Using the NMT

This chapter provides instructions for using the NMT interface, presents an overview of the modeling process, and lists NMT commands that update or extract information from NMT configuration files. This chapter contains the following sections:

- NMT Startup
- NMT Menu Bar
- File Menu
- Keyboard Commands
- Modeling Processes
- Error Checking
- Work Flow

The NMT models a network based on your input. Using your input about the network you want to model, the NMT helps identify the hardware needed by provisioning the chassis with front cards and back cards. The NMT routes the connections using the same software as the WAN switches, based on the Connection Admission Control (CAC). The NMT is aware of all physical and logical constraints that would prevent a connection or a trunk from being provisioned or routed. NMT is also aware of the different features and constraints in each major switch software release.

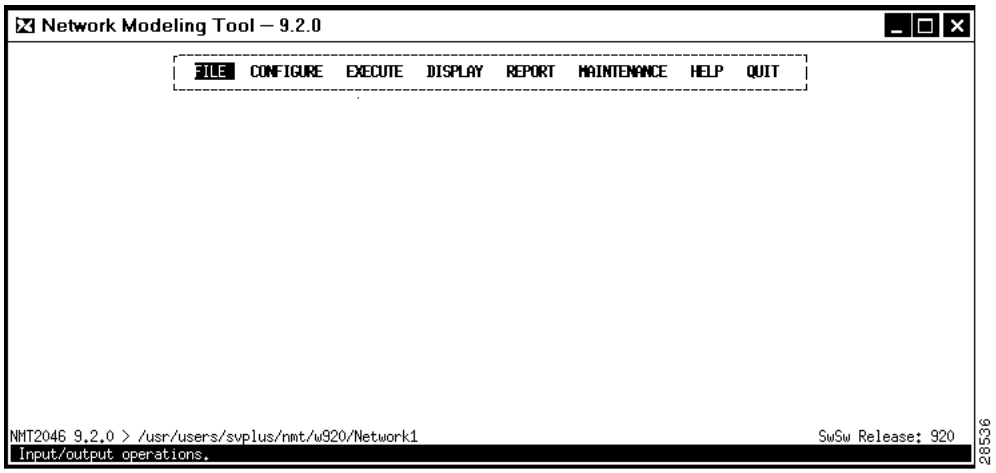
Connection routing can be verified in the network's basic state. The connection re-routing can be verified for any failure scenario. Simulation of failure of all network elements can verify the network's resiliency.

NMT Startup

If you are running NMT on a UNIX platform, start the NMT by entering the command **nmt**. This launches an xterm window for the NMT interface (Figure 3-1).

If you are running NMT on a PC platform, start the NMT by clicking on the nmt.exe file located in the NMT/bin subdirectory. This launches an xterm window for the NMT interface

