Using Cisco Transport Controller

This chapter explains how to connect workstations to the Cisco ONS 15327 and use the Cisco Transport Controller (CTC) software to operate the ONS 15327. This includes understanding the CTC views; setting up basic ONS 15327 information, such as security, timing, and protection groups; viewing ONS 15327 data, such as alarms, conditions, and events; and customizing information, such alarm profiles, external alarms and controls, and network maps.

3.1 Overview

CTC is a Java application that is downloaded from the Cross-Connect, Timing and Control (XTC) card to your workstation when you connect to the ONS 15327. CTC allows you to perform all operations, administration, maintenance, and provisioning (OAM&P) tasks for ONS 15327 using Netscape or Microsoft® Internet Explorer. You can also use TL1 commands to communicate with the ONS 15327 through VT100 terminals, VT100 emulation software, or you can Telnet to the node using TL1 port 2361.

To use CTC, your workstation needs an appropriate version of Netscape, Internet Explorer and the Java Runtime Environment (JRE) and Java plug-ins. Netscape and the required Java files are provided on the Cisco ONS 15327 Software CD. The “Installing CTC” section on page 3-2 explains how to install Netscape and the Java files.

The first time you connect to an ONS 15327, a CTC launcher applet is downloaded from the ONS 15327 XTC card to your workstation. The launcher verifies that the workstation has a CTC version that matches the version on the XTC. If the workstation does not have CTC, or if the version on the XTC is a later release, the launcher downloads the CTC application to the temporary directory designated by your workstation’s operating system and then runs the application.

Note Always point your browser to the node running the most recent release (version) of CTC. CTC is backward compatible but not forward compatible.

3.2 Installing CTC

This section explains how to install CTC on PCs and Solaris workstations.

3.2.1 Preparing PCs to Run CTC

The following minimum requirements are needed to run CTC from personal computers:

- Pentium or equivalent processor
- 128 megabytes of RAM
- LAN connection (to access the ONS 15327 through a LAN)
- Windows 95, Windows 98, Windows NT, or Windows 2000
- Any one of the following:
  - Netscape 4.73 or higher, or
  - Internet Explorer 4.0 (service pack 2) or higher

  Netscape is included on the Cisco ONS 15327 Software CD. Internet Explorer 5.0 is included with the Windows 98 second edition.
- Java Runtime Environment 1.2.2_005 or later with Java 1.2.2 plug-in (JRE 1.3.0 is included on the Cisco ONS 15327 Software CD)
- User-supplied category 5 cable with RJ-45 connectors on each end

Note Your mouse pointer scheme should be set to Windows Standard (Windows 95/98) or None (Windows NT). To check the settings, choose **Settings > Control Panel** from the Windows Start menu. Double-click the Mouse option. From the **Pointers** tab of the Mouse Properties dialog box, select the Windows Standard (or "none" for NT) mouse scheme. Click **OK**.

Procedure: Install Netscape (Windows)

If a web browser is not installed, install Netscape or Microsoft Internet Explorer. Netscape is provided on the Cisco ONS 15327 Software CD. To install it:

Step 1 Insert the Cisco ONS 15327 Software CD into your PC's CD drive.

Step 2 In the Windows/Netscape directory, double-click **cc32e473.exe** and follow the on-screen instructions.

Procedure: Install the Java Runtime Environment and Java Plug-in (Windows)

Step 1 Insert the ONS 15327 Software CD into your PC's CD drive.

Step 2 In the Windows/Jre1.3.0 folder, double-click **J2re1_3_0-win.exe** and follow the on-screen instructions.

CTC software requires JRE 1.2.2_005 or later.

Step 3 In the Windows folder, double-click **JavaPolicyInstall.exe**.

A message displays on the DOS screen stating the installation was successful.

Step 4 Install the JRE 1.3.0 plug-in:

(a) From the Windows Start menu, choose **Settings** > **Control Panel** > **Java Plug-in**.

The Java Plug-in Control Panel is now in the Windows Control Panel. Versions earlier than 1.3.0 were accessed by clicking **Programs** > **Java Plug-in.**

(b) On the Java Plug-in Properties dialog box, click the **Advanced** tab.

(c) Under Java Run Time Environment, choose **JRE 1.3.0**.

(d) Click **Apply**. Close the Java Plug-in Properties dialog box.

Note The JRE and the Java Plug-in are combined into a single bundle on the software CD.

3.2.2 Preparing Solaris Workstations to Run CTC

To install CTC Release 2.3 software on Solaris workstations, the workstation must have Solaris 2.6 or 2.7 installed with a minimum 128 megabytes of RAM. Use the following procedures to install Netscape and the appropriate Java files on the Solaris workstation.

Note Solaris installation instructions use "CD/" instead of an actual CD-ROM path. Remember to substitute the actual path to your CD-ROM drive.

Procedure: Extracting the CTC Version 2.3 Files for Solaris

To install Netscape, you need gzip. If gzip is not installed:

Step 1 Insert the ONS 15327 Software CD into your CD drive. If the CD directory does not open automatically, open it.

Step 2 Extract the files from the CD/Solaris/files.tar archive to a temporary directory on your hard drive by typing:

```
mkdir /tmp/ctctmp
cd /tmp/ctctmp
tar -xvf /CD/solaris/files.tar
```

Procedure: Install Netscape (Solaris)

If Netscape 4.61 or later is not installed on the workstation, install it from the Cisco ONS 15327 System Software Version 1.0.1 CD, which ships with Netscape 4.76:

Step 1 Insert the Cisco ONS 15327 System Software Version 1.0.1 CD into your CD-ROM drive. If the CD directory does not open automatically, open it.

Step 2 Extract the files from the CD/Solaris/files.tar archive (if not extracted in a previous procedure) to a temporary directory on your hard drive by typing:

```
cd /tmp/ctctmp/Solaris/Netscape
tar -vxf communicator-v476-us.sparc-sun-solaris2.5.1.tar
cd communicator-v476.sparc-sun-solaris2.5.1
```

Step 3 If gzip (required) is not installed, install it now by typing:

```
mkdir -p /usr/local/bin
cp /tmp/ctctmp/Solaris/Netscape/gzip /usr/local/bin
```

Step 4 Follow the instructions in: /var/tmp/Solaris/Netscape/navigator-v476.sparc-sun-solaris2.5.1/README.install.

It may be necessary to become root (by typing `su root`) to install Netscape in the /opt/NSCPcom/ directory as recommended.

When prompted for the Netscape software location, type:

```
/opt/NSCPcom
```

Netscape is installed in the [/opt/netscape]: /opt/NSCPcom directory.

You must ensure that `/usr/local/bin` and `/opt/NSCPcom` are in the following search path:

csh: `% set path = ( /usr/local/bin /opt/NSCPcom $path )`
sh or ksh: `# PATH=/usr/local/bin:/opt/NSCPcom:$PATH`
`# export PATH`

Procedure: Install the Java Files (Solaris)

If JRE 1.3.0_01 with Java 1.3 plug-in is not installed on the workstation, complete Steps 1 – 8 to install it from the Cisco ONS 15327 System Software Version 1.0.1 CD. If JRE 1.3.0_01 with 1.3 plug-in is installed, skip to Step 10.

Step 1 Insert the Cisco ONS 15327 System Software Version 1.0.1 CD into your CD-ROM drive. If the directory of the CD does not open automatically, open it.

Step 2 Extract the files from the CD/Solaris/files.tar archive (if not extracted in a previous procedure) to a temporary directory on your hard drive by typing:

```
mkdir /tmp/ctctmp
cd /tmp/ctctmp
tar -xvf /CD/solaris/files.tar
```

Step 3 Go to the /tmp/ctctmp/Solaris/Jre1.3.0_01/ directory and unpack the appropriate tar archive:

- For Solaris 2.6, unpack the *.6.tar archive
- For Solaris 2.7, unpack the *.7.tar archive
- For Solaris 2.8, unpack the *.8.tar archive

The /tmp/ctctmp/Solaris/Jre1.3.0_01/ directory contains the Java Runtime for Solaris. The directory also contains the necessary patch files for Solaris 2.6, 2.7, and 2.8. Determine the release level of your operating system by typing:

```
showrev -p
```

Step 4 Un-compress each patch file by typing:

```
su - root
cd /tmp/ctctmp/Solaris/Jre1.3.0_01
tar -xvf j2sdk1_3_0-patches_solsparc-5.6.tar# or ...5.7 or 5.8.tar
cd 5.6 or 5.7 or 5.8
uncompress *.z
```

Step 5 For each un-compressed tar file, untar the archive, remove the tar file, and install the patch file. For example:

```
tar -xvf 105181-20.tar
```

Step 6 Remove the intermediate tar files, for example:

```
rm *.z 10.tar
```

Do not remove j2sdk1_3_0-patches-solsparc-5.n.tar at this point.

Step 7 Add each patch (as root) using /usr/sbin/patchadd, for example:

```
/usr/sbin/patchadd 105181-11
```

You can add multiple patches at the same time, for example (for Solaris 5.6):

```
cd /tmp/ctctmp/Solaris/Jre1.3.0_01/
patchadd -M . 105181-20 105210-27 105284-33 105568-17
patchadd -M . 105591-09 105633-38 105669-10
patchadd -M . 106040-13 106125-09 106409-01
patchadd -M . 106841-01 106842-09 107733-06 108091-03
```

Note Refer to http://java.sun.com/products/jdk/1.3/install-solaris-patches.html for more information about installing Solaris patches.

Step 8 When the patches are all installed, install the JRE itself by typing:

```
cd /opt
/tmp/ctctmp/Solaris.Jre1.3.0_01/j2re-1_3_0_01-solsparc.bin
```

This installs the JRE in the /opt/j2re1_3_0_01 directory.

Step 9 Install the Java 1.3 plug-in by typing:

```
su - root
cd /tmp/ctctmp/Solaris/Jre1.3.0
tar -xvf plugin-13-sparc.tar
/usr/sbin/pkgadd -d . SUNWj2pi
```

This installs javaplugin.so into the /opt/NSCPcom/plugins directory. If Netscape was installed under /opt/NSCPcom, the plug-in is installed in the Netscape directory. Otherwise, copy javaplugin.so to <Netscape-directory>/plugins. For more information about installing the JRE, see:

```
http://java.sun.com/products/jdk/1.3/runtime_solaris.html
```

Step 10 If the Java plug-in is not in the default location on your workstation, set the environment variable NPX_PLUGIN_PATH to the location of the plug-in for each user and include /opt/j2re1_3_0_01/plugin/sparc/ns4 as its first element (and the only JRE-related element). Set the environment by typing:

csh: `% setenv NPX_PLUGIN_PATH/opt/j2re1_3_0_01/plugin/sparc/ns4:/opt/NSCPcom/plugins`

sh or ksh: `# NPX_PLUGIN_PATH=/opt/j2re1_3_0_01/plugin/sparc/ns4:/opt/NSCPcom/plugins`

Step 11 Ensure that the xterm binary is in your search path by typing:

csh: `% set path = ( /usr/openwin/bin $path ) # export PATH`
sh or ksh: `# PATH=/usr/openwin/bin:$PATH # export PATH`

Step 12 Configure the plug-in to use the proper JRE:

(a) Log out of root.

(b) Run the ControlPanel command located in the /opt/j2re1_3_0_01/bin directory for each user.

(c) In the ControlPanel application, click **Advanced.**

(d) If JRE 1.3.0_01 appears in the list of available JREs, select it.

(e) If JRE 1.3.0_01 does not appear in the list, select Other and place your cursor in front of the Path dialog box and enter the path for the JRE (/opt/J2re1_3_0_01).

(f) Click **Apply.**

Note To bring up the Java console for the plug-in each time you browse to a node, click **Basic**, check the Show Java Control checkbox, and then click **Apply**. This may be useful when troubleshooting.

Procedure: Enable Applet Security for CTC

Step 1 Modify the java.policy file to allow the CTC launcher to write to the workstation's hard drive:

(a) Exit Netscape if a Netscape session is running.

(b) Modify java.policy:

- To enable the applet for all users, copy the lines from: /CD/Cisco15327/LAUNCHER.policy to /opt/j2re1_3_0_01/lib/security/java.policy.

Otherwise:

- If your home directory has a .java.policy file, copy the lines from /CD/Cisco15327/LAUNCHER.policy to that file.
- If your home directory does not have a .java.policy file, copy the /CD/Cisco15327/LAUNCHER.policy file to your home directory and rename it .java.policy.

Note The per-user .java.policy has a leading period (.) while the system-wide file does not.

Step 2 Use Netscape to launch and run CTC. (Before launching Netscape, make sure to put /opt/j2re1_3_0_01/bin in your path.)

Step 3 Clean up the temporary files by typing:

```
cd /tmp/ctctmp
rm -fr Solaris
```

Step 4 Type `eject cdrom` to remove the CTC CD from your CD-ROM drive.

3.3 Connecting PCs to the ONS 15327

You can connect a PC to the ONS 15327 using the RJ-45 LAN port on the XTC. Each ONS 15327 has a unique Internet Protocol (IP) address that you use to access the ONS 15327. The initial IP address, 192.1.0.2, is a generic address for initial ONS 15327 access and configuration. This section describes how to connect to a single node using direct connection or over a LAN. For procedures that connect a node to a multiple-node network, see the "Setting Up General Network Information" section on page 3-29.

Note Do not use dual Network Interface cards (NICs) or an enabled NIC and dial-up adapter at the same time; this hinders communication between CTC and ONS 15327s.

3.3.1 Direct Connections

Use the following procedures to connect a PC running Windows 95, Windows 98, or Windows NT directly to an ONS 15327.

Procedure: Set Up a PC for Direct Connection

Step 1 From the Windows Start menu, choose **Settings** > **Control Panel**.

Step 2 On the Control Panel dialog box, click the **Network** icon.

Step 3 If you have Windows NT, do the following (shown in Figure 3-1):

(a) Click the **Protocols** tab.

(b) Select **TCP/IP Protocol**.

(c) Click **Properties**.

(d) Click the **WINS Address** tab.

(e) Check **Enable DNS for Windows Resolution**.

(f) Leave **Enable LMHOSTS Lookup** as found (checked or unchecked).

(g) Click **Apply** and click **OK**.

If you have Windows 95 or 98, do the following (shown in Figure 3-1):

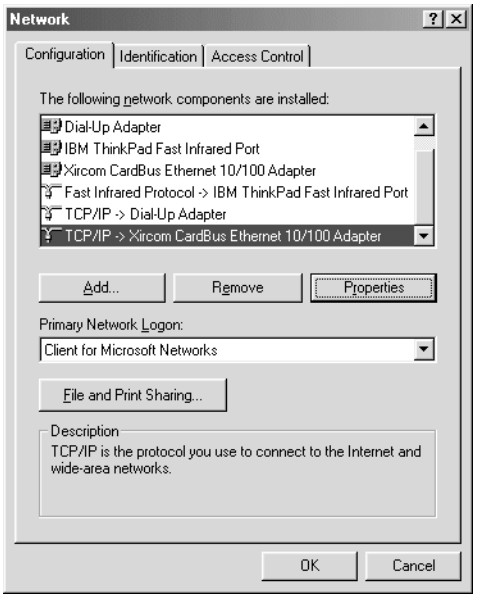
(a) Click the **Configuration** tab.

(b) Select TCP/IP Ethernet 10/100 Adapter.

