Appendix A
Network Monitoring

This chapter provides a general overview of monitoring tools supported on HP routing switches. Configuration examples are provided using the CLI and Web management interfaces.

Monitoring a System

RMON

All HP routing switches come standard with an RMON agent that supports the following groups:

- Statistics (RMON Group 1)
- History (RMON Group 2)
- Alarm (RMON Group 3)
- Event (RMON Group 4)

The CLI allows the user to make configurations changes to the control data for these groups but the user needs a separate RMON application to view and display the data graphically.

Statistics (RMON Group 1)

Count information on multicast and broadcast packets, total packets sent, undersized and oversized packets, CRC alignment errors, jabbers, collision, fragments and dropped events is collected for each port on an HP routing switch.

No configuration is required of the user to activate collection of statistics for the routing switch. This activity is by default automatically activated at system start-up.

USING THE CLI

The user can view a textual summary of the statistics for all ports by entering the following CLI command:

syntax: `show rmon statistics`

NOTE: To see RMON statistics for an individual port only, the user should enter the following command noting a specific port entry number, the user would enter the ***show rmon statistics <port entry#>*** command.

USING THE WEB MANAGEMENT INTERFACE

To view the RMON statistics for the system, the user would do the following:

1. Select the show link from the view menu. The show panel will appear.
2. Select the RMON statistics link. The panel shown in **Figure A.1** will appear.

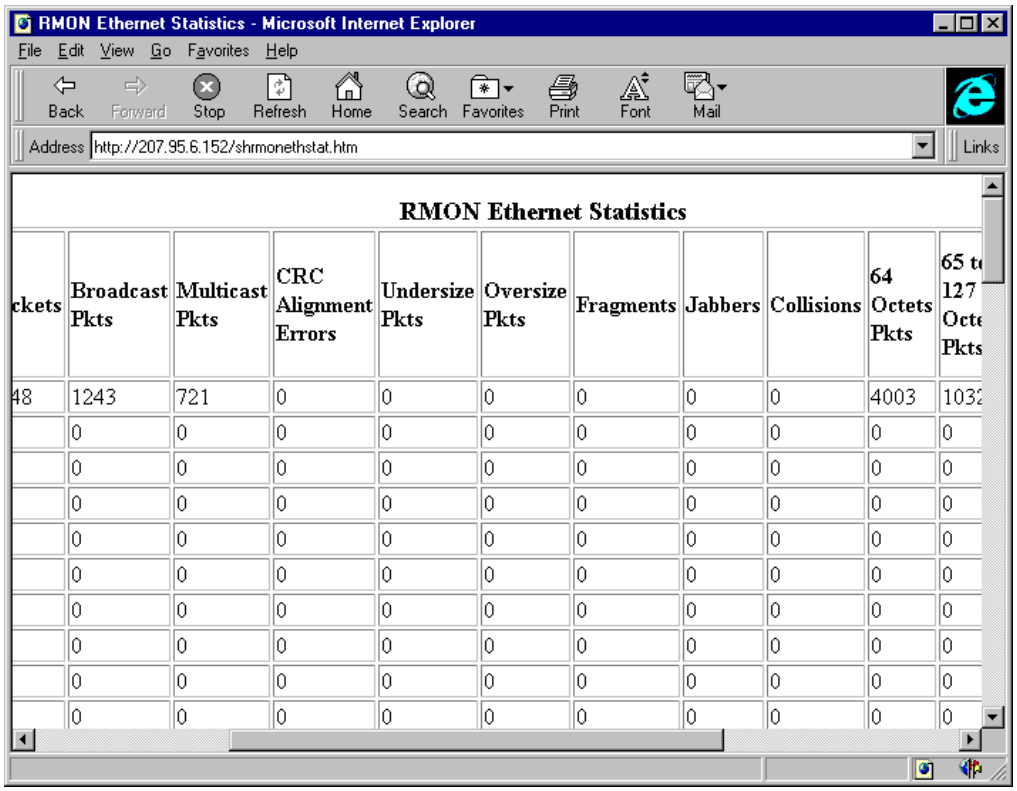


Figure A.1 Show RMON statistics display (partial view)

To see RMON statistics for an individual port only, the user should enter the following command noting a specific port entry number, as seen below:

USING THE CLI

syntax: `show rmon statistics <port entry#>`

NOTE: The number of entries in a RMON statistics table directly corresponds to the number of ports on a system, e.g. if the system is a 26 port device, there will be 26 entries in the statistics display.

USING THE WEB MANAGEMENT INTERFACE

This display is not supported on the Web management interface.

History (RMON Group 2)

All active ports by default will generate two history control data entries per active routing switch interface. An active port is defined as one with a link up. Should the link go down the two entries will automatically be deleted.

The two history entries that will be generated per system are:

- a sampling of statistics every 30 seconds, and
- a sampling of statistics every 30 minutes.

The history data can be accessed and displayed via any of the popular RMON applications

USING THE CLI

A sample RMON history entry and its syntax is shown below:

```
HP9300 (config)# rmon history 1 interface 1 buckets 10 interval 10 owner nyc02
```

syntax: rmon history <entry number> interface <port #> buckets <number> interval <sampling interval> owner <text string>

The user can modify the sampling interval and the bucket (number of entries saved before overwrite) via the CLI. In the above example, owner refers to the RMON station that will request the information.

NOTE: To review the control data entry for each port or interface, the user can enter the ***show rmon history*** command.

USING THE WEB MANAGEMENT INTERFACE

This display is not supported on the Web management interface.

