Chapter 46

Monitoring Redundant SSBs

You monitor redundant M20 router System and Switch Boards (SSBs) to ensure that they do the following (see Table 127):

Provide allocation of incoming data packets throughout shared memory on the Flexible PIC Concentrators (FPCs)

Transfer outgoing data cells to the FPCs for packet reassembly

Perform route lookups using the forwarding table, and monitor system components for failure and alarm conditions

Monitor FPC operation and reset

Table 127: Checklist for Monitoring Redundant SSBs

Monitor Redundant SSB Tasks	Command or Action
Understanding Redundant SSBs on page 606	
Displaying Redundant SSB Configuration on page 608	configure show
Displaying Redundant SSB Hardware Information on page 608	show chassis hardware
Monitoring Redundant SSB Status on page 609	
1. Display the Redundant SSB Environmental Status on page 609	show chassis environment
2. Display the Redundant SSB Detailed Status on page 610	show chassis ssb *slot*
3. Check the Redundant SSB LEDs on page 610	Check the LEDs on the SSB faceplate.
Displaying Redundant SSB Mastership on page 611	
1. Display SSB Mastership from the Command Line on page 611	show chassis ssb
2. Check the SSB Mastership from the LEDs on page 612	Check the LEDs on the SSB panel of the craft interface.
Checking for SSB Alarms on page 612	
1. Display the Current SSB Alarms on page 612	show chassis alarms
2. Display SSB Error Messages in the System Log File on page 612	show log messages
3. Display SSB Error Messages in the Chassis Daemon Log File on page 613	show log chassisd

Monitor Redundant SSB Tasks	Command or Action
Verifying SSB Failure on page 613	
1. Check the SSB Connection on page 614	Check the thumbscrews on the left and right sides of the SSB.
2. Perform a Swap Test on the SSB on page 614	1. Take the SSB offline. 2. Remove the SSB. 3. Replace the SSB with one that you know works. 4. Verify that the new SSB works by using the show chassis ssb CLI command.
Switch SSB Mastership on page 615	request chassis ssb master switch <no-confirm>
Replacing the SSB on page 616	1. Take the SSB offline. 2. Remove the SSB. 3. Install a new SSB. 4. Verify that the new SSB works by using the show chassis ssb CLI command.

Understanding Redundant SSBs

Purpose Inspect redundant SSBs to ensure that they provide allocation of incoming data packets throughout shared memory on the FPCs, transfer outgoing data cells to the FPCs for packet reassembly, perform route lookups using the forwarding table, monitor system components for failure and alarm conditions, and monitor FPC operation and reset.

What Are Redundant SSBs SSBs are redundant when two SSBs are installed in the M20 router. The SSBs occupy the two top slots of the card cage (SSB0 and SSB1), and are installed into the midplane from the front of the chassis (see Figure 231 on page 607). By default, SSB0 is the master SSB and SSB1 is the backup. When the master SSB fails, automatic failover occurs and the backup SSB becomes the master. You can control which SSB is the master by including the ssb statement at the [edit chassis redundancy] hierarchy level in the configuration. For more information, see the *JUNOS System Basics Configuration Guide*.

The SSB performs the following major functions:

Shared memory management on the FPCs—The Distributed Buffer Manager application-specific integrated circuit (ASIC) on the SSB uniformly allocates incoming data packets throughout shared memory on the FPCs.

Outgoing data cell transfer to the FPCs—A second Distributed Buffer Manager ASIC on the SSB passes data cells to the FPCs for packet reassembly when the data is ready to be transmitted.

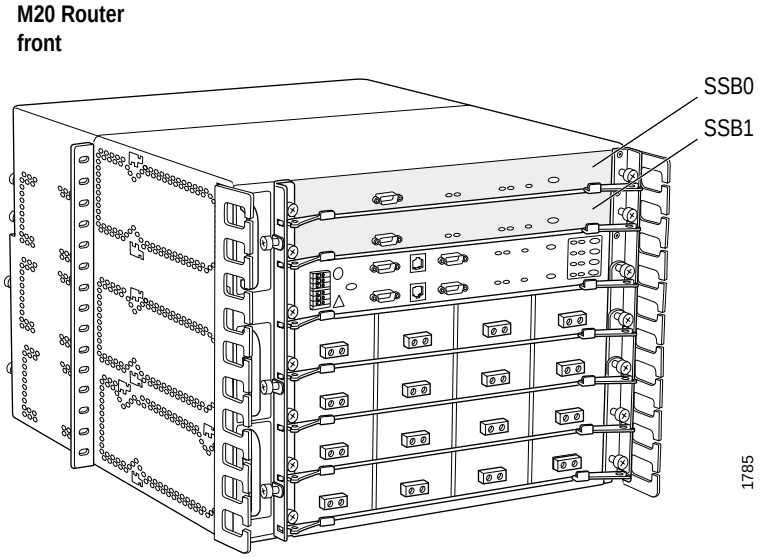
Route lookups—The Internet Processor ASIC on the SSB performs route lookups using the forwarding table stored in synchronous SRAM (SSRAM). After performing the lookup, the Internet Processor ASIC informs the midplane of the forwarding decision, and the midplane forwards the decision to the appropriate outgoing interface.

