp:// <i>login:pswd@remote-locn</i> /] [<i>file-path</i>]						
	<i>new-file-url</i> — the new destination to place the <i>old-file-url</i>						

File System Command Reference

Values *local-url | remote-url:* 255 chars max
local-url: [*cflash-id*]/[*file-path*]
remote-url: [ftp://login:pswd@remote-locn/]
 [*file-path*]

The 7705 SAR-8 and the 7705 SAR-18 support cf3:, cf3-A:, and cf3-B:. In addition, the 7705 SAR-18 supports cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, and cf2-B:.

The 7705 SAR-F, the 7705 SAR-M (all variants), and the 7705 SAR-H support cf3: and cf3-A:.

force — forces an immediate move of the specified file(s)

file move force executes the command without displaying a user prompt message

rd

Syntax **rd** *file-url* [**force**]

Context file

Description This command removes (deletes) a directory in a file system. The following message displays:

Are you sure (y/n)?

Parameters *file-url* — the directory to be removed

Values *local-url | remote-url:* up to 255 characters
local-url: [*cflash-id*]/[*file-path*]
remote-url: [ftp://login:pswd@remote-locn/]
 [*file-path*]

The 7705 SAR-8 and the 7705 SAR-18 support cf3:, cf3-A:, and cf3-B:. In addition, the 7705 SAR-18 supports cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, and cf2-B:.

The 7705 SAR-F, the 7705 SAR-M (all variants), and the 7705 SAR-H support cf3: and cf3-A:.

force — forces an immediate deletion of the specified directory

rd file-url force executes the command without displaying a user prompt message

repair

Syntax **repair** [*cflash-id*]

Context file

Description This command checks a compact flash device for errors and repairs any errors found.

Parameters	<i>cf_{flash-id}</i> — the compact flash slot ID to be shut down or enabled. When a specific <i>cf_{flash-id}</i> is specified, then that drive is shut down. If no <i>cf_{flash-id}</i> is specified, the drive referred to by the current working directory is assumed. If a slot number is not specified, then the active CSM is assumed.
Values	The 7705 SAR-8 and the 7705 SAR-18 support <i>cf3:</i> , <i>cf3-A:</i> , and <i>cf3-B:</i> . In addition, the 7705 SAR-18 supports <i>cf1:</i> , <i>cf1-A:</i> , <i>cf1-B:</i> , <i>cf2:</i> , <i>cf2-A:</i> , and <i>cf2-B:</i> . The 7705 SAR-F, the 7705 SAR-M (all variants), and the 7705 SAR-H support <i>cf3:</i> and <i>cf3-A:</i> .
Default	the current compact flash device

scp

Syntax	scp <i>local-file-url destination-file-url</i> [router <i>router-instance</i>] [force]
Context	file
Description	This command copies a local file to a remote host file system. It uses <code>ssh</code> for data transfer, and uses the same authentication and provides the same security as <code>ssh</code> . The following prompt appears: “Are you sure (y/n)?” The destination must specify a user and a host.
Parameters	<p><i>local-file-url</i> — the local source file or directory</p> <p>Values [<i>cf_{flash-id}</i>]/<i>[file-path]</i>: up to 256 characters</p> <p><i>destination-file-url</i> — the destination file</p> <p>Values <i>user@hostname:destination-file</i></p> <p><i>user</i> — the SSH user</p> <p><i>host</i> — the remote host IP address or DNS name</p> <p><i>file-path</i> — the destination path</p> <p><i>router-instance</i> — specifies the router name or service ID</p> <p>Values <i>router-name</i>: Base, management <i>service-id</i>: 1 to 2147483647</p> <p>Default Base</p> <p>force — forces an immediate copy of the specified file</p> <p>file scp <i>local-file-url destination-file-url</i> [router] force executes the command without displaying a user prompt message</p>

shutdown

Syntax	[no] shutdown [active] [standby] [no] shutdown <i>cflash-id</i>
Context	file
Description	This command shuts down (unmounts) the specified CSM(s).

Use the **no shutdown [active] [standby]** command to enable one or both CSMs.

Use the **no shutdown *cflash-id*** command to enable a compact flash (cf3: on all platforms; cf1: or cf2: on the 7705 SAR-18) on the CSM. The **no shutdown** command can be issued for a specific slot when no compact flash is present. When a compact flash is installed in the slot, the device will be activated upon detection.

In redundant systems, use the **no shutdown** command on cf3: on both CSMs in order to facilitate synchronization. See the [synchronize](#) command in the **configure>redundancy** context.

The **shutdown** command must be issued prior to removing a compact flash. If no parameters are specified, the drive referred to by the current working directory will be shut down.

LED status indicators — The following states are possible for the compact flash:

Operational: If a compact flash is present in a drive and operational (**no shutdown**), the respective LED is lit green. The LED flickers when the compact flash is accessed. Do **not** remove the compact flash during a read/write operation.

State: admin = up, operational = up, equipped

Flash defective: If a compact flash is defective, the respective LED blinks amber to reflect the error condition and a trap is raised.

State: admin = up/down, operational = faulty, equipped = no

Flash drive shut down: When the compact flash drive is shut down and a compact flash is present, the LED is lit amber. In this state, the compact flash can be ejected.

State: admin = down, operational = down, equipped = yes

No compact flash present, drive shut down: If no compact flash is present and the drive is shut down, the LED is unlit.

State: admin = down, operational = down, equipped = no

No compact flash present, drive enabled: If no compact flash is present and the drive is not shut down, the LED is unlit.

State: admin = up, operational = down, equipped = no

Ejecting a compact flash: The compact flash drive should be shut down before ejecting a compact flash. The LED should turn to solid (not blinking) amber. This is the only way to safely remove the compact flash. If a compact flash drive is not shut down before a compact flash is ejected, the LED blinks amber for approximately 5 s before shutting off.

State: admin = down, operational = down, equipped = yes

The **shutdown** or **no shutdown** state is not saved in the configuration file. Following a reboot, all compact flash drives are in their default state.

Default no shutdown — compact flash device is administratively enabled

Parameters *cf-flash-id* — the compact flash slot ID to be shut down or enabled. If a *cf-flash-id* is specified, the drive is shut down or enabled. If no *cf-flash-id* is specified, the drive referred to by the current working directory is assumed. If a slot number is not specified, the active CSM is assumed.

Values The 7705 SAR-8 and the 7705 SAR-18 support cf3:, cf3-A:, and cf3-B:. In addition, the 7705 SAR-18 supports cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, and cf2-B:.

The 7705 SAR-F, the 7705 SAR-M (all variants), and the 7705 SAR-H support cf3: and cf3-A:.

active — all drives on the active CSM are shut down or enabled

standby — all drives on the standby CSM are shut down or enabled

If both **active** and **standby** keywords are specified, all drives on both CSMs are shut down or enabled.

type

Syntax **type file-url**

Context file

Description This command displays the contents of a text file.

Parameters *file-url* — the file contents to display

version

Syntax **version file-url [check]**

Context file

Description This command displays the version of a TiMOS both.tim file.

File System Command Reference

Parameters *file-url* — the file name of the target file

Values	<i>local-url</i> <i>remote-url</i> :	up to 255 characters
	<i>local-url</i> :	[<i>cflash-id</i>]/[<i>file-path</i>]
	<i>remote-url</i> :	{[ftp:// tftp://]login.pswd@remote-locn}/[<i>file-path</i>]
	<i>cflash-id</i> :	The 7705 SAR-8 and the 7705 SAR-18 support cf3:, cf3-A:, and cf3-B:. In addition, the 7705 SAR-18 supports cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, and cf2-B:. The 7705 SAR-F, the 7705 SAR-M (all variants), and the 7705 SAR-H support cf3: and cf3-A:.

check — validates the .tim file

Output The following example shows the version of a TiMOS both.tim file.

Sample Output

```
A:ALU-1# file version cf3:/both.tim
TiMOS-B-0.0.R1 for ALCATEL-LUCENT SAR 7705
A:ALU-1# file version ftp://timos:timos@xxx.xxx.xx.xx/./both.tim check
Validation successful
TiMOS-I-0.0.R1 for ALCATEL-LUCENT SAR 7705
B:Performance#
```

Boot Options

In This Chapter

This chapter provides information about configuring boot option parameters.

Topics in this chapter include:

- [System Initialization](#)
 - [Configuration and Image Loading](#)
 - [Automatic Discovery Protocol](#)
- [Initial System Startup Process Overview](#)
- [Configuration Notes](#)
 - [Reference Sources](#)
- [Configuring Boot File Options with CLI](#)
- [BOF Command Reference](#)

System Initialization

The primary copy of 7705 SAR OS software is located on a compact flash card. The removable media is shipped with each 7705 SAR router and contains a copy of the 7705 SAR OS image.



Note:

- The 7705 SAR uses a compact flash card (cf3) on the CSM to store configurations and executable images. These images can also be stored on an FTP file location.
- The compact flash card also contains the bootstrap and boot option files.
- In most cases you must have a console connection in order to talk to the node when there is no network connectivity to the node. Some commands can be given to the node through the ACO/LT button before there is network connectivity. See [Automatic Discovery Protocol](#). Also refer to the appropriate chassis installation guide, "Automatic Discovery Protocol".

Starting a 7705 SAR begins with hardware initialization (a reset or power cycle). By default, the system searches the compact flash (**cf3**) for the **boot.ldr** file (also known as the boot loader or bootstrap file). The **boot.ldr** file is the image that reads and executes the system initialization commands configured in the boot option file (BOF). The default value to initially search for the **boot.ldr** file on **cf3** cannot be modified.

The following is an example of console display output when the **boot.ldr** file cannot be located on **cf3**.

```
...
Alcatel-Lucent 7705 Boot ROM. Copyright 2010 Alcatel-Lucent.
All rights reserved. All use is subject to applicable license agreements.
Build: X-2.1.R1 on Tue Oct 5 16:25:56 EDT 2010 by csabuild
Version: 0x1D
Performing Data Bus Test... Passed.
Performing Local RAM Test (1st 2MB)... Passed.
COLD boot on processor #1
?Preparing for jump to RAM...
Starting bootrom RAM code...
Boot rom version is v29
CPU BIST check passed.
Testing SDRAM from 0x02200000 to 0x40000000
Testing Compact Flash ... Slot Empty
Board Serial Number is 'NS080940085'
Chassis Serial Number is 'NS000000064'
Searching for boot.ldr on local drives:
No disk in cf3
No disk in cf3
No disk in cf3
Error - file boot.ldr not found on any drive
Please insert CF containing boot.ldr. Rebooting in 5 seconds.

Rebooting...ÿ
```

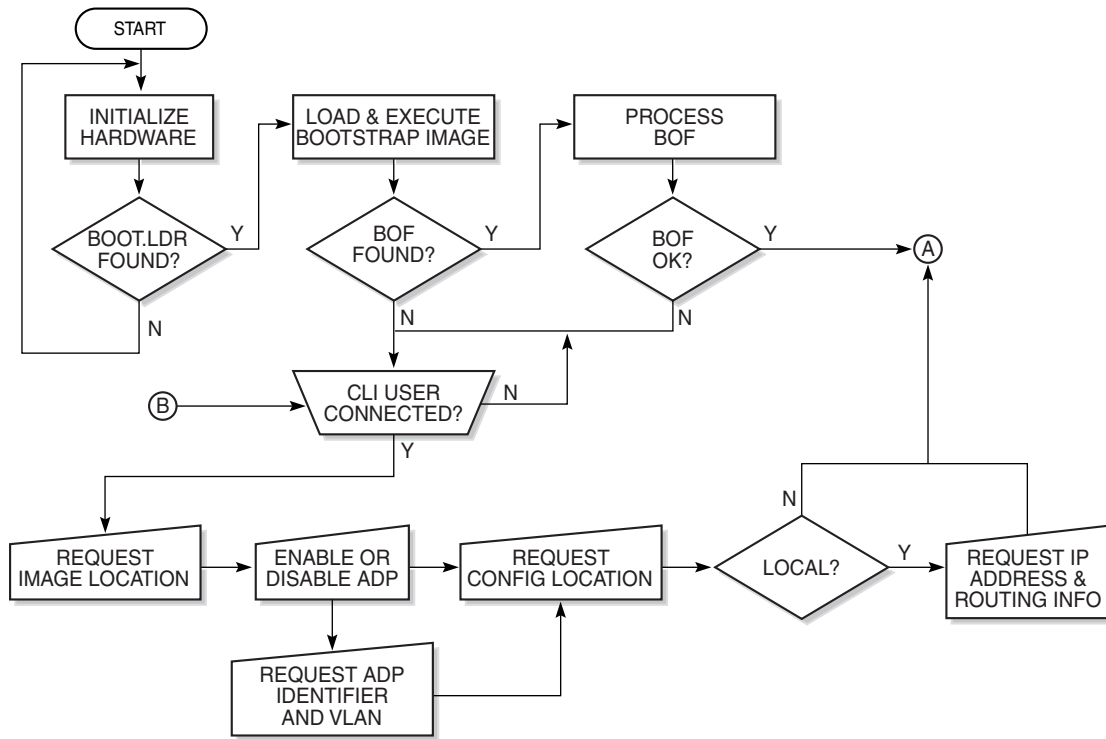
```
Alcatel-Lucent 7705 Boot ROM. Copyright 2000-2010 Alcatel-Lucent.
All rights reserved. All use is subject to applicable license agreements.
Build: X-2.1.R1 on Tue Oct 5 16:25:56 EDT 2010 by csabuild
Version: 0x1D
Performing Data Bus Test... Passed.
Performing Local RAM Test (1st 2MB)... Passed.
COLD boot on processor #1
?Preparing for jump to RAM...
Starting bootrom RAM code...
Boot rom version is v29
CPU BIST check passed.
Testing SDRAM from 0x02200000 to 0x40000000
Testing Compact Flash ... OK (SMART CF)
Board Serial Number is 'NS080940085'
Chassis Serial Number is 'NS000000064'
Searching for boot.ldr on local drives:
Searching cf3 for boot.ldr...
*****

Total Memory: 992MB Chassis Type: sar8 Card Type: corona_r1
TIMOS-L-2.1.R1 boot/hops ALCATEL-LUCENT SAR 7705
Copyright (c) 2000-2010 Alcatel-Lucent.
All rights reserved. All use subject to applicable license agreements.
Built on Tue Oct 5 16:35:12 EDT 2010 by csabuild in /rel2.0/b1/R1/panos/main
```

When the bootstrap image is loaded, the BOF is read to obtain the location of the image and configuration files. The BOF must be located on the same compact flash drive as the **boot.ldr** file.

[Figure 4](#) displays the system initialization sequence.

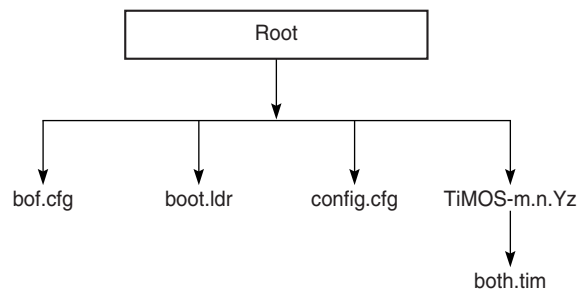
Figure 4: System Initialization - Part 1



21702

Figure 5 displays the compact flash directory structure and file names.

Figure 5: Files on the Compact Flash



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Files on the compact flash are:

- bof.cfg — boot option file
- boot.ldr — bootstrap image
- config.cfg — default configuration file
- TIMOS-m.n.Yz:
 - m — major release number
 - n — minor release number
 - Y: A — alpha release
 - B — beta release
 - M — maintenance release
 - R — released software
 - z — version number
- both.tim — CSM image file

Configuration and Image Loading

When the system executes the **boot.ldr** file, the initialization parameters from the BOF are processed. Three locations can be configured for the system to search for the files that contain the runtime image. The locations can be local or remote. The first location searched is the primary image location. If not found, the secondary image location is searched, and lastly, the tertiary image location is searched.

If the BOF cannot be found or loaded, then the system enters a console message dialog session prompting the user to enter alternate file locations and file names.

When the runtime image is successfully loaded, control is passed from the bootstrap loader to the image. Depending on the options in the BOF file, the runtime image loads the configuration in one of two ways.

If ADP is enabled, no configuration files are processed at startup. Instead, ADP discovers the node configuration from the network and the **primary-config** file is generated based on the configuration discovered by ADP. Any existing **primary-config** file is backed up, then overwritten.

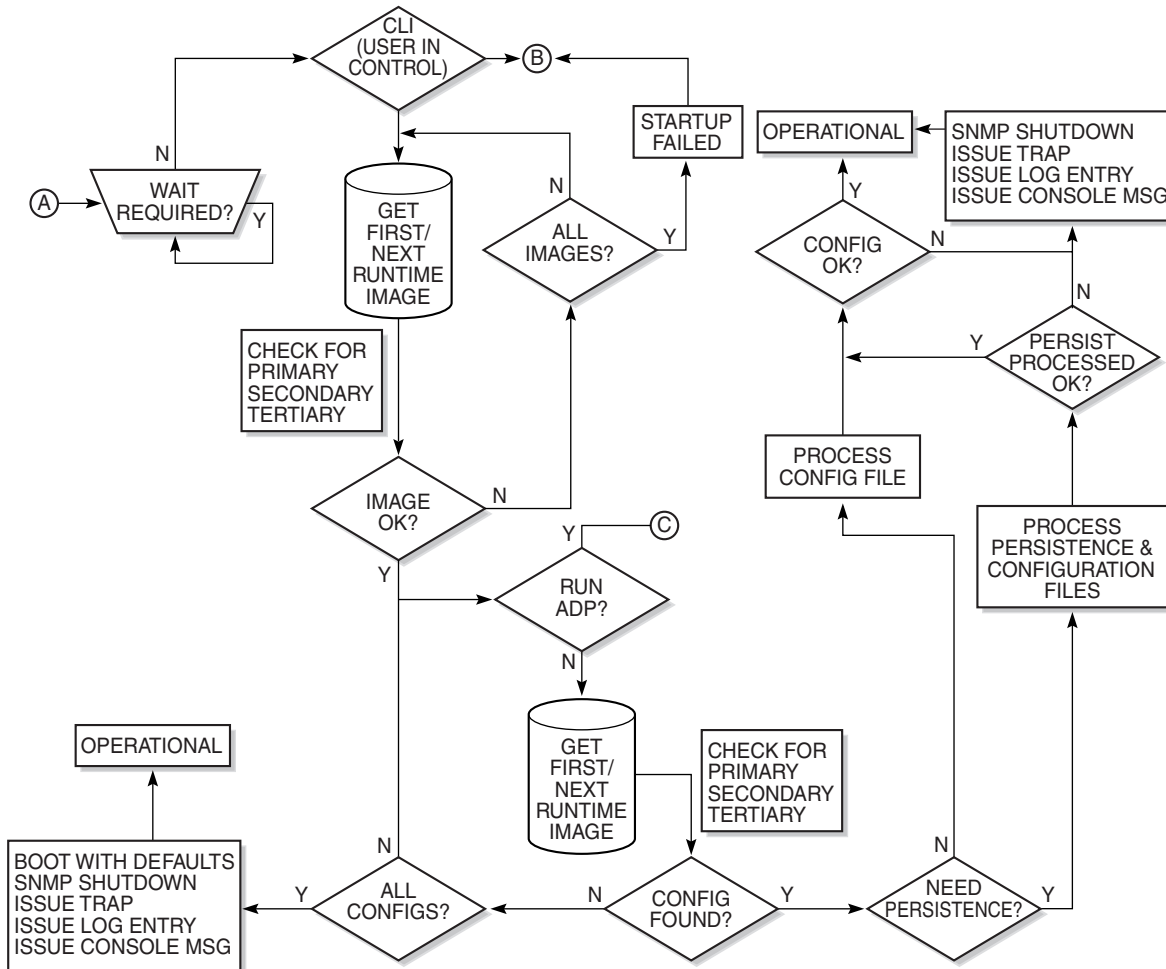
If ADP is not enabled, the runtime image attempts to locate the configuration file as configured in the BOF. Like the runtime image, three locations can be configured for the system to search for the configuration file. The locations can be local or remote. The first location searched is the primary configuration location. If not found, the secondary configuration location is searched, and lastly, the tertiary configuration location is searched.

System Initialization

The configuration file includes chassis, CSM, adapter card and port configurations, as well as system, routing, and service configurations.

Figure 6 displays the boot sequence.

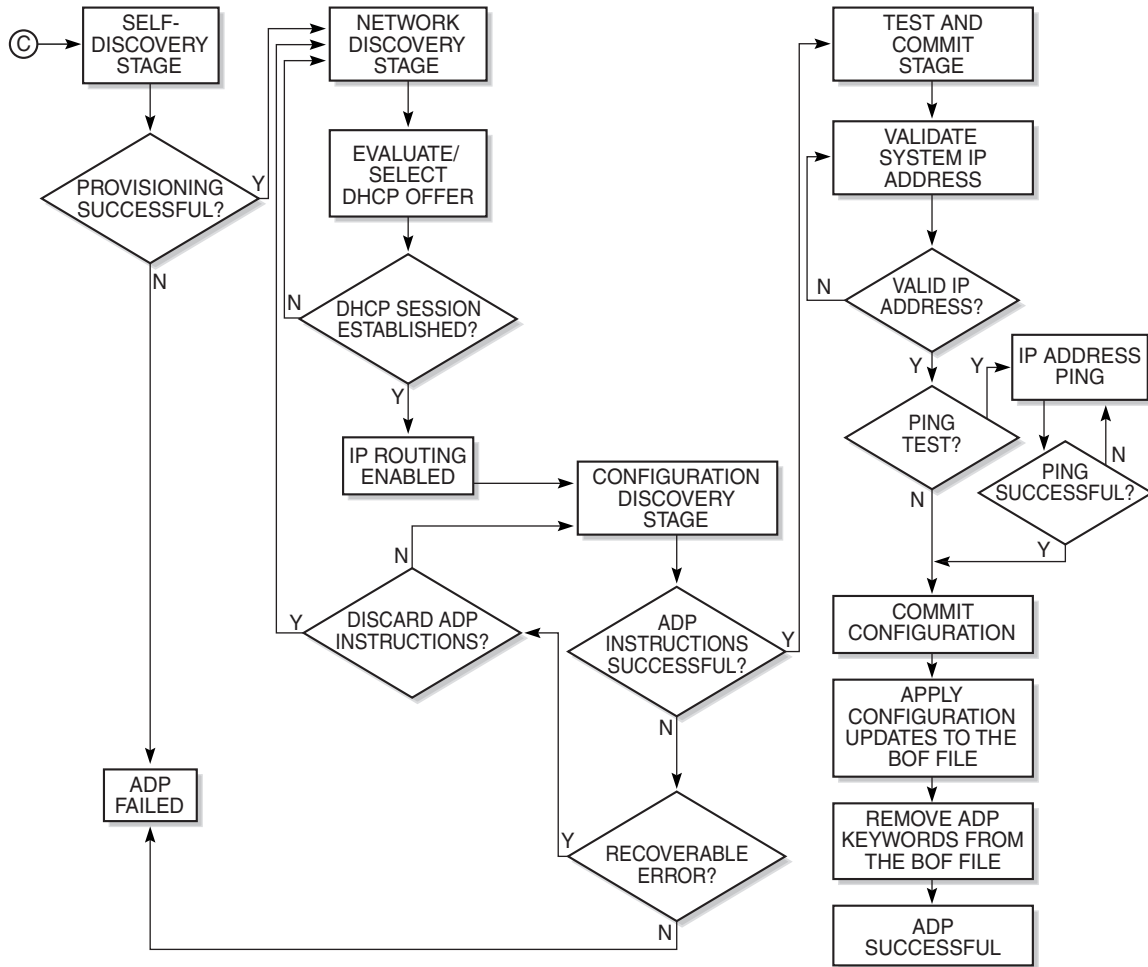
Figure 6: System Initialization - Part 2



21703

Figure 7 shows the boot sequence if Automatic Discovery Protocol (ADP) is run on the system.

Figure 7: System Initialization With ADP



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The following displays an example of BOF output.

```

A:ALU-1> show bof
=====
BOF (Memory)
=====
primary-image      ftp://*:*@xxx.xxx.xxx.xx/home/csahwreg17/images/both.tim
primary-config    ftp://*:*@ xxx.xxx.xxx.xx /home/csahwreg17/images/dut-a.cfg
address           xxx.xxx.xxx.xx /24 active
address           xxx.xxx.xxx.xx /24 standby
primary-dns       xxx.xxx.xxx.xx
dns-domain        labs.ca.alcatel-lucent.com
static-route      xxx.xxx.0.0/16 next-hop xxx.xxx.xxx.x
    
```

System Initialization

```
autonegotiate
duplex          full
speed          100
wait           3
persist        off
console-speed  115200
=====
A:ALU-1>
```

Persistence

The BOF `persist` parameter can specify whether the system should preserve system indexes when a `save` command is executed. During a subsequent boot, the index file is read along with the configuration file. As a result, a number of system indexes are preserved between reboots, including the interface index, LSP IDs, and path IDs. If persistence is not required and the configuration file is successfully processed, then the system becomes operational. If persistence is required, then a matching `x.ndx` file must be located and successfully processed before the system can become operational. Matching files (configuration and index files) must have the same filename prefix, such as `test123.cfg` and `test123.ndx`, and are created at the same time when a `save` command is executed. The persistence option must be enabled to deploy the Network Management System (NMS). The default is off.

Traps, logs, and console messages are generated if problems occur, and SNMP shuts down for all SNMP gets and sets; however, traps are issued.

Automatic Discovery Protocol

Automatic Discovery Protocol (ADP) is triggered by a factory-installed boot option and automates the initial commissioning of 7705 SAR nodes. When the 7705 SAR is started for the first time, an ADP keyword in the BOF causes automatic discovery to run as part of the TiMOS application image. Refer to the appropriate chassis installation guide, “Automatic Discovery Protocol”, for more information on ADP.

ADP supports both null and dot1q encapsulation on:

- all ports on the 8-port Ethernet Adapter card version 1 and version 2 on the 7705 SAR-8
- all ports on the 8-port Ethernet Adapter card version 2 on the 7705 SAR-18
- all ports on the 10-port 1GigE/1-port 10GigE X-Adapter card on the 7705 SAR-18
- all ports on the 8-port Gigabit Ethernet Adapter card, version 1 and version 2
- all Ethernet ports on the 7705 SAR-F and the 7705 SAR-M (all variants)

- all DSL or GPON ports on the 7705 SAR-M (variants with module slots), when a GPON, DCM, or xDSL module is installed in the chassis
- all Ethernet ports on the 7705 SAR-H

When run on the system, ADP goes through four basic stages:

- self-discovery
- network discovery
- configuration discovery
- test and commit

During the self-discovery stage, all supported adapter cards and CSMs are detected and automatically provisioned. The 7705 SAR then brings up all Ethernet ports. Depending on the physical connectivity of the port, some ports may fail to come up. If at least one port connected to the transport network becomes operationally up, ADP moves to the next stage.

During the network discovery stage, the 7705 SAR sends a DHCP DISCOVER message from all operational ports. [Table 16](#) describes the DHCP DISCOVER message options.

Table 16: DHCP DISCOVER Message Options

Option	Name	Description
chaddr	Client HW Address	The MAC address of the port
51	Lease Time	Always set to Infinite
60	Class Identifier	The class of 7705 SAR router: ALU-AD SAR-8 ALU-AD SAR-18 ALU-AD SAR-F ALU-AD SAR-M ALU-AD SAR-H
61	Client Identifier	Not sent by default, but can be configured to be the chassis MAC address or an operator-defined string
82	Relay Agent Information	Network uplink information, such as circuit ID and gateway address, added by the relay agent, if applicable

No client identifier is sent by default, but you can configure this option during boot-up, or with the `auto-discover` command, to be the chassis MAC address or a unique string. During boot-up, you can also configure the VLAN ID for ADP with 802.1q encapsulation.

System Initialization

During the configuration discovery stage, the DHCP server receives the DHCP DISCOVER message and replies with a DHCP OFFER message that contains an IP address assigned to the network interface. [Table 17](#) describes the options included in the DHCP OFFER. If any of the required options are not included, the packet may be dropped and not processed.

Table 17: DHCP OFFER Message Options

Option	Name	Description	Required
yiaddr	Client Ip-Address	The network interface IP address For network consistency, it is recommended that this IP address be a fixed IP address, not assigned randomly from a DHCP server IP pool	Yes
1	Subnet Mask	The network interface subnet mask	Yes
3	Router	The network interface default gateway Only the first router is used – all others are ignored	No
12	Host Name	The network interface host name	No
51	Lease Time	The least time, validated as infinite	Yes
54	Server Address	Identifies the DHCP server	No
67	Bootfile Name	Contains the ADP instructions or a URL to an ADP instructions file	No

Option 67 contains further configuration information in the form of keyword text files interpreted by ADP as instructions and executed during the Configuration and Test phases. For basic reachability, option 67 is not mandatory; however, it can be used to send the system IP address of a newly discovered node, making it possible to communicate with the 5620 SAM and complete ADP.

If a system IP address is made available with the DHCP OFFER and a template configuration file is also executed using the `load-cfg` keyword, then the system IP address specified in the template configuration file is used instead of the one in the DHCP OFFER.

[Table 18](#) describes the keywords used in ADP instructions. A DHCP offer message can contain a maximum of 15 instructions in either the Bootfile Name option, or in an external file referenced by the `include` keyword. If more than 15 instructions are included, ADP fails to complete and the system generates an error message in the ADP log.

Table 18: ADP Instructions

Keyword	Description	Format
sys-addr	Specifies the system interface IP address and the system base routing instance subnet	sys-addr 10.10.10.1/32
sys-name	Specifies the chassis name	sys-name SITE43_7705
sys-loc	Specifies the chassis location	sys-loc 600_MARCH_ROAD
load-cfg	Specifies the URL of a template configuration file to load into the router's runtime configuration	load-cfg ftp://.....@.../7705.cfg
test-ip	Specifies an IP address that must be successfully pinged before committing configuration and declaring ADP a success	test-ip 100.20.2.30
include	Specifies the URL of a file containing additional ADP instructions	include ftp://.....@.../7705.tmp
Any BOF keyword	Interpreted as instructions to update the specified field in the BOF	As per BOF

In order for ADP to be declared successful during the test and commit stage, the discovered configuration must contain an IP address. If the optional `test-ip` keyword is included in the ADP instructions, the node pings the IP address included in the DHCP OFFER message. If ADP is successful, the system stores the configuration and opens an SSH session to provide remote operators access to the router.

ADP can be controlled, without a connected PC or ASCII terminal, by the ACO/LT button on the Fan module. You can use the ACO/LT button to terminate or restart ADP, or reboot the chassis.

ADP runs in the background to allow continued CLI access for status queries and troubleshooting. Periodic progress updates are sent to the console and can be viewed through a connected PC. Additionally, dump commands are available to display information and detailed logs about ADP during and after running on the system. The logs are not retained over a chassis reboot.

System Initialization

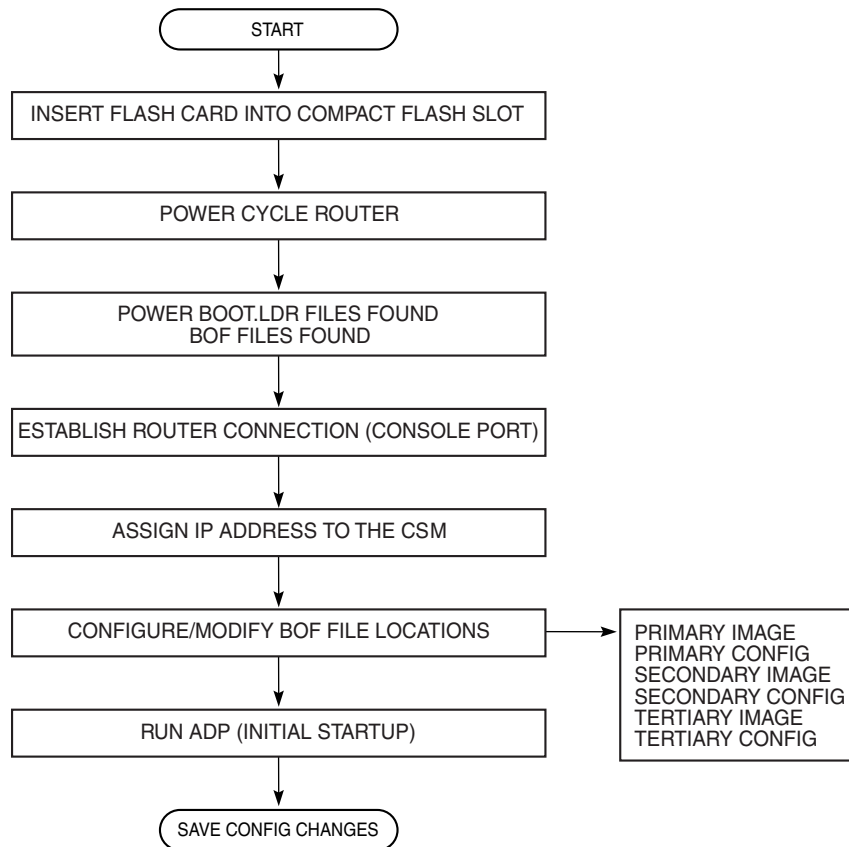
ADP runs only once on a router during initial startup if the automatic discovery is successful. The learned network interface configuration is retained in the local database. On subsequent reboots, the router uses its local database to reload its network configuration. After ADP successfully completes, or if it is manually terminated, the system sends a command to the BOF to remove the ADP keyword. You can terminate ADP at any time while it is running by using the CLI or the ACO/LT button.

Any temporary configuration done by ADP is not stored; however, network configuration and remote access remain enabled to allow the router to be manually provisioned remotely. ADP does not run again on future system reboots unless it is re-enabled via the CLI. If a standby CSM with ADP enabled is inserted into a running system that does not have the ADP keyword in its BOF file, the ADP keyword is automatically removed from the inactive card's BOF file during reconcile.

Initial System Startup Process Overview

Figure 8 displays the process to start the system. This example assumes that the boot loader and BOF image and configuration files are successfully located.

Figure 8: System Startup Flow



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Configuration Notes

The following describes BOF configuration caveats.

- For router initialization, the compact flash card must be installed in the compact flash slot.
- The loading sequence is based on the order in which it is placed in the configuration file (not based on service ID, for example) and it is loaded as it is read in at boot time.

Reference Sources

For information on supported IETF drafts and standards as well as standard and proprietary MIBs, refer to [Standards and Protocol Support](#).

Configuring Boot File Options with CLI

This section provides information to configure BOF parameters with CLI.

Topics in this section include:

- [BOF Configuration Overview](#)
- [Basic BOF Configuration](#)
- [Common Configuration Tasks](#)
 - [Searching for the BOF](#)
 - [Accessing the CLI](#)
- [Configuring BOF Parameters](#)
- [Service Management Tasks](#)
 - [System Administration Commands](#)

BOF Configuration Overview

Alcatel-Lucent 7705 SAR routers do not contain a boot EEPROM. The boot loader code is loaded from the **boot.ldr** file. The BOF file performs the following tasks:

1. Sets up the CSM Management port (speed, duplex, auto)
2. Assigns the IP address for the CSM Management port
3. Creates static routes for the CSM Management port
4. Sets the console port speed
5. Configures the Domain Name System (DNS) name and DNS servers
6. Configures the primary, secondary, tertiary configuration source
7. Configures the primary, secondary, and tertiary image source
8. Configures operational parameters



Note: The CSM Management port is referred to as the CPM Management port in the CLI to align with the CLI syntax used with other SR products.

Basic BOF Configuration

The parameters that specify the location of the image filename that the router will try to boot from and the configuration file are in the BOF.

The most basic BOF configuration should have the following:

- primary address
- primary image location
- primary configuration location

The following displays an example of a basic BOF configuration.

```
A:ALU-1# show bof
=====
BOF (Memory)
=====
primary-image      ftp://*:*@xxx.xxx.xxx.xx/home/csahwreg17/images/both.tim
primary-config     ftp://*:*@ xxx.xxx.xxx.xx /home/csahwreg17/images/dut-a.cfg
address            xxx.xxx.xxx.xx /24 active
address            xxx.xxx.xxx.xx /24 standby
primary-dns        xxx.xxx.xxx.xx
dns-domain         labs.ca.alcatel-lucent.com
static-route       xxx.xxx.0.0/16 next-hop xxx.xxx.xxx.x
autonegotiate
duplex             full
speed             100
wait              3
persist           off
console-speed     115200
=====
A:ALU-1#
```

Common Configuration Tasks

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

- [Searching for the BOF](#)
- [Accessing the CLI](#)
 - [Console Connection](#)
- [Configuring BOF Parameters](#)

For details about hardware installation and initial router connections, refer to the specific 7705 SAR hardware installation guide.

Searching for the BOF

The BOF should be on the same drive as the boot loader file. If the system cannot load or cannot find the BOF, the system checks whether the boot sequence was manually interrupted. The system prompts for a different image and configuration location.

The following example displays the output when the boot sequence is interrupted.

```
...

Hit a key within 3 seconds to change boot parms...
You must supply some required Boot Options. At any prompt, you can type:
  "restart" - restart the query mode.
  "reboot"  - reboot.
  "exit"    - boot with existing values.

Press ENTER to begin, or 'flash' to enter firmware update...

Software Location
-----
  You must enter the URL of the TiMOS software.
  The location can be on a Compact Flash device,
  or on the network.

  Here are some examples
    cf3:/timos2.0R1
    ftp://user:passwd@192.168.xx.xxx/./timos2.0R1
    tftp://192.168.xx.xxx/./timos2.0R1

The existing Image URL is 'ftp://*.*@192.168.xx.xxx/./rel/0.0/xx'
Press ENTER to keep it.
Software Image URL:
Using: 'ftp://*.*@192.168.xx.xxx/./rel/0.0/xx'
```

Configuration File Location

You must enter the location of configuration file to be used by TiMOS. The file can be on a Compact Flash device, or on the network.

Here are some examples

```
cf1:/config.cfg
ftp://user:passwd@192.168.xx.xxx/./config.cfg
tftp://192.168.xx.xxx/./config.cfg
```

The existing Config URL is 'cf3:/config.cfg'
 Press ENTER to keep it, or the word 'none' for no Config URL.
 Config File URL:
 Using: 'cf3:/config.cfg'

Network Configuration

You specified a network location for either the software or the configuration file. You need to assign an IP address for this system.

The IP address should be entered in standard dotted decimal form with a network length.
 example: 192.168.xx.xxx/24

Displays on Non-Redundant Models I

The existing IP address is 192.168.xx.xxx/20. Press ENTER to keep it.
 Enter IP Address:
 Using: 192.168.xx.xxx/20

Display on Redundant Models

The existing Active IP address is 192.168.xx.xxx/20. Press ENTER to keep it.
 Enter Active IP Address:
 Using: 192.168.xx.xxx/20

The existing Standby IP address is 192.168.xx.xxx/20. Press ENTER to keep it.
 Enter Standby IP Address (Type 0 if none desired):
 Using: 192.168.xx.xxx/20

Would you like to add a static route? (yes/no) y

Static Routes

You specified network locations which require static routes to reach. You will be asked to enter static routes until all the locations become reachable.

Static routes should be entered in the following format:
 prefix/mask next-hop ip-address
 example: 192.168.xx.xxx/16 next-hop 192.168.xx.xxx

Common Configuration Tasks

```
Enter route: 1.x.x.0/24 next-hop 192.168.xx.xxx
OK

Would you like to add another static route? (yes/no) n

New Settings
-----
primary-image      ftp://*.*@192.168.xx.xx/./rel/0.0/xx
primary-config    cf3:/config.cfg
address           192.168.xx.xx/20 active
primary-dns       192.168.xx.xx
dns-domain        xxx.xxx.com
static-route      1.x.x.0/24 next-hop 192.168.xx.xxx
autonegotiate
duplex            full
speed             100
wait              3
persist           off

Do you want to overwrite cf3:/bof.cfg with the new settings? (yes/no): y

Successfully saved the new settings in cf3:/bof.cfg
```

Accessing the CLI

To access the CLI to configure the software for the first time, follow these steps:

1. Ensure that the CSM is installed and power to the chassis is turned on. The 7705 SAR software then automatically begins the boot sequence.
2. When the boot loader and BOF image and configuration files are successfully located, establish a router connection (console session).

Console Connection

To establish a console connection, you will need the following:

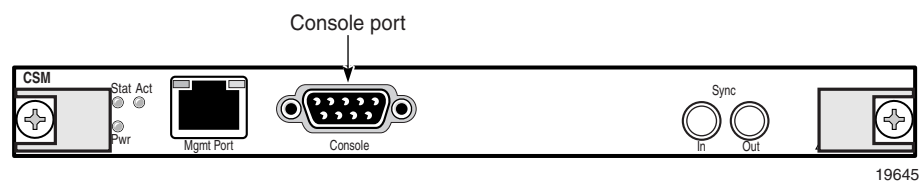
- an ASCII terminal or a PC running terminal emulation software set to the parameters shown in [Table 19](#)
- a standard serial cable with a male DB9 connector

Table 19: Console Configuration Parameter Values

Parameter	Value
Baud Rate	115 200
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

Figure 9 displays an example of the Console port on a 7705 SAR front panel.

Figure 9: 7705 SAR Console Port



To establish a console connection:

- Step 1.** Connect the terminal to the Console port on the front panel (Figure 9) using the serial cable.
- Step 2.** Power on the terminal.
- Step 3.** Establish the connection by pressing the <Enter> key a few times on your terminal keyboard.
- Step 4.** At the router prompt, enter the login and password.
The default login is `admin`.
The default password is `admin`.

Configuring BOF Parameters

Use the CLI syntax displayed below to configure BOF components:

```
CLI Syntax:  bof
                address ip-address/mask [active | standby]
                autonegotiate
                console-speed baud-rate
                dns-domain dns-name
                duplex {full | half}
                persist {on | off}
                primary-config file-url
                primary-dns ip-address
                primary-image file-url
                save [cflash-id]
                secondary-config file-url
                secondary-dns ip-address
                secondary-image file-url
                speed speed
                static-route ip-address/mask next-hop ip-address
                tertiary-config file-url
                tertiary-dns ip-address
                tertiary-image file-url
                wait seconds
```

The following example displays BOF command usage:

```
Example:     ALU-1# bof
                ALU-1>bof# address 10.10.10.103/20 active
                ALU-1>bof# dns-domain ca.alcatel.com
                ALU-1>bof# duplex full
                ALU-1>bof# persist on
                ALU-1>bof# wait 3
                ALU-1>bof# primary-image cf3:\TIMOS.5.0.R0
                ALU-1>bof# primary-config cf3:\test123.cfg
                ALU-1>bof# primary-dns 10.10.10.103
                ALU-1>bof# save cf3:
```

```
A:ALU-1# show bof
=====
BOF (Memory)
=====
primary-image      ftp://*:*@xxx.xxx.xxx.xx/home/csahwreg17/images/both.tim
primary-config    ftp://*:*@ xxx.xxx.xxx.xx /home/csahwreg17/images/dut-a.cfg
address            xxx.xxx.xxx.xx /24 active
address            xxx.xxx.xxx.xx /24 standby
primary-dns        xxx.xxx.xxx.xx
dns-domain          labs.ca.alcatel-lucent.com
static-route       xxx.xxx.0.0/16 next-hop xxx.xxx.xxx.x
```



```
autonegotiate
duplex          full
speed           100
wait            3
persist         off
console-speed   115200
```

```
=====
A:ALU-1#
```

Service Management Tasks

This section discusses the following service management tasks:

- [System Administration Commands](#)
 - [Viewing the Current Configuration](#)
 - [Modifying and Saving a Configuration](#)
 - [Deleting BOF Parameters](#)
 - [Saving a Configuration to a Different Filename](#)
 - [Rebooting](#)

System Administration Commands

Use the following administrative commands to perform management tasks.

CLI Syntax: ALU-1# admin
 display-config
 reboot [active | standby] [now]
 save [*file-url*] [detail] [index]

Viewing the Current Configuration

Use one of the following CLI commands to display the current configuration. The `detail` option displays all default values. The `index` option displays only the persistent indexes. The `info` command displays context-level information.

CLI Syntax: admin# display-config [detail | index]
 info detail

The following displays an example of a configuration file:

```
A:ALU-1# admin display-config
# TiMOS-B-0.0.R3 both/hops ALCATEL-LUCENT SAR 7705
# Copyright (c) 2000-2008 Alcatel-Lucent.
# All rights reserved. All use subject to applicable license agreements.
# Built on Wed Jan 16 01:05:13 EST 2008 by csabuild in /rel0.0/I297/panos/main

# Generated THU JAN 17 21:21:21 2008 UTC

exit all
configure
#-----
```

```

echo "System Configuration"
#-----
  system
    name "ALU-1"
exit
  login-control
    idle-timeout disable
    pre-login-message "CSAxxx - 7705" name
  exit
  time
    sntp
      server-address 128.120.118.37 preferred
      server-address 128.120.210.200
      no shutdown
    exit
    zone EST
  exit
  thresholds
    rmon
  exit
  exit
exit
#-----
echo "System Security Configuration"
#-----
  system
    security
      telnet-server
      ftp-server
      snmp
  exit
...exit all

# Finished THU JAN 17 21:57:11 2008 UTC
A:ALU-1#

```

Modifying and Saving a Configuration

If you modify a configuration file, the changes remain in effect only during the current power cycle unless a `save` command is executed. Changes are lost if the system is powered down or the router is rebooted without saving.

- Specify the file URL location to save the running configuration. If a destination is not specified, the files are saved to the location where the files were found for that boot sequence. The same configuration can be saved with different file names to the same location or to different locations.
- The `detail` option adds the default parameters to the saved configuration.
- The `index` option forces a save of the index file.

Service Management Tasks

Use either of the following CLI syntaxes to save a configuration:

CLI Syntax: `bof# save [cflash-id]`

Example:
ALU-1# bof
ALU-1>bof# save cf3:
ALU-1>bof#

or

CLI Syntax: `admin# save [file-url] [detail] [index]`

Example:
ALU-1# admin save cf3:\test123.cfg
Saving config.# Saved to cf3:\test123.cfg
... complete
ALU-1#



Note: If the `persist` option is enabled and the `admin save file-url` command is executed with an FTP path used as the `file-url` parameter, two FTP sessions simultaneously open to the FTP server. The FTP server must be configured to allow multiple sessions from the same login; otherwise, the configuration and index files will not be saved correctly.

Deleting BOF Parameters

You can delete specific BOF parameters. The `no` form of these commands removes the parameter from configuration. The changes remain in effect only during the current power cycle unless a `save` command is executed. Changes are lost if the system is powered down or the router is rebooted without saving.

Deleting a BOF address entry is not allowed from a Telnet session.

Use the following CLI syntax to remove BOF configuration parameters:

CLI Syntax: `bof# save [cflash-id]`

Example:
ALU-1# bof
ALU-1>bof# save cf3:
ALU-1>bof#

Example: `bof#`
`no address ip-address/mask [active | standby]`
`no autonegotiate`
`no console-speed`
`no dns-domain`

```

no primary-config
no primary-dns
no primary-image
no secondary-config
no secondary-dns
no secondary-image
no static-route ip-address/mask next-hop ip-address
no tertiary-config
no tertiary-dns
no tertiary-image

```

Saving a Configuration to a Different Filename

Save the current configuration with a unique filename to have additional backup copies and to edit parameters with a text editor. You can save your current configuration to an ASCII file.

Use either of the following CLI syntaxes to save a configuration to a different location:

CLI Syntax: `bof# save [cflash-id]`

Example:

```

ALU-1# bof
ALU-1>bof# save cf3:
ALU-1>bof#

```

or

CLI Syntax: `admin# save [file-url] [detail] [index]`

Example:

```

ALU-1>admin# save cf3:\testABC.cfg
Saving config.# Saved to cf3:\testABC.cfg
... complete
ALU-1#

```

Rebooting

When an `admin>reboot` command is issued, routers with redundant CSMs are rebooted. Changes are lost unless the configuration is saved. Use the `admin>save file-url` command to save the current configuration. If no command line options are specified, the user is prompted to confirm the reboot operation.

Use the following CLI syntax to reboot:

CLI Syntax: `admin# reboot [active | standby] [now]`

Service Management Tasks

Example: ALU-1>admin# reboot
A:DutA>admin# reboot

Are you sure you want to reboot (y/n)? y

Resetting...OK

Alcatel-Lucent 7705 Boot ROM. Copyright 2000-2008
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....

BOF Command Reference

Command Hierarchies

- [Configuration Commands](#)
- [Show Commands](#)

Configuration Commands

- bof**
- **[no] address** *ip-prefix/prefix-length* [**active** | **standby**]
- **[no] autonegotiate**
- **auto-discover** [**id** *client-identifier*] [**vlan** *vlan-id*]
- **[no] auto-discover**
- **console-speed** *baud-rate*
- **no console-speed**
- **dns-domain** *dns-name*
- **no dns-domain**
- **duplex** {**full** | **half**}
- **persist** {**on** | **off**}
- **primary-config** *file-url*
- **no primary-config**
- **primary-dns** *ip-address*
- **no primary-dns**
- **primary-image** *file-url*
- **no primary-image**
- **save** [*cflash-id*]
- **secondary-config** *file-url*
- **no secondary-config**
- **secondary-dns** *ip-address*
- **no secondary-dns**
- **secondary-image** *file-url*
- **no secondary-image**
- **speed** *speed*
- **[no] static-route** *ip-prefix/prefix-length* **next-hop** *ip-address*
- **tertiary-config** *file-url*
- **no tertiary-config**
- **tertiary-dns** *ip-address*
- **no tertiary-dns**
- **tertiary-image** *file-url*
- **no tertiary-image**
- **wait** *seconds*

Show Commands

- show**
- **bof** [*cflash-id* | **booted**]
- **boot-messages**

Command Descriptions

- [Configuration Commands](#)
- [Show Commands](#)

Configuration Commands

- [File Management Commands](#)
- [BOF Processing Control Commands](#)
- [Console Port Configuration Commands](#)
- [Image and Configuration Management Commands](#)
- [CSM Management Configuration Commands](#)
- [DNS Configuration Commands](#)

File Management Commands

bof

Syntax	bof
Context	<root>
Description	<p>This command creates or edits the boot option file (BOF) for the specified local storage device.</p> <p>A BOF file specifies where the system searches for runtime images, configuration files, and other operational parameters during system initialization.</p> <p>BOF parameters can be modified. Changes can be saved to a specified compact flash. The BOF must be located in the root directory of either an internal or external compact flash local to the system and have the mandatory filename of bof.cfg.</p> <p>When modifications are made to in-memory parameters that are currently in use or operating, the changes are effective immediately. For example, if the IP address of the CSM Management port is changed, the change takes place immediately.</p> <p>Only one entry of the BOF configuration command statement can be saved once the statement has been found to be syntactically correct.</p> <p>When opening an existing BOF that is not the BOF used in the most recent boot, a message is issued notifying the user that the parameters will not affect the operation of the node.</p> <p>The pound (#) sign is used at the beginning of the File syntax. Using the command <code>file type bof . cfg</code> displays the # character as a comment delimiter at the top of the raw file. No default boot option file exists. The router boots with the factory default boot sequence and options.</p>
Default	n/a

save

Syntax	save [cflash-id]
Context	bof
Description	<p>This command uses the boot option parameters currently in memory and writes them from the boot option file to the specified compact flash.</p> <p>The BOF must be located in the directory of the compact flash drives local to the system and have the mandatory filename of bof.cfg.</p> <p>The BOF is saved to the compact flash drive associated with the active CSM. The slot name is not case-sensitive. You can use uppercase or lowercase “A” or “B”.</p>

BOF Command Reference

Command usage:

- **bof save** — saves the BOF to the default drive (cf3:) associated with the active CSM (either in slot A or B)
- **bof save cf3:** — saves the BOF to cf3: associated with the active CSM (either in slot A or B)

To save the BOF to a compact flash drive associated with the standby CSM (for example, the redundant (standby) CSM is installed in slot B), specify the -A or -B option.

Command usage:

- **bof save cf3-A:** — saves the BOF to cf3: associated with the CSM in slot A whether it is active or standby
- **bof save cf3-B:** — saves the BOF to cf3: associated with the CSM in slot B whether it is active or standby

The slot name is not case-sensitive. You can use uppercase or lowercase “A” or “B”.

The **bof save** and **show bof** commands allow you to save to or read from the compact flash of the standby CSM. Use the **show card** command to determine the active and standby CSM (A or B).