Alarm (RMON Group 3)

Alarm is designed to monitor configured thresholds for any SNMP integer, time tick, gauge or counter MIB object. With CLI, the user can define what MIB objects are monitored, what type of thresholds will be monitored (falling, rising or both), the value of those thresholds and the sample type (absolute or delta).

An alarm event will be reported each time that a threshold is exceeded. The alarm entry also indicates the action (event) to take should the threshold be exceeded.

USING THE CLI

A sample CLI alarm entry and its syntax is shown below:

```
rmon alarm 1 ifInOctets.6 10 delta rising-threshold 100 1 falling threshold 50 1
owner nyc02
```

syntax: rmon alarm <entry number> <MIB object.interface #> <sampling time> <sample type> <threshold type> <threshold value> <event number> <threshold type> <threshold value> <event number> owner <text>

USING THE WEB MANAGEMENT INTERFACE

This display is not supported on the Web management interface.

Event (RMON Group 4)

There are two elements to the Event Group—the **event control table** and the **event log table**.

The event control table defines the action to be taken when an alarm is reported. Defined events can be found by entering the CLI command, **show event**. The **Event Log Table** collects and stores reported events for retrieval by an RMON application.

USING THE CLI

A sample entry and syntax of the event control table is shown below:

```
rmon event 1 description ‘testing a longer string’ log-and-trap public owner nyc02
```

syntax: rmon event <event entry> description <text string> <log | trap | log -and-trap> owner <RMON station>

USING THE WEB MANAGEMENT INTERFACE

This display is not supported on the Web management interface.

SNMP System Log

SNMP traps can be saved locally on a switch or routing switch for later review. Up to 100 entries can be saved and the default setting is 50 entries. This feature must be enabled on the system.

USING THE CLI

To enable system logging and specify a log size of 70, the user would enter the following commands:

```
HP9300(config)# logging on
HP9300(config)# logging 70
```

syntax: logging <on | off >

To view the system log, the user would enter the following:

NOTE: The user can later view traps saved locally by entering the ***show logging*** command.

USING THE WEB MANAGEMENT INTERFACE

To enable the system log on the system, the user would do the following:

1. Select the system log from the main menu. The panel seen in **Figure A.2** will appear.
2. Enable **logging**.
3. Enter the **buffer size**
4. Enter the **IP address** of the server collecting the event log.
5. Select the type of **facility** from the pull down menu.
6. Select the type of SNMP traps that to be saved to the SNMP log by selecting the box next to the **accept severity** entry.

To view the entries in the system log, the user would do the following:

1. Select the show link from the main menu.
2. Select the system log link from the panel that appears.

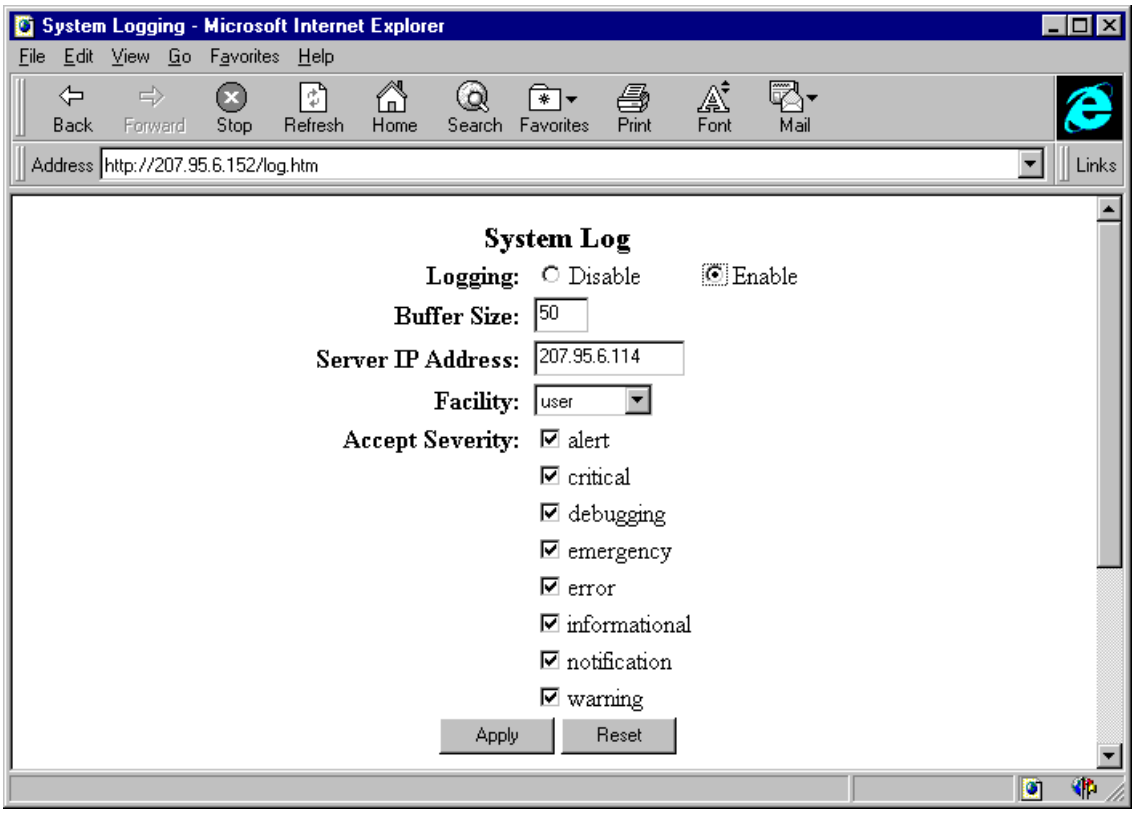


Figure A.2 Enabling and defining the SNMP trap types to be collected

Trace Route and Stop Trace Route

A user can initiate and stop a trace of a route on an HP routing switch. The two CLI commands associated with this feature are listed below:

- ***stop-traceroute***
- ***traceroute***

Trace Route

The user can trace a path from the current HP routing switch to a host address by initiating the trace route option. The maximum and minimum number of hops to be traversed and a time-out value for the route trace can also be defined.

