SAM21 Shelf Controller Fault Management

What's new for SN06

SN06 and ISN06 software has improvements to automatic firmware configuration. This feature requires RM12 or newer firmware. RM12 has been the firmware baseline for Shelf Controllers since SN04. Non System Slot (NSS) cards use different firmware versions.

The Shelf Controller has improvements to managing NSS bootloads and reducing Dead Shelf Recovery (DSR). The Shelf Controller keeps a copy of the 6 most common bootloads in non volatile storage on the Shelf Controller. When an NSS card is unlocked, the Shelf Controller boots that NSS card over the backplane if the Shelf Controller has the bootload in non volatile storage. If the Shelf Controller does not have the bootload, the Shelf Controller attempts to retrieve the bootload from the CS 2000 Core Manager with an Network File System (NFS) request. If NFS is available, the Shelf Controller verifies the integrity of the bootload with a checksum, copies the bootload into non volatile storage, and boots the NSS card over the backplane. If NFS is unavailable, the Shelf Controller attempts to use Trivial File Transfer Protocol (TFTP) or anonymous FTP to retrieve the bootload, copy the bootload to non volatile storage, and boot the NSS card over the backplane. If all these requests fail, the Shelf Controller triggers the NSS card to make its own network boot request to the CS 2000 Core Manager.

Shelf Controllers also store a copy of the Shelf Controller bootload in non volatile storage. When a Shelf Controller is unlocked, it boots from the stored load and validates the version by checksum. If the version is not correct, it bootloads over the network from the CS 2000 Core Manager and updates the bootload in non volatile storage. During a software upgrade, the Shelf Controllers invalidate the bootload in non volatile storage once the new bootload is provisioned at the CS 2000 SAM21 Manager. The Shelf Controllers boot over the network from the CS 2000 Core Manager, and copy the bootload to non volatile storage; the bootload is verified by checksum and the bootload filename

specified in the BOOTP response must match the bootload filename built into the bootload. If NFS, TFTP, or anonymous FTP are not available to the Shelf Controller, no checksum is calculated or verified. If any of those transfer methods is available and used, the checksum is calculated and verified.

Shelf Controllers allow hardware diagnostics from the CS 2000 SAM21 Manager. Diagnostics are not available from the card icon pull down menu, they are available from the Diags tab of the Card View window. Refer to Run diagnostics.

A new alarm for Shelf Controllers with ATM interfaces is available. When the usage of the ATM interface is above 70% of capacity, a minor alarm is raised at the Alarm Browser. When the usage is above 80%, a major alarm is raised, and when usage is above 90%, a critical alarm is raised. The alarm appears in the Services section of the Alarm Browser with a service name of ATM and an service id of 7.

Robustness and recovery of ATM connection set provisioning is improved. In the event that a Shelf Controller reboots and retrieving connection set provisioning from the CS 2000 SAM21 Manager server is unavailable for more than 60 seconds, the mate Shelf Controller delivers the connection set provisioning data.

What's new for SN05

For the SN05 and ISN05 releases, the Shelf Controller offers improved fault management of the Non-System Slot (NSS) cards in the SAM21 shelf:

- The Shelf Controller sets a timer once a lock or unlock request is sent to an NSS card. If the NSS cards does not complete the action within 3 minutes, the Shelf Controller raises a major alarm for the card at the CS 2000 SAM21 Manager client and generates an SCU344 log report. The alarm clears when the action completes or when the card is removed from the shelf.
- The Shelf Controller performs a boot audit for all NSS cards in the shelf. If a card is not running, the Shelf Controller sends a message to the CS 2000 SAM21 Manager server to change the NSS card state to unlocked-disabled-offduty and then the Shelf Controller attempts to boot the NSS card. The change in card state generates an SCU500 log report.
- Each Shelf Controller uses Compact Flash to hold the IP address, BOOTP information, and the administrative state for each card in the shelf. In the event that power to the shelf is lost and restored, the Shelf Controller with the last administrative state of active resumes the active role, bootloads over the network, and downloads the

software loads for the five most common loads in the shelf. Once the downloads complete, the active Shelf Controller boots those cards over the backplane. Any card that is not one of the five most common boots over the network after the Shelf Controllers recover. This feature reduces dead shelf recovery (DSR) time.

Fault management strategy

The Shelf Controller does not require hardware exercise tests or scheduled SWACTs to reduce faults.

Faults on the Shelf Controller or any piece of hardware within the shelf are reported to the CS 2000 SAM21 Manager. Some alarms are reported to additional Element Manager applications. For example, a hardware or platform software fault on a Gateway Controller (GWC) triggers an alarm on the CS 2000 SAM21 Manager, but a fault on the GWC application triggers an alarm on the GWC Manager.

The Shelf Controller periodically performs a boot audit of all cards in the shelf to determine if cards are running. If a card is not running but is unlocked-enabled, the Shelf Controller automatically recovers the card. This activity transitions the affected card through three state changes and generates SCU500 log reports for each transition to record the activity:

1. unlocked-disabled-offduty
2. unlocked-disabled-none
3. unlocked-enabled-none

Refer to the SCU500 log report information in procedure SCU log reports in this Fault Management document for more information.

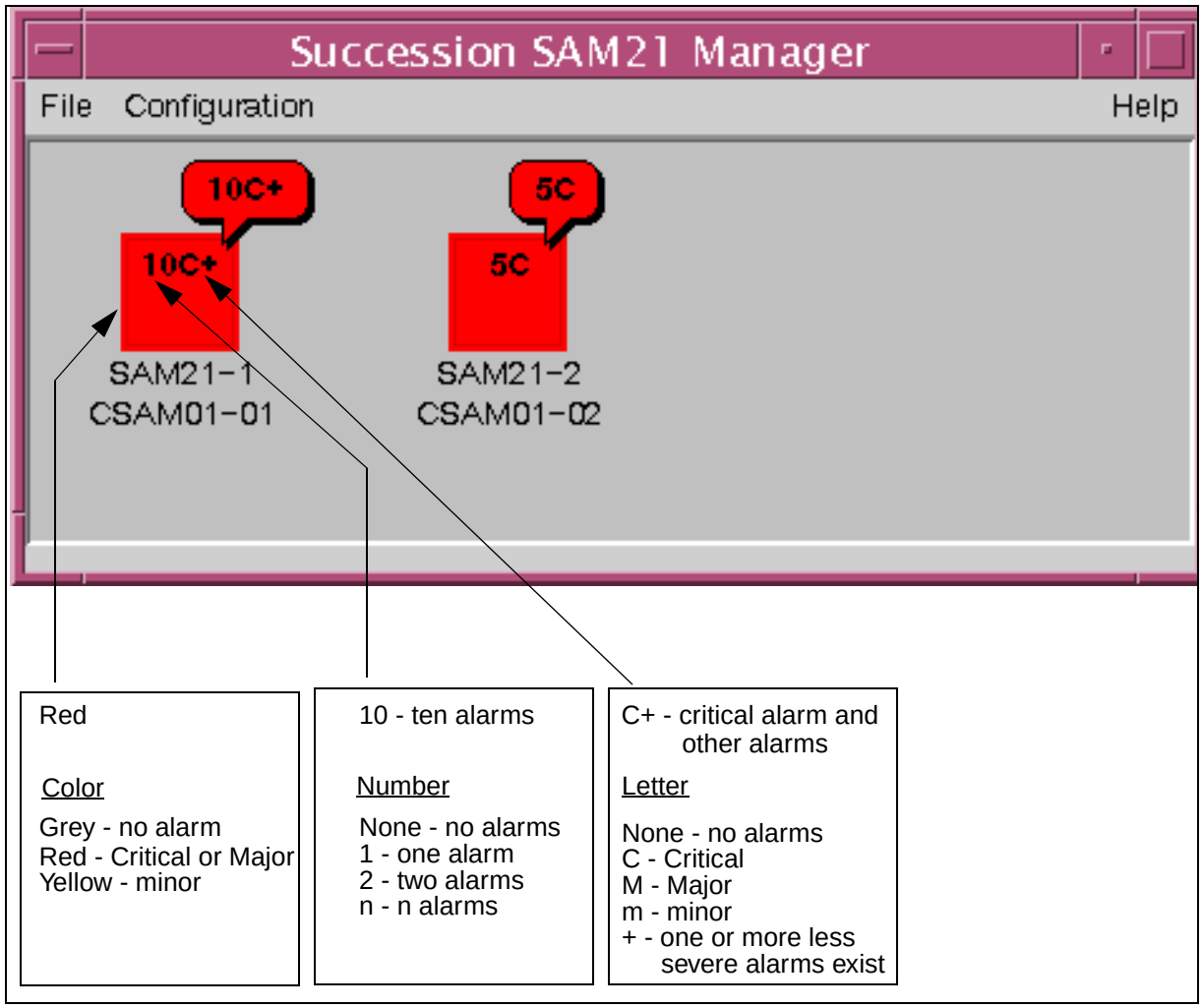
Tools and utilities

The interface to the SAM21 shelf and Shelf Controllers is through the CS 2000 SAM21 Manager client.

Note: If a Card View window is opened and a task or maintenance is completed, close the window rather than minimize the window. Memory consumption is kept to a minimum, but several unused and open Card View windows can consume memory on the CS 2000 SAM21 Manager client workstation.

Access to the applications provided on NSS cards is through their respective Element Managers. The CS 2000 SAM21 Manager displays NSS hardware and platform alarms, but not NSS application alarms.

Figure 1 CS 2000 SAM21 Manager subnet view



Example
A red SAM21 icon with 1M+ indicates a SAM21 with one Major alarm and one or more less severe alarms.

Available procedures

Refer to the following fault management procedures for the SAM21 Shelf Controllers.

Procedure	Page
SCU log reports	7
IPOA log reports	17

Unavailable procedures

The following procedures are unavailable for SAM21 Shelf Controllers.

Restarting element

There is no procedure for restarting all the cards in the SAM21 shelf at once except through the power up or power down of the SAM21 shelf.

Allowing/inhibiting alarm reporting

All alarms are reported to the CS 2000 SAM21 Manager. There is no procedure to silence alarms.

Configuring alarm severity profiles

There is no procedure to configure alarm severity profiles.

Log collection configuration

The LOGROUTE utility on the CS 2000 Core Manager offers distribution of logs and messages from the Shelf Controllers. Refer to the CS 2000 Core Manager documentation for information on the LOGROUTE utility.

Log reports for card state changes, environmental alarms, and Shelf Controller hardware faults are sent to the CS 2000 Core Manager. Refer to procedure SCU log reports for information.

SCU log reports

DANGER
Risk of shock
Diagnosing faults with fans and power feeds may require inspection of the power cables.

The active Shelf Controller gathers the status information for itself and the inactive Shelf Controller and transmits alarms and log reports to the CS 2000 SAM21 Manager server application.

Alarms are available from the CS 2000 SAM21 Manager client in the Alarm brower or Card View windows. Log reports are available from the CS 2000 Core Manager. Use the **LOGQUERY** command on the CS 2000 Core Manager to view the logs. To view only SCU log reports, use the **OPEN SCU** command. If an OSS network is configured, the SCU log reports are transmitted to the OSS network.

For assistance with clearing alarms, refer to SAM21 shelf alarms.

Log report	Severity			Meaning	Action
	C	M	m		
SCU301	X			Extension bridge in Slot <x> is Up. Extension bridge in Slot <y> is down.	Verify that the extension bridges in slots 15 back and 16 back on the rear of the SAM21 shelf are seated. If the alarm persists, replace the failing extension bridge.
SCU310	X	X		CPU load high. One Minute Load is <x.xx>.	If the condition persists and reaches critical severity, ensure the Shelf Controller is in an Inactive state and then Lock and Unlock the Shelf Controller.
SCU315		X		Fan in Sled <x> has been removed.	Reinsert fan or sled. Replace if the problem persists.
	X			Fan in Sled <x> is down.	Check cables connecting fan to the power supply. Replace fan. Replace the Sled if the problem persists.

Log report	Severity C	M	m	Meaning	Action
	X	X		Temperature in Sled <x> is High.	Check for fan blockage and ambient heat.
		X		Diagnostic failed at test case.	Determine the card slot from the log report and re-run the diagnostics. If diagnostics fail a second time, replace the card.
		X		Diagnostic failed due to SWACT.	
		X		Diagnostic failed, <xxxx>	There are 11 possible causes. Determine the card slot from the log report. Re-run the diagnostic. Replace the card if the diagnostic fails a second time.
SCU329	X	X	X	Loss of Communications: <xxx>	Loss of communications can occur for several reasons. Review the problem text and refer to SAM21 shelf alarms.
SCU332	X	X		Memory usage high. Less than <xx> Percent free.	If condition persists and reaches critical severity, ensure the Shelf Controller is in an Inactive state and then Lock and Unlock the Shelf Controller.
SCU335	X			Power Feed <x> is down.	Check power cables in back of shelf.
	X			Power Supply in Sled <x> is down.	Reinsert sled. Replace the sled if the problem persists.
		X		Power Supply in Sled <x> has been removed.	Reinsert sled. Replace the sled if the problem persists.
SCU344	X			Unlock action exceeded expected duration.	Open the Card View window for the affected card and select the States tab to view the status text. Verify Ethernet cable connections, router provisioning, BOOTP service, and that the software load is installed on the CS 2000 Core Manager.