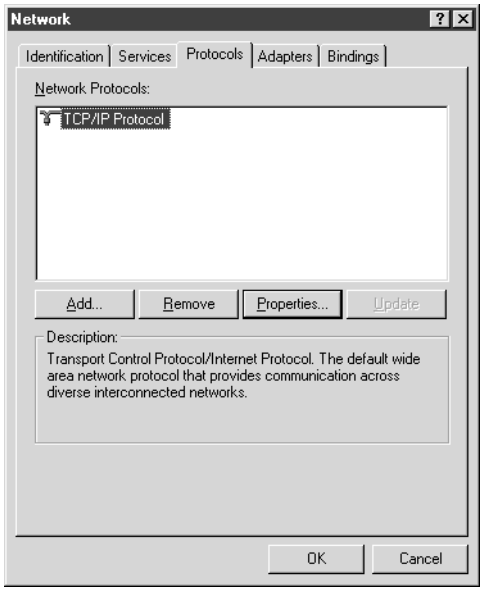
(c) Click **Properties**.

Figure 3-1 The Network dialog boxes for Windows 95/98 and Windows NT

Windows 95/98



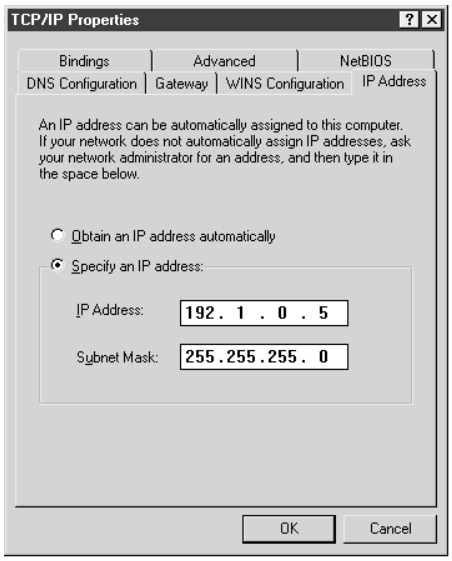
Windows NT



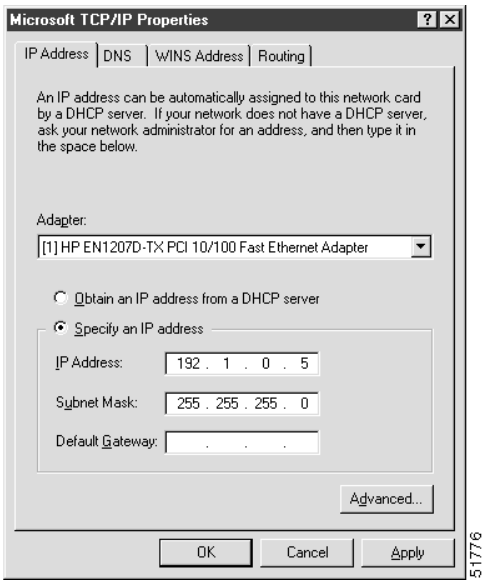
Step 4 Click the **IP Address** tab to view the IP Address information (Figure 3-2).

Figure 3-2 The TCP/IP Properties dialog box (IP Address tab)

Windows 95/98



Windows NT



Step 5 Click **Specify an IP address**.

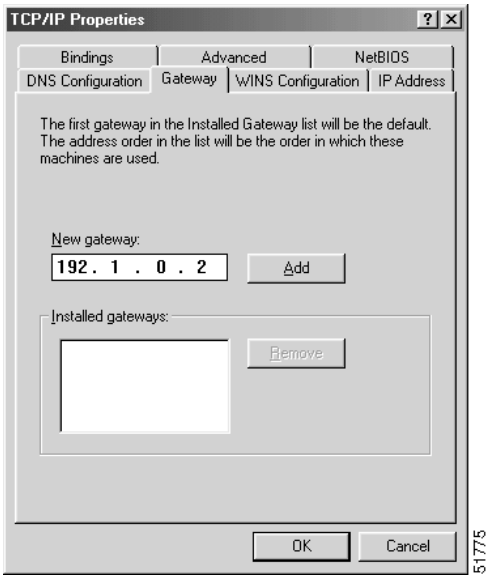
Step 6 In the IP Address field, enter an IP address that is on the same subnet but not identical to the ONS 15327 (in the example the new IP address is 192.1.0.5). The last three digits must be between 1 and 254.

Step 7 Type 255.255.255.0 in the Subnet Mask field.

Step 8 Click **OK**.

Step 9 (Windows 95/98) Click the **Gateway** tab (Figure 3-3).

Figure 3-3 The TCP/IP Properties dialog box – Gateway tab (Windows 95/98)



Step 10 This step defines the ONS 15327 as the default gateway for the PC. In the New Gateway field (Windows 95/98) or Default Gateway field (Windows NT), type the ONS 15327 IP address. For initial setup, this is the default address that ships with the ONS 15327 (192.1.0.2).

Step 11 Click **Apply** (Windows NT) or **Add** (Windows 95/98). For Windows 95/98, verify that the IP address displays in the Installed Gateways field.

Step 12 You will be prompted to restart your PC. Click **Yes**.

Step 13 Test the connection:

(a) Start Netscape or Windows Explorer.

(b) Enter the ONS 15327 IP address in the Web address (URL) field. Within 30 seconds, the CTC login screen displays. If it does not appear, continue with Steps c and d.

(c) From the Windows Start menu, choose MS-DOS prompt.

(d) At the DOS prompt, type `ping [ONS 15327 IP address]`, for example, `ping 192.1.0.2`. If your computer is connected to the ONS 15327, a "reply from [IP address]" message displays.

If your PC is not connected, a "Request timed out" message displays. If this occurs, check that the cables connecting the PC to the ONS 15327 are securely attached. Check the Link Status LED on the PC NIC. Repeat Steps 1 – 13, verifying IP and submask information.

3.3.2 LAN Connections

To access the ONS 15327 from a local area network (LAN):

- The ONS 15327 IP address must be changed to a LAN-compatible IP address.
- The ONS 15327 must be physically connected to the LAN (typically using a cross-over cable to a router, hub, or switch).
- If the PC Network settings were changed for direct access to the ONS 15327, change the settings back to LAN access. Usually this means setting the IP Address on the TCP/IP dialog box back to "Obtain an IP address automatically" (Figure 3-2). If your LAN requires that DNS or WINS is enabled, change the setting on the DNS Configuration or WINS Configuration tab of the TCP/IP dialog box.
- If your computer is connected to a proxy server, disable proxy service or add the ONS 15327 nodes as exceptions.

If these conditions have been met, to access the ONS 15327, start your web browser and type the ONS 15327 IP address in the URL field.

Procedure: Disable Proxy Service Using Windows with Internet Explorer

Step 1 From the Start menu, Choose **Settings** > **Control Panel**.

Step 2 In the Control Panel window, click **Internet Options**.

Step 3 From the Internet Properties dialog box, select the **Connections** tab and click **LAN Settings**.

Step 4 On the LAN Settings dialog box do one of the following:

- Deselect "Use a proxy server" to disable the service, or
- Leave "User a proxy server" selected and click **Advanced**. On the Proxy Setting dialog box under Exceptions, enter the IP addresses of ONS 15327 nodes that you will access. Separate each address with a semi colon. You can insert an asterisk for the host number to include all the ONS nodes on your network. Click **OK** to close each open dialog box.

Procedure: Disable Proxy Service Using Windows with Netscape

Step 1 Open Netscape.

Step 2 From the Edit menu, choose **Preferences.**

Step 3 In the Preferences dialog box under Category, select **Advanced** > **Proxies**.

Step 4 On the right side of the Preferences dialog box under Proxies, do one of the following:

- Select **Direct connection to the Internet** to bypass the proxy server, or

- Select **Manual proxy configuration** to add exceptions to the proxy server, then click **View.** On the Manual Proxy Configuration dialog box under Exceptions, enter the IP addresses of ONS 15327 nodes that you will access. Separate each address with a comma. Click **OK** to close each open dialog box.

3.3.3 Remote Access to the ONS 15327

You can remotely access an ONS 15327 node using a LAN modem. The LAN modem must be connected to the RJ-45 port on an XTC card. The LAN modem must be properly configured for use with the ONS 15327. When the modem is installed, dial-up access to the ONS 15327 is available using a PC modem.

3.3.4 Connecting to the ONS 15327 with TL1 Terminals

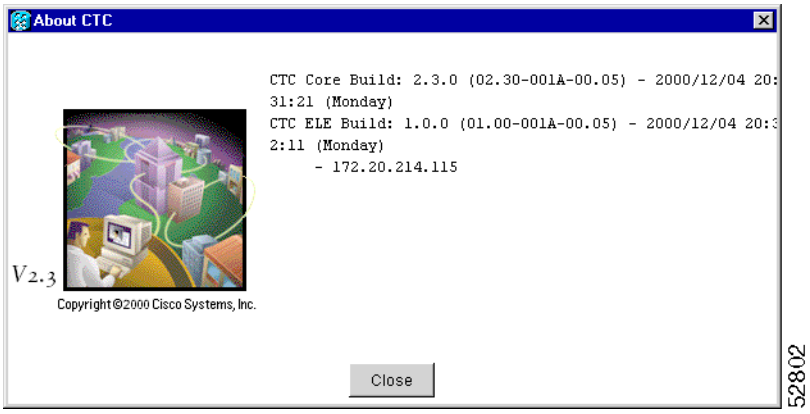
Although the ONS 15327 is designed to be used with CTC, you can communicate with the ONS 15327 using TL1 commands or Telnet to port 2361. To connect a TL1 terminal (or a PC running terminal emulation software) to the ONS 15327, use the craft port on the front panel of the XTC. For TL1 commands that can be used with the ONS 15327, see Chapter 10, “TL1 Reference.”

3.4 Logging into CTC

After you have installed the required files to run CTC and connected your workstation to the ONS 15327, you can log into CTC and begin setting up the ONS 15327 node.

If you have a network with ONS 15327 or ONS 15454 nodes that are running different releases of CTC software, you must log into the node running the most recent release in order to see the network (on the network map) and communicate with all nodes on the network. You can view the software version in the About CTC dialog box (Figure 3-4). To open the About CTC dialog box, on the menu bar click **Help > About CTC**. CTC Core Build tells you which version of software is running on the node. Following the core build information is a list of the various network-element builds found on the network. Each list has a sublist of the nodes running that build.

Figure 3-4 The About CTC dialog box showing the current software version



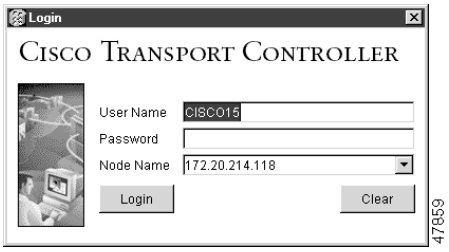
Procedure: Log into the CTC

Step 1 From the PC connected to the ONS 15327, start Netscape or Windows Explorer.

Step 2 In the Netscape or Internet Explorer Web address (URL) field, type the ONS 15327 IP address. For initial setup, this is the default address, 192.1.0.2.

When the PC connects to the ONS 15327, the login window displays (Figure 3-5).

Figure 3-5 The CTC Login screen showing the default user name



Step 3 Type a valid user name and password. For initial setup, type the user name `CISCO15` and click **Login** (no password is required).

Note CISCO15 is the default user name provided with every ONS 15327. This user name has Superuser rights and privileges so you can set up other ONS 15327 users. The CISCO15 user is delivered without a password. To assign a password, click the **Provisioning** > **Security** tabs and change the Superuser password. In addition to the CISCO15 user, a "cerent454" user is provided for compatibility with previous CTC releases. For procedures that set up ONS 15327 security, see the "Setting Up ONS 15327 Security" section on page 3-31.

After logging in, the CTC node view (Figure 3-6) appears. From here, you can navigate to other CTC views to perform the ONS 15327 OAM&P tasks described in the following sections.

3.5 Viewing CTC

The CTC window, or graphical user interface (GUI), includes a menu bar and a top and bottom pane. Information in CTC displays in one of three views that you can navigate through to perform provisioning tasks:

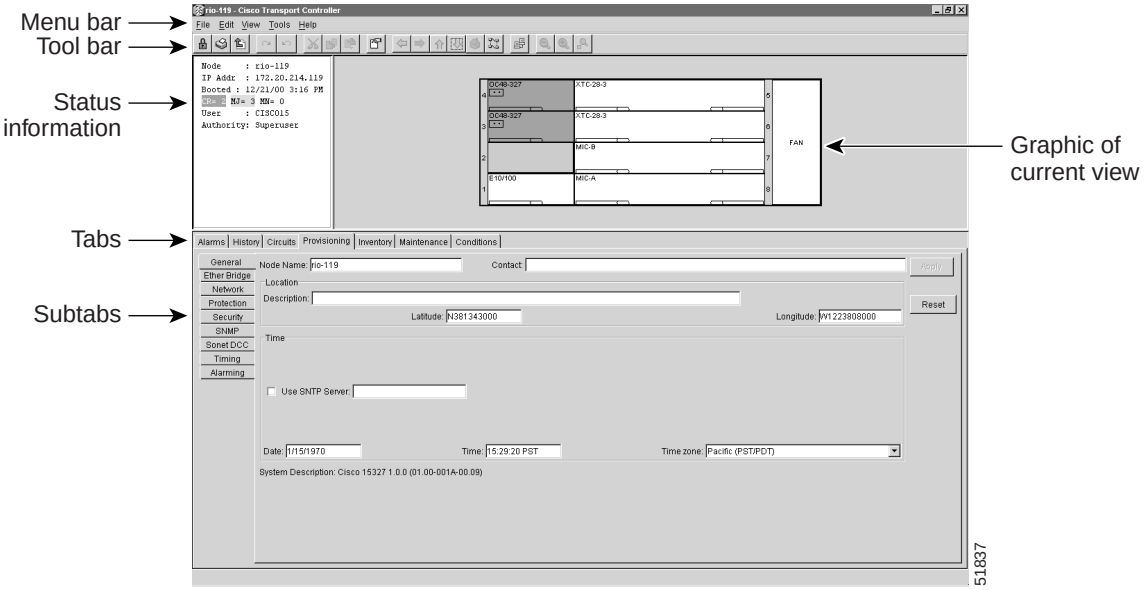
- *Network view*—displays information about the ONS 15327 network. You perform network management tasks in this view.
- *Node view*—displays information about one ONS 15327 node. You perform node management tasks in this view.
- *Card view*—displays information about individual ONS 15327 cards. You perform card management tasks in this view.

A graphic of the current view appears in the upper right portion of the CTC window. The node view displays the ONS 15327 shelf. The network view displays a background map with ONS 15327 nodes represented by colored icons. The card view displays a graphic of the selected card.

Status information for the current view is shown in the upper left hand corner of the node. In node view, the node name; IP address; node boot date and time; a summary of critical (CR), major (MJ), and minor (MN) alarms; the name of the user who is logged in; and the user's security level are shown. In network view, the status of the selected node or span is shown.

The middle of the CTC window provides tabs to access CTC functions. Some CTC tabs have subtabs, which are used to access subfunctions. The tabs that display depend on the view. In node view, seven tabs display: Alarms, History, Circuits, Provisioning, Inventory, Maintenance and Conditions. In network view, only the Alarms, History, Circuits, Provisioning and Maintenance tabs display. The card view contains the Alarms, History, Circuits, Provisioning, Maintenance, Performance, and Conditions tabs. Figure 3-6 shows CTC window elements.