USING THE CLI

```
HP9300> trace-route 192.33.4.7 minttl 5 maxttl 5 timeout 5
```

syntax: trace-route <host IP address> [minttl <value> maxttl <value> timeout <value>]

Possible and default values:

- Minttl-minimum TTL (hops) value: 1 to 255. The default value is 1 second.
- Maxttl-maximum TTL (hops) value:1 to 255. The default value is 30 seconds.
- Timeout value: 1 to 120. The default value is 2 seconds.

USING THE WEB MANAGEMENT INTERFACE

To initiate a trace:

1. Select the traceroute link from the main menu.
2. Enter the **IP address** of the destination device.
3. Enter how long the trace will be in effect by defining the **minimum** and **maximum TTL** values.
4. Define a **timeout** value between 1 and 120.
5. Select the **start** button to begin the trace. The results of the trace route will display on the screen.

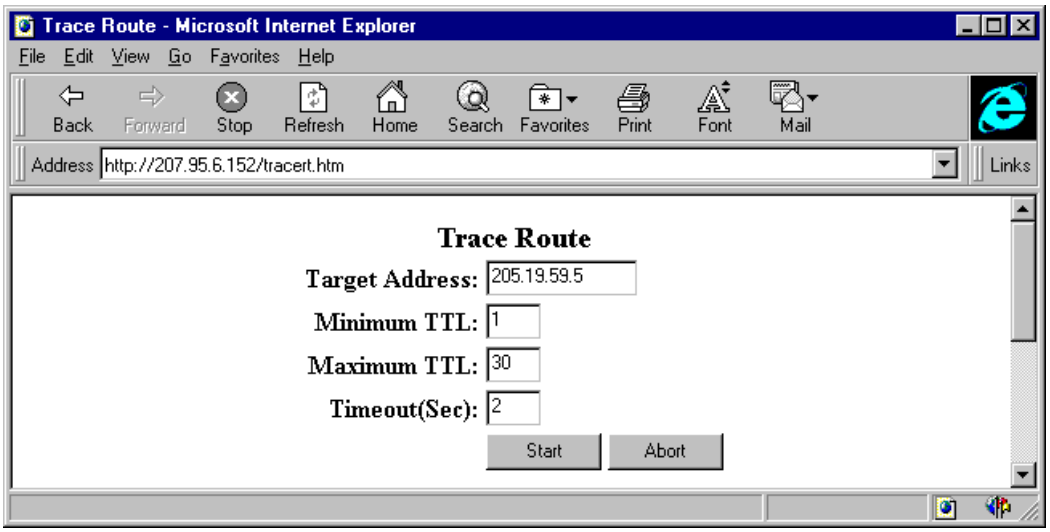


Figure A.3 Trace route entry panel

Stop Trace Route

Stops an initiated trace on an HP routing switch.

USING THE CLI

To stop a trace route on a system, the user would enter the following:

```
HP9300> stop-traceroute
```

***syntax**:* stop-traceroute

USING THE WEB MANAGEMENT INTERFACE

To stop a trace route on a system, the user would do the following:

1. Select the trace route link from the main menu. The trace route panel shown in **Figure A.3** will appear.
2. Select the **abort** button.

Viewing System Summary Information

There are configuration summaries for routing switches—**Configuration** and **Operation**. These summaries display many of the same parameters, yet it is the status of the configuration that is different.

The **operation** screen displays the configuration that is currently running on the routing switch. It lists all of the parameters seen in the configuration screen plus an expanded Spanning Tree summary showing—root cost, root priority, hold time and forwarding delay.

The **configuration** summary screen reflects configuration changes that will become active upon reset of the system. The general configuration data may differ from that displayed in the operation screen if recent changes made to the system configuration have not been saved to flash.

USING THE CLI

To access the operating and configuration information for a routing switch, the user would enter:

- the ***write terminal*** command to view the configured system configuration.
- the ***show configuration*** command to view the running (operating) configuration.

USING THE WEB MANAGEMENT INTERFACE

To define what is shown in the system configuration and operation summary screens, the user would do the following:

- Select the summary link from the menu. The panel shown in **Figures A.4** will appear.
- Select the type of summary to display, either **configuration** or **operation**.
- Check the box next to those items to be displayed in the summary
- Select the **apply** button. The information will display on the screen.

NOTE: To display all options, even those that may not be selected, select the **get all** button.

