Dominion SX

Installation and Operations Manual

SX16
SX32

Raritan®

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Dominion SX

Installation and Operations Manual

SX16
SX32

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DSX-0A-E
October 2003
255-60-2000

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EXPORT NOTICE

Dominion SX models contain 128-bit encryption software. Export of this product is restricted under U.S. law. Information is available from the U.S. Department of Commerce, Bureau of Export Administration at www.bxa.doc.gov.

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Chapter 1: Introduction

Dominion SX Overview

The Dominion SX Series of Serial over IP Console Servers offers convenient and secure, remote access and control via LAN/WAN, Internet or Dial-up modem of all networking devices. Dominion SX connects to any networking device (servers, firewalls, load balancer, etc.) via the serial port and provides the ability to remotely and securely manage the device using any Web browser. Dominion SX provides a non-intrusive solution for managing network elements and does not require any software agents to be installed on the target device.

Product Photos

Dominion SX is a fully configured stand-alone product in a standard 1U 19” rack mount chassis

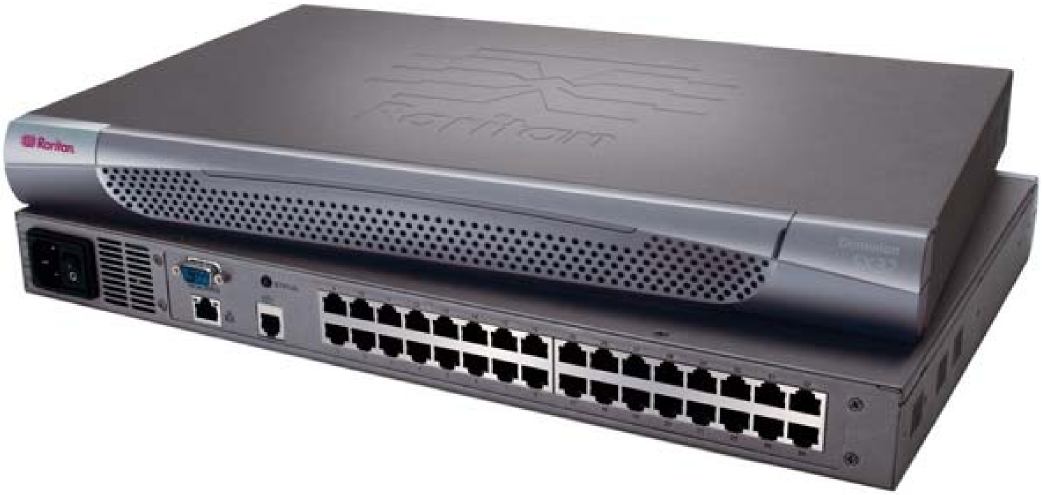


Figure 1 Dominion SX32 Unit

Product Features

Comprehensive Console Management

- Remote Management: Access, monitor, administer, and troubleshoot up to 16 or 32 target devices (depending on model) from any Web browser while consuming only one IP address.
- Scripting: Create, store and execute scripts either on demand or on a continuous basis
- Notification: Create notification messages via email alerts
- Collaborative Management and Training: Access pots simultaneously; up to 10 users per port at any time.
- SecureChat™: “Instant message” other users securely and collaborate on device management, troubleshooting, and training activities.
- Get History: Get up to 999 lines of recent console history to assist with debugging.
- VT100 Console Window: View VT100 terminal emulation including copy/paste and record/playback functionality.
- Three Levels of User Access:
  - **Administrator**: Has read and write access to the console window; can modify the configuration of unit.
  - **Operator**: Has read and write access to the console window; cannot modify the configuration of unit (except own password).
  - **Observer**: Has read-only access to the console window; cannot modify the configuration of unit (except own password).

Strong Security and User-Authentication

- Encryption Security: 128-bit Secure Socket Layer (SSL) handshake protocol and RC4 encryption.
- User Authentication Security: Login Name and Password scheme (MD5 Hash) with global Access Control List (ACL).
- Supports RADIUS (can be configured as a RADIUS client).
- Supports User-defined and installable security Certificates.

Reliable Connectivity

- Modem Connectivity: For emergency remote access if the network has failed.
- Target Device Connectivity: Simplified RJ45-based CAT5 cable scheme; serial port adapters are available from Raritan.

Simplified User Experience

- Browser-based Interface: Graphical User Interface provides intuitive access to target devices (click on the appropriate button to select the desired target device).
- Upgrades: Built-in firmware upgrade capability via FTP/Internet.
- Ability to load specific applications per console port for ease of use; specific applications are available from Raritan.

Package Contents

Each Dominion SX ships with the following:

- (1) Dominion SX unit with mounting racks installed (Rackmount kit is optional on some units)
- (1) Raritan User Manual CD-ROM containing the Dominion SX Installation and Operations Manual
- (1) Power cord
- (1) Release Note page
- (1) Packing List page

Chapter 2: Installation

This section describes the steps necessary to configure Dominion SX for use on a local area network (LAN). All new Dominion SX units come with default network settings, illustrated in the table below. Once units are connected to the network, these default settings will allow the user to configure Dominion SX for normal use.

There are three separate tasks you must complete to use Dominion SX on the network: Hardware Installation, Initial Software Configuration, and Dominion SX Deployment, usually completed in this order, and each described in this chapter.

Hardware Installation describes how to connect the Dominion SX unit to a computer to perform the initial configuration of the unit. This step requires an additional computer that will be used to log into the Dominion SX unit and configure it for the first time in the next section.

Initial Software Configuration describes how to connect to Dominion SX in its default state and to configure it for use in a specific network environment.

Dominion SX Deployment describes how to install a Dominion SX unit on the network once the Initial Software Configuration is complete.

Pre-Configuration Notes

The following list includes information that you will be required to supply to complete the configuration of the Dominion SX. Obtain all required configuration information prior to performing the configuration steps outlined below. If you are uncertain of any information, contact your system administrator for assistance.

Network Information:

- **Raritan Unit Name**: The name of this unit, a generic term for the Dominion SX unit. This can be 64 characters maximum, no minimum, no spaces.
- **IP address**: The IP address of the unit, as directed by your network administrator.
- **IP subnet mask**: The IP subnet mask for the unit, as directed by your network administrator.
- **IP gateway**: The IP gateway for the unit, as directed by your network administrator.
- **Port Address**: Any number from 2000 to 2400, as directed by your network administrator; default value is 23. Choosing a number other than 23 can potentially improve security.

Hardware Installation

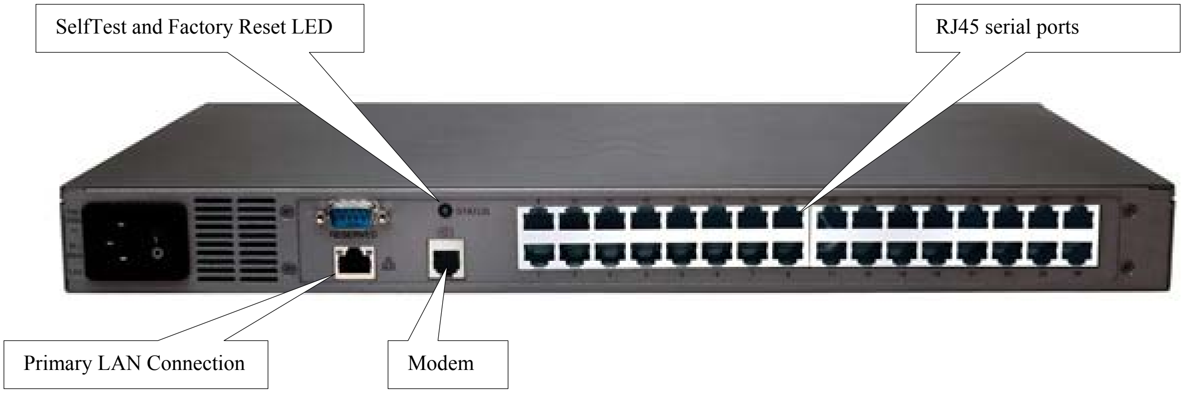


Figure 2 Rear Panel

Physical Installation of Dominion SX for Initial Configuration:

1. Obtain a computer with a network card and crossover network cable. This computer will be referred to as the ‘installation computer.’
2. A unique MAC address for each unit is shown on a sticker on the chassis. Make a note of this address prior to physical installation.
3. Physically mount the unit in an ergonomically sound manner. The unit is designed to be easily rack-mounted, and rack mounting is recommended.
4. Connect the crossover network LAN cable to the primary LAN connection on the back of the chassis. Connect the other end to the network card in the installation computer.
5. Connect the female end of the external power cord to the back of the chassis.
6. Connect the male end of the external power cord to the power supply outlet. Power ON the Dominion SX unit.

> ***Note**: The unit will perform a hardware and firmware self-test, indicated by the green light on the back of the chassis, and then start the software boot sequence. The boot sequence takes approximately 30-60 seconds, and is complete when the green light goes on and remains on.*

7. Each unit comes with a certain set of configuration defaults henceforth referred to as Factory Reset Mode. The default network settings for this mode are:

Internet Address (IP)	192.0.0.192
Gateway Address	192.0.0.192
Subnet Mask	255.255.0.0
Port Address	23

Figure 3 Default Settings for Factory Reset Mode

8. Ensure that your installation computer can communicate with IP address 192.0.0.192. First, verify that the installation computer has the route for 192.0.0.192:
   a. On the command line interface of the installation computer, enter the command **route print**.
   b. If 192.0.0.192 is on the gateway list, proceed to the next step. Otherwise, add 192.0.0.192 to the gateway list: type the following commands into either a DOS or UNIX command line interface on the installation computer where your browser is running:
      i. On a Windows NT/95/98/2000 system: **route add 192.0.0.192 <client_host IP address>**

      Example:

      route add 192.0.0.192 15.128.122.12

      ii. On a UNIX (incl. Sun Solaris) system: **route add 192.0.0.192 <client_host IP address> -interface**

      Example:

      route add 192.0.0.192 15.128.122.12 -interface
9. On the command line interface, type: **ping 192.0.0.192.**
   a. If this command successfully produces a reply from the Dominion SX unit, please proceed to step 10.
   b. If this does not produce a reply, verify that the default IP address is entered correctly and there is a route to that IP address.
10. Use the installation computer to connect to the unit, typing the factory default IP address **192.0.0.192** in the installation computer Web browser’s address line. Once you have reached the unit’s initial configuration screen, proceed to the Initial Software Configuration section that follows.

Initial Software Configuration

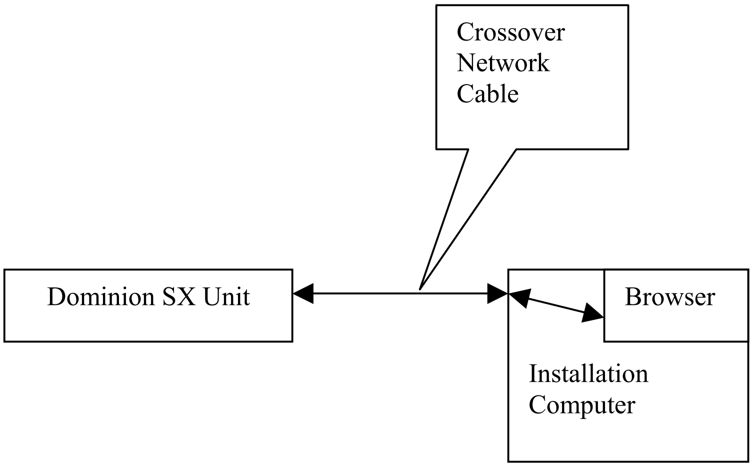


Figure 4 Hardware Setup for Initial Software Configuration

User Information:

This information should be entered for each user, up to 50 user accounts, with at least one administrator for each Dominion SX unit:

- **User Name**: 32 characters maximum, one character minimum, spaces permitted.
- **Login Name**: 20 characters maximum, one character minimum, no spaces.
- **User Type**:
  - Administrator: Can modify configuration of the unit, has read/write access to the console window.
  - Operator: Cannot modify configuration of the unit (except own password), has read/write access to the console window.
  - Observer: Cannot modify configuration of the unit (except own password), has read-only access to the console window.
- **Information**: Any additional information (text) you want associated with this user. Can be 64 characters maximum, no minimum, spaces permitted.
- **Password**: Alphanumeric text, 6–16 characters in length, no spaces. The first six characters of the password must contain at least two alpha and one numeric character; the first four characters cannot be the same as the user name.

Configuration

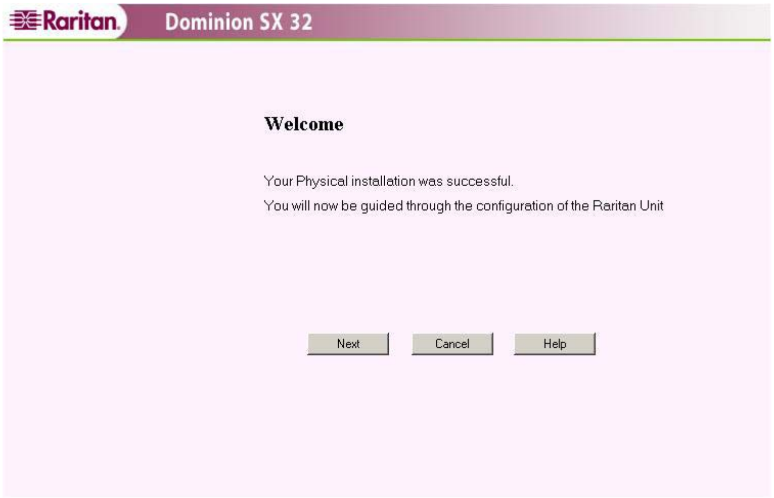
1. Disable **Proxies** in the installation computer Web browser.
   Use "no Proxies" or temporarily add **192.0.0.192** to the list of URLs for which no proxy is configured.
2. Enable Java™ Applet Execution in the installation computer Web browser.
3. Access the unit through your installation computer Web browser on the same subnet by typing the URL **https://192.0.0.192** into the address/location field.
4. Follow the configuration instructions on the screen.

> ***Note**: At this point you will enter all of the initial configuration information listed in Pre-Configuration Notes.*

5. The unit will reboot automatically once it has been configured. The unit now has the user-defined configuration settings, including a new IP address and is ready to be powered off, disconnected from the installation computer, and moved to its intended location.

Step-by-Step Configuration

1. Access the unit through your Web browser on an installation computer that is on the same subnet by typing the URL: **https://192.0.0.192.**



Welcome

Your Physical installation was successful.

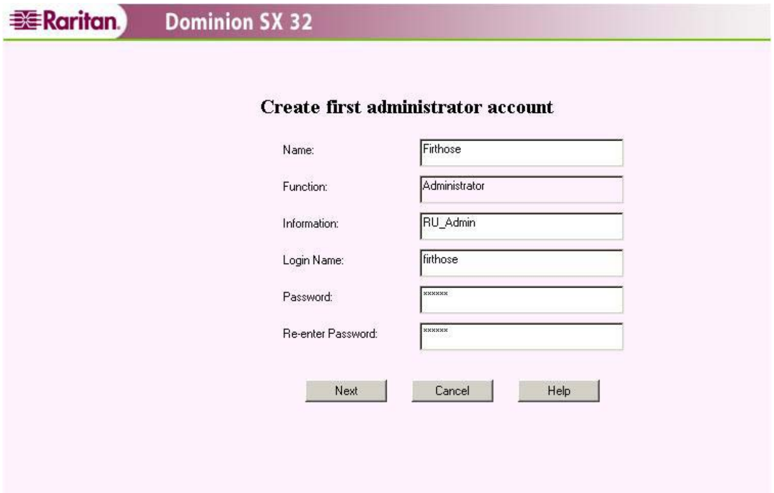
You will now be guided through the configuration of the Raritan Unit

Figure 5 Initial Configuration showing Physical Installation was successful

2. Click on the [**Next**] button to add users.

3. When the User Configuration Window appears, enter the information for the first user for Dominion SX. By default, the first user will have Administrator privileges. All fields except for the Information field are required.

   – **Name**: User's (real) name
   – **Information**: Descriptive information about this user
   – **Login Name**: Unique login identifier
   – **Password**: User's password
   – **Re-enter Password**: Confirm password by re-typing it



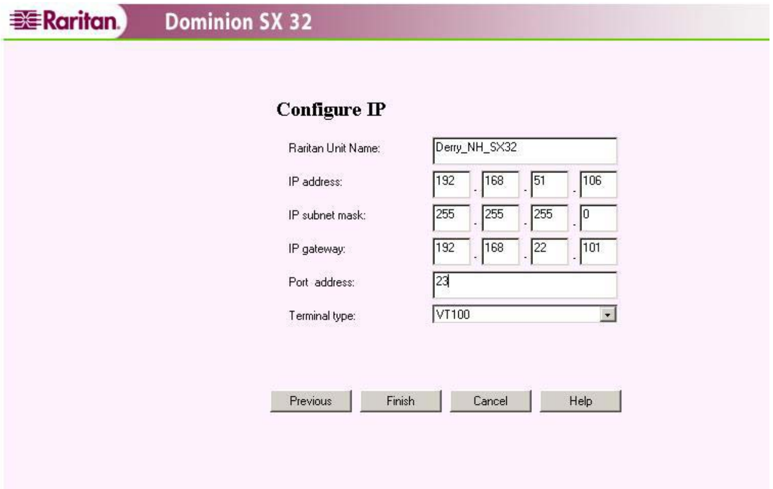
Create first administrator account

Name:	Firthose
Function:	Administrator
Information:	RU_Admin
Login Name:	firthose
Password:	******
Re-enter Password:	******

Figure 6 Initial Configuration screen for the First Administrator Account

4. Click on the [**Next**] button to proceed to the Network Configuration window.
5. The Network Configuration Window allows the user to specify the network settings for the unit. A network administrator typically assigns the values for these parameters. All fields are required:

   – **Raritan Unit Name**: Descriptive name for this unit
   – **IP Address**: Network address for this unit
   – **Subnet Mask**: Subnet mask for the network where this unit will reside
   – **IP Gateway**: Default gateway for this unit
   – **Port Address**: Default application communication port
   – **Terminal Type**: Terminal emulation type; fixed vT100

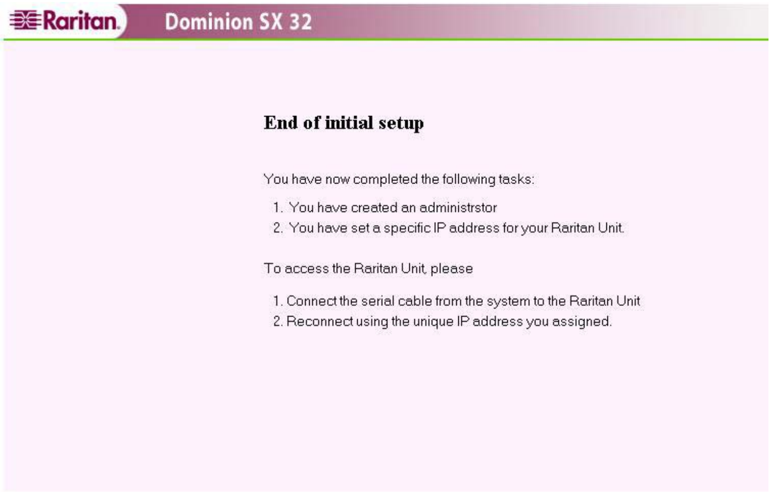


Configure IP

Raritan Unit Name:	Derry_NH_SX32
IP address:	192 . 168 . 51 . 106
IP subnet mask:	255 . 255 . 255 . 0
IP gateway:	192 . 168 . 22 . 101
Port address:	23
Terminal type:	VT100

Figure 7 Initial Configuration screen for Network Settings

6. Click on the [**Finish**] button to complete the initial configuration of Dominion SX. You will see a screen that indicates successful configuration of the unit. The system will reboot and apply the new settings.



End of initial setup

You have now completed the following tasks:

1. You have created an administrstor
2. You have set a specific IP address for your Raritan Unit.

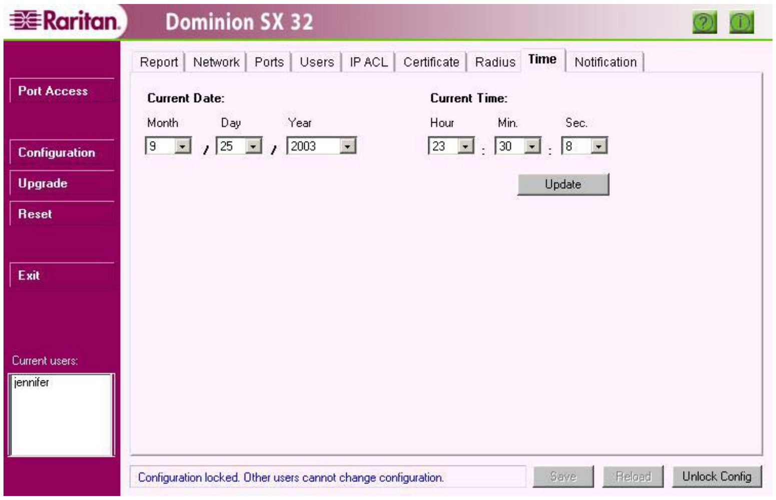
To access the Raritan Unit, please

1. Connect the serial cable from the system to the Raritan Unit
2. Reconnect using the unique IP address you assigned.

Figure 8 End of Initial Setup

Time and Date Configuration

We recommend that you configure the local Date and Time in the Dominion SX unit as soon as it is configured. Some features in Dominion SX, for example, Certificate generation, depend on the correct Timestamp, which is used to check the validity period of the certificate.



Current Date: Month 9 / Day 25 / Year 2003

Current Time: Hour 23 : Min. 30 : Sec. 8

Current users: jennifer

Configuration locked. Other users cannot change configuration.

Figure 9 Time Configuration Display

Configuration

7. Set the **Current Date** and **Current Time**.
8. Click on the [**Update**] button.
9. Click on the [**Save**] button.

Deployment

After the Initial Software Configuration phase, a Dominion SX unit is configured for operation on the LAN.

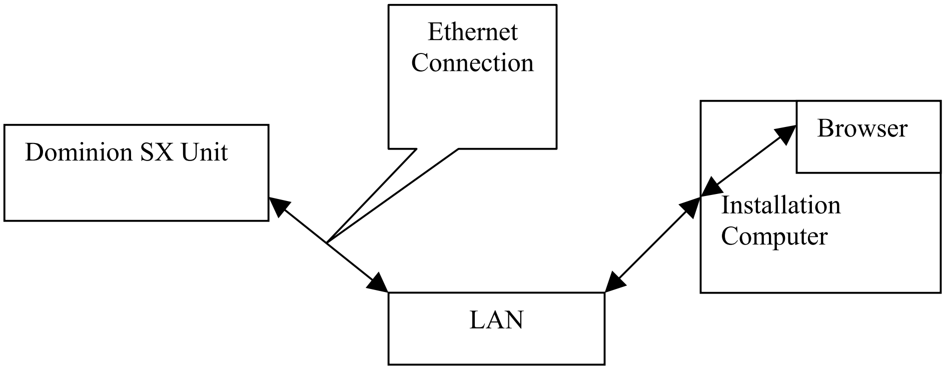


Figure 10 Deployment

1. Make sure you have an allocated Ethernet cable connected to the network for use with the unit.
2. Physically mount the unit in an ergonomically sound manner.
3. Connect the LAN cable to the primary LAN connection on the back of the chassis. Connect and/or verify that the other end of the cable is connected to the proper network. If the unit has a failover module, connect the secondary network LAN connection as well.
4. Connect the female end of the external power cord to the back of the chassis.
5. **Serial Connection to Target Devices**: This manual contains detailed information on connecting the Dominion SX unit to the console port of target devices.
6. **Modem Connection (optional)**: Connect a phone line to the modem port. Remember to write down the phone number for this line, as it will be necessary later when the user configures a client for dialup networking.
7. Connect the male end of the external power cord to the power supply outlet and power ON the Dominion SX unit.

> ***Note**: The unit will perform hardware and firmware self-test, indicated by the green light on the back of the chassis, and then start the software boot sequence. The boot sequence takes approximately 30-60 seconds and is complete when the green light goes out.*

8. Perform a quick connectivity check by connecting to the device using either IE or Netscape. In the address line, enter **https://<IPAddress>** where **IPAddress** is the IP address of the unit as previously configured. The login display should appear verifying that the unit has been properly configured and can be accessed from the network.
9. Enter the Configuration window and enter the various configuration parameters for each console port. Enter specific operational parameters for the unit (please see **Chapter 4: Console Features** for additional information).

Chapter 3: Operation

Overview

Once the Dominion SX unit has been deployed in its final destination, you can access the console of the target device. This chapter explains the normal operational procedures.

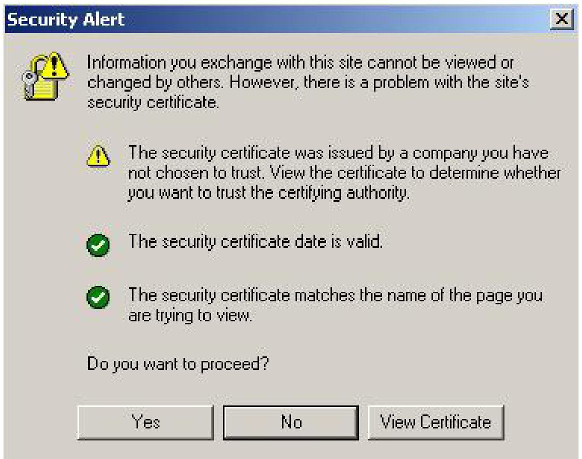
Accessing the Remote Device

The remote device can be accessed in one of two ways, either browser-based or by direct port access, used either as a user based remote device access method or used for application programs to access the target device programmatically.

__Note__: For the purpose of illustration, all discussion in this manual is based on using Internet Explorer as the browser.

Browser-Based Access

1. Using a browser (IE or Netscape) on your client desktop, enter the IP address of the unit. A security alert window will appear.



Security Alert

Information you exchange with this site cannot be viewed or changed by others. However, there is a problem with the site's security certificate.

⚠ The security certificate was issued by a company you have not chosen to trust. View the certificate to determine whether you want to trust the certifying authority.

✓ The security certificate date is valid.

✓ The security certificate matches the name of the page you are trying to view.

Do you want to proceed?

Figure 11 Security Alert Display

The unit is always SSL enabled. When you try to connect to the Dominion SX unit, a Security Alert is displayed ; this is because the CA root certificate is not installed in the browser. Please see **Appendix C: Certificates** for additional information.

2. Click on the [**Yes**] button to continue.

3. When the login screen appears, enter your Login Name and Password, and click on the [**Login**] button.

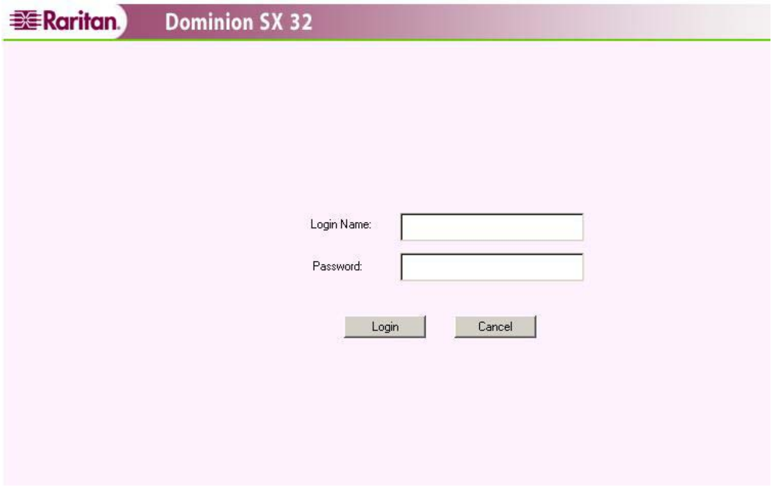
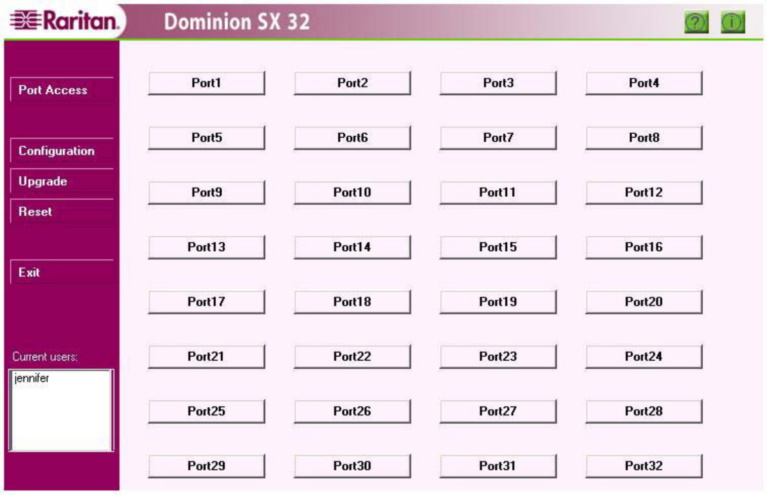


Figure 12 Login Display

4. When the main display page appears, click on the desired [**Port#**] button to launch that port's console display.



Current users:
jennifer

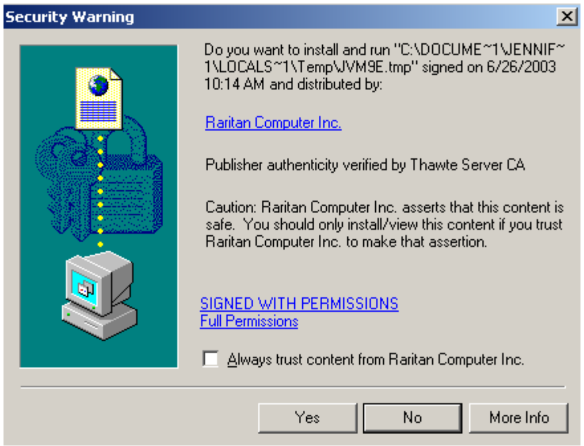
Figure 13 Main Display with Available Ports

Security Dialog for Console Display

RaritanConsole, an applet included with your Dominion SX unit, is designed by Raritan to enable the applet to access the resources of the user's computer. Both the copy and paste and the logging features of these applications require the use of the client computer system resources. Both operations require the user's permission to operate, and Internet Explorer and Netscape Navigator request these permissions in different fashions. In addition, the default code set preferences are stored on the user's computer.

Internet Explorer

Before the RaritanConsole window appears, a Security Warning screen requests permission to access computer resources. The dialog indicates that the authenticity of the signer, Raritan, has been verified by Thawte Server CA, and it specifies the permissions requested from the user.



Do you want to install and run "C:\DOCUME~1\JENNIF~1\LOCALS~1\Temp\JVM9E.tmp" signed on 6/26/2003 10:14 AM and distributed by:

Raritan Computer Inc.

Publisher authenticity verified by Thawte Server CA

Caution: Raritan Computer Inc. asserts that this content is safe. You should only install/view this content if you trust Raritan Computer Inc. to make that assertion.

SIGNED WITH PERMISSIONS
Full Permissions

□ Always trust content from Raritan Computer Inc.

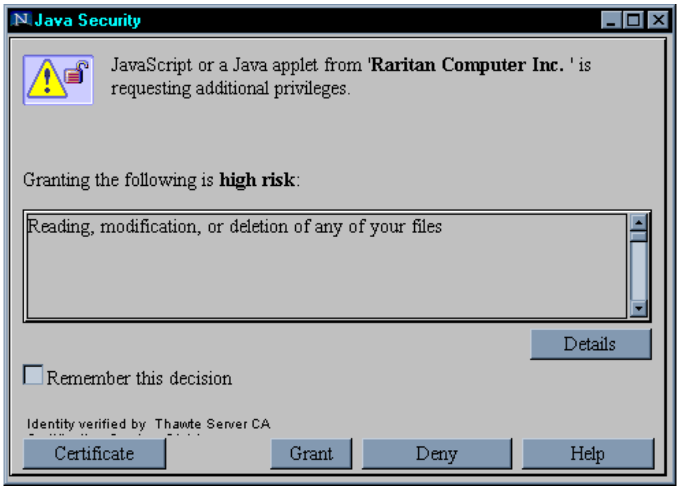
Figure 14 Security Dialog in Internet Explorer

- Click on the [**Yes**] button to accept all requested permissions. These permissions will not be requested again in the same session. Check the [**Always trust content from…**] checkbox to avoid being asked for permissions at the start of every new session.
- Click on the [**No**] button on the dialog box cancels the RaritanConsole window.

Important! Once [No] is selected, the console will not pop up until the browser is closed and a new session is started.

Netscape Navigator

RaritanConsole loads without displaying a Security Warning window. When actions that require user permissions are performed, a security dialog will appear. Each operation requires a unique permission. The Start Logging and Copy/Paste operations will prompt the user with a security dialog window. Once permissions are granted, they will not be requested again in the same session. Users can also check the [**Remember this decision**] checkbox to avoid being asked for permissions every new session.



Java Security

JavaScript or a Java applet from '**Raritan Computer Inc.** ' is requesting additional privileges.

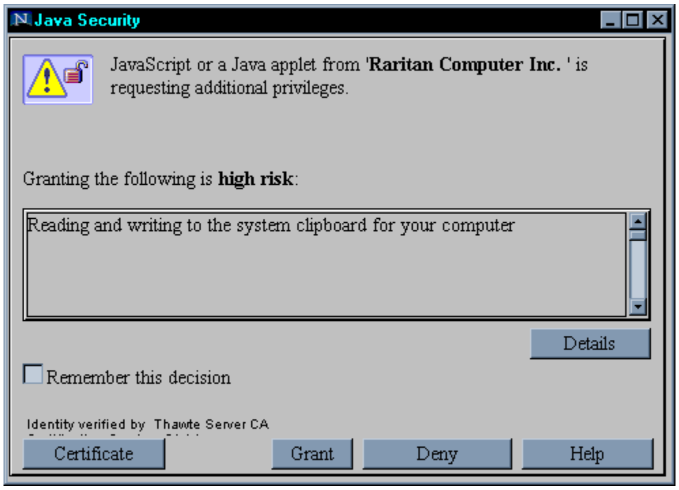
Granting the following is **high risk**:

Reading, modification, or deletion of any of your files

□ Remember this decision

Identity verified by Thawte Server CA

Figure 15 Security Dialog for Logging in Netscape Navigator



Java Security

JavaScript or a Java applet from '**Raritan Computer Inc.** ' is requesting additional privileges.

Granting the following is **high risk**:

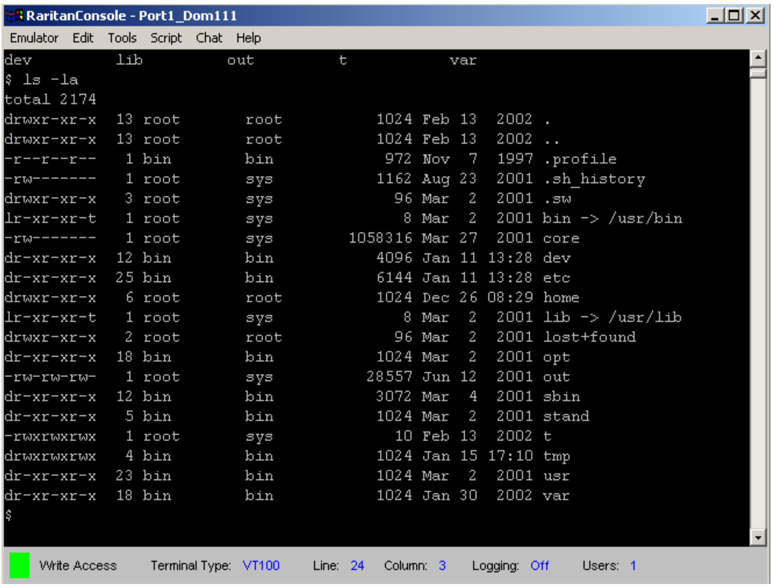
Reading and writing to the system clipboard for your computer

□ Remember this decision

Identity verified by Thawte Server CA

Figure 16 Security Dialog for Copy Paste in Netscape Navigator

Once the Security screens are completed, the console window appears, and the user can begin working with the remote target system.



```
dev          lib          out          t            var
$ ls -la
total 2174
drwxr-xr-x  13 root      root          1024 Feb 13  2002 .
drwxr-xr-x  13 root      root          1024 Feb 13  2002 ..
-r--r--r--   1 bin       bin            972 Nov  7  1997 .profile
-rw-------   1 root      sys           1162 Aug 23  2001 .sh_history
drwxr-xr-x   3 root      sys             96 Mar  2  2001 .sw
lr-xr-xr-t   1 root      sys              8 Mar  2  2001 bin -> /usr/bin
-rw-------   1 root      sys        1058316 Mar 27  2001 core
dr-xr-xr-x  12 bin       bin           4096 Jan 11 13:28 dev
dr-xr-xr-x  25 bin       bin           6144 Jan 11 13:28 etc
drwxr-xr-x   6 root      root          1024 Dec 26 08:29 home
lr-xr-xr-t   1 root      sys              8 Mar  2  2001 lib -> /usr/lib
drwxr-xr-x   2 root      root            96 Mar  2  2001 lost+found
dr-xr-xr-x  18 bin       bin           1024 Mar  2  2001 opt
-rw-rw-rw-   1 root      sys          28557 Jun 12  2001 out
dr-xr-xr-x  12 bin       bin           3072 Mar  4  2001 sbin
dr-xr-xr-x   5 bin       bin           1024 Mar  2  2001 stand
-rwxrwxrwx   1 root      sys             10 Feb 13  2002 t
drwxrwxrwx   4 bin       bin           1024 Jan 15 17:10 tmp
dr-xr-xr-x  23 bin       bin           1024 Mar  2  2001 usr
dr-xr-xr-x  18 bin       bin           1024 Jan 30  2002 var
$
```

🟩 Write Access   Terminal Type: VT100   Line: 24   Column: 3   Logging: Off   Users: 1

Figure 17 Console Window

Sending a Break / Null

Some target systems, such as Sun Servers, require a null character (Break) to be sent from the console. Pressing the <**F8**> function key sends a null character to the target device. To send a break / null:

1. Verify that you have write access. If not, you can either press the <**F8**> key, or can use the drop-down menu to obtain write access, as described in the *Write Access* section of **Chapter 4: Console Features**.
2. Press the <**F8**> key to send the break / null.

Note: <**F8**> is a multifunction key. It is used to obtain write access when the user does not have write access and is also used to send a break / null character to the remote target system once the user obtains write access.

Chapter 4: Console Features

There are six drop-down menus available in the menu bar of the console window:

- Emulator
- Edit
- Chat
- Tools
- Script
- Help

Emulator

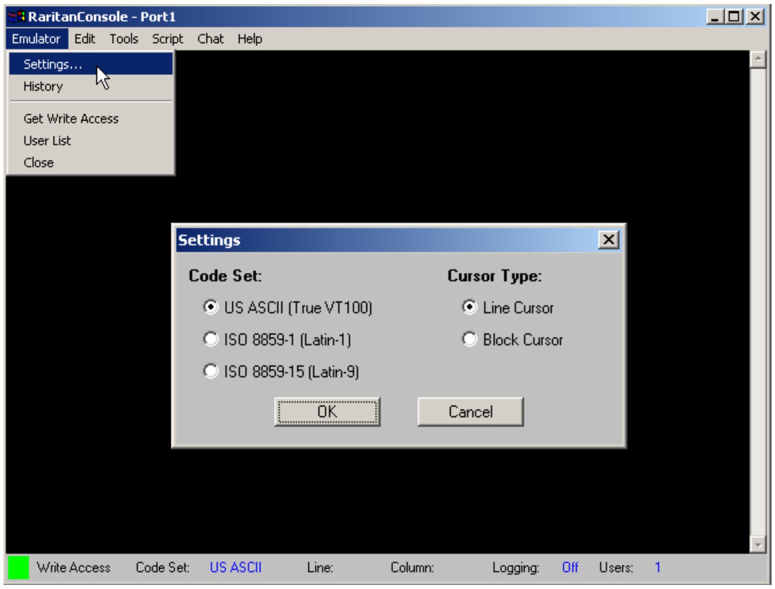
Settings

The Settings window displays the Buffer Size, Terminal Type, and Cursor Type for the console window.

- The Buffer Size is preset to 999 lines and cannot be changed.
- Currently the unit supports only Terminal Type vt100, which cannot be changed.
- The Cursor Type can be either Line or Block, depending on your preference. The default cursor is Line type, but can be changed by clicking on the appropriate radio button.

To View Settings:

1. Click on **Emulator** in the main menu.
2. Select *Settings* from the drop-down menu.



Code Set:
● US ASCII (True VT100)
○ ISO 8859-1 (Latin-1)
○ ISO 8859-15 (Latin-9)

Cursor Type:
● Line Cursor
○ Block Cursor

🟩 Write Access Code Set: US ASCII Line: Column: Logging: Off Users: 1

Figure 18 Settings Command and Settings Window

3. Adjust settings as needed.
4. Click on the [**OK**] button to close the Settings window.

History

The History feature allows you to view the recent history of console sessions by displaying the console messages to and from the target device. This function displays up to 999 lines of recent console message history, allowing a user to see target device events over time. When the 1000th line entry is reached, the text will wrap, overriding the oldest data with the newest. History information can be useful when debugging, troubleshooting, or administering a target device.