System component monitoring—The SSB monitors other system components for failure and alarm conditions. It collects statistics from all sensors in the system and relays them to the Routing Engine, which sets the appropriate alarm. For example, if a temperature sensor exceeds the first internally defined threshold, the Routing Engine issues a “high temp” alarm. If the sensor exceeds the second threshold, the Routing Engine initiates a system shutdown.

Exception and control packet transfer—The Internet Processor ASIC passes exception packets to a microprocessor on the SSB, which processes almost all of them. The remaining packets are sent to the Routing Engine for further processing. Any errors that originate in the Packet Forwarding Engine and are detected by the SSB are sent to the Routing Engine using system log messages.

FPC reset control—The SSB monitors the operation of the FPCs. If it detects errors in an FPC, the SSB attempts to reset the FPC. After three unsuccessful resets, the SSB takes the FPC offline and informs the Routing Engine. Other FPCs are unaffected, and normal system operation continues.

Figure 231: M20 Router Redundant SSB Location



The SSB houses the Internet Processor ASIC and two Distributed Buffer Manager ASICs.

The SSB is hot-pluggable. You can remove and replace it without powering down the system; however this causes major impact to the system. The following functions cannot occur while the SSB is removed from the router:

Route lookups

System component monitoring

Exception and control packet monitoring

FPC resets

When you remove the SSB, all packet forwarding stops immediately and the Routing Engine responds by generating alarms. When you replace the SSB, it is rebooted by flash EEPROM.

If you remove the Routing Engine, the SSB enters a warm shutdown mode and continues its forwarding process for a limited time using a frozen forwarding table. The time limit is determined by a timer in the SSB. If you replace the Routing Engine during the warm shutdown period, the SSB unfreezes its forwarding tables and resumes normal functioning. Otherwise, the SSB shuts itself down.

Displaying Redundant SSB Configuration

You can configure which SSB is the master and which is the backup. By default, the SSB in slot 0 is the master and the SSB in slot 1 is the backup. You can modify the default configuration by including the ssb statement at the [edit chassis redundancy] hierarchy level.

NOTE: We recommend that both Routing Engines have the same configuration.

To display the current SFM redundancy configuration, follow these steps:

1. Enter the CLI configuration mode using the following command:

   user@host# **configure**

2. Go to the [edit chassis redundancy] hierarchy level.

3. Show the SFM configuration using the following command:

   user@host# **show**

Displaying Redundant SSB Hardware Information

Action To display the SSB hardware information, use the following JUNOS software command-line interface (CLI) command:

user@host> **show chassis hardware**

Sample Output

```
user@host> show chassis hardware
Hardware inventory:
Item          Version  Part number  Serial number     Description
[...Output truncated...]
SSB slot 0       REV 01   710-001951   AD5904          Internet Processor II
SSB slot 1       N/A      N/A          N/A             backup
[...Output truncated...]
```

What It Means The command output displays the SSB version level, part number, serial number, and description.

Monitoring Redundant SSB Status

Steps To Take To monitor the SSB, follow these steps:

1. Display the Redundant SSB Environmental Status on page 609
2. Display the Redundant SSB Detailed Status on page 610
3. Check the Redundant SSB LEDs on page 610

Step 1: Display the Redundant SSB Environmental Status

Action To display the SSB environmental status, use the following CLI command:

user@host> **show chassis environment**

Sample Output

```
user@host> show chassis environment
Class Item                Status     Measurement
Power Power Supply A      Failed
      Power Supply B      OK
Temp  FPC Slot 0          OK         27 degrees C / 80 degrees F
      FPC Slot 1          OK         30 degrees C / 86 degrees F
      FPC Slot 2          OK         26 degrees C / 78 degrees F
      FPC Slot 3          OK         25 degrees C / 77 degrees F
      Power Supply A      OK         28 degrees C / 82 degrees F
      Power Supply B      OK         24 degrees C / 75 degrees F
      SSB Slot 0          OK         25 degrees C / 77 degrees F
      Backplane           OK         21 degrees C / 69 degrees F
Fans  Rear Fan            OK         Spinning at normal speed
      Upper Fan           OK         Spinning at normal speed
      Middle Fan          OK         Spinning at normal speed
      Bottom Fan          OK         Spinning at normal speed
Misc  Craft Interface     OK
```

What It Means The command output displays the SSB status and temperature. The SSB status can be OK, Failed, or Absent.