Default saves must be explicitly executed; the BOF is saved to cf3: if a location is not specified

Parameters *flash-id* — the compact flash ID where the **bof.cfg** is to be saved

Values cf3:, cf3-A:, cf3-B:

Default cf3:

BOF Processing Control Commands

wait

Syntax	wait <i>seconds</i>
Context	bof
Description	<p>This command configures a pause, in seconds, at the start of the boot process, which allows system initialization to be interrupted at the console.</p> <p>When system initialization is interrupted, the operator is allowed to manually override the parameters defined in the boot option file (BOF).</p> <p>Only one wait command can be defined in the BOF.</p>
Default	3
Parameters	<i>seconds</i> — the time to pause at the start of the boot process, in seconds
	Values 1 to 10

Console Port Configuration Commands

console-speed

Syntax	console-speed <i>baud-rate</i> no console-speed
Context	bof
Description	<p>This command configures the console port baud rate.</p> <p>When this command is issued while editing the BOF file used for the most recent boot, both the BOF file and the active configuration are changed immediately.</p> <p>The no form of the command reverts to the default value.</p>
Default	115200 — console configured for 115 200 b/s operation
Parameters	<i>baud-rate</i> — the console port baud rate, expressed as a decimal integer
	Values 9600, 19200, 38400, 57600, 115200

Image and Configuration Management Commands

persist

Syntax	persist {on off}
Context	bof
Description	<p>This command specifies whether the system will preserve system indexes when a save command is executed. During a subsequent boot, the index file is read along with the configuration file. As a result, a number of system indexes are preserved between reboots, including the interface index, LSP IDs, and path IDs. This reduces resynchronizations of the Network Management System (NMS) with the affected network element.</p> <p>In the event that persist is on and the reboot with the appropriate index file fails, SNMP is operationally shut down to prevent the management system from accessing and possibly synchronizing with a partially booted or incomplete network element. To enable SNMP access, enter the config>system>snmp>no shutdown command.</p> <p>If persist is enabled and the admin save <url> command is executed with an FTP path used as the <url> parameter, two FTP sessions simultaneously open to the FTP server. The FTP server must be configured to allow multiple sessions from the same login; otherwise, the configuration and index files will not be saved correctly.</p>
	<p>Note:</p> <ul style="list-style-type: none"> • Persistency files (.pst) should not be saved on the same disk as the configuration files and the image files. • When an operator sets the location for the persistency file, the system checks to ensure that the disk has enough free space. If there is not enough free space, the persistency will not become active and a trap is generated. The operator must free up adequate disk space before persistency will become active. The system performs a space availability check every 30 seconds. As soon as the space is available the persistency becomes active on the next 30-second check.
Default	off
Parameters	<p>on — preserves the system index when saving the configuration</p> <p>off — disables the system index saves between reboots</p>

primary-config

Syntax	primary-config <i>file-url</i> no primary-config												
Context	bof												
Description	<p>This command specifies the name and location of the primary configuration file.</p> <p>The system attempts to use the configuration specified in primary-config. If the specified file cannot be located, the system automatically attempts to obtain the configuration from the location specified in secondary-config and then in tertiary-config.</p> <p>If an error in the configuration file is encountered, the boot process aborts.</p> <p>The no form of the command removes the primary-config configuration.</p>												
Default	n/a												
Parameters	<p><i>file-url</i> — the primary configuration file location, expressed as a file URL</p> <table border="0" style="margin-left: 2em;"> <tr> <td style="vertical-align: top;">Values</td> <td><i>file-url</i></td> <td>{<i>local-url</i> <i>remote-url</i>} (up to 180 characters)</td> </tr> <tr> <td></td> <td><i>local-url</i></td> <td>[<i>cflash-id</i>]/[<i>file-path</i>]</td> </tr> <tr> <td></td> <td><i>remote-url</i></td> <td>[{ftp:// tftp://} <i>login:pswd@remote-locn</i>]/[<i>file-path</i>]</td> </tr> <tr> <td></td> <td><i>cflash-id</i></td> <td>cf3:, cf3-A:, cf3-B:</td> </tr> </table>	Values	<i>file-url</i>	{ <i>local-url</i> <i>remote-url</i> } (up to 180 characters)		<i>local-url</i>	[<i>cflash-id</i>]/[<i>file-path</i>]		<i>remote-url</i>	[{ftp:// tftp://} <i>login:pswd@remote-locn</i>]/[<i>file-path</i>]		<i>cflash-id</i>	cf3:, cf3-A:, cf3-B:
Values	<i>file-url</i>	{ <i>local-url</i> <i>remote-url</i> } (up to 180 characters)											
	<i>local-url</i>	[<i>cflash-id</i>]/[<i>file-path</i>]											
	<i>remote-url</i>	[{ftp:// tftp://} <i>login:pswd@remote-locn</i>]/[<i>file-path</i>]											
	<i>cflash-id</i>	cf3:, cf3-A:, cf3-B:											

primary-image

Syntax	primary-image <i>file-url</i> no primary image
Context	bof
Description	<p>This command specifies the primary directory location for runtime image file loading.</p> <p>The system attempts to load all runtime image files configured in the primary-image first. If this fails, the system attempts to load the runtime images from the location configured in the secondary-image. If the secondary image load fails, the tertiary image specified in tertiary-image is used.</p> <p>The no form of the command removes the primary-image configuration.</p>
Default	n/a

Parameters	<i>file-url</i> — the <i>location-url</i> can either be local (this CSM) or a remote FTP server	
Values	<i>file-url</i>	{ <i>local-url</i> <i>remote-url</i> } (up to 180 characters)
	<i>local-url</i>	[<i>cflash-id</i>]/[<i>file-path</i>]
	<i>remote-url</i>	[{ftp:// tftp://} <i>login:pswd@remote-locn</i> /] [<i>file-path</i>]
	<i>cflash-id</i>	cf3:, cf3-A:, cf3-B:

secondary-config

Syntax	secondary-config <i>file-url</i> no secondary-config
Context	bof
Description	<p>This command specifies the name and location of the secondary configuration file.</p> <p>The system attempts to use the configuration as specified in secondary-config if the primary config cannot be located. If the secondary-config file cannot be located, the system attempts to obtain the configuration from the location specified in the tertiary-config.</p> <p>If an error in the configuration file is encountered, the boot process aborts.</p> <p>The no form of the command removes the secondary-config configuration.</p>
Default	n/a
Parameters	<i>file-url</i> — the secondary configuration file location, expressed as a file URL
Values	<i>file-url</i> { <i>local-url</i> <i>remote-url</i> } (up to 180 characters)
	<i>local-url</i> [<i>cflash-id</i>]/[<i>file-path</i>]
	<i>remote-url</i> [{ftp:// tftp://} <i>login:pswd@remote-locn</i> /] [<i>file-path</i>]
	<i>cflash-id</i> cf3:, cf3-A:, cf3-B:

secondary-image

Syntax	secondary-image <i>file-url</i> no secondary-image
Context	bof
Description	<p>This command specifies the secondary directory location for runtime image file loading.</p> <p>The system attempts to load all runtime image files configured in the primary-image first. If this fails, the system attempts to load the runtime images from the location configured in the secondary-image. If the secondary image load fails, the tertiary image specified in tertiary-image is used.</p>

BOF Command Reference

The **no** form of the command removes the **secondary-image** configuration.

Default	n/a
Parameters	<i>file-url</i> — the <i>file-url</i> can either be local (this CSM) or a remote FTP server
Values	<i>file-url</i> { <i>local-url</i> <i>remote-url</i> } (up to 180 characters)
	<i>local-url</i> [<i>cflash-id</i>]/[<i>file-path</i>]
	<i>remote-url</i> [{ftp:// tftp://} <i>login:pswd@remote-locn</i> /] [<i>file-path</i>]
	<i>cflash-id</i> cf3:, cf3-A:, cf3-B:

tertiary-config

Syntax	tertiary-config <i>file-url</i> no tertiary-config
Context	bof
Description	This command specifies the name and location of the tertiary configuration file. The system attempts to use the configuration specified in tertiary-config if both the primary and secondary config files cannot be located. If this file cannot be located, the system boots with the factory default configuration. If an error in the configuration file is encountered, the boot process aborts. The no form of the command removes the tertiary-config configuration.
Default	n/a
Parameters	<i>file-url</i> — the tertiary configuration file location, expressed as a file URL
Values	<i>local-url</i> [<i>cflash-id</i>]/[<i>file-path</i>] <i>cflash-id</i> cf3:, cf3-A:, cf3-B: <i>remote-url</i> [{ftp:// tftp://} <i>login:pswd@remote-locn</i> /] [<i>file-path</i>]

tertiary-image

Syntax	tertiary-image <i>file-url</i> no tertiary-image
Context	bof
Description	This command specifies the tertiary directory location for runtime image file loading.

The system attempts to load all runtime image files configured in the **primary-image** first. If this fails, the system attempts to load the runtime images from the location configured in the **secondary-image**. If the secondary image load fails, the tertiary image specified in **tertiary-image** is used.

All runtime image files (both.tim) must be located in the same directory.

The **no** form of the command removes the **tertiary-image** configuration.

Default n/a

Parameters *file-url* — the location-url can either be local (this CSM) or a remote FTP server

Values	<i>file-url</i>	{[<i>local-url</i> <i>remote-url</i>] (up to 180 characters)}
	<i>local-url</i>	[<i>cflash-id</i>]/[<i>file-path</i>]
	<i>remote-url</i>	[{ftp:// tftp://} <i>login:pswd@remote-locn</i>]/[<i>file-path</i>]
	<i>cflash-id</i>	cf3:, cf3-A:, cf3-B:

CSM Management Configuration Commands

address

Syntax	[no] address <i>ip-prefix/prefix-length</i> [active standby]		
Context	bof		
Description	<p>This command assigns an IP address to the CSM Management port in the running configuration and the Boot Option File (BOF) on the active CSM, or the CSM Management port on the standby CSM for systems using redundant CSMs. Deleting a BOF address entry is not allowed from a Telnet session.</p> <p>The BOF must have an IPv4 address if an IPv6 address is configured in the same BOF for use on the CSM Management port.</p> <p>The no form of the command deletes the IP address from the CSM Management port.</p>		
Default	no address — there are no IP addresses assigned to CSM Management ports		
Parameters	<i>ip-prefix/prefix-length</i> — the IP address for the CSM Management port		
	Values	<i>ipv4-prefix</i>	a.b.c.d (host bits must be 0)
		<i>ipv4-prefix-length</i>	0 to 32
	Values	<i>ipv6-prefix</i>	x:x:x:x:x:x:x (eight 16-bit pieces) x:x:x:x:x:d.d.d.d x: [0 to FFFF]H d: [0 to 255]D
		<i>ipv6-prefix-length</i>	0 to 128
	active standby — specifies which CSM Management port address is being configured: the active CSM Management port or the standby CSM Management port		
	Default	active	

autonegotiate

Syntax	[no] autonegotiate
Context	bof
Description	<p>This command enables speed and duplex autonegotiation on the CSM Management port in the running configuration and the Boot Option File (BOF).</p> <p>When autonegotiation is enabled, the link attempts to automatically negotiate the link speed and duplex parameters. If autonegotiation is enabled, then the configured duplex and speed parameters are ignored.</p>

The **no** form of the command disables the autonegotiate feature on this port.

Default autonegotiate

auto-discover

Syntax **[no] auto-discover** [*id client-identifier*] [**vlan** *vlan-id*]
[no] auto-discover

Context bof

Description This command enables ADP as part of the boot-up sequence by adding an ADP keyword to the BOF file. ADP will run the next time the chassis is rebooted. You can also use this command to specify an optional unique identifier to use in the automatic discovery broadcast. You can use any unique identifier of up to 16 characters. If you specify *mac*, the chassis MAC address is used. If you run ADP with 802.1q encapsulation, you can specify the VLAN ID.

Parameters *client-identifier* — indicates the unique system identifier to use in the auto-discovery broadcast. If you use *mac* as the client identifier, the chassis MAC address is used.

Values any combination of up to 16 alphanumeric characters with no spaces

vlan-id — indicates the VLAN ID for ADP with 802.1q encapsulation

Values 0 to 4094

duplex

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

Context bof

Description This command configures the duplex mode of the CSM Management port when autonegotiation is disabled in the running configuration and the Boot Option File (BOF).

This configuration command allows for the configuration of the duplex mode of the CSM Management port. If the port is configured to autonegotiate, this parameter will be ignored.

Default duplex full — full duplex operation

Parameters **full** — sets the link to full duplex mode
half — sets the link to half duplex mode

BOF Command Reference

speed

Syntax	speed <i>speed</i>
Context	bof
Description	<p>This command configures the speed for the CSM Management port when autonegotiation is disabled in the running configuration and the Boot Option File (BOF).</p> <p>If the port is configured to autonegotiate, this parameter is ignored.</p>
Default	speed 100 — 100 Mb/s operation
Parameters	<p>10 — sets the link to 10 Mb/s speed</p> <p>100 — sets the link to 100 Mb/s speed</p>

static-route

Syntax	[no] static-route <i>ip-prefix/prefix-length next-hop ip-address</i>						
Context	bof						
Description	<p>This command creates a static route entry for the CSM Management port in the running configuration and the Boot Option File (BOF).</p> <p>This command allows manual configuration of static routing table entries. These static routes are only used by traffic generated by the CSM Management port. To reduce configuration, manual address aggregation should be applied where possible.</p> <p>A static default route (0.0.0.0/0) cannot be configured on the CSM Management port. A maximum of 10 IPv4 and 10 IPv6 static routes can be configured on the CSM Management port.</p> <p>Each unique next hop of active static routes configured on both the active and standby CSM Management ports are tested every 60 seconds. If the next hop is unreachable, an alarm is raised. The alarm condition is cleared when the preferred static route becomes reachable.</p> <p>The no form of the command deletes the static route.</p>						
Default	n/a						
Parameters	<p><i>ip-prefix/prefix-length</i> — the destination address requiring the static route</p> <table><tr><td>Values</td><td><i>ipv4-prefix</i></td><td>a.b.c.d (host bits must be 0)</td></tr><tr><td></td><td><i>ipv4-prefix-length</i></td><td>0 to 32</td></tr></table>	Values	<i>ipv4-prefix</i>	a.b.c.d (host bits must be 0)		<i>ipv4-prefix-length</i>	0 to 32
Values	<i>ipv4-prefix</i>	a.b.c.d (host bits must be 0)					
	<i>ipv4-prefix-length</i>	0 to 32					

DNS Configuration Commands

dns-domain

Syntax	dns-domain <i>dns-name</i> no dns-domain
Context	bof
Description	This command configures the domain name used when performing DNS address resolution. This is a required parameter if DNS address resolution is required. Only a single domain name can be configured. If multiple domain statements are configured, the last one encountered is used. The no form of the command removes the domain name from the configuration.
Default	no dns-domain — no DNS domain name is configured
Parameters	<i>dns-name</i> — the DNS domain name

primary-dns

Syntax	primary-dns <i>ip-address</i> no primary-dns										
Context	bof										
Description	This command configures the primary DNS server used for DNS name resolution. DNS name resolution can be used when executing ping, traceroute, and service-ping, and also when defining file URLs. DNS name resolution is not supported when DNS names are embedded in configuration files. The no form of the command removes the primary DNS server from the configuration.										
Default	no primary-dns — no primary DNS server is configured										
Parameters	<i>ip-address</i> — the IP address of the primary DNS server										
Values	<table> <tr> <td><i>ipv4-address</i></td> <td>a.b.c.d (host bits must be 0)</td> </tr> <tr> <td><i>ipv6-address</i></td> <td>x:x:x:x:x:x:x (eight 16-bit pieces)</td> </tr> <tr> <td></td> <td>x:x:x:x:x:d.d.d.d</td> </tr> <tr> <td></td> <td>x: [0 to FFFF]H</td> </tr> <tr> <td></td> <td>d: [0 to 255]D</td> </tr> </table>	<i>ipv4-address</i>	a.b.c.d (host bits must be 0)	<i>ipv6-address</i>	x:x:x:x:x:x:x (eight 16-bit pieces)		x:x:x:x:x:d.d.d.d		x: [0 to FFFF]H		d: [0 to 255]D
<i>ipv4-address</i>	a.b.c.d (host bits must be 0)										
<i>ipv6-address</i>	x:x:x:x:x:x:x (eight 16-bit pieces)										
	x:x:x:x:x:d.d.d.d										
	x: [0 to FFFF]H										
	d: [0 to 255]D										

secondary-dns

Syntax	secondary-dns <i>ip-address</i> no secondary-dns															
Context	bof															
Description	<p>This command configures the secondary DNS server for DNS name resolution.</p> <p>The secondary DNS server is used only if the primary DNS server does not respond.</p> <p>DNS name resolution can be used when executing ping, traceroute, and service-ping, and also when defining file URLs. DNS name resolution is not supported when DNS names are embedded in configuration files.</p> <p>The no form of the command removes the secondary DNS server from the configuration.</p>															
Default	no secondary-dns — no secondary DNS server is configured															
Parameters	<p><i>ip-address</i> — the IP address of the secondary DNS server</p> <table> <tr> <td>Values</td> <td><i>ipv4-address</i></td> <td>a.b.c.d (host bits must be 0)</td> </tr> <tr> <td></td> <td><i>ipv6-address</i></td> <td>x:x:x:x:x:x:x:x (eight 16-bit pieces)</td> </tr> <tr> <td></td> <td></td> <td>x:x:x:x:x:d.d.d.d</td> </tr> <tr> <td></td> <td></td> <td>x: [0 to FFFF]H</td> </tr> <tr> <td></td> <td></td> <td>d: [0 to 255]D</td> </tr> </table>	Values	<i>ipv4-address</i>	a.b.c.d (host bits must be 0)		<i>ipv6-address</i>	x:x:x:x:x:x:x:x (eight 16-bit pieces)			x:x:x:x:x:d.d.d.d			x: [0 to FFFF]H			d: [0 to 255]D
Values	<i>ipv4-address</i>	a.b.c.d (host bits must be 0)														
	<i>ipv6-address</i>	x:x:x:x:x:x:x:x (eight 16-bit pieces)														
		x:x:x:x:x:d.d.d.d														
		x: [0 to FFFF]H														
		d: [0 to 255]D														

tertiary-dns

Syntax	tertiary-dns <i>ip-address</i> no tertiary-dns
Context	bof
Description	<p>This command configures the tertiary DNS server for DNS name resolution.</p> <p>The tertiary DNS server is used only if the primary DNS server and the secondary DNS server do not respond.</p> <p>DNS name resolution can be used when executing ping, traceroute, and service-ping, and also when defining file URLs. DNS name resolution is not supported when DNS names are embedded in configuration files.</p> <p>The no form of the command removes the tertiary DNS server from the configuration.</p>
Default	no tertiary-dns — no tertiary DNS server is configured

BOF Command Reference

Parameters	<i>ip-address</i> — the IP address of the tertiary DNS server
Values	<i>ipv4-address</i> a.b.c.d (host bits must be 0)
	<i>ipv6-address</i> x:x:x:x:x:x:x (eight 16-bit pieces)
	x:x:x:x:x:d.d.d.d
	x: [0 to FFFF]H
	d: [0 to 255]D

Show Commands

bof

Syntax	bof [<i>cflash-id</i> booted]
Context	show
Description	This command displays the Boot Option File (BOF) executed on the last system boot or on the specified device. If no device is specified, the BOF used in the last system boot displays. If the BOF has been modified since the system boot, a message displays.
Parameters	<i>cflash-id</i> — the cflash directory name. The slot name is not case-sensitive. Use uppercase or lowercase “A” or “B” for the slot name. Values cf3:, cf3-A:, cf3-B: booted — displays the boot option file used to boot the system
Output	The following output is an example of BOF information, and Table 20 describes the fields.

Sample Output

```
A:ALU-1# show bof cf3:
=====
BOF on cf3:
=====
primary-image      ftp://*:*@xxx.xxx.xxx.xx/home/csahwreg17/images/both.tim
primary-config     ftp://*:*@ xxx.xxx.xxx.xx /home/csahwreg17/images/dut-a.cfg
address            xxx.xxx.xxx.xx /24 active
address            xxx.xxx.xxx.xx /24 standby
primary-dns        xxx.xxx.xxx.xx
dns-domain         labs.ca.alcatel-lucent.com
static-route       xxx.xxx.0.0/16 next-hop xxx.xxx.xxx.x
autonegotiate
duplex             full
speed              100
wait               3
persist            off
console-speed      115200
=====
A:ALU-1#
```

BOF Command Reference

```
A:ALU-1# show bof booted
=====
System booted with BOF
=====
primary-image      ftp://*:*@xxx.xxx.xxx.xx/home/csahwreg17/images/both.tim
primary-config    ftp://*:*@ xxx.xxx.xxx.xx /home/csahwreg17/images/dut-a.cfg
address           xxx.xxx.xxx.xx /24 active
address           xxx.xxx.xxx.xx /24 standby
primary-dns       xxx.xxx.xxx.xx
dns-domain        labs.ca.alcatel-lucent.com
static-route      xxx.xxx.0.0/16 next-hop xxx.xxx.xxx.x
autonegotiate
duplex            full
speed            100
wait              3
persist           off
console-speed     115200
=====
A:ALU-1#
```

Table 20: Show BOF Output Fields

Label	Description
primary-image	The primary location of the directory that contains the runtime images of the CSM card
primary-config	The primary location of the file that contains the configuration
primary-dns	The primary DNS server for resolution of host names to IP addresses
secondary-image	The secondary location of the directory that contains the runtime images of the CSM card
secondary-config	The secondary location of the file that contains the configuration
secondary-dns	The secondary DNS server for resolution of host names to IP addresses
tertiary-image	The tertiary location of the directory that contains the runtime images of the CSM card
tertiary-config	The tertiary location of the file that contains the configuration
address	The IP address and mask associated with the CSM Management port or the secondary CSM Management port
tertiary-dns	The tertiary DNS server for resolution of host names to IP addresses
persist	on — persistent indexes between system reboots is enabled
	off — persistent indexes between system reboots is disabled
wait	The time configured for the boot to pause while waiting for console input

Table 20: Show BOF Output Fields (Continued)

Label	Description
autonegotiate	No autonegotiate — autonegotiate not enabled
	Autonegotiate — autonegotiate is enabled
duplex	half — specifies that the system uses half duplex
	full — specifies that the system uses full duplex
speed	The speed of the CSM Ethernet interface
console speed	The console port baud rate
dns domain	The domain name used when performing DNS address resolution

boot-messages

- Syntax** `boot-messages`
- Context** `show`
- Description** This command displays boot messages generated during the last system boot.
- Output** The following output is an example of boot messages.

Sample Output

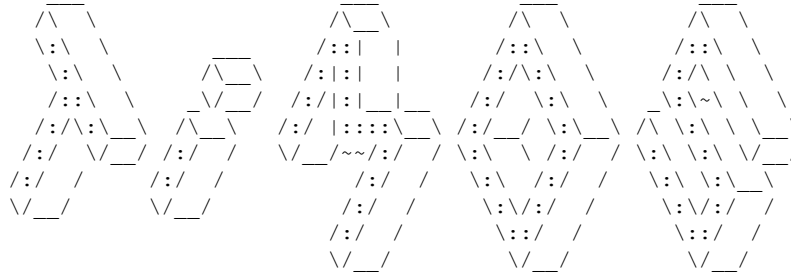
```
A:ALU-1# show boot-messages
=====
cf3:/bootlog.txt
=====
Boot log started on CPU#0
  Build: X-2.1.R1 on Tue Apr 1 16:25:56 EDT 2008 by csabuild

Total Memory: 992MB Chassis Type: sar8 Card Type: corona_r1
TiMOS-L-2.1.R1 boot/hops ALCATEL-LUCENT SAR 7705
Copyright (c) 2000-2008 Alcatel-Lucent.
All rights reserved. All use subject to applicable license agreements.
Built on Wed Apr 9 09:36:02 EDT 2008 by csabuild in /rel2.0/b1/R1/panos/main

TiMOS BOOT LOADER
Time from clock is FRI APR 11 13:31:16 2008 UTC
Switching serial output to sync mode...
Total Memory: 992MB Chassis Type: sar8 Card Type: corona_r1

TiMOS-B-2.1.R1 both/hops ALCATEL-LUCENT SAR 7705
Copyright (c) 2000-2008 Alcatel-Lucent.
All rights reserved. All use subject to applicable license agreements.
Built on Wed Apr 9 09:53:01 EDT 2008 by csabuild in /rel2.0/b1/R1/panos/main
```

BOF Command Reference



```
Time from clock is FRI APR 11 13:31:57 2008 UTC
Initial DNS resolving preference is ipv4-only
```

```
CRITICAL: CLI #1001 Cannot locate the configuration file -
Using default configuration values.
```

```
MAJOR: CLI #1008 The SNMP daemon is disabled. To enable SNMP, execute the comma
nd 'config>system>snmp no shutdown'.
TiMOS-B-2.1.R1 both/hops ALCATEL-LUCENT SAR 7705
Copyright (c) 2000-2008 Alcatel-Lucent.
All rights reserved. All use subject to applicable license agreements.
Built on Wed Apr 9 09:53:01 EDT 2008 by csabuild in /rel2.0/b1/R1/panos/main
```

```
Login:
```

```
=====
cf3:/bootlog_prev.txt
=====
```

```
Boot log started on CPU#0
```

```
Build: X-2.1.R1 on Tue Apr 1 16:25:56 EDT 2008 by csabuild
```

```
Total Memory: 992MB Chassis Type: sar8 Card Type: corona_r1
```

```
TiMOS-L-2.1.R1 boot/hops ALCATEL-LUCENT SAR 7705
```

```
Copyright (c) 2000-2008 Alcatel-Lucent.
```

```
All rights reserved. All use subject to applicable license agreements.
```

```
Built on Wed Apr 9 09:36:02 EDT 2008 by csabuild in /rel2.0/b1/R1/panos/main
```

```
TiMOS BOOT LOADER
```

```
Time from clock is FRI APR 11 13:30:38 2008 UTC
```

```
Switching serial output to sync mode...
```

```
reboot
```

System Management

In This Chapter

This chapter provides information about configuring basic system management parameters.

Topics in this chapter include:

- [System Management Parameters](#)
 - [System Information](#)
 - [System Time](#)
- [High Availability](#)
 - [High Availability Features](#)
- [Synchronization and Redundancy](#)
 - [Active and Standby Designations](#)
 - [When the Active CSM Goes Offline](#)
 - [Administrative Tasks](#)
 - [Automatic Synchronization](#)
 - [Manual Synchronization](#)
- [Node Timing](#)
 - [External Timing Mode](#)
 - [Line Timing Mode](#)
 - [Adaptive Clock Recovery \(ACR\)](#)
 - [Differential Clock Recovery \(DCR\)](#)
 - [Proprietary Clock Recovery \(PCR\)](#)
 - [IEEE 1588v2 PTP](#)
 - [Network Timing Reference \(NTR\)](#)
 - [Synchronous Ethernet](#)
 - [Synchronization Status Messaging with Quality Level Selection](#)
- [System Configuration Process Overview](#)
- [Configuration Notes](#)

In This Chapter

- [Reference Sources](#)
- [Configuring System Management with CLI](#)
- [System Command Reference](#)

System Management Parameters

System management commands allow you to configure basic system management functions such as the system name, the router's location and coordinates, and CLI code as well as time zones, Network Time Protocol (NTP), Simple Network Time Protocol (SNTP) properties, CRON, and synchronization properties.

System Information

System information components include:

- [System Name](#)
- [System Contact](#)
- [System Location](#)
- [System Coordinates](#)
- [Common Language Location Identifier](#)
- [PoE Power Source](#)

System Name

The system name is the MIB II (RFC 1907, *Management Information Base for Version 2 of the Simple Network Management Protocol (SNMPv2)*) sysName object. By convention, this text string is the node's fully qualified domain name. The system name can be any ASCII printable text string of up to 32 characters.

System Contact

The system contact is the MIB II sysContact object. By convention, this text string is a textual identification of the contact person for this managed node, together with information on how to contact this person. The system contact can be any ASCII printable text string of up to 80 characters.

System Location

The system location is the MIB II sysLocation object, which is a text string conventionally used to describe the node's physical location; for example, "Bldg MV-11, 1st Floor, Room 101". The system location can be any ASCII printable text string of up to 80 characters.

System Coordinates

The system coordinates is the Alcatel-Lucent Chassis MIB tmnxChassisCoordinates object. This text string indicates the Global Positioning System (GPS) coordinates of the location of the chassis.

Two-dimensional GPS positioning offers latitude and longitude information as a four-dimensional vector:

(direction, hours, minutes, seconds)

where:

direction is one of the four basic values: N, S, W, E

hours ranges from 0 to 180 (for latitude) and 0 to 90 (for longitude)

minutes and *seconds* range from 0 to 60

<W, 122, 56, 89> is an example of longitude and <N, 85, 66, 43> is an example of latitude.

System coordinates can be expressed in different notations, for example:

- N 45 58 23, W 34 56 12
- N37 37' 00 latitude, W122 22' 00 longitude
- N36 × 39.246' W121 × 40.121

The system coordinates can be any ASCII printable text string up to 80 characters.

Common Language Location Identifier

A Common Language Location Identifier (CLLI) code string for the device is an 11-character standardized geographic identifier that uniquely identifies the geographic location of places and certain functional categories of equipment unique to the telecommunications industry. The CLLI code is stored in the Alcatel-Lucent Chassis MIB tmnxChassisCLLICode object.

The CLLI code can be any ASCII printable text string of up to 11 characters.

PoE Power Source

The 7705 SAR-H supports Power over Ethernet (PoE) on all four 10/100/1000 copper Ethernet ports. To use PoE, the PoE power source must be configured at the system level as either internal or external. When the system is configured for the internal PoE power source option, standard PoE capability (15 W) can be enabled on ports 5 and 6 only. In addition, port 5 can be enabled for PoE+ (34 W) but in that case, port 6 cannot support any PoE capability. When the system is configured for the external PoE power source option, a mix of standard PoE (15 W) and PoE+ (34 W) is available on ports 5, 6, 7, and 8. Refer to the 7705 SAR-H Chassis Installation Guide, “Ethernet Ports”, for information about supported combinations of PoE and PoE+.

To enable PoE or PoE+ on a PoE-capable port, use the `config>port>ethernet>poe` command; refer to the 7705 SAR OS Interface Configuration Guide, “Card, Adapter Card, and Port Command Reference”, for more information.

The PoE-capable ports on the 7705 SAR-H act as a Power Source Equipment (PSE) device. They support IEEE 802.3at and IEEE 802.3af.

System Time

The 7705 SAR routers are equipped with a real-time system clock for time-keeping purposes. When set, the system clock always operates on Coordinated Universal Time (UTC), but the 7705 SAR OS software has options for local time translation as well as system clock synchronization.

System time parameters include:

- [Time Zones](#)
- [NTP](#)
- [SNTP Time Synchronization](#)
- [CRON](#)

Time Zones

Setting a time zone in the 7705 SAR OS allows for times to be displayed in the local time rather than in UTC. The 7705 SAR OS has both user-defined and system-defined time zones.

A user-defined time zone has a user-assigned name of up to four printable ASCII characters that is different from the system-defined time zones. For user-defined time zones, the offset from UTC is configured as well as any summer time adjustment for the time zone.

System Management Parameters

The 7705 SAR OS system-defined time zones are listed in [Table 21](#), which includes both time zones with and without summer time correction.

Table 21: System-defined Time Zones

Acronym	Time Zone Name	UTC Offset
Europe:		
GMT	Greenwich Mean Time	UTC
BST	British Summer Time	UTC +1
IST	Irish Summer Time	UTC +1*
WET	Western Europe Time	UTC
WEST	Western Europe Summer Time	UTC +1
CET	Central Europe Time	UTC +1
CEST	Central Europe Summer Time	UTC +2
EET	Eastern Europe Time	UTC +2
EEST	Eastern Europe Summer Time	UTC +3
MSK	Moscow Time	UTC +3
MSD	Moscow Summer Time	UTC +4
US and Canada:		
AST	Atlantic Standard Time	UTC -4
ADT	Atlantic Daylight Time	UTC -3
EST	Eastern Standard Time	UTC -5
EDT	Eastern Daylight Saving Time	UTC -4
ET	Eastern Time	Either as EST or EDT, depending on place and time of year
CST	Central Standard Time	UTC -6
CDT	Central Daylight Saving Time	UTC -5

Table 21: System-defined Time Zones (Continued)

Acronym	Time Zone Name	UTC Offset
CT	Central Time	Either as CST or CDT, depending on place and time of year
MST	Mountain Standard Time	UTC -7
MDT	Mountain Daylight Saving Time	UTC -6
MT	Mountain Time	Either as MST or MDT, depending on place and time of year
PST	Pacific Standard Time	UTC -8
PDT	Pacific Daylight Saving Time	UTC -7
PT	Pacific Time	Either as PST or PDT, depending on place and time of year
HST	Hawaiian Standard Time	UTC -10
AKST	Alaska Standard Time	UTC -9
AKDT	Alaska Standard Daylight Saving Time	UTC -8
Australia:		
AWST	Western Standard Time	UTC +8
ACST	Central Standard Time	UTC +9.5
AEST	Eastern Standard/Summer Time	UTC +10

NTP

NTP is the Network Time Protocol defined in RFC 1305, *Network Time Protocol (Version 3) Specification, Implementation and Analysis*. It allows for the participating network nodes to keep time more accurately and maintain time in a more synchronized fashion among all participating network nodes.

System Management Parameters

NTP uses stratum levels to define the number of hops from a reference clock. The reference clock is considered to be a stratum-0 device that is assumed to be accurate with little or no delay. Stratum-0 servers cannot be used in a network. However, they can be directly connected to devices that operate as stratum-1 servers. A stratum-1 server is an NTP server with a directly connected device that provides Coordinated Universal Time (UTC), such as a GPS or atomic clock. The 7705 SAR device cannot act as a stratum-1 server but can act as a stratum-2 device as a network connection to an NTP server is required.

The higher stratum levels are separated from the stratum-1 server over a network path, thus, a stratum-2 server receives its time over a network link from a stratum-1 server. A stratum-3 server receives its time over a network link from a stratum-2 server.

The following NTP elements are supported:

- authentication keys — both DES and MD5 authentication are supported as well as multiple keys, to provide increased security support in carrier and other networks
- broadcast or multicast modes — when operating in these modes, the node will receive or send using either a multicast (default 224.0.1.1) or a broadcast address. Multicast is supported on the CSM Management port.
- alert when NTP server is not available — when none of the configured servers are reachable on the node, the system reverts to manual timekeeping and issues a critical alarm. When a server becomes available, a trap is issued indicating that standard operation has resumed.
- NTP and SNTP — if both NTP and SNTP are enabled on the node, then SNTP transitions to an operationally down state. If NTP is removed from the configuration or shut down, then SNTP resumes an operationally up state.
- gradual clock adjustment — as several applications (such as Service Assurance Agent (SAA)) can use the clock, and if a major (128 ms or more) adjustment must be performed, the adjustment is performed by programmatically stepping the clock. If a minor (less than 128 ms) adjustment must be performed, then the adjustment is performed by either speeding up or slowing down the clock.
- in order to facilitate proper operation once the standby CSM takes over from the active CSM, it is required that the time on the secondary CSM be synchronized with the clock of the active CSM
- in order to avoid the generation of too many events and traps, the NTP module will rate limit the generation of events and traps to three per second. At that point, a single trap will be generated that indicates that event/trap squashing is taking place.

SNTP Time Synchronization

For synchronizing the system clock with outside time sources, the 7705 SAR OS includes a Simple Network Time Protocol (SNTP) client. As defined in RFC 2030, SNTP Version 4 is an adaptation of the Network Time Protocol (NTP). SNTP typically provides time accuracy within 100 ms of the time source. SNTP can only receive the time from NTP servers; it cannot be used to provide time services to other systems. SNTP is a compact, client-only version of NTP. SNTP does not authenticate traffic.

SNTP can be configured in both unicast client modes (point-to-point) and broadcast client modes (point-to-multipoint). SNTP should be used only at the extremities of the synchronization subnet. SNTP clients should operate only at the highest stratum (leaves) of the subnet and in configurations where no NTP or SNTP client is dependent on another SNTP client for synchronization. SNTP time servers should operate only at the root (stratum 1) of the subnet and then only in configurations where no other source of synchronization other than a reliable radio clock is available.

The 7705 SAR SNTP client can be configured for either broadcast or unicast client mode.

CRON

The CRON feature supports the Service Assurance Agent (SAA) functions. CRON functionality includes the ability to specify the commands that need to be run, when they will be scheduled, including one-time-only functionality (oneshot), interval and calendar functions, as well as where to store the output of the results. In addition, CRON can specify the relationship between input, output, and schedule. Scheduled reboots, peer turn ups, and service assurance agent tests can be scheduled with CRON, as well as OAM events, such as connectivity checks or troubleshooting runs.

CRON features are saved to the configuration file on both primary and backup control modules. If a control module switchover occurs, CRON events are restored when the new configuration is loaded. If a control module switchover occurs during the execution of a CRON script, the failover behavior will be determined by the contents of the script.

CRON features run serially with at least 255 separate schedules and scripts. Each instance can support a schedule where the event is executed any number of times.

The following CRON elements are supported:

- action — parameters for a script including the maximum amount of time to keep the results from a script run, the maximum amount of time a script may run, the maximum number of script runs to store, and the location to store the results.

System Management Parameters

- `schedule` — the `schedule` function configures the type of schedule to run, including one-time-only (`oneshot`), periodic, or calendar-based runs. All runs are determined by month, day of month or weekday, hour, minute, and interval (seconds).
 - `script` — the `script` command opens a new nodal context that contains information on a script
-

High Availability

This section discusses the high availability routing options and features available to service providers that help diminish vulnerability at the network or service provider edge and alleviate the effect of a lengthy outage on IP/MPLS networks.

High availability is an important feature in service provider routing and switching systems. High availability is gaining momentum due to the unprecedented growth of IP/MPLS services and applications in service provider networks driven by the demand from the enterprise and residential communities. Downtime can be very costly, and, in addition to lost revenue, customer information and business-critical communications can be lost. High availability is the combination of continuous uptime over long periods (Mean Time Between Failures (MTBF)) and the speed at which failover or recovery occurs (Mean Time To Repair (MTTR)).

The popularity of high availability routing is evident at the network or service provider edge where thousands of connections are hosted and rerouting options around a failed piece of equipment can often be limiting. Or, a single access link exists to a customer because of additional costs for redundant links. As service providers converge business-critical services such as real-time voice (VoIP), video, and VPN applications over their IP/MPLS networks, high availability becomes much more stringent compared to the requirements for best-effort data.

Network and service availability become critical aspects when offering advanced IP/MPLS services, which dictate that IP routers that are used to construct the foundations of these networks be resilient to component and software outages.

For high availability configuration information, refer to [Synchronization and Redundancy](#).

High Availability Features

As more and more critical commercial applications move onto the IP/MPLS networks, providing high availability services becomes increasingly important. This section describes high availability features for the 7705 SAR. Most of these features only apply to routers with two Control and Switching Modules (CSMs).

- [Redundancy](#)
 - [Software Redundancy](#)
 - [Configuration Redundancy](#)
 - [Component Redundancy](#)
 - [Accounting Configuration Redundancy](#)
- [Nonstop Routing \(NSR\)](#)
- [In-service Upgrade](#)
- [CSM Switchover](#)
- [Synchronization](#)
 - [Configuration and boot-env Synchronization](#)
 - [State Database Synchronization](#)

Redundancy

The redundancy features enable the duplication of data elements and software functionality to maintain service continuation in case of outages or component failure.

Software Redundancy

Software outages are challenging even when baseline hardware redundancy is in place. There should be a balance to provide high availability routing; otherwise, router problems typically propagate throughout the service provider network and externally to other connected networks possibly belonging to other service providers. This could affect customers on a broad scale. There are several software availability features that contribute to the percentage of time that a router is available to process and forward traffic.

Configuration Redundancy

Features configured on the active CSM are saved on the standby CSM as well. When the active CSM fails, these features are brought up on the standby CSM that takes over the mastership.

Even with modern modular and stable software, the failure of hardware or software can cause the router to reboot or cause other service impacting events. In the best circumstances, failure leads to the initialization of a redundant route processor, which hosts the standby software configuration to become the active processor.

The 7705 SAR supports hot standby. With hot standby, the router image, configuration, and network state are already loaded on the standby; it receives continual updates from the active route processor and the swap over is immediate. Newer-generation service routers like the 7705 SAR have extra processing built into the system so that router performance is not affected by frequent synchronization, which consumes system resources.

Component Redundancy

7705 SAR component redundancy is critical to reducing MTTR for the routing system. Component redundancy consists of the following features:

- dual Control and Switching modules — for a highly available architecture, redundant Control and Switching Modules (CSMs) are essential
- redundant power supply feed — a power feed can be removed without impact on traffic
- redundant fan — if one fan fails, the others will continue to operate and provide cooling to the system without impacting traffic
- hot swap — components in a live system can be replaced or become active without taking the system down or affecting traffic flow to or from other modules

Accounting Configuration Redundancy

When there is a switchover and the standby CSM becomes active, the accounting servers will be checked, and if they are administratively up and capable of coming online (media present and so on), then the standby will be brought online and new accounting files will be created at that point. Users must manually copy the accounting records from the failed CSM.

Nonstop Routing (NSR)

With NSR on the 7705 SAR, routing neighbors are unaware of a routing process fault. If a fault occurs, a reliable and deterministic activity switch to the inactive control complex occurs such that routing topology and reachability are not affected, even in the presence of routing updates. NSR achieves high availability through parallelization by maintaining up-to-date routing state information, at all times, on the standby route processor. This capability is achieved independently of protocols or protocol extensions, providing a more robust solution than graceful restart protocols between network routers.

The NSR implementation on the 7705 SAR applies to all supported routing protocols. NSR makes it possible to keep the existing sessions (such as LDP) during a CSM switchover, including support for MPLS signaling protocols. Peers will not see any change.

Traditionally, high availability issues have been patched through non-stop forwarding solutions. NSR overcomes these limitations by delivering an intelligent hitless failover solution.

The following NSR entities remain intact after a switchover:

- ATM/IMA VPs/VCs
- LDP
- PPP and MLPPP sessions

In-service Upgrade

In-service upgrades allow new routing engine software and microcode to be installed on the 7705 SAR while existing services continue to operate. Software upgrades can be performed only for certain maintenance releases (generally r4 loads and higher). Software upgrades also require NSR. If software or microcode on the CSM needs to be upgraded, CSM redundancy is required.



Note: The in-service upgrade requires the adapter cards to be reset. This will cause a short outage.

Follow the steps below to upgrade routing engine software on the 7705 SAR without affecting existing services:

1. Install new software on the standby CSM.
2. Reboot the standby CSM for the new software to take effect.

3. Perform a manual switchover on the active CSM by using the `force-switchover` command on the CLI. The standby CSM becomes the active CSM, placing the formerly active CSM into standby.
4. Repeat steps 1 and 2 to upgrade the standby CSM.

CSM Switchover

During a switchover, system control and routing protocol execution are transferred from the active to the standby CSM. A switchover may occur automatically or manually.

An automatic switchover may occur under the following conditions:

- a fault condition arises that causes the active CSM to crash or reboot
- the active CSM is declared down (not responding)
- online removal of the active CSM

Users can manually force the switchover from the active CSM to the standby CSM by using the `admin redundancy force-switchover now` CLI command or the `admin reboot active [now]` CLI command.

With the 7705 SAR, the `admin reboot active [now]` CLI command does not cause both CSMs to reboot.

Synchronization

Synchronization between the CSMs includes the following:

- [Configuration and boot-env Synchronization](#)
- [State Database Synchronization](#)

Configuration and boot-env Synchronization

Configuration and boot-env synchronization are supported in `admin>redundancy>synchronize` and `config>redundancy>synchronize` contexts.

State Database Synchronization

If a new standby CSM is inserted into the system, it synchronizes with the active CSM upon a successful boot process.

If the standby CSM is rebooted, it synchronizes with the active CSM upon a successful boot process.

When configuration or state changes occur, an incremental synchronization is conducted from the active CSM to the standby CSM.

If the synchronization fails, the standby CSM does not reboot automatically. The `show redundancy synchronization` command displays synchronization output information.

If the active and standby CSMs are not synchronized for some reason, users can manually synchronize the standby CSM by rebooting the standby by issuing the `admin reboot standby` command.

Synchronization and Redundancy

The 7705 SAR uses a 1:1 redundancy scheme. Redundancy methods facilitate system synchronization between the active and standby CSMs so that they maintain identical operational parameters to prevent inconsistencies in the event of a CSM failure.

When automatic system synchronization is enabled for an entity, any save or delete file operations configured on the primary, secondary, or tertiary choices on the active CSM file system are mirrored in the standby CSM file system.

Although software configurations and images can be copied or downloaded from remote locations, synchronization can only occur locally between compact flash drives (cf3-A: and cf3-B:).

Synchronization can occur:

- automatically — automatic synchronization is disabled by default. To enable automatic synchronization, the `config>redundancy>synchronization` command must be specified with either the `boot-env` parameter or the `config` parameter.

When the `boot-env` parameter is specified, the BOF, `boot.ldr`, `config`, and image files are automatically synchronized. When the `config` parameter is specified, only the `config` files are automatically synchronized.

Automatic synchronization also occurs whenever the BOF is modified with persistence on and when an `admin>save` command is entered with no filename specified.
- manually — to execute synchronization manually, the `admin>redundancy>synchronization` command must be entered with the `boot-env` parameter or the `config` parameter.

When the `boot-env` parameter is specified, the BOF, `boot.ldr`, `config`, and image files are synchronized. When the `config` parameter is specified, only the `config` files are synchronized.

The following shows the output displayed during a manual synchronization of configuration files.

```
ALU-1>admin>redundancy# synchronize config
Syncing configuration.....
Syncing configuration.....Completed.
ALU-1#
```

Active and Standby Designations

Typically, the first CSM installed in a 7705 SAR chassis assumes the role as active, regardless of being inserted in Slot A or B. The next CSM installed in the same chassis then assumes the role as the standby CSM. If two CSMs are inserted simultaneously (or almost simultaneously) and are booting at the same time, preference is given to the CSM installed in Slot A.

If only one CSM is installed in a 7705 SAR, then it becomes the active CSM regardless of the slot it is installed in.

To visually determine the active and standby designations, the MS/CTL LED on the faceplate is lit green (steady) to indicate the active designation. The MS/CTL LED on the second CSM faceplate is flashing green to indicate the standby designation.

The following output shows that the CSM installed in Slot A is acting as the active CSM and the CSM installed in Slot B is acting as the standby.

```
ALU-1# show card
=====
Card State
=====
Slot/  Provisioned   Equipped      Admin Operational  Num   Num  Comments
Id     Type          Type          State  State  Ports MDA
-----
1      iom-sar       iom-sar       up    up
A      csm-1g        csm-1g        up    up
B      csm-1g        csm-1g        up    up
=====
...
```

When the Active CSM Goes Offline

When an active CSM goes offline (due to reboot, removal, or failure), the standby CSM takes control without rebooting or initializing itself. It is assumed that the CSMs are synchronized; therefore, there is no delay in operability. When the CSM that went offline boots and then comes back online, it becomes the standby CSM.

Administrative Tasks

This section contains information to perform administrative tasks:

- [Saving Configurations](#)
- [Specifying Post-Boot Configuration Files](#)

Saving Configurations

Whenever configuration changes are made, the modified configuration must be saved so that it will not be lost when the system is rebooted.

Configuration files are saved by executing explicit command syntax that includes the file URL location to save the configuration file as well as options to save both default and non-default configuration parameters. Boot option file (BOF) parameters specify where the system should search for configuration and image files as well as other operational parameters during system initialization.

For more information about boot option files, refer to the chapter on [Boot Options](#) in this guide.

Specifying Post-Boot Configuration Files

Two post-boot configuration extension files are supported and are triggered when either a successful or failed boot configuration file is processed. The `boot-bad-exec` and `boot-good-exec` commands specify URLs for the CLI scripts to be run following the completion of the boot-up configuration. A URL must be specified or no action is taken.

For example, after a configuration file is successfully loaded, the specified URL can contain a nearly identical configuration file with certain commands enabled or disabled, or particular parameters specified and according to the script which loads that file.

Automatic Synchronization

Use the CLI syntax displayed below to configure synchronization components relating to active-to-standby CSM switchover. In redundant systems, synchronization ensures that the active and standby CSMs have identical operational parameters, including the active configuration, CSM, and IOM images in the event of a failure or reset of the active CSM.

Synchronization and Redundancy

The `force-switchover` command forces a switchover to the standby CSM card.

To enable automatic synchronization, either the `boot-env` parameter or the `config` parameter must be specified. The synchronization occurs when the `admin save` or `bof save` commands are executed.

When the `boot-env` parameter of the `synchronize` command is specified, the BOF, `boot.ldr`, `config`, and image files are automatically synchronized. When the `config` parameter is specified, only the configuration files are automatically synchronized.

Synchronization also occurs whenever the BOF is modified with persistence on and when an `admin>save` command is entered with no filename specified.

Boot-Env Option

The `boot-env` option enables a synchronization of all the files used in system initialization.

When configuring the system to perform this synchronization, the following occurs:

1. The BOF used during system initialization is copied to the same compact flash on the standby CSM (in redundant systems).
Note: The synchronization parameters on the standby CSM are preserved.
2. The primary, secondary, and tertiary images (provided they are locally stored on the active CSM) are copied to the same compact flash on the standby CSM.
3. The primary, secondary, and tertiary configuration files (provided they are locally stored on the active CSM) are copied to the same compact flash on the standby CSM.

Config Option

The `config` option synchronizes configuration files by copying the files specified in the active CSM BOF file to the same compact flash on the standby CSM.

Manual Synchronization

The `admin redundancy synchronize` command performs manual CSM synchronizations. The `boot-env` parameter synchronizes the BOF, image, and configuration files in redundant systems. The `config` parameter synchronizes only the configuration files in redundant systems.

Forcing a Switchover

The `force-switchover now` command forces an immediate switchover to the standby CSM card.

If the active and standby CSMs are not synchronized for some reason, users can manually synchronize the standby CSM by rebooting the standby by issuing the `admin reboot standby` command on the active CSM.

Node Timing

The 7705 SAR supports a centralized synchronization system with an SSU in each CSM. The SSU can be synchronized to a traceable primary reference clock through an external timing port, line interface, or timing-over-packet technology. The transmit clock of each T1/E1, DS3/E3, SONET/SDH port or synchronous Ethernet-capable port (referred to as a synchronous Ethernet port in this guide) can then be configured to use the node clock or alternatives.

The 7705 SAR supports three timing references — one external and two internal. The timing references can be configured as an ordered list of highest to lowest priority. The system uses an available valid timing reference with the highest priority. If a failure on the current timing reference occurs, the next highest timing reference takes over. The reference switching can be configured to operate in a revertive or non-revertive manner with the `sync-if-timing revert` command. Revertive switching always selects the highest-priority valid timing reference as the current source. If a reference with a higher priority becomes valid, the system automatically switches to that timing reference. Non-revertive switching means that the active timing reference remains selected while it is valid, even if a higher-priority timing reference becomes available. If the current timing reference becomes invalid, then a switch to the highest-priority available timing reference is initiated. If all the timing references fail or have not been configured, the SSU enters holdover mode of its Stratum 3 oscillator (if it was previously synchronized) or free-run mode.

The external timing reference input with a 2.048 MHz G.703 signal, 5 or 10 MHz sine wave, is available from the external timing input port on each CSM in the 7705 SAR-8 or directly on the 7705 SAR-F, the 7705 SAR-M (all variants), and the 7705 SAR-H. On the 7705 SAR-18, the external timing reference input with a 2.048 MHz G.703, T1 (100 Ω), or E1 (120 Ω), is supported by the BITS ports 1 and 2 located on the Alarm module.

The two internal timing references originate from timing extracted from interface ports. This timing can be recovered directly from physical layer framing on a T1/E1 port, from adaptive timing recovery for TDM pseudowires, or from a synchronous Ethernet port.

On the 7705 SAR-F, Ethernet SFP ports support synchronous Ethernet and can be used as a timing reference, or two T1/E1 ports can supply a timing reference. For T1/E1 ports, one reference must be from ports 1 to 8 and the other from ports 9 to 16.

On the 7705 SAR-M (all variants), all RJ-45 Ethernet ports and SFP ports support synchronous Ethernet and can supply a timing reference to be used as a source of node synchronization. On the 7705 SAR-M (variants with T1/E1 ports), two T1/E1 ports can also supply a timing reference. One reference must be from ports 1 to 8 and the other from ports 9 to 16.

All DSL modules support [Network Timing Reference \(NTR\)](#). NTR is enabled automatically with no user-configurable commands. The GPON port on the GPON module also supports physical layer clock recovery via the downstream synchronous GPON physical layer. Both NTR and GPON Physical layer timing can be used as a source of node synchronization.

On the 7705 SAR-H, all Ethernet RJ-45 ports and SFP ports support synchronous Ethernet and can supply a timing reference to be used as a source of node synchronization. A single T1/E1 port on the 4-port T1/E1 and RS-232 Combination module can supply a timing reference; it can be independently configured for loop-timing or node-timing.