> ***Note***: *History data is displayed only to the user who requested the history.*

To View Session History:

1. Click on **Emulator** in the main menu.
2. Select *History* from the drop-down menu.

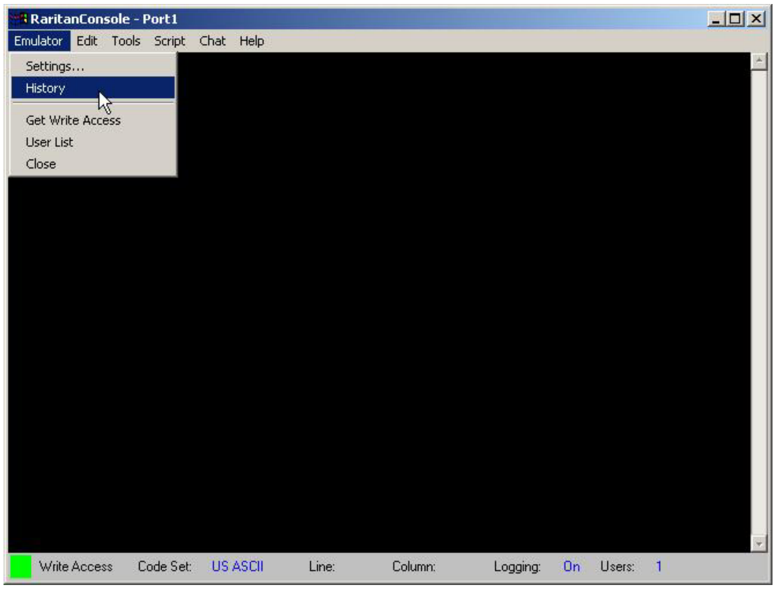


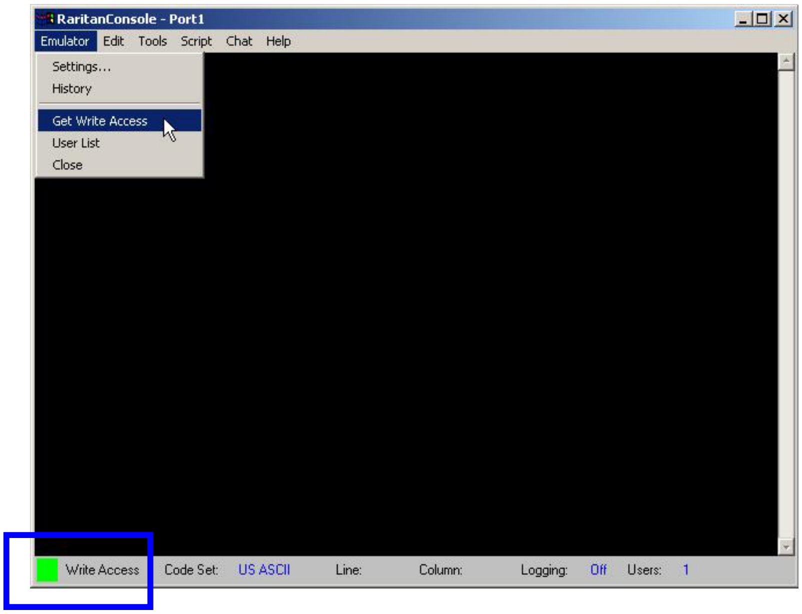
Figure 19 History Command

Write Access

The user with Write Access can send commands to the target device. Write Access can be transferred among users working in RaritanConsole via the Get Write Access command or by using the <**F8**> key (please see **Chapter 2: Operation** for additional details).

To Obtain Write Access:

1. Click on **Emulator** in the main menu.
2. Select *Get Write Access* from the drop-down menu.

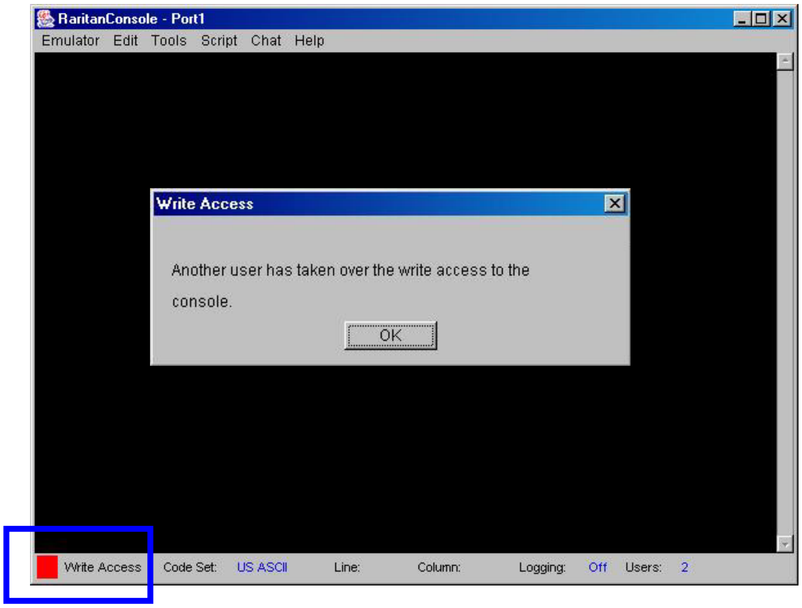


Write Access Code Set: US ASCII Line: Column: Logging: Off Users: 1

Figure 20 Get Write Access Command

3. You now have Write Access to the target device, as indicated by the green block located before Write Access in the status bar.

4. When another user assumes Write Access from you, a modal display will appear on your screen. Loss of Write Access is indicated by a red block before **Write Access** in the status bar. The modal display appears only on the screen of the user who currently has Write Access.



Another user has taken over the write access to the console.

Figure 21 Console without Write Access; with Write Access Warning Window

---

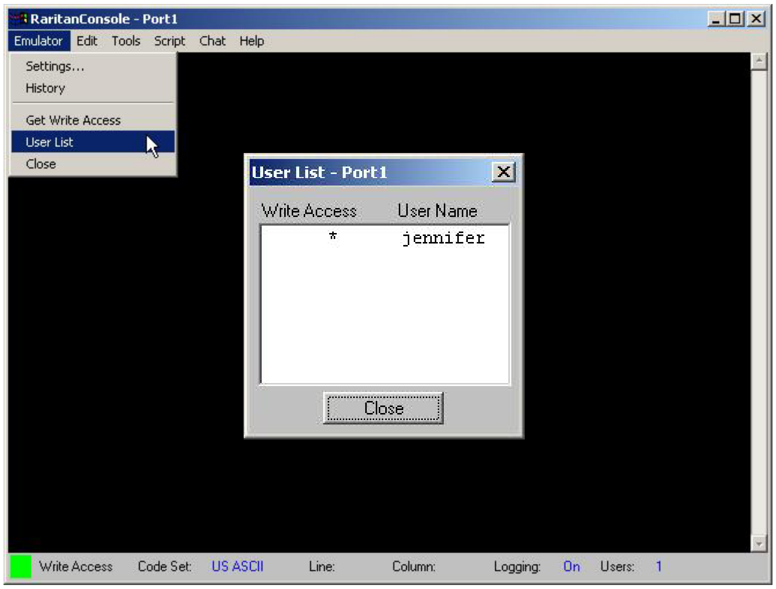
***Note**: <**F8**> is a multifunction key: use it to obtain write access, and also to send a null/break character to the remote target system.*

User List

The User List command allows you to view a list of other users who are accessing the same port. An asterisk (*) appears before the user who has Write Access to the console.

To View the User List:

1. Click on **Emulator** in the main menu.
2. Select *User List* from the drop-down menu.



Write Access	User Name
*	jennifer

🟩 Write Access Code Set: US ASCII Line: Column: Logging: On Users: 1

Figure 22 User List Command and User List Window

3. Click on the [**Close**] button to close the User List window.

Close

To Close RaritanConsole:

1. Click on **Emulator** in the main menu.
2. Select *Close* from the drop-down menu.

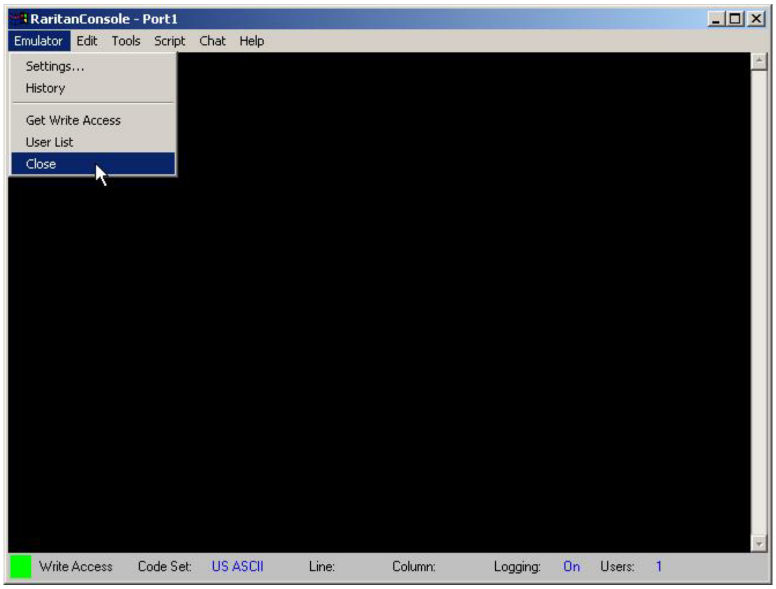
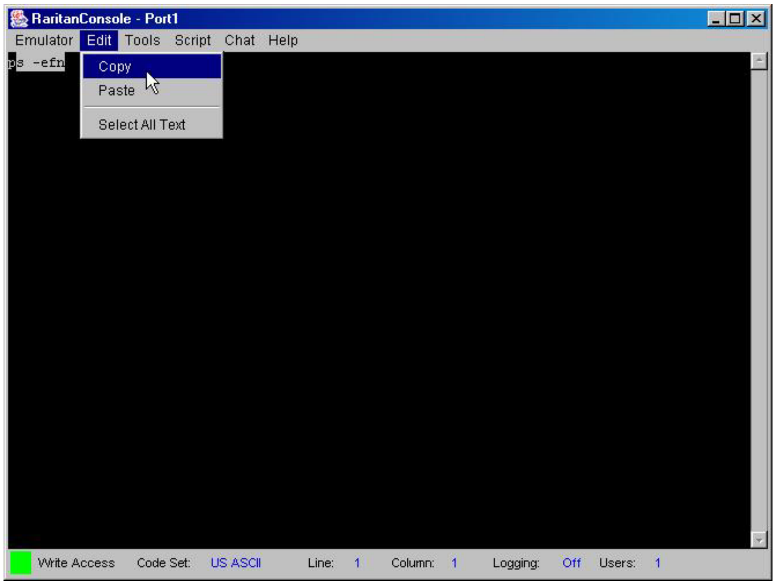


Figure 23 Close Command

Edit

Use the **Copy, Paste**, and **Select All Text** commands to relocate and / or re-use important text.



```
ps -efn
```

🟩 Write Access Code Set: US ASCII Line: 1 Column: 1 Logging: Off Users: 1

Figure 24 Edit Commands - Copy, Paste, and Select All Text

To Copy and Paste All Text:

1. Click on **Edit** in the main menu.
2. Select *Select All Text* from the drop-down menu.
3. Click on **Edit** in the main menu.
4. Select *Copy* from the drop-down menu.
5. Position the cursor at the location you wish to paste the text and click once to make that location active.
6. Click on **Edit** in the main menu.
7. Select *Paste* from the drop-down menu.

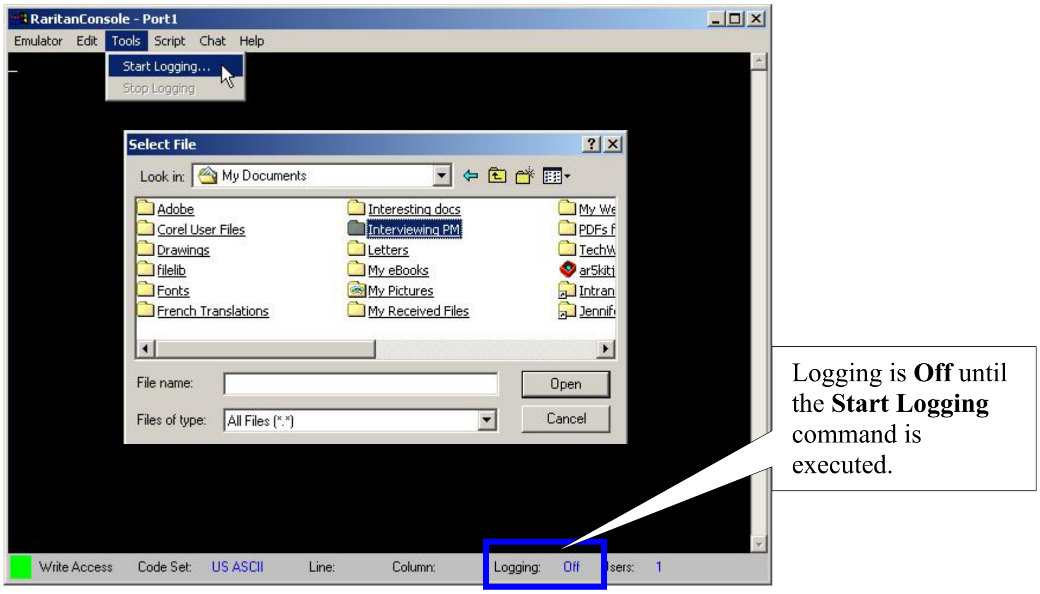
Note: *There are keyboard shortcuts that you can use to highlight, copy, and paste all or partial lines of text:*
- Click and drag your mouse over the text you wish to copy
*- Press <**CTRL**> and tap the <**C**> key to copy*
- Position the cursor where you wish to paste the text and click in that location to make it active
*- Press <**CTRL**> and tap the <**V**> key to paste*

Tools

Raw console data from the target device can be logged to a file in your computer. The Logging indicator on the status bar indicates whether Logging is on or off.

Start Logging

1. Click on **Tools** in the main menu.
2. Select *Start Logging* from the drop-down menu.
3. Choose an existing file or provide a new file name in the File Dialog box. When an existing file is selected for logging, data gets appended to the contents. Providing a new file name creates a brand new file. Click on the [**OK**] button after you have selected or created a file.



Look in: My Documents

File name:

Files of type: All Files (*.*)

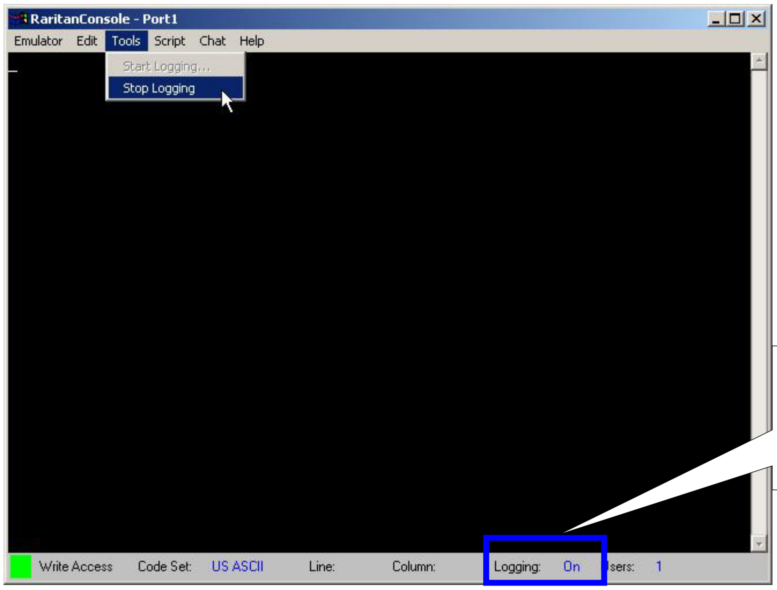
Code Set: US ASCII Line: Column: Logging: Off Users: 1

Logging is **Off** until the **Start Logging** command is executed.

Figure 25 Start Logging Command and Select File Window

Stop Logging

1. Click on **Tools** in the main menu.
2. Select *Stop Logging* from the drop-down menu.



Logging is **On** until the **Stop Logging** command is executed.

Figure 26 Stop Logging Command

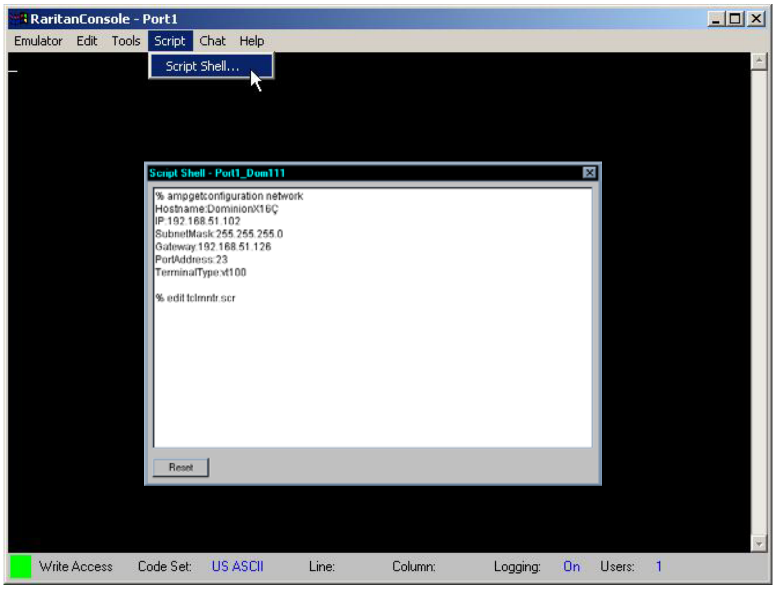
Script

RaritanConsole supports *TCL* version 7.0, an industry standard scripting engine. Using TCL scripting capabilities, system administrators can create their own conditions for event detection, and generate customer-specific notifications and alerts. The unit features a TCL engine and a flash file system for the development and storage of TCL scripts. Please see **Appendix I: TCL Programming Guide** for additional information.

RaritanConsole also comes with User Definable Events that can be generated by TCL scripts. Raritan has introduced an extension library to provide an API to the RaritanConsole's functions. Additionally, the unit comes with an extensive list of notification events that can be used to audit, track and trace the conditions of and modifications to the unit itself.

To Invoke the Script Shell:

1. Click on Script in the main menu.
2. Select *Script Shell* from the drop-down menu.



```
% ampgetconfiguration network
Hostname:DominionX16Ç
IP:192.168.51.102
SubnetMask:255.255.255.0
Gateway:192.168.51.126
PortAddress:23
TerminalType:vt100

% edit tclmntr.scr
```

Write Access Code Set: US ASCII Line: Column: Logging: On Users: 1

Figure 27 Script Shell Command

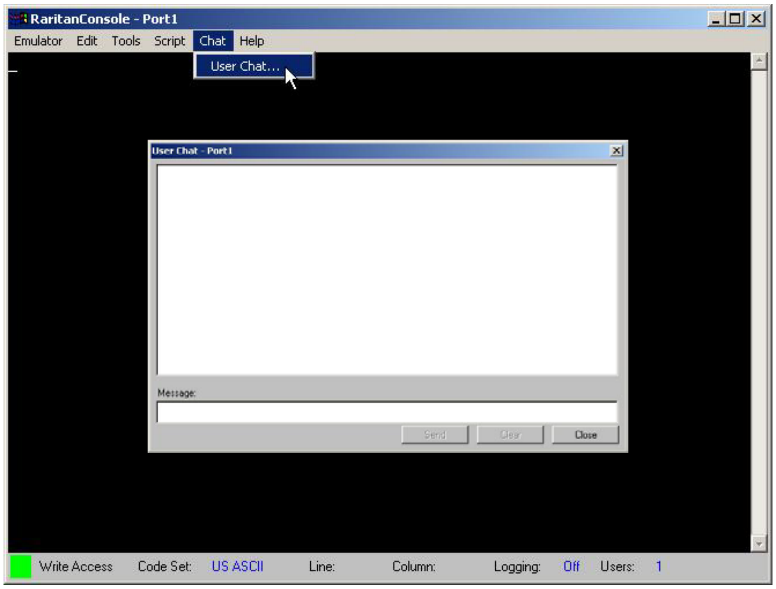
3. Enter your command or script and press the <**Enter**> key (please refer to **Appendix I: TCL Programming Guide** for more information).
4. To reset the script, click on the [**Reset**] button on the Script Shell window.

SecureChat

A real-time interactive chat feature called SecureChat provides you and other users who are accessing the console port of the target device to conduct an online dialog for training or collaborative diagnostic activities.

To use SecureChat:

1. Click on **Chat** in the main menu.
2. Select *User Chat* from the drop-down menu.



Write Access Code Set: US ASCII Line: Column: Logging: Off Users: 1

Figure 28 SecureChat Command and User Chat Window

3. Type a message in the **Message** text field.
4. Click on the [**Send**] button to send the message, click on the [**Clear**] button to delete the typed text, or click on the [**Close**] button to exit and close the Message window.

> ***Note***: *When a chat is initiated, a chat window will appear on the monitors of all users logged on to the port.*

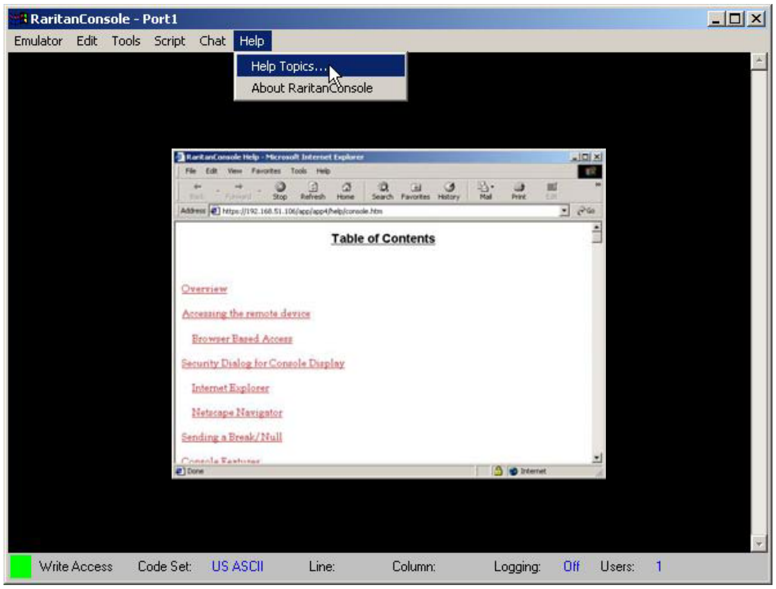
Help

Help Topics include on-line assistance for operating RaritanConsole and the console window, and Release information about RaritanConsole.

Help Topics

To Access Help Topics:

1. Click on **Help** in the main menu.
2. Select *Help Topics* from the drop-down menu.



https://192.168.51.106/app/app4/help/console.htm

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Sending a Break/Null

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Figure 29 Help Topics Command and Help File Window

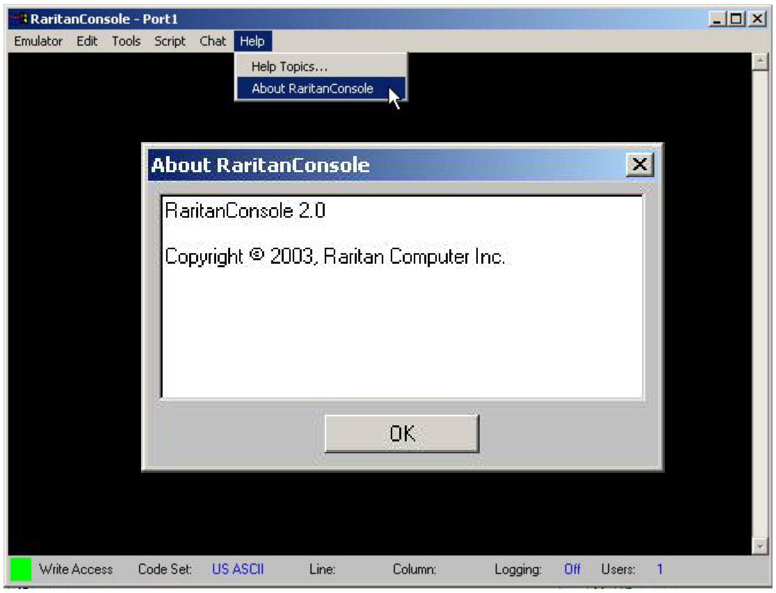
3. Use the navigation bar on the right side of the window to scroll to the topic you need, or click on the links. Close this window when you are finished.

About RaritanConsole

The 'About' window displays version information (name and revision number) for the console terminal emulation software, and copyright information. When contacting Raritan for technical support when performing a software upgrade, etc., you may be asked for this information.

To Access 'About' Information:

1. Click on Help in the main menu.
2. Select *About RaritanConsole* from the drop-down menu.



RaritanConsole 2.0

Copyright © 2003, Raritan Computer Inc.

🟩 Write Access Code Set: US ASCII Line: Column: Logging: Off Users: 1

Figure 30 About RaritanConsole Command and About Window

3. Click on the [**OK**] button to close the About RaritanConsole window.

Direct Port Access

This approach provides a quick and direct method of connecting to the console port in order to access unit programmability or the console of the target device directly. There are two ways to access the target device console directly by giving the appropriate URL.

URL with Password and Username and Port

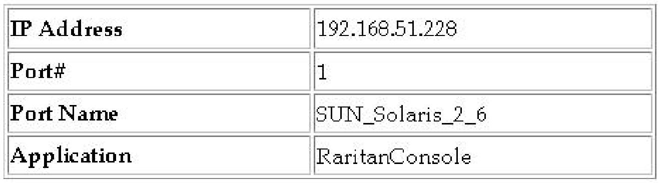
1. Type the following URL into the browser's location bar: **https://<IPAddress>/dpa.htm?username="username"?password="password"?port="portnumber"**
   - **IPAddress**: This is the IP Address of the unit – either the actual IP address of the unit or IPAddress assigned for a modem
   - "**username**": Login name
   - "**password**": Password
   - "**portnumber**": Port number for which a console is required

Example:

https://192.168.50.81/dpa.htm?username="raritan1"?password="rar123"?port="1"

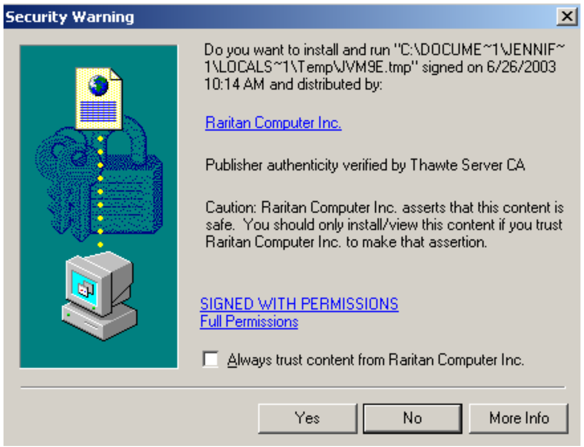
2. The Direct Port Access display will appear.
3. When the security warning appears (only once for the session); click on the [**Yes**] button.
4. The console display will appear.

***Note**: The user's password will appear in the URL location bar.*



IP Address	192.168.51.228
Port#	1
Port Name	SUN_Solaris_2_6
Application	RaritanConsole

Figure 31 Direct Port Access Initial Display



Security Warning

Do you want to install and run "C:\DOCUME~1\JENNIF~1\LOCALS~1\Temp\JVM9E.tmp" signed on 6/26/2003 10:14 AM and distributed by:

Raritan Computer Inc.

Publisher authenticity verified by Thawte Server CA

Caution: Raritan Computer Inc. asserts that this content is safe. You should only install/view this content if you trust Raritan Computer Inc. to make that assertion.

SIGNED WITH PERMISSIONS
Full Permissions

☐ Always trust content from Raritan Computer Inc.

Figure 32 Security Warning Display

Important! This kind of access will generally be used in applications where the user name and password is retrieved from a database. It is not advisable to place this URL in a HTML page where the user name and password are visible.

URL with Port Number

1. Type the following URL into the browser's location bar: **https://<IPAddress>/dpa.htm?port="portnumber"**
   - **IPAddress**: This is the IP Address of the unit. This can be either the actual IP address of the unit or IPAddress assigned for a modem.
   - "**portnumber**": Port number for which a console is required.

Example:

https://192.168.50.81/dpa.htm?port="2"

2. The Direct Port Access display will appear.
3. Enter Login Name and Password and click on the [**Login**] button.
4. When the security warning appears (only once for the session); click on the [**Yes**] button.
5. The console display will appear.

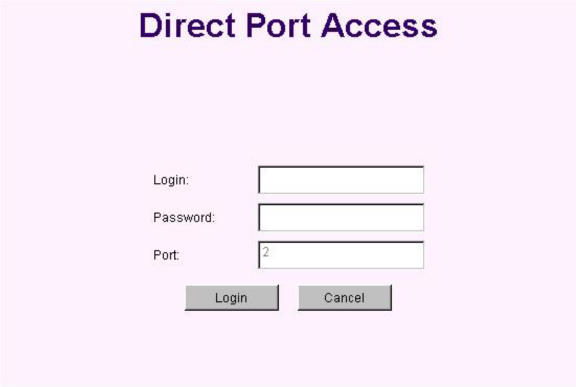


Figure 33 Direct Port Access Display

Error Conditions

If the user name, password, or port number is invalid or incomplete, an error message will be displayed in the browser.

Invalid Port Specified:

If the port specified in the URL is invalid, the user is requested to login again with the correct user name and password, and a valid port number:

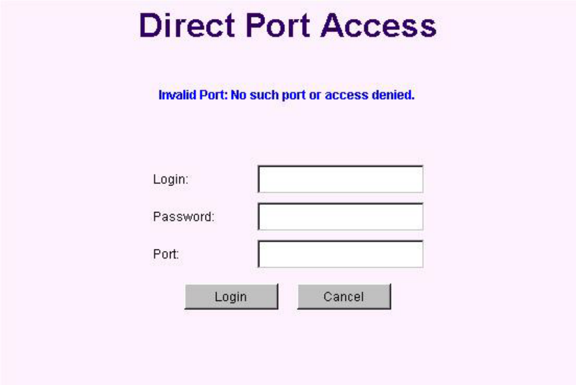
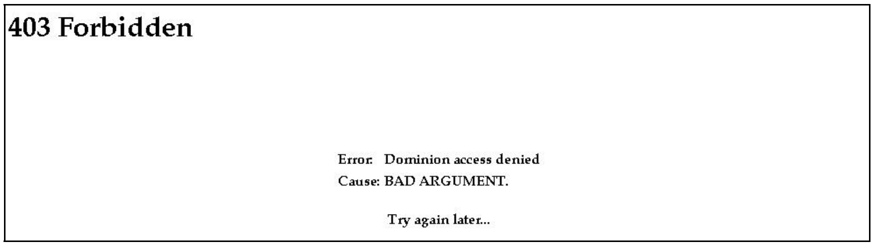

Invalid Port: No such port or access denied.

Figure 34 Invalid Port Number Error Display

Incomplete Parameters Specified:

If the parameters specified in the URL are incomplete, for example, if only the user name and port number are specified and password is omitted in the URL, the user is alerted that there is missing information.



403 Forbidden

Error: Dominion access denied
Cause: BAD ARGUMENT.

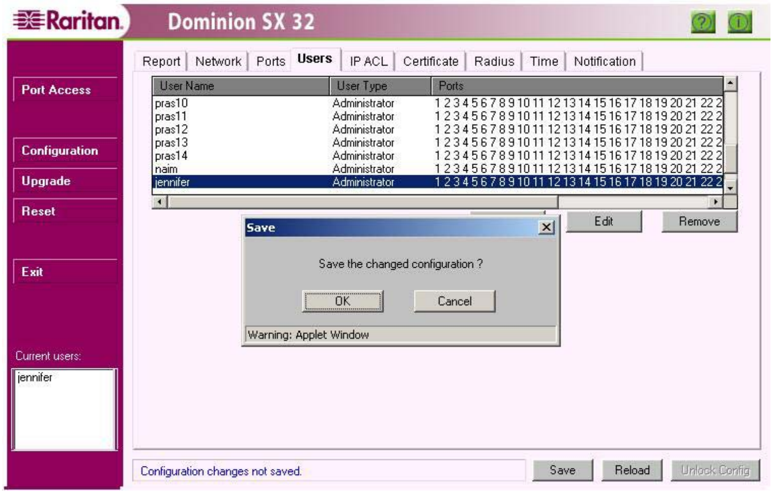
Try again later...

Figure 35 Incomplete Parameter Error Display

Exit the Application

Click on the [**Exit**] button in the left panel of the Dominion SX window to exit Dominion SX.

If changes to the configuration have been made but not saved, a screen will prompt you to save changes and log out of the unit. Click on the [**Yes**] button to save changes and exit, or click on the [**Cancel**] button to return to the configuration.



User Name	User Type	Ports
pras10	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
pras11	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
pras12	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
pras13	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
pras14	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
naim	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
jennifer	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2

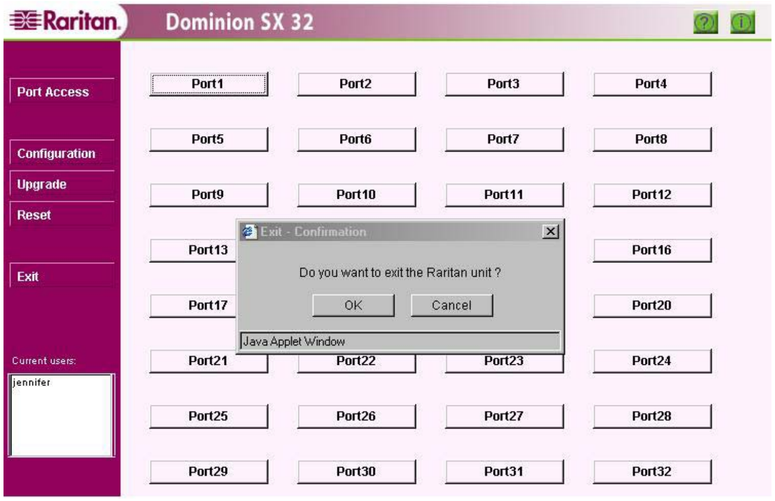
Save the changed configuration ?

Current users:
jennifer

Configuration changes not saved.

Figure 36 Save the Changed Configuration Window

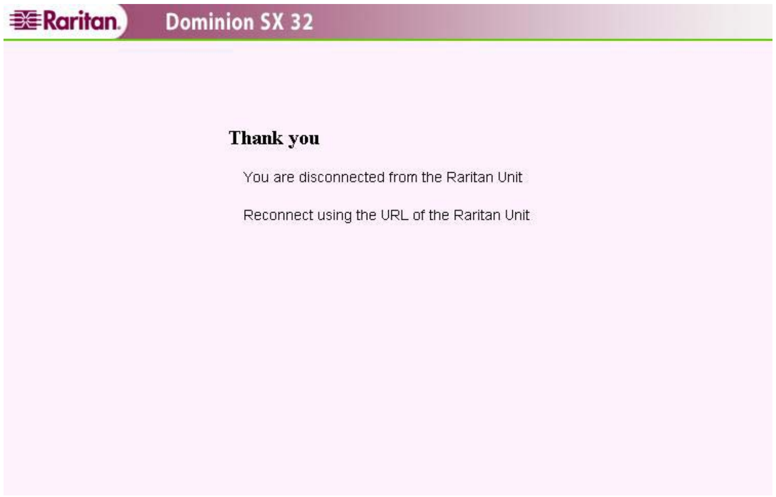
If changes have been saved already, the unit will confirm the request to exit. Click on the [**OK**] button to log out of the unit.



Do you want to exit the Raritan unit ?

Figure 37 Exit Confirmation Display

A confirmation screen will indicate disconnection from the unit.



Thank you

You are disconnected from the Raritan Unit

Reconnect using the URL of the Raritan Unit

Figure 38 Unit Disconnection Display

Dominion SX Management

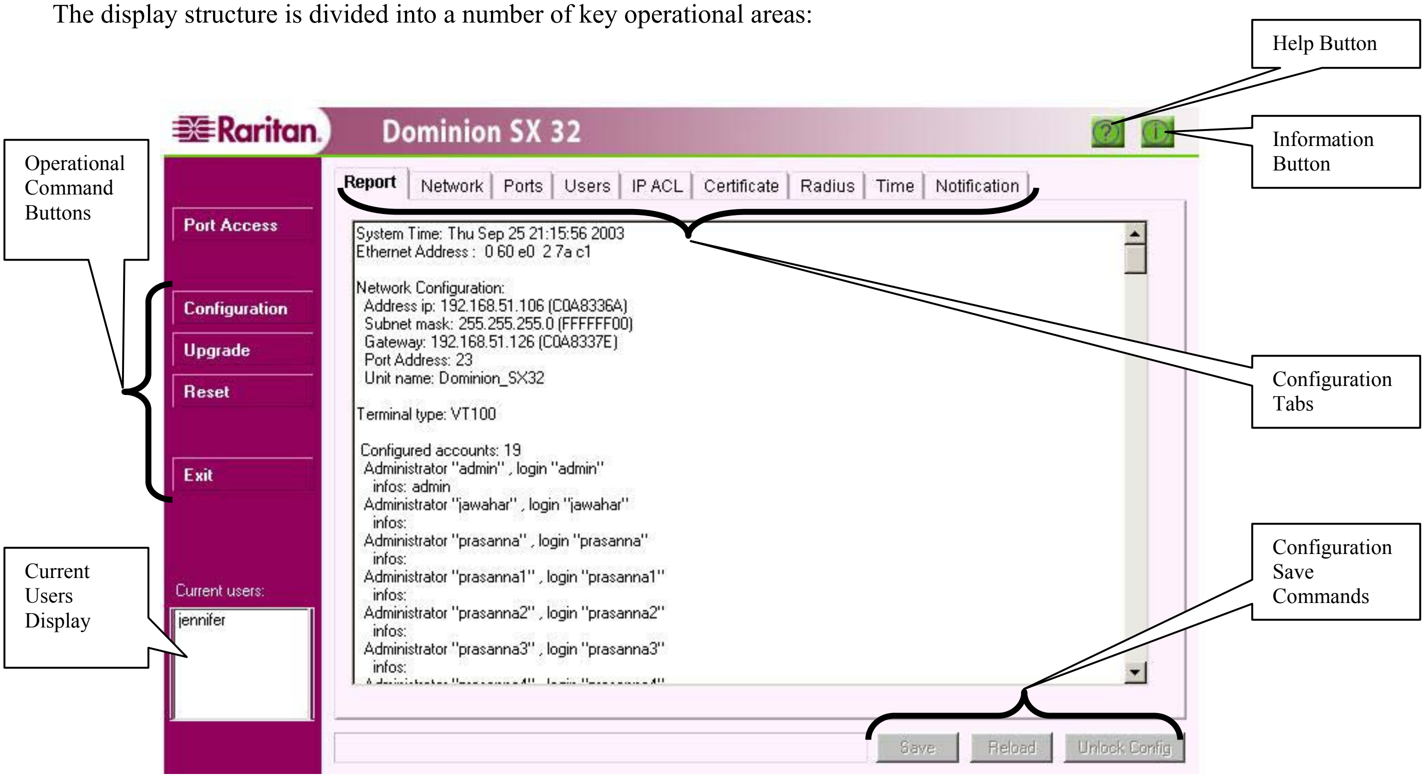
Aside from providing the capability to manage a remote target device, Dominion SX has a number of powerful built-in features and capabilities available to manage the unit itself. With Dominion SX, users can:

- Upgrade the software remotely via the network
- Perform a soft reset on the application
- Change network parameters
- Add and Delete users and assign permission classes to each user
- Increase security using RADIUS
- Use the modem for out-of-band access
- Restrict access based on IP address
- Install a user-generated certificate or request a CSR to allow creation of a third-party certificate
- Install custom applications per port

In each case, dedicated displays are provided to allow the adjustment and configuration of the various parameters.

Display

The display structure is divided into a number of key operational areas:



```
System Time: Thu Sep 25 21:15:56 2003
Ethernet Address :  0 60 e0  2 7a c1

Network Configuration:
  Address ip: 192.168.51.106 (C0A8336A)
  Subnet mask: 255.255.255.0 (FFFFFF00)
  Gateway: 192.168.51.126 (C0A8337E)
  Port Address: 23
  Unit name: Dominion_SX32

Terminal type: VT100

 Configured accounts: 19
  Administrator "admin" , login "admin"
    infos: admin
  Administrator "jawahar" , login "jawahar"
    infos:
  Administrator "prasanna" , login "prasanna"
    infos:
  Administrator "prasanna1" , login "prasanna1"
    infos:
  Administrator "prasanna2" , login "prasanna2"
    infos:
  Administrator "prasanna3" , login "prasanna3"
    infos:
  Administrator "prasanna4" , login "prasanna4"
```

Figure 39 Display Overview

- **Operational Command Buttons**: Used to modify operation of Dominion SX
  - **Port Access**: Connects and displays the remote target device to be managed
  - **Configuration**: Calls up the Configuration Tabs
  - **Upgrade**: Provides a utility to upgrade Dominion SX software through the network
  - **Reset**: Allows a soft reset of the application
  - **Exit**: Logs out of the application and closes the connection to Dominion SX
- **Current Users Display**: Indicates users who are currently connected to Dominion SX
- **Help Button**: Brings up an online help guide on how to use the product
- **Information Button**: Provides copyright notice and software version information

- **Configuration Tabs**: Displays several screens in which the user configures different elements of the application
- **Configuration Save Commands**: Used to save or ignore changes made to configuration

Configuration Lock and the Configuration Save Commands

Dominion SX is designed to allow only one user to configure it at any given time. When a user clicks on any of the Configuration tabs, that user acquires the Configuration Lock, preventing others from modifying the configurations. Other users may click on Configuration tabs at the same time, but will view all data in Read-only mode. Only after the lock is released can another user modify configurations.

To Release the Configuration Lock:

- **Save the Configuration Changes**: Saving the configuration commits the updated information to the unit and automatically releases the Configuration Lock.
- **Reload the Previous Configuration**: Reloading the previous configuration deletes all updated information, reverts to the previously saved data, and automatically releases the Configuration Lock.
- **Unlock the Configuration**: Clicking on the [Unlock Config] button located in the lower right corner of all Configuration screens releases the Configuration Lock only if the user has not updated any configuration changes. If any changes have been updated, only a Save or a Reload can unlock the configuration.

***Note**: Releasing the configuration lock loses any changes that are not updated.*

Important! It is advisable to release the configuration lock once all necessary changes are made. This leaves the configuration available in the event that other users have to make modifications to the device.

Update

Many of the Configuration tab screens feature an [**Update**] button. A user would click on the [**Update**] button to notify the system that changes have been made in that Configuration screen. The configuration changes do not take effect until they are saved. This offers two convenient advantages:

- The user can make as many changes as intended in any number of tabs and just keep the changes updated. All changes could be committed to take effect when desired with a single **Save** operation.
- The user can reject all changes made in a single session using the **Reload** option, offering a higher degree of error tolerance for the system. Any accidental deletions or modifications could be rolled back without having to log out of the unit.

Save and Reload

Users can apply configuration changes to the Dominion SX unit by clicking on the [**Save**] button after editing Configuration screens. Users can reject all the configuration changes using the [**Reload**] button, but it is important to remember that configuration changes cannot be reloaded once they are saved.