Figure 3-6 CTC in node view (login default)



3.5.1 Node View

The CTC node view (Figure 3-6) displays each time you log into CTC. Node view shows a real-time depiction of the ONS 15327 shelf. The colors of the cards, shown in Table 3-1, indicate the status of the physical card and slot.

Table 3-1 Node View Card Colors

Card Color	Status
Grey	Slot is not provisioned; no card is installed
Blue	Slot is provisioned; no card is installed
White	Slot is provisioned; a functioning card is installed
Yellow	Slot is provisioned; a minor alarm condition exists
Orange	Slot is provisioned; a major alarm condition exists
Red	Slot is provisioned; a critical alarm exists

Node view provides seven tabs to access node information and perform node maintenance and provisioning tasks. Some tabs have subtabs. Table 3-2 defines the node view tabs and lists their subtabs.

Table 3-2 Node View Tabs and Subtabs

Tab	Description	Subtabs
Alarms	Lists current alarms for the node	none
History	Provides a history of node alarms including date, type, and severity of each alarm. The Session subtab displays alarms and events for the current CTC session. The Node subtab displays the last 640 alarms and events since the software installation or node power up. These alarms and events are stored on the node.	Session, Node
Circuits	Allows you to create, delete, edit, and map circuits	none
Provisioning	Provision the ONS 15327 node	General, Ether Bridge, Network, Protection, Security, SNMP, Sonet DCC, Timing, Alarming
Inventory	Provides inventory information (part number, serial number, CLEI codes) for cards installed in the node	none
Maintenance	Allows you to perform maintenance tasks for the node	Database, Ether Bridge, Protection, Software, Timing, Diagnostic, Audit, Routing Table
Conditions	Allows retrieval of conditions for the node.	none

3.5.2 Network View

Network view (Figure 3-7) displays information about the ONS network. You perform network provisioning and management tasks in this view. A United States map displays and the ONS 15327 nodes are represented by colored icons. The color of the node icon indicates the status of the node. Table 3-3 shows the colors and their corresponding status.

Figure 3-7 The CTC network view

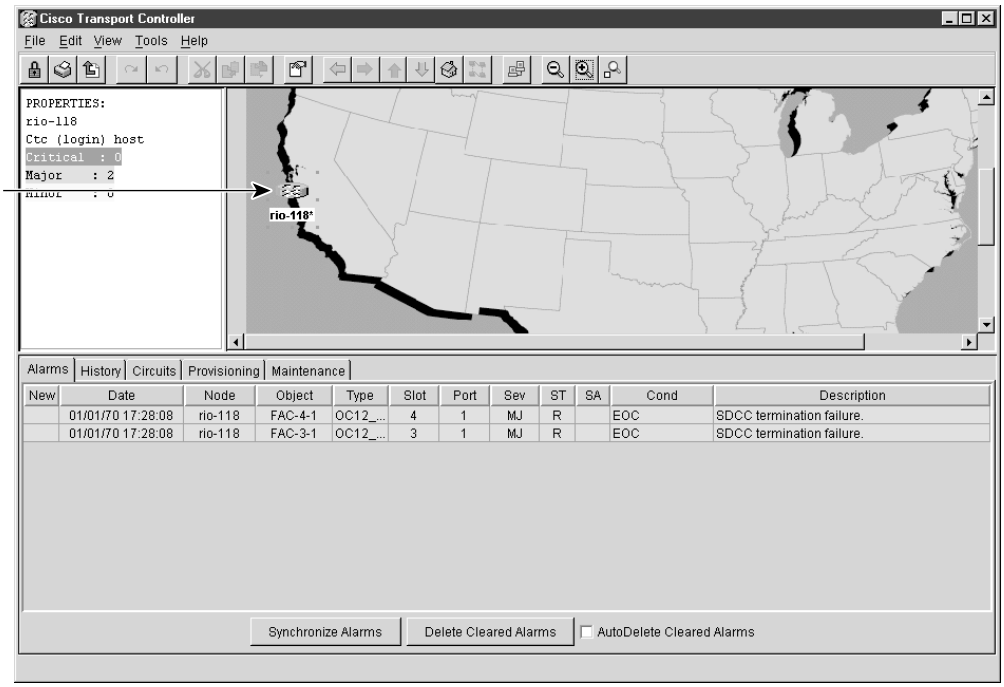


Table 3-3 Node Status

Color	Alarm Status
Green	No alarms
Yellow	Minor alarms
Orange	Major alarms
Red	Critical alarms
Grey with node name	Node is initializing
Grey with IP address	Node is initializing, or a problem exists with IP routing from node to PC

The network view tabs display network alarms, alarm history, circuits, provisioning, and maintenance. You can click spans (the lines connecting the nodes) and node icons on the network map to view circuit properties, provision circuits, and perform protection switches. You can also customize the network map view (see the “Inserting an Alternative Network Topology Map” section on page 3-16) and create new domains (see the “Creating Domains” section on page 3-18). This customized map view becomes the default view for that user, when the user navigates out of the network view. Table 3-4 shows the actions that you can perform in network view.

Table 3-4 Network View Actions

Action	Procedure
Open a node	Any of the following: • Double-click the node icon • Right-click the icon, choose **Drill Down to Node** from the shortcut menu • From the CTC Go To menu, choose **Other Node**, then choose the node from the Select Node dialog box
Move a node icon	Pressing the Control <Ctrl> and left mouse buttons, drag the node icon to a new location.
Reset node icon position	Right-click a node and choose **Reset Position** from the shortcut menu. The node icon moves to the position defined by the longitude and latitude fields on the General subtab.
Display span properties	Click a network span. Properties display in the upper left corner of the window.
Perform a UPSR protection switch for an entire span	Right-click a network span and click **Circuits**. See the "Switch UPSR Traffic" section on page 4-7 for UPSR protection switch procedures.
Provision a circuit	Right-click a node and choose **Provision Circuit To** from the shortcut menu. For circuit procedures, see the "Creating and Provisioning Circuits" section on page 4-18.
Update circuits with new node	Right-click a node and choose **Update Circuits With New Node** from the shortcut menu. Use this command when you add a new node and want to pass circuits through the new node.
Customize map view	To zoom in on the map graphic, click the **Zoom In** tool in the toolbar. To zoom out on the map graphic, click the **Zoom Out** tool. Clicking on the **Zoom Selected Area** tool turns your cursor into a crosshair: hold down the left mouse button and drag the crosshair diagonally across the area. The selected area will be zoomed. You can also right-click on the map graphic and select **Zoom In**, **Zoom Out**, **Zoom Selected Area**, **Set Background Color**, **Set Background Image**, **Remove Background Image**.
Create New Domain	Right-click the map graphic with your mouse pointed anywhere on the map (but not at a node icon) and choose **Create New Domain**.

3.5.2.1 Inserting an Alternative Network Topology Map

With CTC you can install a custom map for the network view. The map needs to be in either a JPEG or GIF file format and stored on an accessible local or network drive. Approximate longitudes and latitudes for the edge coordinates of the map are required — this information is included on U.S.G.S. topographical maps, and you can obtain the longitude and latitude for cities and Zip Codes from the U.S. Census Bureau U.S. Gazetteer website (http://www.census.gov/cgi-bin/gazetteer). CTC uses the edge coordinates of the custom map to determine the relative positions of the ONS node icons on the map graphic. Edge coordinates only need to be precise enough to place ONS node icons in approximate positions on the map graphic.

Procedure: Set Up an Alternative Network Map

Step 1 From the menu bar in network view, choose **Edit** > **Preferences** or click the **Preferences** tool in the toolbar.

The Preference dialog box appears (Figure 3-8) with the four tabs listed in Table 3-5.

Figure 3-8 Specifying a customized network map with the Preferences dialog box

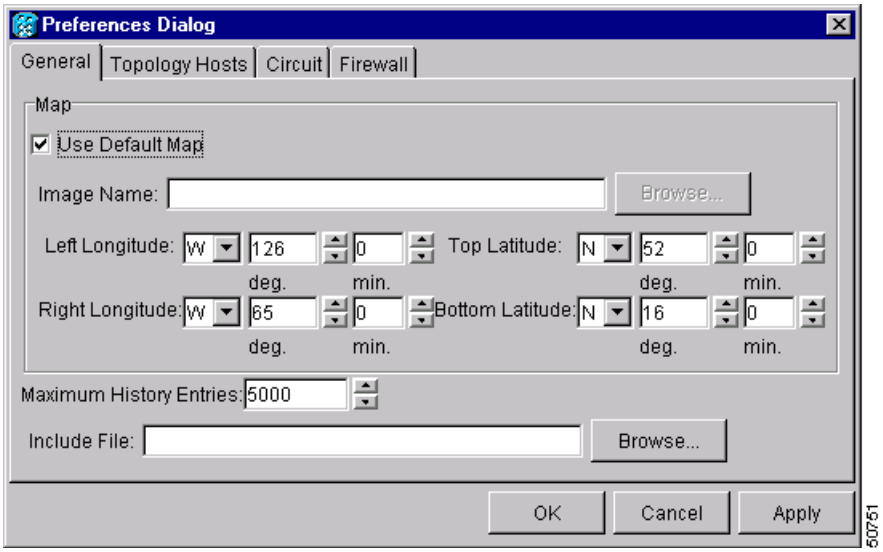


Table 3-5 Preferences Tabs

Tab	Description
General	Sets general map and history attributes
Topology Hosts	Adds and removes additional nodes and rings for multiple ring management
Circuit	Sets foreground/background color of active and standby spans
Firewall	Sets firewall to Default-variable, Standard constant (683), or Other constant:

Step 2 Choose the **General** tab and uncheck **Use Default Map**.

Step 3 Click **Browse**. Navigate to the location of the stored map graphic file.

Step 4 Select the desired file. Click **Open**.

Step 5 Click **Apply** and then click **OK**.

Figure 3-9 Example of a customized map graphic

Step 6 At the network view, fill the window with the desired map graphic:

(a) Click the **Zoom Selected Area** tool in the toolbar.

The cursor arrow becomes a crosshair.

(b) Holding down the left button on your mouse, drag the crosshair diagonally across the area of the map that you want shown.

The view that appears becomes the default network map view for that particular log-in or user profile.

Step 7 From the menu bar, choose **Edit** > **Preferences**.

The Preference dialog box appears.

Step 8 Click the **General** tab.

Step 9 Use the down arrow and up arrow buttons to enter the correct longitudes and latitudes for the top, bottom, left, and right edges of the entire map graphic (not just the portion where you zoomed in).

Step 10 Click **Apply** and click **OK**.

3.5.2.2 Creating Domains

You can create domains for managing the display of multiple nodes on the network-view map. You can reduce the number of icons on the map or group nodes by location.

Procedure: Create a New Domain

Step 1 Right-click the network-view map.

Step 2 Choose **Create New Domain**.

Step 3 Type a name for your domain.

Step 4 Drag nodes onto the cloud icon to place nodes in the domain.

You can place an unlimited number of nodes in a domain.

Step 5 Right-click the domain cloud to display the following menu choices:

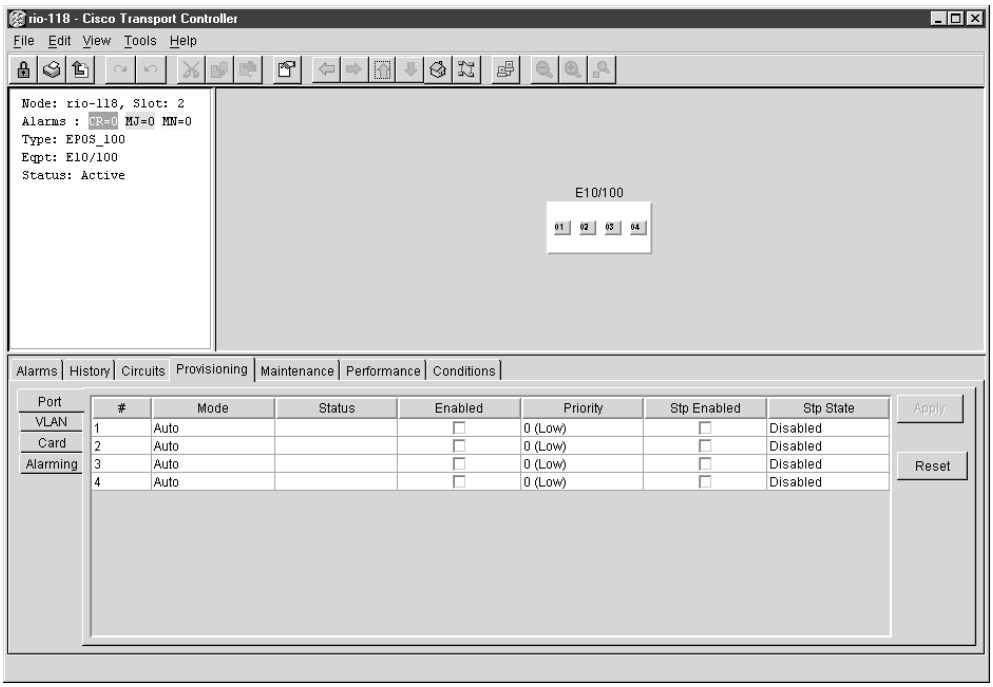
- *Drill Down to Domain*—Opens the domain to display the nodes that comprise the domain. Double-clicking the domain cloud also opens the domain.
- *Rename Domain*—Places the cursor in the name box. Type the desired name in the box.
- *Show Domain Overview*—Displays a thumbnail of the domain.
- Remove Domain—Removes the domain and returns the nodes to the network-view map.

3.5.3 Card View

Card view displays information about individual ONS 15327 cards (Figure 3-10) You perform card-specific maintenance and provisioning tasks in card view. The information that displays and the tasks you perform depend on the card.

Card view provides access to seven tabs: Alarms, History, Circuits, Provisioning, Maintenance, Performance, and Conditions. However, the subtabs, fields, and information displayed under each tab depend on the card type selected. For information about configuring card information such as transmission, threshold, and alarm settings, see Chapter 5, “Provisioning Cards.”

Figure 3-10 The CTC card view showing an E10/100 card



3.5.4 CTC Navigation

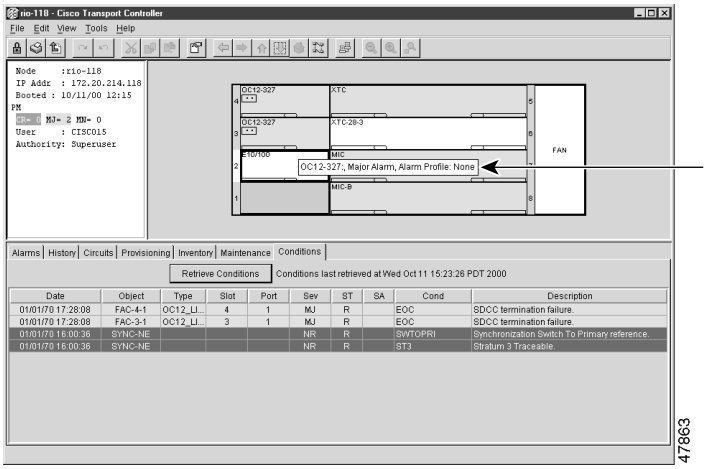
You can use different methods to navigate to views within the CTC window. The toolbar and the menu bar at the top of the screen contain a series of tools/menus that can be used for navigating and other operations. Access the tools by clicking the tool icons. Access the menu options by clicking **File**, **Edit**, **View**, and **Tools**. Table 3-6 identifies each tool and menu choice on the toolbar and its description.