Log report	Severity C	M	m	Meaning	Action
SCU346	X	X		Large Number of Process Abnormally Terminated	If condition persists and reaches critical severity, ensure the Shelf Controller is in an Inactive state and then Lock and Unlock the Shelf Controller.
	X			Firmware Flashing could not connect to the board.	Review the log report to determine the card number. Reprovision the card.
	X			Firmware Flashing failed at downloading firmware.	Verify the firmware file on the CS 2000 Core Mananger in `/swd/sam21` and that the BOOTP service is running. Reprovision the card.
	X			Firmware Flashing failed at validating firmware.	Verify the firmware file on the CS 2000 Core Manager in `/swd/sam21`. Reprovision the card. Reapply the fileset if failure occurs again.
	X			Firmware Flashing failed at backing up firmware.	If problem persists, replace the card.
	X			Firmware Flashing failed flash.	Remove and reinsert the card. Reprovision the card. If provisioning fails, replace the card. Do not enable the Firmware Flash checkbox for other cards of this type until the problem is resolved. Contact Nortel Networks support personnel.

Log report	Severity C	M	m	Meaning	Action
SCU348	X			Provision failed: process ended abnormally Provision failed, could not connect to board Provision failed, connection lost unexpectedly, please reseat/replace the car Provision failed to set application type	Reprovision the card. If the problem persists, replace the card. If the card is not manually recovered, the CS 2000 SAM21 Manager server automatically reprovisions the card. This action is taken only if the card was previously installed in the same slot and provisioned in the same slot; a five minute timer must also expire. After the card is recovered, an SCU500 log report is generated.
SCU349	X	X		Disk usage high. Root file system has <xx> Percent free space.	If condition persists and reaches critical severity, ensure the Shelf Controller is in an Inactive state and then Lock and Unlock the Shelf Controller.
SCU356	X			Mate Shelf Controller unavailable. Operating in Simplex.	Verify that the mate Shelf Controller is latched. If the problem persists, Lock and Unlock the inactive Shelf Controller.
SCU398	X	X	X	A TELCO alarm is raised.	Check alarms at the alarm browser and clear the alarms.
SCU399	X			Remote Node Communication Failure.	The CS 2000 SAM21 Manager server application cannot communicate with the Shelf Controllers and the CS 2000 SAM21 Manager client application exits. Check Ethernet connections and router configuration. Verify connectivity at the host that provides the CS 2000 SAM21 Manager server software.
SCU500				Card state change.	This is an information only log report. No action is required.

Log report	Severity C	M	m	Meaning	Action
SCU501				Card insertion.	This information only log report indicates that a card has been inserted in the shelf. No action is required.
SCU502				Card removal.	This information only log report indicates that a card has been removed from the shelf. No action is required.

Examples

The following figures provides examples of some of the SCU log reports.

SCU301 log reports indicate that an alarm with an Extension Bridge is raised or cleared.

SCU301 log reports

SCU301

```
OFC_NAME  *** SCU301 JUL30 10:50:52 5423 FLT       Alarm Raised
          Location: sam21 1:CSAM01-02:shelf 1:slot 9:card 1
          Time: Thu Jul 30 10:50:45 EST 2002
          Reason: Extension Bridge in Slot 15 is Up, Extension
                  Bridge in Slot 16 is Down
```

SCU301

```
OFC_NAME      SCU301 JUL30 10:50:52 5423 NONE     Alarm Cleared
          Location: sam21 1:CSAM01-02:shelf 1:slot 9:card 1
          Time: Thu Jul 30 10:50:45 EST 2002
```

SCU310 log reports indicate that processor usage exceeds expected levels.

SCU 310 log reports

SCU310

```
OFC_NAME  *** SCU310 JUL30 17:48:52 5000 FLT        Alarm Raised
          Location: sam21 1:CSAM01-02:shelf 1:slot 9:card 1
          Time: Thu Jul 30 17:48:45 EST 2002
          Reason: CPU load high. One Minute Load is 19.11
```

SCU310

```
OFC_NAME      SCU310 JUL30 17:48:52 5000 NONE      Alarm Cleared
          Location: sam21 1:CSAM01-02:shelf 1:slot 9:card 1
          Time: Thu Jul 30 17:48:45 EST 2002
```

SCU315 log reports indicate a failure with a power feed, a fan, or that diagnostics failed on a Non System Slot (NSS) card.

SCU315 log reports

SCU315

```
OFC_NAME   ** SCU315 JUL30 17:48:52 5000 FLT        Alarm Raised
        Location: sam21 1:CSAM01-02:sled 1
        Time: Thu Jul 30 17:48:45 EST 2002
        Reason: Fan in Sled 1 is down
```

SCU315

```
OFC_NAME      SCU315 JUL30 17:48:52 5000 NONE      Alarm Cleared
        Location: sam21 1:CSAM01-02:sled 1
        Time: Thu Jul 30 17:48:45 EST 2002
```

SCU315

```
OFC_NAME   ** SCU315 JUL30 17:48:52 5000 FLT        Alarm Raised
        Location: SAM21 3:CSAM01-01:shelf 1:slot 1:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
        Reason: Diagnostic failed, terminated unexpectedly
```

SCU329 log reports indicate trouble with communication. The Shelf Controllers monitor Ethernet, two serial connections, and a heartbeat cable for connectivity. Any loss of connectivity results in an alarm and an SCU329 log report.

SCU329 log reports

SCU329

```
OFC_NAME  *** SCU329 JUL30 17:48:52 5000 FLT        Alarm Raised
        Location: sam21 1:CSAM01-02:shelf 1:slot 9:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
        Reason: Loss of Communications: Mate Ethernet, Serial
                Connection 1, Serial Connection 2 is down
```

SCU329

```
OFC_NAME      SCU329 JUL30 17:48:52 5000 NONE      Alarm Cleared
        Location: sam21 1:CSAM01-02:shelf 1:slot 9:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
```

SCU332 log reports indicate that memory usage on the Shelf Controller exceeds expected levels.

SCU332 log reports

SCU332

```
OFC_NAME   ** SCU332 JUL30 17:48:52 5000 FLT        Alarm Raised
        Location: sam21 1:CSAM01-02:shelf 1:slot 9:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
        Reason: Memory usage high. Less than 12 Percent free.
```

SCU332

```
OFC_NAME      SCU332 JUL30 17:48:52 5000 NONE      Alarm Cleared
        Location: sam21 1:CSAM01-02:shelf 1:slot 9:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
```

SCU335 log reports indicate trouble with power supplies.

SCU335 log reports

SCU335

```
OFC_NAME  *** SCU335 JUL30 17:48:52 5000 FLT        Alarm Raised
        Location: sam21 1:CSAM01-02:sled 3
        Time: Thu Jul 30 17:48:45 EST 2002
        Reason: Power Supply in Sled 3 is down
```

SCU335

```
OFC_NAME     SCU335 JUL30 17:48:52 5000 NONE       Alarm Cleared
        Location: sam21 1:CSAM01-02:sled 3
        Time: Thu Jul 30 17:48:45 EST 2002
```

SCU344 log reports indicate that a NSS card has taken too long to complete a lock or unlock request.

SCU344 log reports

SCU344

```
OFC_NAME   ** SCU344 JUL30 17:48:52 5000 FLT        Alarm Raised
        Location: sam21 1:CSAM01-02:shelf 1:slot12:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
        Reason: Unlock action exceeded expected duration. Please
                check the state window for errors
```

SCU344

```
OFC_NAME      SCU344 JUL30 17:48:52 5000 NONE      Alarm Cleared
        Location: sam21 1:CSAM01-02:shelf 1:slot12:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
```

SCU346 log reports indicate trouble with flashing firmware on a NSS card or that the number of zombie processes on the Shelf Controller has exceeded expected levels.

SCU346 log reports

SCU346

```
OFC_NAME  *** SCU346 JUL30 17:48:52 5000 FLT        Alarm Raised
        Location: sam21 1:CSAM01-02:shelf 1:slot 2:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
        Reason: Firmware Flashing failed at downloading firmware
```

SCU346

```
OFC_NAME   ** SCU346 JUL30 17:48:52 5000 FLT        Alarm Raised
        Location: sam21 1:CSAM01-02:shelf 1:slot 2:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
        Reason: Large Number of Process Abnormally Terminated
```

SCU346

```
OFC_NAME      SCU346 JUL30 17:48:52 5000 FLT       Alarm Cleared
        Location: sam21 1:CSAM01-02:shelf 1:slot 2:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
```

SCU348 log reports indicate that provisioning a NSS card failed.

SCU348 log reports

SCU348

```
OFC_NAME  *** SCU348 JUL30 17:48:52 5000 FLT        Alarm Raised
        Location: sam21 1:CSAM01-02:shelf 1:slot 1:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
        Reason: Provisioning failed, connection lost
                unexpectedly, please reseat/replace the card
```

SCU348

```
OFC_NAME      SCU348 JUL30 17:48:52 5000 INFO      Alarm Cleared
        Location: sam21 1:CSAM01-02:shelf 1:slot 1:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
```

SCU349 log reports indicate that the usage of disk space in the Shelf Controller RAMDISK exceeds expected levels.

SCU349 log reports

SCU349

```
OFC_NAME   ** SCU349 JUL30 17:48:52 5000 FLT        Alarm Raised
        Location: sam21 1:CSAM01-02:shelf 1:slot 9:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
        Reason: Disk usage high. Root file system has 9.80
                Percent free space
```

SCU349

```
OFC_NAME      SCU349 JUL30 17:48:52 5000 INFO      Alarm Cleared
        Location: sam21 1:CSAM01-02:shelf 1:slot 9:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
```

SCU356 log reports indicate that communication from the active Shelf Controller to the inactive Shelf Controller is impossible. The active Shelf Controller is operating in simplex, without a mate for failover protection.

SCU356 log reports

SCU356

```
OFC_NAME  *** SCU356 JUL30 17:48:52 5000 FLT        Alarm Raised
        Location: sam21 1:CSAM01-02:shelf 1:slot 7:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
        Reason: Mate Shelf Controller Unavailable. Operating in
                Simplex.
```

SCU356

```
OFC_NAME      SCU356 JUL30 17:48:52 5000 NONE      Alarm Cleared
        Location: sam21 1:CSAM01-02:shelf 1:slot 7:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
```

SCU398 log reports indicate that a TELCO alarm is active.

SCU398 log reports

SCU398

```
OFC_NAME  *** SCU398 JUL30 10:50:52 5423 FLT       Alarm Raised
        Location: sam21 1:CSAM01-02
        Time: Thu Jul 30 10:50:45 EST 2002
        Reason: Telco alarm
```

SCU398

```
OFC_NAME      SCU398 JUL30 10:50:52 5423 NONE     Alarm Cleared
        Location: sam21 1:CSAM01-02
        Time: Thu Jul 30 10:50:45 EST 2002
```

SCU399 log reports indicate that the CS 2000 SAM21 Manager server software cannot communicate with the Shelf Controllers. The CS 2000 SAM21 Manager client software exits.

SCU399 log reports

SCU399

```
OFC_NAME  *** SCU399 JUL30 17:48:52 5000 CRIT FLT   Alarm Raised
        Location: sam21 1:CSAM01-02
        Time: Thu Jul 30 17:48:45 EST 2002
        Reason: Remote Node Communication Failure
```

SCU399

```
OFC_NAME      SCU399 JUL30 17:48:52 5000 NONE      Alarm Cleared
        Location: sam21 1:CSAM01-02
        Time: Thu Jul 30 17:48:45 EST 2002
```

SCU500, SCU501, and SCU502 log reports indicate that a NSS card has changed state, been removed from the shelf, or has been inserted into the shelf.

SCU500, SCU501, and SCU502 log reports

SCU500

```
OFC_NAME      SCU500 JUL30 17:48:52 5000 NONE INFO  State Change
        Location: sam21 1:CSAM01-02:shelf 1:slot 17:card 1
        Time: Thu Jul 30 17:48:45 EST 2002
        New state: Unlocked/Enabled/None
```

SCU501

```
OFC_NAME      SCU501 JUL30 17:48:52 5000 NONE INFO  Card Insert
        Location: sam21 1:CSAM01-02:shelf 1:slot 5:card 1
```

SCU502

```
OFC_NAME      SCU502 JUL30 17:48:52 5000 NONE INFO  Card Removal
        Location: sam21 1:CSAM01-02:shelf 1:slot 15:card 1
```

IPOA log reports

Alarms are available from the CS 2000 SAM21 Manager client in the Alarm browser or Card View windows. Log reports are available from the CS 2000 Core Manager. Use the **LOGQUERY** command on the CS 2000 Core Manager to view the logs. To view only IPOA log reports, use the **OPEN IPOA** command. If an OSS network is configured, the logs reports are transmitted to the OSS network.