To Save Configuration Changes:

1. Click on the [**Configuration**] button in the left panel.
2. Click on the tab(s) for the screens in which you want to make configuration changes.
3. When the status bar displays the *Configuration locked* message, other users cannot modify the unit's configuration.
4. Modify data in the screen and click on the [**Update**] button.
5. The status bar will display the message: **Configuration changes not saved**.
6. Click on the [**Save**] button.

***Note**: If you are making changes to several different configuration screens in one session, click on the [**Update**] button in each screen, but wait until making changes in the final configuration screen, and then click on the [**Save**] button to save all changes with just one action.*

7. The status bar displays the message: **Save in progress…**

***Note**: If changes are made in the **Network** and **Modem** configuration screens, a warning message alerts the user to the automatic system reboot upon the completion of the save.*

8. A success message appears.
9. The **Report** screen is updated and displayed after a successful Save.

To Reload Configuration Changes:

1. Click on the [**Configuration**] button in the left panel.
2. Click on the tab(s) for the screens in which you want to make configuration changes.
3. When the status bar displays the **Configuration locked** message, other users cannot modify the unit's configuration.
4. Modify data in the screen, and click on the [**Update**] button.
5. The status bar will display the message: **Configuration changes not saved**.
6. Click on the [**Reload**] button to erase any changes in this and any other configuration screen.
7. A successful reload message appears, indicating a successful reload of the original settings and configuration values.
8. The **Report** screen shows that no data has been changed.

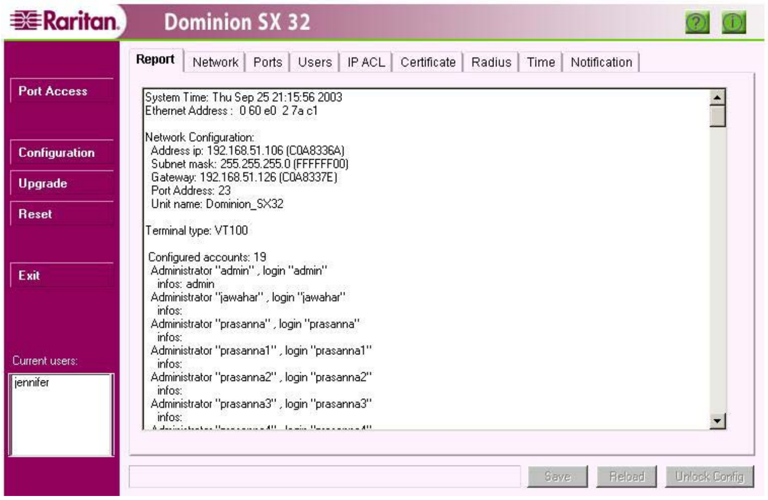
Configuration

Report

Overview

The Report configuration screen displays detailed information on how the Dominion SX has been configured, which can be useful if debugging or troubleshooting.

- System time and date
- Ethernet address
- Network configuration (IP address, subnet mask, and gateway)
- Certificate configuration
- Port configuration
- Number of user accounts configured
- IP ACL configuration
- RADIUS configuration
- Modem configuration



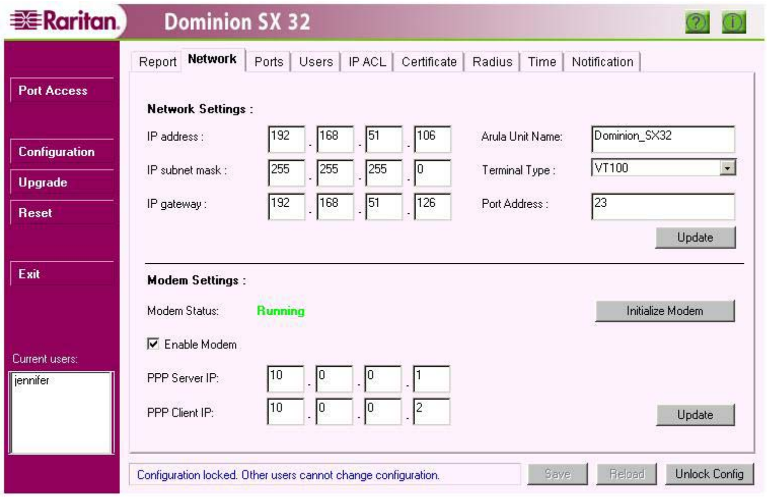
```
System Time: Thu Sep 25 21:15:56 2003
Ethernet Address :  0 60 e0  2 7a c1

Network Configuration:
  Address ip: 192.168.51.106 (C0A8336A)
  Subnet mask: 255.255.255.0 (FFFFFF00)
  Gateway: 192.168.51.126 (C0A8337E)
  Port Address: 23
  Unit name: Dominion_SX32

Terminal type: VT100

 Configured accounts: 19
  Administrator "admin" , login "admin"
    infos: admin
  Administrator "jawahar" , login "jawahar"
    infos:
  Administrator "prasanna" , login "prasanna"
    infos:
  Administrator "prasanna1" , login "prasanna1"
    infos:
  Administrator "prasanna2" , login "prasanna2"
    infos:
  Administrator "prasanna3" , login "prasanna3"
    infos:
```

Figure 40 Report Display

Network

Overview

The Network configuration screen provides an area for Administrators to define both the network and modem (optional) settings for the unit.



Network Settings :

IP address : 192 . 168 . 51 . 106

IP subnet mask : 255 . 255 . 255 . 0

IP gateway : 192 . 168 . 51 . 126

Arula Unit Name: Dominion_SX32

Terminal Type : VT100

Port Address : 23

Modem Settings :

Modem Status: Running

☑ Enable Modem

PPP Server IP: 10 . 0 . 0 . 1

PPP Client IP: 10 . 0 . 0 . 2

Current users: jennifer

Configuration locked. Other users cannot change configuration.

Figure 41 Network Configuration Display

Some Dominion SX units comes equipped with a 56Kbps (bits per second) modem, which allows dial-in access to the unit from virtually any location in the world. On other Dominion SX units, there is a connector on the rear panel for a user-supplied external modem. Client computers connect to the unit by establishing a PPP (Point-to-Point Protocol) link between the client machine and the Dominion SX unit. Once the PPP connection is established, the client computer is physically on the same network as the Dominion SX unit and can access the unit using Internet Explorer or Netscape browsers.

There are three requirements for dialing into the unit:

1. The phone line to the unit must be connected.
2. The modem / PPP connection settings must be configured.
3. The dial-up networking software on the user's personal computer must be configured to establish a PPP connection from the client computer to the unit.

Configure Network Parameters

- **IP address**: IP address for the unit
- **IP subnet mask**: Subnet mask to be used when deployed in the network
- **IP gateway**: Gateway that the unit uses to communicate with other systems that are not on the same subnet
- **Dominion SX Unit Name**: Name to be associated with the unit, 64 characters in length. Valid characters are A-Z, a-z, -, _, 0-9, no spaces or special characters allowed
- **Terminal Type**: Type of terminal supported; default is VT100
- **Port Address**: Port address to be used by the unit when communicating with other systems; the default port address is 23, but can also be set to any value in the range of 2000-2400 (please verify this value with your firewall administrator)

Click on the [**Update**] button to load all the changes.

Click on the [**Save**] button to make the changes permanent.

Important! Remember that saving changes to Network Configuration settings will cause the unit to reboot.

The parameters for configuring modem access include:

PARAMETER	DESCRIPTION
Enable Modem	Configures the modem to answer calls
PPP Server IP	IP address of the PPP server (Dominion SX unit)
PPP Client IP	IP address of the PPP client (remote computer)

Configure Modem Parameters

1. Check the Enable Modem box.
2. Enter the PPP Server IP – the IP address used by the client to access Dominion SX once the modem connection is established.
3. Enter the PPP Client IP – the IP address assigned by Dominion SX to the client in order for the connection to be established.
4. Click on the [**Update**] button.
5. Click on the [**Save**] button.

The Modem Status field indicates one of two states:

- **Running**: The modem is configured and is operational.
- **Stopped**: The modem is not operational.

The [**Initialize Modem**] button can be used to reset the modem if it is running but not operating properly.

> ***Note***: *Be sure to verify the above information with your Network Administrator prior to configuring the unit.*

When using Microsoft Windows, once Microsoft dial-up networking has established a connection, a network is constructed with the parameters specified in the Modem Settings area of the Network configuration window. The client computer now can be connected to two separate networks. These networks must have distinct IP addresses if modem access is to function properly. The second network established by the PPP connection has only two devices, the Dominion SX unit with IP address PPP Server IP and the client computer with IP address PPP Client IP.

Please see **Appendix G: Modem Configuration** for additional information on configuring Microsoft dial-up networking on Windows 2000, Windows 98, and Windows NT.

Modem Usage

Dial-up connection support for the unit allows users to access the connected target device when normal network connectivity to Dominion SX is not available. Once the PPP connection is established between the client computer and the unit, the user can access the unit by using the browser.

*Note: Dial-up access is supported only with connections of **28.8 Kbps** or greater connection baud rates.*

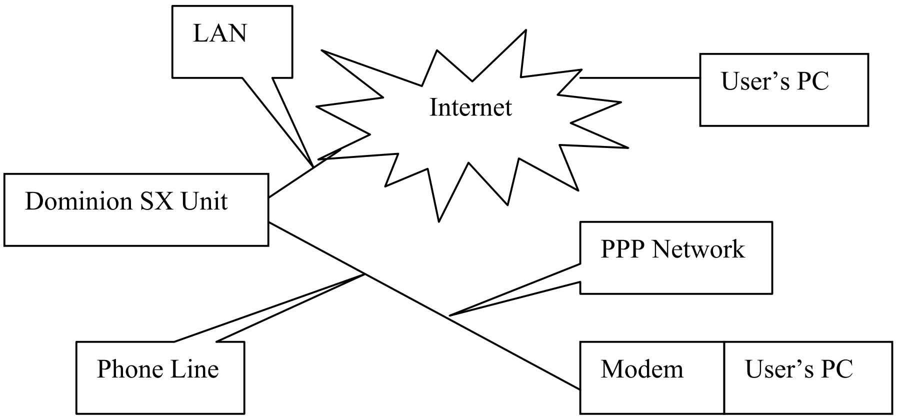


Figure 42 Modem Connection to a Dominion SX unit

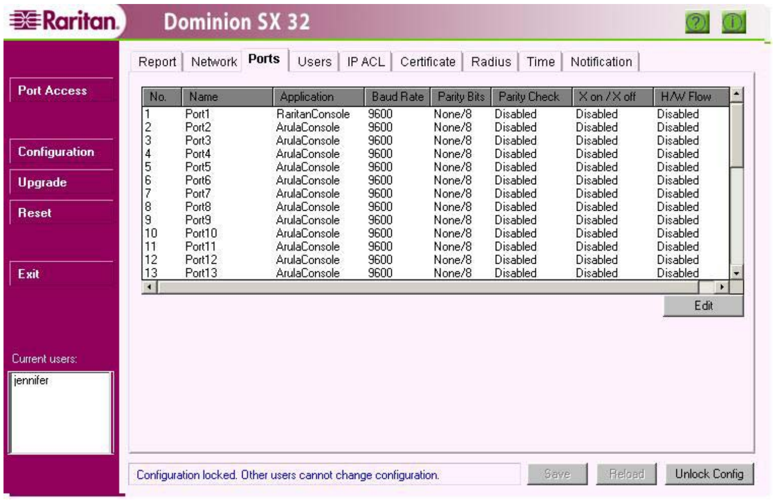
Client Installation for Modem Access

Depending on the characteristics of the phone line, connection speed will vary. The modem that is installed in the unit is a 56Kbps device; generally the connection speed will be approximately 33Kbps. At this speed, there is a possibility that downloading the applet will take some time before a connection can be made with the unit and the remote target device accessed. A client installation that improves the access to the unit is available, and once installed, subsequent access to the unit makes use of this local file. Depending on the client machine browser operating system that is used, the client software installation procedure is different. Please see **Appendix H: Client Software Installation** for additional information.

Ports

Overview

The Ports configuration screen allows Administrators to define the serial/console port settings in order to communicate with remote target devices.

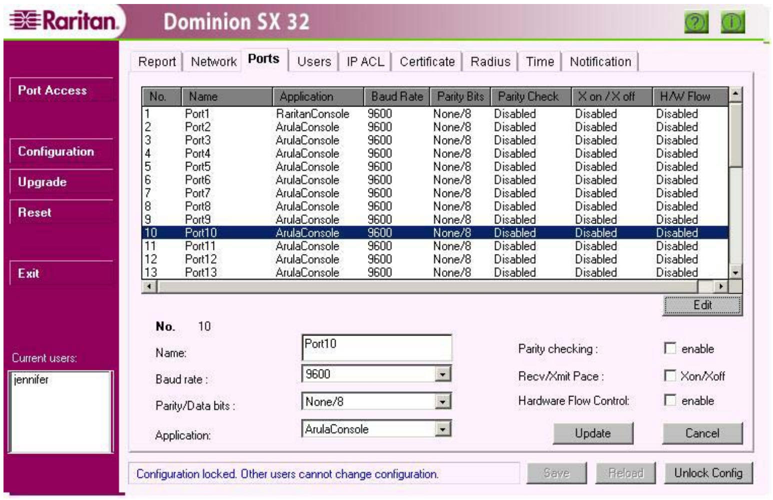


No.	Name	Application	Baud Rate	Parity Bits	Parity Check	X on / X off	H/W Flow
1	Port1	RaritanConsole	9600	None/8	Disabled	Disabled	Disabled
2	Port2	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
3	Port3	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
4	Port4	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
5	Port5	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
6	Port6	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
7	Port7	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
8	Port8	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
9	Port9	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
10	Port10	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
11	Port11	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
12	Port12	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
13	Port13	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled

jennifer

Configuration locked. Other users cannot change configuration.

Figure 43 Port Configuration Display



No.	Name	Application	Baud Rate	Parity Bits	Parity Check	X on / X off	H/W Flow
1	Port1	RaritanConsole	9600	None/8	Disabled	Disabled	Disabled
2	Port2	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
3	Port3	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
4	Port4	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
5	Port5	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
6	Port6	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
7	Port7	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
8	Port8	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
9	Port9	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
10	Port10	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
11	Port11	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
12	Port12	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled
13	Port13	ArulaConsole	9600	None/8	Disabled	Disabled	Disabled

No. 10

Name: Port10

Baud rate : 9600

Parity/Data bits : None/8

Application: ArulaConsole

Parity checking : □ enable

Recv/Xmit Pace : □ Xon/Xoff

Hardware Flow Control: □ enable

jennifer

Configuration locked. Other users cannot change configuration.

Figure 44 Port Editing Display

Configure Port Parameters

- **Name**: Name that associates the serial port with the connected target device; can be up to 64 characters in length and must be unique from the other port names
- **Application**: Application type that is associated with a specific port; default application provided is RaritanConsole (contact Raritan for additional applications)
- **Baud rate**: Baud rate of the serial port; should match that of the target device connected to the port (valid choices are 1200, 1800, 2400, 4800, 9600, 19200, 28800, 38400, 57600, 115200)
- **Parity/Data bits**: Parity/Data of the serial port; should match the setting of the target device (valid choices are None/8, Even/7, Odd/7)

- **Parity check**: Enabling or disabling of the Parity function of the serial port; should also match the target device's setting
- **Xon/Xoff**: Can be enabled if the target system supports this feature; will allow the unit to control the data flow and reduce the chance of data loss
- **Hardware Flow Control RTS/CTS**: Can be enabled if the target system supports this feature; will allow the unit to control the data flow using hardware signals and reduce the chance of data loss.

Edit Port Parameters

1. Select an entry to modify.
2. Click on the [**Edit**] button.
3. The selected entry appears in the lower half of the screen.
4. Make changes to the fields as needed.
5. Click on the [**Update**] button to load the changes or click on the [**Cancel**] button to ignore changes.
6. Click on the [**Save**] button.

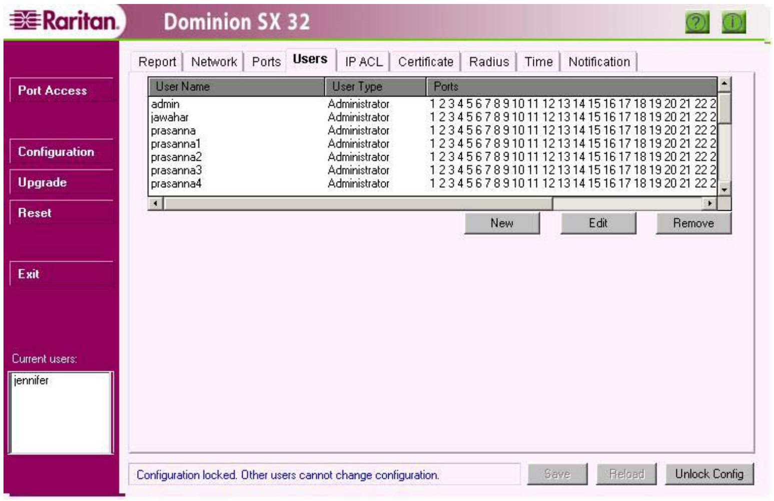
Users

Overview

The Users configuration screen provides a place to define a user list with appropriate unit access permissions. There are three classes of users, each with different rights:

- **Administrators**: Can view and modify all configuration information, including the user information for all user types (Administrators, Operators, and Observers). Administrators have write-access rights to the console window.
- **Operators**: Can view all configuration information but cannot modify information except for their own passwords. Operators have write-access rights to the console window.
- **Observers**: Can view most configuration information but cannot modify any information except their own passwords. Observers have read-only rights to the console window.

USER TYPE	CONFIGURATION	CONTROL REMOTE TARGET	UPGRADE	RESET
Administrator	All	Yes	Yes	Yes
Operator	Edit own user record	Yes	No	No
Observer	Edit own user record	No	No	No



User Name	User Type	Ports
admin	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
jawahar	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna1	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna2	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna3	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna4	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2

Current users:
jennifer

Configuration locked. Other users cannot change configuration.

Figure 45 Users Tab Display

Local Users

The unit can be configured for fifty (50) local user accounts and can support ten (10) users simultaneously logged in to the same port.

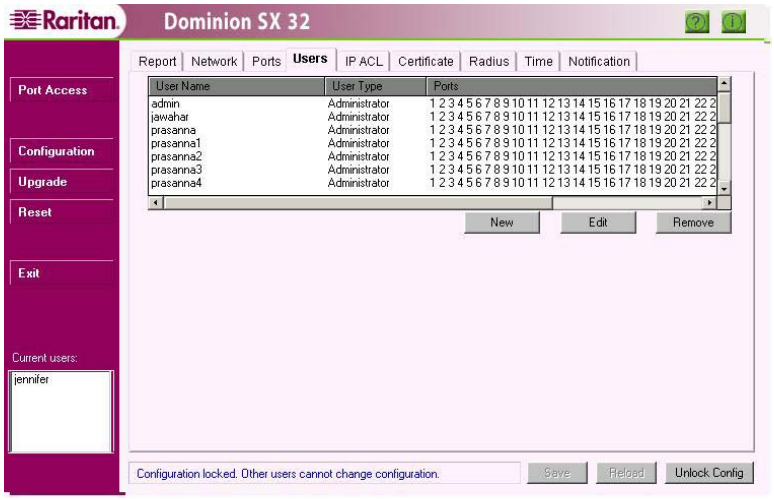
Configurable Parameters

- **User Name**: Name used for display purpose as in the Current Users list; alphanumeric text, 1 – 32 characters in length (mandatory)
- **Login Name**: Login name used to log in to Dominion SX; alphanumeric text, 1 – 20 characters in length (mandatory)
- **User Type**: Administrator / Operator / Observer.
- **Information**: Additional informational and/or description to be associated with the user; alphanumeric text, 1 – 64 characters in length
- **Password**: Authentication password; alphanumeric text, 6 – 16 characters in length (mandatory)

- **Ports**: List of ports that the user can access; by default, Administrators are given access to all ports, and can assign ports to Operators and Observers

Add a New User

Only an Administrator can create a new Administrator, Operator, or Observer. New users' records are valid only after the configuration is saved, and users can change their passwords after the first time they log on.



User Name	User Type	Ports
admin	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
jawahar	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna1	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna2	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna3	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna4	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2

Configuration locked. Other users cannot change configuration.

Figure 46 New User Creation

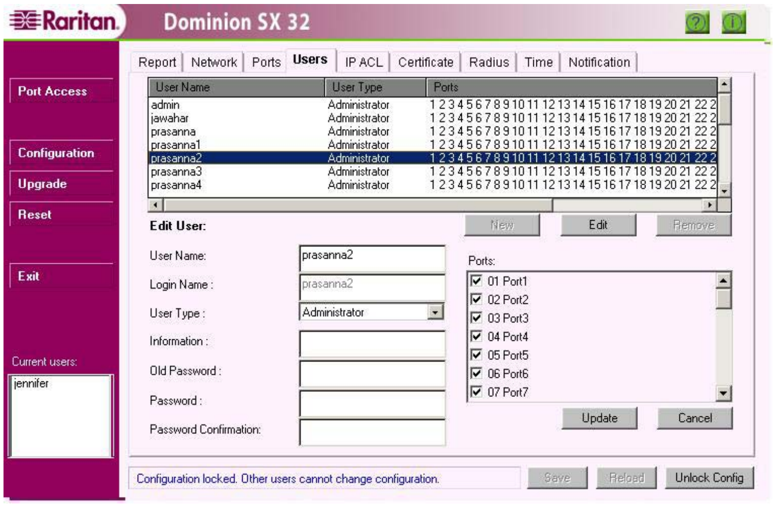
To Add a New User:

1. Click on the [**New**] button.
2. Enter the **User Name, Login Name, User Type,** and **Password**.
3. Retype the password in the **Password Confirmation** field.
4. Assign the ports that the user can access. Note that Administrator users are automatically granted access to all ports.
5. Click on the [**Add**] button.
6. Click on the [**Save**] button.

Edit Existing User Information

All users can edit their own **Passwords**, but only Administrators can edit all other User information (except **Login Name**). Observers and Operators cannot change any User Information.

If the user is logged in at the time the Administrator is editing that User's information, only the **Information** and **Password** fields can be changed.



User Name	User Type	Ports
admin	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
jawahar	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna1	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna2	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna3	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna4	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2

Edit User:

User Name: prasanna2

Login Name : prasanna2

User Type : Administrator

Information :

Old Password :

Password :

Password Confirmation:

Ports:

☑ 01 Port1
☑ 02 Port2
☑ 03 Port3
☑ 04 Port4
☑ 05 Port5
☑ 06 Port6
☑ 07 Port7

Current users:
jennifer

Configuration locked. Other users cannot change configuration.

Figure 47 User Modification

To Edit Existing Information:

1. Click on the **User Name** to modify that user's information.
2. Click on the [**Edit**] button.
3. Update the desired fields – only those fields that you are allowed to change, based on your user type, are enabled.
4. Click on the [**Update**] button.
5. Click on the [**Save**] button.

Delete a User

To Delete an Existing User:

1. Click on the **User Name** of the user to be deleted.
2. Click on the [**Remove**] button.
3. Click on the [**Save**] button.

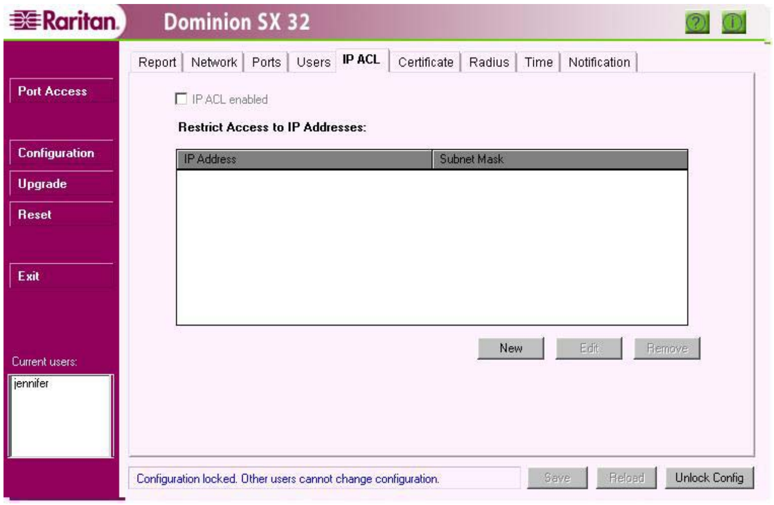
> ***Note***: *If the user being deleted is currently logged in, a warning screen will appear. A logged-in user cannot be deleted until that user has logged out of the system. Please remember that only Administrators can delete users.*

IP ACL

Overview

The IP ACL (Access Control List) Tab provides additional security by allowing Administrators to limit the client machines that can access the unit. Administrators can specify either specific IP addresses or ranges of IP addresses of machines that **cannot** connect to the unit.

For convenience, all desired IP addresses and subnet addresses can be stored in the IP ACL list and allowed or disallowed as needed.



☐ IP ACL enabled

Configuration locked. Other users cannot change configuration.

Figure 48 IP ACL Configuration Display

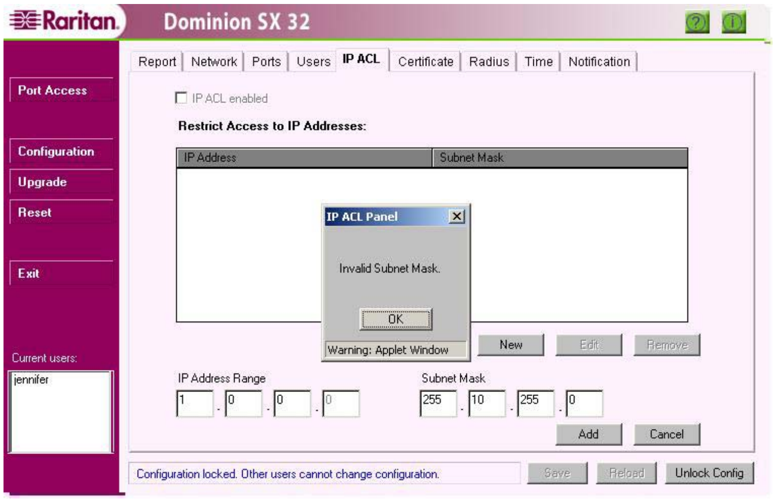
Configure IP ACL Parameters

- **IP ACL Enabled**: Check this box that enables this feature
- **IP Address Range**: Valid IP address range that will be restricted
- **Subnet Mask**: Subnet mask address

Important! Please make absolutely certain that all IP addresses have been entered correctly before enabling IP ACL. If not, you may be locked out of the unit and be unable to access the unit in the future; the only way to restore access to the unit is to perform a factory reset, removing all user-defined values that you have programmed in and forcing you to reconfigure the unit completely.

Only valid subnet masks can be entered in the interface. IP addresses **0.0.0.0** and **255.255.255.255** cannot be added as they are reserved IP addresses. Access to the unit is determined by doing a binary AND of the configured IP address with the specified subnet mask, and comparing this with the result of the binary AND of the IP address of the machine trying to connect to unit and the specified subnet mask. If the results are the same, access to the unit is denied.

If an invalid subnet mask is entered, an error message will appear. For example, ***255.10.255.0*** is an invalid subnet mask.



☐ IP ACL enabled

Restrict Access to IP Addresses:

Invalid Subnet Mask.

Warning: Applet Window

Current users: jennifer

IP Address Range: 1 . 0 . 0 . 0

Subnet Mask: 255 . 10 . 255 . 0

Configuration locked. Other users cannot change configuration.

Figure 49 Invalid Subnet Mask Message

Add a New Address

1. Click on the [**New**] button.
2. Enter the **IP Address Range**.
3. Enter the **Subnet Mask**.
4. Click on the [**Add**] button to add the new address, or click on the [**Cancel**] button to discard it.
5. Click on the [**Save**] button.

Edit an Existing Address

1. Select the **IP address** to be modified.
2. Click on the [**Edit**] button.
3. Make the required changes.
4. Click on the [**Update**] button, or click on the [**Cancel**] button to discard the changes.
5. Click on the [**Save**] button.

Delete an Address

1. Select the **IP address** to be deleted.
2. Click on the [**Remove**] button.
3. Click on the [**Save**] button.

Examples:

→ *To restrict a range of all the IP addresses 10.1.*.* (from 10.1.0.0 to 10.1.255.255), specify the IP address as* ***10.1.x.x*** *with a subnet mask of* ***255.255.0.0****. If the IP address of machine trying to connect to the unit is 10.1.230.54, this IP address will be restricted.*

→ *To restrict a particular IP address, for example, 10.1.101.11, specify the IP address as* ***10.1.101.11*** *with a subnet mask of* ***255.255.255.255****.*

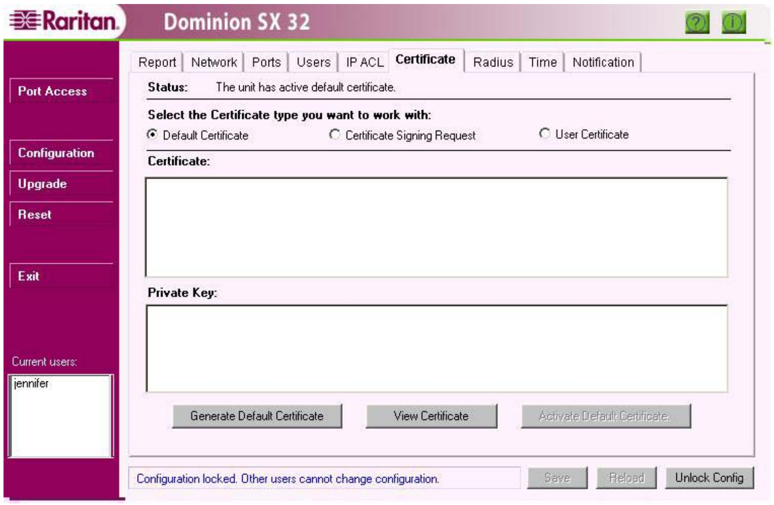
→ *To restrict a range of all the IP addresses 120.*.*.* (from 120.0.0.0 to 120.255.255.255), specify the IP address as* ***120.x.x.x*** *with a subnet mask of* ***255.0.0.0****.*

→ *Entering an IP address of* ***10.2.10.120*** *with a subnet mask of* ***255.255.255.192*** *will restrict IP addresses from 10.2.10.64 to 10.2.10.127.*

Certificate

Overview

The Certificate configuration screen provides an area for Administrators to define security parameters. Dominion SX supports certificate-based server authentication to establish an encrypted SSL session and to assure the user that they are dealing with a correct web site. The encrypted SSL session, always through HTTPS connection, ensures that personal information sent over the network is secure. Dominion SX supports SSL 128-bit encryption, and will negotiate with the client only at the specified security strength. The unit can act as a Certifying Authority and generate both self-signed CA Certificate and the Server Certificate. The certificate generated uses a 1024-bit public key.



Status: The unit has active default certificate.

Select the Certificate type you want to work with:
● Default Certificate ○ Certificate Signing Request ○ User Certificate

Current users: jennifer

Configuration locked. Other users cannot change configuration.

Figure 50 Certificate Tab Display

Configuration

When the user powers up the unit for the first time, an SSL certificate associated with the default IP address **192.0.0.192** is generated. When the user tries to connect to the unit, a Security Alert is displayed because the CA root certificate is not installed in the browser. Click on the [**Yes**] button to continue the Configuration process, and configure the unit. Please refer to **Appendix C: Certificates** for more information on how to install the certificate into the browser to prevent the security alert window from appearing. After the configuration is completed, the unit reboots. The server certificate is generated once again, this time for the new IP address assigned to the unit.

Certificate Generation

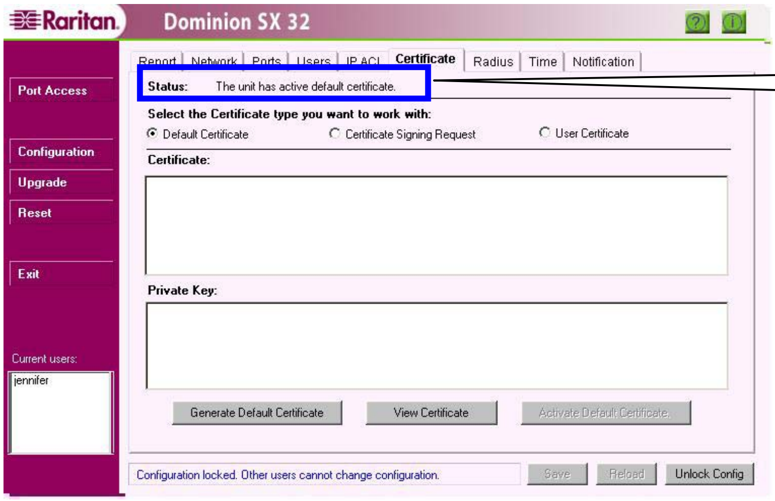
Dominion SX provides different methods of generating certificates.

- **Default (or Self-Signed) Certificate**: By default, the unit ships with a self-signed certificate signed by Raritan Computer. The certificate strength is 1024-bits and the certificate is valid for one year.
- **User Certificate**: This method allows the installation of a user-generated certificate, which can be in one the following forms:
  - User certificate generated from the CSR (Certificate Signing request) form. Clicking the “Generate CSR” button generates a CSR. In this case, only the certificate is installed into the unit. The certificate is compared with the private key (already generated) before it is installed into the unit.
  - User Certificate and private key (without pass-phrase) generated by a trusted third-party are installed into the unit.

Once the certificates are installed, the unit will automatically reboot so that the certificates take effect. There is an option that allows users to select either the self-generated or user-installed certificate at any time. Once installed, certificates are maintained in the unit. A status indicator at the top of the Certificate screen indicates the unit’s Certificate status, which might be:

- Active default certificate.

- Active user certificate.
- User certificate and active default certificate.
- Pending CSR and active default certificate



Status: The unit has active default certificate.

Select the Certificate type you want to work with:
● Default Certificate ○ Certificate Signing Request ○ User Certificate

Certificate:

Private Key:

Current users:
jennifer

Configuration locked. Other users cannot change configuration.

Certificate Status Indicator

Figure 51 Certificate Configuration Display

Default Certificate

The unit ships with a 1024-bit self-signed certificate signed by Raritan. When a user powers up the unit for the first time, an SSL certificate is generated that is associated to the default IP address **192.0.0.192**. Once the unit is configured with its new IP address, the unit reboots and uses the new IP address to generate a new certificate. When the **Default Certificate** radio button is selected. three buttons are available at the bottom of the Certificate screen:

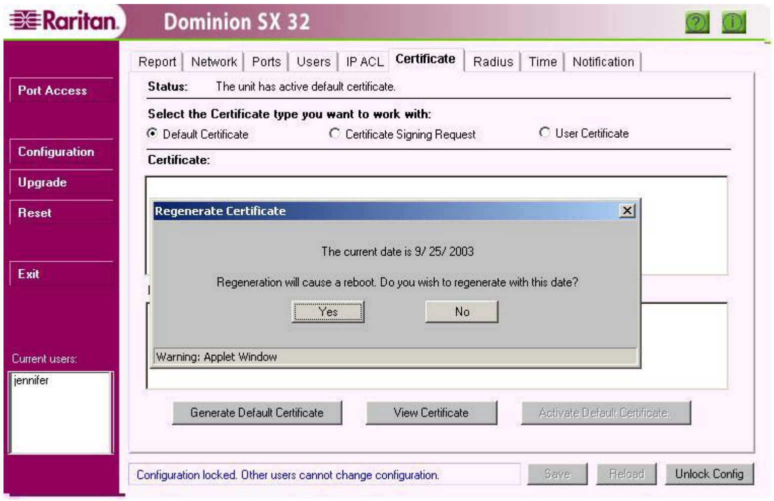
1. [**Generate Default Certificate**]: Click on this button to regenerate the certificate provided by Raritan. Please note that generating the certificate will cause the unit to reboot.
2. [**View Certificate**]: Click on this button to view the currently installed default certificate. This option can also be used to copy the certificate (generated by Raritan) and install it on the client desktop. Please refer to **Appendix C: Certificates** for more information.
3. [**Activate Default Certificate**]: Click on this button to activate the default certificate. This option can be used to replace the user-installed certificate with the default certificate provided by Raritan. Please note that activating the default certificate will cause the unit to reboot.

Generate Default Certificate

This function is used when the certificate has expired and a new one is needed.

1. Click on the [**Generate Default Certificate**] button.
2. When the confirmation window appears, confirm that the correct date is displayed. If not, you must change the date by modifying the information on the Time configuration screen (click on the **Time** tab) before you generate the Certificate, or the Certificate generated may not be valid.
3. The unit will reboot.

> ***Note**: If you factory-reset the unit and there is no user-installed certificate in the unit, the server Certificate is regenerated for the IP address **192.0.0.192**. If the user-installed certificate is active, it will remain active after a factory reset.*



Status: The unit has active default certificate.

Select the Certificate type you want to work with:

● Default Certificate ○ Certificate Signing Request ○ User Certificate

Certificate:

Regenerate Certificate

The current date is 9/ 25/ 2003

Regeneration will cause a reboot. Do you wish to regenerate with this date?

Yes No

Warning: Applet Window

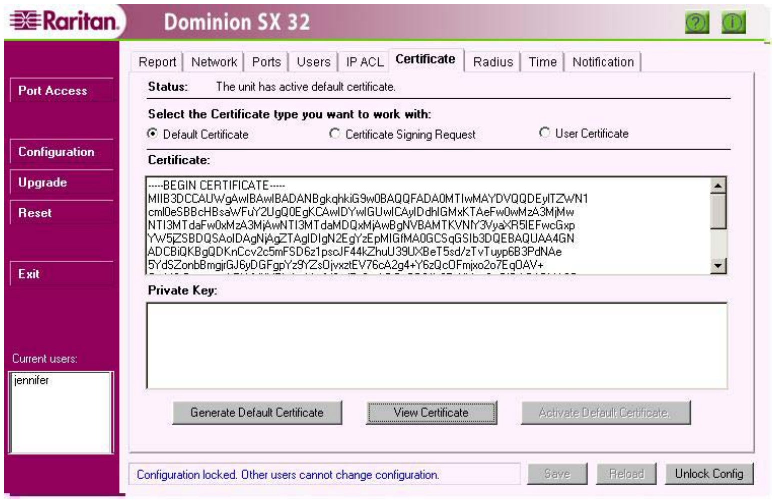
Configuration locked. Other users cannot change configuration.

Figure 52 Generate Certificate Display

View Certificate

This function enables the CA Root Certificate to be generated in the unit.

When you click on the [**View Certificate**] button, the CA Root Certificate appears. Please refer to **Appendix C: Certificates** for more information on installing CA Root.



Status: The unit has active default certificate.

Select the Certificate type you want to work with:

● Default Certificate ○ Certificate Signing Request ○ User Certificate

Certificate:

```
-----BEGIN CERTIFICATE-----
MIIB3DCCAUWgAwIBAwIBADANBgkqhkiG9w0BAQQFADA0MTIwMAYDVQQDEyITZWN1
cml0eSBBcHBsaWFuY2UgQ0EgKCAwIDYwIGUwICAyIDdhIGMxKTAeFw0wMzA3MjMw
NTI3MTdaFw0xMzA3MjAwNTI3MTdaMDQxMjAwBgNVBAMTKVNlY3VyaXR5IEFwcGxp
YW5jZSBDQSAoIDAgNjAgZTAgIDIgN2EgYzEpMIGfMA0GCSqGSIb3DQEBAQUAA4GN
ADCBiQKBgQDKnCcv2c5mFSD6z1pscJF44kZhuU39UXBeT5sd/zTvTuyp6B3PdNAe
5YdSZonbBmgjrGJ6yDGFgpYz9YZsOjvxztEV76cA2g4+Y6zQcOFmjxo2o7EqOAV+
```

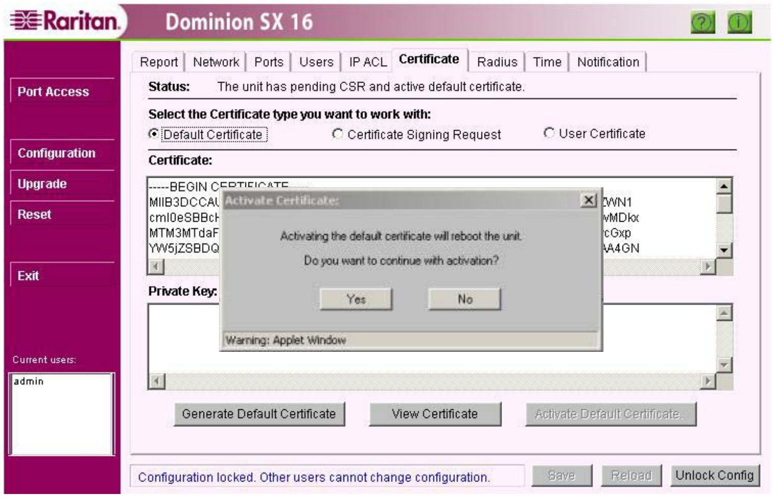
Private Key:

Configuration locked. Other users cannot change configuration.

Figure 53 View Self-Signed Certificate Display

Activate Default Certificate

This button is active only when a user certificate is installed and active on the unit. When you click on the [**Activate Default Certificate**] button, the default certificate generated by Raritan becomes active. The unit will reboot and use this certificate upon rebooting.



Status: The unit has pending CSR and active default certificate.

Select the Certificate type you want to work with:

● Default Certificate ○ Certificate Signing Request ○ User Certificate

Certificate:

Activate Certificate:

Activating the default certificate will reboot the unit.

Do you want to continue with activation?

Warning: Applet Window

Private Key:

Current users: admin

Configuration locked. Other users cannot change configuration.

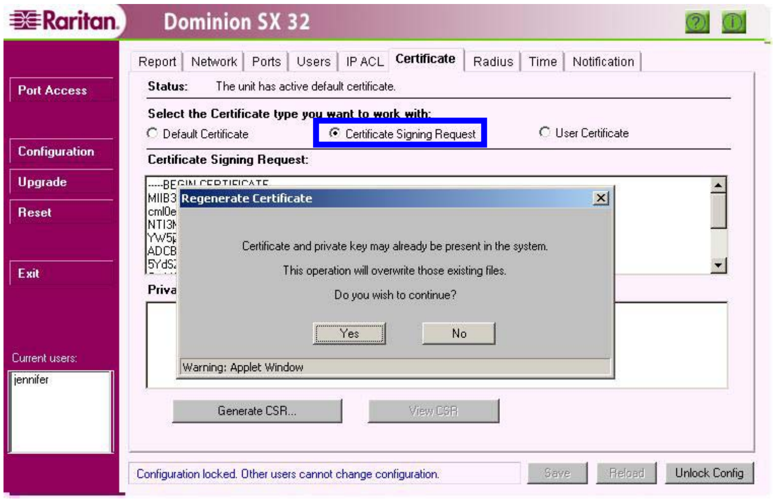
Figure 54 Activating Default Certificate

Certificate Signing Request (CSR)

Dominion SX will generate a CSR that can be used to obtain a user certificate to be installed in the unit, from a trusted third-party source. Bit strengths of 512, 1024, and 2048 are supported. If a user-installed certificate is active, a CSR cannot be generated. The default certificate from Raritan must be active in order to generate a CSR.