Figure 3-1 NMT Main Window

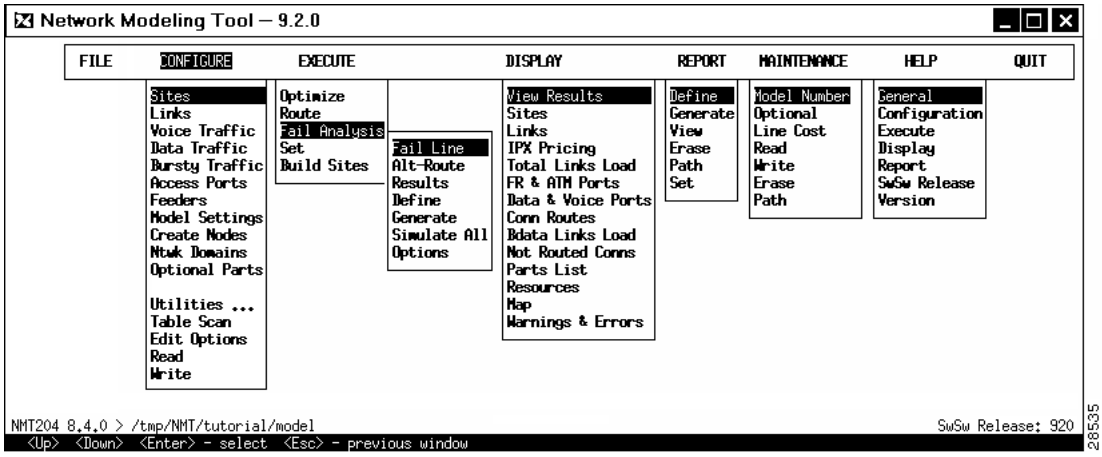


NMT Menu Bar

The menus in the NMT main window contain selections for inputting data that describes the existing or proposed network. These menus also provide selections for generating optimized configurations and many different types of reports. (See Figure 3-2.) The menus are as follows:

- **File**—Contains choices for opening, closing, deleting, and saving your file. It also provides options for importing and exporting files to other formats, changing paths, and viewing a summary of your network.
- **Configure**—Contains choices for describing the network model, including site names, links, and traffic types.
- **Execute**—Provides choices for analyzing and optimizing the network model.
- **Display**—Shows predefined reports describing the sites, links, required hardware, error messages and warnings, and much more. Includes a map tool selection for creating a graphical representation of your network.
- **Report**—Provides options for generating, defining, and displaying reports.
- **Maintenance**—Includes selections for modifying prices and part names and for specifying line costs.
- **Help**—Provides information about how to use the program and describes many of the menus and menu items in the NMT.
- **Quit**—Exits the NMT application.

Figure 3-2 NMT Design Menu (All Menu Options Displayed)



When you highlight a menu item, a one-line description of the selection is displayed beneath the menu. The NMT Design menus and their menu items are further described in the sections that follow.

File Menu

You can access the following commands from the File menu in the Network Design Tools window:

- **New**—Opens a new file. Clears all read and entered topology information.
- **Open**—Opens a previously saved file.
- **Save**—Saves the current configuration.
- **save as...**—Saves the current configuration under a new name.
- **Import**—Reads configuration data from other formats and imports it into the current file.
  - DBF—Import topology from DBF tables and the SSI MS Excel Interface.
  - WANDL—Read the topology from the set of WANDL files specified by their SPEC file.
  - MAP—Read any changes made with the Map interface back into the CNF file.

Note Save changes in the map interface before importing that Map interface into the CNF file.

- **Export**—Writes the configuration data to other formats.
  - DBF—Output table in DBF format for SSI MS Excel Interface.
  - WANDL—Output topology in WANDL format for Further optimization and analysis.
  - CSV—Output Tables in comma separation values.
- **Read 2nd CNF—**Merges all or some tables of one configuration file into another. This enables you to perform certain operations on two separate configuration (CNF) topologies. For example, updating the fields in one CNF table automatically updates the same fields in other CNF tables. You can also use this option to compare two CNF files.
- **Delete**—Erases the configuration file.
- **Change Path**—Changes the current directory path.

- **View Summary**—Shows a summary of the current topology.
- **Report Site**—Shows a summary of a specific site.

Saving Configurations

Save your configuration regularly. The directory path is shown in the bottom left of the window. When you read in configuration files, the path is updated to include the current filename. You can also change the path to read and store files in other directories.