Table 3-6 Toolbar and Menu Bar Options

Tool	Description
Lock	Locks the CTC session
Print	Prints Entire Frame, Tabbed View, or Table of Contents
Export	Saves and exports data as HTML, CSV, or TSV
Undo	Available in a future release
Redo	Available in a future release
Cut	Available in a future release
Copy	Available in a future release
Paste	Available in a future release
Preferences	Sets preferences under General, Topology Hosts, Circuit, and Firewall tabs
Go to previous view	Displays the view observed before the current view
Go to next view	Displays the view observed before clicking “Go to previous view”
Go to parent view	Displays the network view
Go to selected object view	Displays the view of selected object
Go to home view	Displays the node view
Go to network view	Displays the network view
Open TL1 connection	Opens a TL1 session with chosen node
Zoom out	Decreases size of the of the graphic in network view
Zoom in	Increases size of the graphic in network view
Zoom selected area	Increases size of a selected area of the graphic in network view

You can also double-click or right-click objects in the CTC window. Moving the mouse over nodes, cards, card ports and toolbar icons displays popup information about the node, card, port, or icon. Figure 3-11 shows an example of the popup information.

Figure 3-11 CTC popup showing card-status information



Moving the mouse over CTC window elements displays ONS 15327 status information

3.5.5 Table Data

Within the three views, much of the ONS 15327 CTC data, such as alarms, alarm history, circuits, and node inventory, displays in tables. You can change the way the CTC tables display. For example, you can:

- Rearrange or hide table columns.
- Sort tables by primary and secondary keys in descending or ascending order. (Sorting and hiding is available for all read-only tables except Inventory.)
- Export CTC table data to spreadsheets and database management programs to perform additional data manipulation. For exporting procedures, see the “Printing and Exporting CTC Data” section on page 3-48.

To change the CTC table display, left-click or right-click a table column header. Right-clicking a column header displays a shortcut menu, shown in Figure 3-12, with table column display options.

Figure 3-12 Displaying the table column shortcut menu by right-clicking a column header

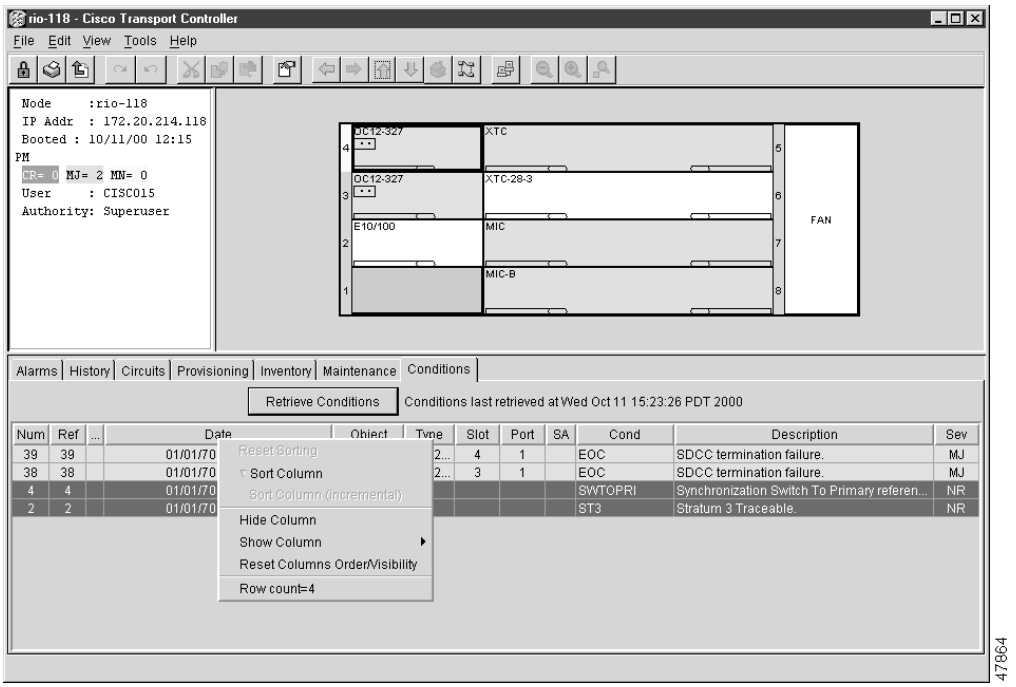


Table 3-7 lists the options that you can use to customize the information that displays in CTC tables.

Table 3-7 Table Display Options

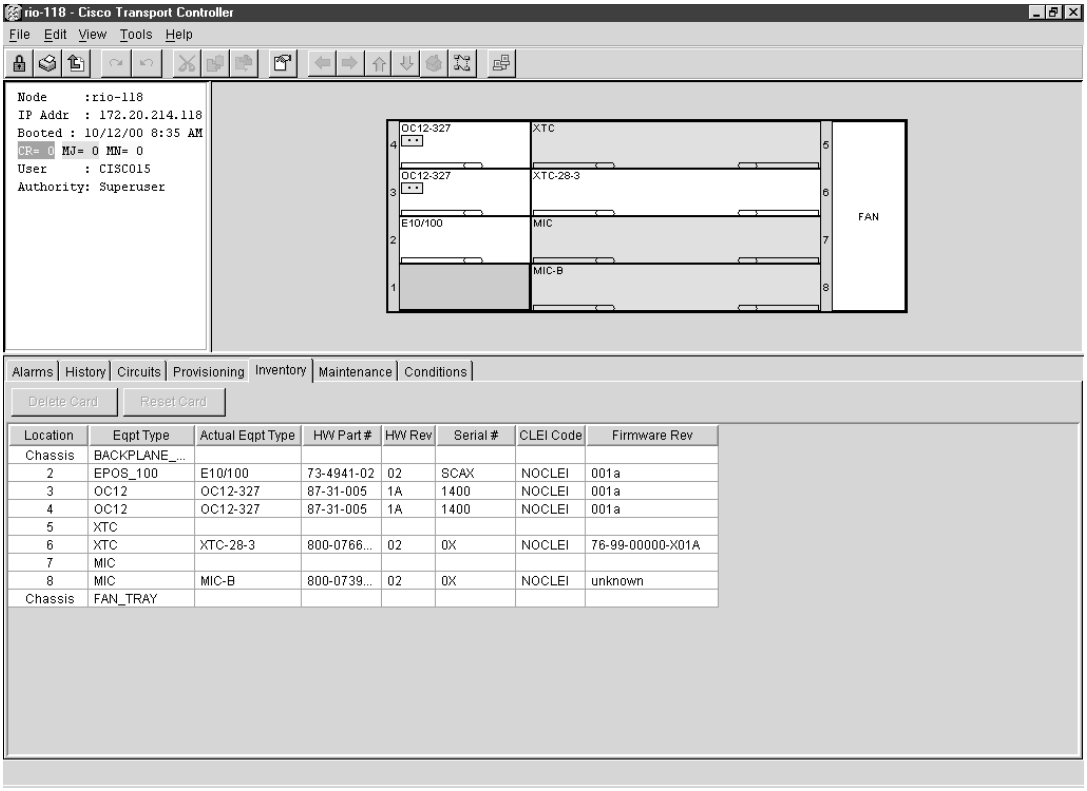
Task	Click	Right-Click Shortcut Menu
Rearrange column order	Drag column header right or left	N/A
Reset column order	N/A	Select Reset Columns Order/Visibility
Hide column	N/A	Select Hide Column
Resize column	Position cursor over column border and drag right or left	N/A
Display a hidden column	N/A	Select Show Column > [column name]
Display all hidden columns	N/A	Select Reset Columns Order/Visibility
Sort table (primary)	Click a column header; each click changes sort order (ascending or descending)	Select Sort Column
Sort table (secondary sorting keys)	Pressing Shift, click column header	Select Sort Column (incremental)
Reset sorting	N/A	Select Reset Sorting
View table row count	N/A	Table row count is the last item on the shortcut menu

3.5.6 Inventory Data

The Inventory tab (Figure 3-13) displays information about cards installed in the ONS 15327 node, including part numbers, serial numbers, hardware revisions, and equipment types. The tab provides a central location to obtain information and to determine the applicability of ONS 15327 Product

Change Notices (PCNs) and Field Service Bulletins (FSBs). Using the ONS 15327 export feature, you can export inventory data from ONS 15327 nodes into spreadsheet and database programs, where you can consolidate information for network inventory management and reporting.

Figure 3-13 Viewing hardware information about installed cards



The Inventory tab displays the following information about the cards installed in the ONS 15327:

- *Location*—The slot where the card is installed
- *Eqpt Type*—Equipment type the slot is provisioned for, for example, OC-12 or XTC
- *Actual Eqpt Type*—The actual card that is installed in the slot, for example, OC48-327 or XTC-28-3

Note You can pre-provision a slot for a certain card before the card is installed by right-clicking the slot in node view and selecting a card type.

- *HW Part #*—Card part number; this number is printed on the top of the card
- *HW Rev*—Card revision number
- *Serial #*—Card serial number; this number is unique to each card
- *CLEI Code*—Common Language Equipment Identifier code
- *Firmware Rev*—Revision number of the software used by the ASIC chip installed on the card

3.6 Viewing ONS 15327 Alarms, Conditions, and Events

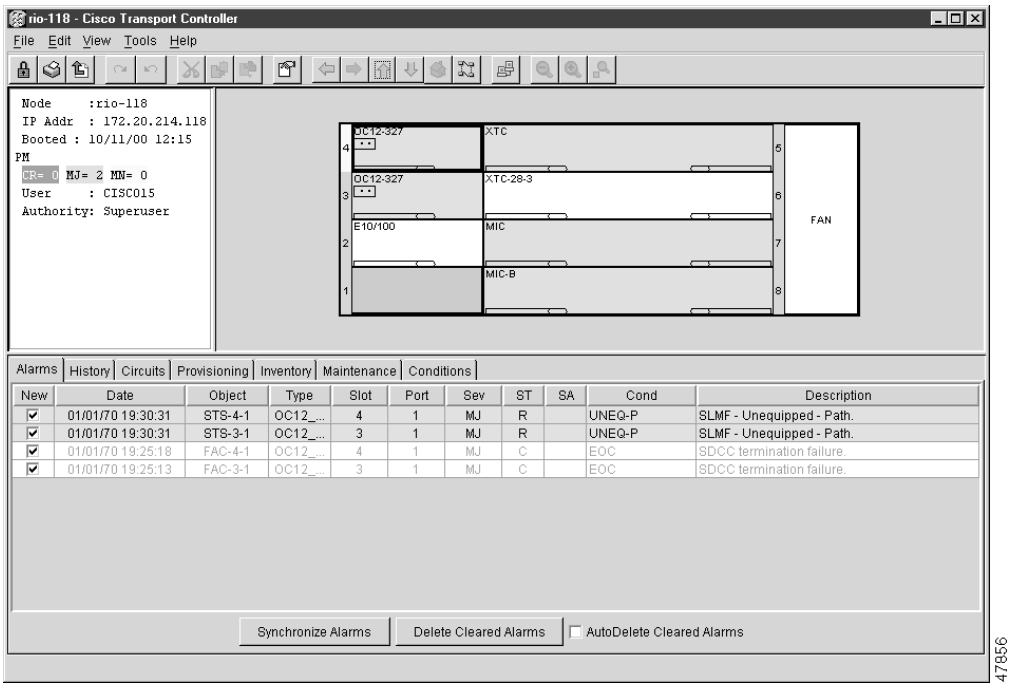
To display current and cleared alarms generated on the node, conditions, and events, open the node view and select the Alarms tab (Figure 3-21). The Alarms tabs in network view and card view show network-level alarms and card-level alarms, respectively. Messages with a severity of critical, major, or minor and a status of raised or cleared qualify as alarms. Conditions are messages with a severity of not reported or not alarmed and a status of raised or cleared. Events have a status of transient with a severity of not alarmed. Table 3-8 shows the information that displays for each ONS 15327 alarm.

Table 3-8 Alarm Data

Column	Description
Num	Unique, per-node alarm identifier (this column is hidden by default)
Ref	If an alarm references another alarm, the number of the referenced alarm (this column is hidden by default)
Date	Date and time of the alarm
New	Indicates an alarm that has not been acknowledged by checking either the **Synchronize Alarms** or **Delete Cleared Alarms** box; shows in all views
Node	Node where the alarm occurred, based on the active XTC (displays in network view only)
Object	TL1 AID for the alarmed object
Type	Type of alarm, based on equipment type
Slot	Slot where the alarm occurred (displays in network and node view only)
Port	Port where the alarm occurred
Sev	Severity level: CR (critical), MJ (major), MN (minor), NA (not alarmed), NR (not reported)
ST	Status: R (raised), C (clear)
SA	When checked, indicates the alarm is service affecting
Cond	The error message code; see Chapter 8, “CTC Alarms” for troubleshooting procedures
Description	Description of the alarm

For a definition of each alarm and its troubleshooting procedure, see Chapter 8, “CTC Alarms.”

Figure 3-14 The Alarms tab showing two standing alarms and two cleared alarms



Alarms are displayed in one of five background colors, listed in Table 3-9, to communicate the alarm severity quickly.

Table 3-9 Alarm Colors

Color	Description
Red	Critical Alarm
Orange	Major Alarm
Yellow	Minor Alarm
Blue	Event Notification (not an alarm)
White	Cleared alarm or event

3.6.1 Controlling Alarm Display

You can control the display of alarms. Table 3-10 shows the actions you can perform from the Alarms tab.

Table 3-10 Alarm Display

Button	Action
Synchronize Alarms	Updates the alarm display; although CTC displays alarms in real time, the Synchronize Alarms button allows you to verify the alarm display (particularly useful during provisioning or troubleshooting)
Delete Cleared Alarms	Deletes alarms that have been cleared
Checkbox	
AutoDelete Cleared Alarms	If checked, automatically deletes new cleared alarms

3.6.2 Viewing Alarm History

The History tab displays historical alarm data. The History tab also shows the events (that is, non-reported activities) that occur in addition to the alarms. For example, protection switching events or performance monitoring threshold crossings appear here. The History tab presents two alarm history views:

- The Session subtab (Figure 3-15) presents alarms and events for the current CTC session. When you log off, the alarms disappear.
- The Node subtab (Figure 3-16) shows the alarms, events and conditions that occurred at the node since the CTC software installation or last node power up, whichever occurred most recently. The ONS 15327 can store up to 640 critical alarms, 640 major alarms, 640 minor alarms, and 640 events. When the limit is reached, the ONS 15327 discards the oldest alarms and events. To display a stored alarm or event, check the desired boxes and click the **Retrieve** button.

Tip Double-click an alarm in the alarm table to display the corresponding view. For example, double-clicking a card alarm takes you to card view. In network view, double-clicking a node alarm takes you to node view.