To Generate a CSR Request:

First click on the **Certificate Signing Request** radio button, and then click on the [**Generate CSR**] button to generate a CSR and a private key that is stored in the unit. When the warning screen appears, click on the [**Yes**] button to continue generating the request and to overwrite the information already on the system.



Status: The unit has active default certificate.

Select the Certificate type you want to work with:

○ Default Certificate ● Certificate Signing Request ○ User Certificate

Certificate Signing Request:

Regenerate Certificate

Certificate and private key may already be present in the system.

This operation will overwrite those existing files.

Do you wish to continue?

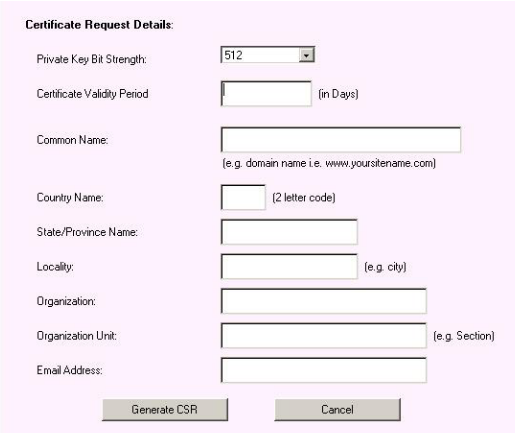
Warning: Applet Window

Private Key:

Current users: jennifer

Configuration locked. Other users cannot change configuration.

Figure 55 Generate CSR Request Display



Certificate Request Details:

Private Key Bit Strength: 512

Certificate Validity Period (in Days)

Common Name: (e.g. domain name i.e. www.yoursitename.com)

Country Name: (2 letter code)

State/Province Name:

Locality: (e.g. city)

Organization:

Organization Unit: (e.g. Section)

Email Address:

Figure 56 CSR Configurable Parameters

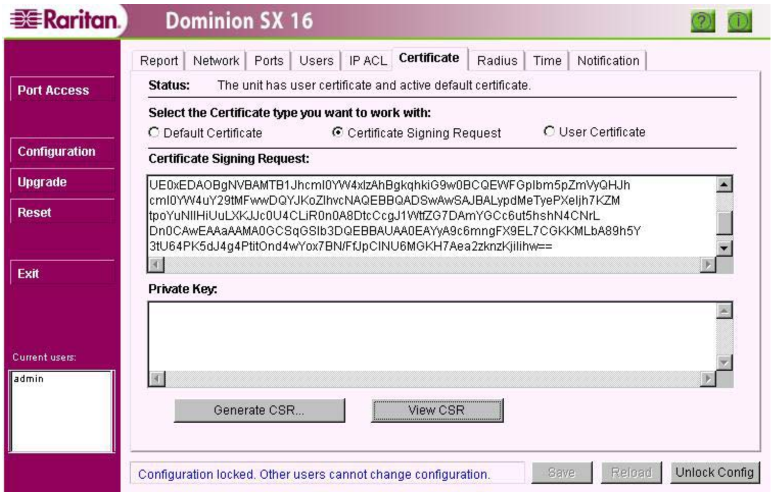
The first three fields in this screen are required; the other fields are optional:

- **Key strength**: 512, 1024, or 2048
- **Certificate validity period**: In days, two years maximum
- **Common name**: Fully qualified host name such as **www.raritan.com** or **10.0.3.65**
- **Country name**
- **State/province name**
- **Locality**
- **Organization**
- **Organization unit**
- **Email address**

Click on the [**Generate CSR**] button to generate and display the request. Cut and paste the result into a text file and use the file to obtain a valid certificate from a third-party. When you receive the new certificate, install it in the unit.

To View the Certificate Signing Request:

Click on the [**View CSR**] button to view the certificate-signing request that has been generated to obtain a valid certificate.



Status: The unit has user certificate and active default certificate.

Select the Certificate type you want to work with:

○ Default Certificate ● Certificate Signing Request ○ User Certificate

Certificate Signing Request:

```
UE0xEDAOBgNVBAMTB1JhcmI0YW4xlzAhBgkqhkiG9w0BCQEWFGpIbm5pZmVyQHJh
cmI0YW4uY29tMFwwDQYJKoZIhvcNAQEBBQADSwAwSAJBALypdMeTyePXeljh7KZM
tpoYuNIlHiUuLXKJJc0U4CLiR0n0A8DtcCcgJ1WtfZG7DAmYGCc6ut5hshN4CNrL
Dn0CAwEAAaAAMA0GCSqGSIb3DQEBBAUAA0EAYyA9c6mngFX9EL7CGKKMLbA89h5Y
3tU64PK5dJ4g4PtitOnd4wYox7BN/FfJpCINU6MGKH7Aea2zknzKjiIihw==
```

Private Key:

Current users:
admin

Configuration locked. Other users cannot change configuration.

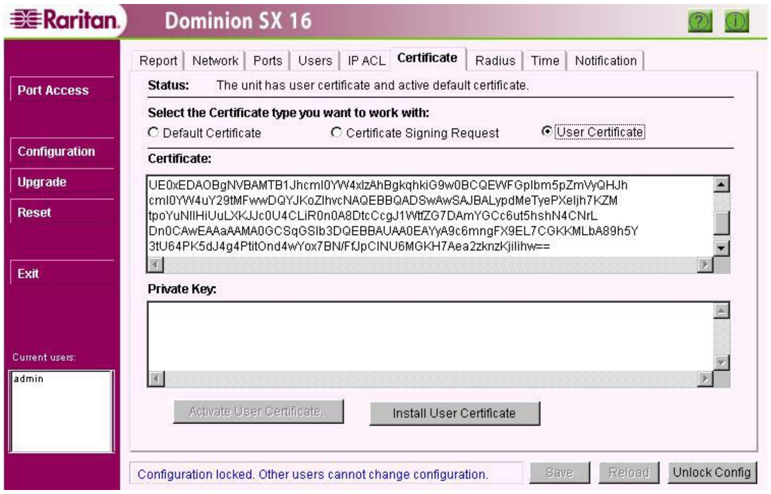
Figure 57 View CSR Display

User Certificate (Install Server Certificate)

This function allows the user to install a certificate from various Certificate Authorities (CA) such as VeriSign, Thawte, and Baltimore. If you do not want to use the Certificate generated by the unit, you can obtain one from one of these Certificate Authorities and install it in the unit yourself.

To Install a User Certificate:

1. Open the certificate and the private key file in a text editor. If the certificate was generated using CSR, only the certificate will be available.
2. Under the **Certificate** Tab, click on the **User Certificate** radio button.
3. Select the text and use the Copy (<**Ctrl+C**>) and Paste (<**Ctrl+V**>) commands to copy the certificate and the private key, as applicable, into the respective window.
4. Click on the [**Install User Certificate**] button.
5. If the installation is successful, the unit will reboot, and the next time a user logs into the unit, the User Installed Certificate will appear.



Status: The unit has user certificate and active default certificate.

Select the Certificate type you want to work with:

○ Default Certificate ○ Certificate Signing Request ● User Certificate

Certificate:

```
UE0xEDAOBgNVBAMTB1JhcmI0YW4xlzAhBgkqhkiG9w0BCQEWFGplbm5pZmVyQHJh
cmI0YW4uY29tMFwwDQYJKoZIhvcNAQEBBQADSwAwSAJBALypdMeTyePXeljh7KZM
tpoYuNIlHiUuLXKJJc0U4CLiR0n0A8DtcCcgJ1WtfZG7DAmYGCc6ut5hshN4CNrL
Dn0CAwEAAaAAMA0GCSqGSIb3DQEBBAUAA0EAYyA9c6mngFX9EL7CGKKMLbA89h5Y
3tU64PK5dJ4g4PtitOnd4wYox7BN/FfJpCINU6MGKH7Aea2zknzKjilihw==
```

Private Key:

Configuration locked. Other users cannot change configuration.

Figure 58 User Certificate

Important! Make sure you install the CA Root Certificate into the browser that issued the Server Certificate. Visit http://help.netscape.com/products/server/certificate/cacertdoc/ for further details.

When a user connects to the unit, the Server Certificate is downloaded. The browser trusts the server certificate if the signer of this Certificate, or "**CA Root**," is installed in the browser.

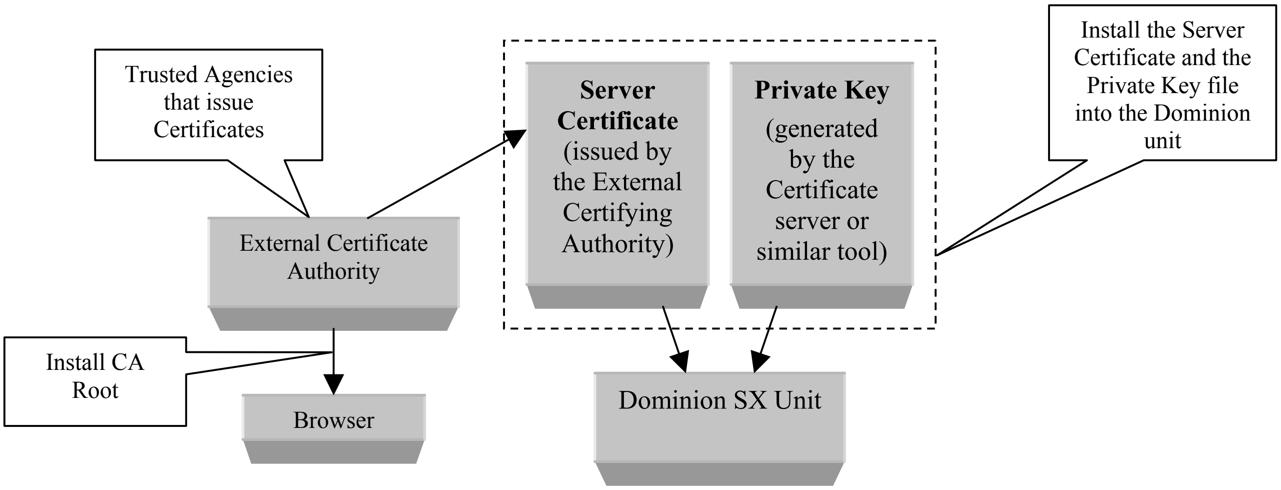

Trusted Agencies that issue Certificates
External Certificate Authority
Server Certificate (issued by the External Certifying Authority)
Private Key (generated by the Certificate server or similar tool)
Install the Server Certificate and the Private Key file into the Dominion unit
Install CA Root
Browser
Dominion SX Unit

Figure 59 Schematic of External Certificate Utilization

RADIUS

Overview

The RADIUS configuration screen allows Administrators to modify information regarding RADIUS, or the Remote Authentication Dial-In User Service, an access server authentication, authorization, and accounting protocol developed by Livingston Enterprises, Inc. RADIUS protocol defines the communication between a RADIUS client and a RADIUS server.

The RADIUS Configuration screen is used to set up the unit for use with a RADIUS protocol server. RADIUS protocol is an Internet standard that provides user authentication, authorization, and accounting services for remote access devices. Dominion SX can be configured as a RADIUS client. The unit will query the RADIUS server for authentication and authorization information each time a user attempts to login to the unit.

The client is responsible for passing user information to designated RADIUS servers, and then acting on the response that is returned. RADIUS servers are responsible for receiving user connection requests, authenticating the user, and then returning all configuration information necessary for the client to deliver service to the user.

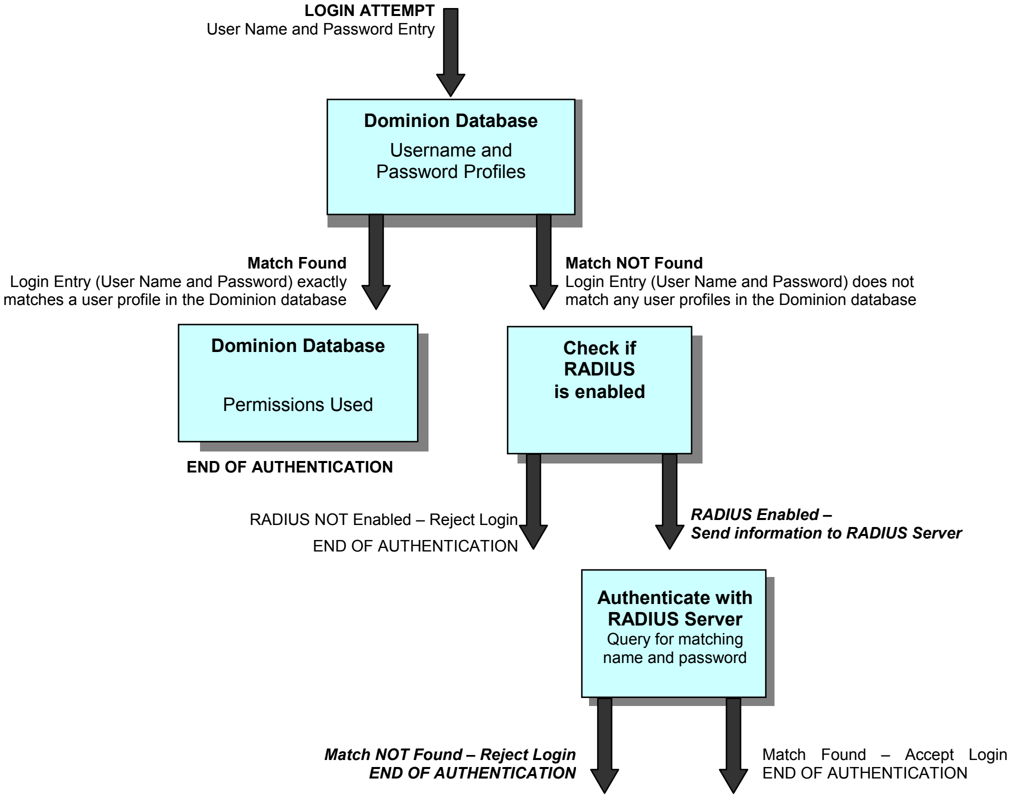

LOGIN ATTEMPT
User Name and Password Entry
Dominion Database
Username and Password Profiles
Match Found
Login Entry (User Name and Password) exactly matches a user profile in the Dominion database
Match NOT Found
Login Entry (User Name and Password) does not match any user profiles in the Dominion database
Dominion Database
Permissions Used
END OF AUTHENTICATION
Check if RADIUS is enabled
RADIUS NOT Enabled – Reject Login
END OF AUTHENTICATION
RADIUS Enabled –
Send information to RADIUS Server
Authenticate with RADIUS Server
Query for matching name and password
Match NOT Found – Reject Login
END OF AUTHENTICATION
Match Found – Accept Login
END OF AUTHENTICATION

Figure 60 RADIUS Users Login Mechanism

RADIUS Authentication occurs when a user tries to log on to the RADIUS client. After prompting the user for login name and password, the client checks to see if the user is already present in the local list. If not, the client sends this information in an authentication request to the RADIUS server. The RADIUS server checks the validity of the request, then checks its database of user names and passwords. If the name or password **are not** valid, it sends a rejection to the client, who in turn rejects the login. If the login name and password **are** valid, the RADIUS server sends back a packet containing information about this user, and the client uses this information to decide what type of service to supply for the user.

RADIUS users are treated differently from local users only until authentication comes from the RADIUS server. Once the RADIUS server authenticates a particular user, this RADIUS user enjoys the same privileges as any other local user.

__Note__: The maximum number of users that can log on to the unit at any given time includes both RADIUS and non-RADIUS (local) users.

RADIUS Advantages

- The RADIUS server has a single, unified "database" of users, allowing for authentication of user names and passwords, as well as for configuration information detailing the type of service to deliver to the user. There is no limit to the number of users; it can store as many users as its disk storage permits.
- If you are using many Dominion SX units, you do not have to configure all users on each of the units. Configure a user once on your RADIUS server, then allow all Dominion SX units authenticate their login requests from the same place.

RADIUS Configuration

- Configure the unit for RADIUS as described in the Enabling RADIUS section that follows.
- Configure your RADIUS server for the logon operation to be successful. The steps to configure a RADIUS server are defined in **Appendix D: RADIUS Server**.
- Log on to the unit as a RADIUS user.

In cases where:

(1) the RADIUS server fails to respond

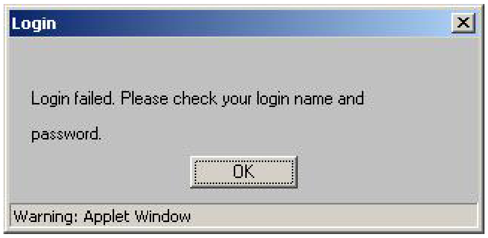
(2) the network connectivity is too slow

(3) the user has misspelled the user name or password

OR

(4) the RADIUS server is not properly configured

the following error message will appear:



Login

Login failed. Please check your login name and password.

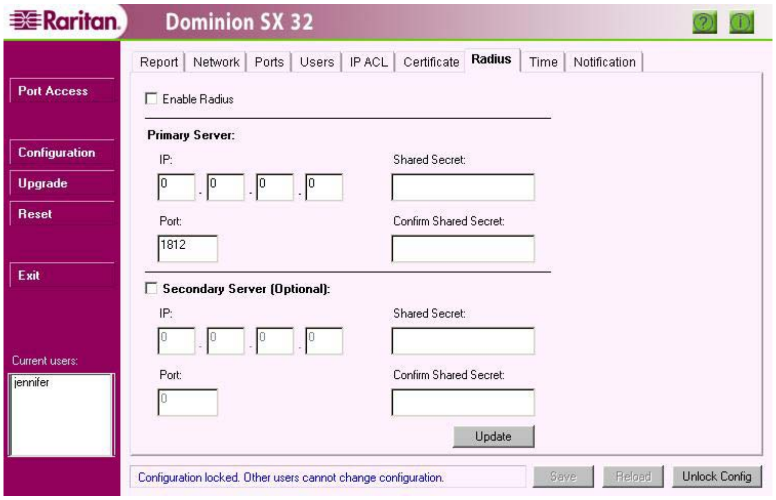
Warning: Applet Window

Figure 61 Unsuccessful Login Message Window

Enabling RADIUS

Every unit has to be configured for RADIUS Communication to obtain authentication from the RADIUS Server. Administrators should log on to the unit as any non-RADIUS user, and then configure the unit following these steps to obtain authentication:

1. Click on the **RADIUS** Tab.



□ Enable Radius

Primary Server:

IP: 0 . 0 . 0 . 0

Shared Secret:

Port: 1812

Confirm Shared Secret:

□ Secondary Server (Optional):

IP: 0 . 0 . 0 . 0

Shared Secret:

Port: 0

Confirm Shared Secret:

Current users: jennifer

Configuration locked. Other users cannot change configuration.

Figure 62 RADIUS Configuration Display

2. Check the **Enable RADIUS** check box.
3. In the **Primary Server IP** field enter the address of the RADIUS server.
4. In the **Shared Secret** field, enter the password for the client, which was added while configuring the RADIUS server. Please refer to **Appendix D: RADIUS Server** for additional information.
5. In the **Port** field, enter the port number – by default, the port number is **1812**, and should be modified in case the RADIUS server is configured for a different port number. The early deployment of RADIUS was done using the chosen port number **1645**, which conflicts with the "Datametrics" service. *The officially assigned default port number for RADIUS is 1812.*
6. The Information for the Secondary RADIUS Server is optional. This is a mirrored image of the Primary RADIUS Server and it is used only in case the Primary RADIUS Server fails to respond.
7. Click on the [**Update**] button.
8. Click on the [**Save**] button.

Note:

→ When you factory reset your box, all the RADIUS parameters will be lost.

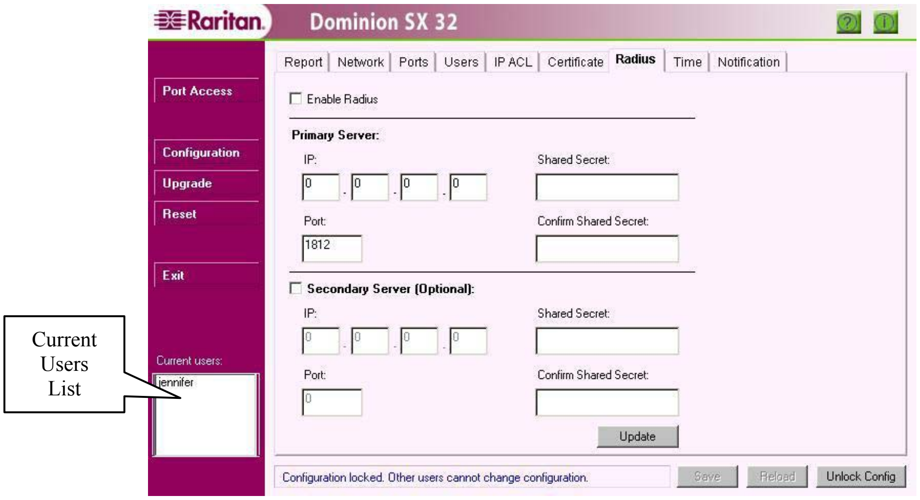
→ RADIUS users are not cached in the memory. Every time you log on as a RADIUS user, authentication comes from the RADIUS server.

→ The RADIUS client sends a packet to the RADIUS server and waits for a reply. If it does not receive a response within 20 seconds, it resends the packet to the same server. If the Primary RADIUS Server again fails to respond, it contacts the Secondary RADIUS Server, if configured to do so. If it does not receive a response from the Secondary RADIUS Server, it informs the user accordingly. Thus, a user may have to wait for as long as 80 seconds if one or both RADIUS server(s) fail to respond or if the Dominion SX unit is not properly configured.

*→ RADIUS users will appear in the **Current users** list in the left panel of the main window, but not in the Users list on the Users configuration screen.*

Usage

Once you are logged on to the unit as a RADIUS user, you can check your login name in the Current users list in the left panel. This list contains a list of RADIUS and as well as non-RADIUS users currently logged-in to the unit.



☐ Enable Radius

Primary Server:

IP: 0 . 0 . 0 . 0

Shared Secret:

Port: 1812

Confirm Shared Secret:

☐ Secondary Server (Optional):

IP: 0 . 0 . 0 . 0

Shared Secret:

Port: 0

Confirm Shared Secret:

Configuration locked. Other users cannot change configuration.

Current users: jennifer

Figure 63 Current Users List

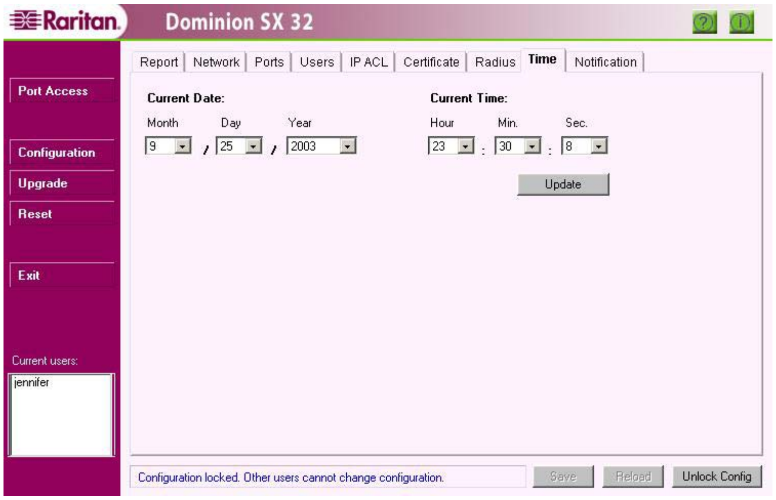
If you have Administrator privileges, you can add new users or edit an existing user. From this stage onwards, there is no difference in behavior between a "local" user and a RADIUS user.

Only non-RADIUS users are listed in the user list on the Users configuration screen under the Users tab. This is because, every time a RADIUS user logs in, authentication comes from the RADIUS server.

Time

Overview

The Time configuration screen is important for modifying the time and date in the Dominion SX unit. Some features in Dominion SX, for example, Certificate generation, depend on the correct Timestamp, which is used to check the validity period of the certificate.



Current Date:

Month 9 / Day 25 / Year 2003

Current Time:

Hour 23 : Min. 30 : Sec. 8

Current users:
jennifer

Configuration locked. Other users cannot change configuration.

Figure 64 Time Configuration Display

Configuration

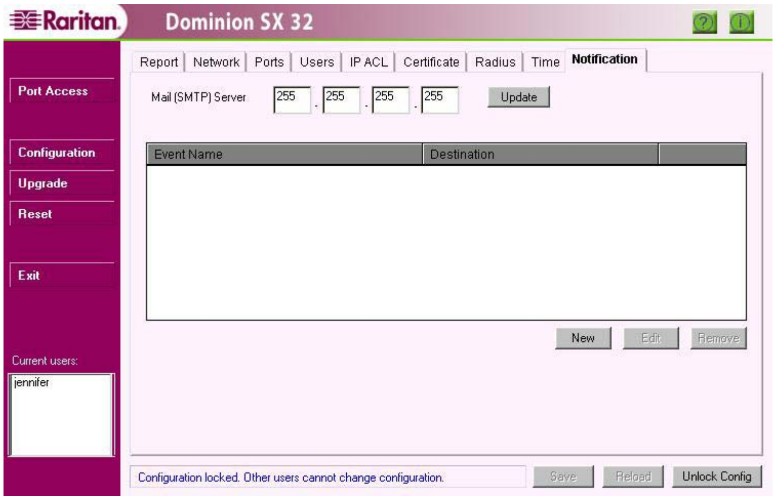
1. Set the Current Date and Current Time.
2. Click on the [**Update**] button.
3. Click on the [**Save**] button.

Notification

Overview

The Notification configuration screen allows an Administrator to set up notification schemes based on events that occur on the target device. Notification events are sent out as email messages. It is possible to convert the email service to a page so that the notification can be received in a prompt manner. Contact your pager service provider company to find out what email addresses can be used to transmit email messages as pages

Dominion SX is shipped with a set of predefined notification messages that are based on events that occur within the unit. It is also possible to have user-defined events sent out as email messages. User defined events are defined using the scripting capability.



Mail (SMTP) Server 255 . 255 . 255 . 255

Current users:
jennifer

Configuration locked. Other users cannot change configuration.

Figure 65 Notification Display

Configurable Parameters

- **Mail Server IP Address**: Valid IP address of the SMTP server.
- **Event Name**: Name of event that is to generate an email message, as selected from a predefined list. User-defined events must be entered as they are stated in the TCL scripts.
- **Destination**: Valid email destination address

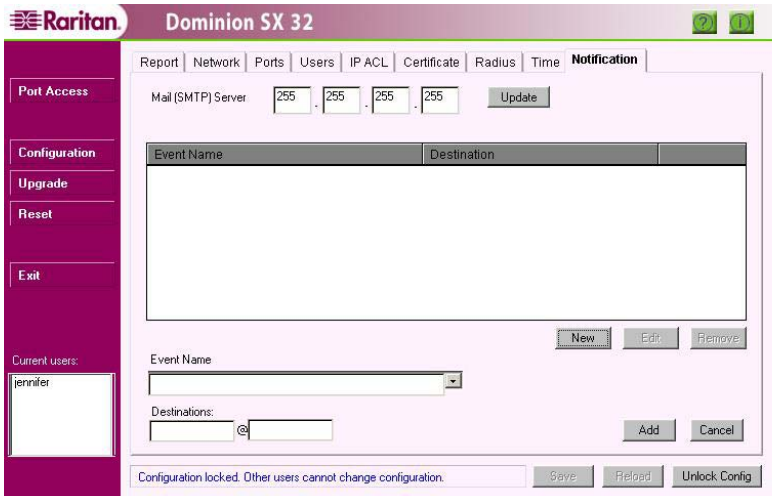
> ***Note****: Microsoft Exchange servers that are on an external network are not currently supported. Enter the IP address, click Update and Save. If the IP address is set to 255.255.255.255 then is used to disable the notification task from sending any alerts to the user.*

Add a New Notification

1. Click on the [**New**] button.
2. Select the desired event from the **Event Name** drop-down list, for which an email is to be generated. The event list contains events predefined by Raritan. To subscribe to a user-defined event, type the user defined event name.

> ***Note****: This name must match exactly with the event name that has been used when the script was generated.*

3. Specify the **Destination(s)** as <**name>@<domain**>.
4. Click on the [**Add**] button to add this event to the list, or click on the [**Cancel**] button to discard the changes.
5. Click on the [**Save**] button.



Mail (SMTP) Server 255 . 255 . 255 . 255

Current users:
jennifer

Configuration locked. Other users cannot change configuration.

Figure 66 New Notification Display

Edit a Notification Entry

1. Select the entry to be modified.
2. Click on the [**Edit**] button.
3. Make changes to the entry in the fields that appear in the lower portion of the screen.
4. Click on the [**Update**] button.
5. Click on the [**Save**] button.

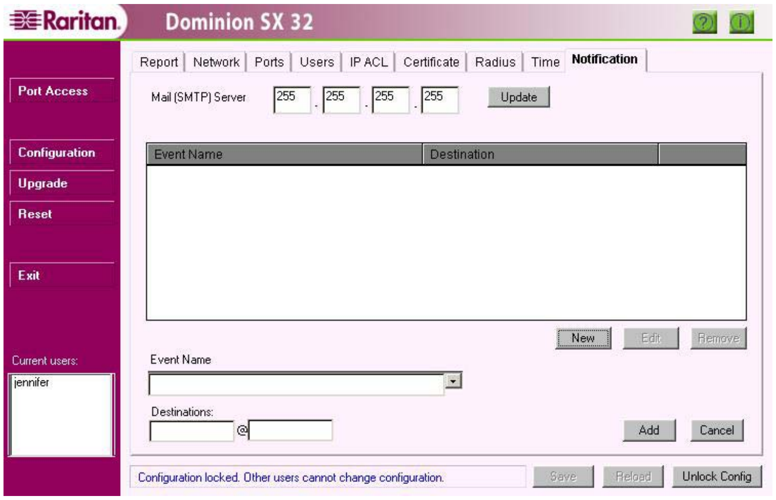


Figure 67 Edit Notification Destination

Delete a Notification Entry

1. Select the entry to be deleted.
2. Click on the [**Remove**] button.
3. Click on the [**Save**] button.

***Note**: Click on the [**Reload**] button to recover the deleted item.*

Dominion SX Standard Notification Events

The following is a list of standard events with their descriptions.

EVENT NAME	DESCRIPTION
event.amp	
event.amp.notice	
event.amp.notice.boot	Unit has successfully booted.
event.amp.notice.reboot	Unit has been requested to be re-booted.
event.amp.notice.upgrade	Unit has been upgraded
event.amp.notice.config	
event.amp.notice.config.info	General configuration has been modified.
event.amp.notice.config.user	Access Control List has been modified.
event.amp.notice.config.version	Firmware Version number has been modified.
event.amp.notice.config.system	Port name has been modified.
event.amp.notice.config.network	Network configuration has been modified.
event.amp.notice.config.datacom	Datacom configuration has been modified.
event.amp.notice.config.users	User configuration has been modified.
event.amp.notice.config.ipacl	IP address-based access control list has been modified.
event.amp.notice.config.notif	Notification configuration has been modified.

Dominion SX Standard Error Notification Events

The following is a list of standard error events that are internally generated by the unit. Should these notifications occur, please call Raritan Support.

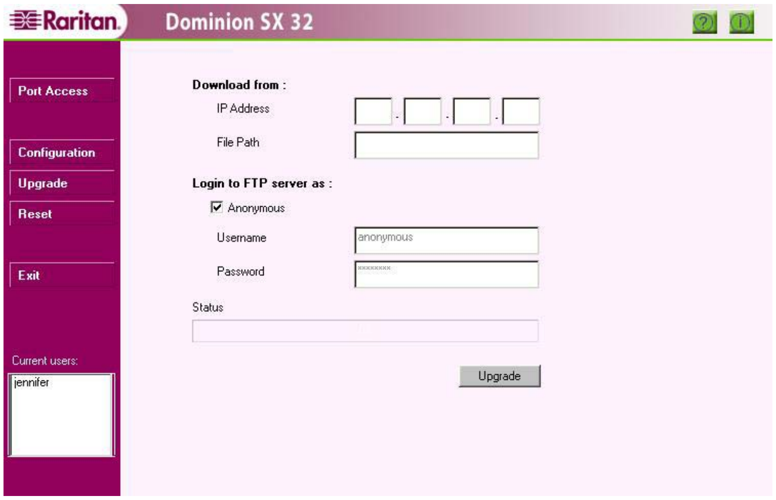
ERROR EVENT NAME	DESCRIPTION
event.amp.error	System related.
event.amp.error.taskInit	System related.
event.amp.error.httpExit	System related.
event.amp.error.outOfMemeory	System related.
event.amp.error.loggingTaskAlreadyDefined	System related.
event.amp.error.ftpReadFailed	System related.
event.amp.error.messagePipeFailed	System related.
event.amp.error.InternalError	System related.
event.amp.error.flashUpgradeFailed	Upgrade failed to write to flash memory.

Upgrade

The Upgrade feature allows an Administrator to upgrade the Dominion SX unit's firmware/application to a newer version of firmware. Firmware and application upgrades preserve user-defined settings, so the unit does not need to be re-configured after the upgrade procedure is complete.

In order to perform a firmware upgrade, the Administrator must download the upgrades file(s) onto a local FTP server and needs the IP address of the FTP server and the file path to the upgrade file(s). Many upgrades can be performed "anonymously" from the FTP server, and the default settings of this screen are for an anonymous upgrade. However, some FTP servers require a user name and password. If this is the case, the Administrator can uncheck the "Anonymous" box and enter the correct user name and password for the FTP server.

Once the upgrade is initiated, the status bar will indicate the progress of the upgrade and a pop-up window will notify the user once the upgrade procedure is complete.



Download from :

IP Address . . .

File Path

Login to FTP server as :

☑ Anonymous

Username anonymous

Password ********

Status

Current users:

jennifer

Figure 68 Upgrade Display

Upgrades can be done of the complete software (AmpAdmin package) and the various applications (AmpApp package) supplied by Raritan. The upgrade steps are similar for both cases.

To Perform a Complete Software Upgrade:

1. Click on the [**Upgrade**] button in the left panel.
2. Enter the **IP Address** where the software package is located.
3. Enter the **File Path** to the software package, for example***, /pub/Dominion/AmpAdmin***.
4. Enter **FTP Username** and **Password**, if required.
5. Click on the [**Upgrade**] button.
6. The unit will access the FTP server and download and install the file(s) onto the unit.
7. The unit will automatically reboot after the software is installed.

Important! During an upgrade procedure, do not attempt to access any unit features or functions, including, but not limited to, Reset and Exit. Interrupting the upgrade procedure can cause memory corruption and render the unit non-functional. Such an action voids your warranty or service contract, and in such a case unit repair/replacement costs are solely the responsibility of the user.

To Upgrade the Application:

Dominion SX has the ability to run different applications on each port; Raritan has a library of applications available for purchase, please contact us for more information.

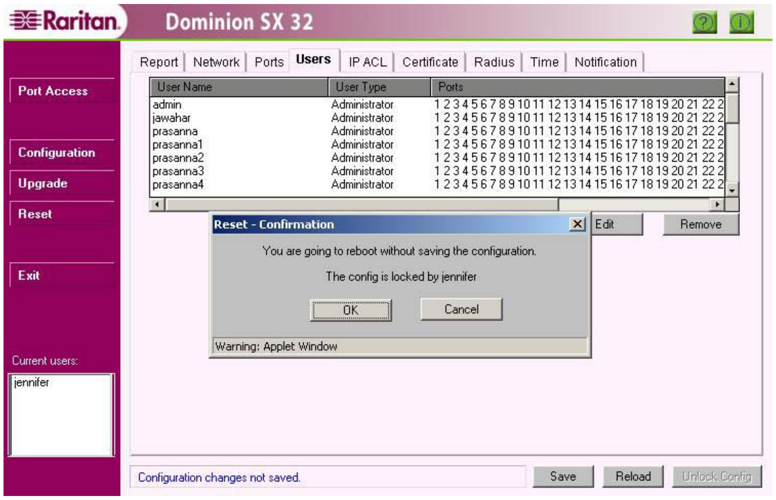
To load these applications into the unit for deployment:

1. Click on the [**Upgrade**] button in the left panel.
2. Enter the **IP Address** where the software application package is located.
3. Specify the **Path** to the software package, for example**, /pub/Dominion/AmpApp**.
4. Enter the **Username** and **Password** if required.
5. Click on the [**Upgrade**] button.
6. The unit will access the FTP server and download and install the files into the unit.
7. Repeat the above steps for each custom application that has to be installed into the unit.
8. After all applications have been installed, click on the [**Reset**] button.
9. When the unit reboots, log on and go to the **Ports** tab. Select the appropriate ports and configure them to use the correct application.

Reset

Soft Reset

Only an Administrator can execute a Soft Reset by clicking on the [**Reset**] button in the left panel of the main window. This resets the unit, logs off all the logged-in users and exits the application. A list of logged-in users who will be logged out upon reset will be displayed. The soft reset is useful when an Administrator wishes to disconnect all users from the unit.



User Name	User Type	Ports
admin	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
jawahar	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna1	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna2	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna3	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2
prasanna4	Administrator	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 2

Reset - Confirmation

You are going to reboot without saving the configuration.

The config is locked by jennifer

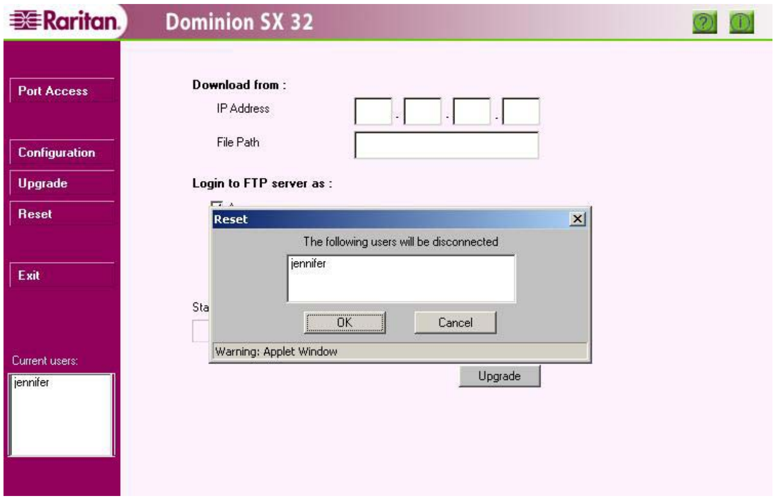
OK Cancel

Warning: Applet Window

Current users: jennifer

Configuration changes not saved.

Figure 69 Confirmation for Reset



Download from :

IP Address . . .

File Path

Login to FTP server as :

Reset

The following users will be disconnected

jennifer

OK Cancel

Warning: Applet Window

Current users: jennifer

Figure 70 Confirmation on Users to be Disconnected

To Perform a Soft Reset:

1. Click on the [**Reset**] button on the left panel.
2. A list of logged-in users, if there are any, is displayed. Click on the [**OK**] button to continue.
3. The unit resets and reboots.
4. Reconnect to the unit.

Factory Reset

You may want to perform a factory reset, or hard reset to the Dominion SX unit to revert the configuration to known defaults. This is useful if the IP address of the unit is no longer known. Using the following procedure, the network settings of the unit will be reset to the values shown in the table below, and all ports will be reset to 9600 baud, no parity checking, and no hardware flow control.

Internet Address (IP)	192.0.0.192
Gateway Address	192.0.0.192
Subnet Mask	255.255.0.0
Port Address	23

Note: *Factory reset does not remove the user-installed certificate from the unit.*

This procedure details the necessary steps to factory reset a unit with a direct connection to another computer, which eliminates conflicts with other network devices. It is not necessary to remove the device from all networks but it is up to the discretion of the Administrator as to whether this is necessary.

The procedure for performing a factory reset is:

1. Power OFF the Dominion SX unit.
2. Attach the supplied Factory Reset Connector (serial DB9 female) to the serial DB9 male port on the rear of the unit
3. Power ON the unit.
4. The unit will restore to factory default settings. This process will take approximately 40 seconds.
5. After 40 seconds, reconnect to the unit with the factory default IP address **192.0.0.192**.
6. Unplug the Factory Reset Connector.