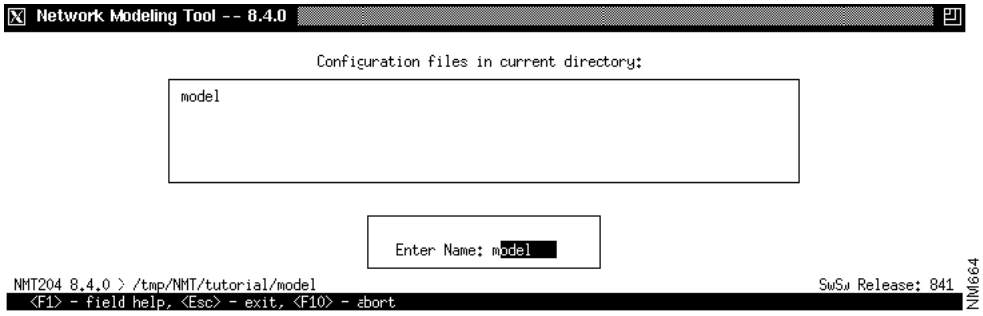
To save a configuration, follow these steps:

Step 1 Select **Save** or **Save as...** from the file menu, or select **Write** from the **Configure** menu

Step 2 Enter a name in the Enter Name dialog box. (See Figure 3-3.)

Step 3 Press **Enter**.

Figure 3-3 File Save Window



Configure Menu

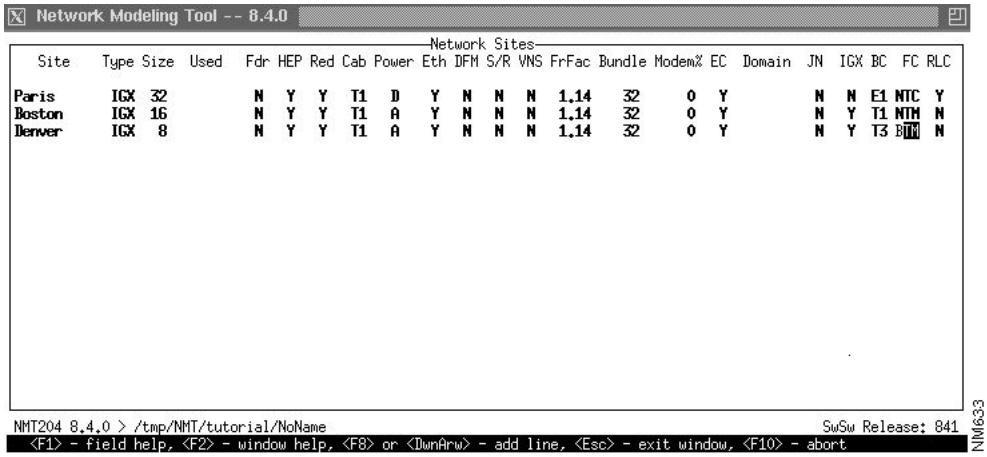
You can view the following tables from the Network Design Tools Error Checking option in the Configure menu:

- **Sites**—Configuration for Network Sites having one or more WAN switches, controllers, and/or feeders.
- **Links**—Existing links and possible links considered for the network design.
- **Voice Traffic**—Customer voice connections and T1/E1 emulation configurations.
- **Data Traffic**—Customer data connection information.
- **Bursty Traffic**—Customer Frame Relay, ATM, and Circuit Emulation connection information.
- **Interfaces**—Customer port assignment, configuration, and partitioning information.
- **Feeders**—Customer access feeders configuration for feeders not specified in the site table.
- **Cards**—Optional table for card slot assignment.
- **Groups and Networks**—PNNI domain names, parameters, hierarchy, and network domain names.

- **Nodes**—User defined node types and restraints.
- **Parameters...**—Global network settings and model options.
- **Utilities...**—Utilities for making global modifications to the configuration file.
- **Table Scan**—Scans all loaded configuration tables for errors.
- **Edit Options**—Modifies the preferences.
- **Read**—Opens a previously saved file. This option is the same as **Open** in the File menu.
- **Write**—Saves the current configuration under a new name. This option is the same as Save as... in the File menu.

The configuration tables define all the network elements necessary for the model, and their parameters. All parameters not specified will default to the latest part available, or the maximum setting, or the standard setting. Many network elements can be defined explicitly in tables, or if not, the NMT will automatically generate implicit network elements. Figure 3-4 shows an example of a configuration table.

