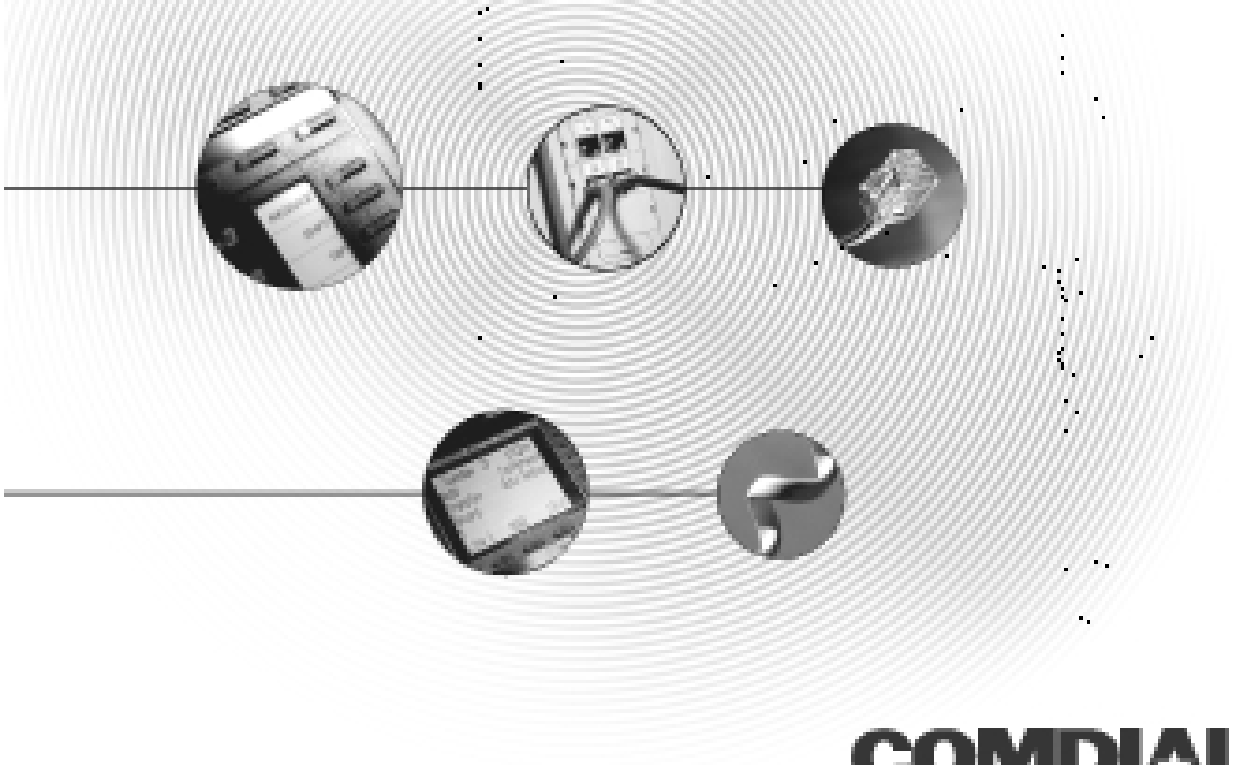
USER GUIDE

Comdial Network Management System

User Instructions



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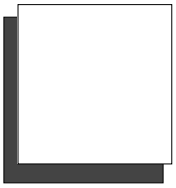

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1 Introducing the Network Management System

Describing the Network Management System

Comdial's Network Management System (NMS) is a utility that helps you maintain a networked digital communications system. The NMS consists of two parts: server software running on the communications system, and client software running on a PC that you connect to a serial port on the communications system. The NMS server software is part of feature set 16A. The NMS client software runs on Windows® 95, 98, NT (Service Pack 5 and later), and 2000 operating systems.

The NMS helps you do the following:

- identify potential resource shortages,
- diagnose problems with the network links,
- collect information on network activity,
- manage network alarms and indicators,
- test hardware integrity,
- synchronize network time across nodes in different time zones,
- validate the network software configuration,
- perform system diagnostic tests.

At startup and exit, the NMS requires a password. NMS has one password the user can set, and one password used by Comdial engineering.