Step 2: Display the Redundant SSB Detailed Status

Action To display more detailed SSB status information, use the following CLI command:

user@host> **show chassis ssb**

Sample Output

```
user@host> show chassis ssb
SSB status:
  Failover:              0 time
  Slot 0:
    State:               Master
    Temperature:          33 Centigrade
    CPU utilization:       0 percent
    Interrupt utilization: 0 percent
    Heap utilization:      0 percent
    Buffer utilization:    6 percent
    DRAM:                 64 Mbytes
    Start time:           1999-01-15 22:05:36 UTC
    Uptime:               21 hours, 21 minutes, 22 seconds
  Slot 1:
    State:               Backup
```

What It Means The command output displays the number of times the mastership has changed, the SSB slot number 0 or 1, and the current state of the SSB: Master, Backup, or Empty. The command output displays the temperature of the air passing by the SSB, in degrees Centigrade. It also displays the total percentage of CPU, interrupt, heap space, and buffer space being used by the SSB processor, including the total DRAM available to the SSB processor. The command output displays the time when the SSB started running and how long it has been running.

Alternative Action To display the status for a particular SSB, use the following CLI command:

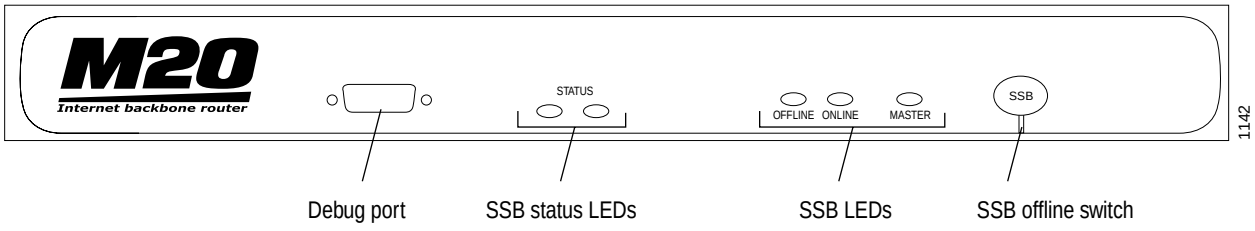
user@host> **show chassis ssb** *slot*

Step 3: Check the Redundant SSB LEDs

Periodically check the SSB LEDs to verify that the SSB is online or offline and the type of task it is performing.

Action To check the SSB LEDs, look on the faceplate at the front of the router (see Figure 232).

Figure 232: SSB LEDs



The SSB has two groups of LEDs: online/offline LEDs and status LEDs. The online/offline LEDs indicate whether the SSB is online or offline. The status LEDs indicate what type of task the SSB is performing. Table 128 describes the SSB LEDs.

Table 128: SSB LED States

Label	Color	State	Description
OFFLINE	Amber	On steadily	SSB is offline.
ONLINE	Green	On steadily	SSB processor is running.
MASTER	Blue	On steadily	SSB is master.
STATUS (left)	Green	Blinking	SSB processor is running. Normally, the blinking is faint and becomes bright only when the SSB is processing many exceptions.
STATUS (right)	Green	Flashing	I/O interrupts are occurring.

Displaying Redundant SSB Mastership

Steps To Take To display the SSB mastership information, follow these steps:

1. Display SSB Mastership from the Command Line on page 611
2. Check the SSB Mastership from the LEDs on page 612

Step 1: Display SSB Mastership from the Command Line

Action To display more detailed SSB status information, use the following CLI command:

```
user@host> show chassis ssb
```

Sample Output

```
user@host> show chassis ssb
SSB status:
  Failover:                0 time
  Slot 0:
    State:                 Master
    Temperature:            33 Centigrade
    CPU utilization:         0 percent
    Interrupt utilization:   0 percent
    Heap utilization:        0 percent
    Buffer utilization:      6 percent
    DRAM:                   64 Mbytes
    Start time:             1999-01-15 22:05:36 UTC
    Uptime:                 21 hours, 21 minutes, 22 seconds
  Slot 1:
    State:                 Backup
```

What It Means The command output displays the number of times the mastership has changed, the SSB slot number 0 or 1, and the current state of the SSB: Master, Backup, or Empty. The command output displays the temperature of the air passing by the SSB, in degrees Centigrade. It also displays the total percentage of CPU, interrupt, heap space, and buffer space being used by the SSB processor, including the total DRAM available to the SSB processor. The command output displays the time when the SSB started running and how long it has been running.