Figure 3-15 Viewing current-session alarms and events

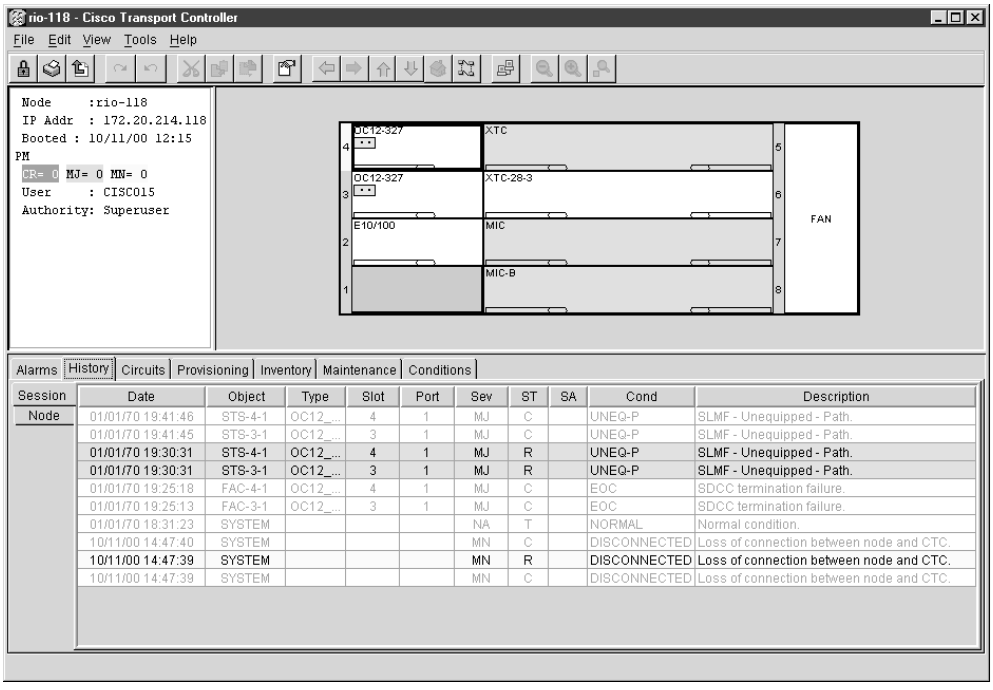
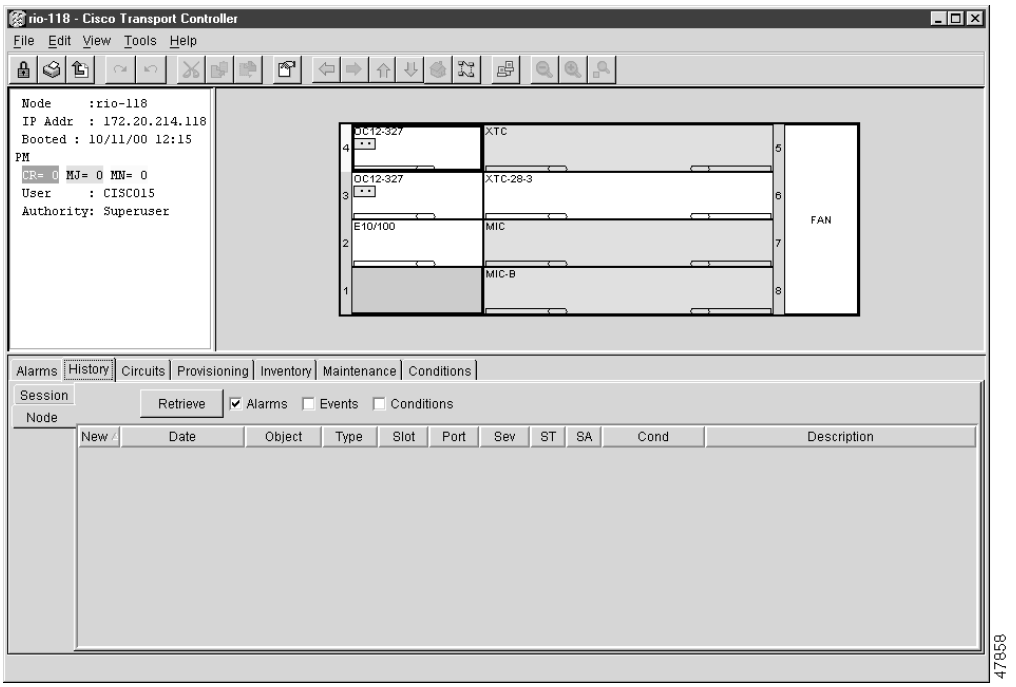


Figure 3-16 Retrieving alarms



3.7 Setting Up General Node Information

The first ONS 15327 provisioning task to perform is setting up basic node information. If the node will be connected to a LAN or other ONS nodes, the information that you enter for the node, such as node name and IP address, must be coordinated with your network administrator.

Procedure: Set Up General Node Information

Step 1 Log into CTC on the ONS 15327 node you are provisioning.

Step 2 Click the **Provisioning** > **General** tabs.

Step 3 Enter the following information:

- *Node Name*—Type a name for the node.
- *Contact*—Type the contact person's name for the node contact and the phone number (optional).
- *Location*—(Optional).
- *Description*—Type the description of the node's location.
- *Latitude*—Type the node's latitude in the Nddmmssfff format, where d=degrees, m=minutes, s=seconds, and f=fractional seconds.
- *Longitude*—Type the node's longitude in the Wdddmmssfff format, where d=degrees, m=minutes, s=seconds, and f=fractional seconds.

CTC uses the latitude and longitude to place node icons on the network-view map. To convert longitudes and latitudes given in decimal degrees to degrees, minutes, and seconds, see the "Convert Coordinates to Degrees, Minutes, and Seconds" section on page 3-28.

- *Use SNTP Server*—when checked, CTC uses a Simple Network Time Protocol (SNTP) server to set the date and time of the node. Using an SNTP server ensures that all ONS 15327 network nodes use the same date and time reference. The server synchronizes the node's time during power outages or software upgrades. If you check *Use SNTP Server*, type the server's IP address in the next field. If you do not use an SNTP server, complete the *Date*, *Time*, and *Time Zone* fields. The ONS 15327 will use these fields for alarm dates and times. You can still select a time zone if you use an SNTP server.
- *Date*—Type the current date.
- *Time*—Type the current time.
- *Time Zone*—Select the time zone.

Step 4 Click **Apply**.

CTC uses the longitude and latitude you enter on the General subtab to place node icons on the network-view map. You can obtain the longitude and latitude for cities and Zip Codes from the U.S. Census Bureau U.S. Gazetteer website (www.census.gov/cgi-bin/gazetteer). Coordinates are generally provided in decimal degrees. CTC requires that you enter coordinates in degrees, minutes, and seconds. Use the following procedure to convert coordinates.

Procedure: Convert Coordinates to Degrees, Minutes, and Seconds

Step 1 Find the location's longitude and latitude. For example, Petaluma, California is 38.250739 N, 122.615536 W.

Step 2 Use the appropriate directional letter plus the first two digits of latitude and first three digits of longitude with no conversion. For Petaluma, this is N38 (latitude) and W122 (longitude).

Step 3 Using the unconverted longitude and latitude, multiply the number after the decimal by 60 to convert it to minutes. For example, .250739 x 60 is 15.0443, and .615536 x 60 is 36.93216. Use the whole numbers for the minutes (in the example, 15 and 36).

Step 4 Multiply the number after the decimal from Step 3 by 60 to convert it to seconds. In the example, .0443 x 60 is 2.6580, and .93216 x 60 is 55.9296. Use the whole numbers of the total (in the example, 02 and 55) for the seconds. If the whole number for either minutes or seconds is less than ten, add a zero to the left of the number, for example, 2 is entered as 02.

Step 5 Use zeros for fractional seconds, because the values are not significant for node positioning on the CTC network-view map.

Step 6 Convert the latitude, originally given in decimal degrees, to the Nddmmssfff format, where d=degrees, m=minutes, s=seconds, and f=fractional seconds. In this example, 38.257039 N = N381502000.

Step 7 Convert the longitude, originally given in decimal degrees, to the Wdddmmssfff format. In the example, 122.615536 = W1223655000. Enter zeros if degrees are less than 100, for example, 98 degrees is entered 098.

3.8 Setting Up General Network Information

This section explains how to set up general network information. For procedures that configure networks, see Chapter 4, "Configuring Networks."

3.8.1 Changing the IP Address

Before you connect an ONS 15327 to other ONS nodes or to a LAN, you must change the default IP address that is shipped with the ONS 15327 (192.1.0.2). IP addresses are unique identifiers for nodes or hosts connected to a network using TCP/IP. Each address consists of a network number and a host number. The network numbers are used for routing, while the host number is used to address an individual host within the network or subnetwork. A subnet mask is used to extract network and host information from the IP address.

IP addresses are 32-bit binary numbers. However, to make IP addresses easier to work with, they are represented as four decimal values, each representing eight bits in the range 0 to 255 (known as octets) and separated by decimal points. For example, the following IP address is in binary format:

```
10001100.10110011.11011100.11001000
```

The same address, represented as four decimal values, is:

```
140.179.220.200
```

Because the IP addresses that you work with represent binary addresses, changing an address is not always straightforward. Therefore, before you change the ONS 15327 IP addresses, consult your LAN administrator or someone knowledgeable in TCP/IP to ensure addresses are suitable to your network. See Chapter 7, "Network Management" and Chapter 6, "Ethernet Applications" for additional information.

Procedure: Set Up Network Information

Step 1 Display the CTC node view.

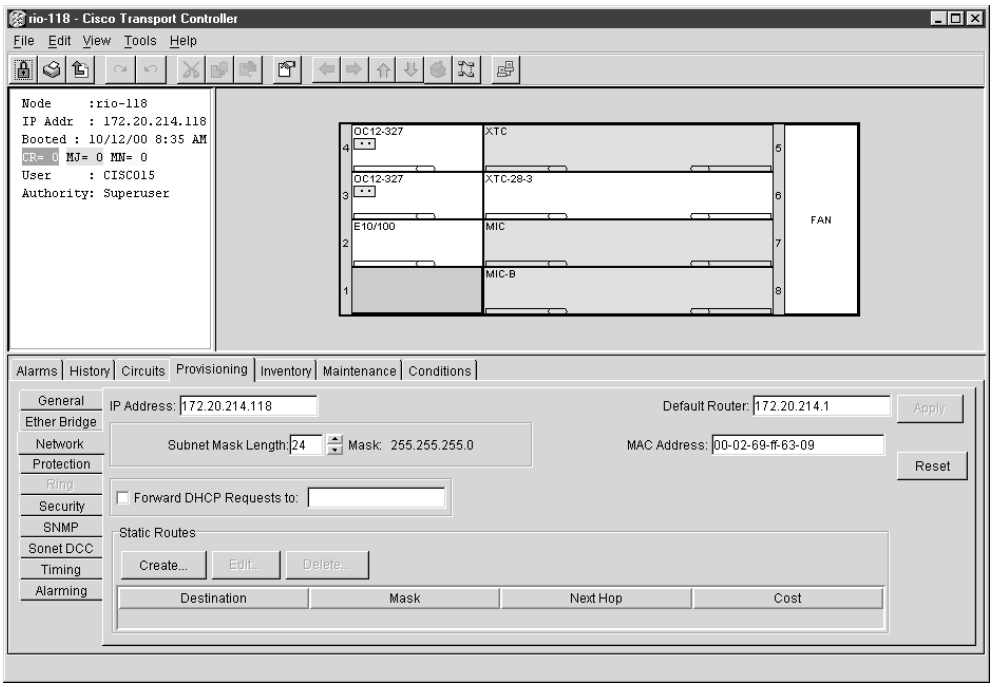
Step 2 Click the **Provisioning** > **Network** tabs (Figure 3-17).

Step 3 Enter the following information:

- *IP Address*—Type the node IP address.
- *Default Router*—If the ONS 15327 must communicate with a device that has an IP address that the ONS 15327 is not routed to, it forwards the packets to the default router. Type the address of the router in this field. If the ONS 15327 is not connected to a LAN, leave this field blank.
- *Subnet Mask Length*—Type the subnet mask length (decimal number representing the subnet mask length in bits), or click the arrows, to adjust the subnet mask length.
- *MAC Address* (read only)—Displays the ONS 15327 address as it is identified on the Media Access Control layer.

- *Static Routes*—Static routes permit multiple CTC sessions with different destination IP addresses to coexist on the same subnet. If the ONS 15327 or the computer used to access the ONS 15327 is linked to a network router, create a static route. For static route provisioning procedures, see the "Static Route Provisioning" section on page 7-25.
- *Forward DHCP Requests*—Dynamic Host Configuration Protocol enables a server to dynamically assign IP addresses to connecting workstations. Checking this box and entering the IP address of a DHCP server allows DHCP requests and responses to be forwarded to the DHCP server through the ONS network. Most users will leave this box unchecked. Ask your LAN administrator if your LAN uses this feature.

Figure 3-17 Entering network information



Step 4 Click **Apply**.

Step 5 Click **Yes** on the confirmation dialog box.

The XTCs may reboot, one at a time, depending on the information that you changed; for example, changes to an IP address or Default Router will trigger a reboot.

Note It may take up to 30 seconds before the reboots begin.

3.9 Setting Up ONS 15327 Security

The ONS 15327 has four security levels that limit the functions you can perform: Retrieve, Maintenance, Provisioning, and Superuser. A Retrieve user can retrieve and view CTC information but cannot set or modify parameters. A Maintenance user can see Maintenance options only. A Provisioning user can see only Provisioning and Maintenance options. A Superuser, usually the network element administrator, can perform all of the functions of the other security levels and set names, passwords, and security levels for other users. Table 3-11 shows a list of CTC actions that can be performed at each security level.

Table 3-11 ONS 15327 Security Levels

CTC Tab	Subtab	Actions	Retrieve	Maintenance	Provisioning	Superuser
Alarms	n/a	Delete cleared alarms	X	X	X	X
History	Session	Read only				
	Node	Retrieve	X	X	X	X
Circuits	n/a	Create/Delete/Edit/VLAN			X	X
		Map	X	X	X	X
Provisioning	General	All				X
	EtherBridge	All			X	X
	Network	Modify mask/IP/Route				X
	Protection	Create/Delete/Edit			X	X
		Browse groups	X	X	X	X
	Security	Create/Delete				X
		Change password	same user	same user	same user	X
	SNMP	Create/Delete/Edit				X
		Browse traps	X	X	X	X
	Sonet DCC	All				X
	Timing	All			X	X
	Alarming	All			X	X
Inventory	n/a	Delete			X	X
		Reset		X	X	X
Maintenance	Database	Backup/Restore				X
	EtherBridge	Read only				
	Protection	Operation on protection groups		X	X	X
	Software	Upgrade/Activate/Revert				X
	Diagnostic	Retrieve				X
	Timing	Read-only				
	Audit	Retrieve	X	X	X	X
	Routing Table	Read Only				
Condition	n/a	Retrieve	X	X	X	X

Note For users to gain access to multiple nodes, the same user name and password must exist on each node.

Security levels also limit the amount of time you can leave the system idle before the CTC window is locked to prevent unauthorized users from making changes. Higher security levels have shorter idle times. Table 3-12 shows CTC security levels and their idle times.

Table 3-12 ONS 15327 Security Idle Times

Security Level	Idle Time
Retrieve	Unlimited
Maintenance	60 minutes
Provisioning	30 minutes
Superuser	15 minutes

Procedure: Create New Users

Step 1 From the CTC node view or network view, click the **Provisioning** tab.