On the 7705 SAR-8 and 7705 SAR-18, a timing reference can come from:

- a single DS3/E3 port on the 4-port DS3/E3 Adapter card
- a single SONET/SDH port on a 2-port OC3/STM1 Channelized Adapter card or 4-port OC3/STM1 Clear Channel Adapter card
- a single synchronous Ethernet port on an 8-port Ethernet Adapter card version 2, 8-port Gigabit Ethernet Adapter card (version 1 and version 2), or 10-port 1GigE/1-port 10GigE X-Adapter card (not supported on a 7705 SAR-8)
- a single T1/E1 port on the 16-port T1/E1 ASAP Adapter card (versions 1 and 2) or 32-port T1/E1 ASAP Adapter card (the 16-port T1/E1 ASAP Adapter card, version 1, is not supported on the 7705 SAR-18)
- a single port on the Packet Microwave Adapter card: on port 1 or 2, it could be a synchronous Ethernet or PCR-enabled port; on port 3 or 4, it could be a synchronous Ethernet (optical SFP only) or PCR-enabled port; on ports 5 through 8, it could be a synchronous Ethernet (optical SFP only) port

Each T1/E1 port can be independently configured for loop-timing (recovered from an Rx line) or node-timing (recovered from the SSU in the active CSM). In addition, T1/E1 CES circuits on the following can be independently configured for adaptive timing (clocking is derived from incoming TDM pseudowire packets):

- 16-port T1/E1 ASAP Adapter card
- 32-port T1/E1 ASAP Adapter card
- 7705 SAR-F
- 7705 SAR-M (variants with T1/E1 ports)
- T1/E1 ports on the 4-port T1/E1 and RS-232 Combination module

The 7705 SAR-M (variants with T1/E1 ports) can also be configured for differential timing (recovered from RTP in TDM pseudowire packets). Adaptive timing and differential timing are not supported on DS1 or E1 channels that have CAS signaling enabled.

Node Timing

Each SONET/SDH port and each T1/E1 CES circuit on a 2-port OC3/STM1 Channelized Adapter card can be independently configured to be loop-timed or node-timed; each DS3 circuit can be independently configured to be loop-timed or free-run. A loop-timed SONET/SDH port can be configured to be a timing source for the node.

Each SONET/SDH port on a 4-port OC3/STM1 Clear Channel Adapter card can be independently configured to be loop-timed or node-timed; a loop-timed SONET/SDH port can be configured to be a timing source for the node.

On the 4-port DS3/E3 Adapter card, each DS3/E3 port can be independently configured to be loop-timed or node-timed, and each DS1 channel within a DS3 port can be independently configured to be loop-timed or node-timed. A loop-timed DS3/E3 port can be configured to be a timing source for the node.

External Timing Mode

The external input and output timing ports are located on the CSM on the 7705 SAR-8 and directly on the 7705 SAR-F, the 7705 SAR-M (all variants), and the 7705 SAR-H. The external input timing port allows the SSU to be synchronized to an external timing reference. The external output timing port provides a synchronization output signal from the 7705 SAR to an external device. These external timing references typically would come from a GPS, BITS (Building Integrated Timing System), or the external output timing ports from other telecom equipment.

The timing ports can be configured for the following:

- 2.048 MHz G.703 section 13 signal
- 5 MHz sine wave
- 10 MHz sine wave

On the 7705 SAR-18, the BITS ports 1 and 2 can be configured for the following:

- 2.048 MHz G.703 section 13 signal
- T1 (ESF or SF)
- E1 (PCM30CRC or PCM31CRC)

When redundant CSMs are used on the 7705 SAR-8, the external synchronization inputs in each CSM must come from the same synchronization source; that is, you cannot select each input of the two CSMs as two of the three timing references. A Y-cable can be used to connect to a single reference connector. The synchronization output on each CSM is clocked by its own SSU clock.

On the 7705 SAR-18, either BITS port 1 or port 2 is available as an input and output source. When both inputs are connected and available, then the quality level (QL) from Synchronization Status Messaging (SSM) is used to determine which port is used by the CSMs as the BITS input. If SSM is not available, then BITS port 1 is the preferred input. BITS port 2 is used if BITS port 1 is not available. In this case, the operation is non-revertive. The BITS output port 1 and port 2 are clocked by the active CSM's SSU clock.

Line Timing Mode

Line timing from a synchronous port, such as a T1/E1 port or synchronous Ethernet port, provides the best synchronization performance through a synchronization distribution network. Line timing mode derives an 8 kHz clock from the framing of T1/E1, DS3/E3, and SONET/SDH signaling that can be used as an accurate reference between nodes in a network. Line timing mode is immune to any packet delay variation (PDV) occurring on Layer 2 or Layer 3 links.

On the 7705 SAR-F, line timing is supported on the T1/E1 ports and on Ethernet SFP ports.

On the 7705 SAR-M (variants with T1/E1 ports), line timing is supported on T1/E1 ports. Line timing is also supported on all RJ-45 Ethernet ports and SFP ports on the 7705 SAR-M (all variants).

In addition, line timing is supported on the following modules when they are installed in 7705 SAR-M chassis variants with module slots:

- GPON module
- 8-port xDSL module (NTR over ADSL2, ADSL2+, or VDSL2)
- 6-port DSL Combination module (two references are available: NTR over SHDSL and NTR over ADSL2, ADSL2+, or VDSL2)

On the 7705 SAR-H, line timing is supported on all Ethernet ports. Line timing is also supported on the T1/E1 ports of the T1/E1 ASAP and RS-232 Combination module when it is installed in the 7705 SAR-H.

On the 7705 SAR-8 and 7705 SAR-18, line timing is supported on the following adapter cards:

- 16-port T1/E1 ASAP Adapter card (versions 1 and 2 – version 1 is not supported on the 7705 SAR-18)
- 32-port T1/E1 ASAP Adapter card
- 8-port Ethernet Adapter card (version 2)
- 8-port Gigabit Ethernet Adapter card (version 1 and version 2)

- 10-port 1GigE/1-port 10GigE X-Adapter card (not supported on the 7705 SAR-8)
- 4-port DS3/E3 Adapter card
- 2-port OC3/STM1 Channelized Adapter card
- 4-port OC3/STM1 Clear Channel Adapter card
- Packet Microwave Adapter card

Adaptive Clock Recovery (ACR)

Adaptive Clock Recovery (ACR) is a timing-over-packet technology that transports timing information via periodic packet delivery over a pseudowire. ACR may be used when there is no other Stratum 1 traceable clock available.

ACR is supported on T1/E1 CES circuits on the following:

- 7705 SAR-F
- 7705 SAR-M (variants with T1/E1 ports)
- T1/E1 ports of the T1/E1 ASAP and RS-232 Combination module

On the 7705 SAR-8 and 7705 SAR-18, ACR is supported on the 16-port T1/E1 ASAP Adapter card (versions 1 and 2) and the 32-port T1/E1 ASAP Adapter card. (The 16-port T1/E1 ASAP Adapter card, version 1, is not supported on the 7705 SAR-18.) ACR is not supported on DS1 or E1 channels that have CAS signaling enabled.

There is no extra equipment cost to implement ACR in a network because this technique utilizes the packet arrival rate of a TDM pseudowire within the 7705 SAR to regenerate a clock signal. Additionally, the nodes in the network that are traversed between endpoints do not need special ACR capabilities. However, because the TDM pseudowire is transported over Layer 2 links, the packet flow is susceptible to PDV.

To achieve the best ACR performance, follow these recommendations:

- use a packet rate between 1000 pps and 4000 pps. Lower packet rates cause ACR to be more susceptible to PDV in the network.
- limit the number of nodes traversed between the source-end and the ACR-end of the TDM pseudowire
- enable QoS in the network with the TDM pseudowire enabled for ACR classified as NC (network control)
- maintain a constant temperature, as much as possible, because temperature variations will affect the natural frequency on the internal oscillators in the 7705 SAR
- ensure that the network does not contain a timing loop when it is designed

ACR States

There are five potential ACR states:

- normal
- phase tracking
- frequency tracking
- holdover
- free-run

When a port's ACR state is normal, phase tracking, or frequency tracking, the recovered ACR clock is considered to be a qualified reference source for the SSU. If this reference source is being used, then transitions between any of these three states will not affect SSU operation.

When a port's ACR state is free-run or holdover, the recovered ACR clock is disqualified as a reference source for the SSU. If this reference source is being used, then transitions to either of these two states cause the SSU to drop the reference and switch to the next highest prioritized reference source. This can potentially be SSU holdover.

ACR Statistics

The system collects statistics on all ACR-capable ports. ACR statistics detail how the digital phase locked loop (DPLL) is functioning in one or more ACR instances in the adapter card. ACR statistics assist with isolating a problem during degraded synchronization performance or with anticipating future issues.

Within the DPLL, there are two values that contribute to ACR statistics:

- DCO frequency
- input phase error of each 2-second update interval

The DCO is the digitally controlled oscillator that produces the regenerated clock signal. The input phase error is the correction signal that provides feedback to the DPLL in order to tune the DCO output. The input phase error should approach zero as the DPLL locks in to the source timing information and stabilizes the output.

The continuous 2-second updates to the output DCO frequency are directly applied as the clock output of the ACR instance. ACR statistics allow you to view the mean frequency and the standard deviation of the output DCO frequency.

During every 2-second update interval, the input phase error and the output DCO frequency are recorded. The input phase error mean, input phase error standard deviation, output DCO mean (Hz and ppb), and output DCO standard deviation are calculated every 60 seconds.

Entering a `show CLI` command on a port with ACR displays the mean and standard deviation values for the previous 60-second interval. A `show detail` command on the same port displays the previous 15 sets of 60-second intervals and a list of state and event counts. An SNMP MIB is also available with these statistics.

Differential Clock Recovery (DCR)

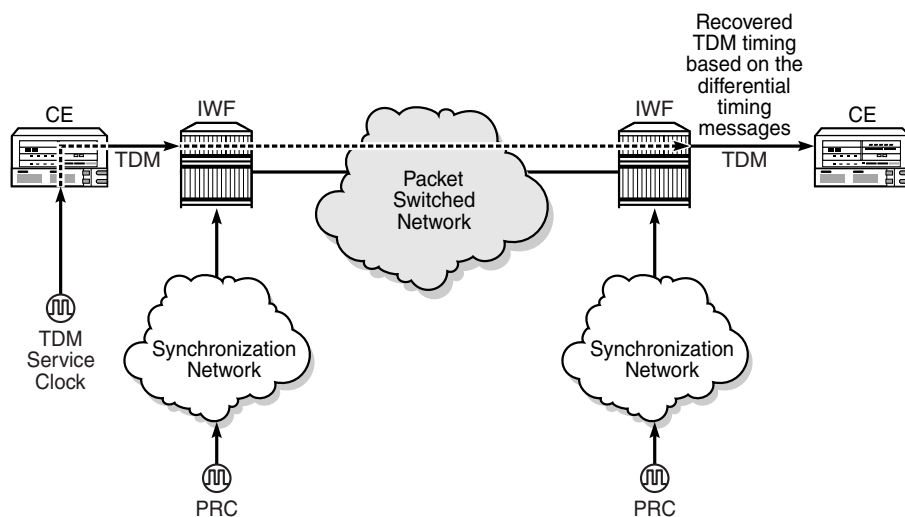
Differential Clock Recovery (DCR) is an alternative method to ACR to maintain the service clock across the packet network for a circuit emulated service. DCR is supported on the 7705 SAR-M (variants with T1/E1 ports) and on the T1/E1 ports of the 4-port T1/E1 and RS-232 Combination module. DCR is not supported on DS1 or E1 channels that have CAS signaling enabled.

DCR uses channel group 1 for timing recovery. If a DS1 or E1 port is channelized, all TDM PWs that share the port use the timing recovered from channel group 1.

To enable DCR, the network must have a common clock between the routers performing the TDM-to-packet interworking function. The common clock can come from two PRC-traceable clocks or one clock that is made available to both ends, such as the transmitted clock of a SONET/SDH or synchronous Ethernet port.

In each direction, the service clock is compared to the common clock and the difference is encoded into the RTP header in the TDM PW overhead. At the other end of the network, the original service clock is reproduced by comparing the common clock to the frequency difference in the RTP header. [Figure 10](#) shows an example of a network using DCR.

Figure 10: Differential Clock Recovery on a Network



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RTP headers are disabled by default and must be enabled for all circuit emulation services that require DCR. RTP must be enabled for the TDM PW that uses channel group 1. All channel groups on the same DS1 or E1 channel must be configured for the same mode of operation.

To achieve the best DCR performance, it is recommended that you use a Layer 1 network synchronization method to ensure the common clock has the best stability. If a timing-over-packet technique is used to transfer the common clock, then the number and type of nodes, the traffic profile, and the temperature variations will affect DCR's synchronization performance. As well, a packet rate of at least 200 pps is recommended (up to 4000 pps is supported). Packet rates lower than 200 pps may affect system performance.

DCR Frequencies

Each DS1/E1 circuit configured with DCR executes its own clock recovery from the packet stream. This allows every DS1/E1 circuit to have an independent frequency.

DCR-timed circuits support the following timestamp frequencies:

- 103.68 MHz
- 77.76 MHz
- 25 MHz
- 19.44 MHz

Each port supports only one frequency that is common to all DCR-timed ports on the 7705 SAR-M or 4-port T1/E1 and RS-232 Combination module. The common clock on both sides of the network must be running at the same frequency. If both ends of the network are 7705 SAR-M nodes or 4-port T1/E1 and RS-232 Combination modules, then all frequencies are supported, provided you use the same frequency on both ends. However, if the remote end is not a 7705 SAR-M or 4-port T1/E1 and RS-232 Combination module, it may not support all possible frequencies. In this case, you must choose a common frequency supported by both ends.

DCR complies with published jitter and wander specifications (G.823, G.824, and G.8261) for traffic interfaces under typical network conditions and for synchronous interfaces under specified packet network delay, loss, and delay variance (jitter) conditions.

Proprietary Clock Recovery (PCR)

PCR is a copper synchronous Ethernet-based, timing-over-packet technology. It is supported on the Packet Microwave Adapter card on the two copper RJ-45 synchronous Ethernet 1000Base-T Microwave Awareness (MWA) ports (ports 1 and 2) and on a copper SFP Ethernet port (ports 3 and 4).

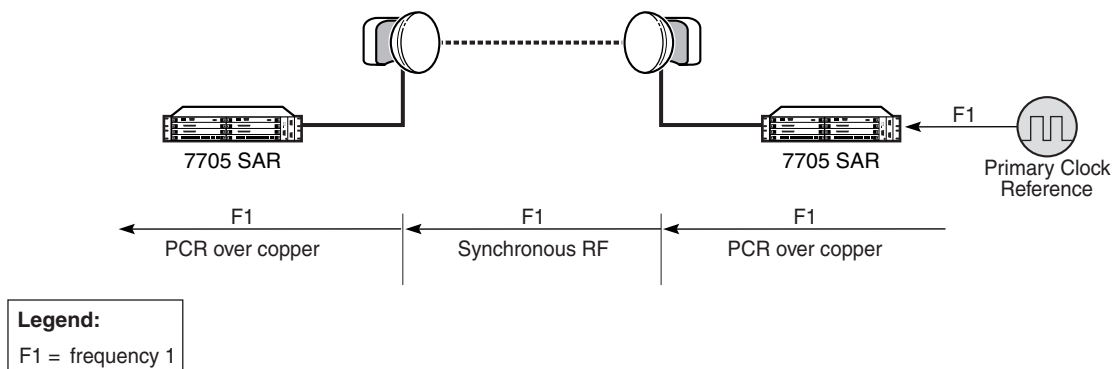
PCR is turned on automatically when a microwave link is enabled on an MWA RJ-45 port. The only requirement for PCR on the 7705 SAR-8 or 7705 SAR-18 side is to ensure that the physical layer transmit clock is set to master when a 1000Base-T link is configured. This is the default for all the MWA ports. If the port was previously set to slave, it must be set to master by using the command `configure>port>ethernet>phy-tx-clock master`. Refer to the 7705 SAR OS Interface Configuration Guide, in the “Card, Adapter Card, and Port Command Reference” chapter, Ethernet Commands for more information.



Note: On the MPR-e side, the MPR-e radio that is connected to a 7705 SAR-8 or 7705 SAR-18 chassis must be enabled and the MAC address of the 7705 SAR-8 or 7705 SAR-18 must be configured. Refer to the MWA Mode User Manual for the required information.

PCR provides the same frequency recovery capability as standard-based copper synchronous Ethernet without having to endure a traffic hit whenever a synchronous source switching occurs. See [Figure 11](#).

Figure 11: Primary Clock Recovery



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By running PCR between the MPR-e radio and the MWA port, frequency synchronization can be delivered in either direction. With standard-based copper synchronous Ethernet, there is a traffic hit every time a clock source change occurs on a 7705 SAR-8 or 7705 SAR-18 because the 7705 SAR-8 or 7705 SAR-18 and the MPR-e radio to which it is connected must bring down the Ethernet link MAC layer before it can renegotiate and reverse the master and slave clock role. This MAC layer re-negotiation affects the data plane and the signaling and routing plane. All MPLS signaling links and the label switched path (LSP) are taken down during the renegotiation process; the routing signaling advertises the down state of the link throughout the network.

However, with PCR running on the microwave link, the physical layer transmit clock on a copper synchronous Ethernet port on the Packet Microwave Adapter card is always set to master. The reversal of the clock role only occurs at the PCR “layer”. This means that a synchronous source change does not disrupt the data plane and the signaling and routing plane on the 7705 SAR-8 or 7705 SAR-18.

IEEE 1588v2 PTP

Precision Time Protocol (PTP) is a timing-over-packet protocol defined in the IEEE 1588v2 standard *1588 2008*.

PTP may be deployed as an alternative timing-over-packet option to ACR. PTP provides the capability to synchronize network elements to a Stratum-1 clock or primary reference clock (PRC) traceable source over a network that may or may not be PTP-aware. PTP has several advantages over ACR. It is a standards-based protocol, has lower bandwidth requirements, can transport both frequency and time, and can potentially provide better performance.

There are five basic types of PTP devices, as listed below:

- ordinary clock (master or slave)
- boundary clock
- end-to-end transparent clock
- peer-to-peer transparent clock
- management node

[Table 22](#) lists the types of PTP support on each platform.

Table 22: IEEE 1588v2 PTP Support per Platform

Synch. Type (Recovery)	PTP Clock Type	7705 SAR-F	7705 SAR-M	7705 SAR-H	7705 SAR-18 and 7705 SAR-8			
					8-port Ethernet Adapter Card, v2	8-port Gigabit Ethernet Adapter Card	Packet Microwave Adapter Card	10-port 1GigE/1-port 10GigE X-Adapter Card ¹
Frequency	Ordinary Slave	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Boundary	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Transparent		Yes					
	Ordinary Master	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time of Day/Phase	Ordinary Slave		Yes	Yes				
	Boundary		Yes	Yes		Yes	Yes	Yes
	Transparent		Yes					
	Ordinary Master							

Note:

1. Not supported on the 7705 SAR-8.

The 7705 SAR-8 supports up to six ordinary slave clocks, ordinary master clocks, or boundary clocks. The 7705 SAR-18 supports up to 12 ordinary slave clocks, ordinary master clocks, or boundary clocks.

The 8-port Ethernet Adapter card, version 2, 8-port Gigabit Ethernet Adapter card, Packet Microwave Adapter card, and 10-port 1GigE/1-port 10GigE X-Adapter card each support one PTP clock.

The 7705 SAR-F, 7705 SAR-M (all variants), and 7705 SAR-H each support one ordinary slave clock, ordinary master clock, or boundary clock; however, the 7705 SAR-M can support an additional PTP clock for transparent clock functionality.

A nodal clock is equipped in each CSM on the 7705 SAR-8 and 7705 SAR-18, or directly on the 7705 SAR-F, 7705 SAR-M (all variants), and 7705 SAR-H. Up to two PTP ordinary or boundary clocks can be configured per node as references to the nodal clock.

Each PTP slave clock can be configured to receive timing from up to two PTP master clocks in the network.

IEEE 1588 PTP messaging for slave and master clocks is supported over module ports on the 7705 SAR-M. When a node loopback address is used as the source interface for 1588 packets, the packets can ingress and egress the module ports. Module ports do not support transparent clock packets.

For all 7705 SAR platforms and clock types, when the node loopback address is used as the source interface for 1588 packets, the packets can ingress and egress over IES interfaces.

IP messaging between the PTP master clock and PTP slave clock over the PTP-enabled IP interface is done using IPv4 unicast mode.

Each PTP instance supports up to 128 synchronization messages per second. The default is 64 synchronization messages per second.

Each master clock has its own configuration for IP address, packet rate, and messaging timeouts, and for statistics, alarms, and events. Each available master clock advertises its presence and information using announce messages. If both master clocks are available, the slave clock uses the Best Master Clock Algorithm (BMCA) to dynamically compare the information in the announce messages of each master clock to determine to which of the two master clocks it should synchronize. This master clock is known as the best master. After the slave clock has determined which is the best master, it may begin to negotiate with it for unicast synchronization communication.

If the `profile` setting for the clock is `ieee1588-2008`, the precedence order for the best master selection algorithm is as follows:

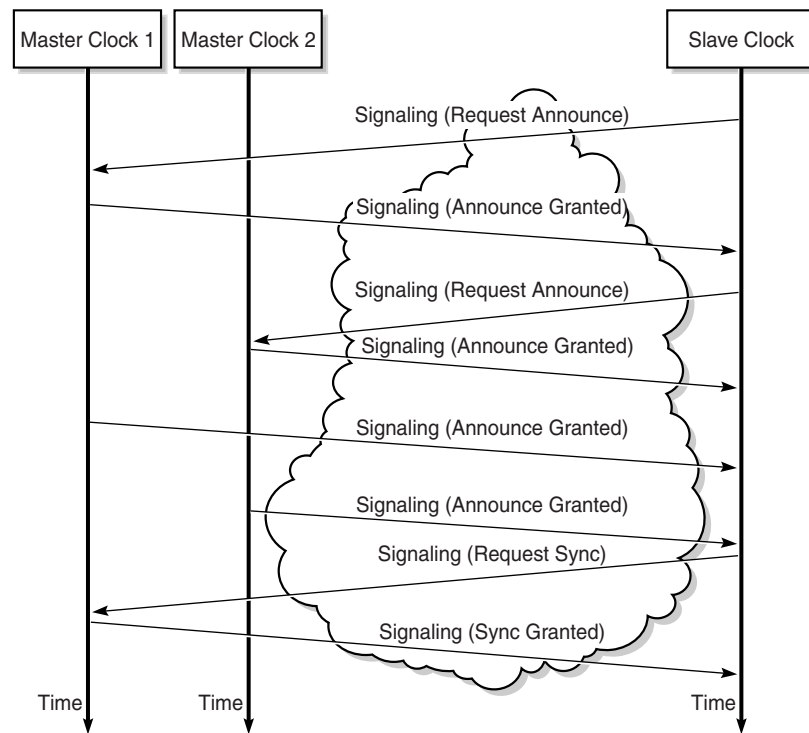
- `priority1` (user-configurable on the master clock side)
- `clock class`
- `clock accuracy`
- `PTP variance`
- `priority2` (user-configurable on the master clock side)
- `clock identity`
- `distance` (number of boundary clocks)

If the `profile` setting for the clock is `itu-telecom-freq` (ITU G.8265.1 profile), the precedence order for the best master selection algorithm is as follows:

- `clock class`
- `peer ID`

[Figure 12](#) shows an example of the messaging sequence between the PTP slave clock and the two PTP master clocks.

Figure 12: Messaging Sequence Between the PTP Slave Clock and PTP Master Clocks



20502

PTP Clock Synchronization

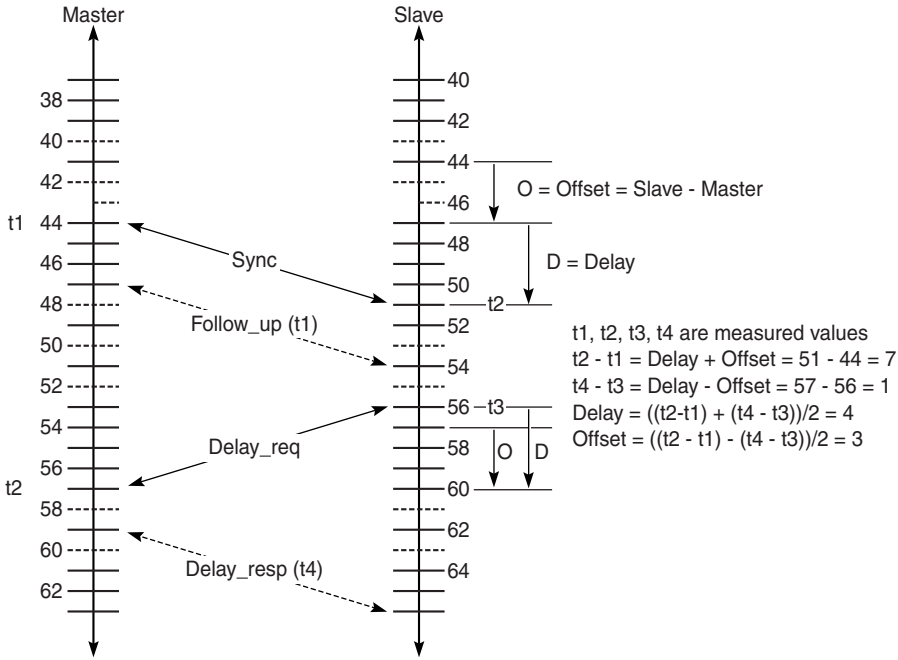
The IEEE 1588v2 standard synchronizes the frequency and time from a master clock to one or more slave clocks over a packet stream. This packet-based synchronization can be over UDP/IP or Ethernet and can be multicast or unicast. Only IPv4 unicast mode with unicast negotiation is supported.

As part of the basic synchronization timing computation, a number of event messages are defined for synchronization messaging between the PTP slave clock and PTP master clock. A one-step or two-step synchronization operation can be used, with the two-step operation requiring a follow-up message after each synchronization message. Currently, only one-step operation is supported on the 7705 SAR.

During startup, the PTP slave clock receives the synchronization messages from the PTP master clock before a network delay calculation is made. Prior to any delay calculation, the delay is assumed to be zero. A drift compensation is activated after a number of synchronization message intervals occur. The expected interval between the reception of synchronization messages is user-configurable.

The basic synchronization timing computation between the PTP slave clock and PTP best master is illustrated in Figure 13. This figure illustrates the offset of the slave clock referenced to the best master signal during startup.

Figure 13: PTP Slave Clock and Master Clock Synchronization Timing Computation



20503

Performance Considerations

Although IEEE 1588v2 can be used on a network that is not PTP-aware, the use of PTP-aware network elements (boundary clocks) within the packet switched network improves synchronization performance by reducing the impact of PDV between the grand master clock and the slave clock.



Note: The grand master clock is the master clock for the network. The best master clock is the clock that the slave clock selects as its master. For example, the slave clock’s best master clock might be a boundary clock, which is connected to a grand master clock.

The performance objective is to meet the synchronization interface maximum time interval error (MTIE) mask. Similar to ACR, the number of factors with the PSN will contribute to how well PTP can withstand, and still meet, those requirements.

PTP Capabilities

PTP messages are supported via IPv4 unicast with a fixed IP header size.

Table 23 describes the support message rates for slave and master states. The ordinary clock can be either in the slave or master state. The boundary clock can be in both of these states.

Table 23: Support Message Rates for Slave and Master Clock States

Support Message	Slave State			Master State	
	Minimum Request Rate	Maximum Request Rate	Default Request Rate	Minimum Allowed Rate	Maximum Allowed Rate
Announce	1/8 s	1/s	1/2 s	1/16 s	8/s
Sync	64 sync/s	128 sync/s	64 sync/s	1 sync/16 s	128 sync/s
Relay Response	64 delay/s	128 delay/s	64 delay/s	1 delay/16 s	128 delay/s

State and statistics data for each master clock are available to assist in the detection of failures or unusual situations.

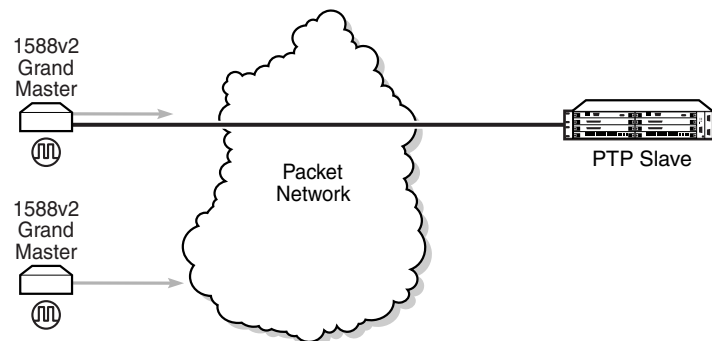
The PTP algorithm is able to recover the clock using both the upstream and downstream directions in both ordinary slave and boundary clock modes. The ability to perform bidirectional clock recovery will improve the performance of networks where the upstream and downstream load is not symmetrical.

PTP Ordinary Slave Clock For Frequency

Traditionally, only clock frequency is required to ensure smooth transmission in a synchronous network. The PTP ordinary clock with slave capability on the 7705 SAR provides another option to reference a Stratum-1 traceable clock across a packet switched network. The recovered clock can be referenced by the internal SSU and distributed to all slots and ports.

Figure 14 shows a PTP ordinary slave clock network configuration.

Figure 14: Slave Clock



21306

The PTP slave capability is implemented on the following:

- 8-port Ethernet Adapter card version 2
- 8-port Gigabit Ethernet Adapter card
- Packet Microwave Adapter card
- 10-port 1GigE/1-port 10GigE X-Adapter card
- Ethernet ports on the 7705 SAR-F, 7705 SAR-M (all variants), and 7705 SAR-H

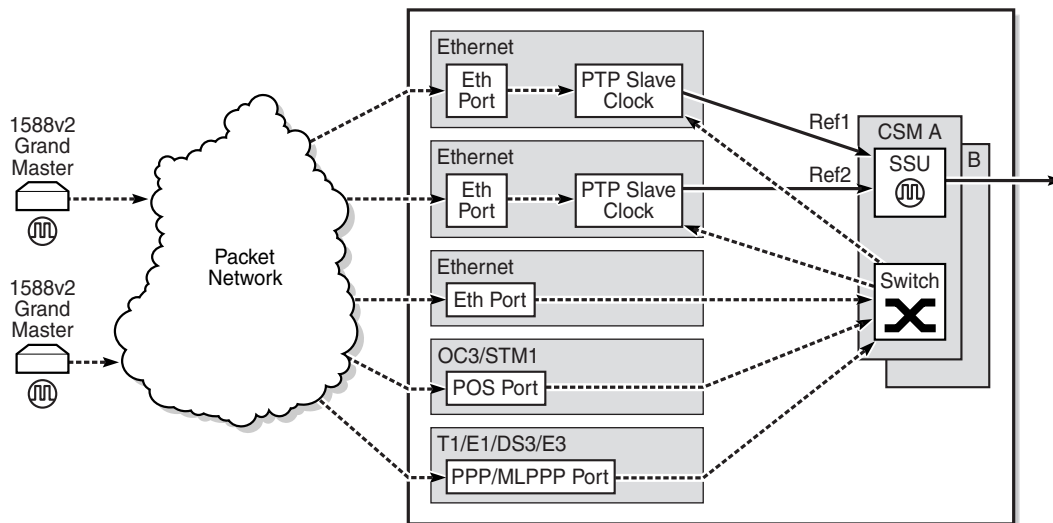
The 7705 SAR-8 can support up to six slave clocks and the 7705 SAR-18 can support up to 12 slave clocks.

The 7705 SAR-F and 7705 SAR-H can each support one slave clock. The 7705 SAR-M (all variants) can support up to two slave clocks when one of those clock types is configured as transparent; otherwise, it supports only one slave clock.

Each slave clock can provide a separate frequency reference to the SSU.

[Figure 15](#) shows the operation of an ordinary PTP clock in slave mode.

Figure 15: Ordinary Slave Clock Operation



21307

Each PTP ordinary slave clock is configured for a specific slot where the 8-port Ethernet Adapter card, version 2, 10-port 1GigE/1-port 10GigE X-Adapter card, 8-port Gigabit Ethernet Adapter card, Packet Microwave Adapter card, or Ethernet port will perform the slave function. On the 7705 SAR-F, this slot is always 1/2. On the 7705 SAR-M and 7705 SAR-H, this slot is always 1/1. Each slave is also associated with an IP interface on a specific port, adapter card, or loopback address for the router.

For best performance, the network should be designed so that the IP messaging between the master clock and the slave clock will ingress and egress through a port where the slave is configured. If the ingress and egress flow of the PTP messages is via a different port or adapter card on the 7705 SAR, then the packets will be routed through the fabric to the Ethernet card with the PTP slave.

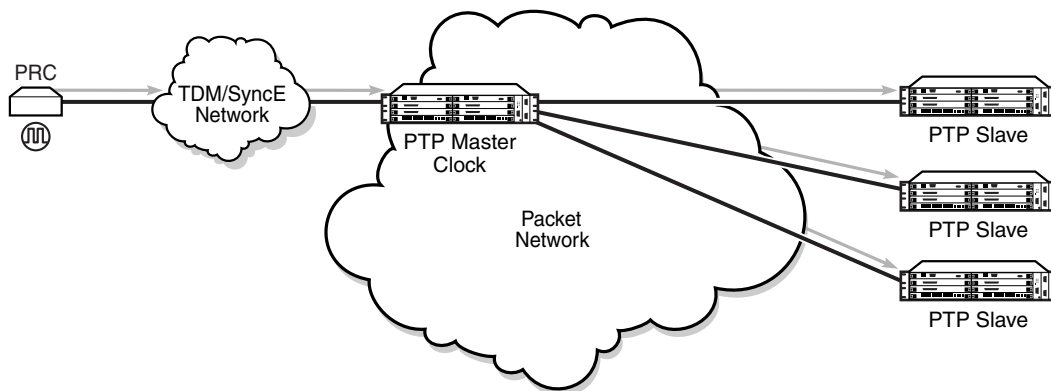
It is possible that the PTP IP packets may be routed through another Ethernet (v1 or v2) port/VLAN, OC3/STM1 clear channel POS, OC3/STM1 channelized MLPPP, DS3/E3 PPP or DS1/E1 MLPPP. The PTP slave performance may be slightly worse in this case because of the extra PDV experienced through the fabric. Packets will be routed this way only if the clock is configured with a loopback address. If the clock is configured with an address tied to a physical port, the packets will arrive on that physical port as described above.

PTP Ordinary Master Clock For Frequency

The 7705 SAR supports the PTP ordinary clock in master mode. Normally, a 1588v2 grand master is used to support many slaves and boundary clocks in the network. In cases where only a small number of slaves and boundary clocks exist and only frequency is required, a PTP integrated master clock can greatly reduce hardware and management costs to implement PTP across the network. It also provides an opportunity to achieve better performance by placing a master clock deeper into the network, as close to the slave clocks as possible.

Figure 16 shows a PTP master clock network configuration.

Figure 16: PTP Master Clock



21310

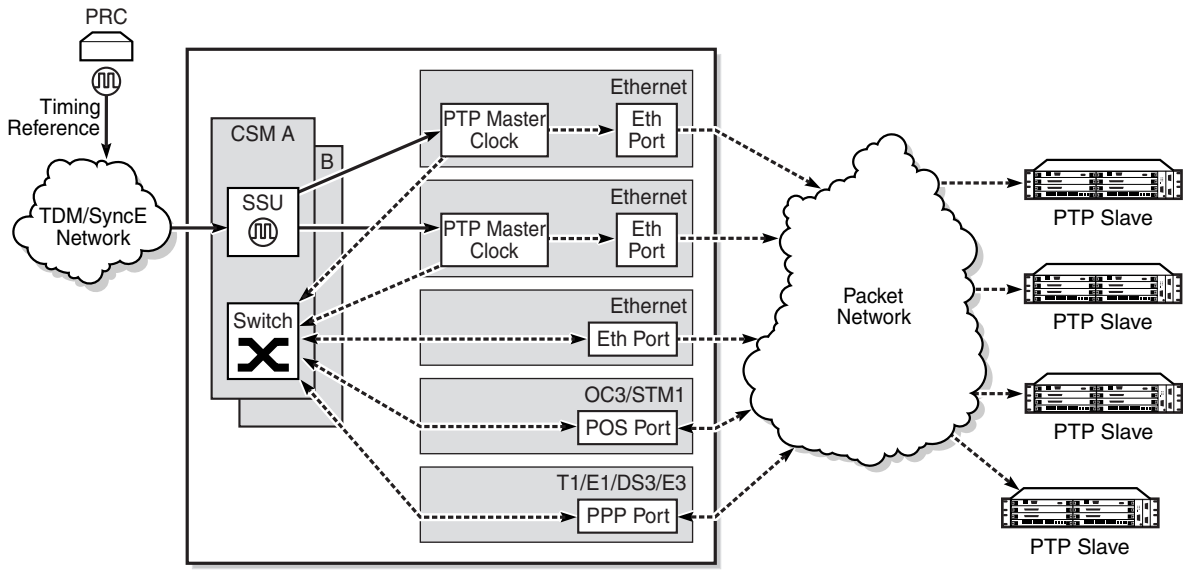
The PTP master clock capability is implemented on the following:

- 8-port Ethernet Adapter card version 2
- 8-port Gigabit Ethernet Adapter card
- 10-port 1GigE/1-port 10GigE X-Adapter card
- Packet Microwave Adapter card
- Ethernet ports on the 7705 SAR-F, 7705 SAR-M (all variants), and 7705 SAR-H

The 7705 SAR-8 can support up to six master clocks and the 7705 SAR-18 can support up to 12 master clocks. The 7705 SAR-F, 7705 SAR-M, and 7705 SAR-H can each support one master clock.

Figure 17 shows the operation of an ordinary PTP clock in master mode.

Figure 17: Ordinary Master Clock Operation



21311

Each PTP master clock is configured for a specific slot where the 8-port Ethernet Adapter card, version 2, the 8-port Gigabit Ethernet Adapter card, the 10-port 1GigE/1-port 10GigE X-Adapter card, the Packet Microwave Adapter card, or the Ethernet port will perform the master function. On the 7705 SAR-F, this slot is always 1/2. On the 7705 SAR-M and 7705 SAR-H, this slot is always 1/1. Each master is also associated with an IP interface on a specific port, adapter card, or loopback address for the router. All packets that ingress or egress through a port where the master is configured are routed to their destination via the best route as determined in the route table.

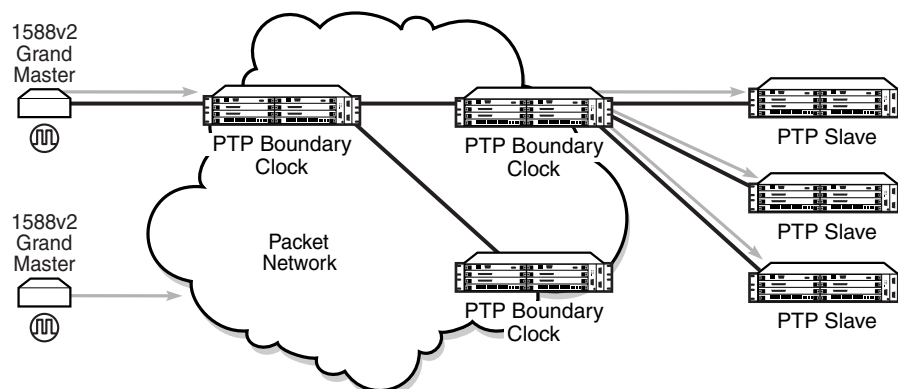
Each master clock can peer with up to 10 slaves or boundary clocks. The IP addresses of these peers can be statically configured via CLI or dynamically accepted via PTP signaling messages. A statically configured peer may displace a dynamic peer on a particular PTP port. If there are fewer than 10 peers, then that dynamic peer can signal back and be granted a different PTP-port instance.

PTP Boundary Clock For Frequency

The 7705 SAR supports boundary clock PTP devices in both master and slave states. IEEE 1588v2 can function across a packet network that is not PTP-aware; however, the performance may be unsatisfactory and unpredictable. PDV across the packet network varies with the number of hops, link speeds, utilization rates, and the inherent behavior of the routers. By using routers with boundary clock functionality in the path between the grand master clock and the slave clock, one long path over many hops is split into multiple shorter segments, allowing better PDV control and improved slave performance. This allows PTP to function as a valid timing option in more network deployments and allows for better scalability and increased robustness in certain topologies, such as rings.

Boundary clocks can simultaneously function as a PTP slave of an upstream grand master (ordinary clock) or boundary clock, and as a PTP master of downstream slaves (ordinary clock) and/or boundary clocks.

Figure 18: Boundary Clock



21308

The PTP boundary clock capability is implemented on the following:

- 8-port Ethernet Adapter card version 2
- 8-port Gigabit Ethernet Adapter card
- 10-port 1GigE/1-port 10GigE X-Adapter card
- Packet Microwave Adapter card
- Ethernet ports on the 7705 SAR-F, 7705 SAR-M (all variants), and 7705 SAR-H

The 7705 SAR-8 can support up to six boundary clocks and the 7705 SAR-18 can support up to 12 boundary clocks. The 7705 SAR-F, 7705 SAR-M (all variants), and the 7705 SAR-H can each support one boundary clock.

Node Timing

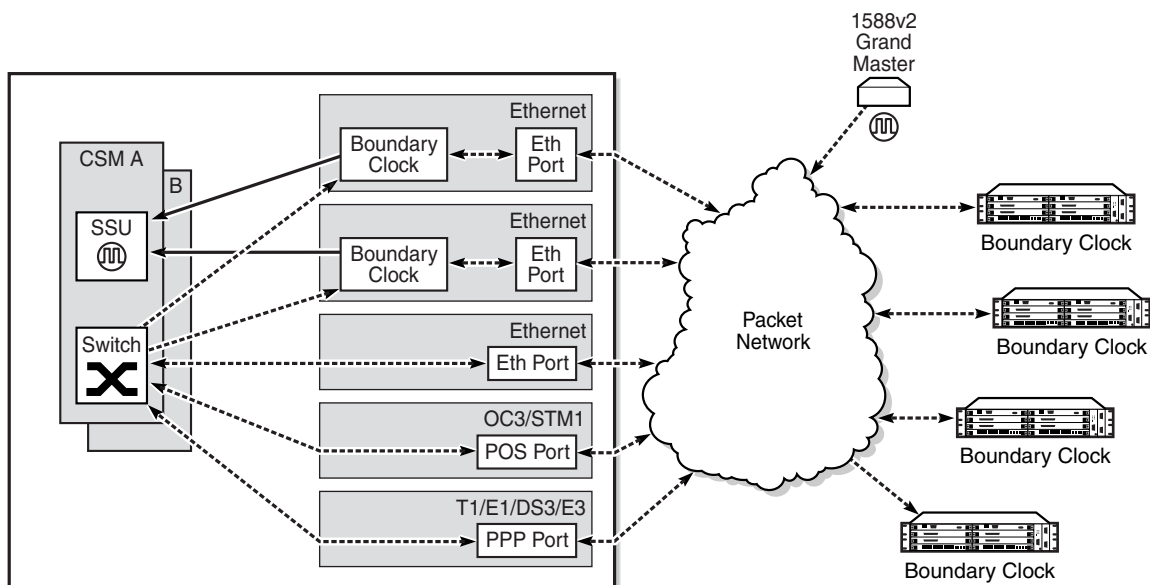
Each PTP boundary clock is configured for a specific slot where the 8-port Ethernet Adapter card, version 2, 8-port Gigabit Ethernet Adapter card, 10-port 1GigE/1-port 10GigE X-Adapter card, Packet Microwave Adapter card, or Ethernet port will perform the boundary clock function. On the 7705 SAR-F, this slot is always 1/2. On the 7705 SAR-M (all variants) and 7705 SAR-H, this slot is always 1/1. Each boundary clock is also associated with a loopback address for the router.

For best performance, the network should be designed so that the IP messaging between the slave or boundary clocks and the 7705 SAR boundary clock will ingress and egress over a port on its corresponding adapter card. If the ingress or egress flow of the PTP messages is through a different 7705 SAR port or adapter card, then the packets will be routed through the fabric to the Ethernet card with PTP boundary clock. It is possible that the PTP IP packets are routed through another Ethernet (v1 or v2) port/VLAN, OC3/STM1 clear channel POS, OC3/STM1 channelized MLPPP, DS3/E3 PPP or DS1/E1 MLPPP. The performance seen on the PTP slaves or boundary clocks may be slightly worse in this case because of the extra PDV experienced through the fabric.

Each boundary clock can be peered with up to 10 slaves, boundary clocks, or grand master clocks. The IP addresses of these peers can be statically configured via CLI or dynamically accepted via PTP signaling messages. A statically configured peer may displace a dynamic peer on a particular PTP port. If there are fewer than 10 peers, then that dynamic peer can signal back and be granted a different PTP-port instance.

Figure 19 shows an example of boundary clock operation.

Figure 19: Boundary Clock Operation



21309

PTP Ordinary Slave Clock for Time of Day/Phase Recovery

The 7705 SAR-M (all variants) and the 7705 SAR-H support PTP slave clock for time of day/phase recovery. Both routers can receive and extract time of day/phase recovery from a 1588 grand master clock or boundary clock and transmit the recovered time of day/phase signal to an external device such as a base station.

For the 7705 SAR-M, transmission is through the ToD port with a 1 pulse/s output signal that is phase-aligned with other routers that are similarly time of day/phase synchronized. An RS-422 serial interface within the ToD port connector communicates the exact time of day of the rising edge of the 1 pulse/s signal.

For the 7705 SAR-H, transmission is through the IRIG-B Out port. An RJ-45 interface is used for the IRIG-B Out port to communicate the exact time of day by the rising edge of the 1 pulse/s signal, an IRIG-B000 unmodulated time code signal, and an IRIG-B12X modulated time code signal.

For incoming IEEE 1588 packets on the 7705 SAR-M or the 7705 SAR-H, the destination IP address is the loopback address. The ingress interface can be an SFP Ethernet port on the faceplate of the chassis, an RJ-45 port on the faceplate of the chassis, or a port on an installed module.

Each PTP slave clock can be configured to receive timing from up to two PTP master clocks in the network. If both master clocks are available, the slave clock uses default BMCA to determine which of the two master clocks it should synchronize.

PTP messaging between the PTP master clock and PTP slave clock is done over UDP/IP using IPv4 unicast mode with a fixed IP header size. Unicast negotiation is supported. Each PTP instance supports up to 128 synchronization messages per second. The default is 64 synchronization messages per second.

PTP Boundary Clock for Time of Day/Phase Recovery

The PTP boundary clock capability for time of day/phase is implemented on the following:

- 8-port Gigabit Ethernet Adapter card
- 10-port 1GigE/1-port 10GigE X-Adapter card
- Packet Microwave Adapter card
- Ethernet ports on the 7705 SAR-M (all variants)
- Ethernet ports on the 7705 SAR-H

Node Timing

The 7705 SAR-8 can support up to six boundary clocks and the 7705 SAR-18 can support up to 12 boundary clocks. The 7705 SAR-M and the 7705 SAR-H can each support one boundary clock.

Each PTP boundary clock for time of day/phase is configured for a specific slot where the 8-port Gigabit Ethernet Adapter card, 10-port 1GigE/1-port 10GigE X-Adapter card, Packet Microwave Adapter card, or Ethernet port will perform the boundary clock function. On the 7705 SAR-M (all variants) and 7705 SAR-H, this slot is always 1/1. Each boundary clock is also associated with a loopback address for the router.

PTP End-to-End Transparent Clock for Time of Day/Phase Recovery

The 7705 SAR-M (all variants) supports PTP end-to-end transparent clock for time of day/phase recovery. For transparent clocks to work, IEEE 1588 PTP packets must ingress and egress the 7705 SAR-M on one of its four SFP ports. If the packets do not ingress and egress an SFP port, then the timestamps in the packets are not corrected for synchronization errors. Furthermore, if a packet ingresses an SFP port but egresses an non-SFP port (or vice versa), then the timestamp is corrupted.

Transparent clock functionality can be used in conjunction with slave or boundary clocks. When transparent clock is enabled, the slave or boundary clock in the 7705 SAR-M will benefit from more accurate timestamping of the PTP packets within the router. If the network is designed so that all PTP packets ingress and egress via the SFP ports of the 7705 SAR-M, then the transparent clock option will provide a better end-to-end performance for time of day/phase.

Transparent clock functionality is supported for PTP packets over UDP/IP over Ethernet (with and without VLAN tags).

PTP Clock Redundancy

Each PTP slave clock can be configured to receive timing from up to two PTP master clocks. If two PTP master clocks are configured, and if communication to the best master is lost or if the BMCA determines that the other PTP master clock is better, then the PTP slave clock switches to the other PTP master clock.

For a redundant or simple CSM configuration on the 7705 SAR-8 and 7705 SAR-18, a maximum of two PTP slave clocks can be configured as the source of reference (ref1 and ref2) to the SSU. If a failure occurs between the PTP slave clock and the master clock, the SSU detects that ref1 or ref2 is unavailable and automatically switches to the other reference source. This switching provides PTP hot redundancy for hardware failures (on the 8-port Ethernet Adapter card, version 2, 8-port Gigabit Ethernet Adapter card, 10-port 1GigE/1-port 10GigE X-Adapter card, or Packet Microwave Adapter card) or port or facility failures (SFP or cut fiber). If a loopback address is used, PTP packets may arrive on any router network interface and the PTP clock will remain up.

The 7705 SAR-F, 7705 SAR-M (all variants), and 7705 SAR-H each support only one PTP slave clock. This slave clock can be configured as the source of reference (ref1 or ref2) to the SSU.

PTP Statistics

The 7705 SAR provides the capability to collect statistics, state, and events data for the PTP slave clock's interaction with PTP peer clock 1 and PTP peer clock 2. This data is collected separately for each peer clock and can be displayed using the `show system ptp clock ptp-port` command. This data can be used to monitor the PTP slave clock performance in relation to the peer clocks and to diagnose a problem or analyze the performance of a packet switched network for the transport of synchronization messages. The following data is collected:

PTP peer-1/PTP peer-2 statistics:

- number of signaling packets
- number of unicast request announce packets
- number of unicast request announce timeouts
- number of unicast request announce packets rejected
- number of unicast request synchronization packets
- number of unicast request synchronization timeouts
- number of unicast request synchronization packets rejected
- number of unicast request delay response packets
- number of unicast request delay response packets timeouts
- number of unicast request delay response packets rejected
- number of unicast grant announce packets
- number of unicast grant announce packets rejected
- number of unicast grant synchronization packets
- number of unicast grant synchronization packets rejected

Node Timing

- number of unicast grant delay response packets
- number of unicast grant delay response packets rejected
- number of unicast cancel announce packets
- number of unicast cancel synchronization packets
- number of unicast cancel delay response packets
- number of unicast acknowledge cancel announce packets
- number of unicast acknowledge cancel synchronization packets
- number of unicast acknowledge cancel delay response packets
- number of announce packets
- number of synchronization packets
- number of delay response packets
- number of delay request packets
- number of follow-up packets
- number of out-of-order synchronization packets
- total number of UDP (port 320) packets
- total number of UDP (port 319) packets
- number of alternate master packets discarded
- number of bad domain packets discarded
- number of bad version packets discarded
- number of duplicate messages packets discarded
- number of step RM greater than 255 discarded

PTP master-1/PTP master-2 algorithm state statistics (in seconds):

- number of free-run states
- number of acquiring states
- number of phase-tracking states
- number of hold-over states
- number of locked states

PTP master-1/PTP master-2 algorithm event statistics:

- number of excessive frequency errors detected
- number of excessive packet losses detected
- number of packet losses spotted
- number of excessive phase shifts detected
- number of high PDVs detected

- number of synchronization packet gaps detected

Network Timing Reference (NTR)

On the 7705 SAR-M, the 6-port DSL Combination module and 8-port xDSL module support network timing reference (NTR) clock recovery. Using NTR, a synchronized clock can be derived from the xDSL physical layer or the SHDSL interface. NTR delivers a highly accurate synchronized clock while eliminating the need for advanced synchronization hardware in the DSL modem, thereby reducing the overall cost of the network.

NTR is equivalent to physical layer synchronization and, at cell sites, is the preference for delivering frequency synchronization over a DSL network. Alternative, packet-based methods of synchronization, such as ACR and IEEE 1588v2 PTP, cannot offer the same level of accuracy as physical layer synchronization due to the inherent PDV characteristics of DSL.

On the 8-port xDSL module, a single NTR timing reference is available to signal back to the 7705 SAR-M. On the 6-port DSL Combination module, there are two DSL interfaces and therefore two separate NTR timing references available to the 7705 SAR-M: one for SHDSL and one for xDSL. On SHDSL interfaces, NTR locks the DSL symbol clock directly to the reference clock. On xDSL interfaces, NTR maps DSL frame phase difference bits information between the reference clock and the DSL free-running clock.

NTR on xDSL Interfaces

On xDSL interfaces, all CPE lines must be connected to the same LT because the clock source for all lines must be identical. While operating in VDSL2 mode, all pairs on an 8-port xDSL module must have their VDSL2 DMT signals aligned.

When NTR on xDSL is in use, a message is sent to the 7705 SAR-M indicating which pair is currently being used to derive NTR. However, once all lines are in show time mode, NTR is carried on all lines. If there is an NTR status change from one pair to another, a status change is indicated in the CLI for the 7705 SAR-M. The status change is also visible through the 5620 SAM.

The chipset automatically selects the line with the best signal-to-noise ratio on the pilot tone. If there is a line drop, or if the signal-to-noise ratio degrades, the system automatically switches NTR to another line in show-time mode to recover clock synchronization. When NTR is locked to a particular line, the status is updated and indicated in the CLI and on the 5620 SAM.

If the line carrying NTR is taken out of show-time mode, there may be phase drift during the switchover if a phase delta difference has been missed.

NTR on SHDSL Interfaces

NTR for SHDSL is carried equally across all lines because all lines must connect back to the same LT on the same DSLAM. NTR for SHDSL operates in auto-detect mode. The 6-port DSL Combination module automatically selects an SHDSL pair that will be used to extract NTR and transmit to the SSU. The SHDSL pair is selected based on clock activity monitoring, coarse frequency monitoring, and chipset level indications on the active status of individual lines.