Step 2: Check the SSB Mastership from the LEDs

Action To check the SSB mastership from the LEDs, look on the faceplate at the front of the router (see Figure 232 on page 610).

The SSB has two groups of LEDs: online/offline LEDs and status LEDs. The online/offline LEDs indicate whether the SSB is online or offline. The status LEDs indicate what type of task the SSB is performing. Table 128 on page 611 describes the SSB LEDs.

Checking for SSB Alarms

Steps To Take To check for SSB alarms, follow these steps:

1. Display the Current SSB Alarms on page 612
2. Display SSB Error Messages in the System Log File on page 612
3. Display SSB Error Messages in the Chassis Daemon Log File on page 613

Step 1: Display the Current SSB Alarms

Action To display the current SSB alarms, use the following CLI command:

```
user@host> show chassis alarms
```

Sample Output

```
user@host> show chassis alarms
2 alarms currently active
Alarm time               Class  Description
2002-06-05 19:55:57 UTC  Major  fxp0: ethernet link down
```

What It Means The command output displays the alarm date, time, severity level, and description. An SSB failure or removal generates an fxp0 link alarm. The fxp0 link is the dedicated 100-Mbps Fast Ethernet link between the SSB and the Routing Engine. This link transfers routing table data from the Routing Engine to the forwarding table in the Internet Processor ASIC. The link also transfers, from the SSB to the Routing Engine, routing link-state updates and other packets destined for the router that have been received through the router interfaces.

Step 2: Display SSB Error Messages in the System Log File

Periodically check the system log messages on the management console for messages sent by the SSB. During normal operation, the SSB notifies the Routing Engine of any errors it detects.

Action To display the SSB error messages in the system log file, use the following CLI command:

```
user@host> show log messages
```

Sample Output

```
user@host> show log messages
Jul 10 13:28:45 myrouter /kernel: fxp1: media DOWN 100Mb / full-duplex
Jul 10 13:28:45 myrouter /kernel: fxp1: media DOWN 10Mb / half-duplex
Jul 10 13:28:45 myrouter /kernel: fxp1: media DOWN 100Mb / full-duplex
Jul 10 13:28:45 myrouter /kernel: fxp1: link UP 100Mb / full-duplex
Jul 10 13:28:45 myrouter rpd[564]: EVENT <UpDown> fxp1.0 index 1 <Up Broadcast Multicast> address #0
0.a0.a5.12.1d.6d
Jul 10 13:28:45 myrouter mib2d[563]: SNMP_TRAP_LINK_UP: ifIndex 2, ifAdminStatus up(1), ifOperStatus up(1),
ifName fxp1
[...Output truncated...]
```

What It Means The messages system log file records the time the failure or event occurred, the severity level, a code, and a message description. You can also use the show log messages | match ssb command to see error messages that are generated when an SSB fails or is offline. Use this information to diagnose a problem and to let the Juniper Networks Technical Assistance Center (JTAC) know what error messages were generated and the router events that occurred before and after the problem. For more information about system log messages, see the *JUNOS System Log Messages Reference*.

Step 3: Display SSB Error Messages in the Chassis Daemon Log File

Action To display the SSB error messages in the chassis daemon (chassisd) log file, use the following CLI command:

```
user@host> show log chassisd
```

Sample Output

```
user@host> show log chassisd
Jul 10 13:27:28 SSB0 is now not present
Jul 10 13:27:28 Assert reset on SSB0
Jul 10 13:27:28 Turn on ethernet loop
[...Output truncated...]
```

What It Means The command output displays the SSB hardware version level, part number, and serial number.

Verifying SSB Failure

Steps To Take To verify SSB failure, follow these steps:

1. Check the SSB Connection on page 614
2. Perform a Swap Test on the SSB on page 614

Step 1: Check the SSB Connection

If the SSB is not seated properly, it will not function.

Action To check the SSB connection, make sure that the SSB is properly seated in the slot. To seat the SSB properly adequately, tighten the screws on the left and right sides of the card carrier.

Step 2: Perform a Swap Test on the SSB

CAUTION: Before performing a swap test, always check for bent pins in the midplane and check the SCB for stuck pins in the connector. Pins stuck in the component connector can damage other good slots during a swap test.