Note: *It is advisable to remove the unit from the main network while performing a factory reset. Should another device on the network have the IP address of* ***192.0.0.192****, these two devices will be in conflict.*

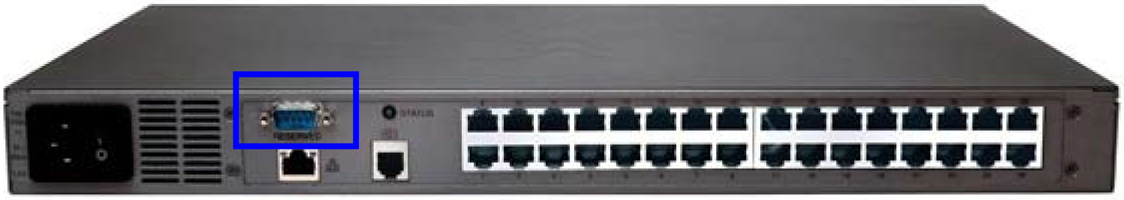


Figure 71 Factory Reset Connector Location

Chapter 5: Dominion SX Connectivity and Serial Pin-Out Guides

Connectivity Table:

This table lists the necessary Dominion SX hardware (adapters and/or cables) for connecting Dominion SX to common Vendor/Model combinations:

VENDOR	MODELS	CONSOLECON NECTOR	SERIAL CONNECTION
ArrowPoint	Switch	RJ45	CA1605 cable
Checkpoint	Firewall	DB9M	MA1609 adapter and CAT5 cable
Cisco	PIX Firewall	DB9M	MA1609 adapter and CAT5 cable
Cisco	Catalyst	RJ45	CA1818 cable
Cisco	Router	DB25F	MA1600 adapter and CAT5 cable
Hewlett Packard	Unix Server	DB9M	MA1609 adapter and CAT5 cable
Silicon Graphics	Origin	DB9M	MA1609 adapter and CAT5 cable
Sun	SPARCStation	DB25F	MA1625 adapter and CAT5 cable
Sun	Netra T1	RJ45	CA1818 cable
Sun	Cobalt	DB9M	MA1611 adapter and CAT5 cable
Various	Windows NT	DB9M	MA1609 adapter and CAT5 cable

Dominion SX Serial Pinouts

The RJ45 connector on the rear of the unit has the following pinout:

RJ45 PIN	SIGNAL
1	CTS
2	--------
3	RxD
4	GND
5	GND
6	TxD
7	--------
8	RTS

Appendix A: Specifications

ITEM	DIMENSIONS	WEIGHT	POWER
SX4	11.34" (W) x 10.7" (D) x 1.75" (H) (288mm x 270mm x 44mm)	4.61 lbs. (2.08 kg.)	110/220V auto-switching: 50-60 Hz
SX8	11.34" (W) x 10.7" (D) x 1.75" (H) (288mm x 270mm x 44mm)	4.81 lbs. (2.17 kg.)	110/220V auto-switching: 50-60 Hz
SX16	17.25" (W) x 11.34" (D) x 1.75" (H) (438mm x 288mm x 44mm)	9.57 lbs. (4.35 kg.)	110/220V auto-switching: 50-60 Hz
SX32	17.25" (W) x 11.34" (D) x 1.75" (H) (438mm x 288mm x 44mm)	10 lbs. (4.53 kb.)	110/220V auto-switching: 50-60 Hz

General

	Models:	SX4, SX8, SX16, SX32
Power Requirements:	110/220V auto-switching: 50-60 Hz	
Operating Temperature:	32° to 104° C (0° to 40° F)	
Operating Humidity:	20% - 85% RG	

Remote Connection

Network:	10/100 Ethernet; RJ-45 connection
Modem:	4, 8: Dedicated Modem Port 16,32: Integrated 56K V.90 (RJ11 port)
Protocols:	TCP/IP, RADIUS, SNMP, PAP, CHAP, HTTP, HTTPS, SSL, SSH

Browser Requirements (Tested)

PLATFORM	BROWSER	JVM VERSION
Win98	IE 5.5	5.0.0.3309
WinNT Wks SP4	Netscape 4.76	Java 1.1.5
WinNT Srv SP6	IE 5.0	5.0.0.3155
Win2K Prof SP2	Netscape 4.76	Java 1.1.5
Win XP	IE 6.0	5.0.0.3802
WinXP	Netscape 4.78	JVM 1.1.5

Software Release Version

	DOMINION C800	DOMINION C1600/C3200
Kernel Version	K.02.00.000	L.02.00.000
Software Version	K.02.00.000	L.02.00.000
GUI Version	K.02.00.000	L.02.00.000
RaritanConsole	1.23	1.23

Appendix B: System Defaults

Dominion SX system defaults, as shipped from Raritan, are defined in the table below.

Item	Default
IP Address	192.0.0.192
Subnet Mask	255.255.0.0
Port Address	23
General Settings	
Modem	Disabled
RADIUS	Disabled
Serial Ports	
Baud Rate	9600
Parity	None

Ports 80, 443 and 23 (can be configured) must be kept open for the unit to be operational.

Appendix C: Certificates

Certificate

A Certificate is an electronic document that is used to identify an individual, a server, or some other entity and to associate that identity with the public Key.

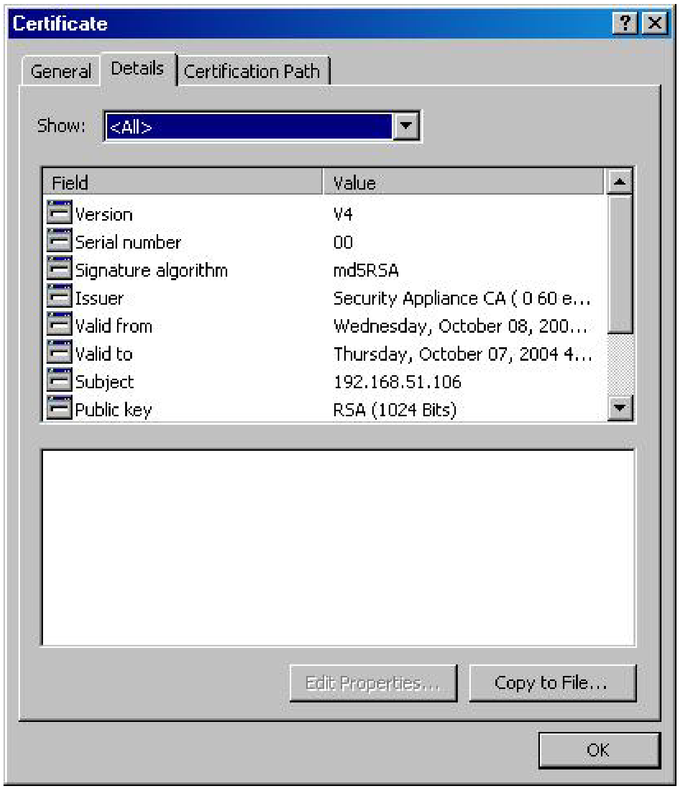
Certificate Contents

This section discusses certificate contents and the differences between the CA (Certificate Authority) Certificate and the Server Certificate that are present on the Dominion SX unit.

A Certificate is an association of the public key with the real identity of an individual, server, or other entity. It contains information identifying data and a public key (a distinguishing name). The certificate also contains the identification and signature of the certificate authority that issued the certificate, and holds administrative information for the CA's use, such as version number, serial number, issuer name, etc.

To View the Certificate:

1. Click on **File** in the main menu.
2. Select *Properties* from the drop-down menu.
3. Click on the [**Certificates**] button.
4. Click on the **Details** tab.



Show: <All>

Field	Value
Version	V4
Serial number	00
Signature algorithm	md5RSA
Issuer	Security Appliance CA (0 60 e...
Valid from	Wednesday, October 08, 200...
Valid to	Thursday, October 07, 2004 4...
Subject	192.168.51.106
Public key	RSA (1024 Bits)

Figure 72 Administrative Information

***Note**: You can also click on the security icon on the browser to view the information.*

Certificate Authority

Certificates are issued by Certificate Authorities (CAs), such as Verisign, Thawte, Baltimore, and others. These certificate authorities validate the identity of the individual/entity before issuing the certificate. A Certificate Authority signs all certificates that it issues with its private key and the CA certificate contains the corresponding public key. A browser must contain this CA Certificate in its **Trusted Root Library** in order to "trust" certificates signed by the CA's private key. For additional information, please see http://www.cren.net/ca/.

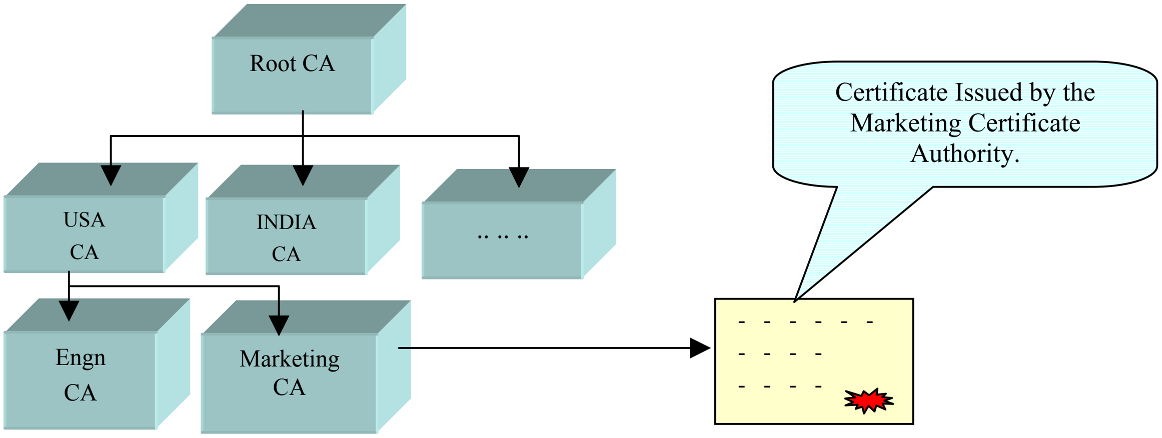


Figure 73 Hierarchies of Certificate Authorities

Installing Dominion SX CA-Root Certificate to a Browser

The CA **Root Certificate** generated in the Dominion SX unit must be installed in the browser in order for the browser to trust the **Server Certificate**. When the user connects to the Dominion SX unit by entering the IP address in the browser, the Server Certificate is downloaded. The browser then checks if the Root Certificate is present in its CA list, which indicates signed Server Certificates. If the verification is successful, the Security Alert will not appear.

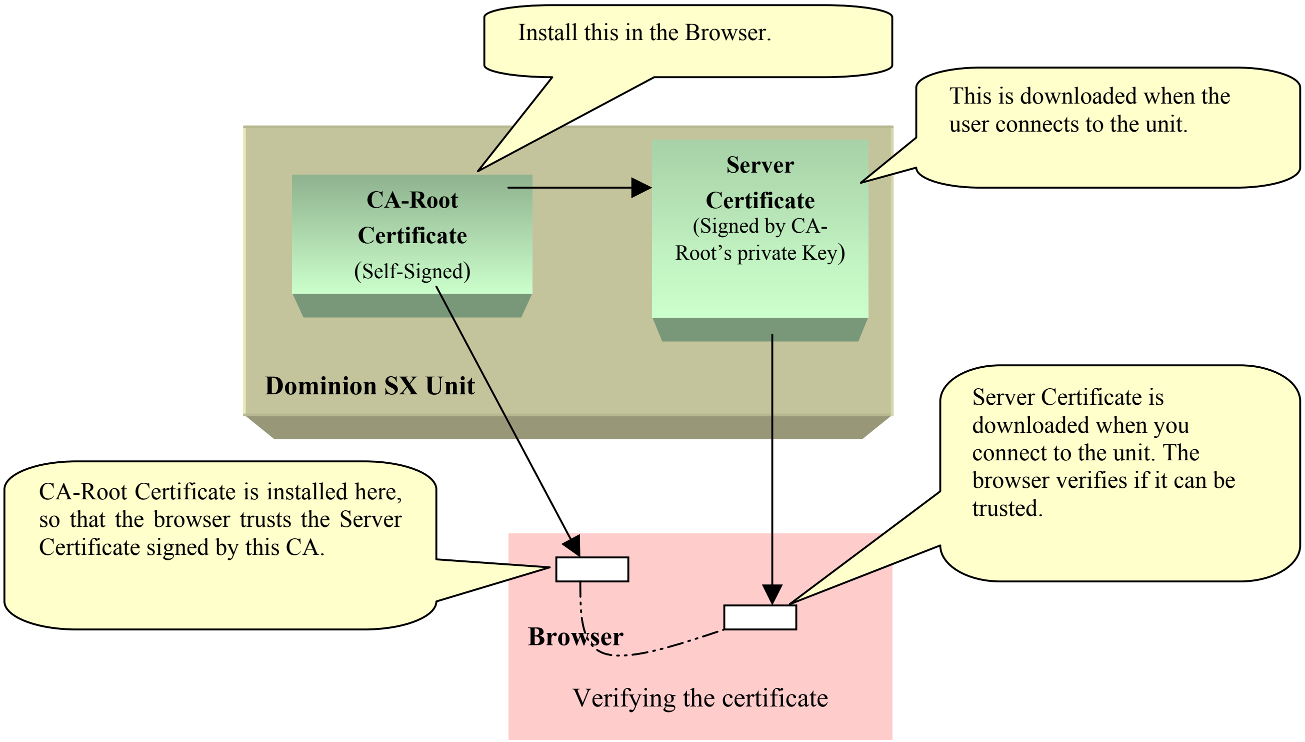

Install this in the Browser.
This is downloaded when the user connects to the unit.
CA-Root Certificate (Self-Signed)
Server Certificate (Signed by CA-Root's private Key)
Dominion SX Unit
Server Certificate is downloaded when you connect to the unit. The browser verifies if it can be trusted.
CA-Root Certificate is installed here, so that the browser trusts the Server Certificate signed by this CA.
Browser
Verifying the certificate

Figure 74 Schematic Diagram of Certificate Authentication Scheme

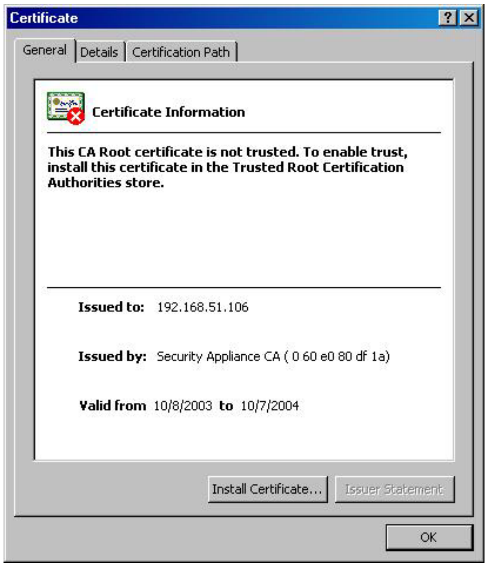
Installing CA Root for IE Browsers

Each time you access an SSL-enabled Dominion SX unit, you will see a New Site Certificate window. Eliminate this window's appearance by either accepting a session certificate permanently or by installing the appropriate root certificate in your browser. These instructions apply if you use Internet Explorer. For Netscape Navigator instructions, please see the next section.

Accept a Certificate (Session-Based)

Accepting a certificate from a particular unit means that the Security Alert window will not appear on your screen when accessing that particular unit. You will have to repeat the acceptance process for each Dominion SX unit you wish to access in order to eliminate the Security Alert window. To eliminate the appearance of this window for every Dominion SX unit with a particular certificate, you must install the root certificate in your browser, described in the *Install the Raritan Root Certificate* section that follows.

1. Open IE and connect to the Dominion SX unit's IP address. The Security Alert window will appear.
2. Click on the [**View Certificate**] button and the Certificate window will appear.



Certificate Information

This CA Root certificate is not trusted. To enable trust, install this certificate in the Trusted Root Certification Authorities store.

Issued to: 192.168.51.106

Issued by: Security Appliance CA (0 60 e0 80 df 1a)

Valid from 10/8/2003 to 10/7/2004

Figure 75 Install Session Based Certificate

3. Click on the [**Install Certificate**] button. This will install the certificate for the current session.

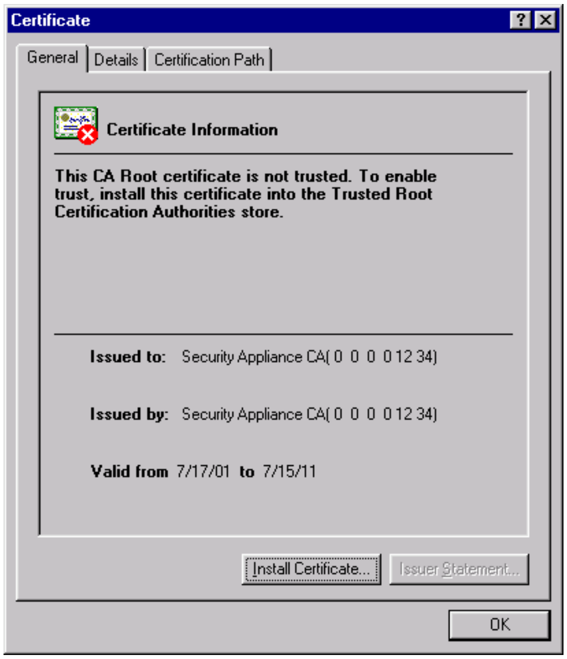
When the session closes, this certificate will expire and will have to be reloaded upon with the next connection.

Install the Raritan Root Certificate

By installing the Raritan root certificate in IE, you can prevent the Security Alert window from appearing whenever you access any SSL-secured Dominion SX unit.

1. Open IE and connect to the Dominion SX unit. Enter **Username** and **Password** when prompted, and log on to the unit.
2. Click on **Configuration** button in the left panel and then click on the **Certificate** tab. The [**Remove User Certificate**] button should be inactive, indicating that a third-party certificate has not been installed and that the certificate in use is the Raritan default certificate.
3. Click on the [**View Certificate**] button. The code for the Raritan certificate should appear in the **Certificate** field.
4. Select the text in the **Certificate** field and copy it.

5. Paste the text into a text editor such as Notepad or WordPad, and save it as a **CA_ROOT.cer** file on your desktop.
6. Open the CA_ROOT.cer file by double-clicking on it. This will open the certificate.



This CA Root certificate is not trusted. To enable trust, install this certificate into the Trusted Root Certification Authorities store.

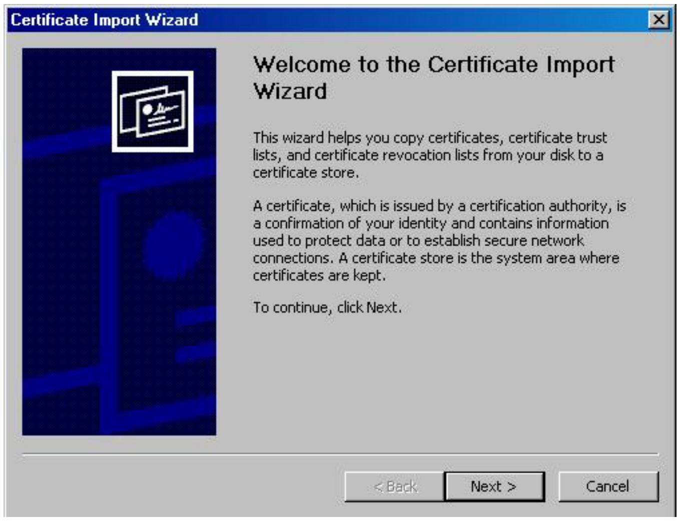
Issued to: Security Appliance CA(0 0 0 0 12 34)

Issued by: Security Appliance CA(0 0 0 0 12 34)

Valid from 7/17/01 to 7/15/11

Figure 76 View of CA_ROOT.cer

7. Click on the [**Install Certificate**] button to start the Certificate Manager Import wizard.


Certificate Import Wizard
Welcome to the Certificate Import Wizard
< Back
Next >
Cancel

This wizard helps you copy certificates, certificate trust lists, and certificate revocation lists from your disk to a certificate store.

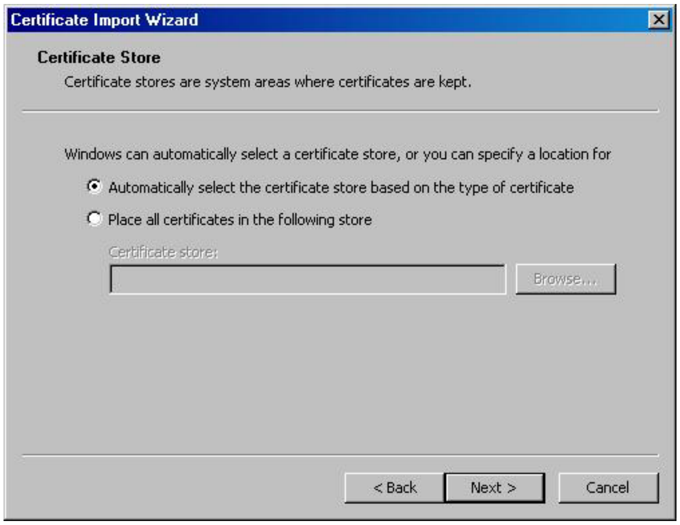
A certificate, which is issued by a certification authority, is a confirmation of your identity and contains information used to protect data or to establish secure network connections. A certificate store is the system area where certificates are kept.

To continue, click Next.

Figure 77 Certificate Manager Import Wizard

8. Click on the [**Next**] button.

9. Select the **Certificate** store, the system area where the certificates are stored. If you do not want the Certificate Manager to select the certificate store automatically, click on the **Place all certificates into the following store** radio button and click on the [**Browse**] button to choose a file you prefer.



Certificate Import Wizard

Certificate Store

Certificate stores are system areas where certificates are kept.

Windows can automatically select a certificate store, or you can specify a location for

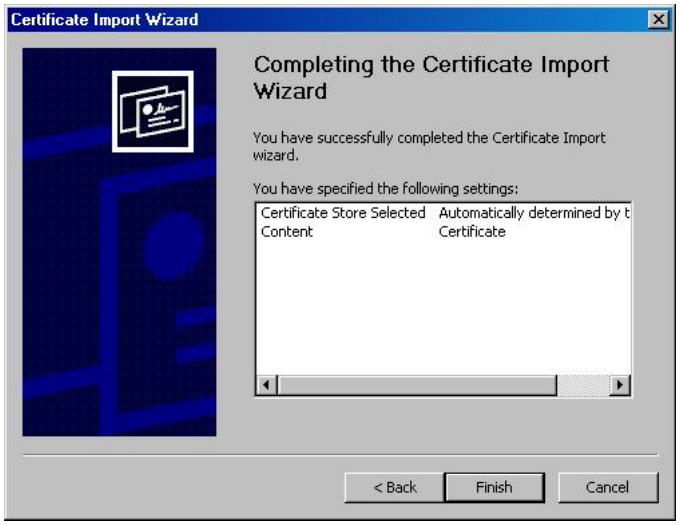
● Automatically select the certificate store based on the type of certificate

○ Place all certificates in the following store

Certificate store:

Figure 78 Import Wizard, Select a Certificate Page

10. Click on the [**Next**] button.
11. Click on the [**Finish**] button



Certificate Import Wizard

Completing the Certificate Import Wizard

You have successfully completed the Certificate Import wizard.

You have specified the following settings:

Certificate Store Selected	Automatically determined by t
Content	Certificate

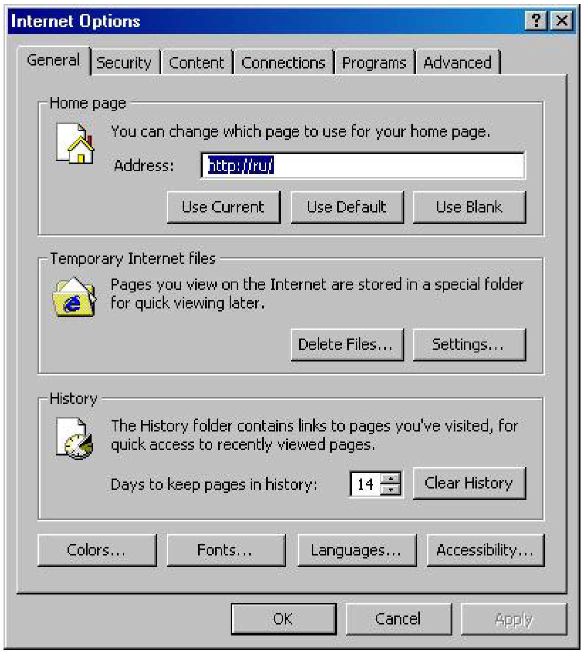
Figure 79 Certificate Manager Import Wizard, Completion Page

12. After installing the certificate, close all IE Browsers and open a new IE Browser to continue working. The next time you connect to the unit, the trusted certificate warning window will not be displayed.

Remove an Accepted Certificate

Removing a certificate that you have previously accepted from the unit is the same process whether removing an Raritan default certificate or a user-installed third-party certificate.

1. Open IE and select **Tools→Internet Options** from the main menu. The Internet Options window will appear.



You can change which page to use for your home page.

Address: http://ru/

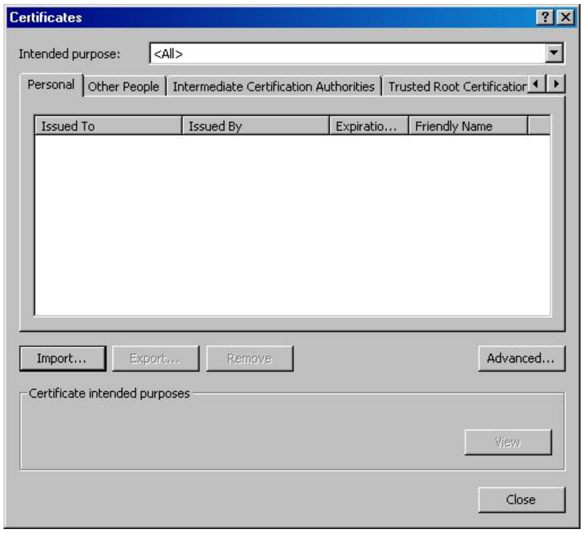
Pages you view on the Internet are stored in a special folder for quick viewing later.

The History folder contains links to pages you've visited, for quick access to recently viewed pages.

Days to keep pages in history: 14

Figure 80 Internet Options Display

2. Click on the **Content** tab and click on the [**Certificates**] button. The Certificates Manager window will appear



Intended purpose: <All>

Figure 81 Certificate Manager Display

3. Scroll through the list of certificates and click on the certificate to be deleted.
4. Click on the [**Remove**] button.
5. Click on the [**Close**] button.
6. Click on the [**OK**] button.

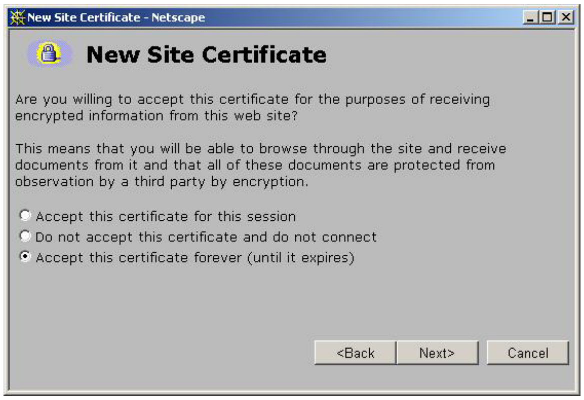
Install CA Root for Netscape Navigator

Each time you access an SSL-enabled Dominion SX unit, you will see a New Site Certificate window. Eliminate this window's appearance by either accepting a session certificate permanently or by installing the appropriate root certificate in your browser. These instructions apply if you use Netscape Navigator.

Accept a Certificate (Session-Based)

Accepting a certificate from a particular unit means that the New Site Certificate will no longer appear on your screen when accessing that particular unit. You must repeat the acceptance process for each Dominion SX unit you wish to access. To eliminate the appearance of this window for every Dominion SX unit with a particular certificate, you must install the root certificate in your browser, described in the Install the Raritan Root Certificate section that follows.

1. Open Netscape Navigator and connect to the IP address of the Dominion SX unit. The New Site Certificate window will appear:



New Site Certificate

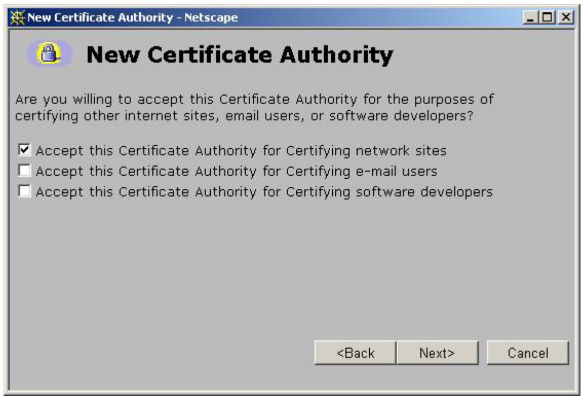
Are you willing to accept this certificate for the purposes of receiving encrypted information from this web site?

This means that you will be able to browse through the site and receive documents from it and that all of these documents are protected from observation by a third party by encryption.

○ Accept this certificate for this session
○ Do not accept this certificate and do not connect
● Accept this certificate forever (until it expires)

Figure 82 Netscape New Site Certificate Window

2. Click on the [**Next**] button, and then click on the [**Next**] button again.
3. Select the **Accept this certificate forever (until it expires)** radio button.



New Certificate Authority

Are you willing to accept this Certificate Authority for the purposes of certifying other internet sites, email users, or software developers?

☑ Accept this Certificate Authority for Certifying network sites
☐ Accept this Certificate Authority for Certifying e-mail users
☐ Accept this Certificate Authority for Certifying software developers

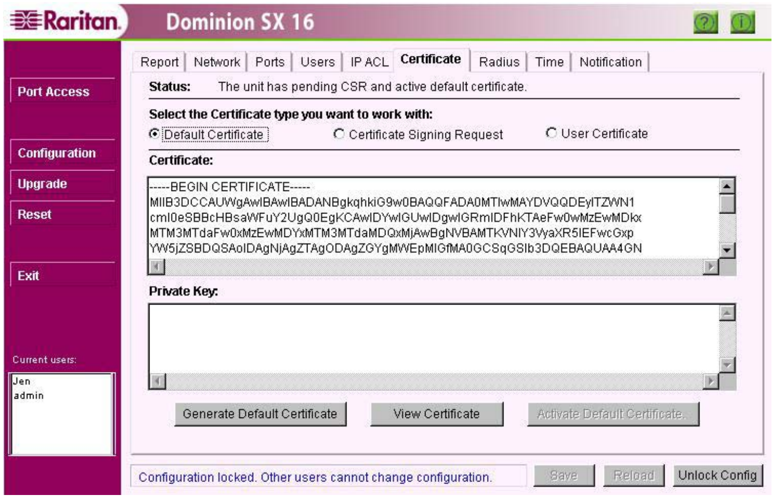
Figure 83 Netscape New Site Certificate Acceptance Window

4. Click on the [**Next**] button in this window, click on the [**Next**] button in the next window, and then click on the [**Finish**] button. The Raritan default certificate is now accepted on this computer.

Install the Dominion SX Root Certificate

Install the Raritan root certificate in Netscape Navigator to eliminate the New Site Certificate window from appearing whenever you access any SSL-secured Dominion SX unit.

1. Open Netscape Navigator and connect to the unit. Enter **Username** and **Password** when prompted and log on to the unit.
2. Click on the [**Configuration**] button in the left panel and click on the **Certificate** tab. The [**Activate Default Certificate**] button should be inactive, indicating that a third-party certificate has not been installed and the Raritan default certificate is the certificate in use.



Status: The unit has pending CSR and active default certificate.

Select the Certificate type you want to work with:

● Default Certificate ○ Certificate Signing Request ○ User Certificate

Certificate:

```
-----BEGIN CERTIFICATE-----
MIIB3DCCAUWgAwIBAwIBADANBgkqhkiG9w0BAQQFADA0MTIwMAYDVQQDEyITZWN1
cmI0eSBBcHBsaWFuY2UgQ0EgKCAwIDYwIGUwIDgwIGRmIDFhKTAeFw0wMzEwMDkx
MTM3MTdaFw0xMzEwMDYxMTM3MTdaMDQxMjAwBgNVBAMTKVNIY3VyaXR5IEFwcGxp
YW5jZSBDQSAoIDAgNjAgZTAgODAgZGYgMWEpMIGfMA0GCSqGSIb3DQEBAQUAA4GN
```

Private Key:

Jen
admin

Configuration locked. Other users cannot change configuration.

Figure 84 Viewing the Certificate

3. Click on the [**View Certificate**] button. The code for the Raritan certificate should appear in the **Certificate** text field.
4. Select the text in the **Base64 Certificate** field and copy it by selecting **Edit→Copy** from the main menu.
5. Open Notepad or another text editor and paste the text you have copied into the editor by selecting **Edit→Paste** from the main menu.
6. Save this file using the file name of your choice, onto your desktop, making certain to save it with the **cacert** extension, for example, **root_certificate.cer**
7. In Netscape Navigator, select **Edit→Preferences** from the main menu. On the left side of the Preferences window, click on the [**Navigator**] button and select *Applications*.
8. Scroll down to the bottom of the list of file types. Look for a file type with a name similar to **x509 Digital Certificate** - you should not find such a listing: if you do, please skip to Step 13.
9. Click on the [**New Type**] button. The New Type window will appear:

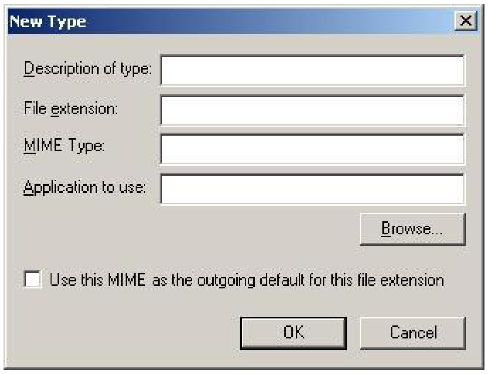


Figure 85 Netscape New Type Window

a. **Description of type**: Enter x509 Digital Certificate

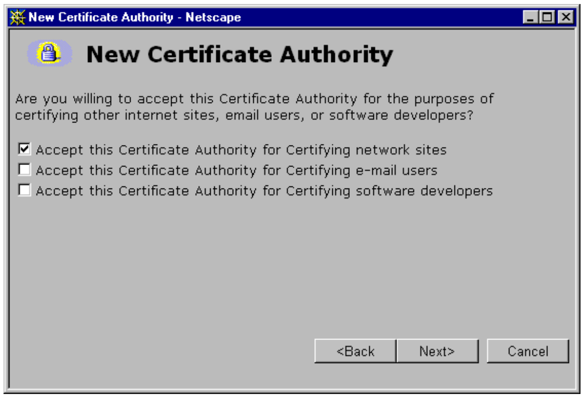
b. **File extension**: Enter x509

c. **MIME Type**: Enter application/x-x509-ca-cer

d. **Application to use**: Click on the [**Browse**] button and locate the Netscape Navigator executable, **netscape.exe**, on your hard drive. Select this executable and click on the [**Open**] button. The path to the Netscape executable, in quotes, will populate the Application to use field. After the end quotation mark, insert a space and type **%1**.

e. Click on the [**OK**] button and click on the [**Close**] button to close the Preferences window.

10. Click on the icon of the root certificate file you saved in Step 6 and drag it into an open Netscape Navigator window. The New Certificate Authority window should appear.
11. Click on the [**Next**] button.
12. Click on the [**Next**] button once more.
13. The Certificate Fingerprint should be displayed. Next to **Signed by** should appear **Security Appliance CA**. Click on the [**Next**] button.
14. Click on the first **Accept this Certificate Authority for Certifying network sites** checkbox. The second and third boxes are optional.



New Certificate Authority - Netscape

New Certificate Authority

Are you willing to accept this Certificate Authority for the purposes of certifying other internet sites, email users, or software developers?

☑ Accept this Certificate Authority for Certifying network sites
☐ Accept this Certificate Authority for Certifying e-mail users
☐ Accept this Certificate Authority for Certifying software developers

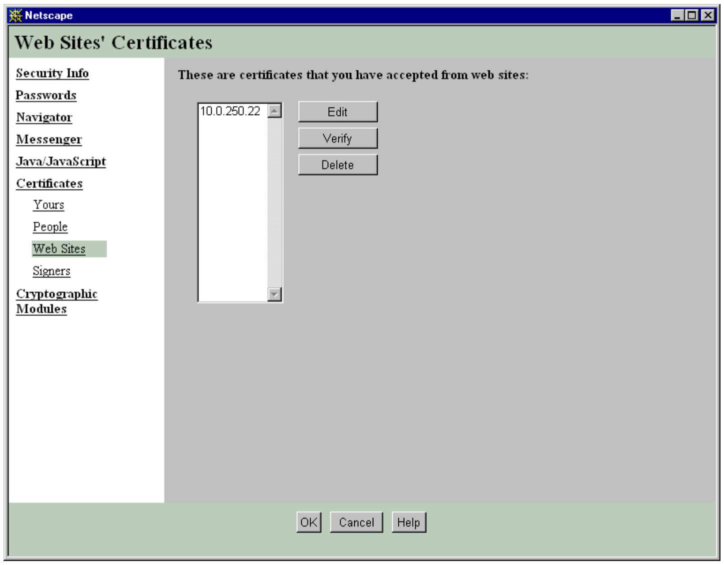
Figure 86 Netscape New Certificate Authority Window

15. Click on the [**Next**] button in this screen, and click on the [**Next**] button in the next screen. When prompted to enter a name for the Certificate Authority, type ***Security Appliance CA***. Click on the [**Finish**] button. The Raritan default root certificate is now installed.

Remove an Accepted Certificate

Removing a previously accepted certificate from a Dominion SX unit uses the same process whether removing a Raritan default certificate or removing a user-installed third-party certificate.

1. Open Netscape Navigator and click on either the [**Security**] button or on the lock icon in the lower left of the window. The Security Info window will appear.
2. On the left side of this window, locate Certificates and click on **Web Sites**.



These are certificates that you have accepted from web sites:

10.0.250.22

Figure 87 Netscape Web Site Certificates Window

3. In the displayed list, select the IP address of the Dominion SX unit from which the certificate was accepted.
4. Click on the [**Delete**] button.
5. Click on the [**OK**] button.
6. Close the Security window.

Install a Third-Party Root Certificate

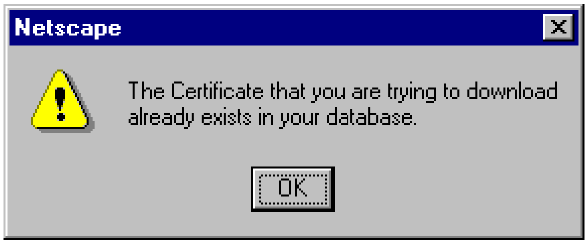
If you have installed a third-party certificate on the unit, you can obtain its corresponding root certificate from the Certificate Authority that provided you with a certificate. These instructions can be used for any of the CAs; this example uses Thawte as an example.

The CA that provided you with a certificate will have a root certificate available for download. Root certificates are available on the CA web site; click on the links to download. Some of the popular CAs and their sites:

Thawte Digital Certificate Services	http://www.thawte.com/
VeriSign Incorporated	http://www.verisign.com/
Baltimore Technologies	http://www.baltimore.com/

> ***Note**: Some CAs will provide the root certificate code in text format rather than providing a downloadable root certificate. If this occurs, select the root certificate code, copy it, and follow the steps outlined in the section* Install the Raritan Root Certificate*, then follow the steps outlined below.*

If the root certificate has already been installed, the following error will appear:



Netscape

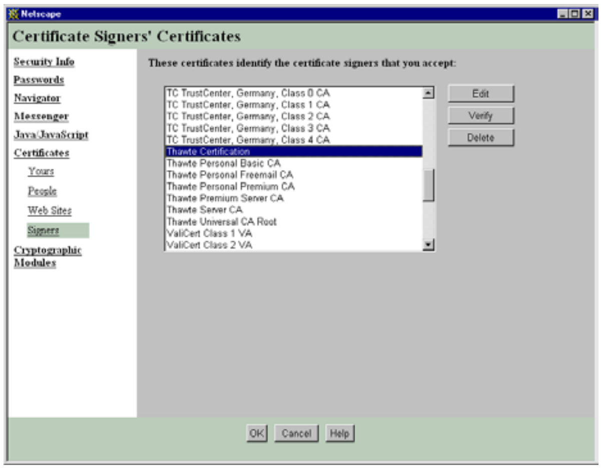
The Certificate that you are trying to download already exists in your database.

Figure 88 Certificate Already Exists Alert Window for Netscape.

If the error message **does not** appear, please skip ahead to Step 6.

If the error message **does** appear, you must uninstall the existing certificate.

1. Click on the [**Security**] button in Netscape, or on the lock icon in the lower left of the window to access the Security Information window.
2. Locate the **Certificates** section in the left panel and click on **<u>Signers</u>** to display a list of root certificates currently installed.



Netscape

Certificate Signers' Certificates

These certificates identify the certificate signers that you accept:

TC TrustCenter, Germany, Class 0 CA
TC TrustCenter, Germany, Class 1 CA
TC TrustCenter, Germany, Class 2 CA
TC TrustCenter, Germany, Class 3 CA
TC TrustCenter, Germany, Class 4 CA
Thawte Certification
Thawte Personal Basic CA
Thawte Personal Freemail CA
Thawte Personal Premium CA
Thawte Premium Server CA
Thawte Server CA
Thawte Universal CA Root
ValiCert Class 1 VA
ValiCert Class 2 VA

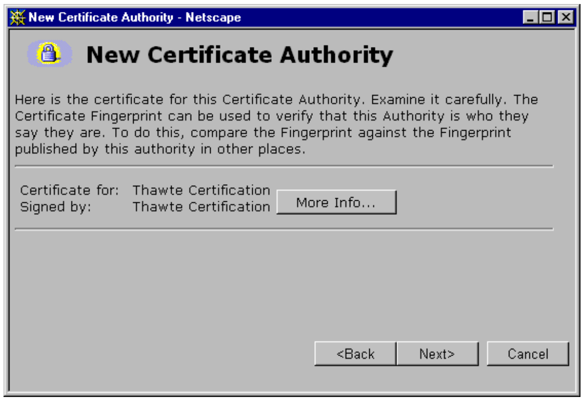
Figure 89 Certificate Signers' Certificates Window in Netscape

3. Find the name of the CA whose certificate you are installing. There may be more than one listing for your CA; select the listing with the same name as the certificate you are trying to install.

4. Click on the [**Delete**] button and then click on the [**OK**] button.
5. Return to the CA's website and try to download the root certificate again.

> ***Note***: *If an error message appears, it indicates that the certificate deleted from the list in the Netscape security settings may not have been the correct one. Please go back to the list and double-check.*

6. On the CA website, click on the root certificate link and the New Certificate Authority window will appear. Click on the [**Next**] button in this screen, and click on the [**Next**] button in the next screen.
7. The Certificate Fingerprint will appear, providing information about the CA and the root certificate you are downloading. It will look similar to the window below. Record the **Signed by** information and click on the [**Next**] button.


New Certificate Authority - Netscape
New Certificate Authority

Here is the certificate for this Certificate Authority. Examine it carefully. The Certificate Fingerprint can be used to verify that this Authority is who they say they are. To do this, compare the Fingerprint against the Fingerprint published by this authority in other places.

Certificate for: Thawte Certification
Signed by: Thawte Certification

More Info...
<Back
Next>
Cancel

Figure 90 New Certificate Authority Window in Netscape

8. Check the **Accept this Certificate Authority for Certifying network sites** checkbox. The second and third boxes are optional.
9. Click on the [**Next**] button, and then click on the [**Next**] button again. When prompted to enter a name for the Certificate Authority, enter the **Signed by** name that you recorded Step 7.
10. Click on the [**Finish**] button. The root certificate for this Certificate Authority is now installed for this computer.

Appendix D: RADIUS Server

Note: This section has been provided for reference only. Please consult your local system administrator for exact implementation details.