Figure 3-4 Sites Table



You can either input or import a configuration.

- To input a configuration, you enter data into tables accessed from the **Configure** menu. For information about inputting a configuration, refer to the section "Keyboard Commands" earlier in this chapter, and see the chapter "Modeling Simple Networks," which provides a step-by-step example of inputting a configuration.
- To import data from Cisco Wan Manager (CWM), see the chapter "Configuration Extraction Tool"; to import (or export) WANDL files, see the chapter "Third-Party Interface"; to import (or export) Microsoft Excel files, see the chapter "SpreadSheet Interface."

For descriptions of the fields contained in the **Configure** menu selections, refer to Chapter 4, "Configuration Tables and Fields."

Note The NMT assumes that the version of the switch software you are using is the same as that of the NMT software. If that is not the case, select **Model Settings** from the **Configure** menu and specify the switch software version you are using by entering a release number next to Network Parameter Switch Software Release. Individual platforms can have unique switch software releases specified in the Site table.

Utilities

Use the Utilities in the Config menu to make bulk changes to the CNF file.

- Expand Quantities — For all records for quantity field value of greater than one, change the quantity value to one and duplicate the record the number of times that appeared in the quantity field.
- Table Conn Merge — Merges connections with identical parameters into one table record, increasing the quantity field. An additional feature enables you to set the options to average the traffic values to further reduce the table record count.
- Order Table Data — Options for sorting the CNF tables by site name.
- Rename or Merge Site — Modify site names.
- Group Rename or Merge— Modify group names.
- Adjust %Util— Modify the %util fields in the connection tables.
- Mesh Data — Add new records such that link or connection tables are fully meshed. Options determine how the mesh is to be done. The weight field in the site table can be used in several ways to affect the outcome of the mesh.
- VH Coordinates — Utilities to create VH coordinates for the map display.
- Path Expansion— Update paths with complete slot/port information.
- Diff Pref Route vs. Cur— Compare all preferred routes to the existing routes in the CNF file.
- Clear Data — Reset or blank out various fields in the CNF file.
- Upgrade Implicit — After running ROUTE or EXECUTE command, have NMT insert any multiple switches at one site as separate entries into the site table
- Feeder MGX8220's — After running ROUTE or EXECUTE command, have NMT insert any implicit MGX8220's at one site as separate entries into the site table
- Store Model Data — After running ROUTE or EXECUTE command, have NMT store various data back into the CNF file. Individual fields can be selected in an additional menu.

Edit Options

Edit Options invokes edit form that includes few flags that control UI in the edit tables

- Strict UI Checking — controls validation of some of the fields like link type, link front card, connection interface, etc. Note, that all the data will be checked in any cases during Execute operation.
- Default CNF file — defines the name of CNF file that is used as a templates for edit tables. The first entry for each table in this file is used as default values when adding new table entries.
- Correct Table Data — controls writing back corrections that makes NMT back to the user data.

  If set to 'Y' (default value), the NMT will write back to the CNF all the corrections it makes internally; if set to 'N' - user data will remain in the state the user sees them in the edit tables.
- Check Route Paths — Enables/disables route checking.
- Suppress Duplicate Messages — After five similar messages appear in the log, suppress all additional messages of that type, and provide the count of suppressed messages.

  If set to 'N' (default value), the UI will skip route checking, so it will be checked during Execute operation. If set to 'Y' the user will be able to check routes in the UI and correct them if necessary.

Defaults

To create your own defaults for any or all tables, create a CNF file and call it DEFAULTS. Save it to your working directory. Any new records you create for a field in any table will have the values of the first entry in that table. To use an existing file for your defaults, select it in the edit options window.

Note This option does not apply to the site names field in any table.

Execute Menu

You can access the following commands from the File menu in the Network Design Tools window:

- **Route**—Routes traffic over specified links
- **Fail Analysis...**—Performs failure analysis on the lines and forces NMT to create alternate routes.
- **Build Sites**—Provisions the nodes without routing.
- **Optimize**—Uses selected links to create a least cost topology.