Action To perform a swap test on the SSB, follow these steps:

1. Attach an electrostatic discharge (ESD) wrist strap to your bare wrist, and connect the wrist strap to one of the two ESD points on the chassis.
2. Locate the SSB offline switch on the front panel and press and hold the switch for 5 seconds to take the SSB offline.

CAUTION: If you take the SSB offline, packet forwarding will be affected.

3. Unscrew the thumbscrews on the left and right sides of the card carrier to unseat the SSB from the midplane.
4. Flip the ends of the two extractor clips, which are adjacent to the thumbscrews, towards the outside edges of the router.
5. Grasp both sides of the card carrier and slide the SSB about three-quarters of the way out of the router.
6. Move one of your hands underneath the SSB to support it, and slide it completely out of the chassis.
7. Replace the SSB with one that you know works.
8. Grasp the front of the SSB card carrier with both hands and align the back of the card carrier with the slide guides on the chassis.
9. Slide the SSB card carrier all the way into the card cage until it contacts the midplane.
10. Flip the extractor clips, located on the left and right sides of the card carrier, towards each other to secure the SSB in place.

11. Tighten the thumbscrews on the left and right sides of the card carrier to seat the SSB.

NOTE: To seat the SSB properly, be sure to tighten the screws adequately. If the SSB is not seated properly, it will not function.

12. Verify that the SSB works by using the show chassis ssb CLI command. (See “Display the Redundant SSB Detailed Status” on page 610.)

Switch SSB Mastership

Purpose To change the default master SSB, include the ssb statement at the [edit chassis redundancy] hierarchy level in the configuration. For more information, see the *JUNOS System Basics Configuration Guide*.

Action To control which SSB is master, use the following CLI command:

user@host> **request chassis ssb master switch <no-confirm>**

Sample Output

```
user@host> request chassis ssb master switch
warning: Traffic will be interrupted while the PFE is re-initialized
Toggle mastership between system switch boards ? [yes,no] (no) yes
Switch initiated, use “show chassis ssb” to verify
```

If you use the no-confirm option, the command output is as follows:

```
user@host> request chassis ssb master switch no-confirm
Switch initiated, use “show chassis ssb” to verify
```

What It Means By default, the SSB in slot 0 (SSB0) is the master and the SSB in slot 1 (SSB1) is the backup.

NOTE: For routers that have two SSBs, both SSBs must be running JUNOS Release 4.0 or later. Do not run JUNOS Release 3.4 on one of the SSBs and JUNOS Release 4.0 or later on the other.

JUNOS Release 3.4 does not support SSB redundancy; if you are using this release of the software, only one SSB can be installed in the router. It can be installed in either slot.

The configurations on the two SSBs do not have to be the same, and they are not automatically synchronized. If you configure both SSBs as masters, when the chassis software restarts for any reason, the SSB in slot 0 becomes the master and the SSB in slot 1 becomes the backup.

Replacing the SSB

Purpose The SSB is hot-pluggable. When the SSB is removed, all packet forwarding stops immediately and the Routing Engine responds by sending alarms through the Ethernet channel to the management console. When the SSB is replaced, it is rebooted by flash EEPROM.

Action To replace a failed SSB, follow these steps:

1. Attach an ESD wrist strap to your bare wrist, and connect the wrist strap to one of the two ESD points on the chassis.
2. Locate the SSB offline switch on the front panel and press and hold the switch for 5 seconds to take the SSB offline.

CAUTION: If you take the SSB offline, packet forwarding will be affected.

3. Unscrew the thumbscrews on the left and right sides of the card carrier to unseat the SSB from the midplane.
4. Flip the ends of the two extractor clips, which are adjacent to the thumbscrews, towards the outside edges of the router.
5. Grasp both sides of the card carrier and slide the SSB about three-quarters of the way out of the router.
6. Move one of your hands underneath the SSB to support it, and slide it completely out of the chassis.
7. Replace the SSB with one that you know works.
8. Grasp the front of the SSB card carrier with both hands and align the back of the card carrier with the slide guides on the chassis.
9. Slide the SSB card carrier all the way into the card cage until it contacts the midplane.
10. Flip the extractor clips, located on the left and right sides of the card carrier, towards each other to secure the SSB in place.
11. Tighten the thumbscrews on the left and right sides of the card carrier to seat the SSB.

NOTE: To seat the SSB properly, be sure to tighten the screws adequately. If the SSB is not seated properly, it will not function.

12. Verify that the SSB works by using the show chassis ssb CLI command. (See “Display the Redundant SSB Detailed Status” on page 610.)