The auto-detect algorithm on the 6-port DSL Combination module selects an SHDSL pair used for NTR by first checking SHDSL pair 1. If pair 1 is not considered an acceptable source, the algorithm checks each pair in sequence until it finds an acceptable source or reaches SHDSL pair 4. The ID of the in-use line is displayed in CLI; however, it is not user-configurable.

When NTR on SHDSL interfaces is in use, the status is indicated to the 7705 SAR-M. The pair currently being used to derive NTR is shown in the CLI and is updated to the 5620 NM. However, once all lines are in show-time mode, NTR is carried on all lines. If there is an NTR status change from one pair to another, a status change is indicated in the CLI for the 7705 SAR-M. The status change is also visible through the 5620 SAM.

The 6-port DSL Combination module automatically selects the SHDSL pair for NTR to use based on the selection algorithm. If there is a line drop, or if the signal-to-noise ratio degrades, the system automatically switches NTR to another line in show-time mode to recover clock synchronization. When NTR is locked to a particular line, the status is updated and indicated in the CLI and on the 5620 SAM.

If the line carrying NTR is taken out of show-time mode, there will be phase drift during the switchover and clock recovery may enter the holdover state if this was the only external timing reference available. If this happens, the 6-port DSL Combination module selects a new SHDSL line if one is available.

Synchronous Ethernet

Synchronous Ethernet is a variant of line timing that derives the physical layer transmitter clock from a high-quality timing reference, traceable to a primary reference clock. Synchronous Ethernet uses the physical layer of the Ethernet link to distribute a common clock signal to all nodes in the network. Each node has a local or system clock that determines the outgoing clock rate of each interface. The system clock of each node in the network is derived from the incoming clock at an input interface or from a dedicated timing interface; for example a BITS port.

Synchronous Ethernet works at Layer 1 and is concerned only with the precision of the timing of signal transitions to relay and recover accurate frequencies. It is not impacted by traffic load and is therefore not affected by packet loss or PDV that occurs with timing methods that use higher layers of the networking technology.

Synchronous Ethernet is automatically enabled on ports and SFPs that support synchronous Ethernet. The operator can select an Ethernet SFP port as a candidate timing reference. The recovered timing from this port is distributed to the nodes in the network over the physical layer of the Ethernet link. This allows the operator to ensure that any of the system outputs are locked to a stable, traceable frequency source. The transmit timing of all SFP ports with SFPs that support synchronous Ethernet is then derived from the node's SSU.

Synchronous Ethernet can only be used for end-to-end network synchronization when all intermediate switching nodes in the network have hardware and software support for synchronous Ethernet.

Synchronous Ethernet is supported on the 8-port Ethernet Adapter card (ports 7 and 8), version 2, on the 8-port Gigabit Ethernet Adapter card, on the 10-port 1GigE/1-port 10GigE X-Adapter card, on the Packet Microwave Adapter card, on Gigabit Ethernet ports on the 7705 SAR-F, and on all Ethernet ports on the 7705 SAR-M (all variants). On the 7705 SAR-H, Synchronous Ethernet is supported on the Gigabit Ethernet ports (ports 1 and 2) and on Ethernet ports 3 and 4 when they are configured with an SFP. Refer to the following Installation Guides for information on supported SFPs:

- 7705 SAR Ethernet/Gigabit Ethernet Adapter Card Installation Guide for a list of the SFPs that support synchronous Ethernet on the 8-port Ethernet Adapter card, version 2, and on the 8-port Gigabit Ethernet Adapter card
- 7705 SAR 10-port 1GigE/1-port 10GigE X-Adapter Card Installation Guide for a list of the SFPs that support synchronous Ethernet on the 10-port 1GigE/1-port 10GigE X-Adapter card
- 7705 SAR Packet Microwave Adapter Card Installation Guide for a list of the SFPs that support synchronous Ethernet on the Packet Microwave Adapter card

If an SFP that does not support synchronous Ethernet is installed, the Ethernet card will use its local oscillator for transmit timing and an event is logged. If the Ethernet port is configured as a source of node synchronization and an SFP that does not support synchronous Ethernet is installed, a clock will not be supplied to the SSU and an event is logged.

Each synchronous Ethernet port can be configured to recover received timing and send it to the SSU. On the 7705 SAR-F, 7705 SAR-M (all variants), and 7705 SAR-H any synchronous Ethernet-capable port can be used as an available reference. On the 7705 SAR-8 and 7705 SAR-18, only one reference is available per 8-port Ethernet Adapter card, version 2, 8-port Gigabit Ethernet Adapter card, 10-port 1GigE/1-port 10GigE X-Adapter card, or Packet Microwave Adapter card.

Node Timing

Synchronous Ethernet ports always use node timing from the SSU. Configuration of one port automatically configures the other port.

If timing is recovered from a synchronous Ethernet port from an upstream non-synchronous Ethernet free-running port and selected as the reference to the SSU, then this clock may not be of sufficient quality or accuracy for node operations. This reference may be disqualified because the frequency may not be within the pull-in range of the SSU's Stratum 3 oscillator.

On the 7705 SAR-M and on the Packet Microwave Adapter card, a copper-based, RJ-45 synchronous Ethernet port `phy-tx-clock` must be configured as slave before the port is configured to be a timing source for the node. If a copper-based, RJ-45 synchronous Ethernet port is a timing source for the node, the port `phy-tx-clock` cannot be changed to another mode.

Synchronization Status Messaging with Quality Level Selection

Synchronization Status Messaging (SSM) provides clock source quality level values that are carried in the downstream network elements for SONET/SDH and synchronous Ethernet interfaces. These quality level values are processed by the system timing module at the beginning of the network timing synchronization trail to track the network timing flow and select the highest-quality source for the central clock. This selection process is described in [Timing Reference Selection Based on Quality Level](#). Also see [Figure 20](#). SSM also allows the network elements to autonomously reconfigure the timing path to select the best possible source for timing and to avoid timing loops. This function is especially useful in a ring topology where network timing may be passed in both directions around the ring.

Synchronization status messages containing the quality level values are placed in prescribed overhead bytes for SONET and SDH signals and in bit-oriented messages within the data link for DS1s (ESF) and E1s physical ports for interaction with the central clock.

For synchronous Ethernet and DSL interfaces, there is no equivalent fixed location to convey synchronization status messages; therefore, the quality level values are transported using Ethernet frames over a message channel. This channel, called the Ethernet Synchronization Message Channel (ESMC), uses an Ethernet protocol based on an IEEE Organization Specific Slow Protocol (OSSP). The 4-bit quality level value is carried within a Type-Length-Value (TLV) byte of an Ethernet OAM Protocol Data Unit (PDU) that uses the OSSP subtype.

The clock source quality levels identified for the purpose of tracking network timing flow are listed below. They make up all of the defined network deployment options given in Recommendations G.803 and G.781 (option I pertains to the SDH model and Option II pertains to the SONET model).

The received quality level values for the two network options based on the specific interfaces within these options are provided in the first two columns of [Table 24](#). The transmitted quality level values are shown in the last two columns of [Table 24](#).

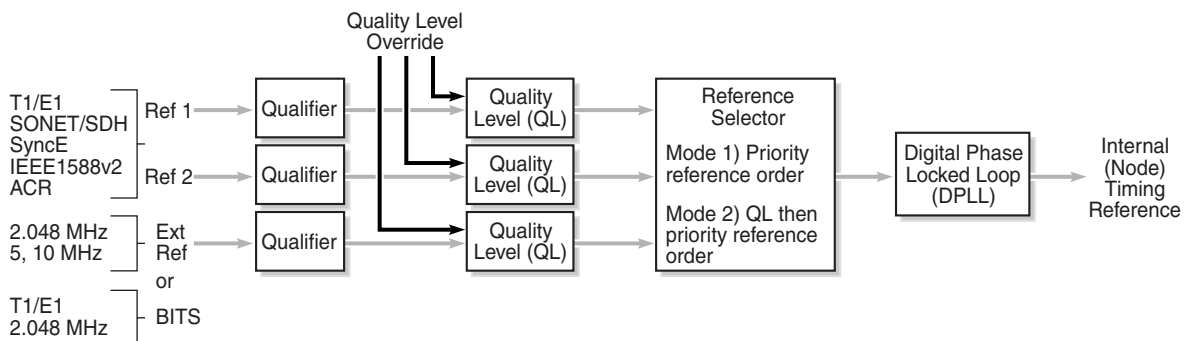
- prs — SONET Primary Reference Source Traceable
- stu — SONET Synchronous Traceability Unknown
- st2 — SONET Stratum 2 Traceable
- tnc — SONET Transit Node Clock Traceable
- st3e — SONET Stratum 3E Traceable
- st3 — SONET Stratum 3 Traceable
- smc — SONET Minimum Clock Traceable
- eec1 — SDH Ethernet Equipment Clock Option 1 Traceable
- eec2 — SONET Ethernet Equipment Clock Option 2 Traceable

Node Timing

- prc — SDH Primary Reference Clock Traceable
- ssu-a — SDH Primary Level Synchronization Supply Unit Traceable
- ssu-b — SDH Second Level Synchronization Supply Unit Traceable
- sec — SDH Synchronous Equipment Clock Traceable

The user may override the received quality level value of the system synchronization reference input by using the `ql-override` command to configure one of the above values as a static value. This in turn may affect the transmitted quality level value on each SSM-capable port. Also, the user may use the `tx-dus` command to force the quality level value transmitted on the SSM channel of the SONET/SDH port or the synchronous Ethernet port to be set to `dnu` (do not use) or `dus` (do not use for synchronization). This capability is provided to block the interface from being a timing source for the 7705 SAR. The `dus/dnu` quality level value cannot be overridden.

Figure 20: Timing Reference Selection Based on Quality Level



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The G.803 and G.781 standards also define additional codes for internal use.

- QL-INV x is generated internally by the system when an unallocated synchronization status message value is received; x represents the binary value of this synchronization status message. Within the 7705 SAR, all these independent values are assigned a single value of QL-INVALID.
- QL-FAILED is generated internally by the system when the terminated network synchronization distribution trail is in the signal fail state.
- QL-UNKNOWN is generated internally by the system to differentiate from a received QL-STU code. It is equivalent to QL-STU for the purposes of quality level selection.
- If the node clock is in a holdover state, a holdover message is generated internally by the system and the transmitted SSM quality level value on an SSM-capable port is either `st3`, `eec1`, `eec2`, or `ssub`, depending on the type of interface (as shown in [Table 24](#)).

Table 24: Quality Level Values by Interface Type

SSM Quality Level Value Received on Port		Internal Relative Quality Level	SSM Quality Level Value to be Transmitted	
SDH interface SyncE interface in SDH mode	SONET interface SyncE interface in SONET mode		SDH interface SyncE interface in SDH mode	SONET interface SyncE interface in SONET mode
0010 (prc)	0001 (prs)	Best quality	0010 (prc)	0001 (prs)
	0000 (stu)		0100 (ssua)	0000 (stu)
	0111 (st2)		0100 (ssua)	0111 (st2)
0100 (ssua)	0100 (tnc)		0100 (ssua)	0100 (tnc)
	1101 (st3e)		1000 (ssub)	1101 (st3e)
1000 (ssub)			1000 (ssub)	1010 (st3/eec2)
	1010 (st3/eec2)	1011 (sec/eec1)	1010 (st3/eec2)	
1011 (sec/eec1)		Lowest quality qualified in QL-enabled mode	1011 (sec/ eec1)	1100 (smc)
	1100 (smc)	See note ¹	1111 (dnu)	1100 (smc)
1111 (dnu)	1111 (dus)	See note ¹	1111 (dnu)	1111 (dus)
Any other	Any other	QL-INVALID	1111 (dnu)	1111 (dus)
		QL-FAILED	1111 (dnu)	1111 (dus)
		QL-UNC	1011 (sec/eec1)	1010 (st3/eec2)

Note:

1. These quality level indications are considered to be lower than the internal clock of the system. They are relayed to the line interfaces when ql-selection is disabled. When ql-selection is enabled, these inputs are never selected. If there is no valid reference available for the internal clock, then the clock enters holdover mode and the quality level is QL-UNC.

Timing Reference Selection Based on Quality Level

For a SONET/SDH or synchronous Ethernet interface that supports SSM or ESMC, a timing input provides a quality level value to indicate the source of timing of the far-end transmitter. These values provide input to the selection processes on the nodal timing subsystem. This selection process determines which input to use to generate the signal on the SSM egress ports and the reference to use to synchronize the nodal clock, as described below.

- For the two reference inputs (ref1 and ref2) and for the BITS input ports, if the interface configuration supports the reception of a QL over SSM or ESMC, then the quality level value is associated with the timing derived from that input.
- For the two reference inputs and for the BITS input ports, if the interface configuration is T1 with SF framing, then the quality level associated with the input is QL-UNKNOWN.
- For the two reference inputs, if they are synchronous Ethernet ports and the ESMC is disabled, then the quality level value associated with that input is QL-UNKNOWN.
- For the two reference inputs and for the BITS input ports, if the interface configuration supports the reception of a QL over SSM (and not ESMC), and no SSM value has been received, then the quality level value associated with the input is QL-STU.
- For the two reference inputs and for the BITS input ports, if the interface configuration supports the reception of a QL over SSM or ESMC, but the quality level value received over the interface is not valid for the type of interface, then the quality level value associated with that input is QL-INVALID.
- For the two reference inputs, if they are external synchronization, DS3, or E3 ports, then the quality level value associated with the input is QL-UNKNOWN.
- For the two reference inputs, if they are synchronous Ethernet ports and the ESMC is enabled but no valid ESMC Information PDU has been received within the previous 5 s, then the quality level value associated with that input is QL-FAILED.
- If the user has configured an override for the quality level associated with an input, the node displays both the received and override quality level value for the input. If no value has been received, then the associated value is displayed instead.

After the quality level values have been associated with the system timing inputs, the two reference inputs and the external input timing ports are processed by the system timing module to select a source for the SSU. This selection process is described below.

- Before an input can be used as a potential timing source, it must be enabled using the `ql-selection` command. If `ql-selection` is disabled, then the priority order of the inputs for the Synchronous Equipment Timing Generator (SETG) is the priority order configured under the `ref-order` command.

- If `ql-selection` is enabled, then the priority of the inputs is calculated using the associated quality level value of the input and the priority order configured under the `ref-order` command. The inputs are ordered by the internal relative quality level (shown in the middle row in [Table 24](#)) based on their associated quality level values. If two or more inputs have the same quality level value, then they are placed in order based on where they appear in the `ref-order` priority. The priority order for the SETG is based on both the reference inputs and the external synchronization input ports.
- Once a prioritized list of inputs is calculated, the SETG and the external synchronization output ports are configured to use the inputs in their respective orders.
- Once the SETG and external synchronization output ports priority lists are programmed, then the highest-qualified priority input is used. To be qualified, the signal is monitored to ensure that it has the expected format and that its frequency is within the pull-in range of the SETG.

SSM/ESMC QL Transmission

If a port is using the SETG output as its timing reference, the port transmits the SSM corresponding to the QL of the SETG.

On the port that is selected as the reference for the SETG, the port transmits the DNU/DUS value in the SSM/ESMC.

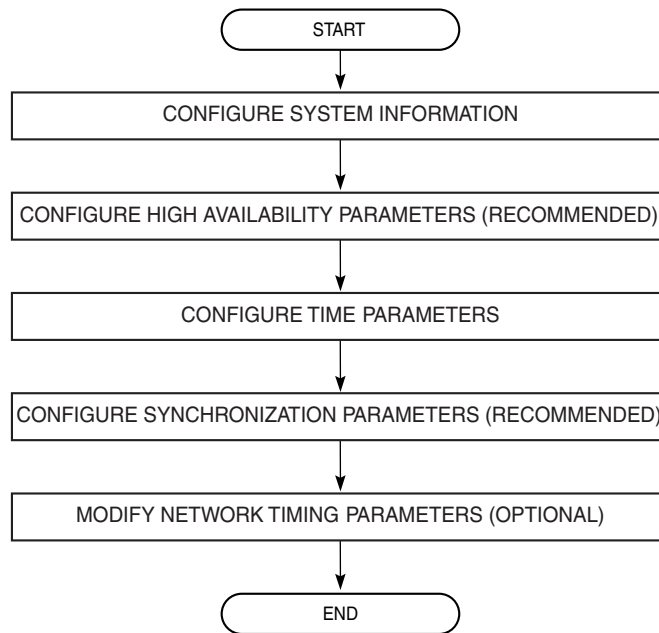
If a BITS port is selected as the reference for the SETG, both BITS ports transmit DNU/DUS value.

An Ethernet port with a copper SFP always transmits DNU/DUS when SSM is enabled on the port. When SSM is enabled on a copper-based RJ45 Ethernet port, DNU/DUS is transmitted if the port `phy-tx-clock` is not configured as master. When SSM is enabled on a copper-based RJ45 Ethernet port and the port `phy-tx-clock` is configured as master, the port transmits the SSM value corresponding to the determined by the SSU.

System Configuration Process Overview

Figure 21 displays the process to provision basic system parameters.

Figure 21: System Configuration and Implementation Flow



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Configuration Notes

This section describes system configuration caveats.

- The 7705 SAR must be properly initialized and the boot loader and BOF files successfully executed in order to access the CLI.

Reference Sources

For information on supported IETF drafts and standards as well as standard and proprietary MIBs, refer to [Standards and Protocol Support](#).

Configuring System Management with CLI

This section provides information about configuring system management features with CLI.

Topics in this section include:

- [System Management Configuration](#)
 - [Saving Configurations](#)
- [Basic System Configuration](#)
- [Common Configuration Tasks](#)
 - [System Information](#)
 - [Configuring Synchronization and Redundancy](#)
 - [Configuring ATM Parameters](#)
 - [Configuring Backup Copies](#)
 - [Configuring System Administration Parameters](#)
 - [System Timing](#)
- [Configuring System Monitoring Thresholds](#)
 - [Creating Events](#)
- [Configuring LLDP](#)

System Management Configuration

Saving Configurations

Whenever configuration changes are made, the modified configuration must be saved so that the changes will not be lost when the system is rebooted. The system uses the configuration and image files, as well as other operational parameters necessary for system initialization, according to the locations specified in the boot option file (BOF) parameters. For more information about boot option files, see [Boot Options](#).

Configuration files are saved by executing explicit or implicit command syntax.

- An explicit save writes the configuration to the location specified in the `save` command syntax (the `file-url` option).
- An implicit save writes the configuration to the file specified in the primary configuration location.

If the `file-url` option is not specified in the `save` command syntax, the system attempts to save the current configuration to the current BOF primary configuration source. If the primary configuration source (path and/or filename) changed since the last boot, the new configuration source is used.

The `save` command includes an option to save both default and non-default configuration parameters (the `detail` option).

The `index` option specifies that the system preserves system indexes when a `save` command is executed, regardless of the persistent status in the BOF file. During a subsequent boot, the index file is read along with the configuration file. As a result, a number of system indexes are preserved between reboots, including the interface index, LSP IDs, and path IDs. This reduces resynchronizations of the Network Management System (NMS) with the affected network element.

If the save attempt fails at the destination, an error occurs and is logged. The system does not try to save the file to the secondary or tertiary configuration sources unless the path and filename are explicitly named with the `save` command.

Basic System Configuration

This section provides information to configure system parameters and provides configuration examples of common configuration tasks. The minimal system parameters that should be configured are:

- [System Information Parameters](#)
- [System Time Elements](#)

The following example displays a basic system configuration:

```
ALU-1>config>system# info
#-----
echo "System Configuration"
#-----
    name "ALU-1"
    coordinates "Unknown"
    snmp
    exit
    security
        snmp
            community "private" rwa version both
        exit
    exit
    time
        ntp
            server 192.168.15.221
            no shutdown
        exit
        sntp
            shutdown
        exit
        zone GMT
    exit
#-----
ALU-1>config>system#
```

Common Configuration Tasks

This section provides a brief overview of the tasks that must be performed to configure system parameters and provides the CLI commands.

- [System Information](#)
 - [System Information Parameters](#)
 - [System Time Elements](#)
- [Configuring Synchronization and Redundancy](#)
 - [Configuring Synchronization](#)
 - [Configuring Manual Synchronization](#)
 - [Forcing a Switchover](#)
 - [Configuring Synchronization Options](#)
- [Configuring ATM Parameters](#)
- [Configuring Backup Copies](#)
- [Configuring System Administration Parameters](#)
 - [Disconnect](#)
 - [Set-time](#)
 - [Display-config](#)
 - [Tech-support](#)
 - [Save](#)
 - [Reboot](#)
 - [Post-Boot Configuration Extension Files](#)
- [System Timing](#)
 - [Entering Edit Mode](#)
 - [Configuring Timing References](#)
 - [Configuring IEEE 1588v2 PTP](#)
 - [Configuring QL Values for SSM](#)
 - [Using the Revert Command](#)
 - [Other Editing Commands](#)
 - [Forcing a Specific Reference](#)

System Information

This section covers the basic system information parameters to configure the physical location of the 7705 SAR, contact information, router location information such as an address, floor, room number, global positioning system (GPS) coordinates, and system name.

Use the CLI syntax displayed below to configure the following system components:

- [System Information Parameters](#)
- [System Time Elements](#)

System Information Parameters

General system parameters include:

- [Name](#)
- [Contact](#)
- [Location](#)
- [CLLI Code](#)
- [Coordinates](#)

CLI Syntax: `config>system`
`name system-name`
`contact contact-name`
`location location`
`clli-code clli-code`
`coordinates coordinates`

Name

Use the `system name` command to configure a name for the device. The name is used in the prompt string. Only one system name can be configured. If multiple system names are configured, the last one encountered overwrites the previous entry.

Use the following CLI syntax to configure the system name:

CLI Syntax: `config>system`
`name system-name`

Example: `alcatel>config>system# name ALU-1`

Common Configuration Tasks

The following example displays the system name:

```
ALU-1>config>system# info
#-----
echo "System Configuration"
#-----
      name "ALU-1"
. . .
      exit
-----
ALU-1>config>system#
```

Contact

Use the `contact` command to specify the name of a system administrator, IT staff member, or other administrative entity.

CLI Syntax: `config>system`
`contact contact-name`

Example: `config>system# contact "Fred Information Technology"`

Location

Use the `location` command to specify the system location of the device. For example, enter the city, building address, floor, and room number where the router is located.

Use the following CLI syntax to configure the location:

CLI Syntax: `config>system`
`location location`

Example: `config>system# location "Bldg.1-floor 2-Room 201"`

CLLI Code

The Common Language Location Code (CLLI code) is an 11-character standardized geographic identifier that is used to uniquely identify the geographic location of a 7705 SAR.

Use the following CLI command syntax to define the CLLI code:

CLI Syntax: `config>system`
`clli-code clli-code`

Example: `config>system# clli-code abcdefg1234`

Coordinates

Use the optional `coordinates` command to specify the GPS location of the device. If the string contains spaces, the entire string must be enclosed within double quotes.

Use the following CLI syntax to configure the location:

CLI Syntax: `config>system`
 `coordinates coordinates`

Example: `config>system# coordinates "N 45 58 23, W 34 56 12"`

The following example displays the configuration output of the general system commands:

```
ALU-1>config>system# info
#-----
echo "System Configuration"
#-----
name "ALU-1"
    contact "Fred Information Technology"
    location "Bldg.1-floor 2-Room 201"
    clli-code "abcdefg1234"
    coordinates "N 45 58 23, W 34 56 12"

. . .
    exit
-----
ALU-1>config>system#
```

System Time Elements

The system clock maintains time according to Coordinated Universal Time (UTC). Configure information time zone and summer time (daylight savings time) parameters to correctly display time according to the local time zone.

Time elements include:

- [Zone](#)
- [Summer Time Conditions](#)
- [NTP](#)
- [SNTP](#)
- [CRON](#)

Common Configuration Tasks

CLI Syntax:

```
config>system
time
    dst-zone zone-name
        end {first | second | third | fourth | last}
            {sunday | monday | tuesday | wednesday |
            thursday | friday | saturday} {january |
            february | march | april | may | june | july
            | august | september | october | november |
            december} hours-minutes
        offset offset
    start {first | second | third | fourth | last}
        {sunday | monday | tuesday | wednesday |
        thursday | friday | saturday} {january |
        february | march | april | may | june | july
        | august | september | october | november |
        december} hours-minutes
ntp
    authentication-check
    authentication-key key-id {key key} [hash |
    hash2] {type des | message-digest}
    broadcastclient [router router-name]
        {interface ip-int-name} [authenticate]
    multicastclient [authenticate]
    server ip-address [key-id key-id] [version
    version] [prefer]
    no shutdown
sntp
    broadcast-client
    server-address ip-address [version
    version-number] [normal | preferred]
        [interval seconds]
    no shutdown
    zone {std-zone-name | non-std-zone-name} [hh[:mm]]
```

Zone

The zone command sets the time zone and/or time zone offset for the router. The 7705 SAR supports system-defined and user-defined time zones. The system-defined time zones are listed in [Table 25](#).

CLI Syntax:

```
config>system>time
    zone {std-zone-name | non-std-zone-name}
        [hh [:mm]]
```

Example:

```
config>system>time#
config>system>time# zone GMT
```


The following example displays the zone output:

```

ALU-1>config>system>time# info
-----
ntp
    server 192.168.15.221
    no shutdown
exit
sntp
    shutdown
exit
zone UTC
-----
ALU-1>config>system>time#

```

Table 25: System-defined Time Zones

Acronym	Time Zone Name	UTC Offset
Europe:		
GMT	Greenwich Mean Time	UTC
WET	Western Europe Time	UTC
WEST	Western Europe Summer Time	UTC +1 hour
CET	Central Europe Time	UTC +1 hour
CEST	Central Europe Summer Time	UTC +2 hours
EET	Eastern Europe Time	UTC +2 hours
EEST	Eastern Europe Summer Time	UTC +3 hours
MSK	Moscow Time	UTC +3 hours
MSD	Moscow Summer Time	UTC +4 hours
US and Canada:		
AST	Atlantic Standard Time	UTC -4 hours
ADT	Atlantic Daylight Time	UTC -3 hours
EST	Eastern Standard Time	UTC -5 hours
EDT	Eastern Daylight Saving Time	UTC -4 hours
CST	Central Standard Time	UTC -6 hours
CDT	Central Daylight Saving Time	UTC -5 hours
MST	Mountain Standard Time	UTC -7 hours

Table 25: System-defined Time Zones (Continued)

Acronym	Time Zone Name	UTC Offset
MDT	Mountain Daylight Saving Time	UTC -6 hours
PST	Pacific Standard Time	UTC -8 hours
PDT	Pacific Daylight Saving Time	UTC -7 hours
HST	Hawaiian Standard Time	UTC -10 hours
AKST	Alaska Standard Time	UTC -9 hours
AKDT	Alaska Standard Daylight Saving Time	UTC -8 hours
Australia and New Zealand:		
AWST	Western Standard Time	UTC +8 hours
ACST	Central Standard Time	UTC +9.5 hours
AEST	Eastern Standard/Summer Time	UTC +10 hours
NZT	New Zealand Standard Time	UTC +12 hours
NZDT	New Zealand Daylight Saving Time	UTC +13 hours

Summer Time Conditions

The `config>system>time>dst-zone` context configures the start and end dates and offset for summer time or daylight savings time to override system defaults or for user-defined time zones.

When configured, the time will be adjusted by adding the configured offset when summer time starts and subtracting the configured offset when summer time ends.

CLI Syntax:

```

config>system>time
dst-zone zone-name
    end {end-week} {end-day} {end-month}
    [hours-minutes]
    offset offset
    start {start-week} {start-day} {start-month}
    [hours-minutes]
    
```

Example:

```
config>system# time
config>system>time# dst-zone pt
config>system>time>dst-zone# start second sunday april
02:00
end first sunday october 02:00
config>system>time>dst-zone# offset 0
```

If the time zone configured is listed in [Table 25](#), then the starting and ending parameters and offset do not need to be configured with this command unless there is a need to override the system defaults. The command will return an error if the start and ending dates and times are not available either in [Table 25](#) or entered as optional parameters in this command.

The following example displays the configured parameters.

```
A:ALU-1>config>system>time>dst-zone# info
-----
start second sunday april 02:00
end first sunday october 02:00
offset 0
-----
A:ALU-1>config>system>time>dst-zone# offset 0
```

NTP

Network Time Protocol (NTP) is defined in RFC 1305, *Network Time Protocol (Version 3) Specification, Implementation and Analysis*. It allows for participating network nodes to keep time more accurately and maintain time in a synchronized manner between all participating network nodes.

NTP time elements include:

- [Authentication-check](#)
- [Authentication-key](#)
- [Broadcastclient](#)
- [Multicastclient](#)
- [Server](#)

CLI Syntax:

```
config>system
time
    ntp
        authentication-check
        authentication-key key-id {key key} [hash |
            hash2] {type des | message-digest}
        broadcastclient [router router-name]
            {interface ip-int-name} [authenticate]
        multicastclient [authenticate]
```

Common Configuration Tasks

```
peer ip-address [key-id key-id] [version
version]
server ip-address [key-id key-id] [version
version] [prefer]
no shutdown
```

Authentication-check

The `authentication-check` command provides for the option to skip the rejection of NTP PDUs that do not match the authentication key or authentication type requirements. The default behavior when authentication is configured is to reject all NTP protocol PDUs that have a mismatch in either the authentication key ID, type, or key.

When `authentication-check` is configured, NTP PDUs are authenticated on receipt. However, mismatches cause a counter to be increased, one counter for key ID, one for type, and one for key value mismatches.

CLI Syntax: `config>system>time>ntp
authentication-check`

Example: `config>system>time>ntp#
config>system>time>ntp# authentication-check
config>system>time>ntp# no shutdown`

Authentication-key

This command configures an authentication key ID, key type, and key used to authenticate NTP PDUs sent to and received from other network elements participating in the NTP protocol. For authentication to work, the authentication key ID, authentication type, and authentication key value must match.

CLI Syntax: `config>system>time>ntp
authentication-key key-id {key key} [hash | hash2]
type {des | message-digest}`

Example: `config>system>time>ntp#
config>system>time>ntp# authentication-key 1 key A type
des
config>system>time>ntp# no shutdown`

The following example shows NTP disabled with the `authentication-key` parameter enabled.

```
A:ALU-1>config>system>time>ntp# info
-----
      shutdown
      authentication-key 1 key "OAwgNULbZgI" hash2 type des
-----
A:ALU-1>config>system>time>ntp#
```

Broadcastclient

The `broadcastclient` command enables listening to NTP broadcast messages on the specified interface.

CLI Syntax:

```
config>system>time>ntp
      broadcastclient[router router-name] {interface
      ip-int-name} [authenticate]
```

Example:

```
config>system>time>ntp#
config>system>time>ntp# broadcastclient interface int11
config>system>time>ntp# no shutdown
```

The following example shows NTP enabled with the `broadcastclient` parameter enabled.

```
ALU-1>config>system>time# info
-----
      ntp
      broadcastclient interface int11
      no shutdown
      exit
      dst-zone PT
      start second sunday april 02:00
      end first sunday october 02:00
      offset 0
      exit
      zone UTC
-----
ALU-1>config>system>time#
```

Common Configuration Tasks

Multicastclient

This command is used to configure an address to receive multicast NTP messages on the CSM Management port. The `no` form of this command removes the multicast client.

If `multicastclient` is not configured, all NTP multicast traffic will be ignored.

CLI Syntax: `config>system>time>ntp
multicastclient [authenticate]`

Example: `config>system>time>ntp#
config>system>time>ntp# multicastclient authenticate
config>system>time>ntp# no shutdown`

The following example shows NTP enabled with the `multicastclient` command configured.

```
ALU-1>config>system>time# info
-----
server 192.168.15.221
multicastclient
no shutdown
-----
ALU-1>config>system>time##
```

Server

The `server` command is used when the node should operate in client mode with the NTP server specified in the address field. Use the `no` form of this command to remove the server with the specified address from the configuration.

Up to five NTP servers can be configured.

CLI Syntax: `config>system>time>ntp
server ip-address [key-id key-id] [version version]
[prefer]`

Example: `config>system>time>ntp#
config>system>time>ntp# server 192.168.1.1 key-id 1
config>system>time>ntp# no shutdown`

The following example shows NTP enabled with the server command configured.

```
A:sim1>config>system>time>ntp# info
-----
          no shutdown
          server 192.168.1.1 key 1
-----
A:sim1>config>system>time>ntp#
```

SNTP

SNTP is a compact, client-only version of the NTP. SNTP can only receive the time from SNTP/NTP servers; it cannot be used to provide time services to other systems. SNTP can be configured in either broadcast or unicast client mode.

SNTP time elements include:

- [Broadcast-client](#)
- [Server-address](#)

CLI Syntax:

```
config>system
time
    sntp
        broadcast-client
        server-address ip-address [version
            version-number] [normal | preferred]
            [interval seconds]
        no shutdown
```

Broadcast-client

The `broadcast-client` command enables listening at the global device level to SNTP broadcast messages on interfaces with broadcast client enabled.

CLI Syntax:

```
config>system>time>sntp
    broadcast-client
```

Example:

```
config>system>time>sntp#
config>system>time>sntp# broadcast-client
config>system>time>sntp# no shutdown
```

Common Configuration Tasks

The following example shows SNTP enabled with the `broadcast-client` parameter enabled.

```
ALU-1>config>system>time# info
-----
      sntp
        broadcast-client
        no shutdown
      exit
      dst-zone PT
        start second sunday april 02:00
        end first sunday october 02:00
        offset 0
      exit
      zone GMT
-----
ALU-1>config>system>time#
```

Server-address

The `server-address` command configures an SNTP server for SNTP unicast client mode.

CLI Syntax: `config>system>time>sntp#`
`config>system>time>sntp# server-address ip-address`
`version version-number] [normal | preferred] [interval`
`seconds]`

Example: `config>system>time>sntp#`
`config>system>time# server-address 10.10.0.94 version`
`1 preferred interval 100`

The following example shows SNTP enabled with the `server-address` parameter configured.

```
ALU-1>config>system>time# info
-----
      sntp
        server-address 10.10.0.94 version 1 preferred interval 100
        no shutdown
      exit
      dst-zone PT start-date 2006/04/04 12:00 end-date 2006/10/25 12:00
      zone GMT
-----
ALU-1>config>system>time#
```


CRON

The CRON command supports the Service Assurance Agent (SAA) functions as well as the ability to schedule turning on and off policies to meet “Time of Day” requirements. CRON functionality includes the ability to specify the commands that need to be run, when they will be scheduled, including one-time only functionality (oneshot), interval and calendar functions, as well as where to store the output of the results. In addition, CRON can specify the relationship between input, output, and schedule. Scheduled reboots, peer turn ups, service assurance agent tests and more can all be scheduled with CRON, as well as OAM events, such as connectivity checks or troubleshooting runs.

CRON elements include:

- [Action](#)
- [Schedule](#)
- [Script](#)

```

CLI Syntax:  config>cron
                 action action-name [owner action-owner]
                   expire-time {seconds | forever}
                   lifetime {seconds | forever}
                   max-completed unsigned
                   results file-url
                   script script-name [owner owner-name]
                   no shutdown
                 schedule schedule-name [owner schedule-owner]
                   action action-name [owner owner-name]
                   count number
                   day-of-month {day-number [..day-number] | all}
                   description description-string
                   end-time [date | day-name] time
                   hour {hour-number [..hour-number] | all}
                   interval seconds
                   minute {minute-number [..minute-number] | all}
                   month {month-number [..month-number] | month-
                       name [..month-name] | all}
                   no shutdown
                   type {periodic | calendar | oneshot}
                   weekday {weekday-number [..weekday-number] |
                       day-name [..day-name] | all}
                 script script-name [owner script-owner]
                   description description-string
                   location file-url
                   no shutdown

```

Common Configuration Tasks

Action

Use this command to configure the parameters for a script, including the maximum amount of time to keep the results from a script run, the maximum amount of time a script may run, the maximum number of script runs to store, and the location to store the results.

```
CLI Syntax:  config>cron
                action action-name [owner action-owner]
                expire-time {seconds | forever}
                lifetime {seconds | forever}
                max-completed unsigned
                results file-url
                script script-name [owner script-owner]
                shutdown
```

```
Example:     config>cron# action test
config>cron>action# results ftp://172.22.184.249/./sim1/
                test-results
config>cron>action# no shutdown
```

The following example shows a script named “test” receiving an action to store its results in a file called “test-results”:

```
A:ALU-1>config>cron# info
-----
script "test"
  location "ftp://172.22.184.249/./sim1/test.cfg"
  no shutdown
exit
action "test"
  results "ftp://172.22.184.249/./sim1/test-results"
  no shutdown
exit
```

Schedule

The schedule function configures the type of schedule to run, including one-time-only (oneshot), periodic, or calendar-based runs. All runs are determined by month, day of month or weekday, hour, minute and interval (seconds). If end-time and interval are both configured, whichever condition is reached first is applied.

```
CLI Syntax:  config>cron
                schedule schedule-name [owner schedule-owner]
                action action-name [owner owner-name]
                count number
                day-of-month {day-number [..day-number] | all}
                description description-string
                end-time [date | day-name] time
```

```

hour {hour-number [..hour-number] | all}
interval seconds
minute {minute-number [..minute-number] | all}
month {month-number [..month-number] | month-
      name [..month-name] | all}
no shutdown
type {periodic | calendar | oneshot}
weekday {weekday-number [..weekday-number] |
        day-name [..day-name] | all}
shutdown

```

```

Example:  config>cron# schedule test2
             config>cron>sched# day-of-month 17
             config>cron>sched# end-time 2010/09/17 12:00
             config>cron>sched# minute 0 15 30 45
             config>cron>sched# weekday friday
             config>cron>sched# shutdown

```

The following example schedules a script named “test2” to run every 15 minutes on the 17th of each month and every Friday until noon on September 17, 2010:

```

*A:ALU-1>config>cron# info
-----
      schedule "test2"
      shutdown
      day-of-month 17
      minute 0 15 30 45
      weekday friday
      end-time 2010/09/17 12:00
      exit
-----
*A:ALU-1>config>cron#

```

Script

The `script` command opens a new nodal context which contains information on a script.

```

CLI Syntax:  config>cron
                script script-name [owner script-owner]
                description description-string
                location file-url
                shutdown

```

```

Example:    config>cron# script test
               config>cron>script#

```

Common Configuration Tasks

The following example names a script “test”:

```
A:sim1>config>cron# info
-----
    script "test"
      location "ftp://172.22.184.249/./sim1/test.cfg"
      no shutdown
    exit
-----
A:sim1>config>cron#
```

Configuring Synchronization and Redundancy

Use the CLI syntax displayed below to configure various synchronization and redundancy parameters:

- [Configuring Synchronization](#)
- [Configuring Manual Synchronization](#)
- [Forcing a Switchover](#)
- [Configuring Synchronization Options](#)

Configuring Synchronization

The `switchover-exec` command specifies the location and name of the CLI script file executed following a redundancy switchover from the previously active CSM card.

CLI Syntax: `config>system`
`switchover-exec file-url`

Configuring Manual Synchronization

Automatic synchronization can be configured in the `config>system>synchronization` context.

Manual synchronization can be configured with the following command:

CLI Syntax: `admin`
`redundancy`
`synchronize {boot-env | config}`

Example: `admin>redundancy# synchronize config`

The following shows the output that displays during a manual synchronization:

```
ALU-1>admin# synchronize config
Syncing configuration.....
Syncing configuration.....Completed.
ALU-1#
```

Forcing a Switchover

The `force-switchover now` command forces an immediate switchover to the standby CSM card.

CLI Syntax: `admin>redundancy
force-switchover [now]`

Example: `admin>redundancy# force-switchover now`

```
ALU-1# admin redundancy force-switchover now
ALU-1y#
Resetting...
?
```

If the active and standby CSMs are not synchronized for some reason, users can manually synchronize the standby CSM by rebooting the standby by issuing the `admin reboot standby` command on the active or the standby CSM.

Configuring Synchronization Options

Network operators can specify the type of synchronization operation to perform between the primary and secondary CSMs after a change has been made to the configuration files or the boot environment information contained in the boot options file (BOF).

Use the following CLI command to configure the `boot-env` option:

CLI Syntax: `config>redundancy
synchronize {boot-env | config}`

Example: `config>system# synchronize boot-env`

Common Configuration Tasks

The following displays the configuration:

```
*ALU-1>config>redundancy# synchronize boot-env
*ALU-1>config>redundancy# show redundancy synchronization
=====
Synchronization Information
=====
Standby Status           : disabled
Last Standby Failure    : N/A
Standby Up Time         : N/A
Failover Time           : N/A
Failover Reason         : N/A
Boot/Config Sync Mode   : Boot Environment
Boot/Config Sync Status : No synchronization
Last Config File Sync Time : Never
Last Boot Env Sync Time : Never
=====
```

Use the following CLI command to configure the config option:

CLI Syntax: config>system
 synchronize {boot-env | config}

Example: config>system# synchronize config

The following example displays the configuration.

```
ALU-1>config>system# synchronize config
ALU-1>config>system# show system synchronization
=====
Synchronization Information
=====
Synchronize Mode       : Configuration
Synchronize Status     : No synchronization
Last Config Sync Time  : 2006/06/27 09:17:15
Last Boot Env Sync Time : 2006/06/24 07:16:37
=====
ALU-1>config>system#
```

Configuring ATM Parameters

The ATM context configures system-wide ATM parameters.

CLI Syntax: config>system#
 atm
 atm-location-id *location-id*

Example: config>system# atm
 config>system>atm# atm-location-id
 03:00:00:00:00:00:00:00:00:00:00:00:00:00

The following example shows the ATM configuration.

```
ALU-1>config>system>atm# info
-----
                atm-location-id 03:00:00:00:00:00:00:00:00:00:00:00:00:00
exit
-----
ALU-1>config>system>atm#
```

Configuring Backup Copies

The `config-backup` command allows you to specify the maximum number of backup versions of configuration and index files kept in the primary location.

For example, if the `config-backup count` is set to 5 and the configuration file is called **xyz.cfg**, the file **xyz.cfg** is saved with a .1 extension when the `save` command is executed. Each subsequent `config-backup` command increments the numeric extension until the maximum count is reached. The oldest file (5) is deleted as more recent files are saved.

- xyz.cfg
- xyz.cfg.1
- xyz.cfg.2
- xyz.cfg.3
- xyz.cfg.4
- xyz.cfg.5
- xyz.ndx

Each persistent index file is updated at the same time as the associated configuration file. When the index file is updated, then the `save` is performed to **xyz.cfg** and the index file is created as **xyz.ndx**. Synchronization between the active and standby CSMs is performed for all configurations and their associated persistent index files.

CLI Syntax: `config>system`
 `config-backup count`

Example: `config>system#`
 `config>system# config-backup 7`

The following example shows the `config-backup` configuration.

```
ALU-1>config>system> info
#-----
echo "System Configuration"
#-----
                name "ALU-1"
                contact "Fred Information Technology"
                location "Bldg.1-floor 2-Room 201"
```

Common Configuration Tasks

```
cli-code "abcdefg1234"  
coordinates "N 45 58 23, W 34 56 12"  
config-backup 7  
...  
-----  
ALU-1>config>system>
```

Configuring System Administration Parameters

Use the CLI syntax displayed below to configure various system administration parameters.

Administrative parameters include:

- [Disconnect](#)
- [Set-time](#)
- [Display-config](#)
- [Tech-support](#)
- [Save](#)
- [Reboot](#)
- [Post-Boot Configuration Extension Files](#)

CLI Syntax: `admin`

```
disconnect [address ip-address | username user-name  
           | {console | telnet | ftp | ssh}]  
display-config [detail | index]  
reboot [active | standby] [upgrade] [now]  
set-time date time  
save [file-url] [detail] [index]
```

Disconnect

The `disconnect` command immediately disconnects a user from a console, Telnet, FTP, or SSH session.



Note: Configuration modifications are saved to the primary image file.

CLI Syntax: admin
 disconnect [address *ip-address* | username *user-name*
 | {console | telnet | ftp | ssh}]

Example: admin# disconnect

The following example displays the disconnect command results.

```
ALU-1>admin# disconnect
ALU-1>admin# Logged out by the administrator
Connection to host lost.
```

Set-time

Use the `set-time` command to set the system date and time. The time entered should be accurate for the time zone configured for the system. The system will convert the local time to UTC before saving to the system clock which is always set to UTC. If SNTP or NTP is enabled (`no shutdown`), this command cannot be used. The `set-time` command does not take into account any daylight saving offset if defined.

CLI Syntax: admin
 set-time *date time*

Example: admin# set-time 2010/09/24 14:10:00

The following example displays the `set-time` command results.

```
ALU-1# admin set-time 2010/09/24 14:10:00
ALU-1# show time
Fri Sept 24 14:10:25 UTC 2010
ALU-1#
```

Display-config

The `display-config` command displays the system's running configuration.

CLI Syntax: admin
 display-config [detail] [index]

Example: admin# display-config detail

Common Configuration Tasks

The following example displays a portion of the `display-config detail` command results.

```
ALU-1>admin# display-config detail
# TiMOS-B-0.0.current both/i386 ALCATEL-LUCENT SAR 7705
# Copyright (c) 2000-2010 Alcatel-Lucent.
# All rights reserved. All use subject to applicable license agreements.
# Built on Fri Sept 24 01:32:43 EDT 2010 by csabuild in /rel0.0/i270/panos/main

# Generated FRI SEPT 24 14:48:31 2010 UTC

exit all
configure
#-----
echo "System Configuration"
#-----
  system
    name "ALU-1"
    contact "Fred Information Technology"
    location "Bldg.1-floor 2-Room 201"
    cli-code "abcdefg1234"
    coordinates "N 45 58 23, W 34 56 12"
    config-backup 7
    boot-good-exec "ftp://*:*@xxx.xxx.xxx.xx/home/csahwreg17/images/env.cfg"
    no boot-bad-exec
    no switchover-exec
    snmp
      engineID "0000197f00006883ff000000"
      packet-size 1500
      general-port 161
      no shutdown
    exit
    login-control
      ftp
        inbound-max-sessions 3
      exit
      telnet
        inbound-max-sessions 5
        outbound-max-sessions 5
      exit
      idle-timeout 1440
      pre-login-message "Property of Service Routing Inc.Unauthorized access
prohibited."
      motd text "Notice to all users: Software upgrade scheduled 3/2 1:00 AM"
      login-banner
      no exponential-backoff
    exit
    atm
      no atm-location-id
    exit
    security
      management-access-filter
        default-action permit
        entry 1
          no description
    ...
ALU-1>admin#
```

Tech-support

The `tech-support` command creates a system core dump.



Note: This command should only be used with explicit authorization and direction from the Alcatel-Lucent Technical Assistance Center (TAC).

Save

The `save` command saves the running configuration to a configuration file. When the `debug-save` parameter is specified, debug configurations are saved in the config file. If this parameter is not specified, debug configurations are not saved between reboots.

CLI Syntax:

```
admin
    save [file-url] [detail] [index]
    debug-save [file-url]
```

Example:

```
admin# save ftp://test:test@192.168.x.xx/./1.cfg
admin# debug-save debugsave.txt
```

The following example displays the `save` command results.

```
ALU-1>admin# save ftp://test:test@192.168.x.xx/./1x.cfg
Writing file to ftp://test:test@192.168.x.xx/./1x.cfg
Saving configuration ...Completed.
ALU-1>admin# debug-save ftp://test:test@192.168.x.xx/./debugsave.txt
Writing file to ftp://julie:julie@192.168.x.xx/./debugsave.txt
Saving debug configuration .....Completed.
```

Reboot

The `reboot` command reboots the router, including redundant CSMs in redundant systems. If the `now` option is not specified, you are prompted to confirm the reboot operation. The `reboot upgrade` command forces an upgrade of the boot ROM and a reboot.

CLI Syntax:

```
admin
    reboot [active | standby] | [upgrade] [now]
```

Example:

```
admin# reboot now
```

Common Configuration Tasks

If synchronization fails, the standby does not reboot automatically. The `show redundancy synchronization` command displays synchronization output information.

Post-Boot Configuration Extension Files

Two post-boot configuration extension files are supported and are triggered when either a successful or failed boot configuration file is processed. The commands specify URLs for the CLI scripts to be run following the completion of the boot-up configuration. A URL must be specified or no action is taken. The commands are persistent between router (re)boots and are included in the configuration saves (`admin>save`).

CLI Syntax:

```
config>system
    boot-bad-exec file-url
    boot-good-exec file-url
```

Example:

```
config>system# boot-bad-exec ftp://t:t@192.168.xx.xxx/./fail.cfg
config>system# boot-good-exec ftp://test:test@192.168.xx.xxx/./ok.cfg
```

The following example displays the command output:

```
ALU-1>config>system# info
#-----
echo "System Configuration"
#-----
    name "ALU-1"
    contact "Fred Information Technology"
    location "Bldg.1-floor 2-Room 201"
    cli-code "abcdefg1234"
    coordinates "N 45 58 23, W 34 56 12"
    config-backup 7
    boot-good-exec "ftp://test:test@192.168.xx.xxx/./ok.cfg"
    boot-bad-exec "ftp://test:test@192.168.xx.xxx/./fail.cfg"
    sync-if-timing
        begin
        ref-order ref1 ref2 bits
    ..
#-----
ALU-1>config>system#
```

Show Command Output and Console Messages

The `show>system>information` command displays the current value of the bad/good exec URLs and indicates whether a post-boot configuration extension file was executed when the system was booted. If an extension file was executed, the `show>system>information` command also indicates if it completed successfully or not.

```
A:ALU-1# show system information
```

```
=====
System Information
=====
System Name           : ALU-1
System Type           : 7705 SAR-8
System Version        : B-5.0.R3
System Contact        : Fred Information Technology
System Location       : Bldg.1-floor 2-Room 201
System Coordinates    : N 45 58 23, W 34 56 12
System Active Slot    : A
System Up Time        : 1 days, 02:03:17.62 (hr:min:sec)

SNMP Port             : 161
SNMP Engine ID        : 0000197f000000164d3c3910
SNMP Max Message Size : 1500
SNMP Admin State      : Enabled
SNMP Oper State       : Enabled
SNMP Index Boot Status : Not Persistent
SNMP Sync State       : OK

Telnet/SSH/FTP Admin  : Enabled/Enabled/Disabled
Telnet/SSH/FTP Oper   : Up/Up/Down

BOF Source            : cf3:
Image Source          : primary
Config Source         : primary
Last Booted Config File: cf3:/config.cfg
Last Boot Cfg Version : FRI APR 20 16:24:27 2007 UTC
Last Boot Config Header: # TiMOS-B-0.0.I346 both/i386 ALCATEL-LUCENT SAR 7705
                        # Copyright (c) 2000-2008 Alcatel-Lucent. # All rights
                        reserved. All use subject to applicable license
                        agreements. # Built on Tue Mar 11 01:43:47 EDT 2008 by
                        csabuild in /rel0.0/I346/panos/main # Generated TUE
                        MAR 11 20:00:37 2008 UTC

Last Boot Index Version: N/A
Last Boot Index Header : # TiMOS-B-0.0.I346 both/i386 ALCATEL-LUCENT SAR 7705
                        # Copyright (c) 2000-2008 Alcatel-Lucent. # All rights
                        reserved. All use subject to applicable license
                        agreements. # Built on Tue Mar 11 01:43:47 EDT 2008 by
                        csabuild in /rel0.0/I346/panos/main # Generated TUE
                        MAR 11 20:00:37 2008 UTC

Last Saved Config     : N/A
Time Last Saved       : N/A
Changes Since Last Save: Yes
Time Last Modified    : 2008/03/25 10:03:09
Max Cfg/BOF Backup Rev : 5
Cfg-OK Script         : N/A
Cfg-OK Script Status  : not used
```

Common Configuration Tasks

```
Cfg-Fail Script      : N/A
Cfg-Fail Script Status : not used

Management IP Addr   : 192.168.1.202/24
DNS Server           :
192.168.x.x
DNS Domain           :
domain.com
BOF Static Routes    :
  To                 Next Hop
  192.168.0.0/16     192.168.1.1
ATM Location ID      : 01:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00
ATM OAM Retry Up     : 2
ATM OAM Retry Down   : 4
ATM OAM Loopback Period: 10
ICMP Vendor Enhancement: Disabled
=====
A:ALU-1#
```

When executing a post-boot configuration extension file, status messages are output to the console screen prior to the “Login” prompt.

The following is an example of a failed boot-up configuration that caused a boot-bad-exec file containing another error to be executed:

```
Attempting to exec configuration file:
'ftp://test:test@192.168.xx.xxx/./12.cfg' ...
System Configuration
Log Configuration
MAJOR: CLI #1009 An error occurred while processing a CLI command -
File ftp://test:test@192.168.xx.xxx/./12.cfg, Line 195: Command "log" failed.
CRITICAL: CLI #1002 An error occurred while processing the configuration file.
The system configuration is missing or incomplete.
MAJOR: CLI #1008 The SNMP daemon is disabled.
If desired, enable SNMP with the 'config>system>snmp no shutdown' command.
Attempting to exec configuration failure extension file:
'ftp://test:test@192.168.xx.xxx/./fail.cfg' ...
Config fail extension
Enabling SNMP daemon
MAJOR: CLI #1009 An error occurred while processing a CLI command -
File ftp://test:test@192.168.xx.xxx/./fail.cfg, Line 5: Command "abc log" failed.
TiMOS-B-5.0.R3 both/hops Alcatel-Lucent 7705 SAR Copyright (c) 2000-2009 Alcatel
Lucent.
All rights reserved. All use subject to applicable license agreements.
Built on Wed Feb 18 12:45:00 EST 2009 by builder in /rel5.0/b1/R3/panos/main
```

System Timing

If network timing is required for the synchronous interfaces in a 7705 SAR, a timing subsystem is utilized to provide a Stratum 3 quality clock to all synchronous interfaces within the system. The clock source is specified in the `config>port>tdm>ds1 | e1>clock-source` context.