Display Menu

You can access the following commands from the File menu in the Network Design Tools window:

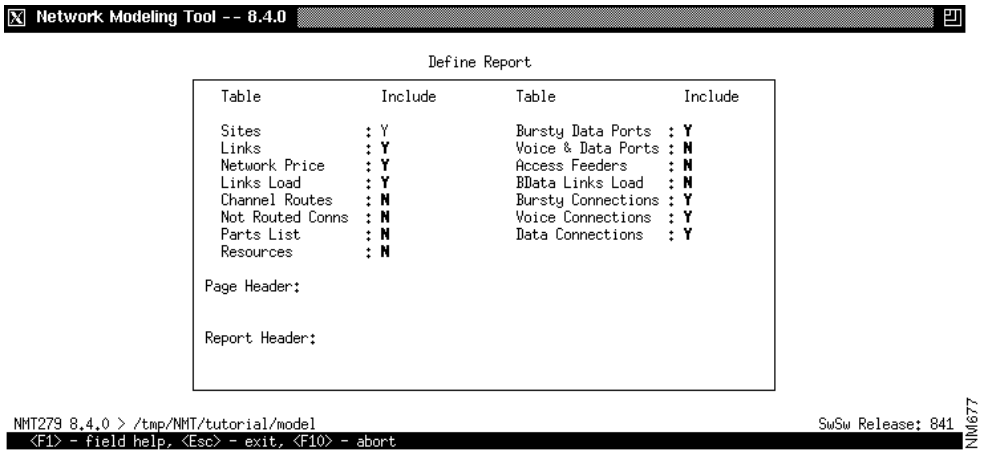
Sites	Displays customer site information.
Links	Displays a list of links in the current network.
Network Summary	Displays summaries of the current network costs and routing status.
Total Links Load	Displays static load estimates by traffic type for each link in the network.
ATM & Fr Ports	Site name, connection type (for example, FRM-V35), slot number, port number, port speed (cells or packets per second), SUM MIN (port load).
Data & Voice Ports	Site name, connection type (for example, SDP-V35), slot number, port number, port speed.
Connection Routes	Connection to/from, number of connections, connection type (for example, FR, 56), path number of hops, delay time in msec for voice and NTS connections.
Failed Connections	Displays failed connections and connections that have not been routed.
Parts List	Listed by site, including part number, description, quantity, cost per site.
Resources	Graphical display of each node's card cage showing front cards and back cards.
PNNI Topology	Displays PNNI logical links.
User Message	View or clear the message log. You can also view the message log by entering **<Ctrl> W**.
Map	Network topology map.

Report Menu

Use the **Report** menu to define, generate, display, and save reports. The menu contains the following options:

Define	Selects which tables to include in a report. Figure 2-5 shows the Define Report window. In this window you can specify the contents of the report and also add a report header. Enter one of the following options: **Y**—includes a report in a report file. **N**—do not include a report in the report file. **X**—do not generate a report (saves execution time).
Generate	Names and generates a report.
View	Selects a report to display.
Erase	Deletes a report from the current directory.
Path	Sets the directory path.
Set Options	Specifies the following report variables: • Price Option— Enter **0** for normal pricing. Enter a number from **1** through **5** to specify number of years in lease. • Detail Reports— Enter **Y** to generate Bursty Link Load Reports. Enter **N** to exclude Bursty Link Load Reports. • Output DBF Reports— Enter **Y** to create a report in DBF and text format. Enter **N** to create report only in text format. • Output Pref Rte — Sets Preferred routes. **Y** to output a file of preferred routes that can be inserted into switch CLI commands to create those routes. • Bundle Connections — **Y** will keep connections bundled by routing properties in the reports to reduce the size. **N** will expand reports for each individual connection. • Output Map Info —**Y** will write the information from a NMT command to be input into the MAP graphical display. **N** will not to reduce execution time. • Map Site Feeders — **Y** will display all feeder sites and their links on the map, **N** will display only routing nodes and links. • Map MultiNode Sites — **Y** will display each switch in the case where NMT generated addition switches at a site, **N** will display only one marker for site table entry.