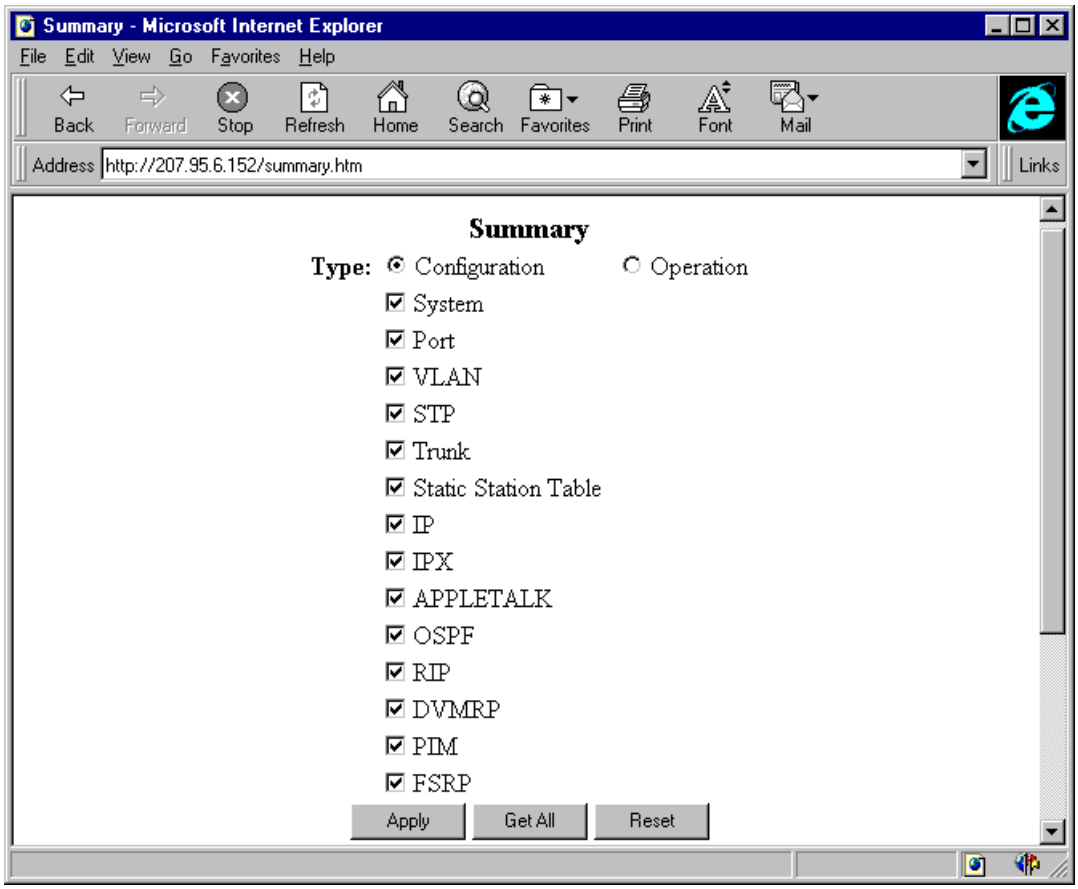


Figure A.4 Summary panel for a routing switch

Viewing System Information

The user can also access software and hardware specifics for an HP routing switch.

USING THE CLI

To view the software and hardware details for the system, the user would enter the following:

```
HP9300# show version
  SW: Version 4.2.00T43 Copyright (c) 1996-1998 HP
      Compiled on Oct 14 1998 at 23:37:06 labeled as R0420013
  HW: Chassis HP9300HP
==========================================================================
SL 1: 8 Port Gig Management Module
 2048 KB BRAM, SMC versin 1, ICBM version 20
  384 KB PRAM(256K+128K) and 2048*8 CAM entries for DMA  0, version 0206
  384 KB PRAM(256K+128K) and shared CAM entries for DMA  1, version 0206
  384 KB PRAM(256K+128K) and 2048*8 CAM entries for DMA  2, version 0206
  384 KB PRAM(256K+128K) and shared CAM entries for DMA  3, version 0206
==========================================================================
```

```
SL 2: 8 Port Gig Module
 2048 KB BRAM, SMC versin 1, ICBM version 20
  384 KB PRAM(256K+128K) and 2048*8 CAM entries for DMA  4, version 0206
  384 KB PRAM(256K+128K) and shared CAM entries for DMA  5, version 0206
  384 KB PRAM(256K+128K) and 2048*8 CAM entries for DMA  6, version 0206
  384 KB PRAM(256K+128K) and shared CAM entries for DMA  7, version 0206
==========================================================================
  240 MHz Power PC processor 603 (revision 7) 66 MHz bus
  128 KB boot flash memory
 4096 KB code flash memory
  512 KB SRAM
32756 KB DRAM
--More--, next page: Space/Return key, quit: Control-c
```

syntax: show version

USING THE WEB MANAGEMENT INTERFACE

1. Verify that the front panel display is visible on the web management interface display. If not, select the frame: enable link from the main menu. This will display the screen with a side panel, front panel and configuration panel as shown in **Figure A.5**.
2. Double-click anywhere on the routing switch front panel display. The device information panel will appear.