Overview

The details of installing and configuring the RADIUS server software will depend on the Server you are using. This Appendix covers the installation and configuration of the **Windows 2000 RADIUS Server**, but regardless of the implementation, there are several items you must configure:

1. **A list of authorized clients and their shared secrets**: The RADIUS server must have the IP addresses of all authorized RADIUS clients. Along with each client's address is a secret. It is not critical what the secret is as long as this same secret is also configured into the client (**Dominion SX** unit). The RADIUS client and server use the secret to encrypt parts of the packets they send to each other and to guarantee that the messages and replies are authentic. In Windows 2000 implementations, this file is called ***clients***. Please refer to **Step D**. in the *Install and Configure the RADIUS Server for Windows 2000* section that follows for more information.
2. **A list of authorized users and their configuration information**: The RADIUS server must know passwords, users, what these users are authorized to do after they log in. In Windows 2000 implementations, Administrators can use **Active Users** and **Directory or Local Authentication** to add users. Information about the user is stored as a list of RADIUS protocol attributes and associated values. These translate directly into the authentication reply the server will send back to the client.
3. **Reply items used by Dominion SX Products**: The following attributes are used by **Dominion SX** products:

- **Vendor-Specific**: This Attribute is available to allow Raritan to support more detailed resource control. To control the number of ports being accessed by a particular user, a new Vendor code is added for Raritan Systems. The Vendor code takes a value of **8267** and the String to be entered should follow this format:
  - IP Address of the Dominion SX unit separated by a ':'
  - Privileges to be given to the user, separated by a ':' Privileges should take one of the following values:
    - **A for Administrator**: has Read and Write access to the console window; can modify the configuration of the unit.
    - **O for Operator**: has Read and Write access to the console window; cannot modify the configuration of the unit.
    - **OB for Observer**: has Read-only access to the console window; cannot modify the configuration of the unit.
  - Port number access, taking a value of:
    - **'*' indicating access to all the ports**.
    - **'1:2:3' indicating access to ports 1, 2 and 3 only**.

***Note**: For more information and examples, please see **Step E**. in the* Install and Configure the RADIUS Server for Windows 2000 *section that follows.*

- **Service-Type**: You must specify characteristics of the service provided to the user by specifying the desired Service-Type in each user profile. The reply items in each user profile determine how the user's session is configured on the Dominion SX unit.

– If the RADIUS Server is not configured for Vendor-Specific type or it fails to follow the above specifications, the value specified for the Service-Type will determine the privileges to be given to the user. In this case, the user will be given access to all the ports. Our RADIUS clients build inside the Dominion SX unit the following attributes and maps them in the following order:

VALUE	ATTRIBUTE NAME	VALUE NAME /TYPE	DESCRIPTION
6	Service-Type	What type of Service the user receives?	
		1) Login	Maps to observer
		2) Framed	Maps to observer
		3) Callback Login	Maps to observer
		4) Callback Framed	Maps to observer
		5) Administrative	Maps to an administrator
		6) NAS prompt	Maps to an operator
		7)Callback NAS prompt	Maps to an observer

***Note**: For more information and examples, please see **Step E.** in the* Install and Configure the RADIUS Server for Windows 2000 *section that follows.*

Install and Configure the RADIUS Server for Windows 2000

A. Install IAS (Internet Authorization Service)

1. Insert the Windows 2000 Server compact disc and start the Setup program.
2. Click **Install Add-On Components**, and then click **Add/Remove Windows Components**.
3. In Components, click **Networking Services** (but do not select or clear its check box), and then click **Details**.
4. Select the **Internet Authentication Service** check box and click on the [**OK**] button.
5. Click on the [**Next**] button.

B. Configure IAS Port Information

1. To configure a remote IAS server, you must have administrative privileges on the remote server.
2. Open IAS: select **Start → Programs → Administrative Tools → Internet Authentication Service**.
3. Right-click on **Internet Authentication Servic**e and select *Properties* from the drop-down menu.
4. Click on the **RADIUS** tab, and examine the settings for ports. If your RADIUS authentication and RADIUS accounting UDP ports differ from the default values provided (1812,1645 for authentication and 1813,1646 for accounting), in **Authentication** and **Accounting**, type your port settings. The values of **1812** for authentication and **1813** for accounting are the RADIUS standards at this time. However, many network access servers use port **1645** for authentication requests and **1646** for accounting requests by default. To use multiple port settings for authentication or accounting requests, separate the ports by using commas.

C. Configure Event Logging for IAS

1. Open IAS.
2. Right-click on **Internet Authentication Service** and select *Properties* from the drop-down menu.
3. Click on the **Service** tab and select each option that is appropriate.
4. Click on the [**OK**] button.

***Note**: Selecting **Log successful authentication requests** can result in extremely large amounts of data being logged. Before selecting this option, verify that the Event Viewer is configured with a maximum log size that will accommodate this type of event logging.*

D. Register RADIUS Client

The client file installed in the RADIUS server must be modified. This flat file stores information about RADIUS clients, including IP addresses and shared secrets; the shared secrets must be protected from casual access. Every client trying to access the RADIUS server must be included in the list.

The following steps must be carried out for every new client trying to access the RADIUS server. As an example, imagine Dominion SX has an IP address of **10.0.3.60**. To add this IP address to the client list, perform these steps:

1. Open IAS.
2. Right-click on **Clients** and select *New Client* from the drop-down menu.
3. In **Friendly Name**, type a descriptive name.
4. In Protocol, click on **RADIUS**, then click on the [**Next**] button.
5. In **Client Address (IP or DNS)**, type the DNS or IP address for the client. If you are using a DNS name, click **Verify**. In the **Resolve DNS Name** dialog box, click **Resolve** and select the IP address you want to associate with that name from **Search Results**.
6. If the client is an NAS and you are planning to use NAS-specific remote access policies for configuration purposes (for example, a remote access policy that contains vendor-specific attributes), click on **Client Vendor**, and select the manufacturer's name. If you do not know the manufacturer's name, or if the name is not in the list, click on **RADIUS Standard**.
7. In **Shared Secret**, type the shared secret for the client, and then type it again in **Confirm Shared Secret**.
8. If your NAS supports using digital signatures for verification (with PAP, CHAP, or MS-CHAP), click on **Client must always send the signature attribute in the request**. If the NAS does not support digital signatures for PAP, CHAP, or MS-CHAP, do not click this option.

***Notes**:*

→ If IAS receives an access request from a RADIUS proxy server, IAS cannot detect the manufacturer of the NAS that originated the request. This can cause problems if you plan to use authorization conditions based on the client vendor and have at least one client defined as a RADIUS proxy server.

→ Passwords (shared secrets) are case-sensitive. Be sure that the client's shared secret and the shared secret you enter in this field are identical to each other and conform to the password rules.

→ If the client address cannot be resolved when you click Verify, make sure the DNS name you entered is correct.

→ The friendly name that you provide for your RADIUS clients can be used in remote access policies to restrict access.

E. Add a Remote Access Policy

1. Open IAS and, if necessary, double-click on **Internet Authentication Service**.
2. In the console tree, right-click **Remote Access Policies** and select *New Remote Access Policy* from the drop-down menu.
3. In the **Properties** dialog box, type the name of the policy in the **Policy Friendly Name** field, and click on the [**Next**] button.
4. Click on the [**Add**] button to specify a new condition, then:
   a. In the Select Attribute dialog box, click the attribute you want, and then click on the Add button. Please add Service-Type for Raritan.
   b. Select **Authenticate only** and click on the [**OK**] button.
      i. To change the configuration of an existing condition:
         (1) Click the condition, and then click on the [**Edit**] button.
         (2) In the attribute dialog box, specify the settings you want, and then click on the [**OK**] button.
      ii. Click on the [**Next**] button. Under **If a user matches the specified conditions**:
         (1) To grant dial-up permission to these users, select **Grant remote access permission**.
         (2) To deny dial-up permission to these users, select **Deny remote access permission**.
      iii. Click on the [**Next**] button. You can now make changes to the profile by selecting **Edit Profile**.

(1) Click on the [**Advanced**] button and add **Vendor-Specific for Raritan**. Please use Vendor Code = **8267** and enter String in the following format:

(a) IP Address of the Dominion SX unit separated by a ':'.

(b) Privileges to be given to the user separated by a ':' Privileges takes a value of:

(i) **A for Administrator**

(ii) **O for Operator**

(iii) **OB for Observer**

(c) Port numbers should follow, with a value of:

(i) '*' indicating access to all the ports.

(ii) '1:2:3' indicating access to ports 1, 2 and 3 only.

c. 2:4:6:8:10:12:14:1 gives access to only these specified ports.

Configuration examples:

- **10.0.3.60:A:3:6:9:12:15**
  - **10.0.3.60** is the IP address of the Dominion SX unit. The privileges and port numbers will apply **only** to this IP address.
  - **A** indicates Administrative privileges are given to the user.
  - **3:6:9:12:15** gives access to only ports 3, 6, 9, 12 and 15.
- **10.0.3.201:O:***
  - **10.0.3.201** is the IP address of the Dominion SX unit. The privileges and port numbers will apply **only** to this IP address.
  - **O** maps to an Operator – this user has only limited privileges.
  - **'*'**Gives access to all ports.
- **10.0.3.61:OB:2:4:6:8:10:12:14:16**
  - **10.0.3.61** is the IP address of the Dominion SX unit. The privileges and port numbers will apply **only** to this IP address.
  - **OB** maps to an Observer – no Dominion SX console-write permission will be given to this user.

***Note**: A string following the format outlined above must be provided for every Dominion SX box contacting the RADIUS server, or else the box will take a default value. If the RADIUS Server is not configured for Vendor-Specific type, or if it fails to follow the above specifications, the value specified for the Service-Type will determine the privileges to be given to the user. In this case, the user will be given total access. In order to change the Service-Type, edit the **Service-Type** in the **Edit Dial-in Profile** menu and modify the **Attribute Value** to take any one of the following values:*
→ Login
→ Framed
→ Callback Login
→ Callback Framed
→ Outbound
→ Administrative
→ NAS Prompt
→ Authenticate Only
→ Callback NAS Prompt

For **Raritan**, the above has been mapped as follows:

- In order to assign *Administrative Privileges* to a user, change the **Service-Type** to **Administrative**. In such a situation, a user is granted all the permissions as if the user had logged in using !root. The user has full configuration ability and access to the port.
- In order to give *Limited Administrative* Access to the unit, change the **Service-Type** to **NAS Prompt**. In such a situation, the user becomes an **Operator** and can access all ports.

- For a **Service-Type** of **Login, Framed, Callback Login, Callback Framed, Outbound**, or **Callback NAS Prompt**, the user is mapped only to an **Observer-type** user and has ***read-only*** access to all ports.

> ***Note***: *The setting of Remote Access Permission on the user object will override this setting if set to either Grant remote access permission or Deny remote access permission.*

F. Select Requests to be Logged

1. Open IAS.
2. In the Console Tree, click on **Remote Access Logging**.
3. In the Details pane, right-click on **Local File** and select *Properties*.
4. Click on the **Settings** tab and select one or more check boxes for recording authentication and accounting requests in the IAS log files:
   a. Click in the **Log accounting requests** check box to capture accounting requests and responses.
   b. Click in the **Log authentication requests** check box to capture authentication requests, access-accept packets, and access-reject packets.
   c. Click in the **Log periodic status** check box to capture periodic status updates such as interim accounting packets.

> ***Notes***:
> *→ It is suggested that you initially select the first two options. You can change the selections if needed to fit your requirements.*
> *→ The Log authentication requests option can help by alerting you to problems with transaction volume and unauthorized attempts to access resources.*
> *→ If you select Log periodic status, attributes are logged only if you have configured the Acct-Interim-Interval attribute to generate the interim accounting requests.*
> *→ To configure this attribute for remote access policies in IAS, do the following:*
> *- In the IAS console tree, click Remote Access Policies.*
> *- Right-click the policy for which interim accounting requests are to be generated and select* Properties *from the drop-down menu.*
> *- On the* ***Settings*** *tab, click* ***Edit profile***.
> *- On the* ***Advanced*** *tab, click* ***Add***.
> *- In the Add Attributes dialog box, select* ***Acct-Interim-Interval*** *and click on the [****Add****] button.*
> *- In the Attribute Information dialog box, type the interval for generating interim accounting requests in the Attribute value field, for example, type 600 to generate requests every 600 seconds (600 is the recommended value).*

G. Configure Log File Properties

1. Open IAS.
2. In the Console Tree, click **Remote Access Logging**.
3. In the Details pane, right-click on **Local File** and select *Properties* from the drop-down menu.
4. Click on the **Local File** tab and select **Database-import Format**. To keep your log files in IAS format, click **IAS format**.
5. To open a new log file at specific intervals, select the interval you want to use:
   a. To handle heavy transaction volume and logging activity, select **Daily**.
   b. To handle lesser transaction volumes and logging activity, select **Weekly** or **Monthly**.
   c. To store all transactions in one log file, select **unlimited file size**.
   d. If you are unsure of the transaction volume, select **when log file size reaches**, then type a log size at which a new log should be opened. The default is **10 MB**.
6. In Log file directory, enter the location where log files are to be stored. The default location is the system root **\system32\LogFiles** folder.
7. Click on the [**OK**] button.

H. Enable the Routing and Remote Access Service

If this server is a member of a Windows 2000 Active Directory domain and you are not a domain administrator, your domain administrator must add the computer account of this server to the **RAS and IAS Servers security group** in the domain of which this server is a member. The domain administrator can add the computer account to the RAS **and IAS Servers security group** by using Active Directory Users and Computers or with the **netsh ras add registered server command**.

1. Open Routing and Remote Access.
2. By default, the local computer is listed as a server.
3. To add another server, in the console tree, right-click on **Server Status** and select *Add Server* from the drop-down menu.
4. In the Add Server dialog box, click the applicable option, and then click on the [**OK**] button.
5. If the server you want is already added, enable the server.
    a. In the console tree, right-click the server you want to enable and select *Configure and Enable Routing and Remote Access* from the drop-down menu.
    b. Follow the instructions in the **Routing and Remote Access** wizard.

Note**: To open Routing and Remote Access, select **Start → Programs → Administrative Tools → Routing and Remote Access.

I. Use RADIUS Authentication

1. Open Routing and Remote Access.
2. Right-click on the server name for which you want to configure RADIUS authentication and select *Properties* from the drop-down menu.
3. Click on the **Security** tab and under **Authentication Provider**, select **RADIUS Authentication**.
4. Click on the [**Apply**] button.
5. Click on the [**OK**] button.

J. Enable the IAS Server to Read User Objects in Active Directory

1. Log on to the IAS server with an account that has domain administrator credentials.
2. Open **Internet Authentication Service**.
3. Right-click on **Internet Authentication Service** and select *Register Service in Active Directory* from the drop-down menu.
4. When the Register Internet Authentication Service in Active Directory dialog box appears, click on the [**OK**] button.

***Notes**:*

→ To open IAS, click Start, select Programs*, select **Administrative Tools**, and click on **Internet Authentication Service**.*

→ This procedure adds the IAS server only to the default domain. To add the IAS server to other domains, you must add the servers manually. To do this:

- Log onto the server using domain administrator credentials.

- Select Start → Programs → Administrative Tools → Active Directory Users and Computers.

*- In the **Console Tree**, select **Users**.*

*- In the Details pane, right-click on **RAS and IAS Servers** and select* Properties *from the drop-down menu.*

*- In the RAS and IAS Servers Properties dialog box, click on the **Members** tab and add each of the IAS servers.*

→ After you register the service in Active Directory, it is a good idea to verify the security settings.

K. Add a User Account

1. Open Active Directory Users and Computers.
2. In the Console Tree, double-click on the domain node.
3. In the Details pane, right-click on the organizational unit to which you want to add the user, point to **New** and select *User*.
4. In the **First Name** field, type the user's first name.
5. In the **Initials** field, type the user's initials.
6. In the **Last Name** field, type the user's last name.
7. Modify **Full Name** as desired.
8. In the **User Logon Name** field, type the name that will be used to log on and select the UPN suffix that must be appended to the user logon name (following the @ symbol) from the drop-down list. If the user will use a different name to log on from computers running Windows NT, Windows 98, or Windows 95, change the user logon name as it appears in **User Logon Name (pre-Windows 2000)** to the different name.
   a. In **Password** and **Confirm password** fields, type the user's password.
   b. Select the appropriate password options.

> ***Notes***:
> → *To open Active Directory Users and Computers, select* ***Start → Programs → Administrative Tools → Active Directory Users and Computers****.*
> → *To add a user, you can click on the new user shortcut icon in the toolbar.*
> → *After creating a user account, edit the user account properties to enter additional user account information.*
> → *To add a user, you can copy any previously created user account.*
> → *A new user account with the same name as a previously deleted user account does not automatically assume the permissions and memberships of the previously deleted account, because the security descriptor for each account is unique. All permissions and memberships must be manually recreated to duplicate a deleted user account.*

L. Create Groups in Active Directory and Add User Accounts

This procedure provides guidelines to assign different roles (Administrative, Operator and Observer) to domain users and add respective groups to the corresponding IAS policy. For instance, create the following groups: RASAdmin, RASOperator, RASObserver. Then assign the appropriate users to these groups.

1. Open Active Directory Users and Computers.
2. In the console tree, click on the domain node.
3. In the details pane, right-click the organizational unit to which you want to add the group, point to **New** and select *Group*.
4. In **Group name**, type the group name, for example, RASAdmin.
5. Under **Group scope**, select **Global**.
6. Under **Group type**, select **Security**.
7. Click on the [**OK**] button.
8. Create two other types of groups, for example, RASOperators and RASObserver.
9. Add users to these groups depending upon types of access to be given.
   a. Right-click on the group and select *Properties* from the drop-down menu.
   b. Click on the **Members** tab.
   c. Click on **Add** and select the users to add to this group.
10. Add these groups in respective IAS policies to assign appropriate user roles to domain users.
   a. Open IAS.
   b. Right-click on **Policy** and select *Properties* from the drop-down menu.
   c. Click **Add** under **Specify the conditions to match**.

d. From the **Attribute types** pop-up menu, click on *Windows-Groups*

e. Click on the [**Add**] button.

f. Click on **Groups** menu.

g. Click on the [**Add**] button.

h. Click on the appropriate group and click on the [**OK**] button.

After these steps are executed, a new user can connect to the NAS device and IAS will look at the user name, find the group in which it is a member, and use the policy associated with that group.

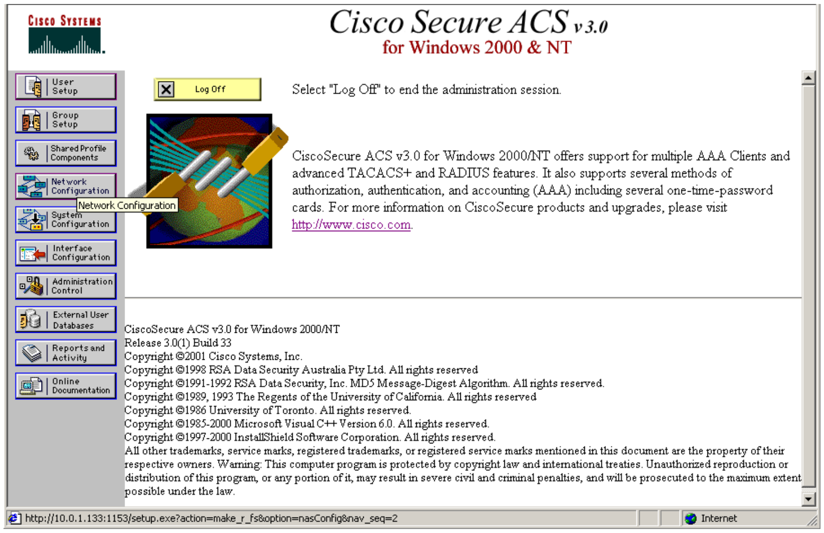
Appendix E: Configuring Cisco ACS RADIUS Server

Use the following procedure to configure the Cisco RADIUS server so that you can work with Dominion SX. It is assumed here that Administrators are familiar with setting up and configuring the RADIUS server. In order for Dominion SX to support RADIUS, both the unit and the user information must be added into the RADIUS configuration.

Only Version 3.0 has been validated; however, other versions of the RADIUS server should operate with the unit. Only the user's role can be controlled on the unit using the RADIUS (IETF) option.

> ***Note**: Access restrictions to specific ports on the unit cannot be controlled.*

1. Log on to Cisco ACS Server using the browser.



Select "Log Off" to end the administration session.

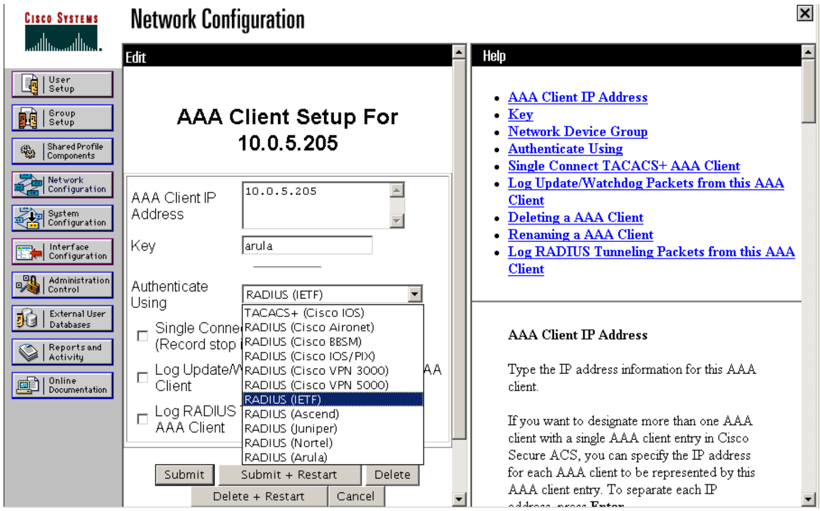
CiscoSecure ACS v3.0 for Windows 2000/NT offers support for multiple AAA Clients and advanced TACACS+ and RADIUS features. It also supports several methods of authorization, authentication, and accounting (AAA) including several one-time-password cards. For more information on CiscoSecure products and upgrades, please visit http://www.cisco.com.

CiscoSecure ACS v3.0 for Windows 2000/NT
Release 3.0(1) Build 33
Copyright ©2001 Cisco Systems, Inc.
Copyright ©1998 RSA Data Security Australia Pty Ltd. All rights reserved
Copyright ©1991-1992 RSA Data Security, Inc. MD5 Message-Digest Algorithm. All rights reserved.
Copyright ©1989, 1993 The Regents of the University of California. All rights reserved
Copyright ©1986 University of Toronto. All rights reserved.
Copyright ©1985-2000 Microsoft Visual C++ Version 6.0. All rights reserved.
Copyright ©1997-2000 InstallShield Software Corporation. All rights reserved.
All other trademarks, service marks, registered trademarks, or registered service marks mentioned in this document are the property of their respective owners. Warning: This computer program is protected by copyright law and international treaties. Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.

http://10.0.1.133:1153/setup.exe?action=make_r_fs&option=nasConfig&nav_seq=2

Figure 91 Cisco ACS Main Display

2. Click on the [**Network Configuration**] button in the left panel of the screen and select **Add Entry** to add/edit AAA Client. This must be done for each unit that is going to accessed via RADIUS. Click on the **Authenticate Using** drop-down menu and select *RADIUS (IETF)* from this list. Click on the [**Submit**] button.



AAA Client Setup For
10.0.5.205

AAA Client IP Address: 10.0.5.205

Key: arula

Authenticate Using: RADIUS (IETF)

☐ Single Conne (Record stop

☐ Log Update/W Client

☐ Log RADIUS AAA Client

- AAA Client IP Address
- Key
- Network Device Group
- Authenticate Using
- Single Connect TACACS+ AAA Client
- Log Update/Watchdog Packets from this AAA Client
- Deleting a AAA Client
- Renaming a AAA Client
- Log RADIUS Tunneling Packets from this AAA Client

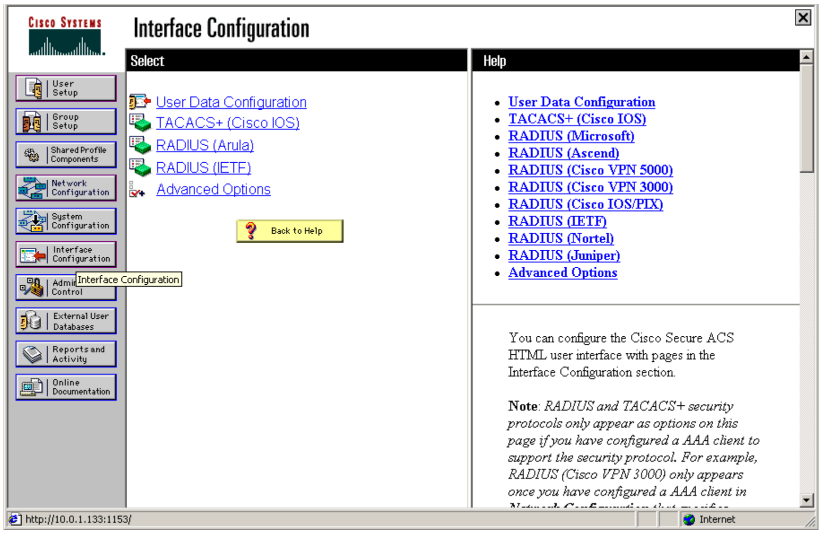
AAA Client IP Address

Type the IP address information for this AAA client.

If you want to designate more than one AAA client with a single AAA client entry in Cisco Secure ACS, you can specify the IP address for each AAA client to be represented by this AAA client entry. To separate each IP

Figure 92 Unit Configuration Display

3. Click on the [**Interface Configuration**] button in the left panel of the screen.



Interface Configuration

Select

- User Data Configuration
- TACACS+ (Cisco IOS)
- RADIUS (Arula)
- RADIUS (IETF)
- Advanced Options

Back to Help

Help

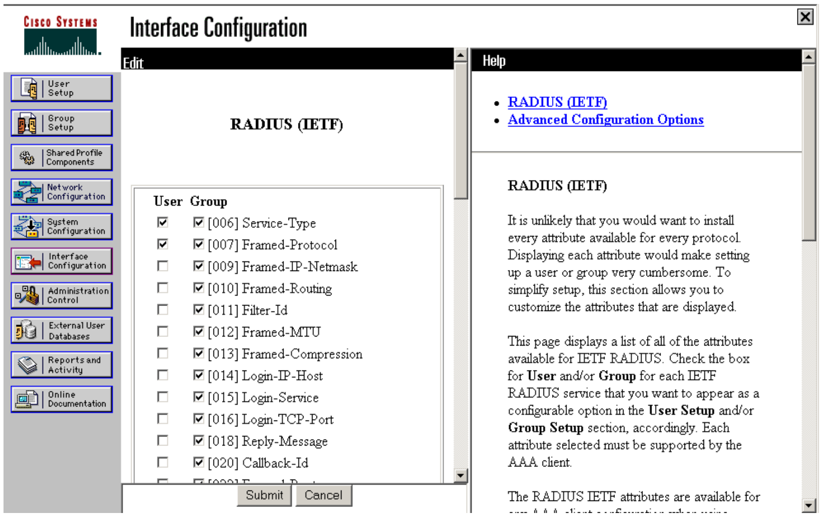
- User Data Configuration
- TACACS+ (Cisco IOS)
- RADIUS (Microsoft)
- RADIUS (Ascend)
- RADIUS (Cisco VPN 5000)
- RADIUS (Cisco VPN 3000)
- RADIUS (Cisco IOS/PIX)
- RADIUS (IETF)
- RADIUS (Nortel)
- RADIUS (Juniper)
- Advanced Options

You can configure the Cisco Secure ACS HTML user interface with pages in the Interface Configuration section.

Note: *RADIUS and TACACS+ security protocols only appear as options on this page if you have configured a AAA client to support the security protocol. For example, RADIUS (Cisco VPN 3000) only appears once you have configured a AAA client in*

Figure 93 Interface Configuration Display

4. Click on the RADIUS (IETF) link to edit properties. Under the **User** heading, click on the check boxes before **Service-Type** and **Framed Protocol**. Click on the [**Submit**] button.



Interface Configuration

Edit

RADIUS (IETF)

User Group

☑ ☑ [006] Service-Type
☑ ☑ [007] Framed-Protocol
□ ☑ [009] Framed-IP-Netmask
□ ☑ [010] Framed-Routing
□ ☑ [011] Filter-Id
□ ☑ [012] Framed-MTU
□ ☑ [013] Framed-Compression
□ ☑ [014] Login-IP-Host
□ ☑ [015] Login-Service
□ ☑ [016] Login-TCP-Port
□ ☑ [018] Reply-Message
□ ☑ [020] Callback-Id

Submit Cancel

Help

- RADIUS (IETF)
- Advanced Configuration Options

RADIUS (IETF)

It is unlikely that you would want to install every attribute available for every protocol. Displaying each attribute would make setting up a user or group very cumbersome. To simplify setup, this section allows you to customize the attributes that are displayed.

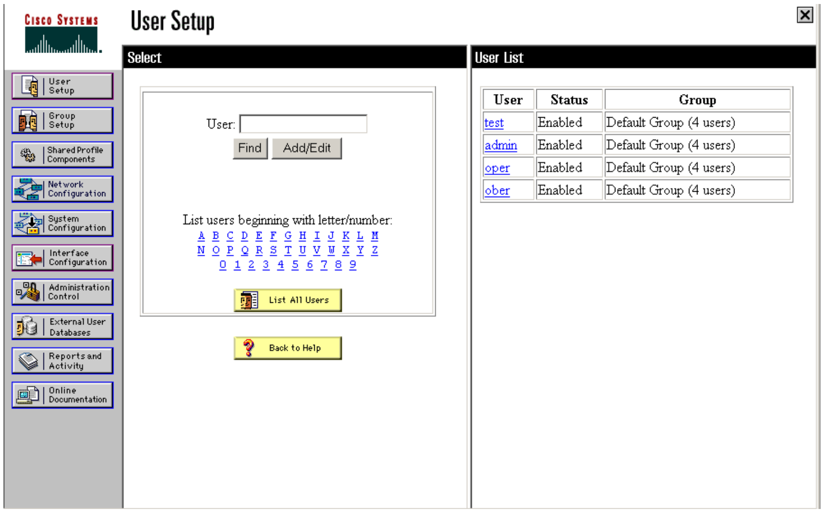
This page displays a list of all of the attributes available for IETF RADIUS. Check the box for **User** and/or **Group** for each IETF RADIUS service that you want to appear as a configurable option in the **User Setup** and/or **Group Setup** section, accordingly. Each attribute selected must be supported by the AAA client.

The RADIUS IETF attributes are available for

Figure 94 RADIUS Properties Display

5. To add new users and configure RADIUS (IETF) attributes, click on the [**User Setup**] button in the left panel of the screen. Enter the user's name and click on the [**Add/Edit**] button.

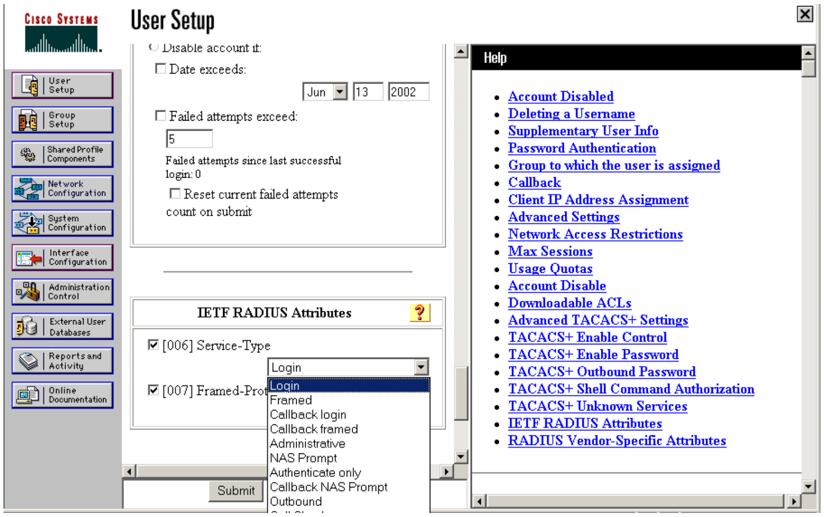
6. To edit existing users, click on the [User Setup] button in the left panel of the screen. Click on the [**List All Users**] button and select a user from the list.



User	Status	Group
test	Enabled	Default Group (4 users)
admin	Enabled	Default Group (4 users)
oper	Enabled	Default Group (4 users)
ober	Enabled	Default Group (4 users)

Figure 95 New User Display

7. Once you have selected a user, on the user properties page, scroll down to the **RADIUS (IETF)** section.



○ Disable account if:

□ Date exceeds: Jun 13 2002

□ Failed attempts exceed: 5

Failed attempts since last successful login: 0

□ Reset current failed attempts count on submit

IETF RADIUS Attributes

☑ [006] Service-Type: Login

☑ [007] Framed-Prot

Figure 96 User Properties Display

8. Click on the **Service-Type** check box and select the appropriate service-type from the drop-down menu:
   – **Administrative**: User with this Service-type will have Administrative privileges on the unit and access to all the ports.
   – **NAS Prompt**: User with this Service-Type will have Operator privileges on the unit and access to all the ports.
   – **Login**: User with this Service-Type will have Observer privileges on the unit and access to all ports.
9. Click on the [**Submit**] button.

Appendix F: RSA ACE/Server Configuration

This section provides guidelines for configuring the RSA ACE/Server 5.0 so that SecureID can be used as the authentication mechanism. Users in an ACE server native database can log on to Dominion SX units installed in the network using SecureID token authentication.

It is assumed that RSA ACE/Server is running RADIUS services and able to authenticate users from its native database. This guide does not provide initial configuration procedures for the ACE server but assumes that the administrator is familiar with the ACE server and has the ability to set up and configure the application. Guidelines are provided to allow SecureID to be used with the Dominion SX units.

These steps must be performed on the RADIUS server in order to use SecureID:

1. Configure all the units (define them in the RADIUS server database)
2. Establish profiles
3. Configure users and associate profiles to each

Please follow the steps below:

1. Select **Start** → **Programs** → **RSA ACE Server** → **Database Administration-Host Mode**.

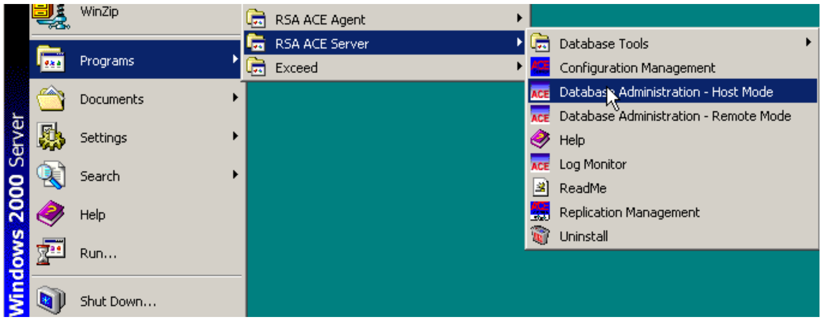


Figure 97 Launching RSA Administration Application

2. Select **Agent Host** → **Add Agent Host** from the main menu to launch the configuration menu.

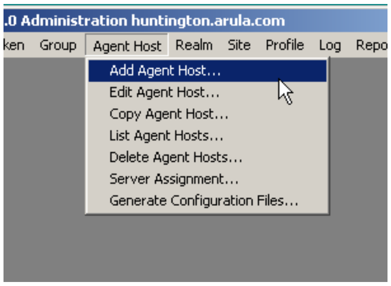
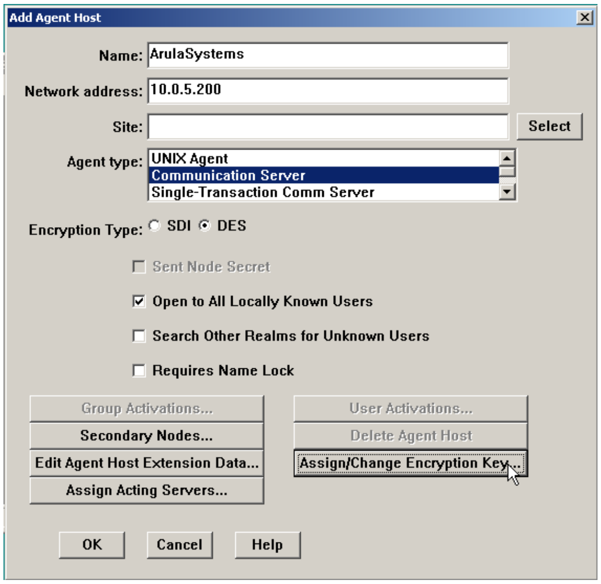

.0 Administration huntington.arula.com
ken Group Agent Host Realm Site Profile Log Repo
Add Agent Host...
Edit Agent Host...
Copy Agent Host...
List Agent Hosts...
Delete Agent Hosts...
Server Assignment...
Generate Configuration Files...

Figure 98 Add Agent Host Selection

3. Define and configure all Dominion SX units.



Add Agent Host

Name: ArulaSystems

Network address: 10.0.5.200

Site:

Agent type: UNIX Agent / Communication Server / Single-Transaction Comm Server

Encryption Type: ○ SDI ● DES

□ Sent Node Secret

☑ Open to All Locally Known Users

□ Search Other Realms for Unknown Users

□ Requires Name Lock

Figure 99 Add Agent Host Display

a. **Name**: Name of the Agent Host; must be a primary name or alias listed in the local host file or DNS server. If an alias is entered, the primary name of the Agent Host appears upon clicking on the [OK] button. If the name entered is not listed in the local host file or DNS server, and error message will appear.

b. **Network Address**: IP address of Dominion SX unit in the network.

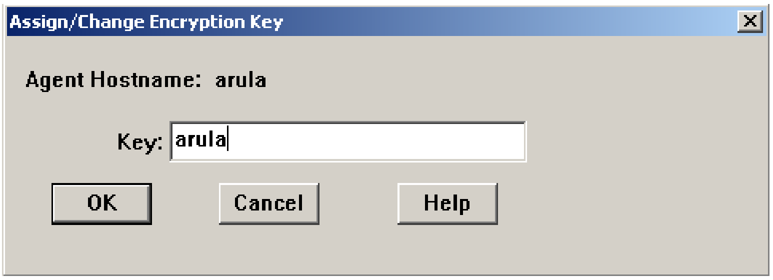
c. **Site**: Optional entry.

d. **Agent Types**: Communication Server: Select this option for Dominion SX units.

e. **Encryption** Type: Select **DES** radio button for Dominion SX units

f. **Open to All Locally Known Users**: Checking this box makes the Agent Host an "open" Agent Host, which needs no specific user or group activations. Any valid user in the local Server database can authenticate on an open Agent Host.

g. **Assign/Change Encryption Key**: If RADIUS is installed and enabled on your system, use this command to enter the secret Key (up to 48 characters) shared between this Agent Host and the RADIUS server with which it will communicate (this Key must also be entered in the unit's RADIUS configuration tab).



Assign/Change Encryption Key

Agent Hostname: arula

Key: arula

Figure 100 RADIUS Secret Key Display

h. Click on the [**OK**] button to save all changes, or click on the [**Cancel**] button to exit the window without saving changes.

4. Select **Profile** → **Add Profile** in the main menu.

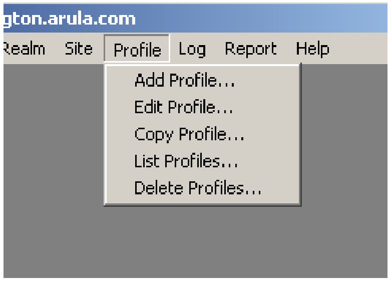


Figure 101 Add Profile Selection

5. In the Add Profile window, assign an appropriate name to identify the desired profile, such as Raritan-Administrator.

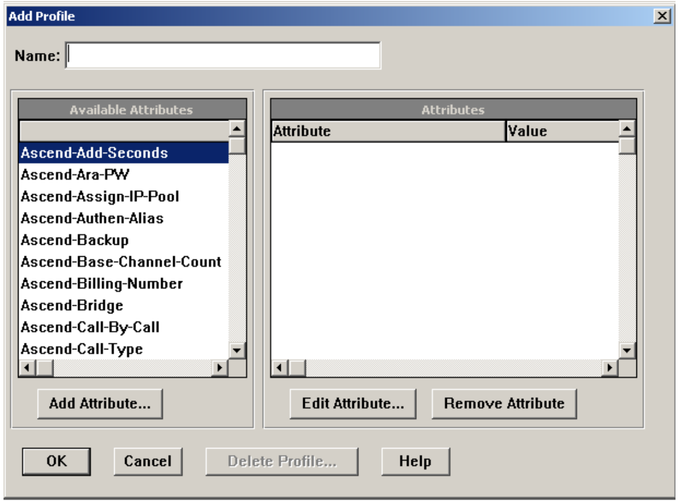


Figure 102 Add Profile Display

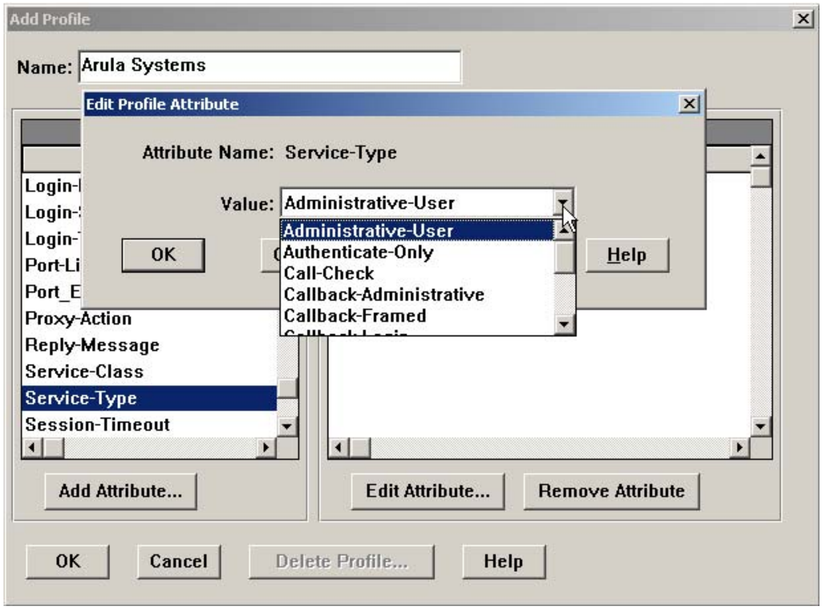
6. Scroll through the list in the **Available Attributes** frame and select **Service-Type**. Click on the [**Add Attribute**] button. The Service-Type Profiles and corresponding user roles are as follows:

– **Administrative-User**: Users with this profile will have Administrator privileges on the unit; they will have read/write access to all ports and will be able to edit the unit's configuration.