Figure 3-5 Report Options



Maintenance Menu

Use the **Maintenance** menu to revise product costs, add optional equipment (for reference purposes), and provide information about line costs. This menu also allows you to read, write, erase, and set the path for maintenance files. The menu contains the following options:

Parts List	Displays a list of Cisco Systems WAN part model numbers.
Line Cost	Displays line cost information.
Read	Loads a previously saved maintenance file.
Write	Saves a maintenance file.
Erase	Deletes a maintenance file.
Change Path	Changes the current directory path.

Help Menu

The NMT has several kinds of online help. The **Help** menu provides information about how to use the program and describes many of the menus and menu items in the NMT.

Quit

The Quit item on the NMT Menu Bar is used to close the NMT application. When you choose this option, a popup window appears asking whether you are sure you want to quit NMT. Type Y and hit return to quit. Type No and hit return to continue working in NMT.

Keyboard Commands

To select a top-level menu item in the NMT design window, use the left and right arrow keys. Press **Enter** to access a submenu. Select submenu entries with the up or down arrow key or by typing the first letter of the submenu entry. To exit from a table or menu, press **Escape**.

The NMT has many keyboard commands to help you create and revise configuration tables and reports. Table 3-1 lists the Sun workstation key assignments used for editing data in the NMT.

Table 3-1 Sun Key Assignments

Key	Function	Description
F1	Field help	Text description of the current field.
F2	Window help	Displays a list of key definitions for data entry and editing.
F3	Copy line	Copies the current line. The Repeat Line command then can be used to repeat it one or more times.
F4	Repeat line	Inserts a previously copied line below the current line.
F5	Choice List	Displays a list of key definitions for data entry and editing (same as F2). **Note** This command is only available on the PC version of NMT.
F6	Clear end-of-field	Clears one field in a table.
F7	Delete line	Removes the current line. The line deleted will be saved in a buffer from which it can be recalled by using the Undelete command.
F8	Insert line	Inserts a table entry below cursor.
F9	Undelete line	Inserts the last deleted line above the current line. If the command is repeated, the last deleted line that has not been undeleted (if any) will be inserted above the current line. A maximum of 50 lines can be undeleted.
F10	Cancel/Abort Table	Exits a table without checking data. If the Exit command has been previously issued, the command will delete all lines in the table that contain illegal data.
Up Arrow	Previous line	
Down Arrow	Next line/Add row	Inserts default field values for new rows.
Left Arrow	Previous Field	
Right Arrow	Next Field	
Page Up	Previous Page	
Page Down	Next Page	
Home	First Page, first row	
End	Last page, last line	
Help, F12	Choices	Lists choices for the selected field. Lists of choices are available for most fields that accept three or more non-numeric values. In the site field, you choose a site by pressing Help (or F12) and then using the up or down arrows to scroll through the site names; press enter to select a site.
Esc	Exit	Exits a table or menu and, in some cases, checks the data in the table.
Ctrl-f	Find Site	Prompts you for site name, and then finds the next table entry using that site name.

Table 3-1 Sun Key Assignments (continued)

Key	Function	Description
Ctrl-g	Go to line/Display line	Reports line number of current table entry. Entering a number allows you to go to that specific table entry.
Ctrl-h	First Field	Moves cursor to the first field in the row.
Ctrl-j	Last Field	Moves cursor to the last field in the line.
Ctrl-k	Left One Space	Moves cursor left one character (within a selected field). If the cursor is on the first character in the field, this command moves the cursor to the previous field.
Ctrl-l	Right One Space	Moves cursor right one character (within a selected field). If the cursor is on the last character in the field, this command moves the cursor to the next field.