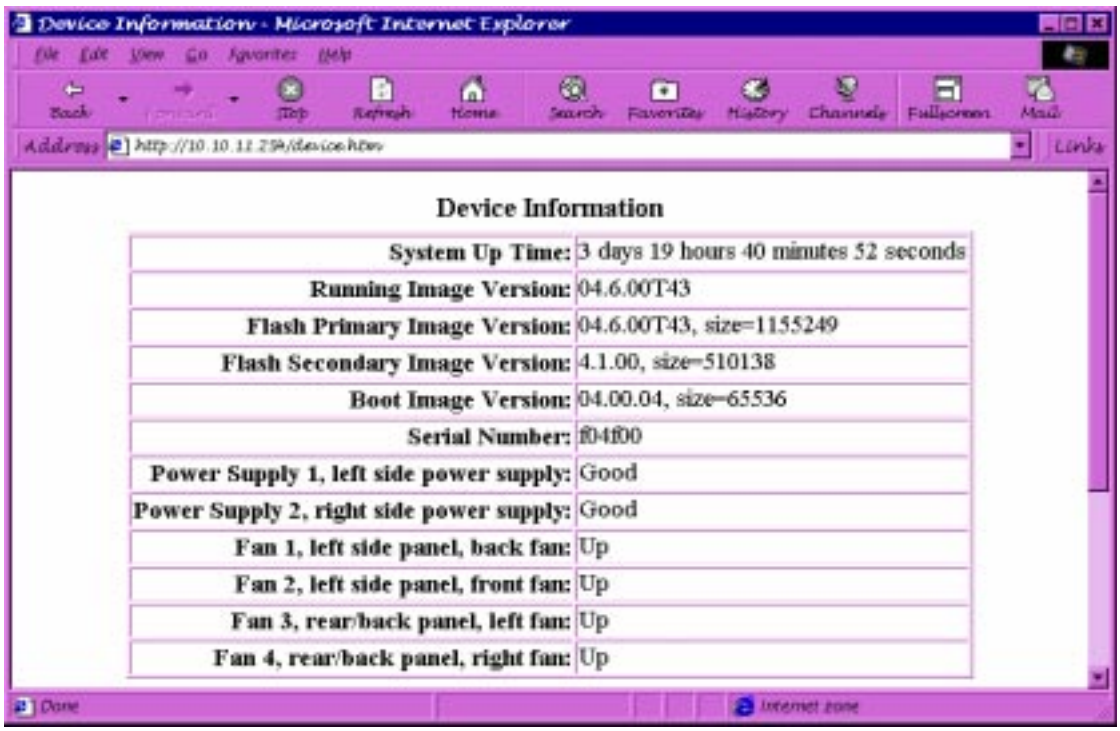


Figure A.5 System information for a routing switch

Viewing Configurations

The user can view a variety of configuration details and statistics with the **show** option. The show option provides a convenient way to check configuration changes before saving them to flash.

The show options available will vary for routing switches and by configuration level.

USING THE CLI

To determine the available show commands for the system or a specific level of the CLI, the user would enter the following:

```
HP9300# show ?
```

syntax: show <option>

NOTE: For a complete summary of all available ***show...*** CLI commands and their displays, refer to **Appendix B**.

USING THE WEB MANAGEMENT INTERFACE

1. Select the show link from the main menu. The panel shown in **Figure A.6** will appear.
2. Select the link that corresponds to the desired configuration information. A summary panel will appear on the screen.

NOTE: Only those protocols active on the routing switch will display options on the show panel.

NOTE: A summary of available show panels for the Web management interface is summarized in the next section.

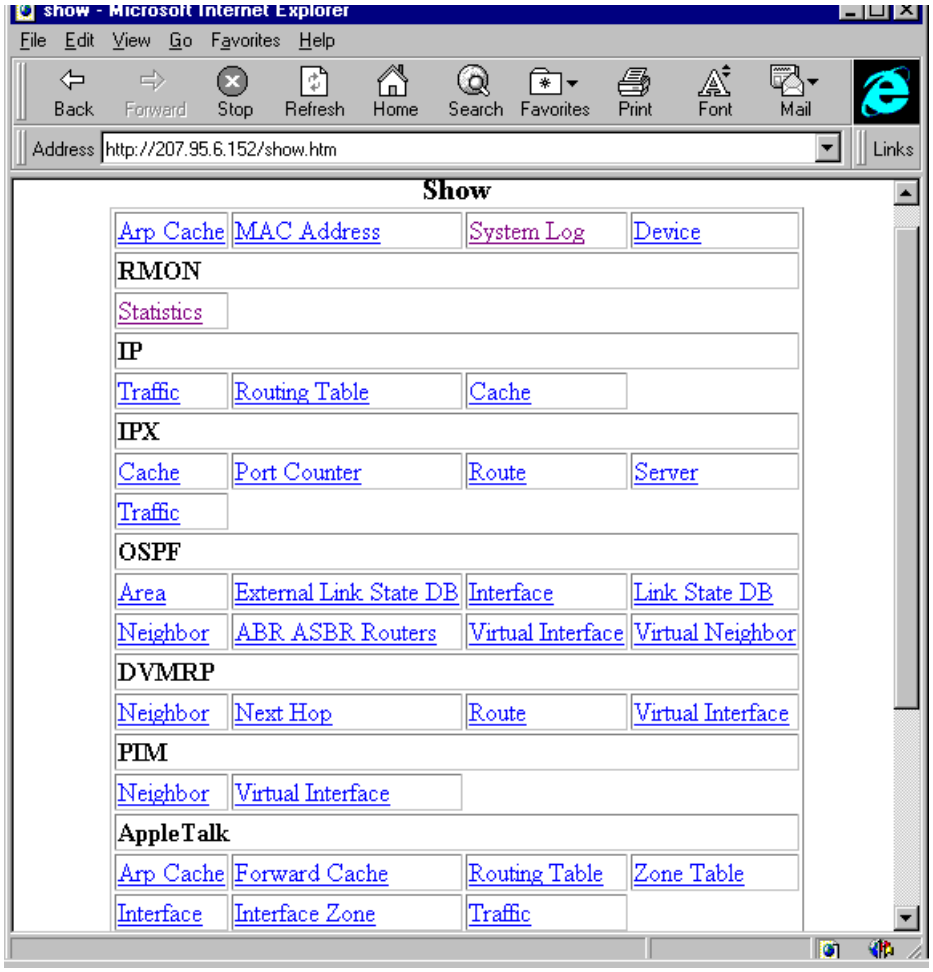


Figure A.6 Show panel for a routing switch

Overview of Show Panel Options

Show ARP cache: Displays the ARP cache of the routing switch noting port type, aging time and resident port.