This section describes the commands used to configure and control the timing subsystem.

- [Entering Edit Mode](#)
- [Configuring Timing References](#)
- [Configuring IEEE 1588v2 PTP](#)
- [Configuring QL Values for SSM](#)
- [Using the Revert Command](#)
- [Other Editing Commands](#)
- [Forcing a Specific Reference](#)

CLI Syntax:

```

config>system>sync-if-timing
  abort
  begin
  commit
  external
    input-interface
      impedance {high-impedance | 50-ohm |
        75-ohm}
      type {2048khz-G703 | 5mhz | 10mhz}
    output-interface
      type {2048khz-G703 | 5mhz | 10mhz}
  ref-order first second [third]
  ref1
    source-port port-id [adaptive]
    no shutdown
  ref2
    source-port port-id [adaptive]
    no shutdown
  revert

```

Entering Edit Mode

To enter the mode to edit timing references, you must enter the `begin` keyword at the `config>system>sync-if-timing#` prompt.

Use the following CLI syntax to enter the edit mode:

CLI Syntax: `config>system>sync-if-timing
begin`

The following error message displays when the you try to modify `sync-if-timing` parameters without entering `begin` first.

```
ALU-1>config>system>sync-if-timing>ref1# source-port 1/1/1
MINOR: CLI The sync-if-
timing must be in edit mode by calling begin before any changes
can be made.
MINOR: CLI Unable to set source port for ref1 to 1/1/1.
ALU-1>config>system>sync-if-timing>ref1#
```

Configuring Timing References

The following example shows the command usage:

Example:

```
config>system# sync-if-timing
config>system>sync-if-timing# begin
config>system>sync-if-timing# ref1
config>system>sync-if-timing>ref1# source-port 1/1/1
config>system>sync-if-timing>ref1# no shutdown
config>system>sync-if-timing>ref1# exit
config>system>sync-if-timing# ref2
config>system>sync-if-timing>ref2# source-port 1/1/2
config>system>sync-if-timing>ref2# no shutdown
config>system>sync-if-timing>ref2# exit
config>system>sync-if-timing>commit
```

The following displays the timing reference parameters:

```
ALU-1>config>system>sync-if-timing# info
-----
ref-order ref2 ref1
ref1
  source-port 1/1/1
  no shutdown
exit
ref2
  no shutdown
  source-port 1/1/2
```



```
exit
```

Configuring IEEE 1588v2 PTP

Use the following CLI syntax to configure basic IEEE 1588v2 PTP parameters.

```
CLI Syntax:  config>system>ptp
                clock clock-id [create]
                clock-mds mds-id
                clock-type {ordinary [master | slave] |
                            boundary}
                domain domain-value
                dynamic-peers
                priority1 priority-value
                priority2 priority-value
                profile ieee1588-20008
                profile itu-telecom-freq
                ptp-port port-id
                    anno-rx-timeout number-of-timeouts
                    log-anno-interval log-anno-interval
                    log-sync-interval log-sync-interval
                    peer peer-id ip-address ip-address
                    [no] shutdown
                    unicast-negotiate
                [no] shutdown
                source-interface ip-if-name
```

```
CLI Syntax:  config>system>sync-if-timing
                ref1
                    source-ptp-clock clock-id
                ref2
                    source-ptp-clock clock-id
```

The following example shows the command usage:

```
Example:     config>system# ptp clock 1 create
config>system>ptp>clock# clock-type ordinary slave
config>system>ptp>clock# source-interface ptp-loop
config>system>ptp>clock# clock-mds 1/2
config>system>ptp>clock# domain 0
config>system>ptp>clock# no dynamic-peers
config>system>ptp>clock# priority1 128
config>system>ptp>clock# priority2 128
config>system>ptp>clock# profile ieee1588-2008
config>system>ptp>clock# ptp-port 1
config>system>ptp>clock>ptp-port# anno-rx-timeout 3
config>system>ptp>clock>ptp-port# log-anno-interval 1
```

Common Configuration Tasks

```
config>system>ptp>clock>ptp-port# log-sync-interval -6
config>system>ptp>clock>ptp-port# unicast-negotiate
config>system>ptp>clock>ptp-port# peer 1
config>system>ptp>clock>ptp-port>peer# description "Peer
to Boundary Clock"
config>system>ptp>clock>ptp-port>peer# ip-address
10.222.222.10
config>system>ptp>clock>ptp-port>peer# exit
config>system>ptp>clock>ptp-port# peer 2
config>system>ptp>clock>ptp-port>peer# description ToGM
config>system>ptp>clock>ptp-port>peer# ip-address
192.168.2.10
config>system>ptp>clock>ptp-port>peer# exit
config>system>ptp>clock>ptp-port# no shutdown
config>system>ptp>clock>ptp-port# exit
config>system>ptp>clock# no shutdown
config>system>ptp>clock# exit
config>system>ptp# exit
config>system# sync-if-timing begin
config>system>sync-if-timing# ref1
config>system>sync-if-timing>ref1# source-ptp-clock 1
config>system>sync-if-timing>ref1# no shutdown
config>system>sync-if-timing>ref1# exit
```

The following display shows a basic IEEE 1588v2 PTP configuration:

```
ALU-1>config>system>ptp># info
#-----
echo "System IEEE 1588 PTP Configuration"
#-----
system
  ptp
    clock 1 create
      clock-type ordinary slave
      source-interface "ptp loop"
      clock-mdt 1/2
      domain 0
      no dynamic-peers
      priority1 128
      priority2 128
      profile ieee1588-2008
      ptp-port 1
        anno-rx-timeout 3
        log-anno-interval 1
        log-sync-interval -6
        unicast-negotiate
        peer 1
          description "Peer to Boundary Clock"
          ip-address 10.222.222.10
        exit
        peer 2
          description "ToGM"
          ip-address 192.168.2.10
        exit
```

no shutdown

Common Configuration Tasks

```
        exit
      no shutdown
    exit
  exit
exit
```

Configuring QL Values for SSM

Use the following syntax to configure the quality level (QL) values for Synchronization Status Messaging (SSM).

CLI Syntax:

```
config>system>sync-if-timing
  abort
  begin
  external
    input-interface
      impedance {high-impedance | 50-ohm |
        75-ohm}
      no shutdown
      ql-override {prs | stu | st2 | tnc | st3e
        | st3 | smc | prc | ssu-a | ssu-b | sec
        | eec1 | eec2}
      type {2048khz-G703 | 5mhz | 10mhz}
  commit
  bits
    input
      [no] shutdown
      interface-type {ds1[{{esf|sf}}] | e1[{{pcm30crc |
        pcm31crc}}] | 2048khz-G703}
    output
      line-length {110|220|330|440|550|660}
      [no] shutdown
      ql-override {prs | stu | st2 | tnc | st3e | st3
        | smc | prc | ssu-a | ssu-b | sec | eec1 |
        eec2}
      ssm-bit sa-bit
      [no] shutdown
    ql-selection
    ref-order first second [third]
  ref1
    ql-override {prs | stu | st2 | tnc | st3e | st3
      | smc | prc | ssu-a | ssu-b | sec | eec1 |
      eec2}
    source-port port-id adaptive
    no shutdown
```

```

ref2
    ql-override {prs | stu | st2 | tnc | st3e | st3
                | smc | prc | ssu-a | ssu-b | sec | eec1 |
                eec2}
    source-port port-id adaptive
    no shutdown

```

The following example shows the command usage:

```

Example:  config>system# sync-if-timing
             config>system>sync-if-timing# begin
             config>system>sync-if-timing# external
             config>system>sync-if-timing>external# input-interface
             config>system>sync-if-timing>external>input-interface#
             impedance 50-Ohm
             config>system>sync-if-timing>external>input-interface#
             no shutdown
             config>system>sync-if-timing>external>input-interface#
             ql-override prs
             config>system>sync-if-timing>external>input-interface#
             exit
             config>system>sync-if-timing>external# exit
             config>system>sync-if-timing# commit
             config>system>sync-if-timing# bits
             config>system>sync-if-timing>bits# interface-type
             2048khz-G703
             config>system>sync-if-timing>bits# ssm-bit 8
             config>system>sync-if-timing>bits# output
             config>system>sync-if-timing>bits>output# line-length
             220
             config>system>sync-if-timing>bits>output# no shutdown
             config>system>sync-if-timing>bits>output# exit
             config>system>sync-if-timing>bits# ql-override prs
             config>system>sync-if-timing>bits# exit
             config>system>sync-if-timing# ql-selection
             config>system>sync-if-timing# ref1
             config>system>sync-if-timing>ref1# shutdown
             config>system>sync-if-timing>ref1# ql-override prs
             config>system>sync-if-timing>ref1# exit
             config>system>sync-if-timing# ref2
             config>system>sync-if-timing>ref2# no shutdown
             config>system>sync-if-timing>ref2# ql-override prs
             config>system>sync-if-timing>ref2# exit
             config>system>sync-if-timing# exit

```

Common Configuration Tasks

The following display shows a basic SSM QL configuration for the 7705 SAR-8:

```
ALU-1>config>system>sync-if-timing# info
-----
ref-order external ref1 ref2
      ql-selection
      external
      input-interface
      no shutdown
      impedance 50-Ohm
      type 2048Khz-G703
      ql-override prs
      exit
      output-interface
      type 2048Khz-G703
      exit
exit
ref1
      no shutdown
      no source-port
      ql-override prs
exit
ref2
      no shutdown
      no source-port
      ql-override prs
exit
no revert
-----
*ALU-1>>config>system>sync-if-timing#
```

The following display shows a basic SSM QL configuration for the 7705 SAR-18:

```
ALU-1>config>system>sync-if-timing# info
-----
ref-order external ref1 ref2
      ql-selection
      exit
      bits
      interface-type 2048Khz-G703
      ssm-bit 8
      ql-override prs
      output
      line-length 220
      no shutdown
      exit
ref1
      no shutdown
      no source-port
      ql-override prs
exit
ref2
      no shutdown
      no source-port
      ql-override prs
exit
no revert
-----
```

Using the Revert Command

The `revert` command allows the clock to revert to a higher-priority reference if the current reference goes offline or becomes unstable. With revertive switching enabled, the highest-priority valid timing reference will be used. If a reference with a higher priority becomes valid, a reference switchover to that reference will be initiated. If a failure on the current reference occurs, the next highest reference takes over.

With non-revertive switching, the active reference will always remain selected while it is valid, even if a higher-priority reference becomes available. If this reference becomes invalid, a reference switchover to a valid reference with the highest priority will be initiated. When the failed reference becomes operational, it is eligible for selection.

CLI Syntax: `config>system>sync-if-timing
revert`

Other Editing Commands

Other editing commands include:

- `commit` — saves changes made to the timing references during a session. Modifications are not persistent across system boots unless this command is entered.
- `abort` — discards changes that have been made to the timing references during a session.

CLI Syntax: `config>system>sync-if-timing
abort
commit`

Forcing a Specific Reference

You can force the system synchronous timing output to use a specific reference.



Note: The `debug sync-if-timing force-reference` command should only be used to test and debug problems. Once the system timing reference input has been forced, it will not revert back to another reference unless explicitly reconfigured.

Common Configuration Tasks

When the command is executed, the current system synchronous timing output is immediately referenced from the specified reference input. If the specified input is not available (shut down), or in a disqualified state, the timing output will enter a holdover state based on the previous input reference.

Debug configurations are not saved between reboots.

CLI Syntax: `debug>sync-if-timing
force-reference {external | ref1 | ref2}`

Example: `debug>sync-if-timing# force-reference`

Configuring System Monitoring Thresholds

Creating Events

The `event` command controls the generation and notification of threshold crossing events configured with the `alarm` command. When a threshold crossing event is triggered, the `rmon event` configuration optionally specifies whether an entry in the RMON-MIB log table will be created to record the occurrence of the event. It can also specify whether an SNMP notification (trap) will be generated for the event. There are two notifications for threshold crossing events, a rising alarm and a falling alarm.

Creating an event entry in the RMON-MIB log table does not create a corresponding entry in the 7705 SAR event logs. However, when the event is set to trap, the generation of a rising alarm or falling alarm notification creates an entry in the 7705 SAR event logs and that is distributed to whatever 7705 SAR log destinations are configured: console, session, memory, file, syslog, or SNMP trap destination. The 7705 SAR logger message includes a rising or falling threshold crossing event indicator, the sample type (absolute or delta), the sampled value, the threshold value, the `rmon-alarm-id`, the associated `rmon-event-id` and the sampled SNMP object identifier.

The `alarm` command configures an entry in the RMON-MIB alarm table. The `alarm` command controls the monitoring and triggering of threshold crossing events. In order for notification or logging of a threshold crossing event to occur there must be at least one associated `rmon event` configured.

The agent periodically takes statistical sample values from the MIB variable specified for monitoring and compares them to thresholds that have been configured with the `alarm` command. The `alarm` command configures the MIB variable to be monitored, the polling period (interval), sampling type (absolute or delta value), and rising and falling threshold parameters. If a sample has crossed a threshold value, the associated 'event' is generated.

Preconfigured CLI threshold commands are available. Preconfigured commands hide some of the complexities of configuring RMON alarm and event commands and perform the same functions. In particular, the preconfigured commands do not require the user to know the SNMP object identifier to be sampled. The preconfigured threshold configurations include memory warnings, alarms, and compact flash usage warnings and alarms.

Configuring System Monitoring Thresholds

To create events, use the following CLI syntax:

CLI Syntax:

```
config>system
  thresholds
    cflash-cap-alarm cflash-id rising-threshold
      threshold [falling-threshold threshold]
      interval seconds [rmon-event-type]
      [startup-alarm alarm-type]
    cflash-cap-warn cflash-id rising-threshold
      threshold [falling-threshold threshold]
      interval seconds [rmon-event-type]
      [startup-alarm alarm-type]
    memory-use-alarm rising-threshold threshold
      [falling-threshold threshold] interval
      seconds [rmon-event-type] [startup-alarm
      alarm-type]
    memory-use-warn rising-threshold threshold
      [falling-threshold threshold] interval
      seconds [rmon-event-type] [startup-alarm
      alarm-type]
  rmon
    alarm rmon-alarm-id variable-oid
      oid-string interval seconds
      [sample-type] [startup-alarm
      alarm-type] [rising-event rmon-event-id
      rising-threshold threshold]
      [falling-event rmon-event-id
      falling-threshold threshold] [owner
      owner-string]
    event rmon-event-id [event-type]
      [description description-string] [owner
      owner-string]
```

Example:

```
config>system>thresholds# cflash-cap-warn cf3-B:
  rising-threshold 2000000 falling-threshold 1999900
  interval 240 trap startup-alarm either
```

Example:

```
config>system>thresholds# memory-use-alarm
  rising-threshold 50000000 falling-threshold 45999999
  interval 500 both startup-alarm either
```

Example:

```
config>system>thresholds# rmon
```

Example:

```
config>system>thresholds>rmon# event 5 both description
  "alarm testing" owner "Timos CLI"
```

The following example displays the command output:

```
A:ALU-49>config>system>thresholds# info
-----
      rmon
        event 5 description "alarm testing" owner "Timos CLI"
      exit
      cflash-cap-warn cfl-B: rising-threshold 2000000 falling-
threshold 1999900
interval 240 trap
      memory-use-alarm rising-threshold 50000000 falling-threshold 45999999
interval 500
-----
A:ALU-49>config>system>thresholds#
```

Configuring LLDP

Use the following syntax to configure LLDP:

CLI Syntax:

```
config>system>lldp
    message-fast-tx time
    message-fast-tx-init count
    notification-interval time
    reinit-delay time
    tx-credit-max count
    tx-hold-multiplier multiplier
    tx-interval interval
```

Example:

```
config>system# lldp
config>system>lldp# message-fast-tx 100
config>system>lldp# notification-interval 10
config>system>lldp# reinit-delay 5
config>system>lldp# tx-credit-max 20
config>system>lldp# tx-hold-multiplier 2
config>system>lldp# tx-interval 10
```

The following example shows the system LLDP configuration:

```
A:ALU-49>config>system>lldp# info
-----
tx-interval 10
tx-hold-multiplier 2
reinit-delay 5
notification-interval 10
tx-credit-max 20
message-fast-tx 100
-----
A:ALU-49>config>system>lldp#
```

System Command Reference

Command Hierarchies

- Configuration Commands
 - System Information Commands
 - System Alarm Commands
 - System Time Commands
 - CRON Commands
 - System Synchronization Commands
 - System LLDP Commands
 - System PTP commands
- Administration Commands
 - System Administration Commands
 - High Availability (Redundancy) Commands
- Show Commands
- Debug Commands
- Clear Commands

Configuration Commands

System Information Commands

```
config
  — system
    — atm
      — atm-location-id location-id
      — no atm-location-id
    — boot-bad-exec file-url
    — no boot-bad-exec
    — boot-good-exec file-url
    — no boot-good-exec
    — cli-code cli-code
    — no cli-code
    — config-backup count
    — no config-backup
    — contact contact-name
    — no contact
    — coordinates coordinates
    — no coordinates
    — location location
    — no location
    — name system-name
    — no name
    — poe-power-source {internal | external}
    — no poe-power-source
```

System Alarm Commands

```

config
  — system
    — thresholds
      — cflash-cap-alarm cflash-id rising-threshold threshold [falling-threshold threshold]
         interval seconds [rmon-event-type] [startup-alarm alarm-type]
      — no cflash-cap-alarm cflash-id
      — cflash-cap-warn cflash-id rising-threshold threshold [falling-threshold threshold]
         interval seconds [rmon-event-type] [startup-alarm alarm-type]
      — no cflash-cap-warn cflash-id
      — memory-use-alarm rising-threshold threshold [falling-threshold threshold] interval
         seconds [rmon-event-type] [startup-alarm alarm-type]
      — no memory-use-alarm
      — memory-use-warn rising-threshold threshold [falling-threshold threshold] interval
         seconds [rmon-event-type] [startup-alarm alarm-type]
      — no memory-use-warn
      — [no] rmon
         — alarm rmon-alarm-id variable-oid oid-string interval seconds [sample-type]
            [startup-alarm alarm-type] [rising-event rmon-event-id rising-threshold
            threshold] [falling event rmon-event-id falling-threshold threshold]
            [owner owner-string]
         — no alarm rmon-alarm-id
         — event rmon-event-id [event-type] [description description-string] [owner
            owner-string]
         — no event rmon-event-id

```

System Time Commands

```

root
  — admin
    — set-time [date] [time]

config
  — system
    — time
      — [no] ntp
        — [no] authentication-check
        — authentication-key key-id key key [hash | hash2] type {des | message-digest}
        — no authentication-key key-id
        — [no] broadcastclient [router router-name] {interface ip-int-name} [authenticate]
        — multicastclient [authenticate]
        — no multicastclient
        — server ip-address [version version] [key-id key-id] [prefer]
        — no server ip-address
        — [no] shutdown
      — [no] sntp
        — [no] broadcast-client
        — server-address ip-address [version version-number] [normal | preferred] [interval seconds]
        — no server-address ip-address
        — [no] shutdown
      — [no] dst-zone [std-zone-name | non-std-zone-name]
        — end {end-week} {end-day} {end-month} [hours-minutes]
        — offset offset
        — start {start-week} {start-day} {start-month} [hours-minutes]
      — zone {std-zone-name | non-std-zone-name} [hh [:mm]]
      — no zone
      — ptp
        — clock clock-id time-ref-priority priority-value
        — no clock
      — tod-1pps
        — message-type {ct | cm | none | irigb-007-127}
        — no message-type
        — output {shutdown | no shutdown}
  
```


CRON Commands

```

config
  — [no] cron
    — [no] action action-name [owner owner-name]
      — expire-time {seconds | forever}
      — lifetime {seconds | forever}
      — max-completed unsigned
      — [no] results file-url
      — [no] script script-name [owner owner-name]
      — [no] shutdown
    — [no] schedule schedule-name [owner owner-name]
      — [no] action action-name [owner owner-name]
      — [no] day-of-month {day-number [..day-number] | all}
      — count number
      — description description-string
      — no description
      — [no] end-time [date | day-name] time
      — [no] hour {..hour-number [..hour-number] | all}
      — [no] interval seconds
      — [no] minute {minute-number [..minute-number] | all}
      — [no] month {month-number [..month-number] | month-name [..month-name] | all}
      — [no] shutdown
      — type schedule-type
      — [no] weekday {weekday-number [..weekday-number] | day-name [..day-name] | all}
    — [no] script script-name [owner owner-name]
      — description description-string
      — no description
      — [no] location file-url
      — [no] shutdown

```

System Synchronization Commands

```

config
  — system
    — sync-if-timing
      — abort
      — begin
      — bits
      — input
        — [no] shutdown
      — interface-type {ds1 [{esf | sf}] | e1 [{pcm30crc | pcm31crc}] |
        2048khz-G703}
      — no interface-type
      — output
        — line-length {110 | 220 | 330 | 440 | 550 | 660}
        — [no] shutdown
      — ql-override {prs | stu | st2 | tnc | st3e | st3 | smc | prc | ssu-a | ssu-b | sec | eec1
        | eec2}
      — no ql-override
      — ssm-bit sa-bit
    — commit
    — external
      — input-interface
        — impedance {high-impedance | 50-Ohm | 75-Ohm}
        — [no] shutdown
        — type {2048khz-G703 | 5mhz | 10mhz}
        — no type
      — output-interface
        — type {2048khz-G703 | 5mhz | 10mhz}
        — no type
      — ql-override {prs | stu | st2 | tnc | st3e | st3 | smc | prc | ssu-a | ssu-b | sec | eec1
        | eec2}
      — no ql-override
    — [no] ql-selection
    — ref-order first second [third]
    — no ref-order
    — refl
      — ql-override {prs | stu | st2 | tnc | st3e | st3 | smc | prc | ssu-a | ssu-b | sec | eec1
        | eec2}
      — no ql-override
      — [no] shutdown
      — source-port port-id [adaptive]
      — no source-port
      — source-ptp-clock clock-id
      — no source-ptp-clock
  
```

- **ref2**
 - **ql-override** {prs | stu | st2 | tnc | st3e | st3 | smc | prc | ssu-a | ssu-b | sec | eec1 | eec2}
 - **no ql-override**
 - **[no] shutdown**
 - **source-port** *port-id* [adaptive]
 - **no source-port**
 - **source-ptp-clock** *clock-id*
 - **no source-ptp-clock**
- **[no] revert**

System LLDP Commands

```
config
  — system
    — lldp
      — message-fast-tx time
      — no message-fast-tx
      — message-fast-tx-init count
      — no message-fast-tx-init
      — notification-interval time
      — no notification-interval
      — reinit-delay time
      — no reinit-delay
      — tx-credit-max count
      — no tx-credit-max
      — tx-hold-multiplier multiplier
      — no tx-hold-multiplier
      — tx-interval interval
      — no tx-interval
```

System PTP commands

```

config
  — system
    — ptp
      — clock clock-id [create]
      — [no] clock
        — clock-mda mda-id
        — no clock-mda
        — clock-type {ordinary [master | slave] | boundary | transparent-e2e}
        — no clock-type
        — domain domain-value
        — no domain
        — dynamic-peers
        — [no] dynamic-peers
        — [no] freq-source {ptp | ssu}
        — priority1 priority-value
        — no priority1
        — priority2 priority-value
        — no priority2
        — profile ieee1588-2008
        — profile itu-telecom-freq
        — no profile
        — ptp-port port-id
          — anno-rx-timeout number-of-timeouts
          — no anno-rx-timeout
          — log-anno-interval log-anno-interval
          — no log-anno-interval
          — log-sync-interval log-sync-interval
          — no log-sync-interval
          — peer peer-id
            — description description-string
            — no description
            — ip-address ip-address
            — no ip-address
          — [no] unicast-negotiate
        — [no] shutdown
        — source-interface ip-if-name
        — no source-interface

```

Administration Commands

System Administration Commands

- root
 - **admin**
 - **debug-save** *file-url*
 - **disconnect** {**address** *ip-address* | **username** *user-name* | **console** | **telnet** | **ftp** | **ssh**}
 - **display-config** [**detail** | **index**]
 - [**no**] **enable-tech**
 - **radius-discovery**
 - **force-discover** [**svc-id** *service-id*]
 - **reboot** [**active** | **standby**] | [**upgrade**] [**now**]
 - **save** [*file-url*] [**detail**] [**index**]
 - **synchronize** [**boot-env** | **config**]
 - **tech-support** [*file-url*]

High Availability (Redundancy) Commands

- root
 - **admin**
 - **redundancy**
 - **force-switchover** [**now**]
 - **synchronize** {**boot-env** | **config**}
- config
 - **system**
 - **switchover-exec** *file-url*
 - **no switchover-exec**
 - **redundancy**
 - **synchronize** {**boot-env** | **config**}

Show Commands

```

show
  — chassis [environment] [power-feed]
  — cron
    — action [action-name] [owner owner-name] run-history run-state
    — schedule [schedule-name] [owner owner-name]
    — script [script-name] [owner owner-name]
  — redundancy
    — synchronization
  — time
  — system
    — connections [address ip-address [interface interface-name]] [port port-number] [detail]
    — cpu [sample-period seconds]
    — information
    — memory-pools
    — ntp
    — ptp
      — clock clock-id [summary] [detail] [timestamp]
      — clock clock-id ptp-port port-id
        — peer peer-id [detail]
    — sntp
    — sync-if-timing
    — thresholds
    — time
  — uptime

```

Debug Commands

```

debug
  — sync-if-timing
    — force-reference {external | ref1 | ref2}
    — no force-reference
  — [no] system
    — http-connections [host-ip-address/mask]
    — no http-connections
    — ntp [router router-name] [interface ip-int-name]
    — no ntp

```

Clear Commands

```

clear
  — cron action completed [action-name] [owner action-owner]
  — screen
  — system sync-if-timing {external | ref 1| ref2}
  — trace log

```

Command Descriptions

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Configuration Commands

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Generic Commands

shutdown

Syntax	[no] shutdown
Context	config>system>time>ntp config>system>time>sntp config>cron>action config>cron>schedule config>cron>script config>system>ptp>clock config>system>ptp>clock>ptp-port config>system>sync-if-timing>external config>system>sync-if-timing>bits>input config>system>sync-if-timing>bits>output config>system>sync-if-timing>ref1 config>system>sync-if-timing>ref2 config>system>lldp
Description	<p>This command administratively disables the entity. When disabled, an entity does not change, reset, or remove any configuration settings or statistics.</p> <p>The operational state of the entity is disabled as well as the operational state of any entities contained within. Many objects must be shut down before they can be deleted.</p> <p>The no form of this command places the entity into an administratively enabled state.</p>
Default	no shutdown

description

Syntax	description <i>description-string</i> no description
Context	config>cron>schedule config>cron>script
Description	<p>This command creates a text description stored in the configuration file for a configuration context.</p> <p>The description command associates a text string with a configuration context to help identify the content in the configuration file.</p> <p>The no form of this command removes the string from the configuration.</p>

Default	n/a — no description is associated with the configuration context
Parameters	<i>string</i> — the description character string. Allowed values are any string up to 80 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.

System Information Commands

atm

Syntax	atm
Context	config>system
Description	This command enables the context to configure system-wide ATM parameters.

atm-location-id

Syntax	atm-location-id <i>location-id</i> no atm-location-id
Context	config>system>atm
Description	This command indicates the location ID for ATM OAM. Refer to the 7705 SAR OS Quality of Service Guide, “ATM QoS Traffic Descriptor Profiles”, for information on ATM QoS policies and the 7705 SAR OS Services Guide, “VLL Services” for information on ATM-related service parameters.
Default	no atm-location-id
Parameters	<i>location-id</i> — specifies the 16 octets that identifies the system loopback location ID as required by the ATM OAM Loopback capability. This textual convention is defined in ITU-T standard I.610. Invalid values include a location ID where the first octet is: 00, FF, 6A Acceptable location-ids include values where the first octet is: 01, 03 Other values are not accepted.
Values	01:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00

boot-bad-exec

Syntax	boot-bad-exec <i>file-url</i> no boot-bad-exec
Context	config>system
Description	Use this command to configure a URL for a CLI script to execute following a failure of a boot-up configuration. The command specifies a URL for the CLI scripts to be run following the completion of the boot-up configuration. A URL must be specified or no action is taken.

The commands are persistent between router (re)boots and are included in the configuration saves (**admin>save**).

Also refer to the related command [exec](#).

Default	no boot-bad-exec
Parameters	<i>file-url</i> — specifies the location and name of the CLI script file executed following failure of the boot-up configuration file execution. When this parameter is not specified, no CLI script file is executed.
Values	<i>file url:</i> { <i>local-url</i> <i>remote-url</i> } 255 chars max <i>local-url:</i> [<i>cflash-id</i>]/[<i>file-path</i>] <i>remote-url:</i> [{ <i>ftp://</i> <i>tftp://</i> } <i>login:pswd@remote-locn/</i>] [<i>file-path</i>] <i>cflash-id:</i> cf3:, cf3-A:, cf3-B:

boot-good-exec

Syntax	boot-good-exec <i>file-url</i> no boot-good-exec
Context	config>system
Description	Use this command to configure a URL for a CLI script to execute following the success of a boot-up configuration. Also refer to the related command exec .
Default	no boot-good-exec
Parameters	<i>file-url</i> — specifies the location and name of the CLI script file executed following successful completion of the boot-up configuration file execution. When this parameter is not specified, no CLI script file is executed.
Values	<i>file url:</i> { <i>local-url</i> <i>remote-url</i> } 255 chars max <i>local-url:</i> [<i>cflash-id</i>]/[<i>file-path</i>] <i>remote-url:</i> [{ <i>ftp://</i> <i>tftp://</i> } <i>login:pswd@remote-locn/</i>] [<i>file-path</i>] <i>cflash-id:</i> cf3:, cf3-A:, cf3-B:

System Command Reference

cli-code

Syntax	cli-code <i>cli-code</i> no cli-code
Context	config>system
Description	<p>This command creates a Common Language Location Identifier (CLLI) code string for the 7705 SAR. A CLLI code is an 11-character standardized geographic identifier that uniquely identifies geographic locations and certain functional categories of equipment unique to the telecommunications industry.</p> <p>No CLLI validity checks other than truncating or padding the string to 11 characters are performed.</p> <p>Only one CLLI code can be configured. If multiple CLLI codes are configured, the last one entered overwrites the previous entry.</p> <p>The no form of the command removes the CLLI code.</p>
Default	n/a — no CLLI codes are configured
Parameters	<i>cli-code</i> — the 11-character string CLLI code. Any printable, 7-bit ASCII characters can be used within the string. If the string contains spaces, the entire string must be enclosed within double quotes. If more than 11 characters are entered, the string is truncated. If fewer than 11 characters are entered, the string is padded with spaces.

config-backup

Syntax	config-backup <i>count</i> no config-backup
Context	config>system
Description	<p>This command configures the maximum number of backup versions maintained for configuration files and BOF.</p> <p>For example, if the config-backup <i>count</i> is set to 5 and the configuration file is called xyz.cfg, the file xyz.cfg is saved with a .1 extension when the save command is executed. Each subsequent config-backup command increments the numeric extension until the maximum count is reached.</p> <ul style="list-style-type: none">• xyz.cfg• xyz.cfg.1• xyz.cfg.2• xyz.cfg.3• xyz.cfg.4• xyz.cfg.5• xyz.ndx

Each persistent index file is updated at the same time as the associated configuration file. When the index file is updated, then the save is performed to **xyz.cfg** and the index file is created as **xyz.ndx**. Synchronization between the active and standby CSM is performed for all configurations and their associated persistent index files.

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

Default 5

Parameters *count* — the maximum number of backup revisions

Values 1 to 9

contact

Syntax **contact** *contact-name*
no contact

Context config>system

Description This command creates a text string that identifies the contact name for the device.

Only one contact can be configured. If multiple contacts are configured, the last one entered will overwrite the previous entry.

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

Default n/a — no contact name is configured

Parameters *contact-name* — the contact name character string. The string can be up to 80 characters long. Any printable, 7-bit ASCII characters can be used within the string. If the string contains spaces, the entire string must be enclosed within double quotes.

coordinates

Syntax **coordinates** *coordinates*
no coordinates

Context config>system

Description This command creates a text string that identifies the system coordinates for the device location. For example, the command **coordinates** "37.390 -122.0550" is read as latitude 37.390 north and longitude 122.0550 west.

Only one set of coordinates can be configured. If multiple coordinates are configured, the last one entered overwrites the previous entry.

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

System Command Reference

Default n/a — no coordinates are configured

Parameters *coordinates* — the coordinates describing the device location character string. The string may be up to 80 characters long. Any printable, 7-bit ASCII characters can be used within the string. If the string contains spaces, the entire string must be enclosed within double quotes. If the coordinates are subsequently used by an algorithm that locates the exact position of this node, then the string must match the requirements of the algorithm.

location

Syntax **location** *location*
no location

Context config>system

Description This command creates a text string that identifies the system location for the device.

Only one location can be configured. If multiple locations are configured, the last one entered overwrites the previous entry.

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

Default n/a — no system location is configured

Parameters *location* — the location as a character string. The string may be up to 80 characters long. Any printable, 7-bit ASCII characters can be used within the string. If the string contains spaces, the entire string must be enclosed within double quotes.

name

Syntax **name** *system-name*
no name

Context config>system

Description This command creates a system name string for the device.

For example, system-name parameter ALU-1 for the name command configures the device name as ALU-1.

```
ABC>config>system# name ALU-1
ALU-1>config>system#
```

Only one system name can be configured. If multiple system names are configured, the last one encountered overwrites the previous entry.

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

- Default** The default system name is set to the chassis serial number which is read from the backplane EEPROM.
- Parameters** *system-name* — the system name as a character string. The string may be up to 32 characters long. Any printable, 7-bit ASCII characters can be used within the string. If the string contains spaces, the entire string must be enclosed within double quotes.

poe-power-source

- Syntax** **poe-power-source** {**internal** | **external**}
no poe-power-source
- Context** config>system
- Description** This command specifies whether the internal system-level PoE power supply or an external PoE power supply is used to power the PoE-capable ports on the 7705 SAR-H.
- When configured for the internal power supply, standard 15 W PoE can be enabled only on ports 5 and 6. Port 5 can also support 34 W PoE+, but in that case, port 6 cannot support PoE.
- When configured for the external PoE power supply, all four PoE-capable ports support a combination of standard 15 W PoE and 34 W PoE+, with a maximum power delivery of 83 W among all PoE-enabled ports. Refer to the 7705 SAR-H Chassis Installation Guide, “Ethernet Ports”, for information about supported combinations and restrictions.
- The **no** form of this command disables the PoE power supply on the node.
- Default** none
- Parameters** **internal** — specifies that the internal PoE power source be used for the PoE-capable ports
external — specifies that an external PoE power source be used for the PoE-capable ports

System Alarm Commands

alarm

- Syntax** **alarm** *rmon-alarm-id* **variable-oid** *oid-string* **interval** *seconds* [*sample-type*] [**startup-alarm** *alarm-type*] [**rising-event** *rmon-event-id* **rising-threshold** *threshold*] [**falling-event** *rmon-event-id* **falling threshold** *threshold*] [**owner** *owner-string*]
no alarm *rmon-alarm-id*
- Context** config>system>thresholds>rmon
- Description** The **alarm** command configures an entry in the RMON-MIB alarm table. The **alarm** command controls the monitoring and triggering of threshold crossing events. In order for notification or logging of a threshold crossing event to occur, there must be at least one associated **rmon>event** configured.
- The agent periodically takes statistical sample values from the MIB variable specified for monitoring and compares them to thresholds that have been configured with the **alarm** command. The **alarm** command configures the MIB variable to be monitored, the polling period (interval), sampling type (absolute or delta value), and rising and falling threshold parameters. If a sample has crossed a threshold value, the associated event is generated.
- Use the **no** form of this command to remove an *rmon-alarm-id* from the configuration.
- Parameters** *rmon-alarm-id* — a numerical identifier for the alarm being configured. The number of alarms that can be created is limited to 1200.
- Values** 1 to 65535
- Default** n/a
- oid-string* — the SNMP object identifier of the particular variable to be sampled. Only SNMP variables that resolve to an ASN.1 primitive type of integer (integer, Integer32, Counter32, Counter64, Gauge, or TimeTicks) may be sampled. The *oid-string* may be expressed using either the dotted string notation or as object name plus dotted instance identifier. For example, “1.3.6.1.2.1.2.2.1.10.184582144” or “ifInOctets.184582144”.
- The *oid-string* has a maximum length of 255 characters.
- Default** n/a
- seconds* — the interval in seconds specifies the polling period over which the data is sampled and compared with the rising and falling thresholds. When setting this interval value, care should be taken in the case of “delta” type sampling – the interval should be set short enough that the sampled variable is very unlikely to increase or decrease by more than 2147483647 - 1 during a single sampling interval. Care should also be taken not to set the interval value too low to avoid creating unnecessary processing overhead.
- Values** 1 to 2147483647
- Default** n/a

sample-type — specifies the method of sampling the selected variable and calculating the value to be compared against the thresholds

Values **absolute** — specifies that the value of the selected variable will be compared directly with the thresholds at the end of the sampling interval

delta — specifies that the value of the selected variable at the last sample will be subtracted from the current value, and the difference compared with the thresholds

Default absolute

alarm-type — specifies the alarm that may be sent when this alarm is first created.

If the first sample is greater than or equal to the rising threshold value and “startup-alarm” is equal to “rising” or “either”, then a single rising threshold crossing event is generated.

If the first sample is less than or equal to the falling threshold value and “startup-alarm” is equal to “falling” or “either”, a single falling threshold crossing event is generated.

Values **rising, falling, either**

Default either

rising-event *rmon-event-id* — the identifier of the **rmon>event** that specifies the action to be taken when a rising threshold crossing event occurs.

If there is no corresponding “event” configured for the specified *rmon-event-id*, then no association exists and no action is taken.

If the “rising-event *rmon-event-id*” has a value of zero (0), no associated event exists.

If a “rising event *rmon-event*” is configured, the CLI requires a “rising-threshold” to also be configured.

Values 0 to 65535

Default 0

rising-threshold *threshold* — specifies a threshold for the sampled statistic. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval was less than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is greater than or equal to this threshold and the associated startup-alarm is equal to rising or either.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value falls below this threshold and reaches less than or equal the “falling-threshold” value.

Values -2147483648 to 2147483647

Default 0

falling-event *rmon-event-id* — the identifier of the **rmon>event** that specifies the action to be taken when a falling threshold crossing event occurs. If there is no corresponding event configured for the specified *rmon-event-id*, then no association exists and no action is taken. If the falling-event has a value of zero (0), no associated event exists.

If a “falling event” is configured, the CLI requires a “falling-threshold” to also be configured.

System Command Reference

Values -2147483648 to 2147483647

Default 0

falling-threshold *threshold* — specifies a threshold for the sampled statistic. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval was greater than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is less than or equal to this threshold and the associated “startup-alarm” is equal to “falling” or “either”.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value rises above this threshold and reaches greater than or equal the rising-threshold *threshold* value.

Values -2147483648 to 2147483647

Default 0

owner — the owner identifies the creator of this alarm. It defaults to “TiMOS CLI”. This parameter is defined primarily to allow entries that have been created in the RMON-MIB alarm table by remote SNMP managers to be saved and reloaded in a CLI configuration file. The owner will not normally be configured by CLI users and can be a maximum of 80 characters long.

Default TiMOS CLI

Configuration example:

```
alarm 3 variable-oid ifInOctets.184582144 interval 20 sample-type delta start-alarm
either rising-event 5 rising-threshold 10000 falling-event 5 falling-threshold 9000
owner "TiMOS CLI"
```

cflash-cap-alarm

Syntax **cflash-cap-alarm** *cflash-id* **rising-threshold** *threshold* [**falling-threshold** *threshold*]
interval *seconds* [*rmon-event-type*] [**startup-alarm** *alarm-type*]
no cflash-cap-alarm *cflash-id*

Context config>system>thresholds

Description This command enables capacity monitoring of the compact flash specified in this command. The severity level is alarm. Both a rising and falling threshold can be specified.

The **no** form of this command removes the configured compact flash threshold alarm.

Parameters *cflash-id* — the *cflash-id* specifies the name of the cflash device to be monitored

Values cf3:, cf3-A:, cf3-B:

rising-threshold *threshold* — specifies a threshold for the sampled statistic. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval was less than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is greater than or equal to this threshold and the associated “startup-alarm” is equal to “rising” or “either”.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value falls below this threshold and reaches less than or equal to the “falling-threshold” value.

Values -2147483648 to 2147483647

Default 0

falling-threshold *threshold* — specifies a threshold for the sampled statistic. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval was greater than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is less than or equal to this threshold and the associated startup-alarm is equal to “falling” or “either”.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value raises above this threshold and reaches greater than or equal to the rising-threshold value.

Values -2147483648 to 2147483647

Default 0

seconds — specifies the polling period, in seconds, over which the data is sampled and compared with the rising and falling thresholds

Values 1 to 2147483647

rmon-event-type — specifies the type of notification action to be taken when this event occurs

Values **log** — an entry is made in the RMON-MIB log table for each event occurrence. This does not create a TiMOS logger entry. The RMON-MIB log table entries can be viewed using the **show>system>thresholds** CLI command.

trap — a TiMOS logger event is generated. The TiMOS logger utility then distributes the notification of this event to its configured log destinations, which may be CONSOLE, telnet session, memory log, cflash file, syslog, or SNMP trap destinations logs.

both — both an entry in the RMON-MIB logTable and a TiMOS logger event are generated

none — no action is taken

Default both

alarm-type — specifies the alarm that may be sent when this alarm is first created

If the first sample is greater than or equal to the rising threshold value and startup-alarm is equal to rising or either, then a single rising threshold crossing event is generated.

If the first sample is less than or equal to the falling threshold value and startup-alarm is equal to “falling” or “either”, a single falling threshold crossing event is generated.

System Command Reference

Values rising, falling, either

Default either

Configuration example:

```
cflash-cap-alarm cfl-A: rising-threshold 50000000 falling-  
threshold 49999900 interval  
120 rmon-event-type both start-alarm rising
```

cflash-cap-warn

- Syntax** **cflash-cap-warn** *cflash-id* **rising-threshold** *threshold* [**falling-threshold** *threshold*] **interval** *seconds* [*rmon-event-type*] [**startup-alarm** *alarm-type*]
no cflash-cap-warn *cflash-id*
- Context** config>system>thresholds
- Description** This command enables capacity monitoring of the compact flash specified in this command. The severity level is warning. Both a rising and falling threshold can be specified. The **no** form of this command removes the configured compact flash threshold warning.
- Parameters** *cflash-id* — the cflash-id specifies the name of the cflash device to be monitored
- Values** cf3:, cf3-A:, cf3-B:
- rising-threshold** *threshold* — specifies a threshold for the sampled statistic. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval was less than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is greater than or equal to this threshold and the associated startup-alarm is equal to “rising” or “either”. After a rising threshold crossing event is generated, another such event will not be generated until the sampled value falls below this threshold and reaches less than or equal to the falling-threshold value.
- Values** -2147483648 to 2147483647
- Default** 0
- falling-threshold** *threshold* — specifies a threshold for the sampled statistic. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval was greater than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is less than or equal to this threshold and the associated startup-alarm is equal to “falling” or “either”. After a rising threshold crossing event is generated, another such event will not be generated until the sampled value raises above this threshold and reaches greater than or equal to the rising-threshold value.
- Values** -2147483648 to 2147483647
- Default** 0
- seconds* — specifies the polling period over which the data is sampled and compared with the rising and falling thresholds

Values 1 to 2147483647

rmon-event-type — specifies the type of notification action to be taken when this event occurs

Values **log** — an entry is made in the RMON-MIB log table for each event occurrence. This does not create a TiMOS logger entry. The RMON-MIB log table entries can be viewed using the **show>system>thresholds** CLI command.

trap — a TiMOS logger event is generated. The TiMOS logger utility then distributes the notification of this event to its configured log destinations, which may be CONSOLE, telnet session, memory log, cflash file, syslog, or SNMP trap destinations logs.

both — both an entry in the RMON-MIB logTable and a TiMOS logger event are generated

none — no action is taken

Default both

alarm-type — specifies the alarm that may be sent when this alarm is first created. If the first sample is greater than or equal to the rising threshold value and startup-alarm is equal to rising or either, then a single rising threshold crossing event is generated. If the first sample is less than or equal to the falling threshold value and startup-alarm is equal to “falling” or “either”, a single falling threshold crossing event is generated.

Values **rising, falling, either**

Default either

Configuration example:

```
cflash-cap-warn cfl-B: rising-threshold 2000000 falling-
threshold 1999900 interval 240
rmon-event-type trap start-alarm either
```

event

Syntax **event** *rmon-event-id* [*event-type*] [**description** *description-string*] [**owner** *owner-string*]
no event *rmon-event-id*

Context config>system>thresholds>rmon

Description The event command configures an entry in the RMON-MIB event table. The event command controls the generation and notification of threshold crossing events configured with the alarm command. When a threshold crossing event is triggered, the **rmon>event** configuration optionally specifies if an entry in the RMON-MIB log table should be created to record the occurrence of the event. It may also specify that an SNMP notification (trap) should be generated for the event. The RMON-MIB defines two notifications for threshold crossing events: Rising Alarm and Falling Alarm.

System Command Reference

Creating an event entry in the RMON-MIB log table does not create a corresponding entry in the TiMOS event logs. However, when the <event-type> is set to trap, the generation of a Rising Alarm or Falling Alarm notification creates an entry in the TiMOS event logs and that is distributed to whatever TiMOS log destinations are configured: CONSOLE, session, memory, file, syslog, or SNMP trap destination.

The TiMOS logger message includes a rising or falling threshold crossing event indicator, the sample type (absolute or delta), the sampled value, the threshold value, the RMON-alarm-id, the associated RMON-event-id and the sampled SNMP object identifier.

Use the **no** form of this command to remove an *rmon-event-id* from the configuration.

Parameters *rmon-event-id* [*event-type*] — the *rmon-event-type* specifies the type of notification action to be taken when this event occurs

Values **log** — an entry is made in the RMON-MIB log table for each event occurrence
This does not create a TiMOS logger entry. The RMON-MIB log table entries can be viewed using the **show>system>thresholds** CLI command.
trap — a TiMOS logger event is generated. The TiMOS logger utility then distributes the notification of this event to its configured log destinations, which may be CONSOLE, telnet session, memory log, cflash file, syslog, or SNMP trap destinations logs.
both — both an entry in the RMON-MIB logTable and a TiMOS logger event are generated
none — no action is taken

Default both

description-string — a user-configurable string that can be used to identify the purpose of this event. This is an optional parameter and can be 80 characters long. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

Default an empty string

owner-string — identifies the creator of this alarm. It defaults to “TiMOS CLI”. This parameter is defined primarily to allow entries that have been created in the RMON-MIB alarm table by remote SNMP managers to be saved and reloaded in a CLI configuration file. The owner will not normally be configured by CLI users and can be a maximum of 80 characters long.

Default TiMOS CLI

Configuration example:

```
event 5 rmon-event-type both description "alarm testing" owner "TiMOS CLI"
```


memory-use-alarm

Syntax	memory-use-alarm rising-threshold <i>threshold</i> [falling-threshold <i>threshold</i>] interval <i>seconds</i> [<i>rmon-event-type</i>] [startup-alarm <i>alarm-type</i>] no memory-use-alarm
Context	config>system>thresholds
Description	<p>The memory thresholds are based on monitoring the TIMETRA-SYSTEM-MIB <code>sgiMemoryUsed</code> object. This object contains the amount of memory currently used by the system. The severity level is Alarm.</p> <p>The absolute sample type method is used.</p> <p>The no form of this command removes the configured memory threshold warning.</p>
Parameters	<p>rising-threshold <i>threshold</i> — specifies a threshold for the sampled statistic. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval was less than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is greater than or equal to this threshold and the associated startup-alarm is equal to “rising” or “either”.</p> <p>After a rising threshold crossing event is generated, another such event will not be generated until the sampled value falls below this threshold and reaches less than or equal to the falling-threshold value.</p> <p>Values -2147483648 to 2147483647</p> <p>Default 0</p> <p>falling-threshold <i>threshold</i> — specifies a threshold for the sampled statistic. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval was greater than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is less than or equal to this threshold and the associated startup-alarm is equal to “falling” or “either”.</p> <p>After a rising threshold crossing event is generated, another such event will not be generated until the sampled value raises above this threshold and reaches greater than or equal to the rising-threshold threshold value.</p> <p>Values -2147483648 to 2147483647</p> <p>Default 0</p> <p><i>seconds</i> — specifies the polling period over which the data is sampled and compared with the rising and falling thresholds</p> <p>Values 1 to 2147483647</p> <p><i>rmon-event-type</i> — specifies the type of notification action to be taken when this event occurs</p> <p>Values log — an entry is made in the RMON-MIB log table for each event occurrence</p> <p>This does not create a TiMOS logger entry. The RMON-MIB log table entries can be viewed using the CLI command.</p>

System Command Reference

trap — a TiMOS logger event is generated. The TiMOS logger utility then distributes the notification of this event to its configured log destinations, which may be CONSOLE, telnet session, memory log, cflash file, syslog, or SNMP trap destinations logs.

both — both an entry in the RMON-MIB logTable and a TiMOS logger event are generated.

none — no action is taken

Default both

alarm-type — specifies the alarm that may be sent when this alarm is first created. If the first sample is greater than or equal to the rising threshold value and startup-alarm is equal to rising or either, then a single rising threshold crossing event is generated. If the first sample is less than or equal to the falling threshold value and startup-alarm is equal to falling or either, a single falling threshold crossing event is generated.

Values rising, falling, either

Default either

Configuration example:

```
memory-use-alarm rising-threshold 50000000 falling-threshold 45999999 interval 500
rmon-event-type both start-alarm either
```

memory-use-warn

Syntax **memory-use-warn rising-threshold** *threshold* [**falling-threshold** *threshold*] **interval** *seconds* [*rmon-event-type*] [**startup-alarm** *alarm-type*]
no memory-use-warn

Context config>system>thresholds

Description The memory thresholds are based on monitoring the MemoryUsed object. This object contains the amount of memory currently used by the system. The severity level is Alarm.

The absolute sample type method is used.

The **no** form of this command removes the configured compact flash threshold warning.

Parameters **rising-threshold** *threshold* — specifies a threshold for the sampled statistic. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval was less than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is greater than or equal to this threshold and the associated startup-alarm is equal to rising or either. After a rising threshold crossing event is generated, another such event will not be generated until the sampled value falls below this threshold and reaches less than or equal to the falling-threshold value.

Values -2147483648 to 2147483647

Default 0

falling-threshold *threshold* — specifies a threshold for the sampled statistic. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval was greater than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is less than or equal to this threshold and the associated startup-alarm is equal to falling or either.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value raises above this threshold and reaches greater than or equal to the rising-threshold value.

Values -2147483648 to 2147483647

Default 0

seconds — specifies the polling period over which the data is sampled and compared with the rising and falling thresholds

Values 1 to 2147483647

rmon-event-type — specifies the type of notification action to be taken when this event occurs

Values **log** — an entry is made in the RMON-MIB log table for each event occurrence

This does not create a TiMOS logger entry. The RMON-MIB log table entries can be viewed using the **show>system>thresholds** CLI command.

trap — a TiMOS logger event is generated. The TiMOS logger utility then distributes the notification of this event to its configured log destinations, which may be CONSOLE, telnet session, memory log, cflash file, syslog, or SNMP trap destinations logs.

both — both an entry in the RMON-MIB logTable and a TiMOS logger event are generated

none — no action is taken

Default both

alarm-type — specifies the alarm that may be sent when this alarm is first created. If the first sample is greater than or equal to the rising threshold value and startup-alarm is equal to rising or either, then a single rising threshold crossing event is generated. If the first sample is less than or equal to the falling threshold value and startup-alarm is equal to falling or either, a single falling threshold crossing event is generated.

Values **rising, falling, either**

Default either

Configuration example:

```
memory-use-warn rising-threshold 500000 falling-threshold 400000 interval 800 rmon
event-type log start-alarm falling
```

System Command Reference

rmon

Syntax	rmon
Context	config>system>thresholds
Description	<p>This command creates the context to configure generic RMON alarms and events.</p> <p>Generic RMON alarms can be created on any SNMP object-ID that is valid for RMON monitoring (for example, an integer-based datatype).</p> <p>The configuration of an event controls the generation and notification of threshold crossing events configured with the alarm command.</p>

thresholds

Syntax	thresholds
Context	config>system
Description	This command enables the context to configure monitoring thresholds.