For assistance with ATM alarms and ATM alarm clearing, refer to ATM Connection alarms.

Log report	Severity			Meaning	Action
	C	M	m		
IPOA301	X			Loss of cell delineation (LCD). All messages on the link are lost.	Check the fibers and connections between this node and the far end node.
IPOA302	X			SONET Alarm indication signal (AIS) alarm. This alarm is raised against the line or the path. The SONET layer link between this node and the far end node is broken.	Check the fibers and connections between this node and the far end node.
IPOA303	X			ATM connection fault. Virtual Circuits (VC) associated with the affected carrier are lost. Only messages on the affected VCs are lost. The entire link is not necessarily affected. An ATM AIS alarm (not a SONET AIS alarm) is raised against the VCs. CC Failure indicates continuity check failure.	Check the connection member states at the ATM connections window. If the alarms are raised against the link, check the fibers and connections between this node and the far end node. If the alarms are not raised against the link, check VC provisioning at this node and the far end node.

Log report	Severity			Meaning	Action
	C	M	m		
IPOA304	X			Connection members changed state and neither the active or inactive is available.	Check the fibers and connections between this node and the far end node.
			X	Connection members changed state and only one of the two is available.	
IPOA801			X	ATM CRC32 Threshold exceeded. A CRC calculation mismatch occured on a cell and the cell was discarded.	Check the fiber for dirt, misinsertion, and tight loops. Check the ATM interfaces for failures or dirt.

Examples

The following figure shows examples of IPOA log reports.

IPOA301

```
OFC_NAME  *** IPOA301 JUL30 10:50:52 5423 CRIT FLT  ATM Interfa
        Location: sam21 1:CSAM01-02
        SC Slot: 9
        Fault Type: LCD (Loss of Cell Delineation)
        Fault Date: Tue Jul 30 09:29:29 EST 2002
```

IPOA302

```
OFC_NAME  *** IPOA302 JUL30 10:50:52 5423 CRIT FLT  SONET Carri
        Location: sam21 1:CSAM01-02
        SC Slot: 9
        Carrier Type: STS3CP
        Fault Type: AIS (Alarm Indication Signal)
        Fault Date: Tue Jul 30 08:09:54 EST 2002
```

IPOA303

```
OFC_NAME  *** IPOA303 JUL30 10:50:52 5423 CRIT FLT  ATM Connect
        Location: sam21 1:CSAM01-02
        SC Slot: 9
        Carrier Type: STS3CP
        Fault Type: CC Failure
        Fault Date: Tue Jul 30 08:09:54 EST 2002
```

IPOA304

```
OFC_NAME  *** IPOA304 JUL30 10:50:52 5423 CRIT FLT  Alarm Raise
        Location: sam21 1:CSAM01-02:Connection Set:CC10 OAMP
        Time: Tue Jul 30 10:50:52 EST 2002
        Reason: ACT CM: FROM:Up TO:Down  INACT CM: FROM:Redirec
```

IPOA801

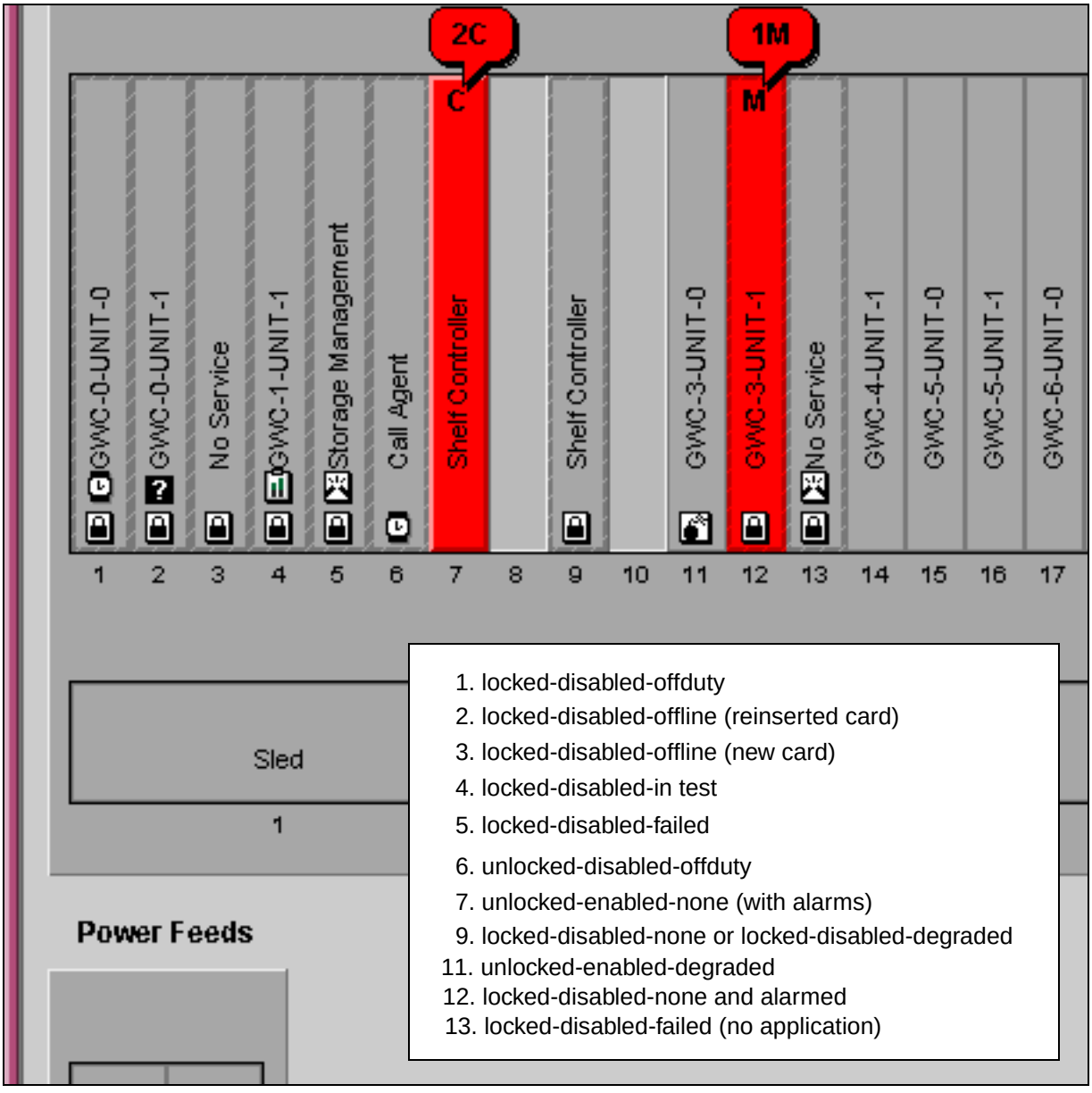
```
OFC_NAME    * IPOA801 JUL30 10:50:52 5423 MINOR FLT ATM CRC32 T
        Location: sam21 1:CSAM01-02
        SC Slot: 9
        Connection Set: CC04 Call Control
        Fault Date: Tue Jul 30 09:31:02 EST 2002
        Threshold: 37
```

Card icons

Use this procedure to determine the state of a card through the CS 2000 SAM21 Manager client.

At the CS 2000 SAM21 Manager client workstation

1 Review the following figure and determine the card icons that apply.



Note: These states also apply to Shelf Controllers.

2 To view the card state tab, right-click on the card icon and select Card View from the card context menu. In the Card View window that opens, select the States tab.

3 Determine the next action.

State	Possible action
locked-disabled-offduty  	Wait for the firmware flash to complete. Verify that the card changes to the locked-disabled-none state. For Gateway Controller (GWC) cards, this state is entered during the SN04 to SN05 upgrade while the Shelf Controller configures the GWC card for the dead shelf recovery (DSR) feature. If the card transitions to locked-disabled-degraded, follow the suggestions for that state.
unlocked-disabled-offduty 	For Call Agent cards, this state also represents the restart and reload of the call processing application during a routine exercise test (RExTst). When the Shelf Controller performs it's boot audit, any card that is not running or booting is set to this state until the Shelf Controller recovers the card.

State	Possible action
locked-disabled-offline (new card) 	Right-click on the card icon and select Assign Service from the card context menu. Select the correct service from the Assign Service window. If the question mark icon does not disappear, open the Card View and view the States tab. If the history text area indicates that service assignment failed because the service type is incompatible with the hardware, either replace the card with the correct hardware type, or unassign service from the shelf view and then assign the correct service type.
locked-disabled-offline (reinsertion)  	Wait for Shelf Controller to recognize the card and reinstate the provisioning information. The question mark icon disappears and the card transitions to a new state. Refer to the suggestions for the new state. If the question mark icon does not disappear, open the Card View window and view the States tab. If the history text area indicates that service assignment failed because the service type is incompatible with the hardware, either replace the card with the correct hardware type, or unassign service from the shelf view and then assign the correct service type. If the history text area indicates that the service assignment failed because the IP address is already reserved by another unit, contact network engineering to determine if another unit is misconfigured, or if this unit should be reconfigured.

State	Possible action
locked-disabled-none or locked-disabled-degraded  	Unlock the card by right-clicking on the card icon and select Unlock from the card context menu. Rerun diagnostics if the CS 2000 SAM21 Manager client generates a Degraded state Unlock confirmation window. If diagnostics fail a second time, replace the card and contact Nortel Networks support personnel. ***Note:*** The active Shelf Controller generates 2 critical alarms when the inactive Shelf Controller is locked. A locked-disabled-degraded state for non system slot (NSS) cards is also alarmed.
locked-disabled-failed  	This card is inaccessible. Verify the following items: • Shelf Controllers are in service • If the Shelf Controllers are in service, reinsert the card. If the card is not recognized, replace the card. If the replacement card does not enter unlocked-enabled-none, contact Nortel Networks support personnel.
locked-disabled-in test  	Wait for diagnostics to complete. Verify that the card changes to the locked-disabled-none state. Optionally monitor diagnostics progress from the Card View window.

State	Possible action
unlocked-enabled-degraded 	This card failed one or more diagnostics and was Unlocked. See Additional information below. This card may not be providing service or may be unreliable. Lock and run diagnostics on this card. If the card fails diagnostics, replace this card and contact Nortel Networks support personnel.
locked-disabled-none and alarmed 	This card has taken more than three minutes to complete a lock or unlock request. The alarm clears when the card completes the request or is removed from the shelf.
locked-disabled-failed (no application)  	The active Shelf Controller detects a card in the slot, but cannot through the backplane to the card. Reinsert the card.

Note: Refer to the Fault Management document for the affected card type.

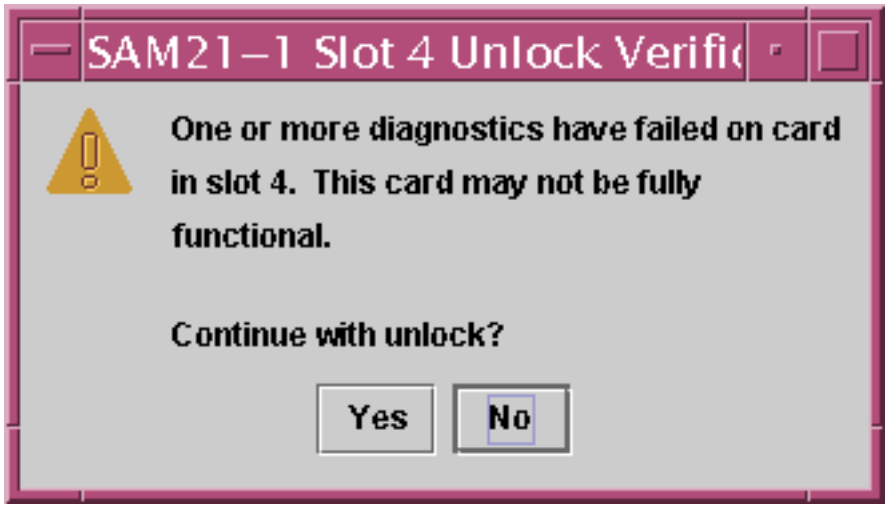
4 This procedure is complete.