– **NAS Prompt**: Users with this profile will have Operator privileges on the unit; they will have read/write access to all ports, but will not be able to edit the unit's configuration.

– **Login**: Users with this profile will have Observer privileges on the unit; they will have only read access to all ports, and will not be able to edit the unit's configuration.

7. Click on the [**OK**] button to save the changes, then click on the [**OK**] button in the Add Profile window to return to the main menu.



Add Profile

Name: Arula Systems

Edit Profile Attribute

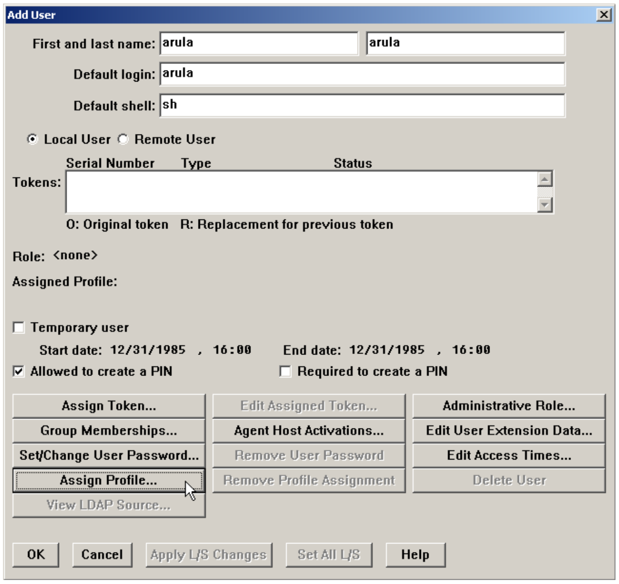
Attribute Name: Service-Type

Value: Administrative-User

Figure 103 Add Attribute Display

***Note**: Only the user's Role can be controlled on the Dominion SX units using specific Service-Type profiles. Access restriction to specific ports on cannot be controlled.*

8. Select **User** → **Add User/Edit User** in the main menu to add a user and assign the appropriate profile.



Add User

First and last name: arula arula

Default login: arula

Default shell: sh

● Local User ○ Remote User

Tokens: Serial Number Type Status

O: Original token R: Replacement for previous token

Role: <none>

Assigned Profile:

□ Temporary user

Start date: 12/31/1985 , 16:00 End date: 12/31/1985 , 16:00

☑ Allowed to create a PIN □ Required to create a PIN

Figure 104 Add User Display

9. Click on the [**Assign Profile**] button and select the appropriate profile from the Select Profile window. Only one profile can be assigned to each user. Click on the [**OK**] button.

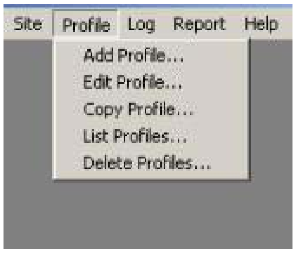


Figure 105 Profile Selection Display

10. To control access to specific units, click on the [**Agent Host Activations**] button. Select the appropriate units from the **Available Agent Host Activation** list and click on the [**Activate On Agent Hosts**] button.

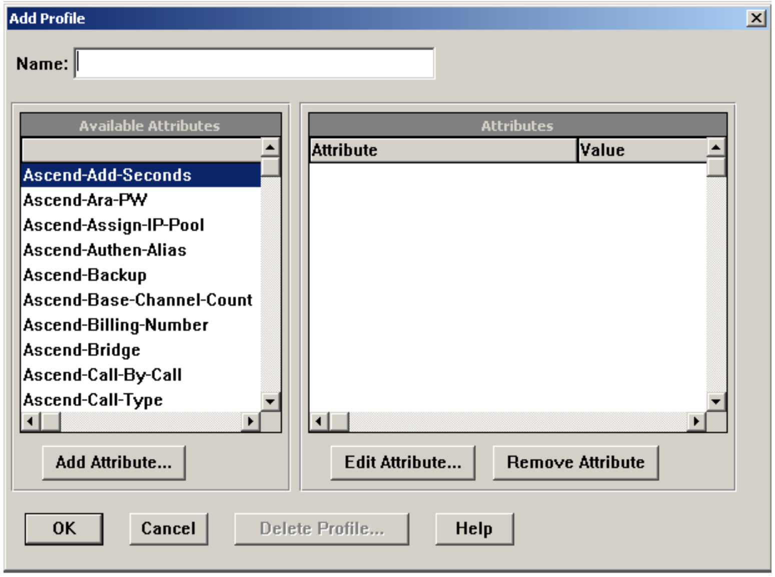


Figure 106 Unit Selection Display per User

11. To configure the Dominion SX device to use RSA/ACE Server as the RADIUS authentication server, log on to the unit with the local administrative account, click on the [**Configuration**] button in the left panel, and select the **RADIUS** tab. Configure the appropriate RADIUS Server IP address, Shared Secret (encryption key), and Port. The unit is now ready to authenticate the user using the ACE RADIUS server.
12. At the login screen for the Dominion SX unit, enter the **Username** and **Passcode** (a combination of the PIN and a number generated on the SecureID token). Authentication will be made using the RADIUS server and access granted based upon user profile.

Appendix G: Modem Configuration

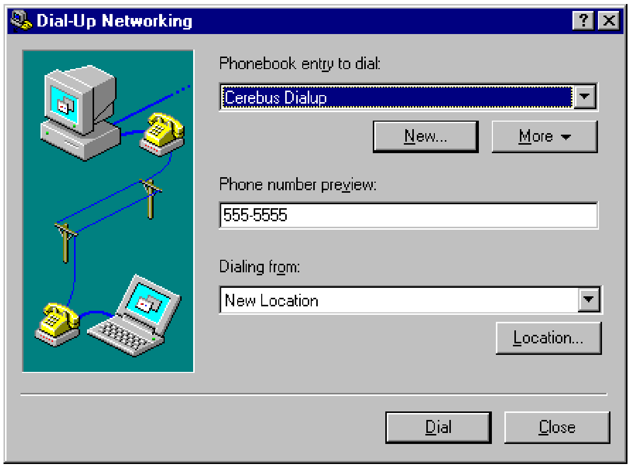
Client Dialup Networking Configuration

Configuring Microsoft Windows Dialup Networking for use with Dominion SX allows configuration of a PC to reside on the same PPP network as the Dominion SX. After the dial-up connection is established, connecting to a Dominion SX is achieved by pointing the web browser to the PPP Server IP. Modem installation guidelines are provided for the following client based systems:

- Windows NT
- Windows 98
- Windows 2000

Windows NT Dialup Networking Configuration

1. Select **Start** → **Programs** → **Accessories** → **Dial-Up Networking**.
2. Click on the [**New**] button.



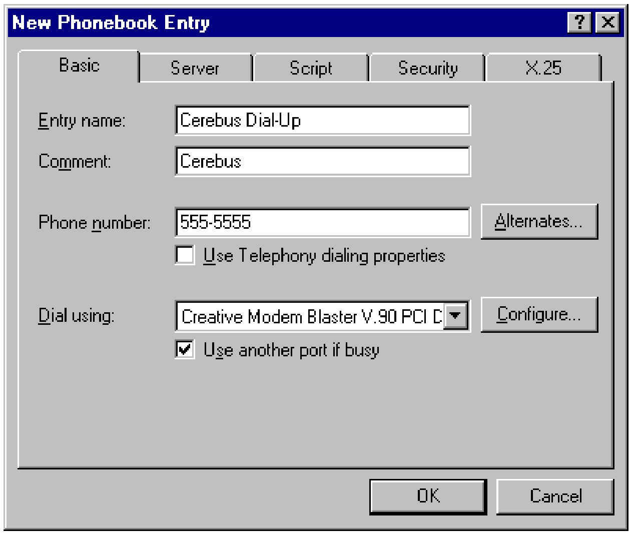
Phonebook entry to dial: Cerebus Dialup

Phone number preview: 555-5555

Dialing from: New Location

Figure 107 Dial-Up Networking Display

3. The New Phonebook Entry window allows you to configure the details of this connection. Click on the Basic tab and complete the following fields:
   a. **Entry name**: Name of the Dominion SX connection
   b. **Phone number**: Phone number of the line attached to the Dominion SX unit
   c. **Dial using**: Modem being used to connect to Dominion SX; if there is no entry here, there is no modem installed in your workstation



Entry name: Cerebus Dial-Up

Comment: Cerebus

Phone number: 555-5555

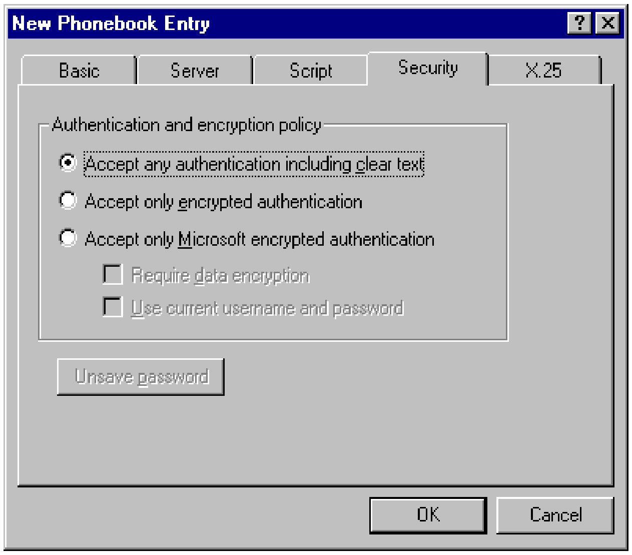
□ Use Telephony dialing properties

Dial using: Creative Modem Blaster V.90 PCI D

☑ Use another port if busy

Figure 108 New Phone Entry Display

4. Click on the **Security** tab. The Security section allows you to specify the level of security to use with the modem connection. Because the security is provided by SSL/RC4 when connecting to the Dominion SX unit, no dialup security is required.
   a. Click on the **Accept any authentication including clear text** radio button.
   b. Click on the [**OK**] button to return to the main Dial screen.



Authentication and encryption policy

● Accept any authentication including clear text

○ Accept only encrypted authentication

○ Accept only Microsoft encrypted authentication

□ Require data encryption

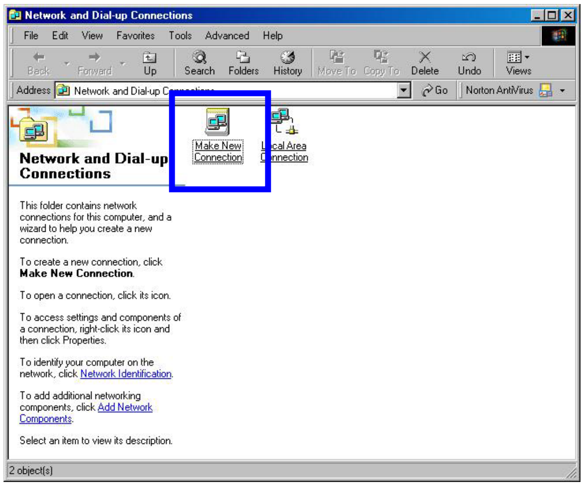
□ Use current username and password

Figure 109 Dial-Up Security Display

5. Click on the [**Dial**] button.
6. In the event of connection error messages, please refer to your Windows NT Users Guide.

Windows 98 Dialup Networking Configuration

1. Select **Start** → **Programs** → **Accessories** → **Communications** → **Dialup Networking**.
2. Double-click on the **Make New Connection icon** in the Dialup Networking window to launch it.


Network and Dial-up Connections
File Edit View Favorites Tools Advanced Help
Back Forward Up Search Folders History Move To Copy To Delete Undo Views
Address Network and Dial-up Connections
Go
Norton AntiVirus
Make New Connection
Local Area Connection
2 object(s)

Network and Dial-up Connections

This folder contains network connections for this computer, and a wizard to help you create a new connection.

To create a new connection, click **Make New Connection**.

To open a connection, click its icon.

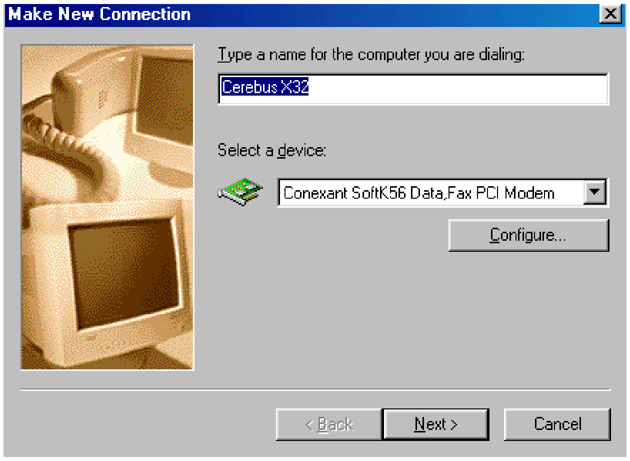
To access settings and components of a connection, right-click its icon and then click Properties.

To identify your computer on the network, click Network Identification.

To add additional networking components, click Add Network Components.

Select an item to view its description.

Figure 110 Configuring Windows 98 Dialup Networking



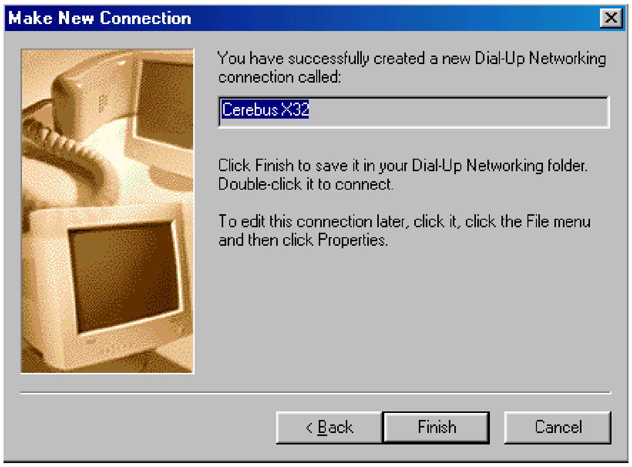
Type a name for the computer you are dialing: Cerebus X32

Select a device: Conexant SoftK56 Data,Fax PCI Modem

Figure 111 Make New Connection – Connection Name

3. In the Make New Connection window, enter:
   a. **Name**: Name for the Dominion SX unit you are dialing.
   b. **Device**: Device you wish to use to connect to the Dominion SX unit from the drop-down list (this will be the Modem).
   c. Click on the [**Next**] button.
   d. **Area code and phone number**: The full number of the phone line connected to the Dominion SX unit.
   e. Click on the [**Next**] button.

f. The next window will inform you that you have successfully created the Dialup Networking Connection.



Make New Connection

You have successfully created a new Dial-Up Networking connection called:

Cerebus X32

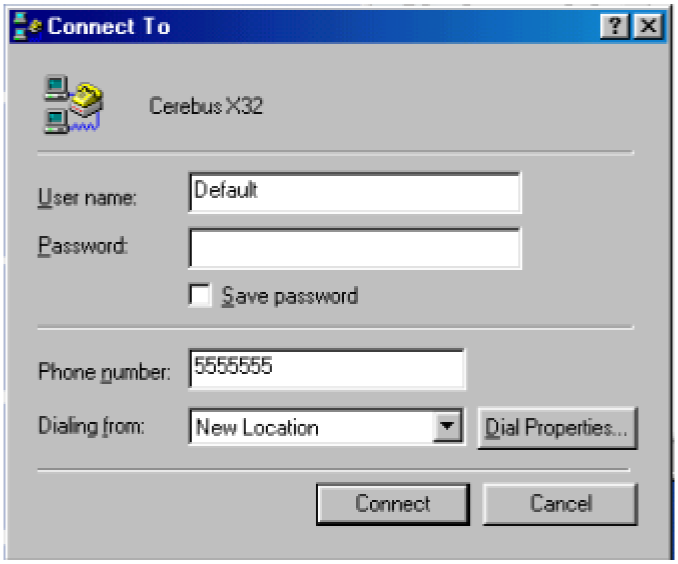
Click Finish to save it in your Dial-Up Networking folder. Double-click it to connect.

To edit this connection later, click it, click the File menu and then click Properties.

Figure 112 Make New Connection – Complete

g. Click on the [**Finish**] button and an icon will appear in the Dialup Networking window.

4. Double-click on the new icon, and in the Connect To window that appears, click on the [**Connect**] button to establish the connection with the Dominion SX unit. No username or password is required for connection, as the security is provided by the Dominion SX unit authentication protocol.



Connect To

Cerebus X32

User name: Default

Password:

□ Save password

Phone number: 5555555

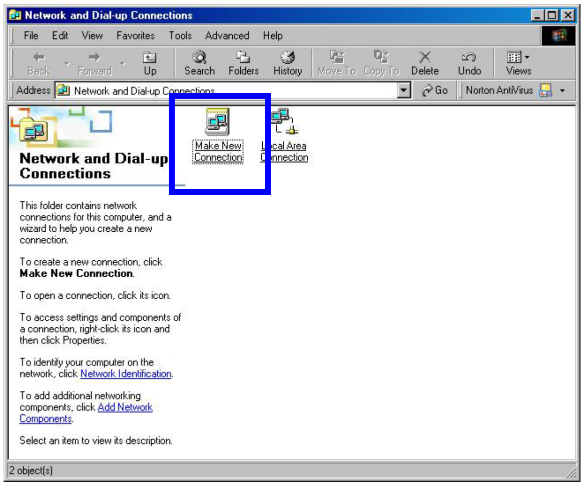
Dialing from: New Location

Figure 113 Connect Window

5. Once logged in, you may connect to the Dominion SX unit with Internet Explorer or Netscape.

Windows 2000 Dialup Networking Configuration

1. Select **Start** → **Programs** → **Accessories** → **Communications** → **Network and Dial-Up Connections**.
2. When the Network and Dial-Up Connections window appears, double-click on the **Make New Connection** icon.


Network and Dial-up Connections
File Edit View Favorites Tools Advanced Help
Back Forward Up Search Folders History Move To Copy To Delete Undo Views
Address Network and Dial-up Connections
Go
Norton AntiVirus
Make New Connection
Local Area Connection
Network and Dial-up Connections
2 object(s)

This folder contains network connections for this computer, and a wizard to help you create a new connection.

To create a new connection, click **Make New Connection**.

To open a connection, click its icon.

To access settings and components of a connection, right-click its icon and then click Properties.

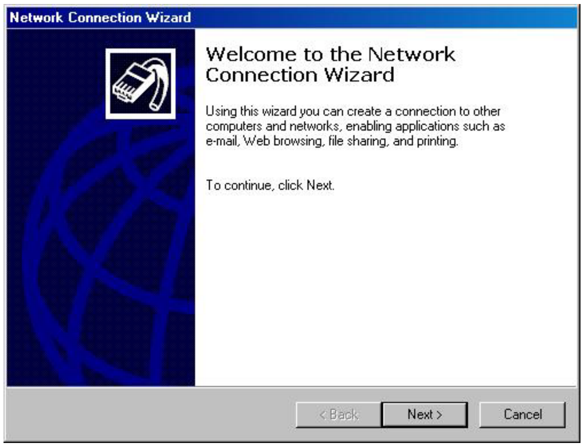
To identify your computer on the network, click Network Identification.

To add additional networking components, click Add Network Components.

Select an item to view its description.

Figure 114 Windows 2000 Network and Dialup Connections

3. Follow the steps in the **Network Connection** Wizard window to create custom dialup network profiles. Click on the [**Next**] button.



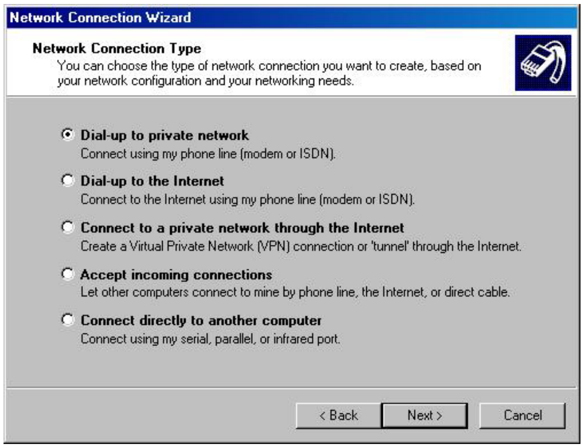
Welcome to the Network Connection Wizard

Using this wizard you can create a connection to other computers and networks, enabling applications such as e-mail, Web browsing, file sharing, and printing.

To continue, click Next.

Figure 115 Welcome to the Network Connection Wizard

4. Click on the **Dial-up to private network** radio button and click on the [**Next**] button.



Network Connection Wizard

Network Connection Type
You can choose the type of network connection you want to create, based on your network configuration and your networking needs.

● **Dial-up to private network**
Connect using my phone line (modem or ISDN).

○ **Dial-up to the Internet**
Connect to the Internet using my phone line (modem or ISDN).

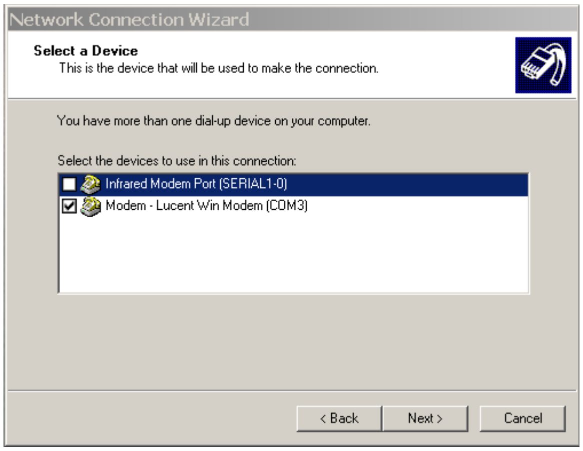
○ **Connect to a private network through the Internet**
Create a Virtual Private Network (VPN) connection or 'tunnel' through the Internet.

○ **Accept incoming connections**
Let other computers connect to mine by phone line, the Internet, or direct cable.

○ **Connect directly to another computer**
Connect using my serial, parallel, or infrared port.

Figure 116 Network Connection Type

5. Click on the check box before the modem that you want to use to connect to the Dominion SX unit and then click on the [**Next**] button.



Network Connection Wizard

Select a Device
This is the device that will be used to make the connection.

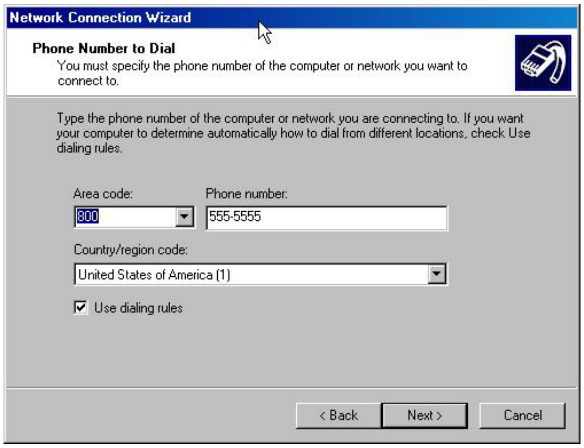
You have more than one dial-up device on your computer.

Select the devices to use in this connection:

□ Infrared Modem Port (SERIAL1-0)
☑ Modem - Lucent Win Modem (COM3)

Figure 117 Device Selection

6. Click in the **Use dialing rules** check box and enter the **Area code** and **Phone number** you wish to dial in the fields. Click on the [**Next**] button.



Network Connection Wizard

Phone Number to Dial

You must specify the phone number of the computer or network you want to connect to.

Type the phone number of the computer or network you are connecting to. If you want your computer to determine automatically how to dial from different locations, check Use dialing rules.

Area code: 800

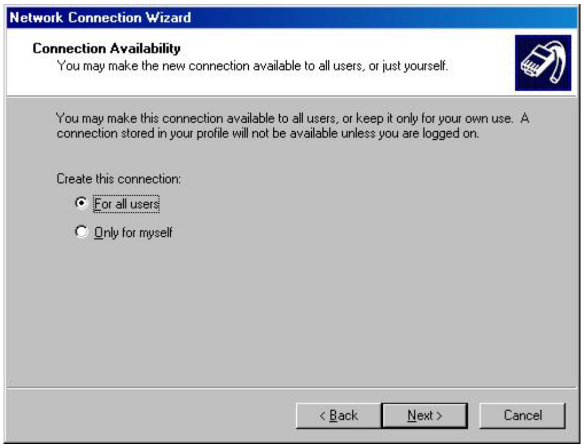
Phone number: 555-5555

Country/region code: United States of America (1)

☑ Use dialing rules

Figure 118 Phone Number to Dial

7. In the Connection Availability screen, click on the **Only for myself** radio button. Click on the [**Next**] button.



Network Connection Wizard

Connection Availability

You may make the new connection available to all users, or just yourself.

You may make this connection available to all users, or keep it only for your own use. A connection stored in your profile will not be available unless you are logged on.

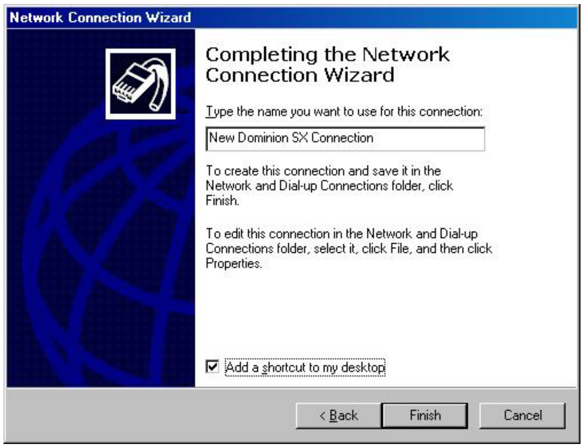
Create this connection:

● For all users

○ Only for myself

Figure 119 Connection Availability

8. The Network Connection has been created, and you can complete set-up of the dial-up connection by entering the name of the Dial-up connection.



Network Connection Wizard

Completing the Network Connection Wizard

Type the name you want to use for this connection:

New Dominion SX Connection

To create this connection and save it in the Network and Dial-up Connections folder, click Finish.

To edit this connection in the Network and Dial-up Connections folder, select it, click File, and then click Properties.

☑ Add a shortcut to my desktop

Figure 120 Network Connection Wizard Completion

9. Click on the [**Finish**] button.
10. To connect to the remote machine, when the Dial Window appears, click on the [**Dial**] button. A window indicating that a successful connection has been established will appear. If you get any errors during this phase, please consult your Windows 2000 Dial-up Networking Help.

Appendix H: Client Software Installation

A client installation that speeds up the connection to the unit is available for both IE and Netscape. This is especially useful when using the modem to access the unit. Once this client is installed, it will be subsequently used even during a network connection.

IE on Windows NT/2000/98

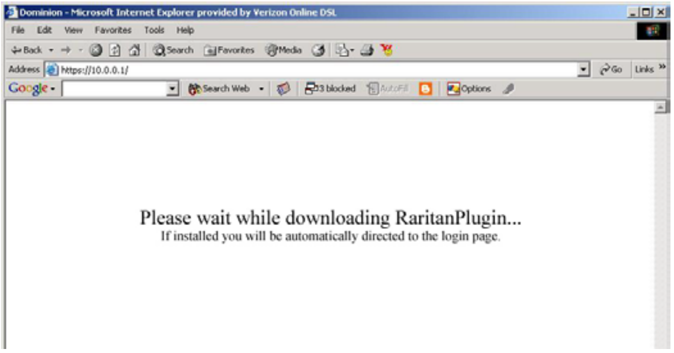
The following procedure applies to IE versions 4.0 and above:

1. Connect to the unit using the modem application provided in Windows.
2. Once a connection is established, launch the browser.
3. Enter the unit's modem IP address, which should have been configured in the unit.

For example:

https://15.0.0.1

4. A downloading display appears. If the Raritan Plugin client has not been installed, then the unit will automatically download the required **.cab** files.

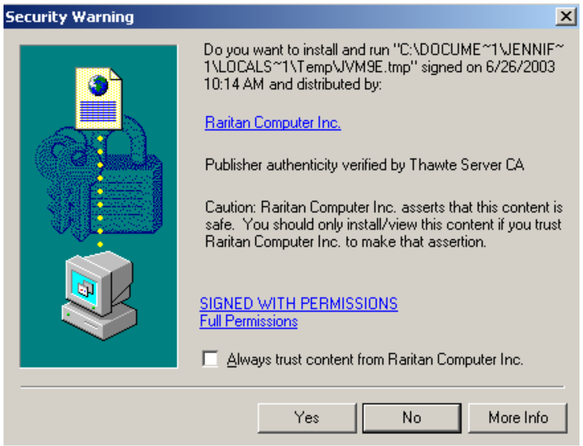

Dominion - Microsoft Internet Explorer provided by Verizon Online DSL
File Edit View Favorites Tools Help
Back Search Favorites Media
Address https://10.0.0.1/
Go Links
Google Search Web 3 blocked AutoFill Options

Please wait while downloading RaritanPlugin...

If installed you will be automatically directed to the login page.

Figure 121 IE Client Download Display

5. Permission to allow IE to install the required files will be requested. Click on the [**Yes**] button to allow IE to install the Raritan Plugin on the client machine (this will take about six minutes with a 56Kbps modem). Please note that this action is performed only once if the files are not present on the client machine – subsequent connections will be immediate, as the necessary files have been downloaded.



Do you want to install and run "C:\DOCUME~1\JENNIF~1\LOCALS~1\Temp\JVM9E.tmp" signed on 6/26/2003 10:14 AM and distributed by:

Raritan Computer Inc.

Publisher authenticity verified by Thawte Server CA

Caution: Raritan Computer Inc. asserts that this content is safe. You should only install/view this content if you trust Raritan Computer Inc. to make that assertion.

SIGNED WITH PERMISSIONS
Full Permissions

☐ Always trust content from Raritan Computer Inc.

Figure 122 Raritan Plugin Security Warning Display

6. When the Admin applet is loaded, will launch and bring up a login display.

7. Log on to the unit as usual.
8. Click on desired port to access the target device.
9. IE starts to download the application plugin – the unit will download the plugin only if it is not present on the client machine.
10. Another Security Warning screen appears requesting permission to allow IE to install the files. Click on the [**Yes**] button to continue.
11. IE downloads the necessary files, installs them on the client machine, and executes them.
12. The console application opens on the client machine.

Netscape on Windows NT/2000/98

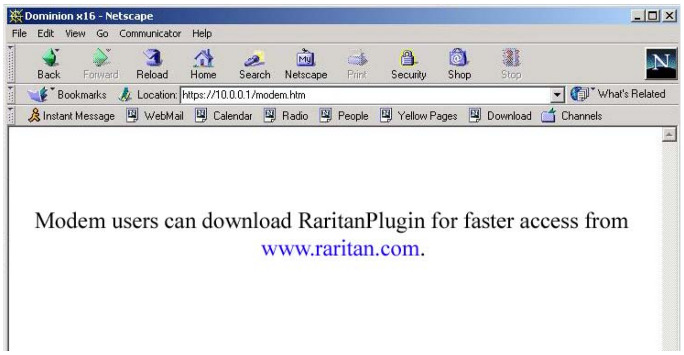
The following procedure applies to Netscape versions 4.76, 4.77, and 4.78:

1. Connect to unit using the modem application provided in Windows.
2. Once a connection is established, launch the browser.
3. Enter the unit's modem IP address, which should have been configured in the unit

For example:

https://15.0.0.*1*

4. A download message appears in the browser.


Dominion x16 - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop Stop
Bookmarks Location: https://10.0.0.1/modem.htm
What's Related
Instant Message WebMail Calendar Radio People Yellow Pages Download Channels

Modem users can download RaritanPlugin for faster access from www.raritan.com.

Figure 123 Netscape Plugin Redirection Display

5. Click on the link for Raritan, www.Raritan.com, which will redirect you to Raritan's download site.
6. Click on the link for the plugin setup, **ArulaPluginSetup.exe**.
7. Download the file and save it on the client machine.
8. Close the browser.
9. Double click on **ArulaPluginSetup.exe** and follow the installation wizard.
10. Launch Netscape.
11. Enter the unit's modem IP address.
12. When the Security Warning window appears, click on the [**Grant**] button to allow permission for the applet to connect to the unit. If you click on the [**Deny**] button, the unit cannot be connected until you re-launch the browser and restart this process.
13. You will be directed to the login display (the local installed client is used to speed up the response).
14. Log on to the unit.
15. When the main display appears, click on desired port to access target device.
16. The console will appear.

Remove RaritanConsole on Windows NT/2000/98

With IE

1. Open your Explorer and find the directory **C:/winntw (or winnt)/Download Program Files/**.
2. Right-click on the file **MpAdmin** and select *Remove* from the drop-down menu. This will remove the Admin part of RaritanConsole.
3. Right-click on the file **AmpApp** and select *Remove* from the drop-down menu. This will remove the Application part of RaritanConsole.

With Netscape

1. Select **Start** → **Settings** → **Control Panel**.
2. Double-click on the **Add/Remove Programs** icon.
3. Select **RaritanConsole** from in the scrolling list.
4. Click on the [**Add/Remove**] button to remove the RaritanConsole.

Client for Sun Solaris and other UNIX platforms

Netscape Installation

1. Using the modem client application, dial into the unit and wait for a connection to be established.
2. Enter the unit's modem IP address, which should have been configured in the unit.

For example:

https://15.0.0.1

3. Click on the Raritan link, www.raritan.com, to launch Raritan's download site.
4. Click on the **ArulaPlugin.tar** link.
5. Select *Save File* in the download pop-up menu and save **ArulaPlugin.tar** to **/var/spool/pkg/ArulaPlugin**.
6. Close Netscape.
7. Type **tar -xvf ArulaPlugin.tar** to extract **ArulaPlugin.tar.**
8. Change the directory to **/var/spool/pkg/ArulaPlugin**.
9. Execute the script **/setup -i** from the shell. This will install all the necessary files into **/usr/local/Arula Systems** directory.

Important! DO NOT remove /var/spool/pkg/ArulaPlugin directory.

10. By default, the installation directory is **/usr/local**. You can install in any path you prefer by executing the command **/setup -i <YOUR PATH>.**
11. Open Netscape browser and provide the Modem IP Address. The browser will automatically be directed to the login screen.
12. Log on to the unit and click on the desired port. The console will appear.

RaritanConsole Removal

1. Log on as **Root**.
2. Change the directory to **/var/spool/pkg/ArulaPlugin**.
3. Execute **/setup -u [<YOUR PATH>]**

***Note**: <**YOUR PATH**> should be provided in case you installed the file in a different directory.*

4. Remove the **ArulaPlugin** directory from **/var/spool/pkg**.

Appendix I: TCL Programming Guide

Disclaimer: The information contained in this section is subject to change without notice. Raritan shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material. Raritan assumes no responsibility for the use or reliability of its software on equipment that is not furnished by Raritan.

Overview

Dominion SX supports TCL (version 7.0), an industry standard scripting engine. Using TCL scripting capabilities, you can create customized conditions for event detection, and can generate customer-specific notifications and alerts. Dominion SX features a TCL engine and a flash file system for the development and storage of TCL scripts.

Dominion SX is pre-configured with a set of User Definable Events that can be generated by TCL scripts. Raritan has introduced an extension library to provide an API to Dominion SX's functions. In addition, Dominion SX includes an extensive list of notification events that can be used to audit, track, and trace the conditions of and modifications to the unit itself.

This appendix describes the architecture and features of the TCL script engine, and provides information to help you develop scripts to manage multiple remote target devices.

TCL Architecture with Target System

The following diagram illustrates the TCL Engine architecture:

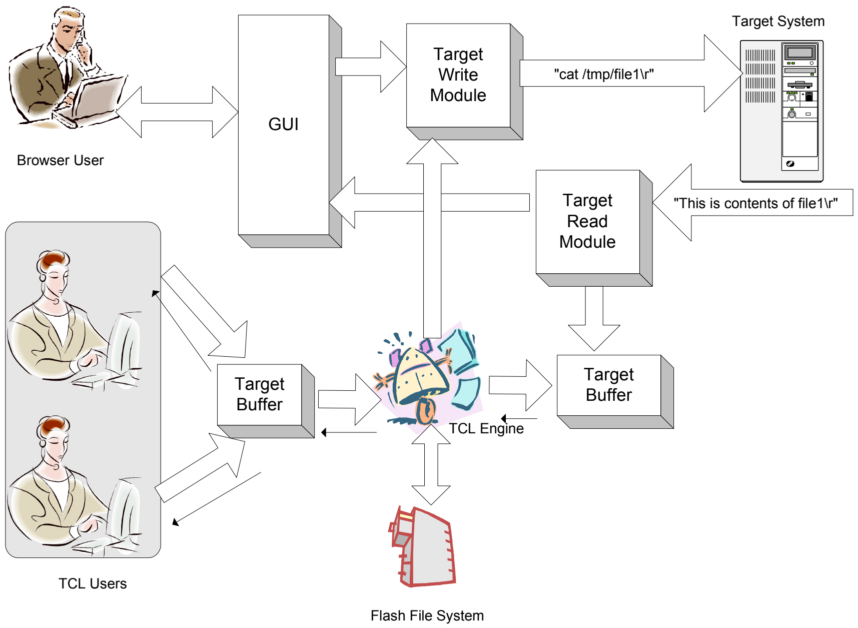


Figure 124 TCL Architecture

Key aspects of TCL architecture:

- The TCL Engine is single-threaded and shared across multiple users and target devices.
- A browser user (standard GUI) does not interact with the TCL Engine.
- The TCL Engine shares the same function blocks for accessing the console via the RS-232 port.
- The TCL Engine does not interfere with normal console access function.
- Only Administrators may operate TCL.

- Data received from each target system on the RS-232 port is sent to all connected Java user consoles and also stored in an internal TCL buffer. Each internal buffer has the following properties:
  - Data received on an RS-232 port from a target device is stored in this buffer.
  - The TCL Engine is the only reader of this data.
  - Internal buffers are circular buffers; 64Kbytes.
  - The buffer uses the FIFO storage method.
  - A data stream methodology for data retrieval is used and there is no random access capability.

Extensions have been made to the TCL framework to enable retrieving data from the TCL internal buffer and to send commands to the target systems. A single script can include instructions to access any RS-232 port. The script has the ability to take away the write access to an RS-232 port from other users, which is communicated to each user through the GUI. Once the script acquires the write access, other users will not be allowed to take the write access until the script releases it. There are several requirements to be considered

- If the script has write access and the user resets TCL through the GUI, the TCL interpreter will release write access before resetting.
- If the script has write access and the user logs out without releasing the write access, access will be held by the TCL interpreter until a user connects to the interpreter and instructs the interpreter to release it or resets the interpreter.
- It is important for the scriptwriter to release the write access, if acquired, in the boot script.
- The write access lock is always associated with a port number. The user is responsible for releasing any locks acquired during script execution.

With the following commands (which may be used interactively by a TCL user or in a TCL script), the user can access the RS-232 ports. Each command takes a number as the final argument to indicate which serial port should be affected:

- *amplock/ampunlock <port>*
  - TCL engine locks the write access for this port. GUI users using the Java Console cannot supersede TCL and force TCL unlock by the issuing the Get Write Access or F8 key. An administrator may only force a TCL unlock by issuing a Reset from the Script Shell window or main GUI.
  - The TCL user must lock the write access in order for the TCL Engine to write to the Console.
- *ampclear <port>*
  - Mark all data in the TCL internal buffer associated with the port as having been READ. Essentially, this command flushes all data in the TCL internal buffers.
- *ampread <timeout> <termination string> <port>*
  - TCL will start examining the unread data in a TCL internal buffer and return the result until:
    - ▪ A timeout has occurred or
    - ▪ A termination string is found in the data stream.
  - If zero is given as the timeout, no timeout limit will be checked.
- *ampwrite <output string> <port>*
  - The string is written to Console port.
- *ampexec <output string> <timeout> <termination string> <port>*
  - This command is simply an ampwrite follow by an ampread.

The above extensions to TCL, along with the standard TCL commands, provide a development platform for powerful scripts for managing the target devices. This guide provides details on all of the extensions provided in the Dominion SX product. A few sample scripts are also provided.

The TCL command queuer provides the following features:

- Serialize multiple TCL Command Requests.
- Process one command with one response.
- Multi-lined single command (multiple commands issued by user as a single task by using ";" between commands) is processed as a single request and single response is returned.
- Execution result returned to the command issuer.

- Access control for TCL.
- By default, administrators are the only users that can access TCL. However, administrators may disable the check.

amppermission, amplisten and ampresponse are commands to enable a TCL script to interact with other TCL users.

- *amppermission <on/off>*
  - On will enforce permission checking.
  - Off will allow observers and operators to access TCL.
- *amplisten*
  - Remember who sent the command and respond to the sender instead of the executer of the script.
  - If no command is present, *amplisten* returns a null.
- *ampresponse.*
  - Flush the data in current result buffer (stdout) to the user.

The extensions enable a TCL script/user to send notifications (SMTP) to subscribed users when an event occurs. The creator of the script is required to generate an event and users are given the option to subscribe to the event. Commands are provided for a script to send notifications to subscribed users when an event occurs. This appendix provides information on how to create and subscribe to an event.

Boot Script Support

A mechanism is available to write scripts that will be executed when the system boots. The boot script is a normal script except that it should be named “boot.scr” (case insensitive). On factory reset, the boot.scr script will be renamed to boot.bak automatically. After the factory reset, the user can make necessary changes in the boot script (“boot.bak”) and rename it back to boot.scr.

The boot script can access the RS-232 ports, but the user must insure that the write locks are released otherwise no user will be able to get write access to the console of the remote target device. In case a write lock is not released, the user has to change the boot script appropriately and perform a soft reset.

File System

Dominion SX includes a general-purpose flash file system, which can be accessed by both the internal web server and the TCL interpreter. The file system is MSDOS 3.3 compatible with 8.3 (xxxxxxxx.xxx) file name constraints and can be used to store TCL data and scripts. A total of 10MB is available for storage of user data. There is no specific limit on the size of a particular script or the number of scripts a user may save.

The file system is accessible only by the TCL engine and hence only Administrator users can modify the filesystem (e.g. create, delete files etc). Operator and Observer users can be granted access to the TCL engine and hence to the filesystem by administrators through the use of the *amppermission* command.