Date and Time Commands

set-time

Syntax	set-time [<i>date</i>] [<i>time</i>]
Context	admin
Description	<p>This command sets the local system time.</p> <p>The time entered should be accurate for the time zone configured for the system. The system will convert the local time to UTC before saving to the system clock, which is always set to UTC. This command does not take into account any daylight saving offset if defined.</p>
Parameters	<p><i>date</i> — the local date and time accurate to the minute in the YYYY/MM/DD format</p> <p>Values <i>YYYY</i> is the 4-digit year <i>MM</i> is the 2-digit month <i>DD</i> is the 2-digit date</p> <p><i>time</i> — the time (accurate to the second) in the <i>hh:mm[:ss]</i> format. If no seconds value is entered, the seconds are reset to :00.</p> <p>Values <i>hh</i> is the 2-digit hour in 24 hour format (00=midnight, 12=noon) <i>mm</i> is the 2-digit minute</p> <p>Default 0</p>

time

Syntax	time
Context	config>system
Description	This command enables the context to configure the system time zone and time synchronization parameters.

Network Time Protocol Commands

ntp

Syntax	[no] ntp
Context	config>system>time
Description	This command enables the context to configure Network Time Protocol (NTP) and its operation. This protocol defines a method to accurately distribute and maintain time for network elements. Furthermore, this capability allows for the synchronization of clocks between the various network elements. Use the no form of the command to stop the execution of NTP and remove its configuration.
Default	n/a

authentication-check

Syntax	[no] authentication-check
Context	config>system>time>ntp
Description	<p>This command provides the option to skip the rejection of NTP PDUs that do not match the authentication key ID, type or key requirements. The default behavior when authentication is configured is to reject all NTP protocol PDUs that have a mismatch in either the authentication key ID, type, or key.</p> <p>When authentication-check is enabled, NTP PDUs are authenticated on receipt. However, mismatches cause a counter to be increased – one counter for type, one for key ID, and one for type value mismatches. These counters are visible in a show command.</p> <p>The no form of this command allows authentication mismatches to be accepted; the counters however are maintained.</p>
Default	authentication-check — rejects authentication mismatches

authentication-key

Syntax	authentication-key <i>key-id</i> key <i>key</i> [hash hash2] type { des message-digest } no authentication-key <i>key-id</i>
Context	config>system>time>ntp
Description	This command sets the authentication key-id, type and key used to authenticate NTP PDUs sent to or received by other network elements participating in the NTP protocol. For authentication to work, the authentication key ID, type, and key value must match. The no form of the command removes the authentication key.
Default	n/a
Parameters	<p><i>key-id</i> — configures the authentication key-id that will be used by the node when transmitting or receiving Network Time Protocol packets</p> <p>Entering the authentication-key command with a key-id value that matches an existing configuration key will result in overriding the existing entry.</p> <p>Recipients of the NTP packets must have the same authentication key-id, type, and key value in order to use the data transmitted by this node. This is an optional parameter.</p> <p>Values 1 to 255</p> <p>Default n/a</p> <p><i>key</i> — the authentication key associated with the configured key-id. The value configured in this parameter is the actual value used by other network elements to authenticate the NTP packet.</p> <p>The key can be any combination of ASCII characters up to 8 characters in length (unencrypted). If spaces are used in the string, enclose the entire string in quotation marks (“.”).</p> <p>hash — specifies that the key is entered in an encrypted form. If the hash or hash2 parameter is not used, the key is assumed to be in a non-encrypted, clear text form. For security, all keys are stored in encrypted form in the configuration file with the hash or hash2 parameter specified.</p> <p>hash2 — specifies that the key is entered in a more complex encrypted form that involves more variables than the key value alone. This means that hash2 encrypted variable cannot be copied and pasted. If the hash or hash2 parameter is not used, the key is assumed to be in a non-encrypted, clear text form. For security, all keys are stored in encrypted form in the configuration file with the hash or hash2 parameter specified.</p> <p>type — determines if DES or message-digest authentication is used</p> <p>This is a required parameter; either DES or message-digest must be configured.</p> <p>Values des — specifies that DES authentication is used for this key message-digest — specifies that MD5 authentication in accordance with RFC 2104 is used for this key</p>

broadcastclient

- Syntax** [no] broadcastclient [router *router-name*] {interface *ip-int-name*} [authenticate]
- Context** config>system>time>ntp
- Description** When configuring NTP, the node can be configured to receive broadcast packets on a given subnet. Broadcast and multicast messages can easily be spoofed; thus, authentication is strongly recommended. If broadcast is not configured, then received NTP broadcast traffic will be ignored. Use the show command to view the state of the configuration.
- The **no** form of this command removes the address from the configuration.
- Parameters** *router-name* — specifies the router name used to receive NTP packets
- Values** Base, management
 - Default** Base
- ip-int-name* — specifies the local interface on which to receive NTP broadcast packets. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.
- Values** 32 character maximum
- authenticate** — specifies whether or not to require authentication of NTP PDUs. When enabled, NTP PDUs are authenticated upon receipt.

multicastclient

- Syntax** multicastclient [authenticate]
no multicastclient
- Context** config>system>time>ntp
- Description** This command configures the node to receive multicast NTP messages on the CSM Management port. If multicastclient is not configured, received NTP multicast traffic will be ignored. Use the show command to view the state of the configuration.
- The **no** form of this command removes the multicast client for the specified interface from the configuration.
- Parameters** **authenticate** — makes authentication a requirement. If authentication is required, the authentication key-id received must have been configured in the “authentication-key” command, and that key-id’s type and key value must also match.

server

Syntax	server <i>ip address</i> [version <i>version</i>] [key-id <i>key-id</i>] [prefer] no server <i>ip-address</i>
Context	config>system>time>ntp
Description	This command is used when the node should operate in client mode with the NTP server specified in the address field of this command. The no form of this command removes the server with the specified address from the configuration. Up to five NTP servers can be configured.
Parameters	<p><i>ip-address</i> — configures the IP address of a node that acts as an NTP server to this network element. This is a required parameter.</p> <p>Values Any valid IP address</p> <p><i>version</i> — the NTP version number that is expected by this node. This is an optional parameter.</p> <p>Values 2 to 4</p> <p>Default 4</p> <p><i>key-id</i> — the key-id that identifies the configured authentication key and authentication type used by this node to transmit NTP packets to an NTP server. If an NTP packet is received by this node, the authentication key-id, type, and key value must be valid; otherwise, the packet will be rejected and an event/trap generated. This is an optional parameter.</p> <p>Values 1 to 255</p> <p>prefer — when configuring more than one peer, one remote system can be configured as the preferred peer. When a second peer is configured as preferred, then the new entry overrides the old entry.</p>

Simple Network Time Protocol Commands

sntp

Syntax	[no] sntp
Context	config>system>time
Description	<p>This command creates the context to edit the Simple Network Time Protocol (SNTP).</p> <p>SNTP can be configured in either broadcast or unicast client mode. SNTP is a compact, client-only version of the NTP. SNTP can only receive the time from SNTP/NTP servers. It cannot be used to provide time services to other systems.</p> <p>The system clock is automatically adjusted at system initialization time or when the protocol first starts up.</p> <p>When the time differential between the SNTP/NTP server and the system is more than 2.5 seconds, the time on the system is gradually adjusted.</p> <p>SNTP is created in an administratively enabled state (no shutdown).</p> <p>The no form of the command removes the SNTP instance and configuration. SNTP does not need to be administratively disabled when removing the SNTP instance and configuration.</p>
Default	no sntp

broadcast-client

Syntax	[no] broadcast-client
Context	config>system>time>sntp
Description	<p>This command enables listening to SNTP/NTP broadcast messages on interfaces with broadcast client enabled at global device level.</p> <p>When this global parameter is configured, then the ntp-broadcast parameter must be configured on selected interfaces on which NTP broadcasts are transmitted.</p> <p>SNTP must be shut down prior to changing either to or from broadcast mode.</p> <p>The no form of the command disables broadcast client mode.</p>
Default	no broadcast-client

server-address

- Syntax** **server-address** *ip-address* [**version** *version-number*] [**normal** | **preferred**] [**interval** *seconds*]
no server-address *ip-address*
- Context** config>system>time>sntp
- Description** This command creates an SNTP server for unicast client mode.
- Parameters** *ip-address* — specifies the IP address of the SNTP server
version-number — specifies the SNTP version supported by this server
- Values** 1 to 3
Default 3
- normal** | **preferred** — specifies the preference value for this SNTP server. When more than one time-server is configured, one server can have preference over others. The value for that server should be set to **preferred**. Only one server in the table can be a preferred server.
- Default** normal
- seconds* — specifies the frequency at which this server is queried
- Values** 64 to 1024
Default 64

Time Zone Commands

dst-zone

Syntax	[no] dst-zone [std-zone-name non-std-zone-name]
Context	config>system>time
Description	<p>This command configures the start and end dates and offset for summer time or daylight savings time to override system defaults or for user defined time zones.</p> <p>When configured, the time is adjusted by adding the configured offset when summer time starts and subtracting the configured offset when summer time ends.</p> <p>If the time zone configured is listed in Table 21, then the starting and ending parameters and offset do not need to be configured with this command unless it is necessary to override the system defaults. The command returns an error if the start and ending dates and times are not available either in Table 21 or entered as optional parameters in this command.</p> <p>Up to five summer time zones may be configured; for example, for five successive years or for five different time zones. Configuring a sixth entry will return an error message. If no summer (daylight savings) time is supplied, it is assumed no summer time adjustment is required.</p> <p>The no form of the command removes a configured summer (daylight savings) time entry.</p>
Default	n/a — no summer time is configured
Parameters	<p><i>std-zone-name</i> — the standard time zone name. The standard name must be a system-defined zone in Table 21. For zone names in the table that have an implicit summer time setting, for example MDT for Mountain Daylight Saving Time, the remaining <i>start-date</i>, <i>end-date</i> and <i>offset</i> parameters need to be provided unless it is necessary to override the system defaults for the time zone.</p> <p>Values std-zone-name ADT, AKDT, CDT, CEST, EDT, EEST, MDT, PDT, WEST</p> <p><i>non-std-zone-name</i> — the non-standard time zone name. Create a user-defined name using the zone command.</p> <p>Values 5 characters maximum</p>

end

Syntax	end { <i>end-week</i> } { <i>end-day</i> } { <i>end-month</i> } [<i>hours-minutes</i>]
Context	config>system>time>dst-zone
Description	This command configures the end of summer time settings.
Parameters	<p><i>end-week</i> — specifies the starting week of the month when the summer time will end</p> <p>Values first, second, third, fourth, last</p> <p>Default first</p> <p><i>end-day</i> — specifies the starting day of the week when the summer time will end</p> <p>Values sunday, monday, tuesday, wednesday, thursday, friday, saturday</p> <p>Default sunday</p> <p><i>end-month</i> — specifies the starting month of the year when the summer time will end</p> <p>Values january, february, march, april, may, june, july, august, september, october, november, december}</p> <p>Default january</p> <p><i>hours</i> — specifies the hour at which the summer time will end</p> <p>Values 0 to 24</p> <p>Default 0</p> <p><i>minutes</i> — specifies the number of minutes, after the hours defined by the <i>hours</i> parameter, when the summer time will end</p> <p>Values 0 to 59</p> <p>Default 0</p>

offset

Syntax	offset <i>offset</i>
Context	config>system>time>dst-zone
Description	This command specifies the number of minutes that will be added to the time when summer time takes effect. The same number of minutes will be subtracted from the time when the summer time ends.
Parameters	<p><i>offset</i> — the number of minutes added to the time at the beginning of summer time and subtracted at the end of summer time, expressed as an integer</p> <p>Values 0 to 60</p> <p>Default 60</p>

System Command Reference

start

Syntax	start { <i>start-week</i> } { <i>start-day</i> } { <i>start-month</i> } [<i>hours-minutes</i>]																
Context	config>system>time>dst-zone																
Description	This command configures start of summer time settings.																
Parameters	<p><i>start-week</i> — specifies the starting week of the month when the summer time will take effect</p> <table><tr><td>Values</td><td>first, second, third, fourth, last</td></tr><tr><td>Default</td><td>first</td></tr></table> <p><i>start-day</i> — specifies the starting day of the week when the summer time will take effect</p> <table><tr><td>Values</td><td>sunday, monday, tuesday, wednesday, thursday, friday, saturday</td></tr><tr><td>Default</td><td>sunday</td></tr></table> <p><i>start-month</i> — the starting month of the year when the summer time will take effect</p> <table><tr><td>Values</td><td>january, february, march, april, may, june, july, august, september, october, november, december</td></tr><tr><td>Default</td><td>january</td></tr></table> <p><i>hours</i> — specifies the hour at which the summer time will take effect</p> <table><tr><td>Default</td><td>0</td></tr></table> <p><i>minutes</i> — specifies the number of minutes, after the hours defined by the <i>hours</i> parameter, when the summer time will take effect</p> <table><tr><td>Default</td><td>0</td></tr></table>	Values	first, second, third, fourth, last	Default	first	Values	sunday, monday, tuesday, wednesday, thursday, friday, saturday	Default	sunday	Values	january, february, march, april, may, june, july, august, september, october, november, december	Default	january	Default	0	Default	0
Values	first, second, third, fourth, last																
Default	first																
Values	sunday, monday, tuesday, wednesday, thursday, friday, saturday																
Default	sunday																
Values	january, february, march, april, may, june, july, august, september, october, november, december																
Default	january																
Default	0																
Default	0																

zone

Syntax	zone { <i>std-zone-name</i> <i>non-std-zone-name</i> } [<i>hh</i> [: <i>mm</i>]] no zone
Context	config>system>time
Description	<p>This command sets the time zone and/or time zone offset for the device.</p> <p>The 7705 SAR supports system-defined and user-defined time zones. The system-defined time zones are listed in Table 21.</p> <p>For user-defined time zones, the zone and the UTC offset must be specified.</p> <p>The no form of the command reverts to the default of Coordinated Universal Time (UTC). If the time zone in use was a user-defined time zone, the time zone will be deleted. If a dst-zone command has been configured that references the zone, the summer commands must be deleted before the zone can be reset to UTC.</p>
Default	zone utc - the time zone is set for Coordinated Universal Time (UTC)
Parameters	<p><i>std-zone-name</i> — the standard time zone name. The standard name must be a system-defined zone in Table 21. For zone names in the table that have an implicit summer time setting, for example MDT for Mountain Daylight Saving Time, the remaining <i>start-date</i>, <i>end-date</i> and <i>offset</i> parameters need to be provided unless it is necessary to override the system defaults for the time zone.</p> <p>For system-defined time zones, a different offset cannot be specified. If a new time zone is needed with a different offset, the user must create a new time zone. Some system-defined time zones have implicit summer time settings that causes the switchover to summer time to occur automatically; in this case, configuring the dst-zone parameter is not required.</p> <p>A user-defined time zone name is case-sensitive and can be up to 5 characters in length.</p> <p>Values A user-defined value can be up to 5 characters or one of the following values: GMT, BST, IST, WET, WEST, CET, CEST, EET, EEST, MSK, MSD, AST, ADT, EST, EDT, ET, CST, CDT, CT, MST, MDT, MT, PST, PDT, PT, HST, AKST, AKDT, WAST, CAST, EAST</p> <p><i>non-std-zone-name</i> — the non-standard time zone name</p> <p>Values Up to 5 characters maximum.</p> <p><i>hh</i> [:<i>mm</i>] — the hours and minutes offset from UTC time, expressed as integers. Some time zones do not have an offset that is an integral number of hours. In these instances, the <i>minutes-offset</i> must be specified. For example, the time zone in Pirlanngimpi, Australia is UTC + 9.5 hours.</p> <p>Values hours: -11 to 11 minutes: 0 to 59</p> <p>Default hours: 0 minutes: 0</p>

PTP System Time Commands

ptp

Syntax	ptp
Context	config>system>time
Description	This command creates the context to create or modify ptp parameters for time.

clock

Syntax	clock <i>clock-id</i> time-ref-priority <i>priority-value</i> no clock
Context	config>system>time>ptp
Description	This command specifies the PTP (Precision Time Protocol) source as an option for recovered time for the 1pps (1 pulse per second) port. The specific PTP clock is identified by <i>clock-id</i> and has an assigned <i>priority-value</i> .
Default	no clock
Parameters	<i>clock-id</i> — specifies which configured clock is being used as the time reference Values 1 to 16 <i>priority-value</i> — specifies the priority order of the given clock configured as the time reference Values 1 to 16

ToD System Time Commands

tod-1pps

Syntax	tod-1pps
Context	config>system>time
Description	This command enables the context to create or modify tod-1pps connector parameters.

message-type

Syntax	message-type {ct cm none irigb-007-127} no message-type
Context	config>system>time>tod-1pps
Description	This command specifies the format for the Time of Day message that is transmitted out the time of day (ToD) port on the 7705 SAR-M (all variants) or the 7705 SAR-H.
Default	no message-type
Parameters	ct — China Telecom cm — China Mobile none — do not send messages over the ToD port irigb-007-127 — specifies IRIG-B message format, available on the 7705 SAR-H only

output

Syntax	output {shutdown no shutdown}
Context	config>system>time>tod-1pps
Description	This command enables or disables the 1pps ToD output port on the 7705 SAR-M (all variants) or the 7705 SAR-H.
Default	shutdown
Parameters	shutdown — disables the ToD output port no shutdown — enables the ToD output port

CRON Commands

cron

Syntax	cron
Context	config
Description	<p>This command creates the context to create scripts, script parameters and schedules that support the Service Assurance Agent (SAA) functions.</p> <p>CRON features are saved to the configuration file on both primary and backup control modules. If a control module switchover occurs, CRON events are restored when the new configuration is loaded. If a control module switchover occurs during the execution of a CRON script, the failover behavior will be determined by the contents of the script.</p>

action

Syntax	[no] action <i>action-name</i> [owner <i>owner-name</i>]
Context	config>cron config>cron>schedule
Description	This command configures action parameters for a script.
Default	n/a
Parameters	<i>action-name</i> — specifies the action name Values maximum 32 characters <i>owner-name</i> — specifies the owner name Default TiMOS CLI

expire-time

Syntax	expire-time {<i>seconds</i> forever}
Context	config>cron>action
Description	This command configures the maximum amount of time to keep the results from a script run.

Parameters *seconds* — specifies the maximum amount of time to keep the results from a script run

Values 1 to 21474836

Default 3600 (1 hour)

forever — specifies to keep the results from a script run forever

lifetime

Syntax **lifetime** {*seconds* | **forever**}

Context config>cron>action

Description This command configures the maximum amount of time a script may run.

Parameters *seconds* — specifies the maximum amount of time a script may run

Values 1 to 21474836

Default 3600 (1 hour)

forever — specifies to allow a script to run forever

max-completed

Syntax **max-completed** *unsigned*

Context config>cron>action

Description This command specifies the maximum number of completed sessions to keep in the event execution log. If a new event execution record exceeds the number of records specified by this command, the oldest record is deleted.

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

Parameters *unsigned* — specifies the maximum number of completed sessions to keep in the event execution log

Values 0 to 255

Default 1

System Command Reference

results

Syntax	[no] results <i>file-url</i>
Context	config>cron>action
Description	This command specifies the location where the system writes the output of an event script's execution. The no form of this command removes the file location from the configuration.
Parameters	<i>file-url</i> — specifies the location where the system writes the output of an event script's execution
Values	<i>file url:</i> { <i>local-url</i> <i>remote-url</i> } 255 chars max <i>local-url:</i> [<i>cflash-id</i>]/[<i>file-path</i>] <i>remote-url:</i> [{ftp:// tftp://} <i>login:pswd@remote-locn</i> /] [<i>file-path</i>] <i>cflash-id:</i> cf3:, cf3-A:, cf3-B:

script

Syntax	[no] script <i>script-name</i> [owner <i>owner-name</i>]
Context	config>cron>action
Description	This command creates action parameters for a script, including the maximum amount of time to keep the results from a script run, the maximum amount of time a script may run, the maximum number of script runs to store and the location to store the results. The no form of this command removes the script parameters from the configuration.
Default	n/a
Parameters	<i>script-name</i> — connects an event to the script that will run when the event is triggered <i>owner-name</i> — owner name of the schedule
Default	TiMOS CLI

schedule

Syntax	[no] schedule <i>schedule-name</i> [owner <i>owner-name</i>]
Context	config>cron
Description	This command configures the type of schedule to run, including one-time only (oneshot), periodic, or calendar-based runs. All runs are determined by month, day of month or weekday, hour, minute and interval (seconds). The no form of the command removes the context from the configuration.

Default n/a

Parameters *schedule-name* — name of the schedule
owner-name — owner name of the schedule

count

Syntax **count** *number*

Context config>cron>schedule

Description This command configures the total number of times a CRON “interval” schedule is run. For example, if the interval is set to 600 and the count is set to 4, the schedule runs 4 times at 600 second intervals.

Parameters *number* — the number of times the schedule is run

Values 1 to 65535

Default 65535

day-of-month

Syntax [**no**] **day-of-month** {*day-number* [*..day-number*] | **all**}

Context config>cron>schedule

Description This command specifies which days of the month that the schedule will occur. Multiple days of the month can be specified. When multiple days are configured, each of them will cause the schedule to trigger. If a day-of-month is configured without configuring [month](#), [weekday](#), [hour](#) and [minute](#), the event will not execute.

Using the **weekday** command as well as the **day-of-month** command will cause the script to run twice. For example, consider that “today” is Monday January 1. If “Tuesday January 5” is configured, the script will run on Tuesday (tomorrow) as well as January 5 (Friday).

The **no** form of this command removes the specified day-of-month from the list.

Parameters *day-number* — positive integers specify the day of the month counting from the first of the month. The negative integers specify the day of the month counting from the last day of the month. For example, configuring **day-of-month -5, 5** in a month that has 31 days will specify the schedule to occur on the 27th and 5th of that month.

Integer values must map to a valid day for the month in question. For example, February 30 is not a valid date.

Values 1 to 31, -31 to -1 (maximum 62 day-numbers)

all — specifies all days of the month

end-time

Syntax	[no] end-time [<i>date</i> <i>day-name</i>] <i>time</i>
Context	config>cron>schedule
Description	<p>This command is used concurrently with type periodic or calendar. Using the type of periodic, end-time determines at which interval the schedule will end. Using the type of calendar, end-time determines on which date the schedule will end.</p> <p>When no end-time is specified, the schedule runs forever.</p>
Parameters	<p><i>date</i> — specifies the date to schedule a command</p> <p>Values YYYY:MM:DD in year:month:day number format</p> <p><i>day-name</i> — specifies the day of the week to schedule a command</p> <p>Values sunday monday tuesday wednesday thursday friday saturday</p> <p><i>time</i> — specifies the time of day to schedule a command</p> <p>Values hh:mm in hour:minute format</p>

hour

Syntax	[no] hour {.. <i>hour-number</i> [.. <i>hour-number</i>] all }
Context	config>cron>schedule
Description	<p>This command specifies which hour to schedule a command. Multiple hours of the day can be specified. When multiple hours are configured, each of them will cause the schedule to trigger. Day-of-month or weekday must also be specified. All days of the month or weekdays can be specified. If an hour is configured without configuring month, weekday, day-of-month, and minute, the event will not execute.</p> <p>The no form of this command removes the specified hour from the configuration.</p>
Parameters	<p><i>hour-number</i> — specifies the hour to schedule a command</p> <p>Values 0 to 23 (maximum 24 hour-numbers)</p> <p>all — specifies all hours</p>

interval

Syntax	[no] interval seconds
Context	config>cron>schedule
Description	This command specifies the interval between runs of an event.
Parameters	<i>seconds</i> — the interval, in seconds, between runs of an event
Values	30 to 4294967295

minute

Syntax	[no] minute {<i>minute-number</i> [<i>..minute-number</i>] all}
Context	config>cron>schedule
Description	This command specifies the minute to schedule a command. Multiple minutes of the hour can be specified. When multiple minutes are configured, each of them will cause the schedule to occur. If a minute is configured, but no hour or day is configured, the event will not execute. If a minute is configured without configuring month , weekday , day-of-month , and hour , the event will not execute. The no form of this command removes the specified minute from the configuration.
Parameters	<i>minute-number</i> — specifies the minute to schedule a command
Values	0 to 59 (maximum 60 minute-numbers)
	all — specifies all minutes

month

Syntax	[no] month {<i>month-number</i> [<i>..month-number</i>] <i>month-name</i> [<i>..month-name</i>] all}
Context	config>cron>schedule
Description	This command specifies the month when the event should be executed. Multiple months can be specified. When multiple months are configured, each of them will cause the schedule to trigger. If a month is configured without configuring weekday , day-of-month , hour and minute , the event will not execute. The no form of this command removes the specified month from the configuration.

System Command Reference

Parameters	<i>month-number</i> — specifies a month number
Values	1 to 12 (maximum 12 month-numbers)
	<i>month-name</i> — specifies a month by name
Values	january, february, march, april, may, june, july, august, september, october, november, december (maximum 12 month names)
	all — specifies all months

type

Syntax	type <i>schedule-type</i>
Context	config>cron>schedule
Description	This command specifies how the system should interpret the commands contained within the schedule node.
Parameters	<i>schedule-type</i> — specifies the type of schedule for the system to interpret the commands contained within the schedule node
Values	periodic — specifies a schedule that runs at a given interval. The interval value must be specified for this feature to run successfully. calendar — specifies a schedule that runs based on a calendar. The values, weekday , month , day-of-month , hour , and minute , must be specified for this feature to run successfully. oneshot — specifies a schedule that runs one time only. As soon as the first event specified in these parameters takes place and the associated event occurs, the schedule enters a shutdown state. month , weekday , day-of-month , hour and minute must be specified for this feature to run successfully.
Default	periodic

weekday

Syntax	[no] weekday { <i>weekday-number</i> [<i>..weekday-number</i>] <i>day-name</i> [<i>..day-name</i>] all }
Context	config>cron>schedule
Description	This command specifies which days of the week that the schedule will fire on. Multiple days of the week can be specified. When multiple days are configured, each of them will cause the schedule to occur. If a weekday is configured without configuring month , day-of-month , hour and minute , the event will not execute.

Using the **weekday** command as well as the **day-of month** command will cause the script to run twice. For example, consider that “today” is Monday January 1. If “Tuesday January 5” is configured, the script will run on Tuesday (tomorrow) as well as January 5 (Friday).

The **no** form of this command removes the specified weekday from the configuration.

- Parameters** *weekday-number* — specifies a weekday number
- Values** 1 to 7 (maximum 7 week-day-numbers)
- day-name* — specifies a day by name
- Values** sunday, monday, tuesday, wednesday, thursday, friday, saturday
(maximum 7 weekday names)
- all** — specifies all days of the week

script

- Syntax** **[no] script** *script-name* [**owner** *owner-name*]
- Context** config>cron>script
- Description** This command configures the name associated with this script.
- Parameters** *script-name* — specifies the script name
- owner-name* — specifies the owner of the script

location

- Syntax** **[no] location** *file-url*
- Context** config>cron>script
- Description** This command configures the location of script to be scheduled.
- Parameters** *file-url* — specifies the location where the system writes the output of an event script’s execution
- Values**
- | | | |
|--------------------|--|---------------|
| <i>file url:</i> | { <i>local-url</i> <i>remote-url</i> } | 255 chars max |
| <i>local-url:</i> | [<i>cflash-id</i> /][<i>file-path</i>] | |
| <i>remote-url:</i> | [{ftp:// tftp://} <i>login:pswd@remote-locn</i> /]
[<i>file-path</i>] | |
| <i>cflash-id:</i> | cf3:, cf3-A:, cf3-B: | |

System Synchronization Configuration Commands

sync-if-timing

Syntax	sync-if-timing
Context	config>system
Description	This command creates or edits the context to create or modify timing reference parameters.
Default	not enabled (The ref-order must be specified in order for this command to be enabled.)

abort

Syntax	abort
Context	config>system>sync-if-timing
Description	This command is required to discard changes that have been made to the synchronous interface timing configuration during a session.

begin

Syntax	begin
Context	config>system>sync-if-timing
Description	This command is required in order to enter the mode to create or edit the system synchronous interface timing configuration.

bits

Syntax	bits
Context	config>system>sync-if-timing
Description	This command enables the context to configure parameters for BITS timing on the 7705 SAR-18. The BITS input and output ports can be configured for T1/E1 or 2 MHz G.703 signals.

input

Syntax	input
Context	config>system>sync-if-timing>bits
Description	This command enables the context to configure BITS input timing ports parameters on the 7705 SAR-18.

interface-type

Syntax	interface-type {ds1 [{esf sf}] e1 [{pcm30crc pcm31crc}] 2048khz-G703} no interface-type
Context	config>system>sync-if-timing>bits
Description	This command specifies the signal type for the BITS input and output ports. If you configure the signal type as ds1 , the system automatically defaults to esf . If you configure the signal type as e1 , the system automatically defaults to pcm30crc . The no form of the command reverts to the default configuration.
Default	ds1 esf
Parameters	ds1 esf — specifies Extended Super Frame (ESF). ESF is a framing type used on DS1 circuits. ESF consists of 24 192-bit frames. The 193rd bit provides timing and other functions. ds1 sf — specifies Super Frame (SF), also called D4 framing. SF is a common framing type used on DS1 circuits. SF consists of 12 192-bit frames. The 193rd bit provides error checking and other functions. ESF supersedes SF. e1 pcm30crc — specifies PCM30CRC as the pulse code modulation (PCM) type. PCM30CRC uses PCM to separate the signal into 30 user channels with Cyclic Redundancy Check (CRC) protection. e1 pcm31crc — specifies PCM31CRC as the PCM type. PCM31CRC uses PCM to separate the signal into 31 user channels with CRC protection.

output

Syntax	output
Context	config>system>sync-if-timing>bits
Description	This command enables the context to configure BITS output port parameters on the 7705 SAR-18.

System Command Reference

line-length

Syntax	line-length { 110 220 330 440 550 660 }
Context	config>system>sync-if-timing>bits>output
Description	This command configures the line length, in feet, between the network element and the central clock (BITS/SSU). This command is only applicable when the interface-type is DS1.
Default	110
Parameters	110 — specifies a line length from 0 to 110 ft 220 — specifies a line length from 111 to 220 ft 330 — specifies a line length from 221 to 330 ft 440 — specifies a line length from 331 to 440 ft 550 — specifies a line length from 441 to 550 ft 660 — specifies a line length from 551 to 660 ft

ql-override

Syntax	ql-override { prs stu st2 tnc st3e st3 smc prc ssu-a ssu-b sec eec1 eec2 } no ql-override
Context	config>system>sync-if-timing>external config>system>sync-if-timing>bits config>system>sync-if-timing>ref1 config>system>sync-if-timing>ref2
Description	This command configures a static quality level value. This value overrides any dynamic quality level value received by the Synchronization Status Messaging (SSM) process.
Default	no ql-override
Parameters	prs — SONET Primary Reference Source Traceable stu — SONET Synchronous Traceability Unknown st2 — SONET Stratum 2 Traceable tnc — SONET Transit Node Clock Traceable st3e — SONET Stratum 3E Traceable st3 — SONET Stratum 3 Traceable smc — SONET Minimum Clock Traceable prc — SDH Primary Reference Clock Traceable

ssu-a — SDH Primary Level Synchronization Supply Unit Traceable

ssu-b — SDH Second Level Synchronization Supply Unit Traceable

sec — SDH Synchronous Equipment Clock Traceable

eec1 — Ethernet Equipment Clock Option 1 Traceable (SDH)

eec2 — Ethernet Equipment Clock Option 2 Traceable (SONET)

ssm-bit

Syntax	ssm-bit <i>sa-bit</i>
Context	config>system>sync-if-timing>bits
Description	This command configures which Sa-bit to use for conveying Synchronization Status Messaging (SSM) information when the interface type is E1.
Default	Sa8
Parameters	<i>sa-bit</i> — specifies the Sa-bit value
Values	Sa4 to Sa8

commit

Syntax	commit
Context	config>system>sync-if-timing
Description	This command is required in order to save the changes made to the system synchronous interface timing configuration.

external

Syntax	external
Context	config>system>sync-if-timing
Description	This command enables the context to configure parameters for external timing via the port on the CSM. This can be used to reference external synchronization signals.

input-interface

Syntax	input-interface
Context	config>system>sync-if-timing>external
Description	This command enables the context to configure parameters for external input timing interface via the port on the CSM.

impedance

Syntax	impedance {high-impedance 50-Ohm 75-Ohm}
Context	config>system>sync-if-timing>external>input-interface
Description	This command configures the impedance of the external input timing port.
Default	50-Ohm
Parameters	high-impedance — specifies a high input impedance value 50-Ohm — specifies a 50 Ω input impedance value 75-Ohm — specifies a 75 Ω input impedance value

type

Syntax	type {2048khz-G703 5mhz 10mhz} no type
Context	config>system>sync-if-timing>external>input-interface config>system>sync-if-timing>external>output-interface
Description	This command configures the interface type of the external timing port. The no form of the command reverts to the default.
Default	2048 kHz-G703
Parameters	2048khz-G703 — specifies G703 2048 kHz clock 5mhz — specifies a 5 mHz sine clock 10mhz — specifies a 10 mHz sine clock

output-interface

Syntax	output-interface
Context	config>system>sync-if-timing>external
Description	This command enables the context to configure parameters for external output timing interface via the port on the CSM.
Default	n/a

ql-selection

Syntax	[no] ql-selection
Context	config>system>sync-if-timing
Description	This command enables SSM encoding as a means of timing reference selection.
Default	no ql-selection

ref-order

Syntax	ref-order <i>first second [third]</i> no ref-order
Context	config>system>sync-if-timing
Description	<p>The synchronous equipment timing subsystem can lock to three different timing reference inputs, those specified in the ref1, ref2, and external and begin command configuration. This command organizes the priority order of the timing references.</p> <p>If a reference source is disabled, then the clock from the next reference source as defined by ref-order is used. If the reference sources are disabled, then clocking is derived from a local oscillator.</p> <p>If a sync-if-timing reference is linked to a source port that is operationally down, the port will no longer be qualified as a valid reference.</p> <p>The no form of the command resets the reference order to the default values.</p>
Default	external, ref1 ref2

System Command Reference

- Parameters** *first* — specifies the first timing reference to use in the reference order sequence
- Values** ref1, ref2, external, bits
- second* — specifies the second timing reference to use in the reference order sequence
- Values** ref1, ref2, external, bits
- third* — specifies the third timing reference to use in the reference order sequence
- Values** ref1, ref2, external, bits

ref1

- Syntax** **ref1**
- Context** config>system>sync-if-timing
- Description** This command enables the context to configure parameters for the first timing reference.

ref2

- Syntax** **ref2**
- Context** config>system>sync-if-timing
- Description** This command enables the context to configure parameters for the second timing reference.

source-port

- Syntax** **source-port** *port-id* [**adaptive**]
no source-port
- Context** config>system>sync-if-timing>ref1
config>system>sync-if-timing>ref2
- Description** This command configures the source port for timing reference **ref1** or **ref2**.
- The timing reference can either be timing extracted from the receive port (line-timed) or packetized data of a TDM PW (adaptive). If the adaptive option is not selected, the system uses line timing mode. If the line timing is from a port that becomes unavailable or the link goes down, then the reference sources are re-evaluated according to the reference order configured by the [ref-order](#) command.
- On the 7705 SAR-F, line timing is supported on the T1/E1 ports and on Ethernet optical SFP ports.
- On the 7705 SAR-M (variants with T1/E1 ports), line timing is supported on T1/E1 ports. Line timing is also supported on all RJ-45 Ethernet ports and optical SFP ports on the 7705 SAR-M (all variants).

On the 7705 SAR-H, line timing is supported on all ports and on the T1/E1 ports of the T1/E1 ASAP and RS-232 Combination module when it is installed in the 7705 SAR-H.

In addition, line timing is supported on the following modules when they are installed in chassis variants with module slots:

- GPON module via the synchronous downstream 8 khz GPON physical layer
- 8-port xDSL module (NTR over ADSL2, ADSL2+, or VDSL2)
- 6-port DSL Combination module (two references are available: NTR over SHDSL and NTR over ADSL2, ADSL2+, or VDSL2)

On the 7705 SAR-8 and 7705 SAR-18, line timing is supported on:

- T1/E1 ports on the 16-port T1/E1 ASAP Adapter card (versions 1 and 2) and 32-port T1/E1 ASAP Adapter card (the 16-port T1/E1 ASAP Adapter card, version 1, is not supported on the 7705 SAR-18)
- Ethernet SFP ports with SFPs that support synchronous Ethernet on the 8-port Ethernet Adapter card (version 2), on the 8-port Gigabit Ethernet Adapter card, on the Packet Microwave Adapter card, and on the 10-port 1GigE/1-port 10GigE X-Adapter card (on the 7705 SAR-18 only)
- SONET/SDH ports on the 4-port OC3/STM1 Clear Channel Adapter card and 2-port OC3/STM1 Channelized Adapter card
- DS3/E3 ports on the 4-port DS3/E3 Adapter card

Adaptive timing is supported on the T1/E1 ports on the 7705 SAR-F and 7705 SAR-M (variants with T1/E1 ports). On the 7705 SAR-8 and 7705 SAR-18, adaptive timing is supported on the 16-port T1/E1 ASAP Adapter card (versions 1 and 2) and the 32-port T1/E1 ASAP Adapter card configured with one or more TDM PWs. (The 16-port T1/E1 ASAP Adapter card, version 1, is not supported on the 7705 SAR-18.) Adaptive timing is also supported on the T1/E1 ports of the T1/E1 ASAP and RS-232 Combination module when it is installed in the 7705 SAR-H.



Note: The PW terminated on channel group 1 will be used to extract the ACR timing.

Synchronous Ethernet ports can supply a timing reference on the 7705 SAR-F and 7705 SAR-M (all variants). Two T1/E1 ports can supply a timing reference on the 7705 SAR-F and 7705 SAR-M (variants with T1/E1 ports). One reference must be from ports 1 to 8 and the other from ports 9 to 16.

On the 7705 SAR-8 and 7705 SAR-18, a timing reference can come from:

- a single DS3/E3 port on the 4-port DS3/E3 Adapter card
- a single SONET/SDH port on a 2-port OC3/STM1 Channelized Adapter card or 4-port OC3/STM1 Clear Channel Adapter card
- a single synchronous Ethernet port on an 8-port Ethernet Adapter card (version 2), 8-port Gigabit Ethernet Adapter card, Packet Microwave Adapter card, or 10-port 1GigE/1-port 10GigE X-Adapter card (on the 7705 SAR-18 only)

System Command Reference

- a single T1/E1 port on the 16-port T1/E1 ASAP Adapter card (versions 1 and 2) and 32-port T1/E1 ASAP Adapter card (the 16-port T1/E1 ASAP Adapter card, version 1, is not supported on the 7705 SAR-18)

The **no** form of this command deletes the source port from the reference. An example of when the **no** form would be used is if the user wants to change the reference to a source IP interface in order to enable PTP. In this case, the user would first delete the PTP using the **no source-port** command, then configure the source IP interface using the [source-ptp-clock](#) command.

Parameters *port-id* — identifies the port in the slot/mda/port format
adaptive — clock recovery is adaptive, rather than line-timed

source-ptp-clock

Syntax **source-ptp-clock** *clock-id*
no source-ptp-clock

Context config>system>sync-if-timing>ref1
config>system>sync-if-timing>ref2

Description This command configures the reference source clock using the clock ID configured by the PTP [clock](#) command.

Default no source-ptp-clock

Parameters *clock-id* — identifies the PTP clock to use as the reference source clock

Values 1 or 2

revert

Syntax [**no**] **revert**

Context config>system>sync-if-timing

Description This command allows the clock to revert to a higher-priority reference if the current reference goes offline or becomes unstable. With revertive switching enabled, the highest-priority valid timing reference will be used. If a reference with a higher priority becomes valid, a reference switchover to that reference will be initiated. If a failure on the current reference occurs, the next highest reference takes over.

With non-revertive switching, the active reference will always remain selected while it is valid, even if a higher-priority reference becomes available. If this reference becomes invalid, a reference switchover to a valid reference with the highest priority will be initiated. When the failed reference becomes operational, it is eligible for selection.

Default no revert

LLDP System Commands

Refer to the 7705 SAR OS Interface Configuration Guide, “7705 SAR Interfaces”, for LLDP Ethernet port commands.

lldp

Syntax	lldp
Context	config>system
Description	This command enables the context to configure system-wide Link Layer Discovery Protocol (LLDP) parameters.

message-fast-tx

Syntax	message-fast-tx <i>time</i> no message-fast-tx
Context	config>system>lldp
Description	<p>This command configures the interval between LLDPDU transmissions by the LLDP agent during a fast transmission period.</p> <p>The fast transmission period begins when a new neighbor is detected. During the fast transmission period, LLDPDUs are transmitted at shorter intervals than the standard tx-interval to ensure that more than one LLDPDU is sent to the new neighbor. The first transmission occurs as soon as the new neighbor is detected. The length of the fast transmission period is determined by the number of LLDPDU transmissions (configured by the message-fast-tx-init command) and the interval between them.</p> <p>The no form of the command reverts to the default value.</p>
Default	1
Parameters	<i>time</i> — specifies the interval between LLDPDU transmissions in seconds
Values	1 to 3600

message-fast-tx-init

Syntax	message-fast-tx-init <i>count</i> no message-fast-tx-init
Context	config>system>lldp
Description	<p>This command configures the number of LLDPDUs to send during a fast transmission period.</p> <p>The fast transmission period begins when a new neighbor is detected. During the fast transmission period, LLDPDUs are transmitted at shorter intervals than the standard tx-interval to ensure that more than one LLDPDU is sent to the new neighbor. The first transmission occurs as soon as the new neighbor is detected. The length of the fast transmission period is determined by the number of LLDPDU transmissions and the interval between them (configured by the message-fast-tx command).</p> <p>The no form of the command reverts to the default value.</p>
Default	4
Parameters	<i>count</i> — specifies the number of LLDPDUs to send during the fast transmission period
Values	1 to 8

notification-interval

Syntax	notification-interval <i>time</i> no notification-interval
Context	config>system>lldp
Description	<p>This command configures the minimum time between change notifications. A change notification is a trap message sent to SNMP whenever a change occurs in the database of LLDP information.</p> <p>The no form of the command reverts to the default value.</p>
Default	5
Parameters	<i>time</i> — specifies the minimum time, in seconds, between change notifications
Values	5 to 3600

reinit-delay

Syntax	reinit-delay <i>time</i> no reinit-delay
Context	config>system>lldp
Description	This command configures the time before reinitializing LLDP on a port. The no form of the command reverts to the default value.
Default	2
Parameters	<i>time</i> — specifies the time, in seconds, before reinitializing LLDP on a port Values 1 to 10

tx-credit-max

Syntax	tx-credit-max <i>count</i> no tx-credit-max
Context	config>system>lldp
Description	This command configures the maximum number of consecutive LLDPDUs that can be transmitted at any time. The no form of the command reverts to the default value.
Default	5
Parameters	<i>count</i> — specifies the maximum number of consecutive LLDPDUs transmitted Values 1 to 100

tx-hold-multiplier

Syntax	tx-hold-multiplier <i>multiplier</i> no tx-hold-multiplier
Context	config>system>lldp
Description	This command configures the multiplier of the transmit interval defined by the tx-interval command. The transmit interval time multiplied by the tx-hold-multiplier is the TTL value in the LLDPDU. The TTL value determines the amount of time the receiving device retains LLDP packet information in local information databases before discarding it. The no form of the command reverts to the default value.

System Command Reference

Default 4

Parameters *multiplier* — specifies the multiplier of the transmit interval

Values 2 to 10

tx-interval

Syntax **tx-interval** *interval*
no tx-interval

Context config>system>lldp

Description This command configures the LLDP transmit interval time.

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

Default 30

Parameters *interval* — specifies the LLDP transmit interval time in seconds

Values 5 to 32768

System PTP commands

ptp

Syntax	ptp
Context	config>system
Description	This command creates or edits the context to create or modify PTP timing parameters.

clock

Syntax	clock <i>clock-id</i> [create] no clock
Context	config>system>ptp
Description	This command creates a PTP clock, which can be set to a master, slave, or boundary clock using the clock-type command.
Parameters	<i>clock-id</i> — specifies the clock ID of this PTP instance
Values	For the 7705 SAR-F, 7705 SAR-H, 7705 SAR-8, and 7705 SAR-18, the range is 1 to 16 For the 7705 SAR-M (all variants), the range is 1 to 16, where only one instance can be master, slave, or boundary
create	— keyword required when first creating the configuration context. When the context is created, you can navigate into the context without the create keyword.

clock-mdm

Syntax	clock-mdm <i>mdm-id</i> no clock-mdm
Context	config>system>ptp>clock
Description	This command configures the adapter card slot that performs the IEEE 1588v2 clock recovery. On the 7705 SAR-F, this slot is always 1/2. On the 7705 SAR-M and 7705 SAR-H, this slot is always 1/1. The no form of this command clears the clock recovery adapter card.
Default	n/a
Parameters	<i>mdm-id</i> — <i>slot/mdm</i>

clock-type

Syntax	clock-type { ordinary [master slave] boundary transparent-e2e } no clock-type
Context	config>system>ptp>clock
Description	This command configures the type of clock. The no form of the command reverts to the default configuration (ordinary slave). The clock type can only be changed when PTP is shut down.
Default	ordinary slave
Parameters	ordinary — configures the clock as either a PTP master or slave master — configures the clock as a PTP master only slave — configures the clock as a PTP slave only boundary — configures the clock as a boundary clock capable of functioning as both a master and slave concurrently transparent-e2e — configures the clock as a transparent clock capable (this option is only available for the 7705 SAR-M (all variants))

domain

Syntax	domain <i>domain-value</i> no domain
Context	config>system>ptp>clock
Description	This command defines the PTP device domain, defined as an integer. A domain consists of one device or multiple PTP devices communicating with each other as defined by the protocol. A PTP domain defines the scope of PTP message communication, state, operations, data sets and timescale. A domain is configured since it is possible that a deployment could require the two PTP instances within a single network element to be programmed with different domain values. The no form of this command reverts to the default value.
Default	0
Parameters	<i>domain-value</i> — specifies the PTP device domain value Values 0 to 127

dynamic-peers

Syntax	[no] dynamic-peers
Context	config>system>ptp>clock
Description	<p>This command allows a slave clock to connect to the master clock without the master being aware of it. Once connected, the master clock or boundary clock assigns the slave a PTP port and/or peer ID dynamically.</p> <p>Dynamic peers are not stored in the configuration file. If a master clock with dynamic peers goes down and comes back up, the slave clocks renegotiate to it and are reassigned resources on the master clock or boundary clock.</p> <p>The no form of this command disables dynamic peers. In this case, the user must manually program any slave peer clocks into the master clock or boundary clock in order for those clocks to accept those slaves.</p>
Default	no dynamic-peers

freq-source

Syntax	[no] freq-source {ptp ssu}
Context	config>system>ptp>clock
Description	<p>This command specifies the administrative value for the frequency source for the time of day recovery algorithm of a given PTP clock.</p> <p>The no form of the command reverts to the default configuration.</p>
Default	ptp
Parameters	<p>ptp — configures the clock as a PTP</p> <p>ssu — configures the clock as SSU</p>

priority1

Syntax	priority1 <i>priority-value</i> no priority1
Context	config>system>ptp>clock
Description	<p>This command configures the first priority value of the local clock. This value is used by the Best Master Clock Algorithm (BMCA) to determine which clock should provide timing for the network. It is also used as the advertised value in announce messages and as the local clock value in data set comparisons.</p> <p>The no form of the command reverts to the default configuration.</p>
Default	128
Parameters	<i>priority</i> — specifies the priority1 value of the local clock
	Values 0 to 255

priority2

Syntax	priority2 <i>priority-value</i> no priority2
Context	config>system>ptp>clock
Description	<p>This command configures the second priority value of the local clock. This value is used by the BMCA to determine which clock should provide timing for the network. It is also used as the advertised value in announce messages and as the local clock value in data set comparisons.</p> <p>The no form of the command reverts to the default configuration.</p>
Default	128
Parameters	<i>priority</i> — specifies the priority2 value of the local clock
	Values 0 to 255

profile

Syntax	profile ieee1588-2008 profile itu-telecom-freq no profile
Context	config>system>ptp>clock
Description	<p>This command defines the specification rules to be used by PTP. Configuring the profile changes the BMCA and SSM/QL mappings to match the settings in the specification. The profile can only be changed when PTP is shut down.</p>

The **no** form of the command reverts to the default configuration.

Default ieee1588-2008

Parameters **ieee1588-2008** — configures the PTP profile to follow the IEEE 1588-2008 specification rules
itu-telecom-freq — configures the PTP profile to follow the ITU G.8265.1 specification rules

ptp-port

Syntax **ptp-port** *port-id*

Context config>system>ptp>clock

Description This command configures an IEEE 1588v2 logical port in the system. It also creates the context to configure parameters for IEEE 1588v2. PTP ports are created when the clock type is set with the [clock-type](#) command.

When the clock type is set to ordinary slave, one port with two peers is created. When the clock type is set to ordinary master, one port with 10 peers is created. When the clock type is set to boundary clock, 10 ports each with one peer are created.

Default n/a

Parameters *port-id* — specifies the PTP port ID

Values 1 to 10

anno-rx-timeout

Syntax **anno-rx-timeout** *number-of-timeouts*
no anno-rx-timeout

Context config>system>ptp>clock>ptp-port

Description This command defines the number of announce timeouts that need to occur on a PTP slave port or boundary clock port in slave mode before communication messages with a master clock are deemed lost and the master clock is considered not available. One timeout in this context is equal to the announce interval in seconds, calculated using the logarithm $2^{\log\text{-anno-interval}}$.

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

Default 3

Parameters *number-of-timeouts* — specifies the number of timeouts that need to occur before communication messages to a master clock are deemed lost and the master clock is considered not available

Values 2 to 10

log-anno-interval

Syntax	log-anno-interval <i>log-anno-interval</i> no log-anno-interval
Context	config>system>ptp>clock>ptp-port
Description	This command defines the expected interval between the reception of announce messages for a PTP slave port or boundary clock port in slave mode. The no form of this command reverts to the default value.
Default	1
Parameters	<i>log-anno-interval</i> — specifies the expected interval between the reception of announce messages Values 0 to 3, where 0 = 1 s, 1 = 2 s, 2 = 4 s, 3 = 8 s

log-sync-interval

Syntax	log-sync-interval <i>log-sync-interval</i> no log-sync-interval
Context	config>system>ptp>clock>ptp-port
Description	This command defines the expected interval between the reception of synchronization messages for a PTP slave port or a PTP boundary clock port in slave mode. The no form of this command reverts to the default value.
Default	-6
Parameters	<i>log-sync-interval</i> — specifies the expected interval between the reception of synchronization messages Values -6 or -7, where -6 is 64 packets/s and -7 is 128 packets/s

peer

Syntax	peer <i>peer-id</i>
Context	config>system>ptp>clock>ptp-port
Description	This command enables the context to configure parameters associated with remote PTP peers such as grand master clocks. For ordinary slave clocks, two peers are automatically created. For ordinary master clocks, 10 peers are automatically created. For boundary clocks, 1 peer per PTP port is automatically created. The no form of the command removes the IP address from the PTP peer.

Default	n/a
Parameters	<i>peer-id</i> — specifies the PTP peer ID
Values	1 to 10

description

Syntax	description <i>description-string</i> no description
Context	config>system>ptp>clock>ptp-port>peer
Description	This command configures a text description and associates it with a configuration context to help identify the content in a configuration file. The no form of the command removes the string from the configuration.
Default	n/a
Parameters	<i>description-string</i> — specifies the text description
Values	any string of 7-bit ASCII characters, up to 80 characters in length; the entire string must be enclosed in double quotes if it contains any special characters

ip-address

Syntax	ip-address <i>ip-address</i> no ip-address
Context	config>system>ptp>clock>ptp-port>peer
Description	This command configures a remote PTP peer address and provides the context to configure parameters for the remote PTP peer. Up to two remote PTP peers may be configured on a PTP port. The no form of the command removes the IP address from the PTP peer.
Default	n/a
Parameters	<i>ip-address</i> — specifies the IP address of the remote peer
Values	a.b.c.d

unicast-negotiate

Syntax	[no] unicast-negotiate
Context	config>system>ptp>clock>ptp-port
Description	<p>This command specifies whether the slave clock is to initiate a unicast request to the master clock or wait for announce and synchronization messages from the master clock.</p> <p>The no form of this command disables unicast-negotiate. In this case, the user must specify the slave clock information when configuring the 7705 SAR master node in order for communication between the slave clock and master clock to take place.</p>
Default	unicast-negotiate

source-interface

Syntax	source-interface <i>ip-if-name</i> no source-interface
Context	config>system>ptp>clock
Description	<p>This command defines the IP interface that provides the IEEE 1588 packets to the clock recovery mechanism on the adapter card or port. The interface must be PTP-enabled.</p> <p>If the <i>ip-if-name</i> refers to a loopback address, then the remote peer must send packets to ingress on this particular loopback address via any network IP interface on the node. If the <i>ip-if-name</i> refers to an interface that is associated with a physical port or VLAN, then the remote peer must send packets to ingress on this particular IP interface.</p>
Default	n/a
Parameters	<i>ip-if-name</i> — specifies the IP interface used by the PTP slave clock

Administration Commands

- [System Administration Commands](#)
- [High Availability \(Redundancy\) Commands](#)

System Administration Commands

admin

Syntax	admin
Context	<ROOT>
Description	This command enables the context to configure administrative system commands. Only authorized users can execute the commands in the admin context.
Default	n/a

debug-save

Syntax	debug-save <i>file-url</i>
Context	admin
Description	This command saves existing debug configuration. Debug configurations are not preserved in configuration saves.
Default	n/a
Parameters	<i>file-url</i> — the file URL location to save the debug configuration

Values	<i>file url:</i>	{ <i>local-url</i> <i>remote-url</i> } 255 chars max
	<i>local-url:</i>	[<i>cflash-id</i>]/[<i>file-path</i>]
	<i>remote-url:</i>	[{ftp://} <i>login:pswd@remote-locn</i> /] [<i>file-path</i>]
	<i>cflash-id:</i>	cf3:, cf3-A:, cf3-B:

disconnect

Syntax	disconnect { address <i>ip-address</i> username <i>user-name</i> console telnet ftp ssh }
Context	admin
Description	This command disconnects a user from a console, Telnet, FTP, or SSH session.