Step 2 Click the **Security** subtab.

Step 3 On the Security pane, click **Create**.

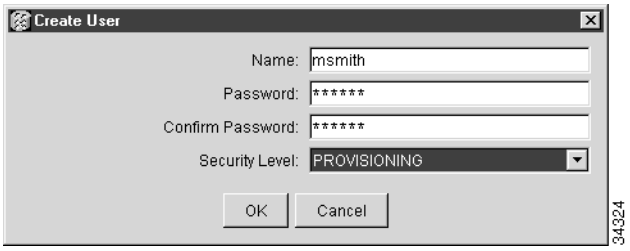
Users created at the network view are given access (added) to all nodes on the network.

Step 4 In the Create User dialog box enter the following:

- *Name*— type the user name.
- *Password*—type the user password. The password must contain at least six characters and can be any letter or number (a-z, A-Z, 0-9).
- *Confirm Password*—type the password again to confirm it.
- *Security Level*—Select the user's security level.

Step 5 Click **OK**.

Figure 3-18 Assigning a security level in the Create User dialog box



Note When creating new users from the node view, you must add CTC users to each node where they need access. Users are not automatically added to other network nodes. When creating new users from the network view, the user will be created on all nodes. You can also delete and change a user on all nodes from this view.

Procedure: Edit User Security (Node Level)

Step 1 Display the CTC node view.

Step 2 Click the **Provisioning** > **Security** tabs.

Step 3 On the Security pane, click the user you want to edit.

Step 4 On the right portion of the Security pane, enter new security information for the user: name, password, password confirmation, and/or security level. A Superuser does not need to enter an old password. Other users must enter their old password to change a new password.

Step 5 Click **Apply**.

Note Changing user permissions and access levels does not take effect while you are logged into CTC. The changes take effect the next time you log into CTC. If you have access to more than one node, you must change the user settings at each node.

Procedure: Edit User Security at the Network Level (all nodes)

Step 1 Display the CTC network view.

Step 2 Click the **Provisioning** > **Security** tabs.

Step 3 Click the **Change** button.

Step 4 In the Change User dialog box enter the following:

- *Name*— Type the user name.
- *Password*—Type the user password. The password must contain at least six characters and can be any letter or number (a-z, A-Z, 0-9).
- *Confirm Password*—Type the password again to confirm it.
- *Security Level*—Select the user's security level.

Step 5 Click **OK**.

Step 6 Click **OK** in the Changing User dialog box to confirm the changes.

3.10 Setting Up Protection Groups

The ONS 15327 provides several card protection methods. When you set up protection for ONS 15327 cards, you must choose between maximum protection and maximum card-slot availability. The highest protection reduces the number of available card slots; the highest card-slot availability reduces the protection. For a description of protection groups refer to the "Card Protection" section on page 2-2.

For the ONS 15327, a 1:1 (electrical) XTC protection group is pre-provisioned. The name of the protection group is XTCPROTGRP and it cannot be edited or deleted. Therefore, you only need to create protection for optical cards.

Procedure: Create Protection Groups for Optical Cards

Step 1 From the CTC node view, click the **Provisioning** tab.

Step 2 Click the **Protection** subtab.

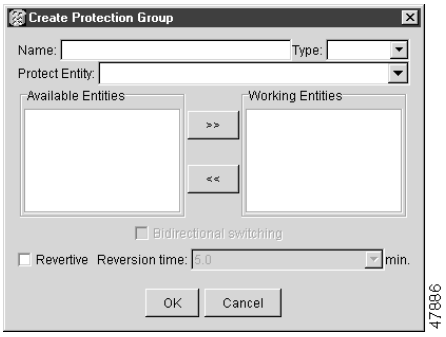
Step 3 Under Protection Groups, click **Create**.

Step 4 In the Create Protection Group dialog box (Figure 3-19), enter the following:

- *Name*—Type a name for the protection group, up to 32 alpha-numeric characters.
- *Type*—Choose 1+1 as the protection type. The protection selected determines the ports that are available to serve as protect and working ports.
- *Protect Entity*—Choose protect port from the list.

Based on these selections, a list of available working ports displays under Available Entities. Because 1:1 protection is pre-provisioned, no cards appear under available cards.

Figure 3-19 Specifying protection attributes in the Create Protection Group dialog box



Step 5 From the Available Entities list, choose the port that you want to provision as the working port. This port will be protected by the port you selected in Protect Entity. Select the top arrow button to move it to the Working Entities list. You can move more than one port.

Step 6 Complete the remaining fields:

- *Bidirectional switching*—(optical cards only) if checked, both transmit and receive channels switch if a failure occurs to one.
- *Revertive*—if checked, the ONS 15327 reverts back to the working port after failure conditions are corrected.

- *Reversion time*—if *Revertive* is checked, enter the amount of time following a corrected failure condition that the ONS 15327 should switch back to the working port.

Step 7 Click **OK.**

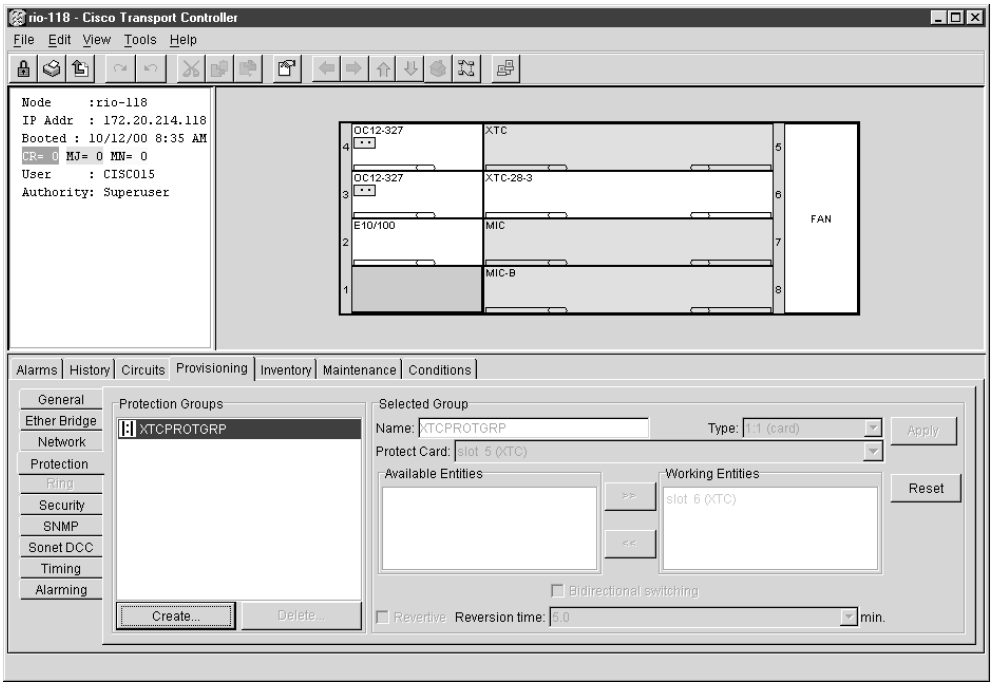
Note The default XTCPROTGRP provides XTC-level protection for DS-1 and DS-3 ports. It is non-revertive and cannot be modified or deleted.

Procedure: Edit Protection Groups

Step 1 Display the CTC node view.

Step 2 Click the **Provisioning** > **Protection** tabs (Figure 3-20).

Figure 3-20 Editing and deleting protection groups in the Protection subtab



Step 3 Under Protection Groups, choose a protection group.

Step 4 Under Selected Group, edit the fields as appropriate. (For field descriptions, see the "Create Protection Groups for Optical Cards" section on page 3-34.)

Step 5 Click **Apply**.

Procedure: Delete Protection Groups

Step 1 Display the CTC node view.

Step 2 Verify that working traffic is not running on the protect card:

(a) Click the **Maintenance > Protection** tabs.

(b) Under Protection Groups, choose the group you want to delete.

(c) Under Selected Group, verify that the protect card is in standby mode. If it is, continue to Step 3. If the protect card is active, manually switch traffic back to the working card. Verify that the protect card is in standby mode, then continue to Step 3. If the protect card is still active, do not continue. Begin troubleshooting or call technical support.

Step 3 Click the **Provisioning** > **Protection** tabs.

Step 4 Under Protection Groups, choose a protection group.

Step 5 Click **Delete**.

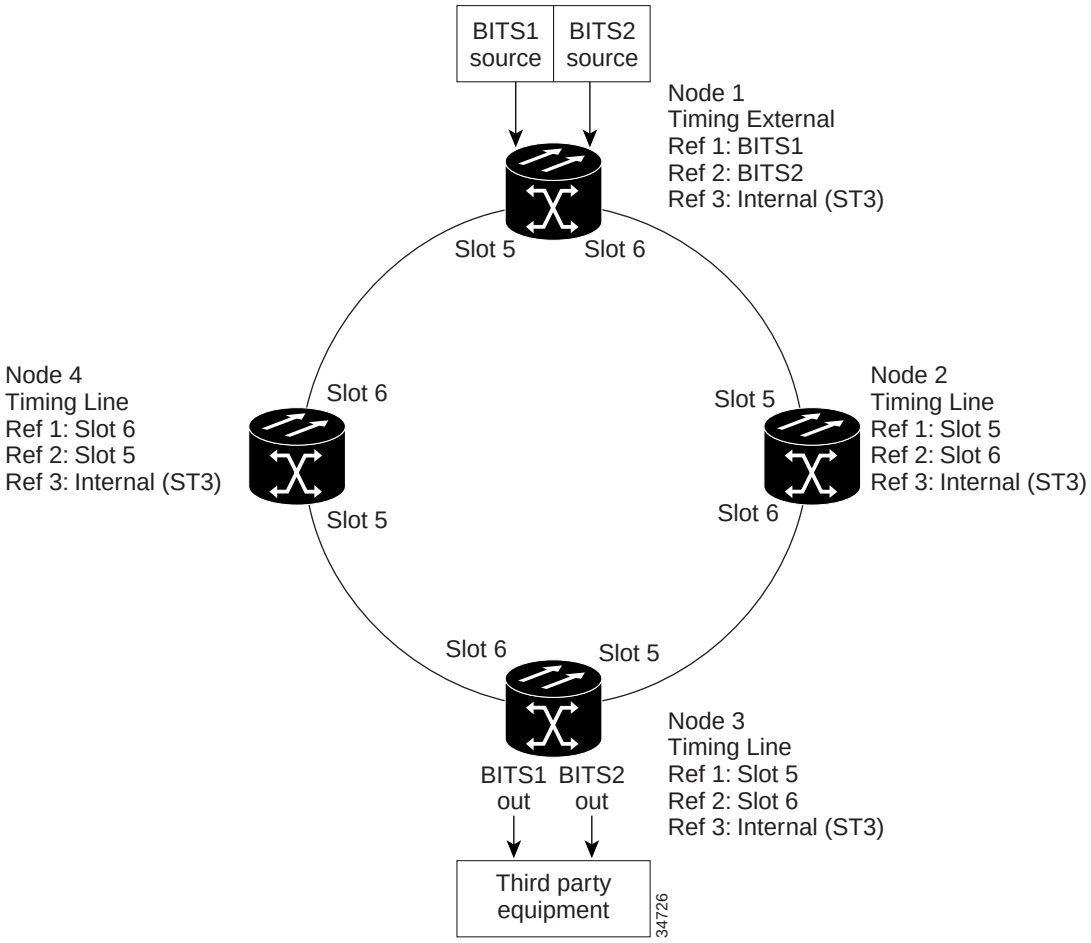
3.11 Setting Up Timing

You must set the SONET timing parameters for each ONS 15327. ONS 15327 timing is set to one of two modes: external or line. The external node derives its timing from a Building Integrated Timing Supply (BITS) source wired to the BITS input on the management interface card (MIC). The BITS source, in turn, derives its timing from a Primary Reference Source (PRS) such as a Stratum 1 clock or GPS signal. The line nodes derive timing from Optical cards.

For protection, up to two additional timing references can be identified: a BITS-level or line-level source and an internal reference. The internal reference is the Stratum 3 (ST3) clock provided on every ONS 15327 XTC card.

Figure 3-21 shows an example of an ONS 15327 network timing setup. Node 1 is set to external timing. Two references are set to BITS, and the third reference is set to internal. The BITS output pins on the MICs of Node 3 provide timing to outside equipment, such as a Digital Access Line Access Multiplexer.

Figure 3-21 An ONS 15327 timing example with external, BITS, and internal timing



Synchronization Status Messaging (SSM) is a SONET protocol that communicates information about the quality of the timing source. SSM messages are carried on the S1 byte of the SONET Line layer. They enable SONET devices to automatically select the highest-quality timing reference and to avoid timing loops.

SSM messages are either Generation 1 or Generation 2. Generation 1 is the first and most widely deployed SSM message set. Generation 2 is a newer version. If you enable SSM for the ONS 15327, consult your timing-reference documentation to determine which message set to use. Table 3-13 and Table 3-14 show the Generation 1 and Generation 2 message sets.

Table 3-13 SSM Generation 1 Message Set

Message	Quality	Description
PRS	1	Primary reference source - Stratum 1
STU	2	Sync traceability unknown
ST2	3	Stratum 2
ST3	4	Stratum 3
SMC	5	SONET minimum clock
ST4	6	Stratum 4
DUS	7	Do not use for timing synchronization

Table 3-13 SSM Generation 1 Message Set (continued)

Message	Quality	Description
RES		Reserved; quality level set by user

Table 3-14 SSM Generation 2 Message Set

Message	Quality	Description
PRS	1	Primary reference source - Stratum 1
STU	2	Sync traceability unknown
ST2	3	Stratum 2
TNC	4	Transit node clock
ST3E	5	Stratum 3E
ST3	6	Stratum 3
SMC	7	SONET minimum clock
ST4	8	Stratum 4
DUS	9	Do not use for timing synchronization
RES		Reserved; quality level set by user

Procedure: Set Up ONS 15327 Timing

Step 1 Display the CTC node view.

Step 2 Click the **Provisioning** > **Timing** tabs (Figure 3-22).

Step 3 Enter the following information:

- *Timing Mode*—Set to External if timing is derived from an external BITS source wired to the MIC; set to Line if timing is derived from an Optical Carrier card.
- *SSM Message Set*—Choose the message set level supported by your network. If a Generation 1 node receives a Generation 2 message, the message will be mapped down to the next available Generation 1. For example, a ST3E message becomes a ST3.
- *Quality of RES*—If your timing source supports the reserve S1 byte, you set the timing quality here. (Most timing sources do not use RES.) Qualities are displayed in descending quality order as ranges. For example, ST3<RES<ST2 means the timing reference is higher than a Stratum 3 and lower than a Stratum 2. See Table 3-13 and Table 3-14 for more information.
- *Revertive*—If checked, the ONS 15327 reverts back to a primary reference source after the conditions that caused it to switch to a secondary timing reference are corrected.
- *Revertive Time*—If *Revertive* is checked, enter the amount of time the ONS 15327 will wait before reverting back to its primary timing source.

The BITS Facilities section sets the parameters used by your BITS1 and BITS2 timing references. Many of these settings are determined by the timing-source manufacturer. The BITS 1 port is on MIC-A and the BITS 2 port is on MIC-B.

- *State*—Set the BITS reference to IS (In Service) or OOS (Out of Service). For nodes set to Line timing, set State to OOS; for nodes using external timing, or nodes using the external BITS out, set State to IS.