Help Keys

You can get help using keyboard commands as follows:

- Pressing the F1 key. If you are unsure what data to enter when the cursor is in a field of a table, you can press the F1 key to display a help screen that lists and describes the options for that field.
- Pressing the F2 key. This provides a description of the window editing and cursor capabilities of the function keys for a selected table.
- Highlighting an item in a menu, which displays a one-line description.
- If you enter an unacceptable value (for example, IXG instead of IGX) into an NMT field, the system beeps and an explanation is displayed at the bottom of the window.
- Press the Help or F12 key (or F5 in the PC version of NMT) to display a “Choice List”. You can scroll through the list to select a valid entry for the field. Not all fields have a choice list.

Message Keys

Enter **Ctrl-w** from any where in NMT to view working and error messages from your working session.

Modeling Processes

The NMT models your configuration when you select one of the options under the **Execute** menu.

If there is any problem with your configuration, a message box displays the following message:

```
New warning messages generated.
```

To check your warning messages, enter **Ctrl-w**.

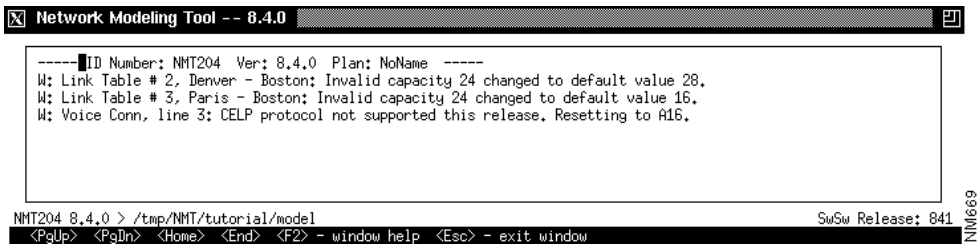
The NMT generates three types of messages:

- **L**—Log messages are generally displayed when the NMT records the command the user requested.
- **I**—Informational messages generally indicate that site or link parameters have been modified to comply with user entered data.
- **W**—Warning messages are generally displayed when the NMT modifies connection data.
- **E**—Error messages are generally displayed when the NMT cannot create a topology because of incorrect data.

The message box also keeps a log of the commands executed. The message box always scrolls to the last viewed message.

An example of warning output is shown in Figure 3-6.

Figure 3-6 Example of NMT Warning Output



Error Checking

The NMT does automatic error checking in the following circumstances:

- When you exit a data entry screen, the NMT automatically performs a line-by-line check of the data in your table.
- When you exit the **Configure** menu, the NMT checks your data again and, in many cases, makes corrections. If the NMT makes any changes or finds any errors, it generates information, warning, or error messages as needed. When this happens, you are instructed to select **Warnings & Errors** from the **Display** menu.

Note If you are working with a large configuration, you may want to exit the data entry screen without having the NMT perform a line-by-line check. To do this, press the F10 key instead of Escape key.

- When you select **Route**, **Optimize**, or **Build Sites** from the **Execute** menu, the NMT checks your data and may make corrections. If the NMT makes any changes or finds any errors, it generates information, warning, or error messages as needed. When this happens, you are instructed to select **Warnings & Errors** from the **Display** menu.

To thoroughly check and correct all configuration tables in VI mode, select **Table Scan** from the **Configure** menu.

Troubleshooting NMT

The table below describes a common NMT problems and what can be done about it.

Symptom	Your mouse does not work on the PC version of NMT. **Note** The mouse is not supported in the UNIX version of NMT.
Probable Causes	The **Quick Edit Mode** option is checked in the Console window's **Properties<Options** menu.
Solution	Open the **Properties** menu and ensure that Quick Edit Mode is not checked in the Options tab. If it is checked, click on the box next to Quick Edit Mode to un-check it, and then click **OK**.