Additional information

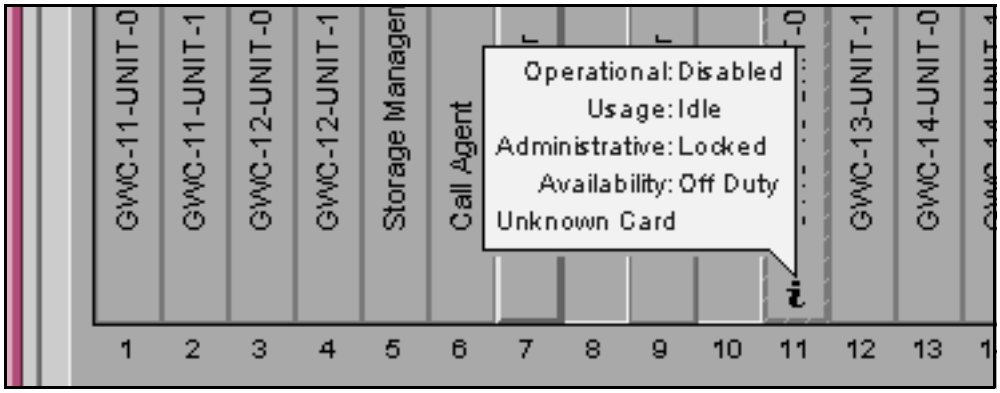
The CS 2000 SAM21 Manager application opens the following window if a card failed a diagnostic test and an unlock request is made. Run

brief and full diagnostics. If the card fails a second time, replace the card and contact Nortel Networks support personnel.

Degraded state Unlock confirmation window



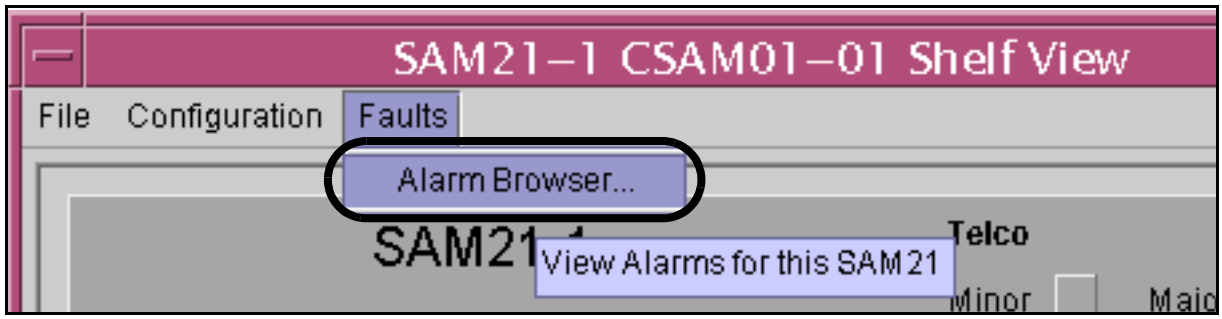
An additional shelf view card icon indicates that the CS 2000 SAM21 Manager client cannot display all the card icons. Click this information icon to view the card state information in a balloon. This icon normally indicates that the card type is not supported for the current release of the CS 2000 SAM21 Manager software.



At the CS 2000 SAM21 Manager client workstation

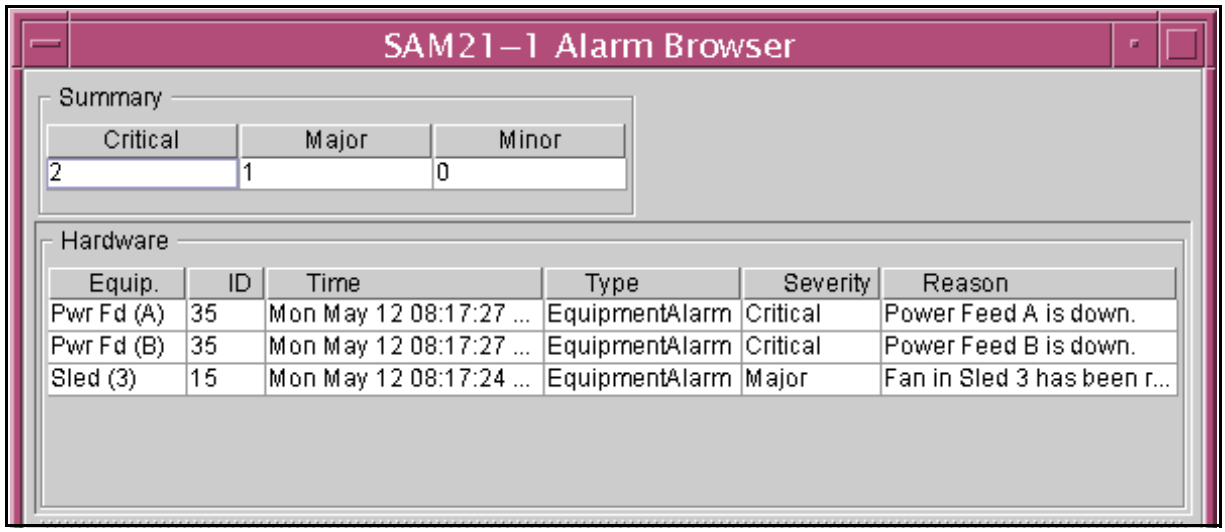
1 From the Subnet View, double click on the alarmed SAM21 icon to open the Shelf View window.

2 From the Shelf View window, select Faults from the menu bar and Alarm Browser from the drop down menu.



3 The Alarm Browser window shows alarm information for all cards in the SAM21 shelf.

Note: The alarm browser window is resizeable and contains information about Hardware and Services on the entire SAM21 shelf.



4 Refer to Hardware alarm IDs for information about clearing alarms. If the Shelf Controller is installed with an ATM interface, refer to Services alarm IDs for information about clearing ATM related alarms.

5 This procedure is complete.

Hardware alarm IDs

The following table provides the hardware alarm IDs and remedy suggestions.

Hardware alarm codes (Sheet 1 of 5)

Alarm ID	Log Report	Remedy
1	SCU301	`Extension bridge in Slot <x> is Up. Extension bridge in Sloy <y> is down.` Verify that the extension bridges in slots 15 back and 16 back on the rear of the SAM21 shelf are seated. If the alarm persists, replace the failing extension bridge.
10	SCU310	`CPU load high. One Minute Load is <x.xx>` If condition persists and reaches critical severity, ensure the Shelf Controller is in an Inactive state and then Lock and Unlock the Shelf Controller.

15	SCU315	Use the alarm text to determine which condition exists:
		• `Fan in Sled <x> is down`
		`Fan in Sled <x> has been removed.`
		Ensure sled is seated. Verify fan is spinning. Replace sled if problem persists.
		• `Temperature in Sled <x> is High`.
		Ensure ventilation to the fan is adequate and free of obstructions. Ensure that the cooling in the room is adequate.
		• `Diagnostic failed at test case`
		`Diagnostic failed, <xxxxxxxxxxxxxxx>`
		`Diagnostic failed due to SWACT.`
		Attempt the brief diagnostics. If brief diagnostics succeed, attempt full diagnostics. Record the progress information. Contact Nortel Networks support personnel if the diagnostic fails a second time.

Hardware alarm codes (Sheet 2 of 5)

Alarm ID	Log Report	Remedy

29	SCU329	Use the alarm text to determine which condition exists.
		• `Loss of Communications: Serial Connection <x> is down`
		`Loss of Communications: Serial Connection 1, Serial Connection 2 is down`
		Verify that the serial connections on the back of the shelf are intact.
		• `Loss of Communications: Mate Ethernet is Down`
		Verify Ethernet connectivity for the inactive Shelf Controller. This alarm is reported only by the active Shelf Controller.
		• `Loss of Communications: Remote Network is Down`
		Verify that the CS 2000 Core Manager is running. This alarm is reported by the inactive Shelf Controller only and indicates that the inactive Shelf Controller cannot ping the CS 2000 Core Manager.
		• `Loss of Communications: Mate Ethernet, Serial Connection <x> is down`
		`Loss of Communications: ISCS, Mate Ethernet, Serial Connection 2 is down`
		`Loss of Communications: Mate Ethernet, Serial Connection 1, Serial Connection 2 is down`
		These alarms are reported by the active Shelf Controller only. Verify Ethernet and serial cabling.
		• `Loss of Communications: Mate Ethernet, Serial Connection 1, Serial Connection 2, is down`
		This alarm indicates that both serial connections and the Ethernet connection to the inactive Shelf Controller are unavailable. Verify Ethernet and serial cabling. Lock and Unlock the inactive Shelf Controller.

Hardware alarm codes (Sheet 3 of 5)

Alarm ID	Log Report	Remedy

		• `Loss of Communications: Remote Network, Serial Connection <x> is down`
		`Loss of Communications: Remote Network, Serial Connection 1, Serial Connection 2 is down`
		This alarm is raised by the inactive Shelf Controller and indicates that the inactive Shelf Controller cannot ping the CS 2000 Core Manager but it can ping the mate Shelf Controller. Verify serial and Ethernet cabling.
		• `Loss of Communications: Local Ethernet Interface is down`
		The inactive Shelf Controller raises this alarm to indicate that it cannot ping the CS 2000 Core Mananger or it's mate over Ethernet. Verify Ethernet cabling.
		• `Loss of Communications: Local Ethernet Interface, Serial Connection <x> is down`
		`Loss of Communications: Local Ethernet Interface, ISCS, Serial Connection <x> is down`
		Verify serial and Ethernet cabling.
		• `Loss of Communications: All Communication Paths Down`
		Verify serial and Ethernet cabling. Verify router configuration.

32	SCU332	`Memory usage high. Less than <xx> Percent free.` If condition persists and reaches critical severity, ensure the Shelf Controller is in an Inactive state and then Lock and Unlock the Shelf Controller.
35	SCU335	Use the alarm text to determine which condition exists: • `Power Supply in Sled <x> is down.` `Power Supply in Sled <x> has been removed.` Ensure sled is seated. Replace sled if problem persists. • `Power Feed <x> is down.` Verify electrical power feed connection.

Hardware alarm codes (Sheet 4 of 5)

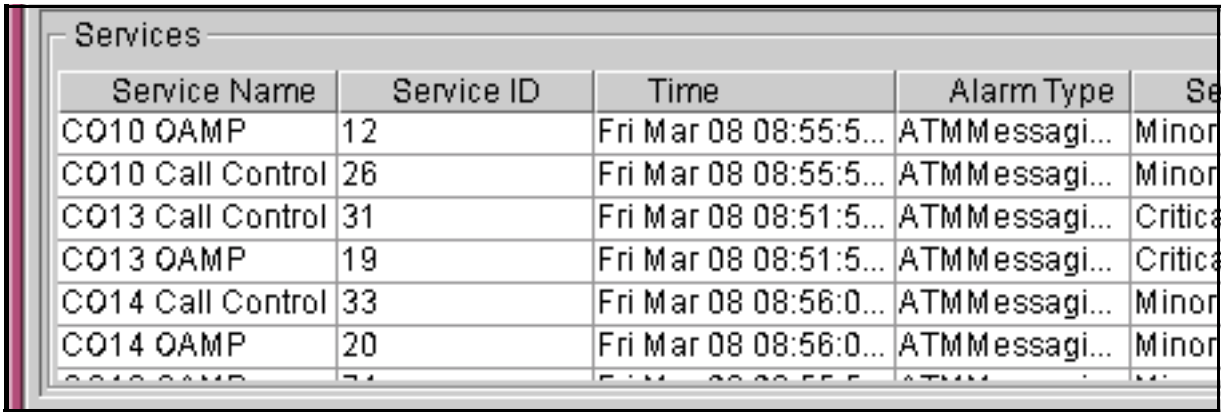
Alarm ID	Log Report	Remedy
44	SCU344	`Unlock action exceeds expected duration.` A NSS card has taken too long to Unlock or Lock. Verify Ethernet cable connections, router provisioning, BOOTP service, and that the software load for the card type is installed on the CS 2000 Core Manager.
46	SCU346	Use the alarm text to determine which condition exists: • `Firmware Flashing could not connect to the board` `Firmware Flashing failed at backing up firmware` Use the Card View window to resend provisioning information. • `Firmware Flashing failed at downloading firmware` Verify that the firmware file exsits in `/swd/sam21` on the CS 2000 Core Manager and that the BOOTP service is running. Reprovision the card. • `Firmware Flashing failed at validating firmware` Use the Card View window to resend provisioning information. Reinstall the SAM21 Platform fileset on the CS 2000 Core Manager if this problem persists. • `Firmware Flashing failed flash` Remove and reinsert the card. Use the Card View window to resend provisioning information. Do not enable the Firmware Flash checkbox for other cards of this type until the problem is resolved. Contact Nortel Networks support personnel if the problem persists. • `Large Number of Process Abnormally Terminated` If condition persists and reaches critical severity, ensure the SC is in an Inactive state and then Lock and Unlock the SC.