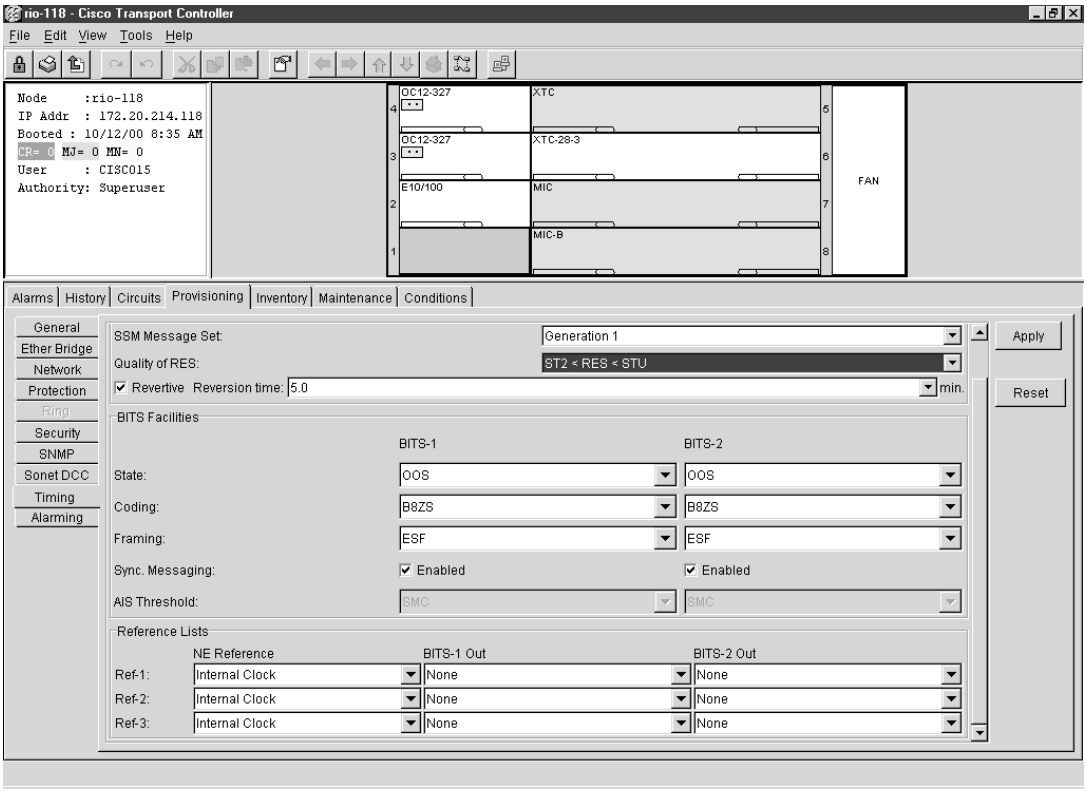
- *Coding*—Set to the coding used by your BITS reference, either B8ZS or AMI.
- *Framing*—Set to the framing used by your BITS reference, either ESF (Extended Super Frame, or SF (D4)(Super Frame). SSM is not available with Super Frame.
- *Sync Messaging*—Check to enable SSM.
- *AIS Threshold*—Sets the quality level where a node sends an alarm indication signal (AIS) from the BITS 1 Out and BITS 2 Out MIC pins. When a node times at or below the *AIS Threshold* quality, an AIS is sent (used when SSM is disabled or frame is SF).

Reference fields define up to three timing references for the node and up to six BITS Out references. BITS Out references define the timing references used by equipment that can be attached to the node's BITS Out pins on the MIC. If you attach equipment to BITS Out, you must attach it to a node in Line mode because equipment near the External timing reference might be directly wired to the reference.

- *NE Reference*—Defines up to three network element (the current node) references, Ref 1, Ref 2, Ref 3. The options displayed depend on the node's timing mode. If the timing mode is External, the options are BITS1, BITS2, and Internal. If the timing mode is Line, the node's working optical cards are displayed. In this case, select optical ports on cards that are directly or indirectly connected to a BITS timed source, that is, the node's trunk cards.
- *BITS 1 Out/BITS 2 Out*—Define the timing references for equipment wired to the BITS Out pins. Normally, BITS Out is used with Line nodes, so the options displayed are the working optical cards.

Note Changing the BITS facilities settings affects both BITS In and BITS Out.

Figure 3-22 Setting timing parameters



Step 4 Click **Apply**.

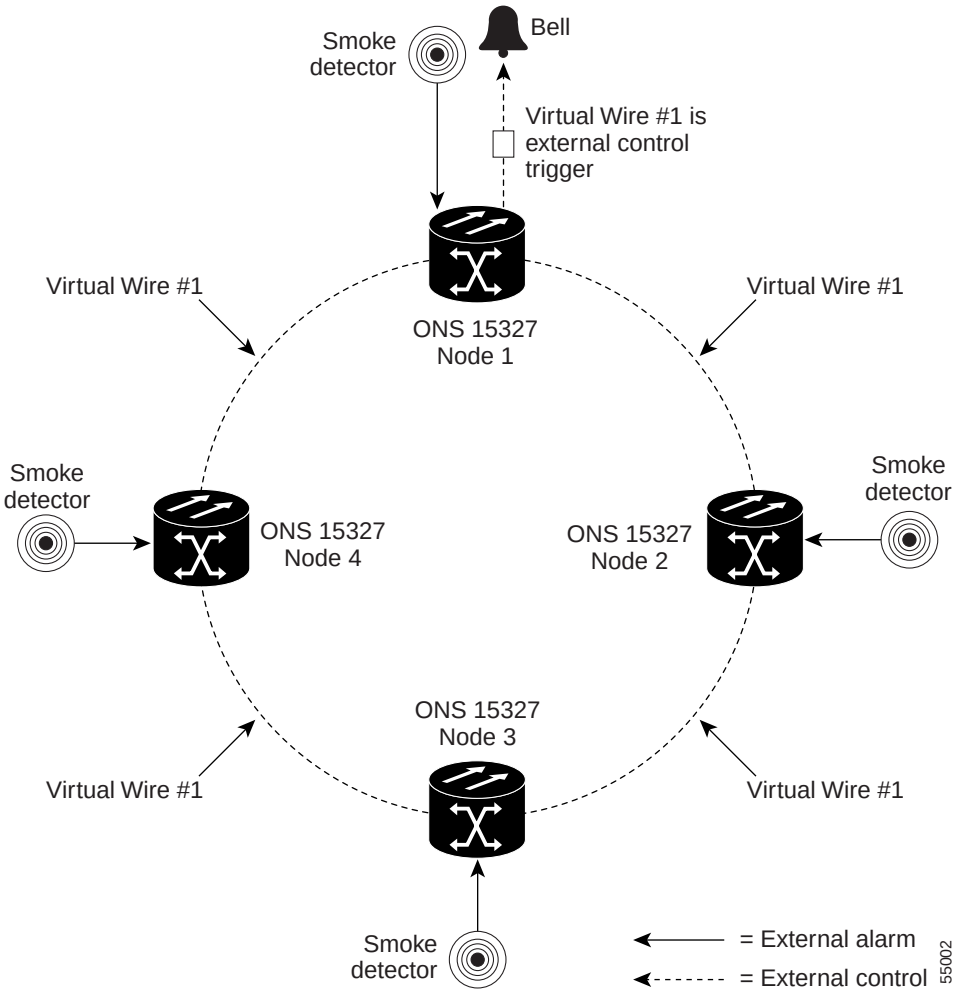
3.12 Setting Up External User-Provisionable Alarms

You can use CTC to provision up to six external input alarms and two external output controls for the ONS 15327. The XTC card houses the control logic for external alarm inputs and outputs.

3.12.1 Using Virtual Wires

Provisioning the external alarms provides a “virtual wires” option that you can use to route external alarms and controls from different nodes to one or more alarm collection centers. For example, in Figure 3-23, smoke detectors provisioned as external alarms at Nodes 1, 2, 3, and 4 are assigned to Virtual Wire #1, and Virtual Wire #1 is provisioned as the trigger (external output control) for an external bell at Node 1.

Figure 3-23 Example of external alarms and controls in a virtual wire configuration



3.12.2 External Input Alarms

Use external alarms for sensors such as open doors, temperature sensors, flood sensors, and other environmental conditions.

Procedure: Provision External Alarms

Step 1 Wire the external-device relays to the Alarm RJ-45 connector on the MIC.

Step 2 Log into CTC and display the working XTC card in card view.

Step 3 Click the **External Alarms** subtab (Figure 3-24).

Step 4 Complete the following fields for each external device wired to the RJ-45 connector on the MIC card:

- *Enabled*—Click the box to activate the fields for the corresponding alarm input number.
- *Alarm Type*—Select an alarm type from the list provided.

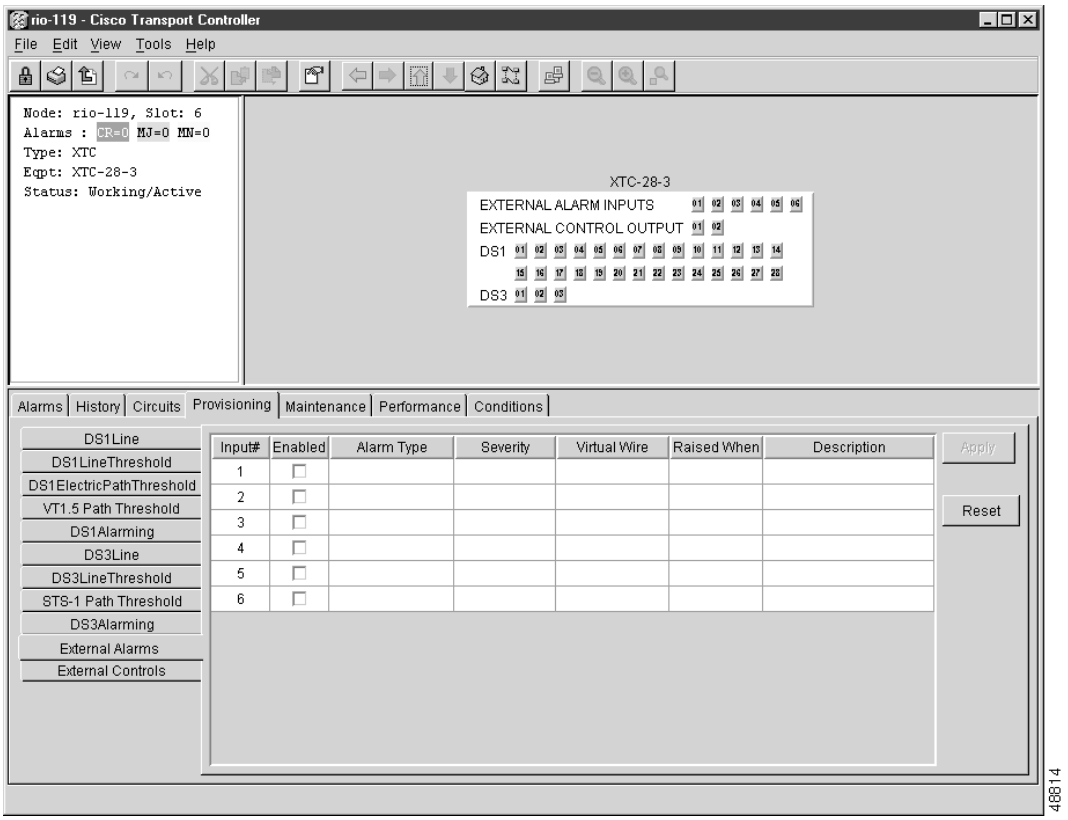
- *Severity*—Select a severity. The severity determines how the alarm displays in the CTC Alarms and History tabs and whether the LEDs activate. Critical, Major, and Minor activate the appropriate LEDs. Not Alarmed and Not Reported do not activate LEDs, but do report the information in CTC.
- *Virtual Wire*—Select the virtual wire that will carry the alarm signal (none or Virtual Wire 1– 4).
- *Raised When*—Select the contact condition (open or closed) that will trigger the alarm in CTC.
- *Description*—Default descriptions are provided for each alarm type; change the description as necessary. The description appears in Alarms tab view when the alarm is raised.

Step 5 To provision additional devices, complete Step 4 for each additional device.

Step 6 Click **Apply.**

Figure 3-24 shows the External Alarms subtab.

Figure 3-24 The External Alarms subtab showing the XTC-28-3 card



3.12.3 External Output Controls

Use external controls, or office alarms, to drive visual or audible devices such as bells and lights. The alarm-triggering conditions for the external controls can be the user-defined external input alarms (virtual wire), local severity-based alarms (e.g. trigger when any Major alarm happens), or remote severity-based alarms.

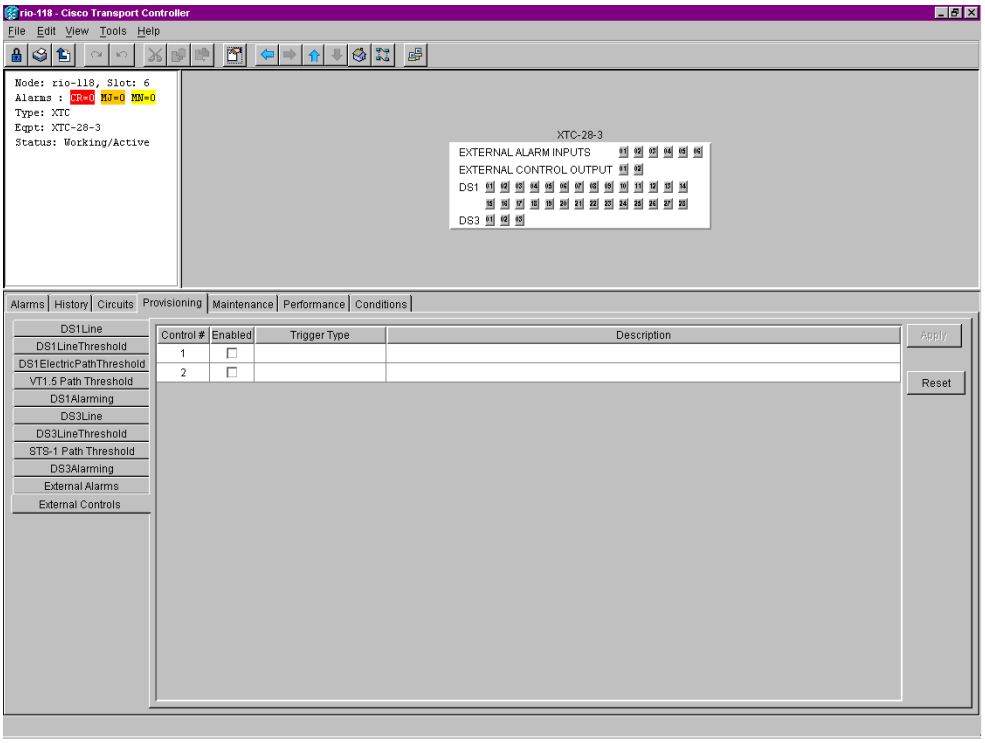
Procedure: Provision External Controls

Step 1 Wire the external control relays to the ALARM RJ-45 connector on the MIC.

Step 2 In CTC, log into the node and display the XTC card view.

Step 3 Click the **External Controls** subtab as shown in Figure 3-25.