If any of the console, Telnet, FTP, or SSH options are specified, then only the respective console, Telnet, FTP, or SSH sessions are affected.

If no console, Telnet, FTP, or SSH options are specified, then all sessions from the IP address or from the specified user are disconnected.

Any task that the user is executing is terminated. FTP files accessed by the user will not be removed. A major severity security log event is created specifying what was terminated and by whom.

Default	n/a — no disconnect options are configured
Parameters	<i>ip-address</i> — the IP address to disconnect, specified in dotted-decimal notation
	Values 1.0.0.0 to 223.255.255.255
	<i>user-name</i> — the name of the user
	console — disconnects the console session
	telnet — disconnects the Telnet session
	ftp — disconnects the FTP session
	ssh — disconnects the SSH session

display-config

Syntax	display-config [detail index]
Context	admin
Description	This command displays the system's running configuration. By default, only non-default settings are displayed. Specifying the detail option displays all default and non-default configuration parameters.
Parameters	detail — displays default and non-default configuration parameters index — displays only persistent indexes

reboot

Syntax	reboot [active standby] [upgrade] [now]
Context	admin
Description	This command reboots the router including redundant CSMs or upgrades the boot ROMs. If no options are specified, the user is prompted to confirm the reboot operation. For example: <pre>ALU-1>admin# reboot Are you sure you want to reboot (y/n)?</pre> If the now option is specified, no boot confirmation messages appear.

System Command Reference

Parameters **active** — keyword to reboot the active CSM

Default active

standby — keyword to reboot the standby CSM

Default active

upgrade — enables card firmware to be upgraded during chassis reboot. The 7705 SAR and the boot.ldr support functionality to perform automatic firmware upgrades on CSMs. The automatic upgrade must be enabled in the 7705 SAR Command Line Interface (CLI) when rebooting the system.

When the **upgrade** keyword is specified, a chassis flag is set for the Boot Loader (boot.ldr) and on the subsequent boot of the 7705 SAR on the chassis, any firmware images on CSMs requiring upgrading will be upgraded automatically.

If a 7705 SAR is rebooted with the “admin reboot” command (without the “upgrade” keyword), the firmware images are left intact.

Any CSMs that are installed in the chassis will be upgraded automatically. For example, if a card is inserted with down revision firmware as a result of a card hot swap with the latest OS version running, the firmware on the card will be automatically upgraded before the card is brought online.

If the card firmware is upgraded automatically, a CHASSIS “cardUpgraded” (event 2032) log event is generated. The corresponding SNMP trap for this log event is “tmnxEqCardFirmwareUpgraded”.

During any firmware upgrade, automatic or manual, it is imperative that during the upgrade procedure:

- power must NOT be switched off or interrupted
- the system must NOT be reset
- no cards are inserted or removed

Any of the above conditions may render cards inoperable requiring a return of the card for resolution.

The time required to upgrade the firmware on the cards in the chassis depends on the number of cards to be upgraded. On system reboot, the firmware upgrades can take from approximately 3 minutes (for a minimally loaded 7705 SAR) to 8 minutes (for a fully loaded 7705 SAR chassis), after which the configuration file will be loaded. The progress of the firmware upgrades can be monitored at the console. Inserting a single card requiring a firmware upgrade in a running system generally takes less than 2 minutes before the card becomes operationally up.

now — forces a reboot of the router immediately without an interactive confirmation

save

- Syntax** `save [file-url] [detail] [index]`
- Context** admin
- Description** This command saves the running configuration to a configuration file. For example:

```
ALU-1>admin# save ftp://test:test@192.168.x.xx/./100.cfg
Saving configuration .....Completed.
```

By default, the running configuration is saved to the primary configuration file.

- Parameters** *file-url* — the file URL location to save the configuration file

Values

file-url: {*local-url* | *remote-url*} (255 characters max)

local-url: [*cflash-id*/] [*file-path*]

remote-url: [{ftp:// | tftp://}login:pswd@remote-locn/] [*file-path*]

cflash-id: cf3:, cf3-A:, cf3-B:

Default the primary configuration file location

detail — saves both default and non-default configuration parameters

Default saves non-default configuration parameters

index — forces a save of the persistent index file regardless of the persistent status in the BOF file. The index option can also be used to avoid an additional boot required while changing your system to use the persistence indexes.

enable-tech

- Syntax** `[no] enable-tech`
- Context** admin
- Description** This command enables the shell and kernel commands.



Note: This command should only be used with authorized direction from the Alcatel-Lucent Technical Assistance Center (TAC).

System Command Reference

radius-discovery

Syntax	radius-discovery
Context	admin
Description	This command performs RADIUS discovery operations.

force-discover

Syntax	force-discover [svc-id <i>service-id</i>]
Context	admin>radius-discovery
Description	When enabled, the server is immediately contacted to attempt discovery.
Parameters	<i>service-id</i> — specifies an existing service ID

tech-support

Syntax	tech-support <i>file-url</i>
Context	admin
Description	This command creates a system core dump.



Note: This command should only be used with authorized direction from the Alcatel-Lucent Technical Assistance Center (TAC).

Parameters	<i>file-url</i> — the file URL location to save the binary file
Values	<i>file-url:</i> { <i>local-url</i> <i>remote-url</i> } (255 characters max)
	<i>local-url:</i> [<i>cflash-id</i>] [<i>file-path</i>]
	<i>remote-url:</i> [{ <i>ftp://</i> <i>tftp://</i> } <i>login:pswd@remote-locn</i>] [<i>file-path</i>]
	<i>cflash-id:</i> cf3:, cf3-A:, cf3-B:

High Availability (Redundancy) Commands

redundancy

Syntax	redundancy
Context	admin config
Description	This command enters the context to allow the user to perform redundancy operations.

force-switchover

Syntax	force-switchover [now]
Context	admin>redundancy
Description	This command forces a switchover to the standby CSM card. The primary CSM reloads its software image and becomes the secondary CSM.
Parameters	now — forces the switchover to the redundant CSM card immediately

switchover-exec

Syntax	switchover-exec <i>file-url</i> no switchover-exec
Context	config>system
Description	<p>This command specifies the location and name of the CLI script file executed following a redundancy switchover from the previously active CSM card. A switchover can happen because of a fatal failure or by manual action.</p> <p>The CLI script file can contain commands for environment settings, debug settings, and other commands not maintained by the configuration redundancy.</p> <p>When the <i>file-url</i> parameter is not specified, no CLI script file is executed.</p>
Default	n/a

System Command Reference

Parameters	<i>file-url</i> — specifies the location and name of the CLI script file
Values	<i>file-url</i> : { <i>local-url</i> <i>remote-url</i> } (255 characters max)
	<i>local-url</i> : [<i>cflash-id</i> /] [<i>file-path</i>]
	<i>remote-url</i> : [{ftp:// tftp://} <i>login:pswd@remote-locn</i> /] [<i>file-path</i>]
	<i>cflash-id</i> : cf3:, cf3-A., cf3-B:

synchronize

Syntax	synchronize {boot-env config}
Context	admin>redundancy config>redundancy
Description	<p>This command performs a synchronization of the standby CSM's images and/or config files to the active CSM. Either the boot-env or config parameter must be specified.</p> <p>In the admin>redundancy context, this command performs a manually triggered standby CSM synchronization.</p> <p>In the config>redundancy context, this command performs an automatically triggered standby CSM synchronization.</p> <p>When the standby CSM takes over operation following a failure or reset of the active CSM, it is important to ensure that the active and standby CSMs have identical operational parameters. This includes the saved configuration and CSM images.</p> <p>The active CSM ensures that the active configuration is maintained on the standby CSM. However, to ensure smooth operation under all circumstances, runtime images and system initialization configurations must also be automatically synchronized between the active and standby CSM.</p> <p>If synchronization fails, alarms and log messages that indicate the type of error that caused the failure of the synchronization operation are generated. When the error condition ceases to exist, the alarm is cleared.</p> <p>Only files stored on the router are synchronized. If a configuration file or image is stored in a location other than on a local compact flash, the file is not synchronized (for example, storing a configuration file on an FTP server).</p>
Default	n/a for admin — redundancy context enabled for config — redundancy context
Parameters	boot-env — synchronizes all files required for the boot process (loader, BOF, images, and configuration files) config — synchronizes only the primary, secondary, and tertiary configuration files
Default	config

Show Commands

connections

Syntax	connections [address <i>ip-address</i> [interface <i>interface-name</i>]] [port <i>port-number</i>] [detail]
Context	show>system
Description	This command displays UDP and TCP connection information. If no command line options are specified, a summary of the TCP and UDP connections displays.
Parameters	<p><i>ip-address</i> — displays only the connection information for the specified IP address</p> <p>Values ipv4-address: a.b.c.d (host bits must be 0)</p> <p><i>interface-name</i> — displays connection information only for the specified interface</p> <p><i>port-number</i> — displays only the connection information for the specified port number</p> <p>Values 0 to 65535</p> <p>detail — appends TCP statistics to the display output</p>
Output	The following output is an example of UDP and TCP connection information, and Table 26 describes the fields.

Sample Output

```
A:ALU-1# show system connections
=====
Connections :
=====
Proto    RecvQ    TxmtQ Local Address          Remote Address          State
-----
TCP      0        0 0.0.0.0.21            0.0.0.0.0              LISTEN
                                0
TCP      0        0 0.0.0.0.23            0.0.0.0.0              LISTEN
                                0
TCP      0        0 0.0.0.0.179           0.0.0.0.0              LISTEN
                                0
TCP      0        0 10.0.0.xxx.51138      10.0.0.104.179         SYN_SENT
                                4095
TCP      0        0 10.0.0.xxx.51139      10.0.0.91.179          SYN_SENT
                                4095
TCP      0        0 10.10.10.xxx.646     0.0.0.0.0              LISTEN
                                0
TCP      0        0 10.10.10.xxx.646     10.10.10.104.49406    ESTABLISH
                                4095
TCP      0        0 11.1.0.1.51140        11.1.0.2.179           SYN_SENT
                                4095
TCP      0        993 192.168.x.xxx.23     192.168.x.xx.xxxx     ESTABLISHED
                                4095
```

System Command Reference

```
UDP      0      0 0.0.0.0.123      ---
          0.0.0.0.0      0
UDP      0      0 0.0.0.0.646      ---
          0.0.0.0.0      0
UDP      0      0 0.0.0.0.17185    ---
          0.0.0.0.0      0
UDP      0      0 10.10.10.xxx.646  ---
          0.0.0.0.0      0
UDP      0      0 127.0.0.1.50130  ---
          127.0.0.1.17185 4095
```

No. of Connections: 14
=====

A:ALU-1#

Sample Detailed Output

A:ALU-1# show system connections detail

```
-----  
TCP Statistics  
-----  
packets sent           : 659635  
data packets          : 338982 (7435146 bytes)  
data packet retransmitted : 73 (1368 bytes)  
ack-only packets      : 320548 (140960 delayed)  
URG only packet       : 0  
window probe packet   : 0  
window update packet  : 0  
control packets       : 32  
packets received      : 658893  
acks                  : 338738 for (7435123 bytes)  
duplicate acks        : 23  
ack for unsent data   : 0  
packets received in-sequence : 334705 (5568368 bytes)  
completely duplicate packet : 2 (36 bytes)  
packet with some dup. data : 0 (0 bytes)  
out-of-order packets  : 20 (0 bytes)  
packet of data after window : 0 (0 bytes)  
window probe          : 0  
window update packet  : 3  
packets received after close : 0  
discarded for bad checksum : 0  
discarded for bad header offset field : 0  
discarded because packet too short : 0  
connection request    : 4  
connection accept     : 24  
connections established (including accepts) : 27  
connections closed    : 26 (including 2 drops)  
embryonic connections dropped : 0  
segments updated rtt  : 338742 (of 338747 attempts)  
retransmit timeouts   : 75  
connections dropped by rexmit timeout : 0  
persist timeouts      : 0  
keepalive timeouts    : 26  
keepalive probes sent : 0  
connections dropped by keepalive : 1
```



```
pcb cache lookups failed           : 0
connections dropped by bad md5 digest : 0
connections dropped by enhanced auth : 0
=====
A:ALU-1#
```

Table 26: Show System Connections Output Fields

Label	Description
Proto	The socket protocol, either TCP or UDP
RecvQ	The number of input packets received by the protocol
TxmtQ	The number of output packets sent by the application
Local Address	The local address of the socket. The socket port is separated by a period.
Remote Address	The remote address of the socket. The socket port is separated by a period.
State	Listen — the protocol state is in the listen mode
	Established — the protocol state is established

cpu

Syntax `cpu [sample-period seconds]`

Context `show>system`

Description This command displays CPU utilization per task over a sample period.

Parameters *seconds* — the number of seconds over which to sample CPU task utilization

Default 1

Values 1 to 10

Output The following output is an example of system CPU information, and [Table 27](#) describes the fields.

Sample Output

```
A:ALU-1# show system cpu sample-period 2
=====
CPU Utilization (Test time 2001135 uSec)
=====
Name                CPU Time      CPU Usage
                   (uSec)
-----
System              3465          0.34%
Icc                  1349          0.13%
RTM/Policies         0             0.00%
OSPF                 61            ~0.00%
```

System Command Reference

```

MPLS/RSVP          2113          0.21%
LDP                 19           ~0.00%
IS-IS              0            0.00%
RIP                 21           ~0.00%
VRRP                0            0.00%
BGP                 0            0.00%
Services           155          0.01%
IOM                 24337         2.43%
SIM                 4892          0.49%
IP Stack           2865          0.14%
MBUF                0            0.00%
IGMP/MLD SnpG      351          0.01%
TLS MFIB           2522          0.12%
WEB Redirect       0            0.00%
BFD                 0            0.00%
MCPATH             0            0.00%
Idle                961064        96.34%
=====
A:ALU-1#

```

Table 27: Show System CPU Output Fields

Label	Description
CPU Utilization	The total amount of CPU time
Name	The process or protocol name
CPU Time (uSec)	The CPU time each process or protocol has used in the specified time
CPU Usage	The sum of CPU usage of all the processes and protocols

cron

Syntax `cron`

Context `show>cron`

Description This command enters the show CRON context.

action

Syntax `action [action-name] [owner owner-name] run-history run-state`

Context `show>cron`

Description This command displays cron action parameters.

Parameters `action-name` — specifies the action name

Values maximum 32 characters

owner-name — specifies the owner name

Default TiMOS CLI

run-state — specifies the state of the test to be run

Values executing, initializing, terminated

Output The following output is an example of cron action information, and [Table 28](#) describes the fields.

Sample Output

```
*A:Redundancy# show cron action run-history terminated
=====
CRON Action Run History
=====
Action "test"
Owner "TiMOS CLI"
-----
Script Run #17
-----
Start time      : 2006/11/06 20:30:09      End time       : 2006/11/06 20:35:24
Elapsed time    : 0d 00:05:15             Lifetime      : 0d 00:00:00
State          : terminated               Run exit code : noError
Result time     : 2006/11/06 20:35:24     Keep history   : 0d 00:49:57
Error time      : never
Results file    : ftp://*:*@192.168.15.18/home/testlab_bgp/cron/_20061106-203008.
                  out
Run exit        : Success
-----
Script Run #18
-----
Start time      : 2006/11/06 20:35:24      End time       : 2006/11/06 20:40:40
Elapsed time    : 0d 00:05:16             Lifetime      : 0d 00:00:00
State          : terminated               Run exit code : noError
Result time     : 2006/11/06 20:40:40     Keep history   : 0d 00:55:13
Error time      : never
Results file    : ftp://*:*@192.168.15.18/home/testlab_bgp/cron/_20061106-203523.
                  out
Run exit        : Success
=====
*A:Redundancy#

*A:Redundancy# show cron action run-history executing
=====
CRON Action Run History
=====
Action "test"
Owner "TiMOS CLI"
-----
Script Run #20
-----
Start time      : 2006/11/06 20:46:00      End time       : never
Elapsed time    : 0d 00:00:56             Lifetime      : 0d 00:59:04
State          : executing               Run exit code : noError
Result time     : never                  Keep history   : 0d 01:00:00
```

System Command Reference

```
Error time      : never
Results file   : ftp://*:*@192.168.15.18/home/testlab_bgp/cron/_20061106-204559.
                out
=====
-----
*A:Redundancy#

*A:Redundancy# show cron action run-history initializing

=====
CRON Action Run History
=====
Action "test"
Owner "TiMOS CLI"
-----
Script Run #21
-----
Start time      : never                End time       : never
Elapsed time   : 0d 00:00:00          Lifetime      : 0d 01:00:00
State          : initializing          Run exit code  : noError
Result time    : never                Keep history   : 0d 01:00:00
Error time     : never
Results file   : none
-----
Script Run #22
-----
Start time      : never                End time       : never
Elapsed time   : 0d 00:00:00          Lifetime      : 0d 01:00:00
State          : initializing          Run exit code  : noError
Result time    : never                Keep history   : 0d 01:00:00
Error time     : never
Results file   : none
-----
Script Run #23
-----
Start time      : never                End time       : never
Elapsed time   : 0d 00:00:00          Lifetime      : 0d 01:00:00
State          : initializing          Run exit code  : noError
Result time    : never                Keep history   : 0d 01:00:00
Error time     : never
Results file   : none
=====
-----
*A:Redundancy#
```

Table 28: Show Cron Run History Output Fields

Label	Description
Action	The name of the action
Action owner	The name of the action owner
Administrative status	Enabled — administrative status is enabled
	Disabled — administrative status is disabled
Operational status	Enabled — operational status is enabled
	Disabled — operational status is disabled
Script	The name of the script
Script owner	The name of the script owner
Script source location	The location of scheduled script
Max running allowed	The maximum number of allowed sessions
Max completed run histories	The maximum number of sessions previously run
Max lifetime allowed	The maximum amount of time the script may run
Completed run histories	The number of completed sessions
Executing run histories	The number of sessions in the process of executing
Initializing run histories	The number of sessions ready to run/queued but not executed
Max time run history saved	The maximum amount of time to keep the results from a script run
Last change	The system time a change was made to the configuration

schedule

Syntax `schedule [schedule-name] [owner owner-name]`

Context `show>cron`

Description This command displays cron schedule parameters.

Parameters *schedule-name* — displays information for the specified scheduler name
owner-name — displays information for the specified scheduler owner

Output The following output is an example of cron schedule information, and [Table 29](#) describes the fields.

Sample Output

```
A:ALU-1>show>cron schedule test
=====
CRON Schedule Information
=====
Schedule                : test
Schedule owner          : TiMOS CLI
Description              : none
Administrative status    : enabled
Operational status      : enabled
Action                  : test
Action owner            : TiMOS CLI
Script name             : test
Script Owner            : TiMOS CLI
Script source location  : ftp://*****:*****@192.168.15.1/home/testlab_bgp
                        /cron/test1.cfg
Script results location : ftp://*****:*****@192.168.15.1/home/testlab_bgp
                        /cron/res

Schedule type           : periodic
Interval                : 0d 00:01:00 (60 seconds)
Repeat count            : infinite
Next scheduled run      : 0d 00:00:42
Weekday                 : none
Month                   : none
Day of month            : none
Hour                    : none
Minute                  : none
Number of schedule runs : 10
Last schedule run       : 2006/11/07 17:20:52
Number of schedule failures : 0
Last schedule failure   : no error
Last failure time       : never
=====
A:ALU-1>show>cron
```

Table 29: Show Cron Schedule Output Fields

Label	Description
Schedule	The name of the schedule
Schedule owner	The name of the schedule owner
Description	The description of the schedule
Administrative status	Enabled — administrative status is enabled
	Disabled — administrative status is disabled
Operational status	Enabled — operational status is enabled
	Disabled — operational status is disabled
Action	The name of the action
Action owner	The name of the action owner

Table 29: Show Cron Schedule Output Fields (Continued)

Label	Description
Script	The name of the script
Script owner	The name of the script owner
Script source location	The location of the scheduled script
Script results location	The location where the script results have been sent
Schedule type	Periodic — displays a schedule that ran at a given interval
	Calendar — displays a schedule that ran based on a calendar
	Oneshot — displays a schedule that ran one time only
Interval	Displays the interval between runs of an event
Next scheduled run	The time for the next scheduled run
Weekday	The configured weekday
Month	The configured month
Day of Month	The configured day of month
Hour	The configured hour
Minute	The configured minute
Number of scheduled runs	The number of scheduled sessions
Last scheduled run	The last scheduled session
Number of scheduled failures	The number of scheduled sessions that failed to execute
Last scheduled failure	The last scheduled session that failed to execute
Last failure time	The system time of the last failure

script

Syntax `script [script-name] [owner owner-name]`

Context `show>cron`

Description This command displays cron script parameters.

Parameters *script-name* — displays information for the specified script
owner-name — displays information for the specified script owner

System Command Reference

Output The following output is an example of cron script information, and [Table 30](#) describes the fields.

Sample Output

```
A:ALU-1>show>cron# script
=====
CRON Script Information
=====
Script                               : test
Owner name                           : TiMOS CLI
Description                           : asd
Administrative status                 : enabled
Operational status                   : enabled
Script source location                : ftp://*****:*****@192.168.15.1/home/testlab_bgp
                                      /cron/test1.cfg
Last script error                     : none
Last change                           : 2006/11/07 17:10:03
=====
A:ALU-1>show>cron#
```

Table 30: Show Cron Script Output Fields

Label	Description
Script	The name of the script
Script owner	The owner name of script
Administrative status	Enabled — administrative status is enabled
	Disabled — administrative status is disabled
Operational status	Enabled — operational status is enabled
	Disabled — operational status is disabled
Script source location	The location of the scheduled script
Last script error	The system time of the last error
Last change	The system time of the last change

information

Syntax information

Context show>system

Description This command displays general system information including basic system, SNMP server, last boot and DNS client information.

Output The following output is an example of general system information, and [Table 31](#) describes the fields.

Sample Output

```

A:ALU-1# show system information
=====
System Information
=====
System Name           : ALU-1
System Type           : 7705 SAR-8
System Version        : B-0.0.I323
System Contact        : Fred Information Technology
System Location       : Bldg.1-floor 2-Room 201
System Coordinates    : N 45 58 23, W 34 56 12
System Active Slot    : A
System Up Time        : 1 days, 02:03:17.62 (hr:min:sec)

SNMP Port             : 161
SNMP Engine ID        : 0000197f00006883ff000000
SNMP Max Message Size : 1500
SNMP Admin State      : Enabled
SNMP Oper State       : Enabled
SNMP Index Boot Status : Not Persistent
SNMP Sync State       : OK

Tel/SSH/FTP Admin    : Enabled/Enabled/Disabled
Tel/SSH/FTP Oper     : Up/Up/Down

BOF Source           : cf3:
Image Source         : primary
Config Source        : primary
Last Booted Config File: cf3:/config.cfg
Last Boot Cfg Version : FRI APR 20 16:24:27 2007 UTC
Last Boot Config Header: # TiMOS-B-5.0.R3 both/hops ALCATEL-LUCENT 7705 SAR #
                        Copyright (c) 2000-2008 Alcatel-Lucent. All rights
                        reserved. # All use subject to applicable license
                        agreements. # Built on Wed Feb 13 19:45:00 EST 2008 by
                        builder in /rel5.0/R3/panos/main # Generated TUE
                        MAR 11 16:24:27 2008 UTC

Last Boot Index Version: N/A
Last Boot Index Header : # TiMOS-B-5.0.R3 both/hops ALCATEL-LUCENT 7705 SAR #
                        Copyright (c) 2000-2008 Alcatel-Lucent. All rights
                        reserved. # All use subject to applicable license
                        agreements. # Built on Wed Feb 13 19:45:00 EST 2008 by
                        builder in /rel5.0/R3/panos/main # Generated TUE
                        MAR 11 16:24:27 2008 UTC

Last Saved Config     : N/A
Time Last Saved       : N/A
Changes Since Last Save: Yes
Time Last Modified    : 2008/03/19 10:03:09
Max Cfg/BOF Backup Rev : 5
Cfg-OK Script         : N/A
Cfg-OK Script Status  : not used
Cfg-Fail Script       : N/A
Cfg-Fail Script Status : not used

Management IP Addr    : 138.120.52.131/24
DNS Server            :
138.120.118.196
DNS Domain            :
ca.alcatel.com

```

System Command Reference

```

BOF Static Routes      :
  To                   Next Hop
  192.168.0.0/16      192.168.1.1
ATM Location ID       : 01:00:00:00:00:00:00:00:00:00:00:00:00:00
ATM OAM Retry Up      : 2
ATM OAM Retry Down    : 4
ATM OAM Loopback Period: 10

ICMP Vendor Enhancement: Disabled
=====
A:ALU-1#

```

Table 31: Show System Information Output Fields

Label	Description
System Name	The configured system name
System Contact	A text string that describes the system contact information
System Location	A text string that describes the system location
System Coordinates	A text string that describes the system coordinates
System Up Time	The time since the last boot
SNMP Port	The port number used by this node to receive SNMP request messages and to send replies
SNMP Engine ID	The SNMP engine ID to uniquely identify the SNMPv3 node
SNMP Max Message Size:	The maximum SNMP packet size generated by this node
SNMP Admin State	Enabled — SNMP is administratively enabled and running
	Disabled — SNMP is administratively shut down and not running
SNMP Oper State	Enabled — SNMP is operationally enabled
	Disabled — SNMP is operationally disabled
SNMP Index Boot Status	Persistent — system indexes are saved between reboots
	Not Persistent — system indexes are not saved between reboots
Telnet/SSH/FTP Admin	The administrative state of the Telnet, SSH, and FTP sessions
Telnet/SSH/FTP Oper	The operational state of the Telnet, SSH, and FTP sessions
BOF Source	The location of the BOF

Table 31: Show System Information Output Fields (Continued)

Label	Description
Image Source	Primary — Indicates that the directory location for runtime image file was loaded from the primary source
	Secondary — Indicates that the directory location for runtime image file was loaded from the secondary source
	Tertiary — Indicates that the directory location for runtime image file was loaded from the tertiary source
Config Source	Primary — Indicates that the directory location for configuration file was loaded from the primary source
	Secondary — Indicates that the directory location for configuration file was loaded from the secondary source
	Tertiary — Indicates that the directory location for configuration file was loaded from the tertiary source
Last Booted Config File	The URL and filename of the last loaded configuration file
Last Boot Cfg Version	The date and time of the last boot
Last Boot Config Header	The header information such as image version, date built, date generated
Last Boot Index Version	The version of the persistence index file read when this CSM card was last rebooted
Last Boot Index Header	The header of the persistence index file read when this CSM card was last rebooted
Last Saved Config	The location and filename of the last saved configuration file
Time Last Saved	The date and time of the last time configuration file was saved
Changes Since Last Save	Yes — There are unsaved configuration file changes
	No — There are no unsaved configuration file changes
Time Last Modified	The date and time of the last modification
Max Cfg/BOF Backup Rev	The maximum number of backup revisions maintained for a configuration file. This value also applies to the number of revisions maintained for the BOF file.
Cfg-OK Script	URL — the location and name of the CLI script file executed following successful completion of the boot-up configuration file execution
	N/A — no CLI script file is executed

Table 31: Show System Information Output Fields (Continued)

Label	Description
Cfg-OK Script Status	Successful/Failed — the results from the execution of the CLI script file specified in the Cfg-OK Script location
	Not used — no CLI script file was executed
Cfg-Fail Script	URL — the location and name of the CLI script file executed following a failed boot-up configuration file execution
	Not used — no CLI script file was executed
Cfg-Fail Script Status	Successful/Failed — the results from the execution of the CLI script file specified in the Cfg-Fail Script location
	Not used — no CLI script file was executed
Management IP Addr	The management IP address and mask
DNS Server	The IP address of the DNS server
DNS Domain	The DNS domain name of the node
BOF Static Routes	To — the static route destination
	Next Hop — the next hop IP address used to reach the destination
	Metric — displays the priority of this static route versus other static routes
	None — no static routes are configured
ICMP Vendor Enhancement:	Enabled — inserts one-way timestamp in outbound SAA ICMP ping packets
	Disabled — one-way timestamping is not performed on outbound SAA ICMP ping packets

memory-pools

Syntax `memory-pools`

Context `show>system`

Description This command displays system memory status.

Output The following output is an example of system memory information, and [Table 32](#) describes the fields.

Sample Output

A:ALU-1# show system memory-pools

```

=====
Memory Pools
=====
Name                Max Allowed      Current Size      Max So Far        In Use
-----
System              No limit         308,145,416      316,100,296      300,830,200
Icc                 16,777,216      2,097,152        2,097,152        773,920
RTM/Policies        No limit         2,097,152        2,097,152        1,027,792
OSPF                No limit         1,048,576        1,048,576        437,904
MPLS/RSVP          No limit         21,145,848       21,145,848       19,562,376
LDP                 No limit         1,048,576        1,048,576        224,848
IS-IS               No limit         0                 0                 0
RIP                 No limit         0                 0                 0
VRRP                No limit         1,048,576        1,048,576        1,144
BGP                 No limit         2,097,152        2,097,152        1,176,560
Services            No limit         5,685,504        5,685,504        3,884,512
IOM                 No limit         249,068,424      249,068,424      245,119,136
SIM                 No limit         1,048,576        1,048,576        129,808
IP Stack            No limit         4,295,184        4,295,184        3,189,048
MBUF                No limit         1,048,576        1,048,576        151,520
IGMP/MLD SnpG      No limit         1,048,576        1,048,576        71,192
TLS MFIB            No limit         1,048,576        1,048,576        1,027,312
WEB Redirect        16,777,216      0                 0                 0
BFD                 No limit         1,048,576        1,048,576        828,448
MCPATH              No limit         1,048,576        1,048,576        472
-----
Current Total Size :    604,069,016 bytes
Total In Use       :    578,436,192 bytes
Available Memory   :     78,909,496 bytes
=====
*A:ALU-1#

```

Table 32: Show Memory Pool Output Fields

Label	Description
Name	The name of the system or process
Max Allowed	Integer — the maximum allocated memory size
	No Limit — no size limit
Current Size	The current size of the memory pool
Max So Far	The largest amount of memory pool used
In Use	The current amount of the memory pool currently in use
Current Total Size	The sum of the Current Size column
Total In Use	The sum of the In Use column
Available Memory	The amount of available memory

System Command Reference

ntp

- Syntax** ntp
- Context** show>system
- Description** This command displays NTP protocol configuration and state.
- Output** The following output is an example of NTP information, and [Table 33](#) describes the fields.

Sample Output

```
A:pc-40>config>system>time>ntp# show system ntp
=====
NTP Status
=====
Enabled          : Yes          Stratum          : 3
Admin Status     : up           Oper Status      : up
Server enabled   : No           Server keyId     : none
System Ref Id    : 192.168.15.221  Auth Check      : Yes
=====

A:pc-40>config>system>time>ntp# show system ntp all
=====
NTP Status
=====
Enabled          : Yes          Stratum          : 3
Admin Status     : up           Oper Status      : up
Server enabled   : No           Server keyId     : none
System Ref Id    : 192.168.15.221  Auth Check      : Yes
=====

=====
NTP Active Associations
=====
State      Remote      Reference ID  St Type  A   Poll  Reach  Offset(ms)
-----
reject     192.168.15.221  192.168.14.50  2  srvr  none  64    y    0.901
chosen     192.168.15.221  192.168.14.50  2  mclnt none  64    y    1.101
=====

A:pc-40>config>system>time>ntp#

A:pc-40>config>system>time>ntp# show system ntp detail
=====
NTP Status
=====
Enabled          : Yes          Stratum          : 3
Admin Status     : up           Oper Status      : up
Server enabled   : No           Server keyId     : none
System Ref Id    : 192.168.15.221  Auth Check      : Yes
Auth Errors      : 0           Auth Errors Ignored : 0
Auth Key Id Errors : 0         Auth Key Type Errors : 0
=====

A:pc-40>config>system>time>ntp#
```

```

A:pc-40>config>system>time>ntp# show system ntp detail all
=====
NTP Status
=====
Enabled           : Yes           Stratum           : 3
Admin Status     : up             Oper Status      : up
Server enabled   : No            Server keyId     : none
System Ref Id    : 192.168.15.221 Auth Check       : Yes
Auth Errors      : 0             Auth Errors Ignored : 0
Auth Key Id Errors : 0           Auth Key Type Errors : 0
=====

NTP Active Associations
=====
State      Remote      Reference ID  St  Type  A    Poll  R  Offset (ms)
-----
reject    192.168.15.221  192.168.14.50  2  srvr  none  64   y  0.901
chosen    192.168.15.221  192.168.1.160  4  mclnt none  64   y  1.101
=====

```

Table 33: Show System NTP Output Fields

Label	Description
Enabled	NTP enabled or disabled state. Output is yes or no.
Admin Status	Administrative state. Output is up or down.
NTP Server	The NTP server state of this node. Output is yes or no.
Stratum	The stratum level of this node
Oper Status	The operational state, either up or down.
Auth Check	Displays authentication requirement. Output is yes or no.
System Ref. ID	IP address of this node or a 4-character ASCII code showing the state
Auth Error	Authentication errors
Auth Errors Ignored	Authentication errors ignored
Auth key ID Errors	Authentication key identification errors
Auth Key Type Errors	Authentication key type errors
Peer Status/State	The operational status of the peer
Reject	The peer is rejected and will not be used for synchronization. Rejection reasons could be the peer is unreachable, the peer is synchronized to this local server so synchronizing with it would create a sync loop, or the synchronization distance is too large. This is the normal startup state.
Invalid	The peer is not maintaining an accurate clock. This peer will not be used for synchronization.

Table 33: Show System NTP Output Fields (Continued)

Label	Description
Excess	The peer's synchronization distance is greater than ten other peers. This peer will not be used for synchronization.
Outlyer	The peer is discarded as an outlier. This peer will not be used for synchronization.
Candidate	The peer is accepted as a possible source of synchronization
Selected	The peer is an acceptable source of synchronization, but its synchronization distance is greater than six other peers
Chosen	The peer is chosen as the source of synchronization
ChosenPPS	The peer is chosen as the source of synchronization, but the actual synchronization is occurring from a pulse-per-second (PPS) signal
Remote	The ip address of the remote NTP server or peer with which this local host is exchanging NTP packets
Reference ID	<p>When stratum is between 0 and 15 this field shows the IP address of the remote NTP server or peer with which the remote is exchanging NTP packets. For reference clocks, this field shows the identification assigned to the clock, such as, “.GPS.” For an NTP server or peer, if the client has not yet synchronized to a server/peer, the status cannot be determined and displays the following codes:</p> <p>Peer Codes:</p> <p>ACST — the association belongs to any cast server</p> <p>AUTH — server authentication failed. Please wait while the association is restarted.</p> <p>AUTO — autokey sequence failed. Please wait while the association is restarted.</p> <p>BCST — the association belongs to a broadcast server</p> <p>CRPT — cryptographic authentication or identification failed. The details should be in the system log file or the cryptostats statistics file, if configured. No further messages will be sent to the server.</p> <p>DENY — access denied by remote server. No further messages will be sent to the server.</p> <p>DROP — lost peer in symmetric mode. Please wait while the association is restarted.</p> <p>RSTR — access denied due to local policy. No further messages will be sent to the server.</p> <p>INIT — the association has not yet synchronized for the first time</p> <p>MCST — the association belongs to a manycast server</p>

Table 33: Show System NTP Output Fields (Continued)

Label	Description
Reference ID (Cont)	NKEY — no key found. Either the key was never installed or is not trusted. RATE — rate exceeded. The server has temporarily denied access because the client exceeded the rate threshold. RMOT — the association from a remote host running ntpdc has had unauthorized attempted access STEP — a step change in system time has occurred, but the association has not yet resynchronized system codes INIT — the system clock has not yet synchronized for the first time STEP — a step change in system time has occurred, but the system clock has not yet resynchronized
Auth	Authentication
Poll	Polling interval in seconds
R	Yes — the NTP peer or server has been reached at least once in the last 8 polls No — the NTP peer or server has not been reached at least once in the last 8 polls
Offset	The time between the local and remote UTC time, in milliseconds

ptp

Syntax ptp**Context** show>system**Description** This command enters the show PTP context.

clock

Syntax clock *clock-id* [summary | detail | timestamp]**Context** show>system>ptp**Description** This command displays PTP clock information.**Parameters** *clock-id* — specifies the clock ID of this PTP instance**Values** 1 or 2

System Command Reference

Output The following outputs are examples of PTP clock information:

- PTP clock summary information ([Sample Output, Table 34](#))
- PTP clock detailed information ([Sample Output, Table 35](#))
- PTP clock timestamp information ([Sample Output, Table 36](#))

Sample Output

```
A:# show system ptp clock 1 summary
=====
Prt/ Peer IP          Slave Port  Dyn/ In/ Anno      Sync      Delay
Peer                State Stat Out          Rate      Req/Resp
=====
1/1  10.222.222.10    yes  slave  sta in  623      82990     82988
                               sta out  0         0         82988
1/2                               sta in  0         0         0
                               sta out  0         0         0
=====
Prt/ Peer IP          In/ Anno  Sync  Delay  Anno      Sync      Delay
Peer                Out Lease Lease Lease  Rate      Rate      Rate
                               (sec) (sec) (sec) (pkt/s) (pkt/s) (pkt/s)
=====
1/1  10.222.222.10    in  174   182   182   1 pkt/2 s  64 pkt/s  64 pkt/s
                               out -     -     -     -     -         -
1/2                               -  -     -     -     -     -         -
                               out -     -     -     -     -         -
=====
Prt/ Peer IP          Slave Pri1  GM    GM    GM    Pri2 GM ClockId      Step
Peer                State  Clk   Clk   Clk   Clk   Clk   Clk   Rem
                               Cls   Acc  Var
=====
1/1  10.222.222.10    yes   128   6     3e3   25600  128  4041424344454637 1
1/2                               -     -     -     -     -     -     -     -
```

Boundary clock case:

```
A:# show system ptp clock 1 summary
=====
Prt/ Peer IP          Slave Port  Dyn/ In/ Anno      Sync      Delay
Peer                State Stat Out          Rate      Req/Resp
=====
1/1  200.253.252.10    no   master  sta in  7         0         0
                               sta out 770       0         0
2/1  200.254.254.10    no   master  sta in  0         0         103052
                               sta out 773       103054    103052
3/1  6.6.6.5           no   master  sta in  0         0         0
                               sta out 0         0         0
4/1                               no   initia* sta in  0         0         0
                               sta out 0         0         0
5/1                               no   initia* sta in  0         0         0
                               sta out 0         0         0
6/1                               no   initia* sta in  0         0         0
                               sta out 0         0         0
7/1                               no   initia* sta in  0         0         0
                               sta out 0         0         0
```

```

8/1          no  master  sta in 0          0          0
              sta out 0          0          0
9/1  192.168.2.11  yes  slave  sta in 823      105272     105271
              sta out 0          0          105271
10/1         no  initia* sta in 0          0          0
              sta out 0          0          0
=====
Prt/ Peer IP      In/ Anno  Sync  Delay  Anno  Sync  Delay
Peer           Out Lease Lease Lease Rate  Rate  Rate
              (sec) (sec) (sec) (pkt/s) (pkt/s) (pkt/s)
=====
1/1  200.253.252.10  in 166  0    0    1 pkt/2 s  -    -
              out 228  -    -    1 pkt/2 s  -    -
2/1  200.254.254.10  in 1    0    0    -    -    -
              out 231  235  235  1 pkt/2 s  64 pkt/ s  64 pkt/s
3/1  6.6.6.5         in 1    0    0    -    -    -
              out -    -    -    -    -    -
4/1          -    -    -    -    -    -    -
              out -    -    -    -    -    -
5/1          -    -    -    -    -    -    -
              out -    -    -    -    -    -
6/1          -    -    -    -    -    -    -
              out -    -    -    -    -    -
7/1          -    -    -    -    -    -    -
              out -    -    -    -    -    -
8/1          -    -    -    -    -    -    -
              out -    -    -    -    -    -
9/1  192.168.2.11  in 102  106  106  1 pkt/2 s  64 pkt/s  64 pkt/s
              out -    -    -    -    -    -
10/1         -    -    -    -    -    -    -
              out -    -    -    -    -    -
=====
Prt/ Peer IP      Slave Pri1  GM  GM  GM  Pri2 GM ClockId  Step
Peer           Clk  Clk  Clk  Clk  Clk  Clk  Clk  Clk  Rem
              Cls  Acc  Var
=====
1/1  200.253.252.10  no   128  13  254  65535  128  002105fffe6da9b7 0
2/1  200.254.254.10  no   -    -    -    -    -    -    -
3/1  6.6.6.5         no   -    -    -    -    -    -    -
4/1          -    -    -    -    -    -    -    -
5/1          -    -    -    -    -    -    -    -
6/1          -    -    -    -    -    -    -    -
7/1          -    -    -    -    -    -    -    -
8/1          -    -    -    -    -    -    -    -
9/1  192.168.2.11  yes  128  6   33  25600  128  4041424344454637 0
10/1         -    -    -    -    -    -    -    -

```

Table 34: Show System PTP Clock Summary Output Fields

Label	Description
Prt/Peer	The PTP port and peer ID as configured in the config system ptp clock context
Peer IP	The IP address of the PTP peer
Slave	Whether or not the clock is in a slave state

Table 34: Show System PTP Clock Summary Output Fields (Continued)

Label	Description
Port State	The PTP port state: initializing, listening, uncalibrated, slave, master, or passive
Dyn/Stat	Indicates if the peer is statically configured or dynamically requested
In/Out	The direction of the packet counts
Anno	The number of ingress or egress announce packets
Sync	The number of ingress or egress synchronization packets
Delay: Req/Resp	The number of ingress or egress delay request or delay response packets
Anno Lease	The announce time remaining in the unicast session. The peer must re-request announce before this expires or the peer communication will be canceled.
Sync Lease	The synchronization time remaining in the unicast session. The peer must re-request synchronization before this expires or the peer communication will be canceled.
Delay Lease	The delay time remaining in the unicast session. The peer must re-request delay before this expires or the peer communication will be canceled.
Anno Rate	The rate of announce packets to or from the peer
Sync Rate	The rate of synchronization packets to or from the peer
Delay Rate	The rate of delay packets to or from the peer
Pri1	The grand master clock priority1 designation
GM Clk Cls	The grand master clock class designation
GM Clk Acc	The grand master clock accuracy designation
GM Clk Var	The grand master clock scaled log variance, in decimal format
Pri2	The grand master clock priority2 designation
GM ClockId	The grand master clock identification
Step Rem	The number of boundary clocks between the peer and the grand master

Sample Output

```
A:# show system ptp clock 1 detail
```

```
=====
IEEE1588 PTP Clock Information
=====
-----
Local Clock
-----
Clock Type           : boundary           Admin State           : up
Source I/F           : ptp loop           Clock MDA              : 1/1
PTP Profile           : ieee1588-2008     Dynamic Peers         : not allowed
Admin Freq-source    : ssu                Oper Freq-source      : ptp
Clock ID              : 0025bafffed119b7  Clock Class           : 255
Clock Accuracy        : unknown(254)      Clock Variance        : not computed
Clock Priority1       : 128                Clock Priority2       : 128
Domain                : 0                  Two-Step              : unknown
-----
Parent Clock
-----
Parent Clock ID      : 001af0fffe6808a7  Parent Port Number    : 2
GM Clock Id          : 4041424344454637  GM Clock Class        : 6
GM Clock Accuracy    : 100ns             GM Clock Variance     : 25600
GM Clock Priority1   : 128                GM Clock Priority2    : 128
-----
Slave Port Index     : 1                  Slave Port State      : slave
Slave Peer Index     : 1                  Slave Peer IP         : 10.222.222.10
Forward Weight       : 100                Reverse Weight        : 0
Recovery State       : phase-tracking
-----
Time Information
-----
Timescale            : PTP
Current Time         : -
Freq Traceable       : true
Time Traceable       : true
Time Source          : gps
-----
Interface Configuration Information
=====
Source IP Interface  : ptp loop           IP Interface Port     : loopback:125
IP Interface Address : 200.254.254.10     PTP Enabled           : True
Admin Status         : Up                 Oper Status           : Up
=====
Reference Operational Information
=====
Admin Status         : up                 Qualified For Use     : Yes
Not Qualified Due To : N/A                Selected For Use      : Yes
Not Selected Due To  : not qualified
=====
```

Table 35: Show System PTP Clock Detail Output Fields

Label	Description
Clock Type	The local clock type
Admin State	up — the local clock is enabled and running
	down — the local clock is shut down and not running
Source I/F	The PTP clock source interface as configured by the source-interface command
Clock MDA	The PTP clock-mda as configured by the clock-mda command
PTP Profile	The PTP profile as configured by the profile command
Dynamic Peers	Whether or not dynamic peers are enabled
Admin Freq-source	The administrative value of the frequency source
Oper Freq-source	The operational value of the frequency source
Clock ID	The local clock identification
Clock Class	The local clock class
Clock Accuracy	The local clock accuracy designation
Clock Variance	The local clock variance
Clock Priority1	The local clock priority1 designation
Clock Priority2	The local clock priority2 designation
Domain	The local clock domain
Two-Step	Whether the local clock uses a one-step or two-step synchronization method
Parent Clock	
Parent Clock ID	The parent clock identification
Parent Port Number	The parent clock port number
GM Clock ID	The grand master clock ID
GM Clock Class	The grand master clock class
GM Clock Accuracy	The grand master clock accuracy designation
GM Clock Variance	The grand master clock variance
GM Clock Priority1	The grand master clock priority1 designation
GM Clock Priority2	The grand master clock priority2 designation

Table 35: Show System PTP Clock Detail Output Fields (Continued)

Label	Description
Slave Port Index	The port index of the slave clock
Slave Port State	The port state of the slave clock
Slave Peer Index	The peer index of the slave clock
Slave Peer IP	The IP address of the slave clock
Forward Weight	The percentage of the sync packet direction being used to recover the clock from the selected peer
Reverse Weight	The percentage of the delay packet direction being used to recover the clock from the selected peer
Recovery State	The clock recovery state: free-run, acquiring, phase-tracking, or locked
Time Information	
Timescale	The PTP timescale flag sent in the 1588 ANNOUNCE message
Current Time	The current time being recovered by the PTP time recovery algorithm
Freq Traceable	The frequency traceable flag sent in the 1588 ANNOUNCE message
Time Traceable	The time traceable flag sent in the 1588 ANNOUNCE message
Time Source	The time-source parameter sent in the 1588 ANNOUNCE message
Interface Configuration Information	
Source IP Interface	The IP interface name that provides IEEE 1588v2 PTP packets to the clock recovery mechanism on the following: <ul style="list-style-type: none"> • 8-port Ethernet Adapter card, version 2, on the 7705 SAR-8 and 7705 SAR-18 • 8-port Gigabit Ethernet Adapter card on the 7705 SAR-8 and 7705 SAR-18 • 10-port 1GigE/1-port 10GigE X-Adapter card on the 7705 SAR-18 • Packet Microwave Adapter card on the 7705 SAR-8 and 7705 SAR-18 • Ethernet port on the 7705 SAR-F, 7705 SAR-M (all variants), and 7705 SAR-H • GPON or DSL port on the 7705 SAR-M (variants with module slots)
IP Interface Port	The source IP interface port
IP Interface Address	The source IP interface address

Table 35: Show System PTP Clock Detail Output Fields (Continued)

Label	Description
PTP Enabled	True — PTP is enabled on the IP interface
	False — PTP is not enabled on the IP interface
Admin Status	The administrative status of the source IP interface
Oper Status	The operational status of the source IP interface
Reference Operational Information	
Admin Status	down — the ref1 configuration is administratively shut down
	up — the ref1 configuration is administratively enabled
Qualified for Use	Whether or not the ref1 or ref2 timing reference is qualified for use by the synchronous timing subsystem
Not Qualified Due To	If the ref1 or ref2 timing reference is not qualified, the reason why
Selected for Use	Whether or not the ref1 or ref2 timing reference is presently selected
Not Selected Due To	If the ref1 or ref2 timing reference is not selected, the reason why

Sample Output

```
A:# show system ptp clock 2 timestamp
=====
Timestamp Correction Summary
-----
Phys   In/   Sync   Delay Req   FCS
Port  Out  Pkt    Pkt         Errors
-----
1/1/1  in   0      0           0
      out 0      0           0
1/1/2  in   661026 745677      0
      out 745822 660583      0
1/1/3  in   850460 0           0
      out 0      850430      0
1/1/4  in   397599 103354      0
      out 103361 397572      0
-      in   -       -           -
      out -     -           -
-      in   -       -           -
      out -     -           -
-      in   -       -           -
      out -     -           -
-      in   -       -           -
      out -     -           -
-      in   -       -           -
      out -     -           -
```


Table 36: Show System PTP Clock Timestamp Output Fields

Label	Description
Phys Port	The physical port identifier
In/Out	The direction of the packet counts
Sync Pkt	The number of ingress or egress synchronization packets
Delay Req Pkt	The number of ingress or egress delay request packets
FCS Errors	The number of FCS errors

ptp-port

Syntax `ptp-port port-id`

Context `show>system>clock`

Description This command displays PTP port information.

Parameters *port-id* — specifies the PTP port ID

Values 1 to 10

Output The following output is an example of PTP port information, and [Table 37](#) describes the fields.

Sample Output

```
A:# show system ptp clock 1 ptp-port 1
```

```
=====
PTP Port
=====
Admin State           : up           Number Of Peers      : 2
Log-anno-interval    : 1           Anno-rx-timeouts    : 3
Log-sync-interval    : -6          Unicast              : True
PTP Port State       : slave
=====
```

Table 37: Show System PTP Port Output Fields

Label	Description
Admin State	up — The SNTP server is administratively up
	down — The SNTP server is administratively down
Number Of Peers	The number of peers associated with this PTP port

Table 37: Show System PTP Port Output Fields (Continued)

Label	Description
Log-anno-interval	The expected interval between the reception of announce messages
Anno-rx-timeouts	The number of announce timeouts that need to occur before communication messages with a master clock are assumed lost and the master clock is considered not available. One timeout in this context is equal to the announce interval in seconds, calculated using the logarithm $2^{\text{log-anno-interval-value}}$.
Log-sync-interval	The expected interval between the reception of synchronization messages
Unicast	True — the PTP slave clock can unicast-negotiate with the PTP master clock
	False — the PTP slave clock cannot unicast-negotiate with the PTP master clock
PTP Port State	The PTP port state: initializing, listening, uncalibrated, slave, master, or passive

peer

Syntax `peer peer-id [detail]`

Context `show>system>clock>ptp-port`

Description This command displays PTP peer information.

Parameters `peer-id` — specifies the PTP peer ID

Values 1 to 10

Output The following output is an example of detailed PTP peer information, and [Table 38](#) describes the fields.