Hardware alarm codes (Sheet 5 of 5)

Alarm ID	Log Report	Remedy
48	SCU348	• `Provision failed: process ended abnormally` • `Provision failed, could not connect to board` • `Provision failed to set application type` Reprovision the card. If the problem persists, replace the card. If the card is not manually recoved, the CS 2000 SAM21 Mananer server automatically reprovisions the card. This action is taken only if the card was previously installed and provisioned in the same slot; a five minute time must also expire. After the card is recoved, an SCU500 log report is generated.
49	SCU349	`Disk usage high. Root file system has <xx> Percent free space.` If condition persists and reaches critical severity, ensure the Shelf Controller is in an Inactive state and then Lock and Unlock the Shelf Controller.
56	SCU356	`Mate Shelf Controller unavailable. Operating in Simplex.` Verify that the mate Shelf Controller is latched. Unlock the mate Shelf Controller. If unable to Unlock, contact Nortel Networks support personnel.

Services alarm IDs

Service alarms apply to ATM networks. The following figure shows the Services section of the Alarm Browser window.



Use the Service Name and Service ID to identify the Alarm.

The following table provides the service alarm IDs and remedy suggestions.

Service alarm codes

Service ID	Log Report	Remedy
7 or 9	none	`<x>% of ATM Capacity Reached` Review the ATM capacity Operational Measurements (OM) recorded to the host that provides the CS 2000 Management Tools. Use this data to characterize the interface usage and contact Nortel Networks support personnel for assistance with reengineering the network. The Service ID indicates the slot of the Shelf Controller that exceeded the capacity threshold.
integer	none	If the alarm is for a Connection Set, refer to ATM Connection alarms.

Use the Reason text to determine the previous and current IP Path state for the active and inactive Connection Members (CM).

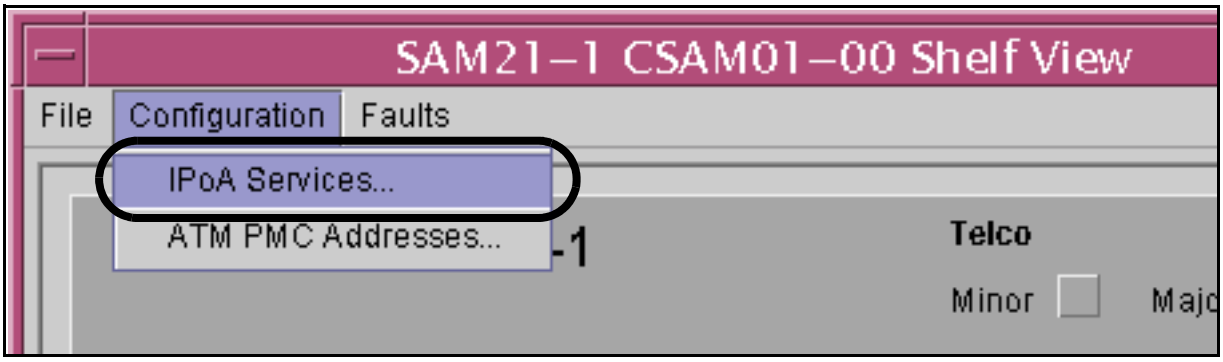
Example

```
ACT CM:FROM:Up TO:Up INACT CM:FROM:Down TO:Up
```

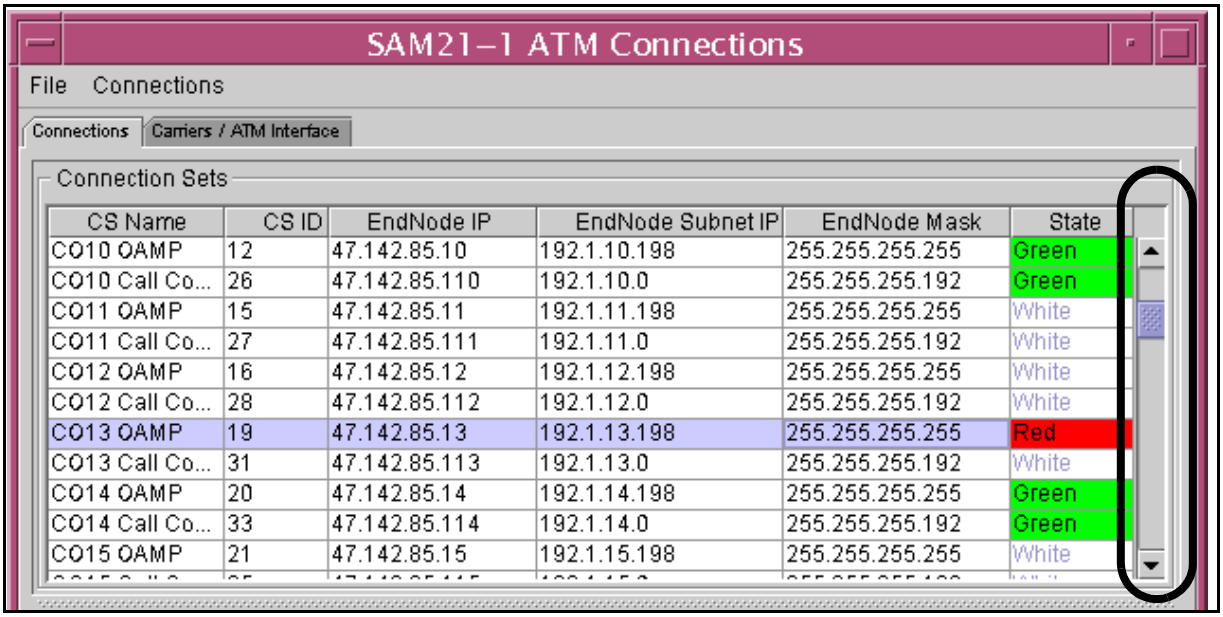
Refer to the ATM Connection alarms for more information about diagnosing ATM faults.

At the CS 2000 SAM21 Manager client workstation

1 Click on Configuration and then IPoA Services from the Shelf View to open the ATM Connections window.



2 Use the Connection Sets scroll bar to locate a Connection Set (CS) that is not Green, or use the Service ID from the Alarm Browser to locate the degraded CS and select the CS.

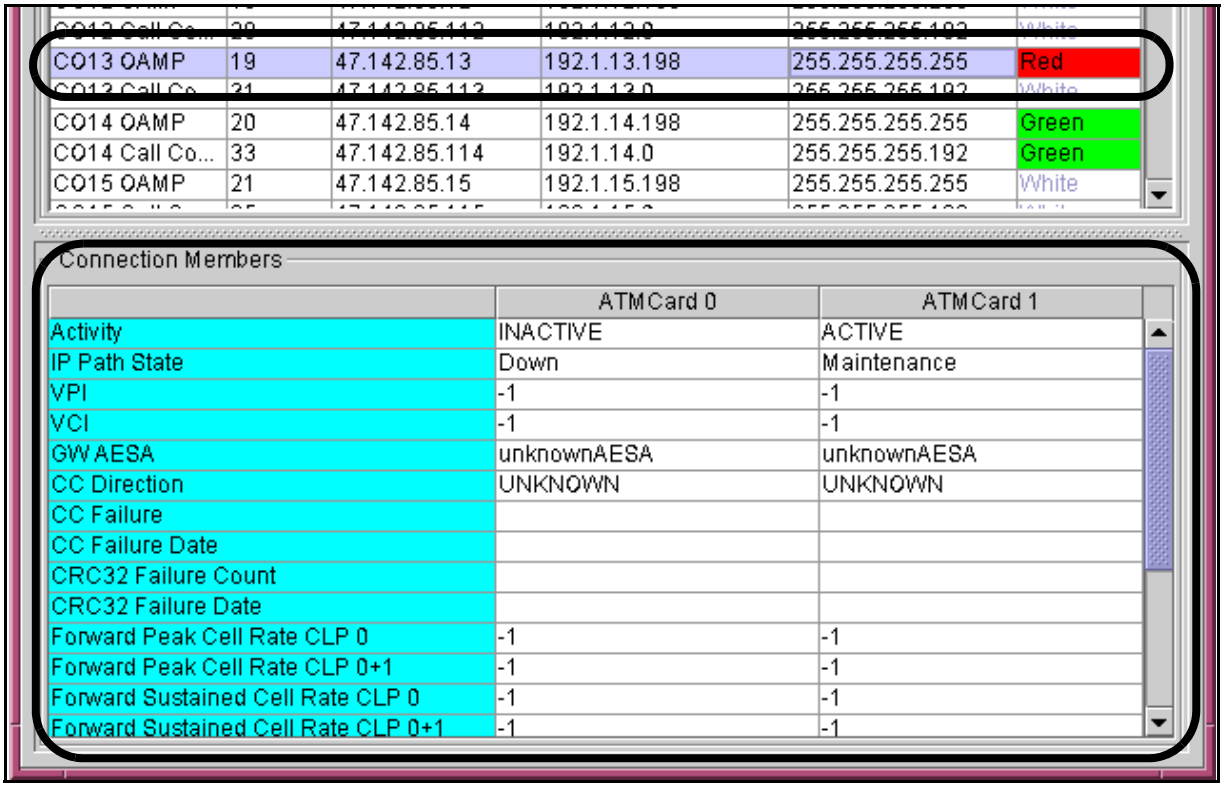


CS Name	CS ID	EndNode IP	EndNode Subnet IP	EndNode Mask	State
CO10 OAMP	12	47.142.85.10	192.1.10.198	255.255.255.255	Green
CO10 Call Co...	26	47.142.85.110	192.1.10.0	255.255.255.192	Green
CO11 OAMP	15	47.142.85.11	192.1.11.198	255.255.255.255	White
CO11 Call Co...	27	47.142.85.111	192.1.11.0	255.255.255.192	White
CO12 OAMP	16	47.142.85.12	192.1.12.198	255.255.255.255	White
CO12 Call Co...	28	47.142.85.112	192.1.12.0	255.255.255.192	White
CO13 OAMP	19	47.142.85.13	192.1.13.198	255.255.255.255	Red
CO13 Call Co...	31	47.142.85.113	192.1.13.0	255.255.255.192	White
CO14 OAMP	20	47.142.85.14	192.1.14.198	255.255.255.255	Green
CO14 Call Co...	33	47.142.85.114	192.1.14.0	255.255.255.192	Green
CO15 OAMP	21	47.142.85.15	192.1.15.198	255.255.255.255	White

The following table provides information about the state colors.

State color	Meaning
white	The connection is in a maintenance state.
yellow	One connection member IP Path state is up and the IP Path state on the active Shelf Controller is not maintenance.
green	The IP Path state for both active and inactive Shelf Controller is up.
red	The IP Path state for the active and inactive Shelf Controllers is not up or The IP Path state for the inactive Shelf Controller is up, but the IP Path state for the active Shelf Controller is maintenance.

3 Review the data in the Connection Members area.



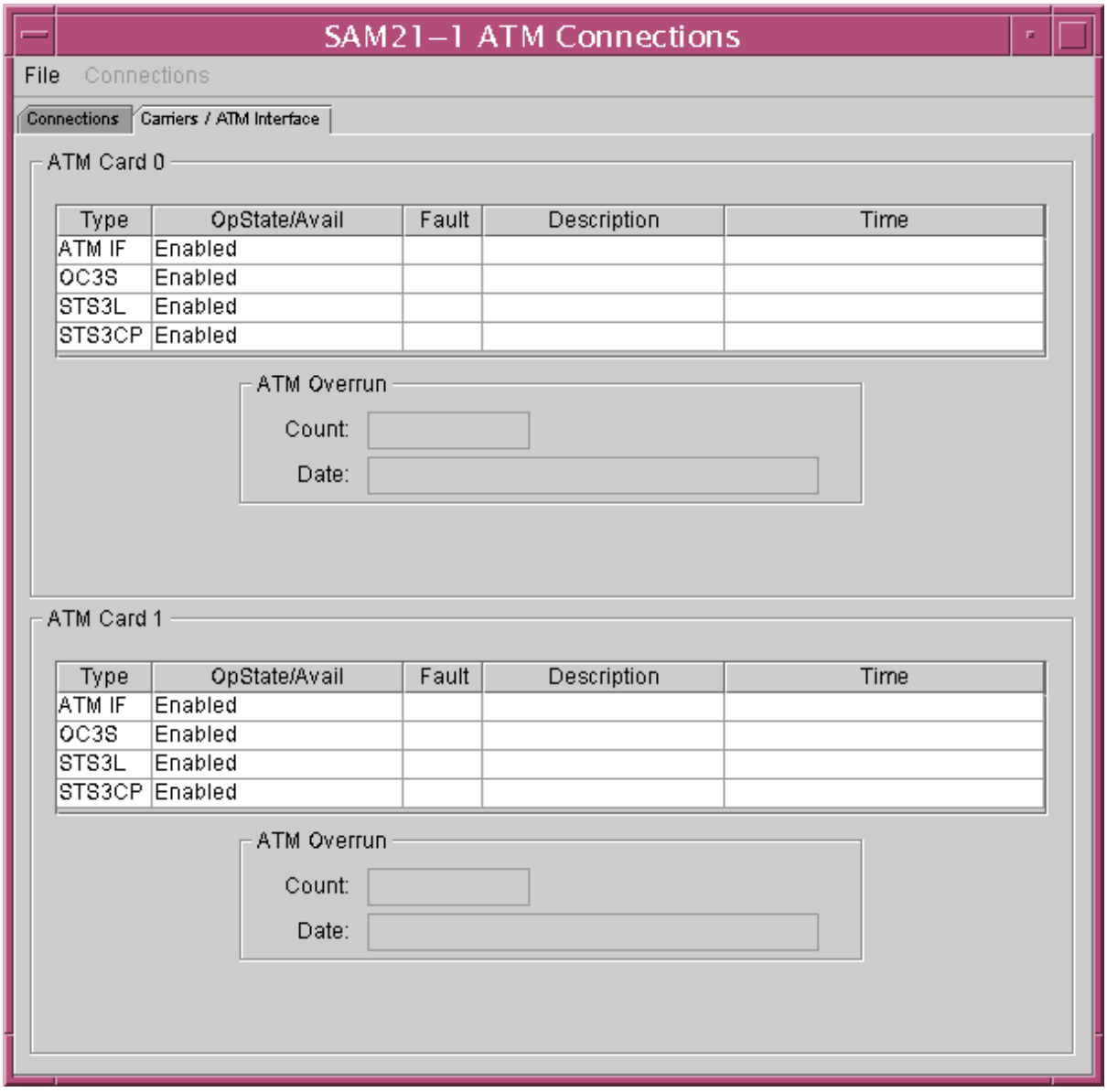
The following table provides information about the Connection Members area.