MAC address link: Displays all MAC addresses resident on a routing switch.

Routing table: Displays all active IP routes for a routing switch.

IP traffic: Displays packets sent, received and forwarded: fragmented and re-fragmented packets, and filtered packets.

IPX cache: Displays summary by port, network number, forwarding (Next Hop Router), MAC address, out filter status and frame type for a routing switch.

IPX port counter: Displays packets received, sent, forwarded and filtered.

IPX route: Displays active IPX routes noting hop, tick and port.

IPX server: Displays IPX servers defined for the routing switch noting type, network number, node number, socket and name.

IPX traffic: Displays a port summary of total IPX packets forwarded. It also breaks down the packets by transmit and receive. Totals for dropped and filter packets are also shown.

OSPF area: Displays the following information for defined OSPF areas:

- type of area—stub or normal
- cost (for stub area only)
- number of times the SPF (shortest path first) calculation is performed for the area,
- number of area borders within the area
- number of AS boundary routers within the area
- number of link state advertisements (LSA) in the link state database of the area
- sum of LSA checksums in the area

OSPF external interface: Displays external link state advertisements for an OSPF area.

OSPF interface: Displays the following information about OSPF interfaces: state of the interface and additional parameters such as authentication type, hello and dead interval, priority and retransmission interval.

OSPF link state: Displays the router, network, summary and summary ASBR link state advertisements. Status will display a detailed summary and advertise will display a short form.

OSPF neighbor: Displays information about all neighbor routers or a specific neighbor router:

- neighbor router ID
- neighbor IP address
- neighbor state
- number of times the neighbor state changed
- count of packets retransmitted to the neighbor router will be shown.

OSPF route: Displays all active routes noting router ID, type next hop router and interface.

OSPF virtual interface: Displays virtual interfaces on the system noting parameter settings.

OSPF virtual neighbor: Displays the virtual neighbor value for the specified index on a routing switch.

DVMRP neighbor: Displays all neighbor DVMRP routers and the port on which they are resident.

DVMRP next hop: Displays information on next hops for outgoing interfaces.

DVMRP route: Displays network address, mask and gateway and associated IP multicast group membership and ports.

DVMRP virtual interface: Displays statistical counters for DVMRP interfaces.

PIM neighbor: Displays all PIM neighbor routers for physical, virtual and tunnel interfaces noting up time and expiry dead interval.

PIM virtual interface: Lists all active PIM interfaces configured for a routing switch.

Appletalk ARP cache: Displays the ARP table for the AppleTalk routing protocol.

Appletalk forward cache: Displays the forwarding table for the AppleTalk routing protocol.

Appletalk routing table: Displays the global configuration parameters for the AppleTalk routing protocol.

Appletalk zone table: Displays the network numbers and zones learned on the network.

Appletalk interface: Displays the AppleTalk configuration for an individual interface or all interfaces.

Appletalk interface zone: Displays the zones defined on all AppleTalk interfaces.

Appletalk route: Displays the AppleTalk routing table.

Appletalk traffic: Displays statistical information for RTMP, ZIP, AEP, DDP and AARP packets.

Viewing Port Statistics

Port statistics are polled by default every 10 seconds.

USING THE CLI

The user can see statistics for ports by entering the following show commands:

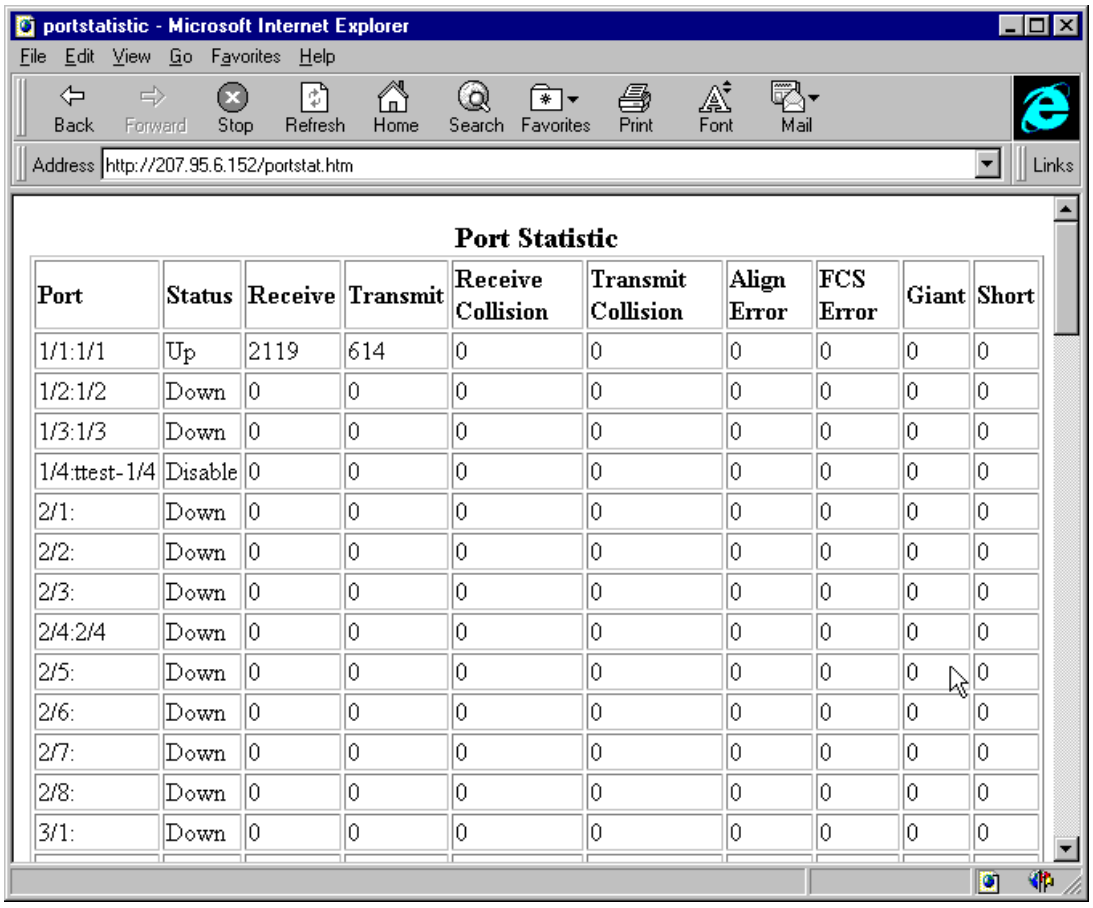
- ***show interfaces***
- ***show configuration***