File Directory Structure

All user scripts and data are stored in /ata/usr. Access to all other directories in the system are restricted to the user.

File System API through TCL

pwd

Display current path.

dir <directory name>

List directory contents.

mkdir <directory name>

If absolute path is not provided, then the new directory is created in the present working directory.

rmdir <directory name>

Remove the specified directory.

cd <directory name>

Change the current directory to the new directory specified. This command will take a relative path or an absolute path. /ata and system related directories are not accessible.

del <filename>

Delete specified file name

TCL Commands

The TCL interpreter incorporated supports TCL 7.0. All built-in TCL commands for TCL 7.0 are supported *except* **exec, interp, library,** and **TCLvars**.

The following TCL commands are supported:

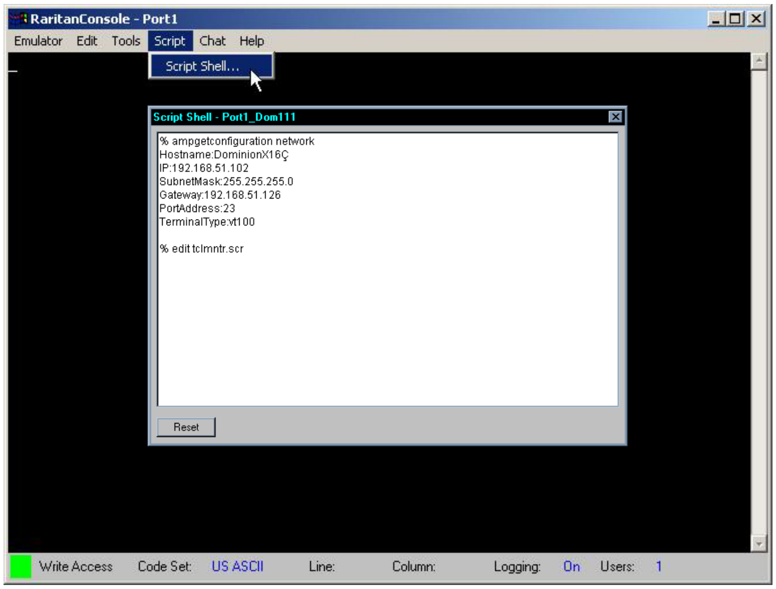
append	glob	pwd
array	global	read
break	history	regexp
case	if	regsub
catch	incr	rename
cd	info	return
close	join	scan
concat	lappend	seek
continue	lindex	set
eof	linsert	source
error	list	split
eval	llength	string
exit	lrange	switch
expr	lreplace	tell
file	lsearch	time
flush	lsort	trace
for	open	unknown
foreach	pid	unset
format	proc	uplevel
gets	puts	upvar
		while

Accessing TCL Window

The TCL Interpreter can be accessed through RaritanConsole using the **Script** menu selection, as described in **Chapter 4: Console Features**.

The TCL prompt is “%”. The command(s) to be executed must be entered AFTER the prompt. The result will be echoed on the next new line. The user may execute multiple-line commands using the Copy and Paste features from the Windows/Unix operating system.

> ***Note**: Any response that is larger than 4K will not be echoed back to the user, but the command’s output may be stored in a variable.*


RaritanConsole - Port1
Emulator Edit Tools Script Chat Help
Script Shell...
Script Shell - Port1_Dom111
Reset
Write Access Code Set: US ASCII Line: Column: Logging: On Users: 1

```
% ampgetconfiguration network
Hostname:DominionX16Ç
IP:192.168.51.102
SubnetMask:255.255.255.0
Gateway:192.168.51.126
PortAddress:23
TerminalType:vt100

% edit tclmntr.scr
```

Figure 125 Activating TCL Scripting Window

Resetting TCL Interpreter

TCL scripts may have forever-loops due to programming errors, unknown conditions, or by design. When this condition occurs, click on the [**Reset**] button in the scripting window to halt the execution of the TCL script. However, not all conditions are recoverable by clicking on the [**Reset**] button. Therefore, full software reset from the GUI may be necessary to restart the interpreter.

When a *Reset* has been issued to the TCL Interpreter, the BOOT.SCR will **NOT** be executed. This will prevent errors in the boot script from incapacitating the interpreter. Not all conditions are recoverable by *Reset*. The user may have to execute a factory reset to remove the error condition. When factory reset occurs, boot.scr is renamed boot.bak. Administrations will need to rename boot.bak to boot.scr once the factory reset is complete.

Editing TCL Scripts

The TCL Shell includes a built-in editor, activated by typing ***edit <filename>*** at the **%** prompt. The file will be saved to the directory in which the TCL interpreter is currently operating. Administrators, Operators, and TCL script developers should understand the mechanisms by which Write Access is obtained and released in order to develop applications to manage target devices.

> ***Note**: The TCL engine owns files created by the users. Removing a user account does not delete any created files.*

Executing TCL Scripts

A stored TCL Script may be executed as follows.

% source <filename>

The prompt does not return if the script contains forever-loops, but the shell is active (listening) and will take input if the script is designed to accept them.

Automatic Execution of a TCL Script upon Power Up

For a TCL script to be executed automatically upon each reboot or power cycle of the unit, the script needs to be named ***boot.scr*** and placed in the ***/ata/usr*** directory.

Important! Using *ampreset, ampformatfs* or *ampupgrade* in a boot script may lead to unknown state.

Generating a User Event

TCL scripts are a powerful tool for performing true device management, in the form of customer-defined monitoring and notification of events. A sample script is shown below:

```
#This script performs the monitoring of HTTP servers.
proc pstat {procname port_num} {
        set psef [concat "ps -ef | grep " $procname | grep -v "grep" | wc -l]
        ampexec "stty -echo\r" 5 "#" $port_num
        set output [ampexec "$psef\r" 10 "#" $port_num]
        ampexec "stty echo\r" 5 "#" $port_num
        return [lindex $output 0]
}

# add subscription to an event here.
ampaddsubscription event.user.httpProcess  “xyz@xyz.com”

# Run through 4 different servers to find out if HTTP service is running
# on each one of them and trigger an event appropriately.
for {set port_num 0} {$port_num < 4} {incr port_num +1} {
        ampclear $port_num
        amplock  $port_num

        set output [pstat httpd $port_num]
        ampunlock $port_num

        if {$output > 0} {
           puts "HTTP_SERVER_OK $port_num"
           amptriggerevent event.user.httpProcess “HTTP service is up and running on $port_num”
        } else {
           puts " HTTP_SERVER_ERROR $port_num"
           amptriggerevent event.user.httpProcess “HTTP service down on $port_num”
        }
}
```

In the Notification tab of the unit, the user can subscribe to either of the following:
event.user or event.user.httpProcess to get this message: “HTTP service is up and running on 1”. To subscribe to user-defined events (defined in the TCL script), the event name must be specified.

> ***Note:*** *This Event Name must match* ***EXACTLY*** *with the event name the user generated using the TCL script.* event.user *will send out an notification whenever this event is triggered.* event.user.httpProcess *will be sent out only when this specific event occurs. The entry must be entered in the notification tab exactly as it appears in the script.*

Extensions to TCL

Various extensions have been incorporated into TCL to support functions to interact with the RaritanConsole unit. The command *info comm amp* (executed in a Script Shell Window) lists all the commands that are supported.

ampsetconfiguration, ampaddsubscription, amprmsubscription, ampsetipacl, amprmipacl, ampadduser, amprmuser are commands that make configuration changes to the Raritan unit. *ampsave* must be executed in order for the changes to become effective, and may be executed at the end of executing a set of these commands or after each command. Please note that in some cases (network), *ampsave* causes the unit to reboot. Use *ampreload* to revert changes before a save is executed.

ampgetconfiguration

Returns a list of categories that can be displayed

Usage: ampgetconfiguration

```
% ampgetconfiguration
network
modem
datacom
smtp
radius
```

If a specific category is specified, then the data for that category will be displayed.

Usage: ampgetconfiguration <category><port_number>

- **Category**: can be network, datacom, smtp, and radius
- **Port_number**: valid port number, applies only to datacom category; otherwise not used

```
% ampgetconfiguration network
Hostname: RaritanConsole_C3200
IP:10.0.1.41
SubnetMask:255.0.0.0
Gateway:10.0.1.41
PortAddress:2398
TerminalType:VT100
```

ampsetconfiguration

Sets the specified field to the value passed. Returns an error if the interpreter cannot get the config lock.

Usage: ampsetconfiguration <category> <field_name> <value>

- **Category**: network, datacom, smtp, radius
- **Field_name**: field to be altered in a particular category
- **Value**: new value

Setting a specific parameter is done as follows (changing a port configuration):

```
% ampsetconfiguration network portaddress 2398
configuration successful
% ampsave
```

Important! An ampsave command must be executed in order for any changes to take effect. In the instance above, a reboot occurs.

Possible error condition:

```
% ampsetconfiguration network portaddress 2398
TCL cannot write to the configuration: locked by John Smith
```

This denotes that there is a user that is viewing/modifying the configuration of the unit and the command cannot modify the configuration parameters.

ampgetuser

Returns a string listing all the currently configured users and their user account parameters.

Usage: ampgetuser

```
% ampgetuser
Users: Steve Gaumer John Smith Michael White Fredrick Jones
```

***Note**: The names are not shown with any delimiters.*

If a specific user is specified, only that user’s account information is listed. If the user name contains spaces, the name needs to be entered in quotes.

Usage: ampgetuser <user_name>

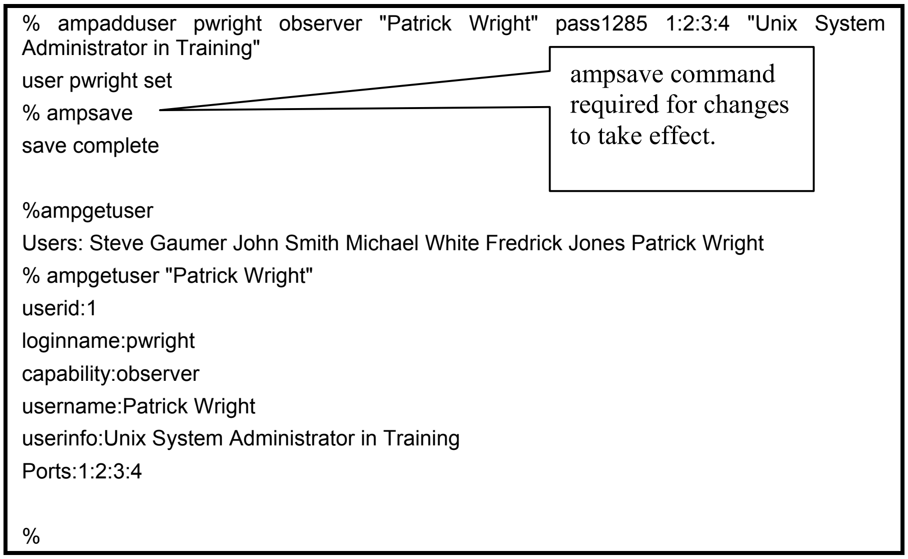
```
% ampgetuser "Steve Gaumer"
userid:5
loginname:wgaumer
capability:observer
username:Steve Gaumer
userinfo:Network Engineer in Training
Ports:1:2:3:4:5:6:7:8
```

ampadduser

Creates a new user account or edit an existing user account. The last argument is optional.

Usage: ampadduser <loginname> <function> <user_name> <password> <portpermission> [information]

- **Loginname**: user login name
- **Function**: type of user (administrator, operator, observer)
- **User_name**: name of user; if there are spaces in the name, the name must be entered in quotes
- **Password**: password
- **Port permission**: ports the person will have access to. **For administrator type, use “” for port permission parameter.**
- **Information** (optional): information field; if there are spaces the content must be in quotes



```
% ampadduser pwright observer "Patrick Wright" pass1285 1:2:3:4 "Unix System
Administrator in Training"
user pwright set
% ampsave
save complete

%ampgetuser
Users: Steve Gaumer John Smith Michael White Fredrick Jones Patrick Wright
% ampgetuser "Patrick Wright"
userid:1
loginname:pwright
capability:observer
username:Patrick Wright
userinfo:Unix System Administrator in Training
Ports:1:2:3:4

%
```

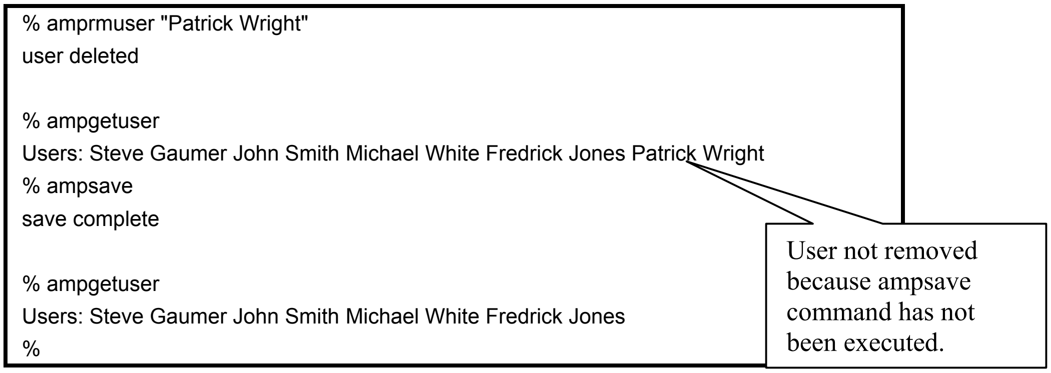
ampsave command required for changes to take effect.

amprmuser

Deletes the named user account.

Usage: amprmuser <user_name>

- **User_name**: user name to be removed. If there are spaces in the name then the name should appear in quotes i.e. “John Doe”



```
% amprmuser "Patrick Wright"
user deleted

% ampgetuser
Users: Steve Gaumer John Smith Michael White Fredrick Jones Patrick Wright
% ampsave
save complete

% ampgetuser
Users: Steve Gaumer John Smith Michael White Fredrick Jones
%
```

User not removed because ampsave command has not been executed.

ampreset

Reboots the unit. All users are disconnected.

Usage: ampreset

ampupgrade

Upgrades the unit. ip_address specifies the server to obtain the file specified by file_path. If the login and password are specified they are used by FTP. If they are not specified, anonymous FTP is used.

Usage: ampupgrade <ip_address> <file_path> [login] [password] <port_number>

- **Ip_address**: location of the files that are to be used in the upgrade
- **File_path**: location where the files are stored
- **Login** (optional)

ampgetversion

Returns a string containing a version report.

Usage: ampgetversion

```
% ampgetversion

  Kernel version: K.02.00.000
  Software version: K.02.00.000
  GUI version: K.02.00.000
```

ampgetipacl

Returns a string containing a list of IP addresses configured to have access to the unit.

Usage: ampgetipacl

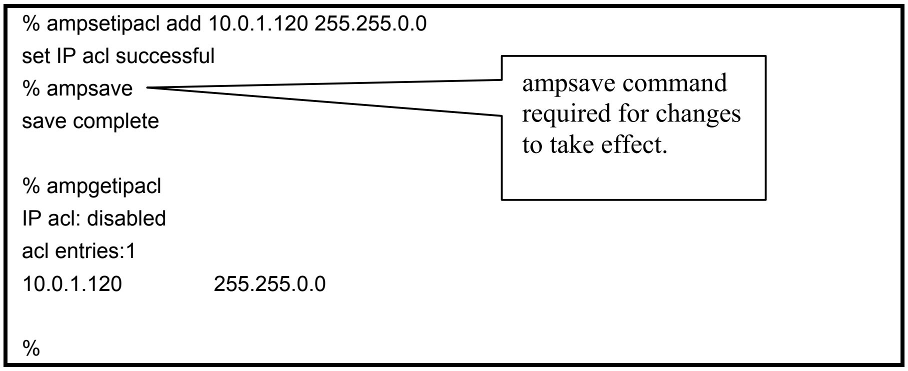
```
% ampgetipacl
IP acl: disabled
acl entries:0

%
```

ampsetipacl add

Adds an IP address to the IP ACL list.

Usage: ampsetipacl add <ip_address> <subnet_mask>

- **Ip_address**: ip address to be added to the list
- **Subnet_mask**: subnet mask



```
% ampsetipacl add 10.0.1.120 255.255.0.0
set IP acl successful
% ampsave
save complete

% ampgetipacl
IP acl: disabled
acl entries:1
10.0.1.120            255.255.0.0

%
```

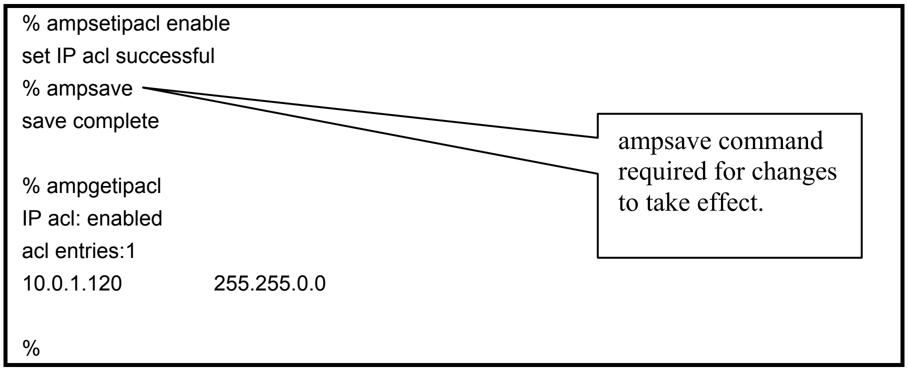
ampsave command required for changes to take effect.

ampsetipacl

Either turns on or turns off access-based on-source IP address.

Usage: ampsetipacl <enable/disable>

- **Enable**: turns on ip acl
- **Disable**: turns off ip acl



```
% ampsetipacl enable
set IP acl successful
% ampsave
save complete

% ampgetipacl
IP acl: enabled
acl entries:1
10.0.1.120            255.255.0.0

%
```

ampsave command required for changes to take effect.

amprmipacl

Removes an IP address from the IP ACL list.

Usage: amprmipacl <ip_address> or amprmipacl <all>

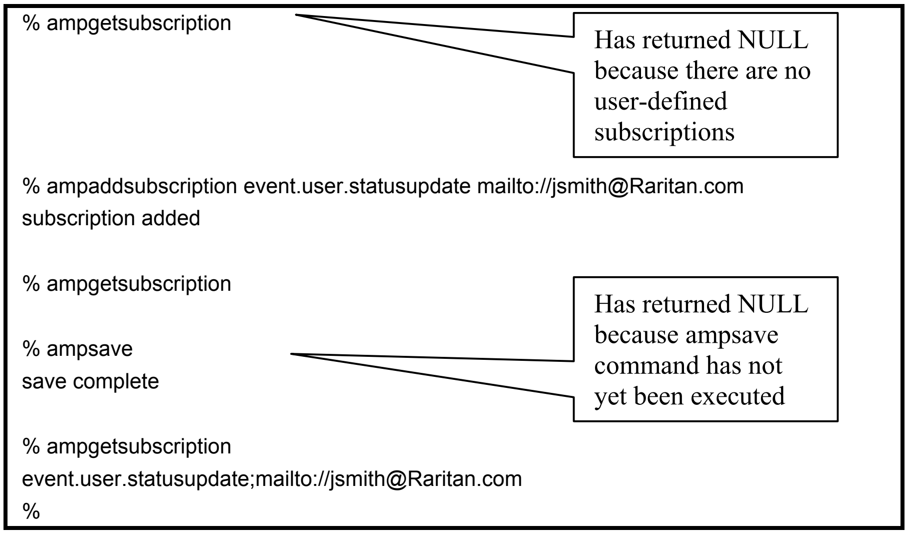
- **ip_address**: ip address to be removed from the list
- **All**: remove all the ip addresses from the list

ampgetsubscription

Returns a string listing all user-defined subscriptions.

ampaddsubscription <event> <url>

Creates a subscription for the URL to the event specified. The URL encapsulates the service to be used for notification, and any parameters required by that service.



```
% ampgetsubscription

% ampaddsubscription event.user.statusupdate mailto://jsmith@Raritan.com
subscription added

% ampgetsubscription

% ampsave
save complete

% ampgetsubscription
event.user.statusupdate;mailto://jsmith@Raritan.com
%
```

Has returned NULL because there are no user-defined subscriptions

Has returned NULL because ampsave command has not yet been executed

amprmsubscription <event> <url>

Deletes the subscription.

ampping <ip_address>

Returns true (1) if a response from the IP address is received within the ping timeout, false (0) if not.

ampread <timeout> <terminator> <port>

Returns a string representing the next chunk of console data up to and including the terminator or the end of the data stream when a timeout occurs (in seconds), whichever comes first.

> ***Note:*** *Issue an ampclear command to clear old data before starting any new operations. The terminator can be a multi-character (up to 32) string specified in quotes.*

ampwrite <string> <port>

Writes the string to the console (the script must first lock the write access using *amplock*).

ampclear <port>

Clears the buffer from which *ampread* and *ampexec* read.

ampexec <string> <timeout> <terminator> <port> <number>

A convenience routine: writes the string to the console and then reads the response until the terminator OR timeout occurs. A typical terminator can be the system prompt to indicate the completion of an execution. The response is returned as a string.

ampdelay <seconds>

Pauses the TCL script a number of seconds equal to the integer argument.

amptriggerevent <event> <message>

Generates an event with the appropriate associated message. The event may not begin with the amp prefix. Events that begin with the amp prefix may only be generated by the AMP and not by a user created script or interactively.

amplock <port>

Gets write access to the console and locks it.

ampunlock <port>

Unlocks the console regardless of who has write access to the console. The script must be running as an Administrator to succeed.

amplisten

Reads the client input waiting to be read by the interpreter, calls *exec* on the input, and returns the resulting string to the client.

ampsave

Saves any changes to the system configuration. In order for changes (network) to take effect, the system will be rebooted.

ampreload

Reloads the previous configuration before changes were made.

amppermission [on/off]

In order for observers and operators to access a user programmed TCL Script Server, the script must issue amppermssion off to allow the access.

> ***Note:*** *if the permission is left off without restoring security, non-administrator users may gain privilege access through TCL scripting shell. A reset to the TCL interpreter or the device will reset the permission to on and prevent observer and operator type users from accessing TCL interpreter.*

ampresponse

Flushes the output buffer to the client who has last requested the data.

ampopensocket [ip_address port_number]

Opens a socket to a specific port on a device with a given IP address. The command returns a unique socket ID. If the command fails or the arguments are improperly formatted, the command will return an error message. The IP address must be specified in "dot notation." (i.e., 207.25.71.20)

Command Return	Messages
0 (TCL_OK)	• Unique socket ID returned
1 (TCL_ERROR)	• wrong # args: should be ampopensocket ipAddress port • invalid IP address %s • Invalid Port Number %s, values allowed between [0-65535] • Invalid Port Number %s, only 16 bits digit allowed • open socket failed

ampwritesocket [socket_id message]

Sends a string to the socket represented by the socket ID. If the write fails or the arguments are invalid, the command will return an error with an error message.

Command Return	Messages
0 (TCL_OK)	• No message returned
1 (TCL_ERROR)	• wrong # args: should be ampwritesocket socketDescriptor message. Command failed • Invalid Socket Descriptor %s • write socket failed

ampclosesocket [socket_id]

Closes the socket represented by the socket ID. If the command fails or the arguments are invalid, the command will return an error with an error message.

Command Return	Messages
0 (TCL_OK)	• No message returned
1 (TCL_ERROR)	• wrong # args: should be ampclosesocket socketDescriptor • Invalid Socket Descriptor %s • close socket failed

ampreadsocket [socket_id length timeout]

A non-blocking call: reads from the socket represented by the socket ID until either the length or timeout is reached. Timeout is specified in microseconds; a timeout of zero indicates the socket will be polled and the results returned immediately. The command returns a buffer with the data read, and if the data available to read is less than the length requested, the command returns a buffer with the data read. If there is no data read or timeout occurs, the command returns an "OK" with an empty buffer. If the command fails or the arguments are invalid, the command will return an error with an error message.

Command Return	Messages
0 (TCL_OK)	• No data read • Actual data read • Timeout occurred
1 (TCL_ERROR)	• Command failed: "not enough memory" • Command failed: "Invalid Socket Descriptor OR read socket failed" • Arguments invalid: "wrong # args: should be ampreadsocket socketDescriptor messagelength timeout" • Arguments invalid: "Invalid Socket Descriptor %s" • Arguments invalid: "invalid length %s, only digits allowed" • Arguments invalid: "invalid timeout %s, only digits allowed"

Note: *Issue an* ***ampclear*** *command to clear old data before starting any new operations.*

ampgetmacaddress

Returns the Ethernet MAC address of the unit.

ampsetconfig datacom checkparity <value>

Enables the parity bit if value is 1; disables the parity bit if value is 0.

An administrator/operator user will not have write access in a console window when a TCL script is running and has executed amplock for that port. Issuing an F8 or "Get Write Access" will **not** result in getting writing access.

In order for the administrator/operator user to get write access, one of the following methods must be used.

1. Administrator issues a *Reset* to the TCL interpreter by pressing the [**Reset**] button in the Script shell window.
2. Operator/Observers execute the [**Reset**] button in the script shell window if the TCL script running has the *amppermission* off command built into the script.
3. A TCL script may be designed to accept input from users (administrators and operator/observers if *amppermission* off has been performed by the script) and based on the input, may either exit the execution of the script or release the lock and wait for further input before getting the lock and continuing execution of the script. In this case, the Administrator/Operator must be aware of the inputs that may be sent to the running TCL script and type the appropriate word/number in the Script shell window to gain write access to the console and relinquish write access if appropriate.

Basic TCL Server Example

```
while (1) {
        amppermission off
        set s ""
        set s [amplisten]
        if {[string length $s] !=0} {
                puts $s
                ampresponse
        }
        if {[string length $s] == 5} {
                amppermision on
                break
        }
}
```

Script Function Description:

This TCL Server will echo back any strings from any client who connects to the TCL interpreter through the TCL Scripting Window.

Key programming points:

amplisten checks to see if there is a new command from any client.

Puts will push back the response to the output buffer.

ampresponse will push the previous response back to the EXACT client who sent the command.

Due to security, the TCL scripting feature is not normally accessible by Operators or Observers. However, for the TCL Server to be general, Operators and Observers need access to the TCL scripting feature. *amppermission* allows such communication. Also, when reset, *amppersmission* will, by default, be on. (Hence, only explicit "unlocks" by the Administrator are allowed.)

Basic CPU Utilization Monitoring Example

```
#Description: This TCL script checks the CPU utilization for each port connected
#                    to a HP-UX server. It alerts the subscribed user that the threshold
#                    limit has reached through e-mail notification. This TCL script uses
#                    vmstat to find out the CPU usage of the user process and checks with
#                    given threshold limit. During the process user can input the threshold
#                    limit or the interval through the following commands:
#                    THR <threshold> - Input of threshold
#                    INTR <interval> - Interval at which the TCL script has to do checking.
#                    To quit out of the script type QUIT and hit enter

#Default threshold is 2 %
set thr 2
#Default interval is 10 seconds
set intr 10

#change this mail id to your own
set mailid "mailto://xyz@xyz.com"

#initalize events
proc initEvents { } {
        global mailid
        #add subscriptions to events.
        ampaddsubscription event.alarm.cpu  $mailid
        #save subscription
        ampsave
}

#delete events. Called during QUIT
proc delEvents { } {
        global mailid
        #delete subscriptions to events
        amprmsubscription event.alarm.cpu $mailid
        #save configuration
        ampsave
}

#Retrive cpu utilization for user process,
#check if it has reached the threshold and trigger an event

proc cpuUtil { port } {
        global thr


        set us 0
        set sy 0
        set id 0

        #lock the console
        amplock $port

        #clear any previous data in the read buffer
        ampclear $port

        #write to the console
        ampwrite "vmstat -n\n" $port

        #ignore the first 8 lines to read the cpu usage params.
          for  {set i  0 }  {$i < 9} {incr i +1} {
               set cpu [ampread 1 "\n" $port]
          }

        #unlock the console
         ampunlock $port

        #set the user's cpu usage
         scan $cpu "%d %d %d" us sy id

        #Trigger event if user process utilization has gone beyond threshold
        if { $us > $thr } {
                amptriggerevent event.alarm.cpu "User Process CPU utilization goes beyond threshold $thr on
port$port"
        }
}

#listen to command inputs from user - QUIT/THR/INTR
proc ListenCmds { } {

        global thr incr

        set cmd [amplisten]
         if { [string compare $cmd "QUIT"] == 0 } {
                puts "Quitting"
                ampresponse
                return 1
        } elseif  [string match THR* $cmd] {
                scan $cmd "%s %d" c thr
                puts "Threshold is $thr"
                ampresponse
        } elseif  [string match INTR* $cmd] {
                scan $cmd "%s %d" c intr
                puts "Interval now is $intr"
```

```
                  ampresponse
         }
         ampresponse
}

set ports 1
set noOfPorts 2

initEvents

#Main loop starts here...

while { 1>0 } {
         cpuUtil $ports
         ampdelay $intr
         set rval [ListenCmds]
         if { $rval == 1} {
            delEvents
            unset $ports
            unset $noOfPorts
            unset $thr
            unset $intr
            unset $mailid
            break
         }
         incr  ports 1
         if { $ports > $noOfPorts } {
             set ports 1
         }
}
```

Script Function Description:

It is required to monitor CPU usage of user process running on several HP-UX machines through RS232 console connections. This TCL script will monitor the use through the well-known *vmstat* functionality given by HP-UX. When CPU utilization has surpassed the given limit, this script will trigger an event that notifies the subscribed users via e-mail. The user is allowed to input the threshold limit or the frequency through his/her own commands (This example use THR and INTR respectively).

Key programming points:

- Use *ampclear* to remove all history information for a port
- Use *ampread* with "\n" as terminator since the script has to read each line to find out the user process utilization that is on the 10th line.
- Use *amptriggerevent* to trigger a user-defined event *event.alarm.cpu*. The event may not begin with "amp," as that namespace is reserved for system-generated events. A user may subscribe to events related only to one server by designating which server they are interested in. For example, a user may subscribe to *event.alarm.cpu.2* to receive a notification when cpu utilization on server 2 is measuring above 10 %.
- The event will be sent only if the user who requests the notification is properly subscribed in the Notification subscription list.

- In the subscription option, the User must type in the EXACT event shown previously: *event.alarm.cpu.*
- Delay 10 seconds so the script does not overflow the e-mail system. This is configurable using the command **INTR** while this script is running using the amplisten facility.

TCL Server designed to interact with a TCL user

Allow observers and operators to issue commands to this TCL Service

Clear old data in the TCL internal buffer so that there is no confusion when data is gathered upon user request.

Lock the console for this TCL service to use.

Initializing variables

```
amppermission off
amplock 1
ampclear 1
set val1 0.0
set val2 0.0
set val3 0.0
while { 1 } {
        set s [amplisten]
        if {[string length $s] > 0}{
                if {$s == “DATA”}{
                        puts [format “Mach Value = %f; Voltage Value = %f;  Current
Value = %f.” $val1 $val2 $val3]
                        ampresponse
                } elseif {$s == “READ1”}{
                        set readTarget [ampexec “READ MACH” 5 “##$$” 1]
                        scan readTarget “MACH Val %f” val1
                        puts “READ1 COMPLETED”
                        ampresponse
                } elseif {$s == “READ2”}{
                         set readTarget [ampexec “READ VOLTAGE” 5 “##$$” 1]
                        scan readTarget “VOLT Val %f” val2
                        puts “READ2 COMPLETED”
                        ampresponse
                } elseif {$s == “READ3”}{
                         set readTarget [ampexec “READ CURRENT” 5 “##$$” 1]
                        scan readTarget “AMP Val %f” val3
                        puts “READ3 COMPLETED”
                        ampresponse
                } elseif {$s == “CONSOLE”}{
                        ampunlock 1
                   puts “Lock Released. Waiting for DONECONSOLE input”
                        ampresponse
                        while { [amplisten] != “DONECONSOLE” } {ampdelay 10}
                        amplock 1
                        puts “Lock Acquired”
                        ampresponse
                } elseif {$s == “QUIT”}{
                        amppermission on
                        ampunlock 1
                        puts “Exiting script”
```

Read in user command.

If user input is “DATA” , format the data associated with variables val1, val2, val3 in a string and respond back the user.

If the reader requests the TCL service to re-acquire one of the three values, the TCL service will issue the command to the target and read in the value. It will also respond back to the requester with a message, “COMPLETE”

If the user input is “CONSOLE” relinquish the write console access lock and respond with content “Console Lock released and waiting for input DONECONSOLE”.

If user input is QUIT lock up permission on TCL script, unlock write access and exit script.

```
                        ampresponse
                        break
                    } else {
puts “A TCL script is running.\rInputs accepted are DATA/READ1/READ2/READ3/CONSOLE/QUIT"
                        ampresponse
                    }
                }
            }
```

Input received is not as per expectation. Remind user what the expected inputs are.

Appendix J: Troubleshooting

Problems and Suggested Solutions

Page Access

PROBLEM	SOLUTION
Server Unreachable	If a unit appears to be unreachable by a given browser, please run through the following troubleshooting list: • Verify that the unit is powered on. • Verify that the unit is properly connected to a network. • Ping the unit from a computer on the same network to ensure that network communication with the unit occurs. • Should the *ping* fail, contact your network administrator. There may be a problem with your network configuration that is preventing communication with the unit. • Should the *ping* succeed, consult the following topics.
DNS Error/Server Unreachable	When attempting to connect to the Dominion SX URL using Microsoft IE, a web page may appear indicating a DNS error and reading that the server is unreachable. • Remove any installed Dominion SX certificates and restart the browser.
Unsupported Encryption	The unit supports only 128-bit SSL encryption. • In Internet Explorer, view **Help→About Internet Explorer** and determine the maximum SSL bit strength for the browser. If it is not at the desired strength, it is recommended that the browser be upgraded. • In Netscape, view **Communicator→Tools→Security Info→SSL v3.0 Configuration** and ensure that 128-bit SSL is supported
Number of Users Exceeded	The unit has a security measure that allows only a specific number of login pages to be authenticated at any given time. Should this number be reached when attempting to login to the unit, a pop-up window will be displayed indicating that the maximum number of users is exceeded. This is normal behavior for the unit. • Wait for a few minutes and attempt to login again. Note that you may need to refresh or <**Shift+Refresh**> your browser to successfully log on.

Firewall

PROBLEM	SOLUTION
Unable to Access the Web Page	Firewalls must allow access on port 80 and 443 in order for the unit to operate through a firewall. • Contact your system administrator and request port 80 and 443 access.
Login Failure	Firewalls must be configured to allow connections using the Dominion SX configurable port network parameter (Default 23). If the firewall does not allow these connections, the applet indicates that the login has failed. • Contact your system administrator and request connections be allowed on the configurable port.
SSL Security Warnings	The unit embeds its Internet Address (IP) in its SSL certificate. Should the firewall perform Network Address Translation (NAT), the SSL certificate will not match the IP address recognized by the browser generating a security warning. • This is normal behavior. • The warning message does not affect operation of the unit.

Login

PROBLEM	SOLUTION
Login Failure	To provide additional security, the unit login screen expires after 20 minutes; therefore, all login attempts after this time period will fail. Reload the browser to reset this timer. • Hold down the <**Shift**> key and click on the [**Reload**] button in your browser. This will refresh the login screen from the unit itself (not from a local cache) and allow login to the unit.
RADIUS Users	The unit can be configured to support RADIUS authentication. Any user not defined to be a local user is considered to be a RADIUS user when RADIUS is enabled. Should the RADIUS server not be reachable for user authentication for any reason, the unit will not allow the user to log on until the unit receives the result of the authentication request from the RADIUS server. • Authentication may take up to 40 seconds. Please be patient and wait until either the user successfully logs in, or the Authentication Denied message is displayed.

Port Access

PROBLEM	SOLUTION
Port Access Refresh	The unit does not automatically refresh the Port Access List. It is refreshed only when the user clicks on the [**Port Access**] button, therefore, it is possible that a user will have permissions revoked and these changes will not be visible on the port access screen until the [**Port Access**] button is activated. • A window will appear indicating that permission is no longer allowed to this port. • Whenever possible, it is recommended that Administrators not change port access rights to a user who is already logged in to the unit.

Upgrade

PROBLEM	SOLUTION
FTP - Server Unreachable	Should the FTP server specified in the upgrade panel be unreachable or incorrect, the upgrade process will halt until a response is received from the FTP server or until a timeout occurs. • Please wait and allow the FTP Server Unreachable message to appear.
FTP - File Not Found	The unit requires a package of upgrade files to be in the directory specified by the upgrade path. This package must have all included files and an **upgrade.cnf** file. Should this file not exist, or if the contents of the file are not in the indicated places, the File Not Found message will appear. • Verify that the upgrade package is in the correct directory and confirm the upgrade path and IP address of the FTP server. • If the upgrade still fails, reinstall the upgrade package and begin again.

Modem

PROBLEM	SOLUTION
Login Failure	The unit supports Web-browser access through the modem at connection speeds of 28.8K bps or greater. Should the baud rate be insufficient, the user will be unable to log on to the unit via the modem. • 28.8K bps minimum connection speed is required for browser-based modem authentications (login).

Appendix K: Technical FAQs

QUESTION	ANSWER
What are the browsers (and versions) supported?	Netscape 4.7 or greater (but not 6.0), or Internet Explorer 5.0 with Java VM 5.0 or greater.
Is the status of the unit limited by the status of the device or equipment to which it is attached (i.e. Server, router, firewall, load balancer, or other network device)?	No, because the unit is a totally "out of band" solution that runs on its own dedicated microprocessor. Even if the target devices to which the Dominion SX is attached are turned off, you will still be able to access the unit.
Can I reset the unit without losing my settings?	There are two ways to perform a basic reset without losing your user-defined settings: (1) Click on the [**Reset**] button in the left panel of the Main Menu screen, or (2) Switch off power from the unit, and then switch the power back on. Using either of these two methods, the previously established IP address and all other user-defined settings will be preserved. **Important:** Performing a "soft" reset as described above will log all users off the unit. Users will be able to access the unit again once the unit's boot sequence is complete.
How do I reset the unit back to its factory-default settings?	To perform a factory default reset, which will erase all custom settings and re-establish the factory default settings, attach the "factory reset fixture" to the unit's 9-pin serial port (located on the back of the chassis), turn the unit off, wait a few seconds, turn the unit back on, and allow the unit to complete the factory default reset sequence. This will take about 60 seconds. The factory default reset sequence consists of the following: A solid green light for about 5 seconds, then no light for about 15-20 seconds, then another solid green light for about 5 seconds and then 3 green flashes (about 1 second each). The total time for this sequence is generally about 40 seconds. The IP address for the unit will be reset to **192.0.0.192**. **Important:** Performing a "hard" reset as described above will log all users off the unit. Users will not be able to access the unit again until the unit is re-configured.
Does the unit need to be on the same physical LAN as the client_host during installation and setup?	Yes, the unit must be on the same physical LAN as the client_host during installation and setup. There should be no intermediate IP routers between the unit and the client_host during this stage.
Once the physical installation is complete and my *ping* query elicits a response from the unit, how do I initially access the unit and begin the process to customize the unit?	Open a supported network-enabled web browser (Netscape or Internet Explorer), type "**192.0.0.192**" in the address line, and press the <**Enter**> key. You will be presented with the start-up screen for the unit, and prompted through the entire set-up process. Once setup is complete, you will log off the console, and use the IP address you assigned during set-up to re-access the unit.
Once I have assigned the unit a unique IP address, how do I access the unit in the future?	Open your supported Web browser (Netscape or Internet Explorer), enter the IP address you have assigned to that unit into the Address field and press the <**Enter**> key. The login/password screen for the unit will appear.

QUESTION	ANSWER
Can I assign specific port access to a specific user?	Yes, but only if the user is NOT an Administrator. Administrator will always have access to all the ports.
Sometimes when I try to log on, I see a message that states my "login is incorrect" even though I am sure I am entering the correct User Name and Password. Why is this?	There is a session-specific ID that is sent out each time you login to the unit. This ID has a time-out feature, so if you do not login to the unit before the time-out occurs, then the session ID becomes invalid. Performing a **<Shift-Reload>** refreshes the page from the unit, and not from the now-expired cache. Similarly, you may close the current browser, open a new browser, and login again. This provides an additional security feature so that no one can recall information stored in cache to access the unit.
What should I do if the browser returns with the message that the device timed out?	Try reloading using <**Shift-Reload**>. If this does not work, check your network connections and network status. You may also want to **ping** the console or perform a **route print** (as described in other FAQs) to ensure that proper network communication is occurring. If a web page does not load to your browser, there are probably network difficulties that are preventing the page from loading.
How do I upgrade the Dominion SX software?	Software upgrades are easy to perform on the unit. In the Main Menu screen, click "**Upgrade**" and then follow the prompts. You will need to enter the "**IP Address**" and "**File Path**" to perform the upgrade.
What if I forget or lose my password?	Any Administrator can assign any user (Administrator, Operator, or Observer) a new password if it is forgotten or lost. **Important:** If there is only one Administrator, and he/she forgets his/her password, then the unit must be factory-reset and re-configured from the initial set-up screen. In this case, all saved values would be lost.
Is there any way for me to optimize the performance of Microsoft Internet Explorer if it is my preferred Web browser?	To improve the performance of Microsoft Internet Explorer when accessing the console, disable **JIT compiler for virtual machine enabled, Java logging enabled,** and **Java console enabled.** Select **Tools→Internet Options→Advanced** from the main menu. Scroll through the list until you see the above items and make sure that they are disabled.
I am having trouble using the 128-bit SSL on the unit. Do you know what might be causing this?	It is likely that the browser you are using does not support 128-bit SSL encryption. Depending on the version of browser installed on your workstation, you may need to either (1) install a 128-bit SSL compatible version of your browser, or (2) upgrade your current browser to be 128-bit SSL compatible. Refer to the browser manufacturer's web site for instructions.
Sometimes when I am trying to dial-in to the unit or when I am connected to the unit via the modem and I lose my connection, if I immediately try to dial-in again, I can't get connected. However, if I wait for a few minutes, the dial-in is successful. Why is this?	In this case, "a few minutes" is the key: The modem has a pre-defined "clean up time" after every connection ends. It does not matter whether the connection is dropped, severed, or intentionally closed by the user. The modem will take about one minute to re-cycle itself to be ready for the next incoming call.