Sample Output

```
A:# show system ptp clock 1 ptp-port 1 peer 1 detail
=====
Peer-1
=====
IP Address      : 10.222.222.10    static/dynamic      : static
Current Master  : TRUE
Description     : (Not Specified)
Clock Id       : 001af0fffe6808a7 Port Number      : 2
```

```

GM Clock Id      : 4041424344454637 GM Clock Class   : 6
GM Clock Accuracy : 100ns             GM Clock Variance : 25600
GM Clock Priority1 : 128               GM Clock Priority2 : 128
Step Type        : one-step
Last Rx Anno Msg : 11/10/2010 10:32:54
    
```

Unicast Info

Dir	Type	Rate	Dur	Result	Time	Remain
Rx	Anno	1 pkt/2 s	300	granted	11/10/2010 10:31:34	142
	Sync	64 pkt/s	300	granted	11/10/2010 10:31:38	150
	DelayResp	64 pkt/s	300	granted	11/10/2010 10:31:38	150

=====
PTP Peer-1 Statistics
=====

	Input	Output

Signalling Packets	91	94
Unicast Request Announce Packets	55	15
Unicast Request Announce Timeout	0	3
Unicast Request Announce Reject	0	
Unicast Request Sync Packets	0	12
Unicast Request Sync Timeout	0	0
Unicast Request Sync Reject	0	
Unicast Request Delay Resp Packe*	0	12
Unicast Request Delay Resp Timeo*	0	0
Unicast Request DelayResp Reject	0	
Unicast Grant Announce Packets	12	0
Unicast Grant Announce Rejected	0	55
Unicast Grant Sync Packets	12	0
Unicast Grant Sync Rejected	0	0
Unicast Grant Delay Resp Packets	12	0
Unicast Grant Delay Resp Rejected		0
Unicast Cancel Announce Packets	0	0
Unicast Cancel Sync Packets	0	0
Unicast Cancel Delay Resp Packets	0	0
Unicast Ack Cancel Announce Pack*	0	0
Unicast Ack Cancel Sync Packets	0	0
Unicast Ack Cancel Delay Resp Pa*	0	0
Anno Packets	854	0
Sync Packets	113840	0
Delay Response Packets	113838	0
Delay Request Packets	0	113838
Follow-Up Packets	0	
Out Of Order Sync Packets	1	
Total UDP (port 320) Pkts	945	94
Total UDP (port 319) Pkts	227678	113838

Discard Statistics

Alternate Master Packets	0
Bad Domain Packets	0
Bad Version Packets	0
Duplicate Msg Packets	0

System Command Reference

```

Step RM Greater Than 255                                0
=====
* indicates that the corresponding row element may have been truncated.

=====
PTP Peer 1 Algorithm State Statistics (in seconds)
=====
Free-run          : 1100
Acquiring         : 120
Phase-Tracking    : 560
Hold-over         : 0
Locked           : 0
=====

=====
PTP Peer 1 Algorithm Event Statistics
=====
Excessive Freq Error Detected : 4
Excessive Packet Loss Detected : 0
Packet Loss Spotted          : 0
Excessive Phase Shift Detected : 0
High PDV Detected            : 0
Sync Packet Gaps Detected     : 0
=====

=====
PTP Peer-1 Clock Recovery
- Internal Digital Phase Locked Loop (DPLL) Statistics
=====
time          sync      delay-req      phase      phase
              pkt delay  pkt delay      error      error
              stddev     stddev         (ns)      error
              (ns)       (ns)
-----
11/10/2010 10:31:17      0          0          211         16
11/10/2010 10:29:17      0          0          251          7
11/10/2010 10:27:17      0          0          243         11
11/10/2010 10:25:16      0          0          170         32
11/10/2010 10:07:16    138        131        -6789       36545
~11/10/2010 10:05:16      0          0           0           0

```

Table 38: Show System PTP Port Peer Detail Output Fields

Label	Description
Peer-1	
IP Address	The peer-1 clock IP address
Current Master	True — the peer-1 clock is the current master clock
	False — the peer-1 clock is not the current master clock
Description	The peer-1 clock description
Clock ID	The peer-1 clock identification

Table 38: Show System PTP Port Peer Detail Output Fields (Continued)

Label	Description
Port Number	The peer-1 clock port number
GM Clock ID	The grand master clock identification
GM Clock Class	The grand master clock class designation
GM Clock Accuracy	The grand master clock accuracy designation
GM Clock Variance	The grand master clock scaled log variance in decimal format
GM Clock Priority1	The grand master clock priority1 designation
GM Clock Priority2	The grand master clock priority2 designation
Step Type	Whether the peer-1 clock uses a one-step or two-step synchronization method
Last Rx Anno Msg	The time when the last announce message was received from the peer clock
Unicast Info	
Dir	The direction of the unicast information: either Rx or Tx
Type	The message type: announce, synchronization, or delay response
Rate	The rate of the unicast information in packets per second
Dur	The lease duration for the session
Result	The result of the last unicast request sent to the peer for the indicated message type
Time	The time the unicast information was received
Remain	The time remaining before the lease expires

Table 38: Show System PTP Port Peer Detail Output Fields (Continued)

Label	Description
PTP Peer-1/Peer-2 Statistics	
	<p>The following input/output statistics are provided for the peer-1/peer-2 clock:</p> <ul style="list-style-type: none"> • Signalling Packets • Unicast Request Announce Packets • Unicast Request Announce Timeout • Unicast Request Announce Reject • Unicast Request Sync Packets • Unicast Request Sync Timeout • Unicast Request Sync Reject • Unicast Request Delay Resp Packets • Unicast Request Delay Resp Timeout • Unicast Request Delay Resp Reject • Unicast Grant Announce Packets • Unicast Grant Announce Rejected • Unicast Grant Sync Packets • Unicast Grant Sync Rejected • Unicast Grant Delay Resp Packets • Unicast Grant Delay Resp Rejected • Unicast Cancel Announce Packets • Unicast Cancel Sync Packets • Unicast Cancel Delay Resp Packets • Unicast Ack Cancel Announce Packets • Unicast Ack Cancel Sync Packets • Unicast Ack Cancel Delay Resp Packets • Anno Packets • Sync Packets • Delay Response Packets • Delay Request Packets • Follow-Up Packets • Out Of Order Sync Packets • Total UDP (port 320) Pkts • Total UDP (port 319) Pkts

Table 38: Show System PTP Port Peer Detail Output Fields (Continued)

Label	Description
	<p>The following discard statistics are provided for the peer-1/peer-2 clock:</p> <ul style="list-style-type: none"> • Alternate Master Packets • Bad Domain Packets • Bad Version Packets • Duplicate Msg Packets • Step RM Greater Than 255
	<p>The following algorithm state statistics (in seconds) are provided for the peer-1/peer-2 clock:</p> <ul style="list-style-type: none"> • Free-run • Acquiring • Phase-Tracking • Hold-over • Locked
	<p>The following algorithm event statistics are provided for the peer-1/peer-2 clock:</p> <ul style="list-style-type: none"> • Excessive Freq Error Detected • Excessive Packet Loss Detected • Packet Loss Spotted • Excessive Phase Shift Detected • High PDV Detected • Sync Packet Gaps Detected
	<p>The following statistics are shown for the peer clock. These statistics are refreshed every 2 min; the display shows the time of the last update:</p> <ul style="list-style-type: none"> • sync pkt delay stddev (ns) • delay-req pkt delay stddev (ns) • phase error (ns) • phase error stddev (ns)

sntp

- Syntax** **sntp**
- Context** show>system
- Description** This command displays SNTP protocol configuration and state.
- Output** The following output is an example of SNTP information, and [Table 39](#) describes the fields.

Sample Output

```
A:ALU-1# show system sntp

=====
SNTP Status
=====
Admin Status : up           Oper Status : up           Mode : unicast
=====

=====
SNTP
Servers
=====
SNTP Server      Version      Preference      Interval
-----
10.10.20.253    3            Preferred      64
=====
A:ALU-1#
```

Table 39: Show System SNTP Output Fields

Label	Description
Admin Status	up — the SNTP server is administratively up
	down — the SNTP server is administratively down
Oper Status	up — the SNTP server is operationally up
	down — the SNTP server is operationally down
Mode	broadcast — the SNTP server has broadcast client mode enabled
	unicast — the SNTP server has unicast client mode enabled
SNTP Server	The SNTP server address for SNTP unicast client mode
Version	The SNTP version number, expressed as an integer
Preference	Normal — when more than one time server is configured, one server can be configured to have preference over another
	Preferred — indicates that this server has preference over another

Table 39: Show System SNMP Output Fields (Continued)

Label	Description
Interval	The frequency, in seconds, that the server is queried

thresholds

Syntax	thresholds
Context	show>system
Description	This command display system monitoring thresholds.
Output	The following output is an example of system monitoring thresholds information, and Table 40 describes the fields.

Sample Output

```
A:ALU-48# show system thresholds
=====
Threshold Alarms
=====
Variable: tmnCpmFlashUsed.1.11.1
Alarm Id      : 1      Last Value : 835
Rising Event Id : 1      Threshold  : 5000
Falling Event Id : 2      Threshold  : 2500
Sample Interval : 2748341* SampleType : absolute
Startup Alarm  : either Owner      : TiMOS CLI

Variable: tmnCpmFlashUsed.1.11.1
Alarm Id      : 2      Last Value : 835
Rising Event Id : 3      Threshold  : 10000
Falling Event Id : 4      Threshold  : 5000
Sample Interval : 27483 SampleType : absolute
Startup Alarm  : rising Owner      : TiMOS CLI

Variable: sgiMemoryUsed.0
Alarm Id      : 3      Last Value : 42841056
Rising Event Id : 5      Threshold  : 4000
Falling Event Id : 6      Threshold  : 2000
Sample Interval : 2147836 SampleType : absolute
Startup Alarm  : either Owner      : TiMOS CLI

=====
* indicates that the corresponding row element may have been truncated.
=====
Threshold Events
=====
Description: TiMOS CLI - cflash capacity alarm rising event
Event Id      : 1      Last Sent   : 10/31/2006 08:47:59
Action Type   : both   Owner      : TiMOS CLI

Description: TiMOS CLI - cflash capacity alarm falling event
```

System Command Reference

```
Event Id      : 2      Last Sent   : 10/31/2006 08:48:00
Action Type   : both   Owner        : TiMOS CLI
```

Description: TiMOS CLI - cflash capacity warning rising event

```
Event Id      : 3      Last Sent   : 10/31/2006 08:47:59
Action Type   : both   Owner        : TiMOS CLI
```

Description: TiMOS CLI - cflash capacity warning falling event

```
Event Id      : 4      Last Sent   : 10/31/2006 08:47:59
Action Type   : both   Owner        : TiMOS CLI
```

Description: TiMOS CLI - memory usage alarm rising event

```
Event Id      : 5      Last Sent   : 10/31/2006 08:48:00
Action Type   : both   Owner        : TiMOS CLI
```

Description: TiMOS CLI - memory usage alarm falling event

```
Event Id      : 6      Last Sent   : 10/31/2006 08:47:59
Action Type   : both   Owner        : TiMOS CLI
```

=====

=====

Threshold Events Log

=====

```
Description      : TiMOS CLI - cflash capacity alarm falling eve
                   nt : value=835, <=2500 : alarm-index 1, event
                   -index 2 alarm-variable OID tmnxCpmFlashUsed.
                   1.11.1
```

```
Event Id        : 2      Time Sent   : 10/31/2006 08:48:00
```

```
Description      : TiMOS CLI - memory usage alarm rising event :
                   value=42841056, >=4000 : alarm-index 3, even
                   t-index 5 alarm-variable OID sgiMemoryUsed.0
```

```
Event Id        : 5      Time Sent   : 10/31/2006 08:48:00
```

=====

A:ALU-48#

Table 40: Show System Threshold Output Fields

Label	Description
Variable	The variable OID
Alarm Id	The numerical identifier for the alarm
Last Value	The last threshold value
Rising Event Id	The identifier of the RMON rising event
Threshold	The identifier of the RMON rising threshold
Falling Event Id	The identifier of the RMON falling event
Threshold	The identifier of the RMON falling threshold

Table 40: Show System Threshold Output Fields (Continued)

Label	Description
Sample Interval	The polling interval, in seconds, over which the data is sampled and compared with the rising and falling thresholds
Sample Type	The method of sampling the selected variable and calculating the value to be compared against the thresholds
Startup Alarm	The alarm that may be sent when this alarm is first created
Owner	The owner of this alarm
Description	The event cause
Event Id	The identifier of the threshold event
Last Sent	The date and time the alarm was sent
Action Type	<p>log — an entry is made in the RMON-MIB log table for each event occurrence. This does not create a TiMOS logger entry. The RMON-MIB log table entries can be viewed using the show>system>thresholds CLI command.</p> <p>trap — a TiMOS logger event is generated. The TiMOS logger utility then distributes the notification of this event to its configured log destinations which may be CONSOLE, telnet session, memory log, cflash file, syslog, or SNMP trap destinations logs.</p> <p>both — both an entry in the RMON-MIB logTable and a TiMOS logger event are generated</p> <p>none — no action is taken</p>
Owner	The owner of the event

System Command Reference

time

- Syntax** **time**
- Context** show>system
- Description** This command displays the system time and zone configuration parameters.
- Output** The following output is an example of system time information, and [Table 41](#) describes the fields.

Sample Output

```
A:ALU-1# show system time
=====
Date & Time
=====
Current Date & Time : 2008/05/25 23:03:13   DST Active       : yes
Current Zone       : PDT                   Offset from UTC  : -7:00
-----
Non-DST Zone      : PST                   Offset from UTC  : -8:00
Zone type         : standard
-----
DST Zone          : PDT                   Offset from Non-DST : 0:60
Starts           : first sunday in april 02:00
Ends             : last sunday in october 02:00
=====
Time Of Day - 1 Pulse Per Second Port
=====
Input             : shutdown              Message Type     : cm
Output            : no shutdown           Source           : PTP
Port Type         : RS-422
Baud Rate        : 9600                   Stop Bits       : 1
=====
A:ALU-1#
```

show>system>time with no DST zone configured

```
A:ALU-1# show system time
=====
Date & Time
=====
Current Date & Time : 2008/05/12 11:12:05   DST Active       : no
Current Zone       : APA                   Offset from UTC  : -8:00
-----
Non-DST Zone      : APA                   Offset from UTC  : -8:00
Zone Type         : non-standard
-----
No DST zone configured
=====
A:ALU-1#
```

Table 41: Show System Time Output Fields

Label	Description
Date & Time	The system date and time using the current time zone
DST Active	Yes — Daylight Savings Time is currently in effect
	No — Daylight Savings Time is not currently in effect
Zone	The zone names for the current zone, the non-DST zone, and the DST zone if configured
Zone type	Non-standard — the zone is user-defined
	Standard — the zone is system-defined
Offset from UTC	The number of hours and minutes added to universal time for the zone, including the DST offset for a DST zone
Offset from Non-DST	The number of hours (always 0) and minutes (0—60) added to the time at the beginning of Daylight Saving Time and subtracted at the end Daylight Saving Time
Starts	The date and time Daylight Saving Time begins
Ends	The date and time Daylight Saving Time ends
Time of Day - 1 Pulse Per Second Port	
Message Type	The type of message: ct, cm, or none
Output	The state of the output: shutdown or no shutdown
Source	The time reference type for the pulse per second output
Port Type	The port type: <ul style="list-style-type: none"> • on the 7705 SAR-M, the port type is RS-422 • on the 7705 SAR-H, the port type is RJ-45
Baud Rate	The baud rate of the port
Stop Bits	The number of stop bits

System Command Reference

time

- Syntax** `time`
- Context** `show`
- Description** This command displays the current day, date, time and time zone.
- The time is displayed either in the local time zone or in UTC depending on the setting of the root level **time-display** command for the console session.
- Output** The following output is an example of time information.

Sample Output

```
A:ALU-1# show time
Tue Mar 25 12:17:15 GMT 2008
A:ALU-1#
```

redundancy

- Syntax** `redundancy`
- Context** `show`
- Description** This command enables the context to show redundancy information.

synchronization

- Syntax** `synchronization`
- Context** `show>redundancy`
- Description** This command displays redundancy synchronization times.
- Output** The following output is an example of redundancy synchronization information, and [Table 42](#) describes the fields.

Sample Output

```
A:ALU-1>show>redundancy# synchronization
```

```
=====
Synchronization Information
=====
```

```
Standby Status           : disabled
Last Standby Failure     : N/A
Standby Up Time          : N/A
Failover Time            : N/A
Failover Reason          : N/A
```

```

Boot/Config Sync Mode      : None
Boot/Config Sync Status   : No synchronization
Last Config File Sync Time : Never
Last Boot Env Sync Time   : Never

```

```

=====
A:ALU-1>show>redundancy#

```

Table 42: Show Synchronization Output Fields

Label	Description
Standby Status	Displays the status of the standby CSM
Last Standby Failure	Displays the timestamp of the last standby failure
Standby Up Time	Displays the length of time the standby CSM has been up
Failover Time	Displays the timestamp when the last redundancy failover occurred causing a switchover from active to standby CSM. If there is no redundant CSM card in this system or no failover has occurred since the system last booted, the value will be 0.
Failover Reason	Displays a text string giving an explanation of the cause of the last redundancy failover. If no failover has occurred, an empty string displays.
Boot/Config Sync Mode	Displays the type of synchronization operation to perform between the primary and secondary CSMs after a change has been made to the configuration files or the boot environment information contained in the boot options file (BOF).
Boot/Config Sync Status	Displays the results of the last synchronization operation between the primary and secondary CSMs
Last Config File Sync Time	Displays the timestamp of the last successful synchronization of the configuration files
Last Boot Env Sync Time	Displays the timestamp of the last successful synchronization of the boot environment files

uptime

Syntax **uptime**

Context show

Description This command displays the time since the system started.

Output The following output is an example of system uptime information, and [Table 43](#) describes the fields.

System Command Reference

Sample Output

```
A:ALU-1# show uptime
System Up Time      : 11 days, 18:32:02.22 (hr:min:sec)
A:ALU-1#
```

Table 43: System Uptime Output Fields

Label	Description
System Up Time	The length of time the system has been up in days, hr:min:sec format

sync-if-timing

Syntax `sync-if-timing`

Context `show>system`

Description This command displays synchronous interface timing operational information.

Output The following output is an example of synchronous interface timing information, and [Table 44](#) describes the fields.



Note: Some of the fields in the following output apply to the 7705 SAR-18 only.

Sample Output

```
A:ALU-1# show system sync-if-timing
=====
System Interface Timing Operational Info
=====
System Interface Timing Operational Info
=====
System Status CSM A           : Master Locked
  Reference Input Mode       : Non-revertive
  Quality Level Selection    : Disabled

Reference Order               : bits ref1 ref2

Reference Input 1
  Admin Status               : down
  Configured Quality Level   : none
  Rx Quality Level           : unknown
  Qualified For Use          : No
    Not Qualified Due To     : disabled
  Selected For Use           : No
    Not Selected Due To     : disabled
```



```

Reference Input 2
  Admin Status           : down
  Configured Quality Level : none
  Rx Quality Level       : unknown
  Qualified For Use      : No
    Not Qualified Due To : disabled
  Selected For Use      : No
    Not Selected Due To  : disabled

Reference BITS 1
  Admin Status           : up
  Configured Quality Level : stu
  Rx Quality Level       : unknown
  Qualified For Use      : Yes
  Selected For Use      : Yes
  Interface Type         : DS1
  Framing                : ESF
  Line Coding             : B8ZS
  Output Admin Status    : up
  Output Reference Selected : none
  Tx Quality Level       :

Reference BITS 2
  Admin Status           : up
  Configured Quality Level : stu
  Rx Quality Level       : unknown
  Qualified For Use      : No
    Not Qualified Due To : LOS
  Selected For Use      : No
    Not Selected Due To  : not qualified
  Interface Type         : DS1
  Framing                : ESF
  Line Coding             : B8ZS
  Output Admin Status    : up
  Output Reference Selected : none
  Tx Quality Level       :
    
```

=====
A:ALU-1#

Table 44: Show Sync-If-Timing Output Fields

Label	Description
System Status CSM A	The present status of the synchronous timing equipment subsystem (SETS): <ul style="list-style-type: none"> • Not Present • Master Freerun • Master Holdover • Master Locked • Slave • Acquiring

Table 44: Show Sync-If-Timing Output Fields (Continued)

Label	Description
Reference Input Mode	Revertive — a revalidated or a newly validated reference source that has a higher priority than the currently selected reference has reverted to the new reference source
	Non-revertive — the clock cannot revert to a higher priority clock if the current clock goes offline
Quality Level Selection	Whether Quality Level Selection is enabled or disabled
Reference Order	bits, ref1, ref2 — the priority order of the timing references
Reference Input 1, 2	The reference 1 and reference 2 input parameters
Admin Status	down — the ref1 or ref2 configuration is administratively shut down
	up — the ref1 or ref2 configuration is administratively enabled
Configured Quality Level	Synchronization Status Messaging quality level value manually configured on port for ref1 or ref2
Rx Quality Level	Synchronization Status Messaging quality level value received on port for ref1 or ref2
Qualified for Use	Whether or not the ref1 or ref2 timing reference is qualified for use by the synchronous timing subsystem
Selected for Use	Whether or not the ref1 or ref2 timing reference is presently selected
Not Selected Due To	If the ref1 or ref2 timing reference is not selected, the reason why
Not Qualified Due To	If the ref1 or ref2 timing reference is not qualified, the reason why
Source Port	None — no source port is configured or in use as a ref1 or ref2 timing reference
	card/slot/port — the source port of the ref1 or ref2 timing reference
Reference BITS 1, 2	The reference 1 and reference 2 BITS parameters, applicable to the 7705 SAR-18 only
Admin Status	down — the BITS 1 or BITS 2 configuration is administratively shut down
	up — the BITS 1 or BITS 2 configuration is administratively enabled

Table 44: Show Sync-If-Timing Output Fields (Continued)

Label	Description
Configured Quality Level	Synchronization Status Messaging quality level value manually configured on port for BITS 1 or BITS 2
Rx Quality Level	Synchronization Status Messaging quality level value received on port for BITS 1 or BITS 2
Qualified For Use	Whether or not the BITS 1 or BITS 2 reference is qualified for use by the synchronous timing subsystem
Selected For Use	Whether or not the BITS 1 or BITS 2 reference is presently selected
Not Qualified Due To	If the BITS 1 or BITS 2 reference is not qualified, the reason why
Not Selected Due To	If the BITS 1 or BITS 2 reference is not selected, the reason why
Interface Type	The interface type for the BITS port
Framing	The framing type used by the BITS port
Line Coding	The line coding type used by the BITS port
Output Admin Status	The administrative status of the BITS output port
Output Reference Selected	The type of output reference selected by the BITS port
Tx Quality Level	The Synchronization Status Messaging quality level value transmitted on the BITS port

chassis

Syntax `chassis [environment | power-feed]`

Context show

Description This command displays general chassis status information.

Parameters **environment** — displays chassis environmental status information

Default Display all chassis information.

power-feed — displays chassis power feed status information

Default Display all chassis information.

Output The following output is an example of general chassis information, and [Table 45](#) describes the fields.

Sample Output

A:ALU-1# show chassis

=====

Chassis Information

=====

```
Name           : ALU-1
Type           : 7705 SAR-8
Location       :
Coordinates    :
CLLI code     :
Number of slots : 3
Number of ports : 88
Critical LED state : Red
Major LED state : Off
Minor LED state : Off
Over Temperature state : OK
Base MAC address : 00:1a:f0:67:fc:a6
```

Hardware Data

```
Part number      : 3HE02773AAAA0101
CLEI code       : ipmjj10gra
Serial number    : NS000000094
Manufacture date : 11262007
Manufacturing string : Backplane SEEP
Manufacturing deviations :
Time of last boot : 2008/04/11 09:32:06
Current alarm state : alarm active
```

Environment Information

```
Module
Status           : ok
Type            : fan-v1
```

Fan Information

```
# of on-board fans : 8
Status             : up
Speed              : full speed
```

External Alarms Interface

```
-----
Input  Pin  Event      State
-----
IN-1   1    Major     : ok
IN-2   2    Major     : ok
IN-3  11    Major     : ok
IN-4  12    Minor     : ok
-----
```

Hardware Data

```
Part number      : 3HE02777AAAA01
CLEI code       :
Serial number    : NS073840018
Manufacture date :
Manufacturing string :
Manufacturing deviations :
Time of last boot : 2008/04/11 09:32:07
Current alarm state : alarm cleared
```

```

Power Feed Information
  Number of power feeds      : 2

  Input power feed          : A
    Type                    : dc
    Status                   : up

  Input power feed          : B
    Type                    : dc
    Status                   : failed
=====
A:ALU-1#

A:7705-3>config# show chassis environment
=====
Chassis Information
=====
Environment Information
  Module
    Status                   : ok
    Type                     : fan-v1

  Fan Information
    # of on-board fans      : 8
    Status                   : up
    Speed                    : full speed

  External Alarms Interface
  -----
    Input  Pin  Event          State
  -----
    IN-1   1    Major           : ok
    IN-2   2    Major           : ok
    IN-3  11    Major           : ok
    IN-4  12    Minor           : ok
  -----

Hardware Data
  Part number                : 3HE02777AAAA01
  CLEI code                  :
  Serial number              : NS073840018
  Manufacture date           :
  Manufacturing string        :
  Manufacturing deviations    :
  Time of last boot          : 2008/04/11 09:32:07
  Current alarm state        : alarm cleared
=====
A:7705>

```

Table 45: Show Chassis Output Fields

Label	Description
Name	The system name for the router
Type	The router series 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 all CSM slots.
Number of ports	The total number of ports currently installed in this chassis. This count does not include the CSM Management ports that are used for management access.
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
Over Temperature state	Indicates whether there is an over-temperature condition
Base MAC address	The base chassis Ethernet MAC address
Part number	The CSM part number
CLEI code	The code used to identify the router
Serial number	The CSM part number. Not user-modifiable
Manufacture date	The chassis manufacture date. Not user-modifiable.
Manufacturing string	Factory-inputted manufacturing text string. Not user-modifiable.
Time of last boot	The date and time the most recent boot occurred
Current alarm state	Displays the alarm conditions for the specific board

Table 45: Show Chassis Output Fields (Continued)

Label	Description
Environment Information	
Status	Current status of the fan module
Type	Version of the fan module
# of on-board fans	The total number of fans installed in this chassis
Status	Current status of the fans
Speed	Half speed — the fans are operating at half speed
	Full speed — the fans are operating at full speed
External Alarms Interface	
Input	External alarm input number
Pin	Port connector pin number for the alarm input
Event	Severity level of events reported by this input: <ul style="list-style-type: none"> • Critical: critical log event, trap and critical alarm/relay LED illuminated • Major: major log event, trap and major alarm/relay LED illuminated • Minor: minor log event, trap and minor alarm/relay LED illuminated • Warning: warning log, event, trap, no alarm/relay illuminated • Indeterminate: indeterminate log event trap, no alarm/relay illuminated • Suppressed: no log events, traps or alarm/relays illuminated
State	State of alarm event
Hardware data	Hardware information for fan module
Power Feed Information	
Number of power feeds	The number of power feeds installed in the chassis
Input power feed - Type	The type of power feed – dc power
Input power feed - Status	Up — the specified power supply is up
	Down — the specified power supply is down

Debug Commands

sync-if-timing

Syntax	sync-if-timing
Context	debug
Description	This command enables the context to debug synchronous interface timing references.

force-reference

Syntax	force-reference {external ref1 ref2} no force-reference
Context	debug>sync-if-timing
Description	This command allows an operator to force the system synchronous timing output to use a specific reference.



Note: This command should be used for testing and debugging purposes only. Once the system timing reference input has been forced, it will not revert back to another reference at any time. The state of this command is not persistent between system boots.

When the **debug force-reference** command is executed, the current system synchronous timing output is immediately referenced from the specified reference input. If the specified input is not available (shutdown), or in a disqualified state, the timing output will enter the holdover state based on the previous input reference.

Parameters	ref1 — forces the clock to use the first timing reference ref2 — forces the clock to use the second timing reference external — forces the clock to use the third timing reference
-------------------	---

system

Syntax	[no] system
Context	debug
Description	This command displays system debug information.

http-connections

Syntax	http-connections [<i>host-ip-address/mask</i>] no http-connections
Context	debug>system
Description	This command displays HTTP connections debug information.
Parameters	<i>host-ip-address/mask</i> — displays information for the specified host IP address and mask

ntp

Syntax	ntp router <i>router-name</i> interface <i>ip-int-name</i> no ntp
Context	debug>system
Description	This command enables and configures debugging for NTP. The no form of the command disables debugging for NTP.
Parameters	<i>router-name</i> — specifies the route name, either base or management Default base <i>ip-int-name</i> — maximum 32 characters; must begin with a letter. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

Clear Commands

cron

Syntax	cron action completed [<i>action-name</i>] [owner <i>action-owner</i>]
Context	clear
Description	This command clears completed CRON action run history entries.
Parameters	<i>action-name</i> — specifies the action name Values maximum 32 characters <i>action-owner</i> — specifies the owner name Default TiMOS CLI

screen

Syntax	screen
Context	clear
Description	This command allows an operator to clear the Telnet or console screen.

system

Syntax	system sync-if-timing { external ref1 ref2 }
Context	clear
Description	This command allows an operator to individually clear (re-enable) a previously failed reference. As long as the reference is one of the valid options, this command is always executed. An inherent behavior enables the revertive mode which causes a re-evaluation of all available references.
Parameters	ref1 — clears the first timing reference ref2 — clears the second timing reference external — clears the third timing reference

trace

Syntax	trace log
Context	clear
Description	This command allows an operator to clear the trace log.

List of Acronyms

Table 46: Acronyms

Acronym	Expansion
2G	second generation wireless telephone technology
3DES	triple DES (data encryption standard)
3G	third generation mobile telephone technology
5620 SAM	5620 Service Aware Manager
7705 SAR	7705 Service Aggregation Router
7710 SR	7710 Service Router
7750 SR	7750 Service Router
9500 MPR	9500 microwave packet radio
ABR	available bit rate area border router
AC	alternating current attachment circuit
ACK	acknowledge
ACL	access control list
ACR	adaptive clock recovery
ADM	add/drop multiplexer
ADP	automatic discovery protocol
AFI	authority and format identifier
AIS	alarm indication signal
ANSI	American National Standards Institute

Table 46: Acronyms (Continued)

Acronym	Expansion
Apipe	ATM VLL
APS	automatic protection switching
ARP	address resolution protocol
A/S	active/standby
AS	autonomous system
ASAP	any service, any port
ASBR	autonomous system boundary router
ASM	autonomous system message
ASN	autonomous system number
ATM	asynchronous transfer mode
ATM PVC	ATM permanent virtual circuit
B3ZS	bipolar with three-zero substitution
Batt A	battery A
B-bit	beginning bit (first packet of a fragment)
Bc	committed burst size
Be	excess burst size
BECN	backward explicit congestion notification
Bellcore	Bell Communications Research
BFD	bidirectional forwarding detection
BGP	border gateway protocol
BITS	building integrated timing supply
BMCA	best master clock algorithm

Table 46: Acronyms (Continued)

Acronym	Expansion
BMU	broadcast, multicast, and unknown traffic Traffic that is not unicast. Any nature of multipoint traffic: <ul style="list-style-type: none"> • broadcast (that is, all 1s as the destination IP to represent all destinations within the subnet) • multicast (that is, traffic typically identified by the destination address, uses special destination address); for IP, the destination must be 224.0.0.0 to 239.255.255.255 • unknown (that is, the destination is typically a valid unicast address but the destination port/interface is not yet known; therefore, traffic needs to be forwarded to all destinations; unknown traffic is treated as broadcast)
BOF	boot options file
BPDU	bridge protocol data unit
BRAS	Broadband Remote Access Server
BSC	Base Station Controller
BSTA	Broadband Service Termination Architecture
BTS	base transceiver station
CAS	channel associated signaling
CBN	common bonding networks
CBS	committed buffer space
CC	control channel continuity check
CCM	continuity check message

Table 46: Acronyms (Continued)

Acronym	Expansion
CE	customer edge circuit emulation
CEM	circuit emulation
CES	circuit emulation services
CESoPSN	circuit emulation services over packet switched network
CFM	connectivity fault management
cHDLC	Cisco high-level data link control protocol
CIDR	classless inter-domain routing
CIR	committed information rate
CLI	command line interface
CLP	cell loss priority
CoS	class of service
CPE	customer premises equipment
Cpipe	circuit emulation (or TDM) VLL
CPM	Control and Processing Module (CPM is used instead of CSM when referring to CSM filtering to align with CLI syntax used with other SR products). CSM management ports are referred to as CPM management ports in the CLI.
CPU	central processing unit
C/R	command/response
CRC	cyclic redundancy check
CRC-32	32-bit cyclic redundancy check
CRON	a time-based scheduling service (from chronos = time)
CSM	Control and Switching Module
CSNP	complete sequence number PDU

Table 46: Acronyms (Continued)

Acronym	Expansion
CSPF	constrained shortest path first
C-TAG	customer VLAN tag
CV	connection verification customer VLAN (tag)
CW	control word
DC	direct current
DC-C	DC return - common
DCE	data communications equipment
DC-I	DC return - isolated
DCO	digitally controlled oscillator
DCR	differential clock recovery
DDoS	distributed DoS
DE	discard eligibility
DES	data encryption standard
DF	do not fragment
DHB	decimal, hexadecimal, or binary
DHCP	dynamic host configuration protocol
DHCPv6	dynamic host configuration protocol for IPv6
DIS	designated intermediate system
DLCI	data link connection identifier
DLCMI	data link connection management interface
DM	delay measurement
DNAT	destination network address translation
DNS	domain name server
DoS	denial of service

Table 46: Acronyms (Continued)

Acronym	Expansion
dot1p	IEEE 802.1p bits, in Ethernet or VLAN ingress packet headers, used to map traffic to up to eight forwarding classes
dot1q	IEEE 802.1q encapsulation for Ethernet interfaces
DPI	deep packet inspection
DPLL	digital phase locked loop
DSCP	differentiated services code point
DSL	digital subscriber line
DSLAM	digital subscriber line access multiplexer
DTE	data termination equipment
DU	downstream unsolicited
DUID	DHCP unique identifier
DV	delay variation
e911	enhanced 911 service
EAP	Extensible Authentication Protocol
EAPOL	EAP over LAN
E-bit	ending bit (last packet of a fragment)
ECMP	equal cost multi-path
EFM	Ethernet in the first mile
EGP	exterior gateway protocol
EIA/TIA-232	Electronic Industries Alliance/ Telecommunications Industry Association Standard 232 (also known as RS-232)
EIR	excess information rate
ELER	egress label edge router

Table 46: Acronyms (Continued)

Acronym	Expansion
E&M	ear and mouth earth and magneto exchange and multiplexer
Epipe	Ethernet VLL
EPL	Ethernet private line
EPS	equipment protection switching
ERO	explicit route object
ESD	electrostatic discharge
ESMC	Ethernet synchronization message channel
ETE	end-to-end
ETH-CFM	Ethernet connectivity fault management (IEEE 802.1ag)
EVDO	evolution - data optimized
EVPL	Ethernet virtual private link
EXP bits	experimental bits (currently known as TC)
FC	forwarding class
FCS	frame check sequence
FD	frequency diversity
FDB	forwarding database
FDL	facilities data link
FEAC	far-end alarm and control
FEC	forwarding equivalence class
FECN	forward explicit congestion notification
FF	fixed filter
FIB	forwarding information base
FIFO	first in, first out
FNG	fault notification generator

Table 46: Acronyms (Continued)

Acronym	Expansion
FOM	figure of merit
Fpipe	frame relay VLL
FR	frame relay
FRG bit	fragmentation bit
FRR	fast reroute
FTN	FEC-to-NHLFE
FTP	file transfer protocol
FXO	foreign exchange office interface
FXS	foreign exchange subscriber interface
GFP	generic framing procedure
GigE	Gigabit Ethernet
GPON	Gigabit Passive Optical Network
GRE	generic routing encapsulation
GSM	Global System for Mobile Communications (2G)
HA	high availability
HCM	high capacity multiplexing
HDB3	high density bipolar of order 3
HDLC	high-level data link control protocol
HEC	header error control
HMAC	hash message authentication code
Hpipe	HDLC VLL
HSB	hot standby
HSDPA	high-speed downlink packet access
HSPA	high-speed packet access
HVPLS	hierarchical virtual private line service

Table 46: Acronyms (Continued)

Acronym	Expansion
IANA	internet assigned numbers authority
IBN	isolated bonding networks
ICMP	Internet control message protocol
ICMPv6	Internet control message protocol for IPv6
ICP	IMA control protocol cells
IEEE	Institute of Electrical and Electronics Engineers
IEEE 1588v2	Institute of Electrical and Electronics Engineers standard 1588-2008
IES	Internet Enhanced Service
IETF	Internet Engineering Task Force
IGP	interior gateway protocol
ILER	ingress label edge router
ILM	incoming label map
IMA	inverse multiplexing over ATM
INVARP	inverse address resolution protocol
IOM	input/output module
IP	Internet Protocol
IPCP	Internet protocol control protocol
IPIP	IP in IP
Ipipe	IP interworking VLL
IPoATM	IP over ATM
IPSec	IP Security
IS-IS	Intermediate System-to-Intermediate System
IS-IS-TE	IS-IS-traffic engineering (extensions)
ISO	International Organization for Standardization

Table 46: Acronyms (Continued)

Acronym	Expansion
IW	interworking
LB	loopback
lbf-in	pound force inch
LBM	loopback message
LBO	line buildout
LBR	loopback reply
LCP	link control protocol
LDP	label distribution protocol
LER	label edge router
LFIB	label forwarding information base
LIB	label information base
LLDP	link layer discovery protocol
LLDPDU	link layer discovery protocol data unit
LLF	link loss forwarding
LLID	loopback location ID
LM	loss measurement
LMI	local management interface
LSA	link-state advertisement
LSDB	link-state database
LSP	label switched path link-state PDU (for IS-IS)
LSR	label switch router link-state request
LSU	link-state update
LT	linktrace
LTE	line termination equipment
LTM	linktrace message

Table 46: Acronyms (Continued)

Acronym	Expansion
LTN	LSP ID to NHLFE
LTR	linktrace reply
MA	maintenance association
MAC	media access control
MA-ID	maintenance association identifier
MBB	make-before-break
MBS	maximum buffer space maximum burst size media buffer space
MBSP	mobile backhaul service provider
MC-MLPPP	multi-class multilink point-to-point protocol
MD	maintenance domain
MD5	message digest version 5 (algorithm)
MDA	media dependent adapter
MDDDB	multidrop data bridge
MDL	maintenance data link
ME	maintenance entity
MED	multi-exit discriminator
MEF	Metro Ethernet Forum
MEG	maintenance entity group
MEG-ID	maintenance entity group identifier
MEN	Metro Ethernet network
MEP	maintenance association end point
MFC	multi-field classification
MHF	MIP half function
MIB	management information base

Table 46: Acronyms (Continued)

Acronym	Expansion
MIR	minimum information rate
MLPPP	multilink point-to-point protocol
MP	merge point multilink protocol
MP-BGP	multiprotocol border gateway protocol
MPLS	multiprotocol label switching
MPLSCP	multiprotocol label switching control protocol
MPR	see 9500 MPR
MPR-e	microwave packet radio-standalone mode
MPT	microwave packet transport
MPT-HC V2/9558HC	microwave packet transport, high capacity version 2
MPT-MC	microwave packet transport, medium capacity
MPT-XP	microwave packet transport, high capacity (very high power version of MPT-HC V2/9558HC)
MRRU	maximum received reconstructed unit
MRU	maximum receive unit
MSDU	MAC Service Data Unit
MS-PW	multi-segment pseudowire
MTIE	maximum time interval error
MTSO	mobile trunk switching office
MTU	maximum transmission unit multi-tenant unit
M-VPLS	management virtual private line service
MW	microwave

Table 46: Acronyms (Continued)

Acronym	Expansion
MWA	microwave awareness
N·m	newton meter
NAT	network address translation
NBMA	non-broadcast multiple access (network)
NE	network element
NERC	North American Electric Reliability Corporation
NERC-CIP	NERC-Critical Infrastructure Protection
NET	network entity title
NHLFE	next hop label forwarding entry
NHOP	next-hop
NLPID	network level protocol identifier
NLRI	network layer reachability information
NNHOP	next next-hop
NNI	network-to-network interface
Node B	similar to BTS but used in 3G networks — term is used in UMTS (3G systems) while BTS is used in GSM (2G systems)
NPAT	network and port address translation
NSAP	network service access point
NSP	native service processing
NSSA	not-so-stubby area
NTP	network time protocol
NTR	network timing reference
OAM	operations, administration, and maintenance
OAMPDU	OAM protocol data units

Table 46: Acronyms (Continued)

Acronym	Expansion
OC3	optical carrier level 3
OLT	optical line termination
ONT	optical network terminal
OPX	off premises extension
ORF	outbound route filtering
OS	operating system
OSI	Open Systems Interconnection (reference model)
OSINLCP	OSI Network Layer Control Protocol
OSPF	open shortest path first
OSPF-TE	OSPF-traffic engineering (extensions)
OSS	operations support system
OSSP	organization specific slow protocol
OTP	one time password
OWAMP	one-way active measurement protocol
PADI	PPPoE active discovery initiation
PADR	PPPoE active discovery request
PAE	port authentication entities
PBX	private branch exchange
PCP	priority code point
PCR	proprietary clock recovery
PDU	protocol data units
PDV	packet delay variation
PDVT	packet delay variation tolerance
PE	provider edge router
PEAPv0	protected extensible authentication protocol version 0

Table 46: Acronyms (Continued)

Acronym	Expansion
PFoE	power feed over Ethernet
PHB	per-hop behavior
PHY	physical layer
PID	protocol ID
PIR	peak information rate
PLCP	Physical Layer Convergence Protocol
PLR	point of local repair
PNAT	allocated port network address translation
PoE	power over Ethernet
POP	point of presence
POS	packet over SONET
PPP	point-to-point protocol
PPPoE	point-to-point protocol over Ethernet
PPS	pulses per second
PRC	primary reference clock
PSN	packet switched network
PSNP	partial sequence number PDU
PTM	packet transfer mode
PTP	performance transparency protocol precision time protocol
PVC	permanent virtual circuit
PVCC	permanent virtual channel connection
PW	pseudowire
PWE	pseudowire emulation
PWE3	pseudowire emulation edge-to-edge
Q.922	ITU-T Q-series Specification 922

Table 46: Acronyms (Continued)

Acronym	Expansion
QL	quality level
QoS	quality of service
RADIUS	Remote Authentication Dial In User Service
RAN	Radio Access Network
RBS	robbed bit signaling
RD	route distinguisher
RDI	remote defect indication
RED	random early discard
RESV	reservation
RIB	routing information base
RJ-45	registered jack 45
RNC	Radio Network Controller
RPS	radio protection switching
RR	round robin
RRO	record route object
RS-232	Recommended Standard 232 (also known as EIA/TIA-232)
RSHG	residential split horizon group
RSTP	rapid spanning tree protocol
RSVP-TE	resource reservation protocol - traffic engineering
RT	receive/transmit
RTM	routing table manager
RTN	battery return
RTP	real-time protocol
R&TTE	Radio and Telecommunications Terminal Equipment

Table 46: Acronyms (Continued)

Acronym	Expansion
RTU	remote terminal unit
RU	rack unit
SAA	service assurance agent
SAP	service access point
SAR-8	7705 Service Aggregation Router - 8-slot chassis
SAR-18	7705 Service Aggregation Router - 18-slot chassis
SAR-F	7705 Service Aggregation Router - fixed form-factor chassis
SAR-H	7705 Service Aggregation Router - temperature- and EMC-hardened to the following specifications: IEEE 1613 and IEC 61850-3
SAR-M	7705 Service Aggregation Router - four variants: <ul style="list-style-type: none"> • actively cooled chassis with 16 T1/E1 ports, 7 Ethernet ports, and 1 hot-insertable module slot • actively cooled chassis with 0 T1/E1 ports, 7 Ethernet ports, and 1 hot-insertable module slot • passively cooled chassis with 16 T1/E1 ports, 7 Ethernet ports, and 0 module slots • passively cooled chassis with 0 T1/E1 ports, 7 Ethernet ports, and 0 module slots
SAToP	structure-agnostic TDM over packet
SCADA	surveillance, control and data acquisition
SCP	secure copy
SD	signal degrade
SDH	synchronous digital hierarchy

Table 46: Acronyms (Continued)

Acronym	Expansion
SDI	serial data interface
SDP	service destination point
SE	shared explicit
SF	signal fail
SFP	small form-factor pluggable (transceiver)
SGT	self-generated traffic
SHA-1	secure hash algorithm
SHG	split horizon group
SIR	sustained information rate
SLA	Service Level Agreement
SLARP	serial line address resolution protocol
SLID	subscriber location identifier of a GPON module
SNMP	Simple Network Management Protocol
SNPA	subnetwork point of attachment
SNR	signal to noise ratio
SNTP	simple network time protocol
SONET	synchronous optical networking
SNAT	source network address translation
S-PE	switching provider edge router
SPF	shortest path first
SPT	shortest path tree
SR	service router (includes 7710 SR, 7750 SR)
SRLG	shared risk link group
SSH	secure shell
SSM	synchronization status messaging

Table 46: Acronyms (Continued)

Acronym	Expansion
SSU	system synchronization unit
S-TAG	service VLAN tag
STM1	synchronous transport module, level 1
STP	spanning tree protocol
SVC	switched virtual circuit
SYN	synchronize
TACACS+	Terminal Access Controller Access-Control System Plus
TC	traffic class (formerly known as EXP bits)
TCP	transmission control protocol
TDEV	time deviation
TDM	time division multiplexing
TE	traffic engineering
TFTP	trivial file transfer protocol
TLDP	targeted LDP
TLS	transport layer security
TLV	type length value
TM	traffic management
ToS	type of service
T-PE	terminating provider edge router
TPID	tag protocol identifier
TPIF	IEEE C37.94 teleprotection interface
TPMR	two-port MAC relay
TPR	teleprotection relay
TPS	transmission protection switching
TTL	time to live

Table 46: Acronyms (Continued)

Acronym	Expansion
TTLS	tunneled transport layer security
TTM	tunnel table manager
TWAMP	two-way active measurement protocol
U-APS	unidirectional automatic protection switching
UBR	unspecified bit rate
UDP	user datagram protocol
UMTS	Universal Mobile Telecommunications System (3G)
UNI	user-to-network interface
V.11	ITU-T V-series Recommendation 11
V.24	ITU-T V-series Recommendation 24
V.35	ITU-T V-series Recommendation 35
VC	virtual circuit
VCC	virtual channel connection
VCCV	virtual circuit connectivity verification
VCI	virtual circuit identifier
VID	VLAN ID
VLAN	virtual LAN
VLL	virtual leased line
VoIP	voice over IP
Vp	peak voltage
VP	virtual path
VPC	virtual path connection
VPI	virtual path identifier
VPLS	virtual private LAN service
VPN	virtual private network

Table 46: Acronyms (Continued)

Acronym	Expansion
VPRN	virtual private routed network
VRF	virtual routing and forwarding table
VSE	vendor-specific extension
VSO	vendor-specific option
VT	virtual trunk
WCDMA	wideband code division multiple access (transmission protocol used in UMTS networks)
WRED	weighted random early discard
WRR	weighted round robin
WTR	wait to restore
X.21	ITU-T X-series Recommendation 21

List of Acronyms

Standards and Protocol Support



Note: For specific Safety, EMC, Power Utility, Railway, Environmental, and Telecom compliance information for individual 7705 SAR platforms, refer to the Compliance section of the relevant chassis installation guide.

Safety

- AS/NZS 60950-1—Safety of information technology equipment including electrical business equipment
- CSA 60950-1-07—Information Technology Equipment - Safety - Part 1: General Requirements (Bi-National standard, with UL 60950-1)
- EN 60950-1:2006—Information technology equipment. Safety. General requirements
- FDA CDRH 21-CFR 1040—PART 1040 Performance Standards for Light-Emitting Products
- IEC 60825-1—Safety of laser products - Part 1: Equipment Classification and Requirements
- IEC 60825-2—Safety of laser products - Part 2: Safety of optical fibre communication systems (OFCS)
- IEC 60950-1—Information technology equipment - Safety - Part 1: General requirements
- UL 60950-1—UL Standard for Safety of Information Technology Equipment
- IEC 60529—Degree of Protection Provided by Enclosures (IP Code)

EMC

- AS/NZS CISPR 22:2009—Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
- CISPR 22:2005 + A1:2006—Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
- EN55022 2006 + A1:2007—Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
- EN 300 386 v1.6.1—Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Telecommunication network equipment; ElectroMagnetic Compatibility (EMC) requirements
- FCC Part 15— “RADIO FREQUENCY DEVICES”, Code of Federal Regulations, Title 47 -- Telecommunication, Chapter I – Federal Communications Commission, Part 15 – Radio Frequency Devices, 47CFR15
- ICES-003—Spectrum Management and Telecommunications – Interference-Causing Equipment Standard – Information Technology Equipment (ITE) — Limits and methods of measurement
- ITU-T K.20—Resistibility of Telecommunication Equipment Installed in a Telecommunications Centre to Overvoltages and Overcurrents

Power Utility Substation

- (Applies to Alcatel-Lucent 7705 SAR-8 and 7705 SAR-H; the 7705 SAR-8 and 7705 SAR-8 v2 chassis use fans and require a DC surge protection kit (part number 3HE07771AA) for compliance)**
- IEEE 1613:2009—Environmental and Testing Requirements for Communications Networking Devices Installed in Electric Power Substations
- IEC 61850-3—Communication networks and systems in substations - Part 3: General requirements (hazardous substances exception; for example, sea salt mist, oil)
- AS60870.2.1—Telecontrol equipment and systems - Part 2.1: operating conditions - Power supply and electromagnetic compatibility
- IEC TS 61000-6-5—EMC - Generic Standards - Immunity of power substations and substation environments

Standards and Protocol Support

IEC 60255-21-1/2/3 (Class 1)—Vibration, shock, bump and seismic test on measuring relays and protection equipment

Railway

(Applies to Alcatel-Lucent 7705 SAR-8, 7705 SAR-H, and 7705 SAR-M)

EN 50121-4—Emission and Immunity of signalling and telecommunications apparatus

Environmental

ATT-TP-76200—Network Equipment Power, Grounding, Environmental, and Physical Design Requirements

ETSI EN 300 019-2-1 (Class 1.2)—Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-1: Specification of environmental tests; Storage

ETSI EN 300 019-2-2 (Class 2.3)—Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-2: Specification of environmental tests; Transportation

ETSI EN 300 019-2-3 (Class 3.2)—Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-3: Specification of environmental tests; Stationary use at weather protected locations

ETSI EN 300 132-2—Power Supply Interface at the input to telecommunication equipment; Part 2: operated by direct current

ETSI EN 300 132-3-2—Environmental Engineering (EE); Power supply interface at the input to telecommunications and datacom (ICT) equipment; Part 3: Operated by rectified current source

ETSI 300 753 (Class 3.2)—Equipment Engineering (EE); Acoustic noise emitted by telecommunications equipment

Telcordia GR-63-CORE—NEBS Requirements: Physical Protection

Telcordia GR-1089-CORE—Electromagnetic Compatibility (EMC) and Electrical Safety – Generic Criteria for Network Telecommunications Equipment

Verizon VZ-TPR-9305—Verizon NEBSTM Compliance: NEBS Compliance Clarification Document Verizon Technical Purchasing Requirements

Telecom

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ANSI/TIA/EIA-232-F—Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange

ANSI/TIA/EIA-422-B—Electrical Characteristics of Balanced Digital Interface Circuits, Electronic Industries Association Engineering Department. Washington D.C. 1994

AS/ACIF S016 (Australia/New Zealand)—Requirements for Customer Equipment for connection to hierarchical digital interfaces

IC CS-03—Spectrum Management and Telecommunications

IEEE 802.1ag—Service Layer OAM

IEEE 802.1p/q—VLAN Tagging

IEEE 802.3—10BaseT

IEEE 802.3ah—Ethernet OAM

IEEE 802.3at—PoE, PoE+

IEEE 802.3u—100BaseTX

IEEE 802.3x —Flow Control

IEEE 802.3z—1000BaseSX/LX

IEEE 802.3—Revised base standard

IEEE 802.1AX—Link Aggregation Task Force (transferred from IEEE 802.3ad)

IEEE C37.94—N Times 64 Kilobit Per Second Optical Fiber Interfaces Between Teleprotection and Multiplexer Equipment

ITU-T G.703—Physical/electrical characteristics of hierarchical digital interfaces

ITU-T G.704—Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s hierarchical levels

ITU-T G.707—Network node interface for the Synchronous Digital Hierarchy (SDH)

ITU-T G.712—Transmission performance characteristics of pulse code modulation channels

ITU-T G.957—Optical interfaces for equipments and systems relating to the synchronous digital hierarchy

ITU-T G.984.1—Gigabit-capable passive optical networks (GPON): general characteristics

ITU-T V.11 (RS-422)—V.11/X.27 Electrical characteristics for balanced double-current interchange circuits operating at data signalling rates up to 10 Mbit/s

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ITU-T V.36—Modems for synchronous data transmission using 60-108 kHz group band circuits

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ITU-T Y.1731—OAM functions and mechanisms for Ethernet-based networks

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GR-1113-CORE—Bellcore, Asynchronous Transfer Mode (ATM) and ATM Adaptation Layer (AAL) Protocols Generic Requirements, Issue 1, July 1994

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BGP

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RFC 4724—Graceful Restart Mechanism for BGP - GR Helper

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DIFFERENTIATED SERVICES

RFC 2474—Definition of the DS Field in the IPv4 and IPv6 Headers

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RFC 2598—An Expedited Forwarding PHB

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DIGITAL DATA NETWORK MANAGEMENT

V.35

RS-232 (also known as EIA/TIA-232)

X.21

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ITU-T G.998.2—SHDSL 4-pair EFM bonding

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FRF.1.2—PVC User-to-Network Interface (UNI) Implementation Agreement

FRF.12—Frame Relay Fragmentation Implementation Agreement

RFC 2427—Multiprotocol Interconnect over Frame Relay

GRE

RFC 2784—Generic Routing Encapsulation (GRE)

IPv6

RFC 2460—Internet Protocol, Version 6 (IPv6) Specification

RFC 2462—IPv6 Stateless Address Autoconfiguration

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RFC 3587—IPv6 Global Unicast Address Format

RFC 3595—Textual Conventions for IPv6 Flow Label

RFC 4007—IPv6 Scoped Address Architecture

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RFC 4205 for Shared Risk Link Group (SRLG) TLV draft-ietf-isis-igp-p2p-over-lan-05.txt

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 RFC 3412—Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)
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 RFC 2328—OSPF Version 2
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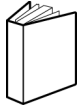
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Customer documentation and product support



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