USING THE WEB MANAGEMENT INTERFACE

To view the port statistics for all ports on a routing switchHP, select the port link from the menu and the display shown in **Figure A.7** will appear.

NOTE: The polling rate can be modified by selecting the Preference link from the main menu, and modifying the port statistic field. To disable polling, the user would enter zero in that field.

NOTE: To clear all port statistics, the user would select the **Clear** button (not shown) on the port statistic summary panel.



Port Statistic

Port	Status	Receive	Transmit	Receive Collision	Transmit Collision	Align Error	FCS Error	Giant	Short
1/1:1/1	Up	2119	614	0	0	0	0	0	0
1/2:1/2	Down	0	0	0	0	0	0	0	0
1/3:1/3	Down	0	0	0	0	0	0	0	0
1/4:ttest-1/4	Disable	0	0	0	0	0	0	0	0
2/1:	Down	0	0	0	0	0	0	0	0
2/2:	Down	0	0	0	0	0	0	0	0
2/3:	Down	0	0	0	0	0	0	0	0
2/4:2/4	Down	0	0	0	0	0	0	0	0
2/5:	Down	0	0	0	0	0	0	0	0
2/6:	Down	0	0	0	0	0	0	0	0
2/7:	Down	0	0	0	0	0	0	0	0
2/8:	Down	0	0	0	0	0	0	0	0
3/1:	Down	0	0	0	0	0	0	0	0

Figure A.7 Port statistics summary panel

Viewing STP Statistics

The user can view a summary of STP statistics for routing switches. STP statistics are by default polled every 10 seconds.

To modify this polling rate (when using the Web management interface), select the Preferences link from the main menu, and modify the STP field. The user can disable polling by setting the field to zero.