Field	Value	Meaning	Action
Activity	ACTIVE or INACTIVE	This indicates which Shelf Controller is active.	
IP Path State	Up	Connectivity is established with the far end node.	
	Down	Connectivity is not available to the far end node.	
	Maintenance	The Shelf Controller is locked or the far end node is not attempting to signal.	
	Redirect	Fiber connectivity between the active Shelf Controller and the far end node is lost. Signalling is carried between the inactive Shelf Controller and the far end node, but processing is completed by the active Shelf Controller.	Determine if a fiber is pulled or if a fiber repair is needed.
VPI	integer	Virtual Path Identifier	
VCI	integer	Virtual Channel Identifier	
GW AESA	20 hexidecimal pairs or unknownAESA	This is the address of the far end node. The first 14 bytes indicate the network identifier, the last 6 bytes indicate the host. “unknownAESA” indicates that connectivity is unavailable.	If the value is unknown, determine if the fiber connection is available.
CC Direction	UNKNOWN, CCinactive, CCsend, CCreceive, CCsendAndReceive	This value indicates the Continuity Checking value provisioned at the far end node.	

Field	Value	Meaning	Action
CC Failure	CCfailure or blank	Blank indicates no continuity check failures. CCfailure indicates that the far end node did not reply to a periodic audit.	Verify that the fiber connections are tight at the near and far end. Initiate diagnostics on the far end node interface card to verify hardware integrity.
CC Failure Date	date	This value indicates the date of the latest CC Failure.	
CRC Failure Count	integer	This value indicates the cumulative number of CRC32 failures.	Zero failures are expected in a lightly loaded network. If CRC failures appear, verify that the fiber connections are clean. If the network is heavily loaded, consider reengineering the network.
CRC Failure Date	date	This value indicates the date of the latest CRC failure.	

Note: The other values on this panel are configured at the far end node and are not used for troubleshooting.

4 Review the data on the Carriers tab.



The following table provides information about the Carriers panel.

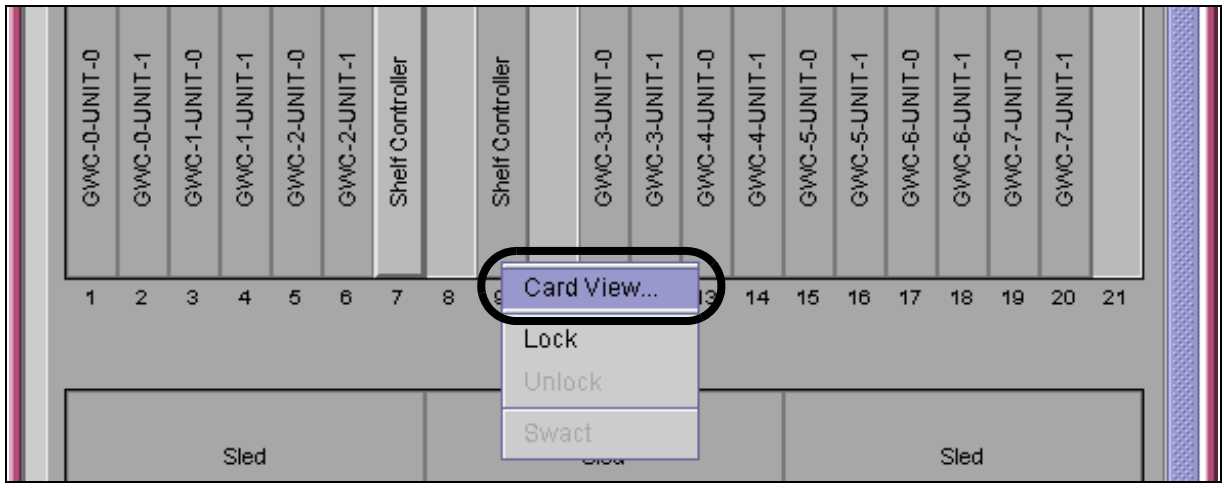
Fault	Action
LOS LOF AIS-L RDI-L AIS-P RDI-P LOP	These section, line, and path faults indicate that SONET connectivity between the Shelf Controller and the far end node is unavailable on one fiber. Check the fibers and connections between the Shelf Controller and the far end node.
ATM Overrun Count	This field indicates the number of times cells were dropped. The cells were dropped because due to a shortage of buffer space. Verify the following items: • the ATM network between the Shelf Controller and the far end node is not overloaded • the network does not have a babbling NE
ATM Overrun Date	This field indicates the date of the last overrun.

5 This procedure is complete.

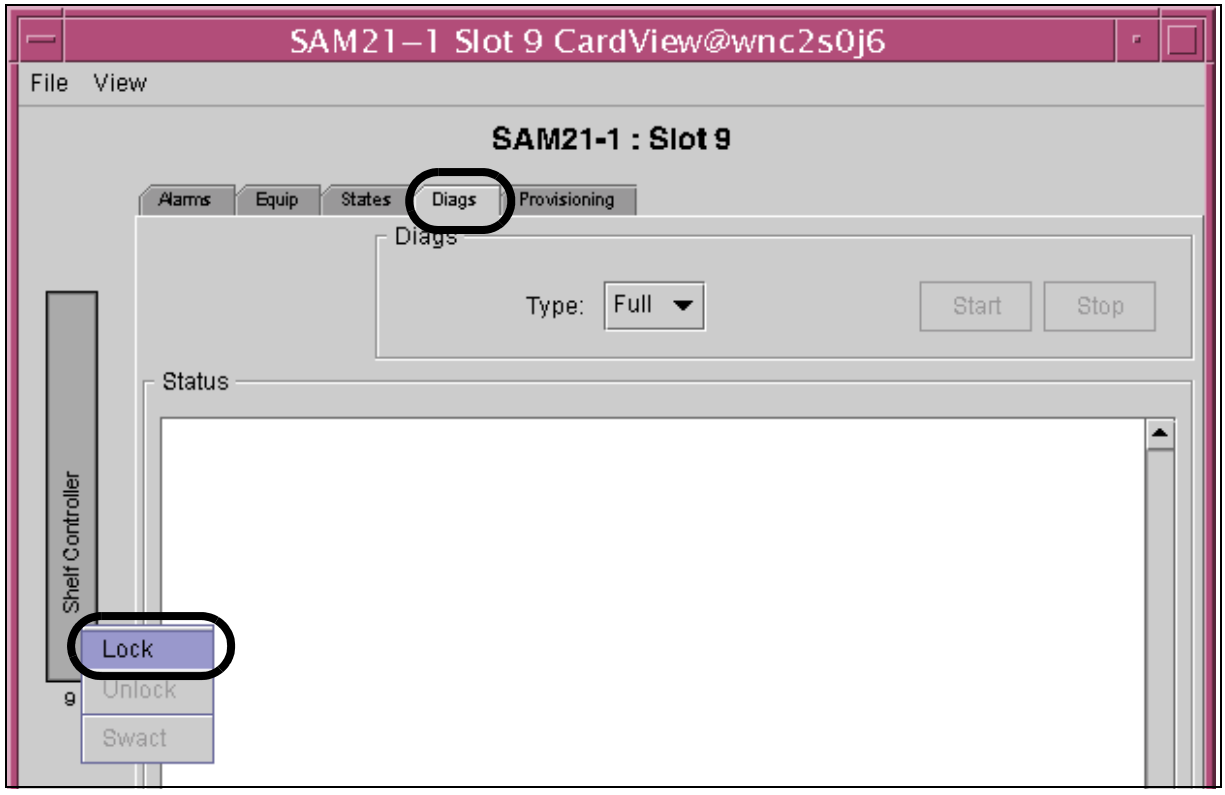
Run diagnostics

At the CS 2000 SAM21 Manager client workstation

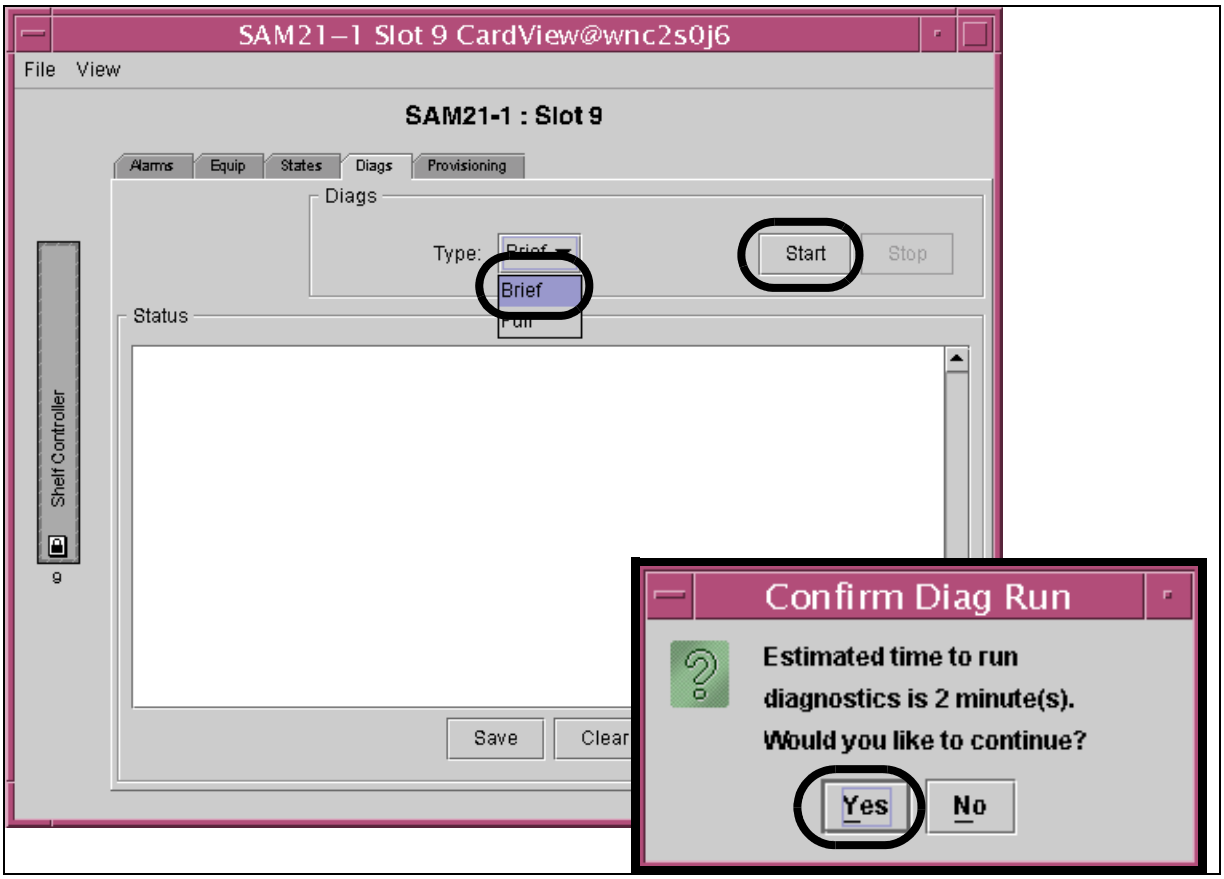
1 Open the Card View window for the Shelf Controller.