Figure 3-25 The External Controls subtab showing the XTC-28-3 card



Step 4 Complete the following fields for each external control wired to the Alarm connector on the MIC:

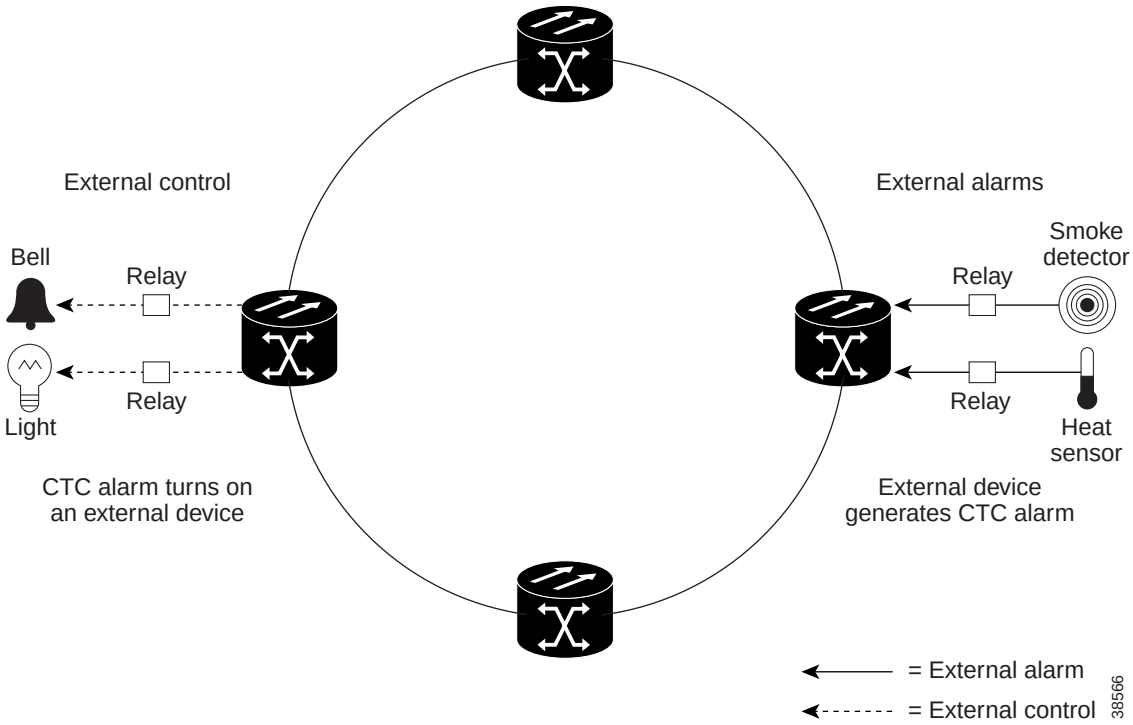
- *Enabled*—Click the box to activate the fields for alarm input number 1 or 2.
- *Trigger Type*—Select a trigger type: a local Minor, Major, or Critical alarm; a remote Minor, Major, or Critical alarm; or a virtual wire activation.
- *Description*—Enter a description.

Step 5 To provision additional controls, complete Step 4 for each additional device.

Step 6 Click **Apply.**

Figure 3-26 shows a functional diagram of alarm input and output.

Figure 3-26 Example of the external alarm input and output process

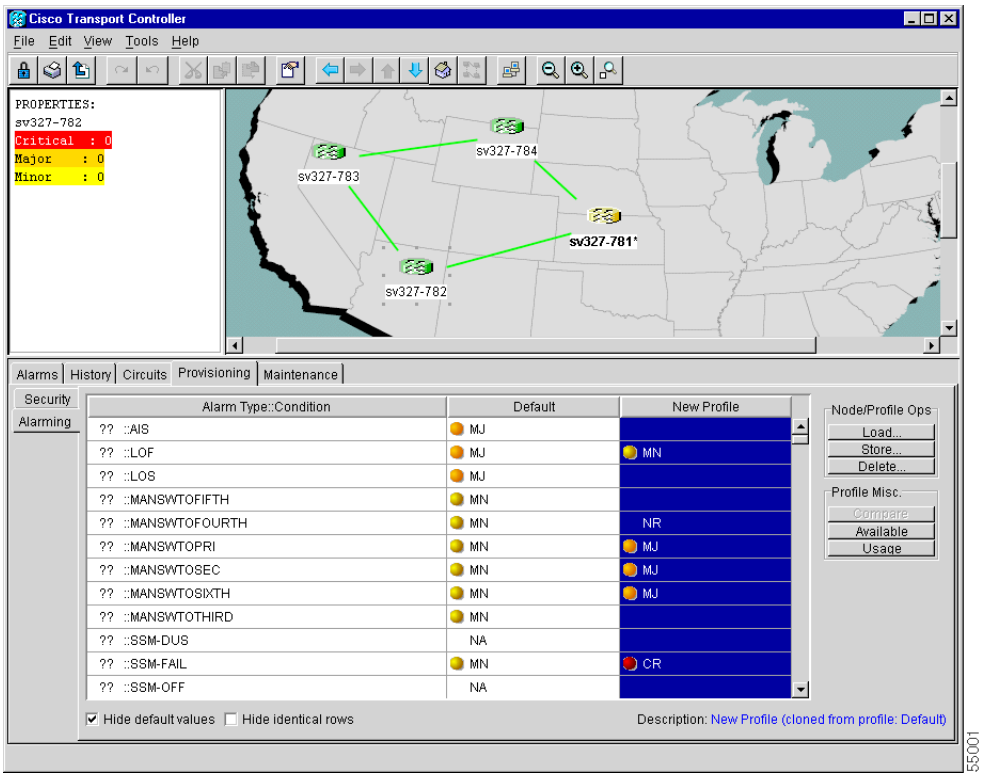


3.13 Creating Alarm Profiles

The Alarm Profiles feature allows you to provision alarm severities by creating unique alarm profiles for individual ONS 15327 nodes. A profile you create can be applied to a port, card, node, or all nodes on the network. Alarm profiles must be stored on a node before they can be applied to a node, card, or port.

To assign alarm profiles to electrical ports, see the “DS-1 and DS-3 Alarming” section on page 5-6. To assign alarm profiles to optical ports, see the “Optical Alarm Settings” section on page 5-10. To assign alarm profiles to Ethernet ports, see “Ethernet Alarm Settings” section on page 5-11.

Figure 3-27 The Alarming tab showing the default profile and a new profile



Alarm Profiles are created at the network view using the Provisioning > Alarming tabs (Figure 3-27). A default alarm profile (in the Default column) is pre-provisioned and you use the Clone feature to create new profiles based on the default alarm profile.

The Alarming tab shows the default profile and the new profile. It also has two headings, Node/Profile Ops and Profile Misc, which include six alarm profile buttons. Table 3-15 lists and describes each of the alarm profile buttons.

Table 3-15 Alarm Profile Buttons

Heading	Button	Description
Node Profile Ops	Load	Loads a profile from either a node or a file
	Store	Stores profiles to a node (or nodes) or to a file
	Delete	Deletes profiles from a node
Profile Misc.	Compare	Displays differences between alarm profiles (i.e. individual alarms that are not configured equivalently between profiles)
	Available	Displays all of the profiles available on each node
	Usage	Displays all of the entities present in the network and which profile(s) each is using

Five additional alarm profile options are located in a Profile Editing menu that you can display with a right-click in any column that contains an alarm profile. Table 3-16 lists and describes the profile editing options available when you right-click an alarm profile column.

Table 3-16 Alarm Profile Editing Options

Button	Description
Store	Loads a profile from either a node or a file
Rename	Changes a profile name
Clone	Creates a new profile that contains the same alarm severity settings as the highlighted profile (the profile being cloned)
Reset	Restores a profile to the state of that profile before it was last applied or to the state when it was first loaded, if it has not yet been applied
Remove	Removes a profile from the table editor

Alarm severity is changed/assigned using a menu. To view this menu, right-click the alarm you want to change in its alarm profile column. Seven alarm severity levels appear:

- CR: Critical alarm
- MJ: Major alarm
- MN: Minor alarm
- NR: Not reported
- NA: Not alarmed
- TR: Transparent alarm
- UN: Unset alarm

Transparent and unset alarms are associated only with alarm profiles and therefore do not appear when you view alarms, history, or conditions.

In addition to the alarm profile tabs, the Alarming tab displays two check boxes at the bottom of the screen: **Hide default values** and **Hide identical rows**. The **Hide default values** check box will be blank if the severity for that alarm is the same as the default. The **Hide identical rows** check box allows you to hide rows that contain the same severity in each profile.

Procedure: Create an Alarm Profile

Step 1 Display the CTC network view.

Step 2 Click the **Provisioning** > **Alarming** tabs.

Step 3 Right-click anywhere in the Default column to display the Profile Editing menu.

Step 4 Choose **Clone** from the menu.

Step 5 In the Clone Profile Default dialog box, enter a name in New Profile Name.

Profile names must be unique. If you try to import or name a profile that has the same name as another profile, CTC attempts to find an alternate name by adding a suffix.

Step 6 Click **OK**.

The new profile (named in Step 5) is created. It is identical to the default profile and is added as a new column on the far right-hand side.

Step 7 Modify (customize) the alarm profile:

(a) In the new alarm profile column, click in a row that contains the alarm severity you want to change.

(b) From the menu, select the desired severity.

(c) Repeat Steps a and b for each alarm that needs to be changed.

(d) After you have assigned the properties to your new alarm profile, click the **Store** tab.

(e) In the Store Profile(s) dialog box, select a node or nodes where the profile will be stored and/or specify a file on the workstation.

(f) Click **OK**.

Procedure: Apply an Alarm Profile at the Card View

Step 1 In CTC, display the card view of the desired DS-N card (the DS-N ports are located on the XTC card).

Step 2 Click the **Provisioning** > (**DS1** or **DS3**) **Alarming** tabs.

Step 3 To apply profiles on a port-to-port basis:

(a) Click the appropriate row under the **Profile** column for the port desired.

(b) Choose the appropriate profile.

(c) Click **Apply**. (Multiple port profiles can be selected before clicking **Apply**.)

Step 4 To set a profile for all the ports on a card:

(a) Click the **Force all ports to profile** menu arrow at the bottom of the screen.

(b) Choose the appropriate profile.

(c) Click **Force (still need to "Apply")**

(d) Click **Apply**.

Tip If you choose the wrong profile, click **Reset** to return to the previous profile setting.

Procedure: Apply an Alarm Profile at the Node View

Step 1 In CTC, display the node view.

Step 2 Click the **Provisioning** > **Alarming** tabs.

Step 3 To apply profiles on a card basis:

(a) Click the **Profile** column for the card desired.

(b) Choose the appropriate profile.

(c) Click **Apply**. (Multiple card profiles can be selected before clicking **Apply**.)

Step 4 To apply the profile to an entire node:

(a) Click the **Node Profile** menu arrow.

(b) Choose the appropriate profile.

(c) Click **Apply**.

Note The Port Overrides column at the node view reads true when additional profiles are available and false when only the inherited profile is available.

Tip If you choose the wrong profile, click **Reset** to return to the previous profile.

3.14 Printing and Exporting CTC Data

You can print CTC windows and CTC data that displays in columns, such as alarms and inventory. You can also export CTC table data in formats that can be used by other applications such as spreadsheets, word processors, and database management applications. Table 3-17 shows the CTC data that you can export.

Table 3-17 Exportable CTC Table Data

View	Tab	Subtab
Node	Alarms	
	History	Node/Session
	Circuits	
	Provisioning	Ether Bridge/Network (Static Routes)/Alarming
	Inventory	
	Maintenance	Ether Bridge/Software/Audit/Routing Table
Network	Alarms	
	History	
	Circuits	
	Provisioning	Security (Print Only)/Alarming
	Maintenance	Software
OC Cards	Alarms	
	History	Session/Card
	Circuits	
	Provisioning	Line/Threshold/Alarming
	Maintenance	Loopback/Protection (print only)
	Performance	
Ethernet Cards	Alarms	
	History	
	Circuits	
	Provisioning	Port/VLAN/Card (print only)/Alarming
	Performance	Statistics/Utilization/History

Table 3-17 Exportable CTC Table Data (continued)

View	Tab	Subtab
XTC Cards	Alarms	
	History	Session/Card
	Circuits	
	Provisioning	DS1 Alarming/DS3 Alarming/External
	Maintenance	
	Performance	DS1/DS3

Procedure: Print CTC Data

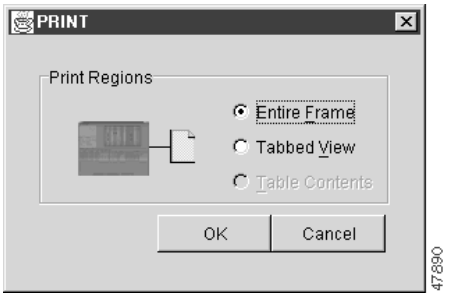
Use the following procedure to print CTC screens and data. Before you start, make sure your PC is connected to a printer.

Step 1 From the File menu on the menu bar, click **Print**.

Step 2 In the Print dialog box (Figure 3-28), choose an option:

- *Entire Frame*—Prints the entire CTC window
- *Tabbed View*—Prints the lower half of the CTC window
- *Table Contents*—Prints CTC data in table format; this option is only available for CTC table data (see Table 3-17)

Figure 3-28 Printing the CTC window



Step 3 Click **OK**.

Step 4 In the Windows Print dialog box, choose a printer and click **Print**.

Procedure: Export CTC Data

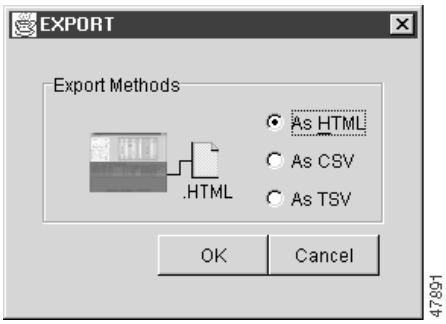
Step 1 From the File menu, click **Export**.

Step 2 In the Export dialog box (Figure 3-29), choose an option:

- *As HTML*—Saves the data as an HTML file. The file can be viewed with a web browser without running CTC.
- *As CSV*—Saves the CTC table values as text, separated by commas. You can import CSV data into spreadsheets and database management programs.

- *As TSV*—Saves the CTC table values as text, separated by tabs. You can import TSV data into spreadsheets and database management programs.

Figure 3-29 Exporting CTC data as HTML



Step 3 Click **OK**.

Step 4 In the Save dialog box, enter a file name in one of the following formats:

- *[filename].htm* for HTML files.
- *[filename].csv* for CSV files.
- *[filename].tsv* for TSV files.

Step 5 Navigate to a directory where you will store the file.

Step 6 Click **OK**.

3.15 Displaying CTC Data in Other Applications

You can display CTC data exported in HTML with any web browser application, such as Netscape or Microsoft Internet Explorer. To display the data, use the web browser's File/Open command to open the CTC data file.

You can display CTC data exported as comma separated values (CSV) or tab separated values (TSV) in text editors, word processors, spreadsheets, and database management applications. Although procedures depend on the application, you can typically use File/Open to display the CTC data. Text editors and word processors display the data exactly as it is exported. Spreadsheet and database management applications display the data in cells. You can format and manage the data using the spreadsheet or database management application tools.