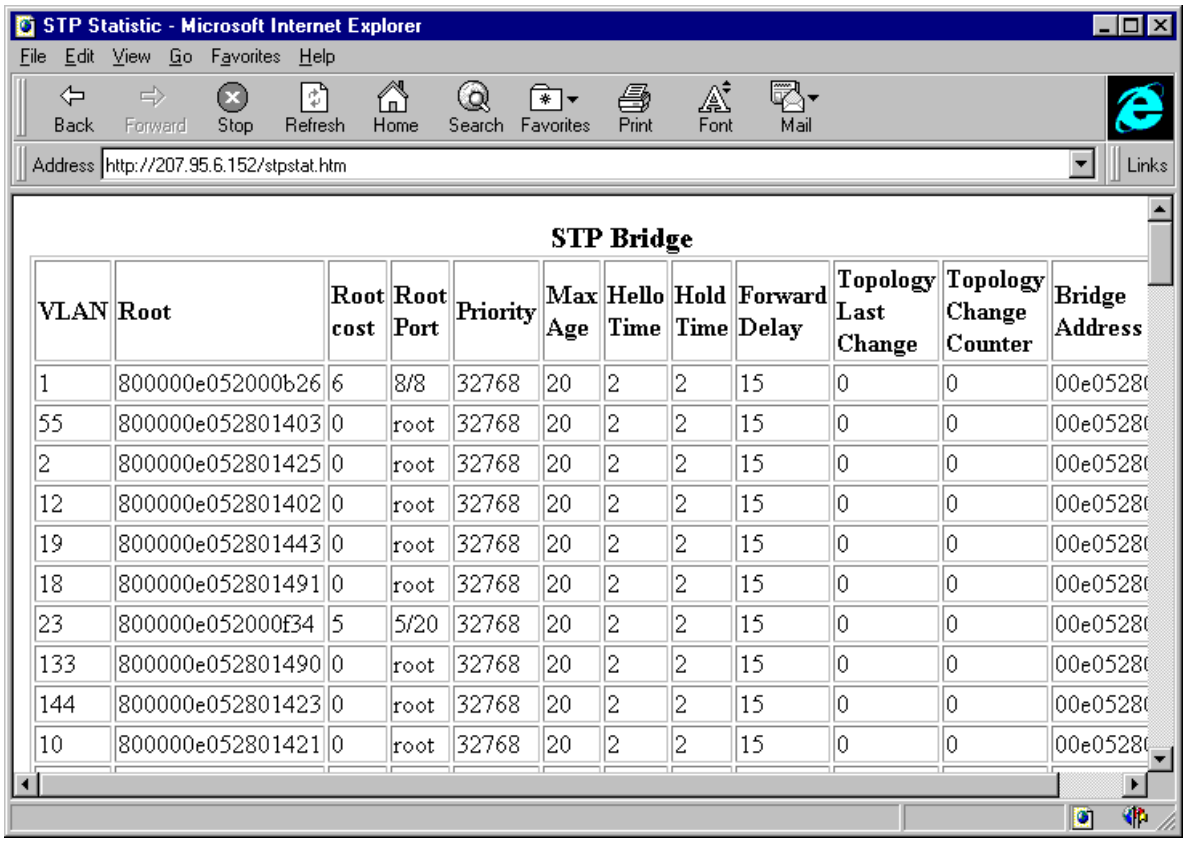
USING THE CLI

To view spanning tree statistics, the user would enter the ***show span*** command. To view STP statistics for a VLAN, the user would enter the ***span vlan*** command.

USING THE WEB MANAGEMENT INTERFACE

To view a summary of spanning tree statistics, the user can select the STP link from the menu. The screen shown in **Figure A.8** will appear.

STP statistics are by default polled every 10 seconds. To modify this polling rate, select the Preferences link from the main menu, and modify the STP field. The user can disable polling by setting the field to zero.



STP Bridge

VLAN	Root	Root cost	Root Port	Priority	Max Age	Hello Time	Hold Time	Forward Delay	Topology Last Change	Topology Change Counter	Bridge Address
1	800000e052000b26	6	8/8	32768	20	2	2	15	0	0	00e0528(
55	800000e052801403	0	root	32768	20	2	2	15	0	0	00e0528(
2	800000e052801425	0	root	32768	20	2	2	15	0	0	00e0528(
12	800000e052801402	0	root	32768	20	2	2	15	0	0	00e0528(
19	800000e052801443	0	root	32768	20	2	2	15	0	0	00e0528(
18	800000e052801491	0	root	32768	20	2	2	15	0	0	00e0528(
23	800000e052000f34	5	5/20	32768	20	2	2	15	0	0	00e0528(
133	800000e052801490	0	root	32768	20	2	2	15	0	0	00e0528(
144	800000e052801423	0	root	32768	20	2	2	15	0	0	00e0528(
10	800000e052801421	0	root	32768	20	2	2	15	0	0	00e0528(

Figure A.8 STP statistics summary panel

Clearing Statistics

The user can clear statistics for many parameters with the **clear** option.

USING THE CLI

To determine the available clear commands for the system, the user would enter the following:

```
HP9300# clear ?
```

syntax: clear <option>

For a complete summary of all available ***clear...*** CLI commands and their displays, refer to **Appendix B.**

NOTE: Clear commands are found at the privileged EXEC level.

USING THE WEB MANAGEMENT INTERFACE

The user can clear statistics by doing the following:

1. Select the Clear link from the main menu. The panel seen in **Figure A.9** will appear.
2. Select all items to be cleared.
3. Select the **apply** button to initiate the information removal.

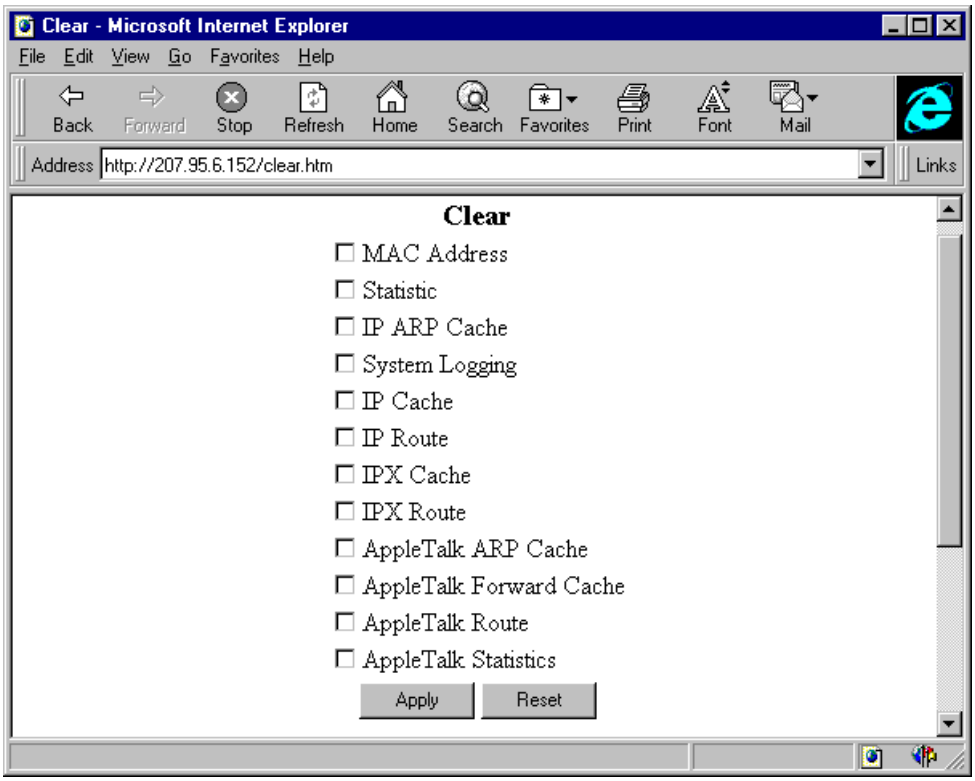


Figure A.9 Clear panel for routing switches