2 Click on the Diags tab and Lock the Shelf Controller from the card icon.



3 Select Brief or Full diagnostics and then Click Start and confirm the diagnostic run prompt.

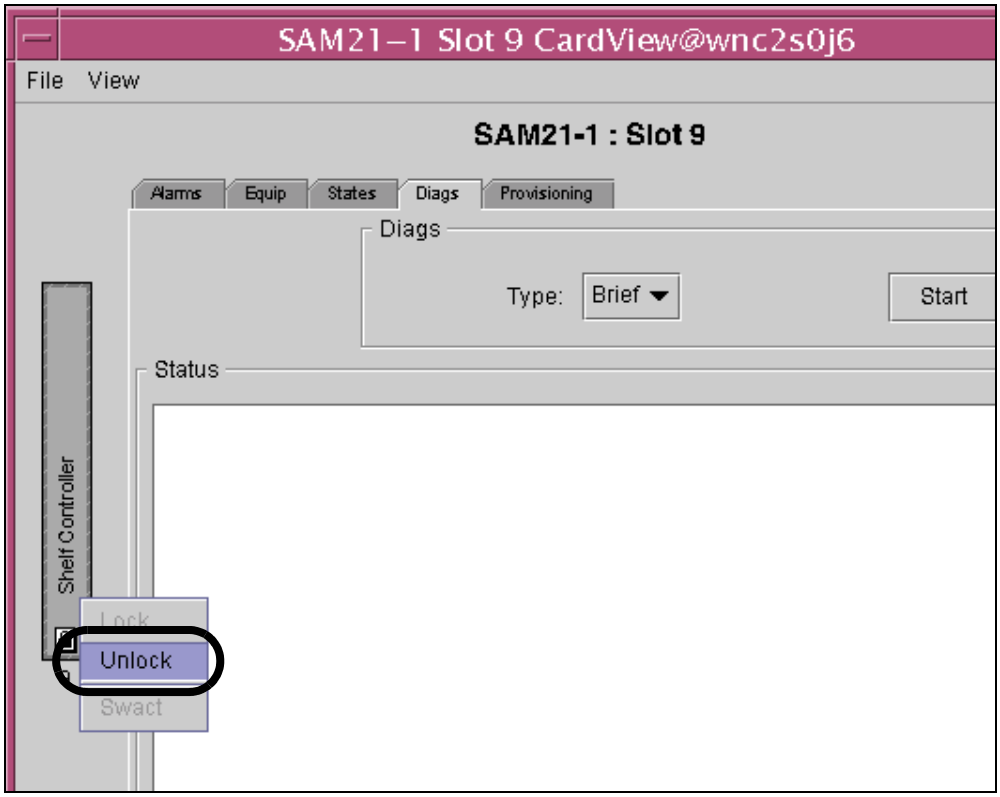


4 Wait for diagnostics to complete and to indicate Success.

If diagnostics fail, retry Brief and then Full. If either diagnostic fails, contact Nortel Networks support personnel for assistance with replacing the Shelf Controller card.

5 Optionally save the diagnostic messages to a file by clicking the Save button.

6 Unlock the Shelf Controller.



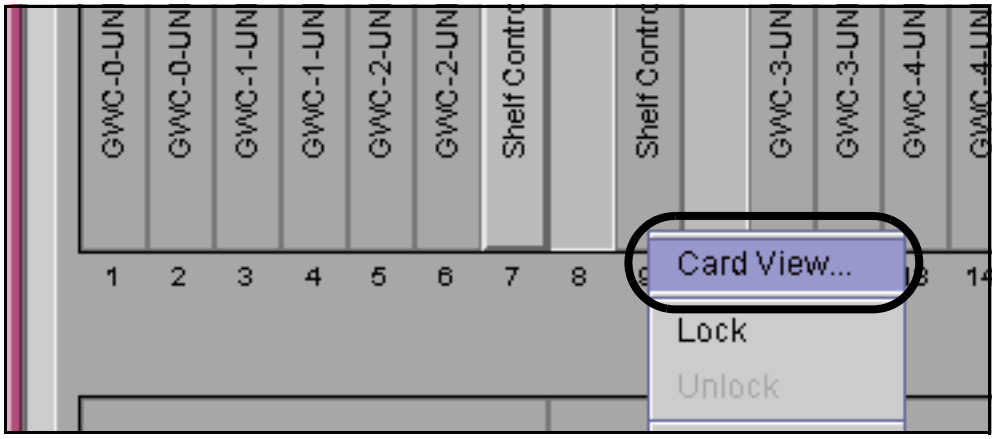
7 This procedure is complete.

Shelf controller status history retrieval

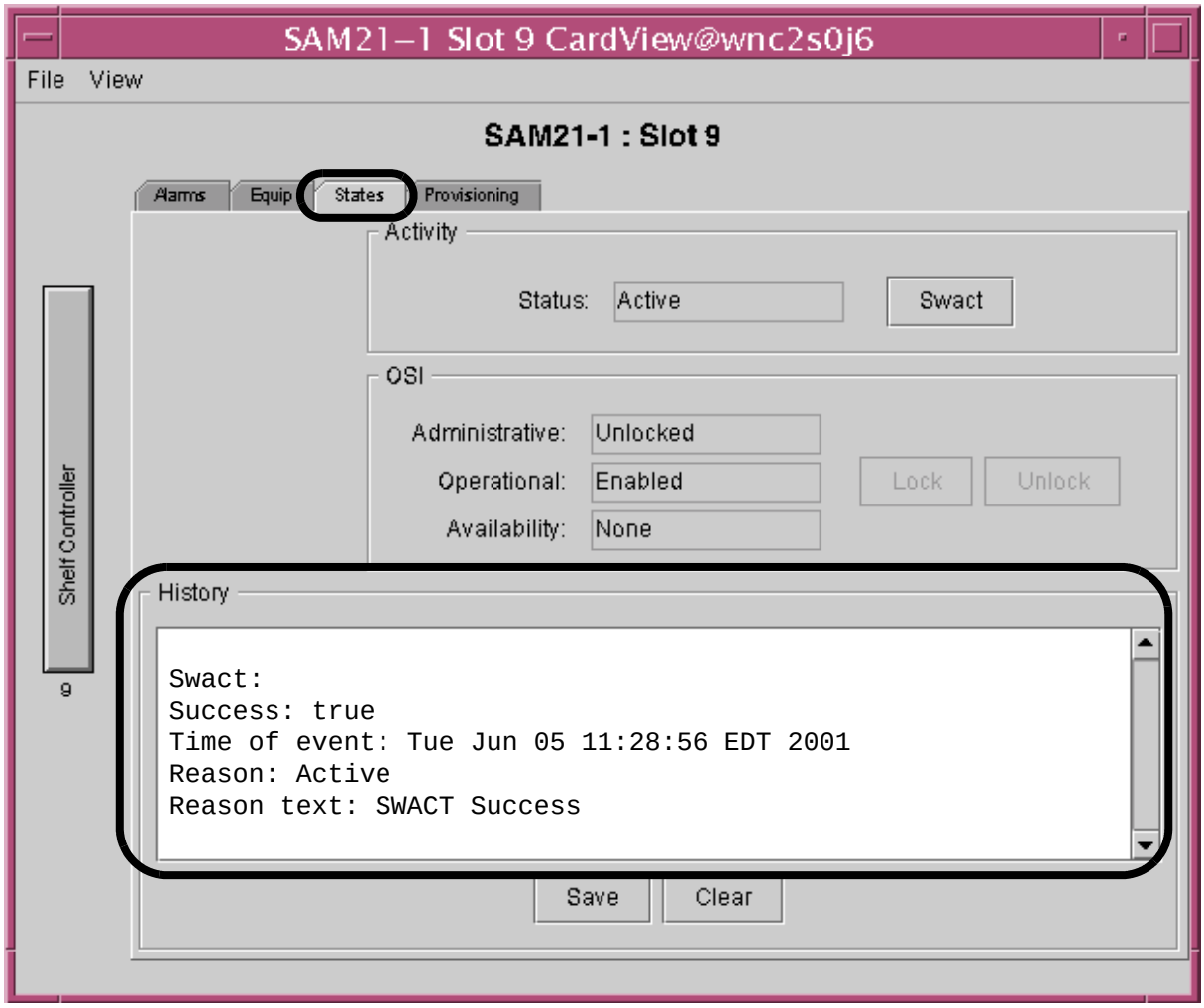
The Shelf Controller does not provide alarm history. The Shelf Controller does provide a history of the card status.

At the CS 2000 SAM21 Manager client workstation

1 From the Shelf View, right click on the Shelf Controller and select Card View from the context menu to bring up the Shelf Controller window.



2 Select the States tab from the Shelf Controller window.

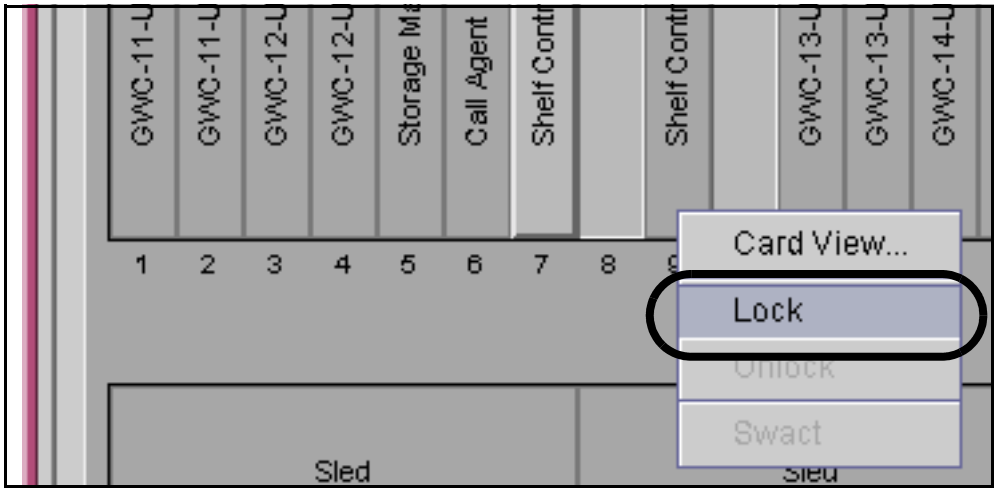


3 This procedure is complete.

Shelf Controller reload or restart

At the CS 2000 SAM21 Manager client workstation

1 From the Shelf View, right click on the card and select Lock from the context menu.



2 Wait for the lock icon to appear on the selected card and the other Shelf Controller to indicate that it is in simplex (alarm 2C on the other Shelf Controller).

3 Right click on the card again and select Unlock from the context menu.

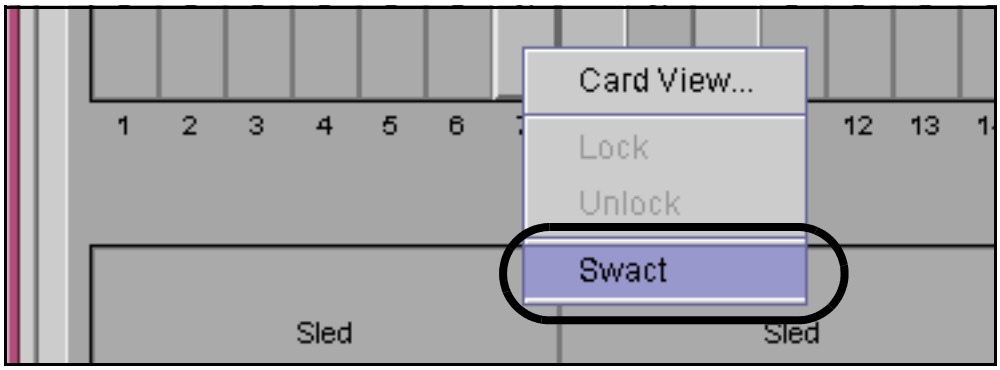
The card resets, downloads software, and reboots.

4 This procedure is complete.

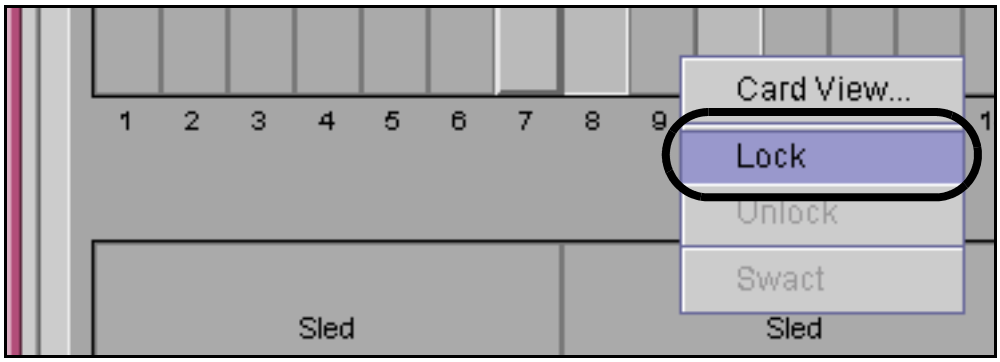
At the CS 2000 SAM21 Manager client workstation

1 If the Shelf Controller to be replaced is not inactive, Swact the Shelf Controllers by right clicking on the Shelf Controller in the Shelf View and selecting Swact from the context menu.

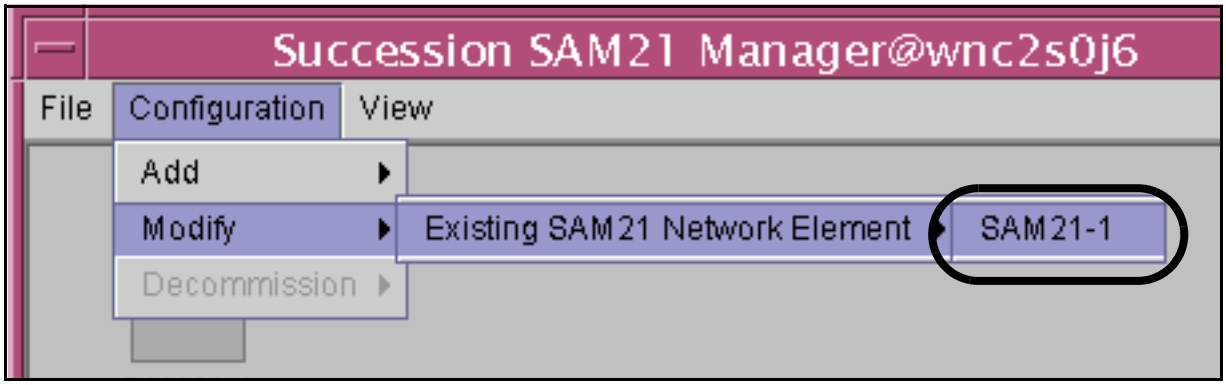
If the Shelf Controller is configured with an ATM interface, perform the Swact at a period of low activity.



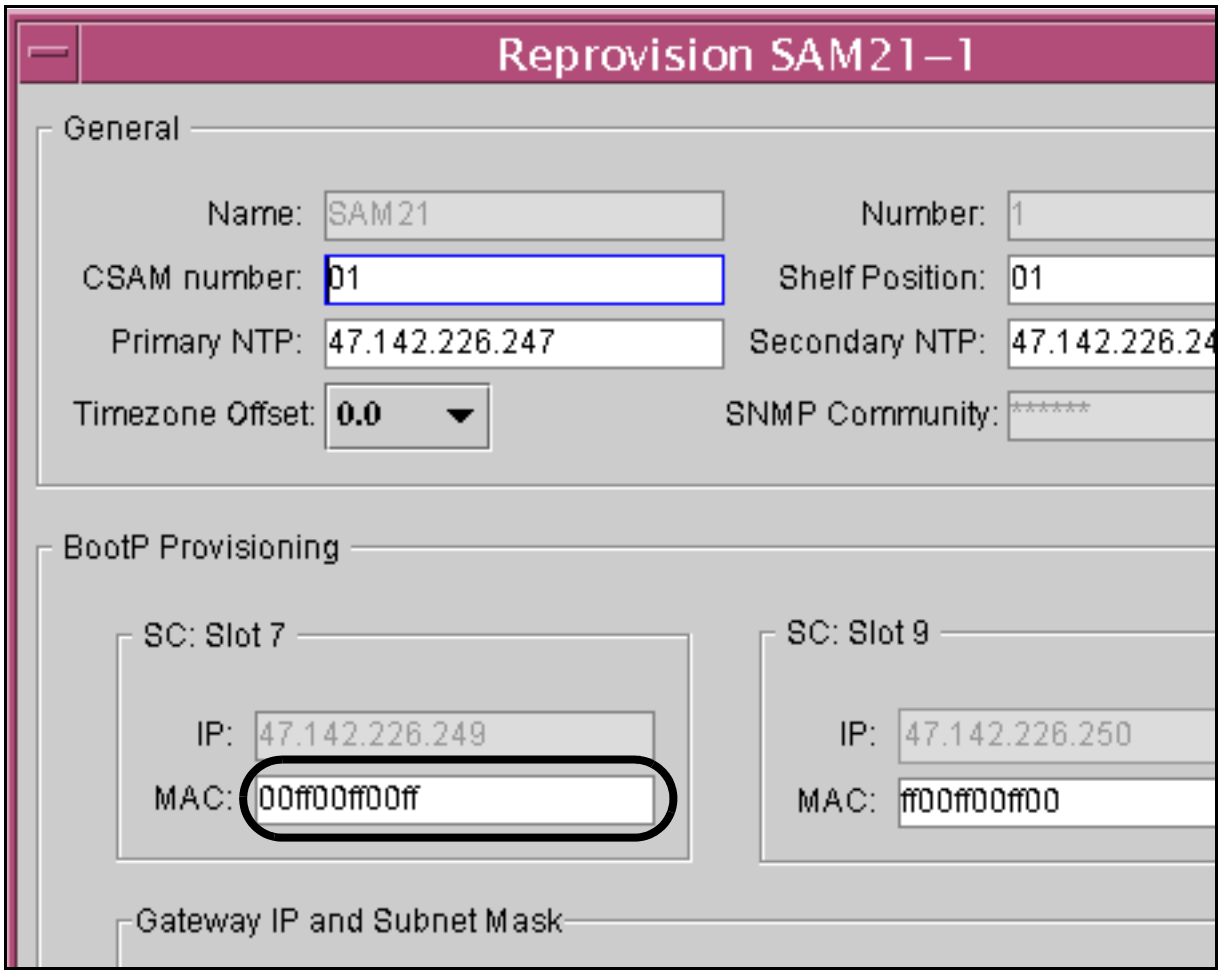
2 Lock the Shelf Controller.



3 From the Subnet View window, select Configuration, Modify, Existing SAM21 Network Element, and then the SAM21 shelf from the menu bar.



4 Change the MAC address provisioning to the MAC address of the replacement Shelf Controller. The MAC address is printed on the faceplate of the Shelf Controller.



5 Select the Save button from the Reprovision window to commit the change.

At the SAM21 frame

6 Unlock the ejector levers on the Shelf Controller card. Verify that the green LED is not lit and that the red LED is lit. If the green LED is lit, then this Shelf Controller is not locked and is not the Shelf Controller to replace.

7 Remove the Shelf Controller card and replace with the new Shelf Controller card.

Hold the replacement Shelf Controller card by the latches and insert the Shelf Controller by holding the latches. Do not push on the faceplate.

Note: Verify that the CPU LED lights. If the CPU LED does not light, reseat the card. If the CPU LED fails to light a second time, replace the card.

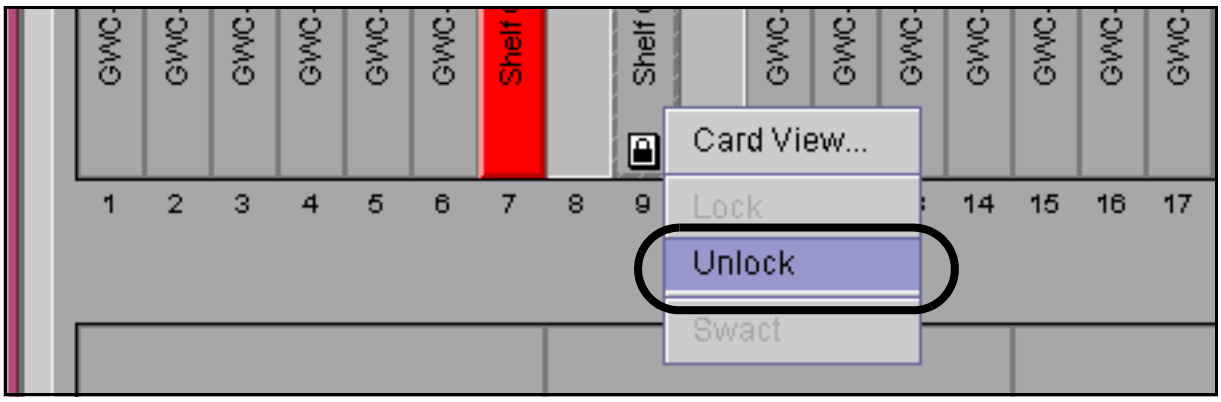
At the CS 2000 SAM21 Manager client workstation

8 Wait for the Shelf Controller to appear in the Shelf View window.

9 Right click on the card icon and select Unlock from the card context menu.

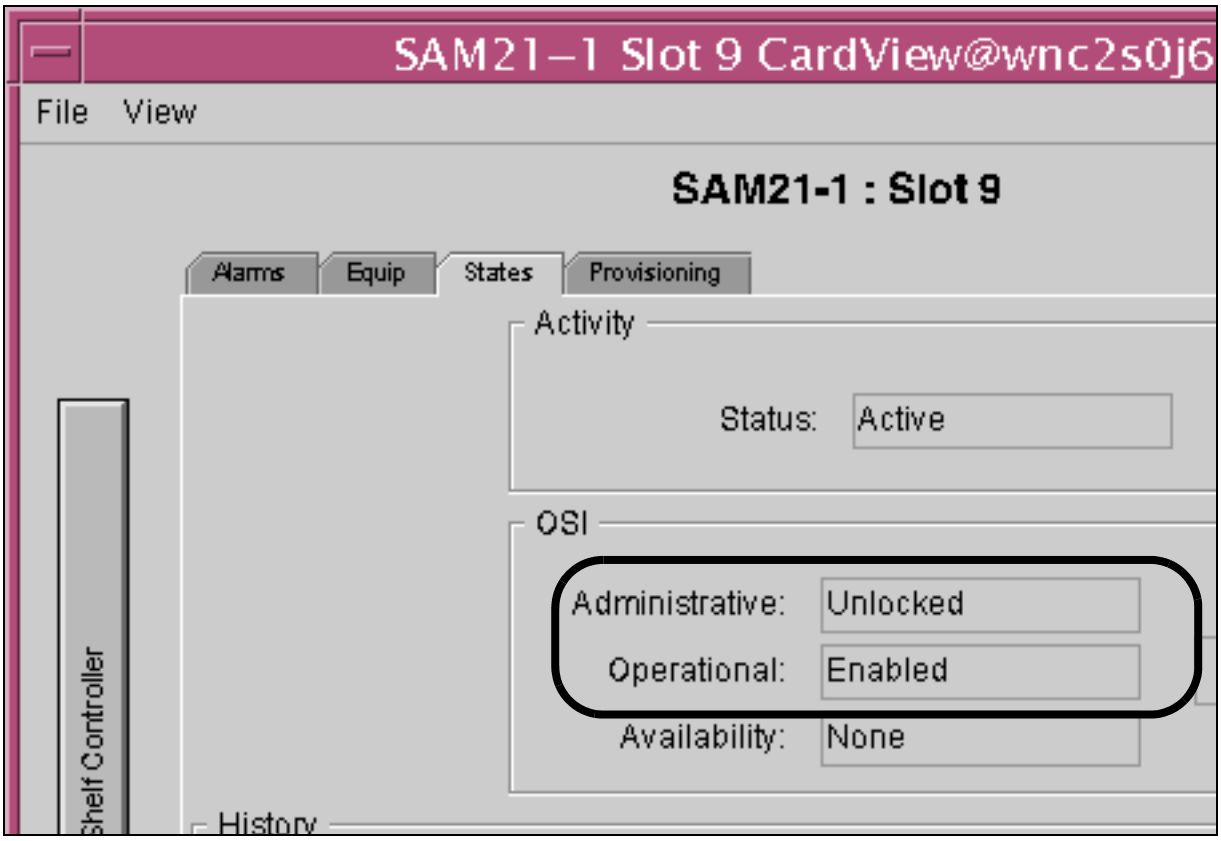
Note 1: If the replacement Shelf Controller has the current firmware revision, then the Shelf Controller unlocks.

Note 2: If the replacement Shelf Controller firmware requires an update, then the active Shelf Controller unlocks the replacement Shelf Controller and downloads the updated firmware. The active Shelf Controller then applies the firmware, but does not boot the replacement. The card icon appears with a dashed outline and no lock icon. Refer to SAM21 Shelf Controller does not unlock in *SAM21 Shelf Controller Upgrades*, NN10067-461.



10 Right click on the Shelf Controller icon and select Card View from the context menu.

11 Select the States tab from the Card View window and wait for the Administrative field to indicate Unlocked and the Operational field to indicate Enabled.



12 This procedure is complete.