The NMS client software communicates with the telephone system as an Open Architecture Interface (OAI) device through a serial data connection. That connection can be either to a hub in a networked configuration, or to a non-networked, stand-alone system. You can connect the NMS to a network node, but it will behave as a stand-alone system.

NOTE: Before connecting the NMS PC to a network node, Networking must be disabled on that node.

If the NMS is connected to a stand-alone system or to a network node, it can only access non-network information. The software limits the connection to one hub, node, or stand-alone system at a time.

When connected to a network hub, the NMS minimizes its use of data channels between nodes by delaying transmissions to leave maximum bandwidth for call processing.

The NMS PC must be directly connected to the communications system at all times. You can use pcANYWHERE™ for remote connection to the NMS PC.

NOTE: Using software other than pcANYWHERE can result in loss of data.

Using this Guide

This user's guide contains three chapters.

Chapter 1, *Introducing the Network Management System*, describes the NMS and its basic functions.

Chapter 2, *Installing the Network Management System*, contains instructions for loading the NMS software on your PC and for connecting the NMS PC to the hub.

Chapter 3, *Using the Network Management System*, contains instructions for using the NMS to run diagnostic tests on a networked communications system.

2 Installing the Network Management System

Installing the NMS Client Software

The PC that you install the NMS client software on must meet the following minimum requirements:

- Pentium 100 MHz,
- 64 MB RAM (128 MB RAM for Windows NT or 2000),
- Windows 95, 98, NT (Service Pack 5 and later), or 2000.

The NMS PC must be directly connected to the communications system at all times. You can use pcANYWHERE™ for remote connection to the NMS PC.

To install the NMS client software,

1. Insert the NMS CD in the computer's CD-ROM drive.
2. Using Windows Explorer, navigate to the CD-ROM drive. Double-click the **Setup.exe** icon in the CD's directory.
3. Following the prompts, accept the license agreement, enter your name, company name, and serial number.
4. Enter the directory where you want to install NMS. The default directory is **C:\Program Files\Comdial\NMSystem**.
5. Select **Typical**, then enter a name for the program folder.
6. Once setup is complete, click **Start/Programs/Network Management System/Network Management System Installation**. Accept the default prompts until installation is complete.
7. Once installation is finished, the Demo NMS program launches automatically. The password is **demo**.

Enabling the NMS Feature on the Communications System

The NMS system application is part of Feature Set 16A; however, you need a system software key to enable it. You must call Comdial to obtain a software key number, then enter that number using the VMMI.

Once you have obtained a software key number, you can use the System Key Wizard to enable the NMS without upgrading the system software. You can also enable the NMS at the same time you use the System Software Upgrade feature to download a software upgrade. Both the System Key Wizard and the System Software Upgrade are in the VMMI **Switch** menu.

For more information on upgrading system software, refer to the VMMI help topic titled *System Software Upgrade*.

To enable the NMS feature (without upgrading system software),

1. From the **Switch** drop-down menu select **Key Wizard**. From this dialog you can enter a new software key number or examine the features enabled by the current key.

2. Click **Next** to examine the features that the software key enables. If you provided a new key number and the correct features are enabled, click **Finish** to set the key on the system.

NOTE: The system resets itself when you change the key.

3 Using the Network Management System

Starting the Program

To start the Network Management System, click **Start/Programs/Network Management System/Network Management System.**

Once the NMS is running, the main window showing a diagram of the network appears. Since the NMS PC is connected to the hub, the representation is from the hub's perspective. The names of the hub and the nodes are constantly shown on the screen. Only nodes and networked links programmed into the hub network configuration are shown in the diagram.

Double-clicking on the hub or a node displays the Node Information screen, which contains identification information.

Clicking on a network link displays the Network Board Information screen, which contains identification information for the node's network boards.

Holding the mouse pointer over an object (hub, node, or network link) for a few seconds will display summary information about the object. For a hub or node the information includes node name, node ID, and system type. For a network link, the information includes the number of network boards, the current voice channels busy, and the total voice channels available.

Click on a hub or node to select it. Once you have selected a node, you can click on one of the top function buttons to read NMS information for that node or hub.

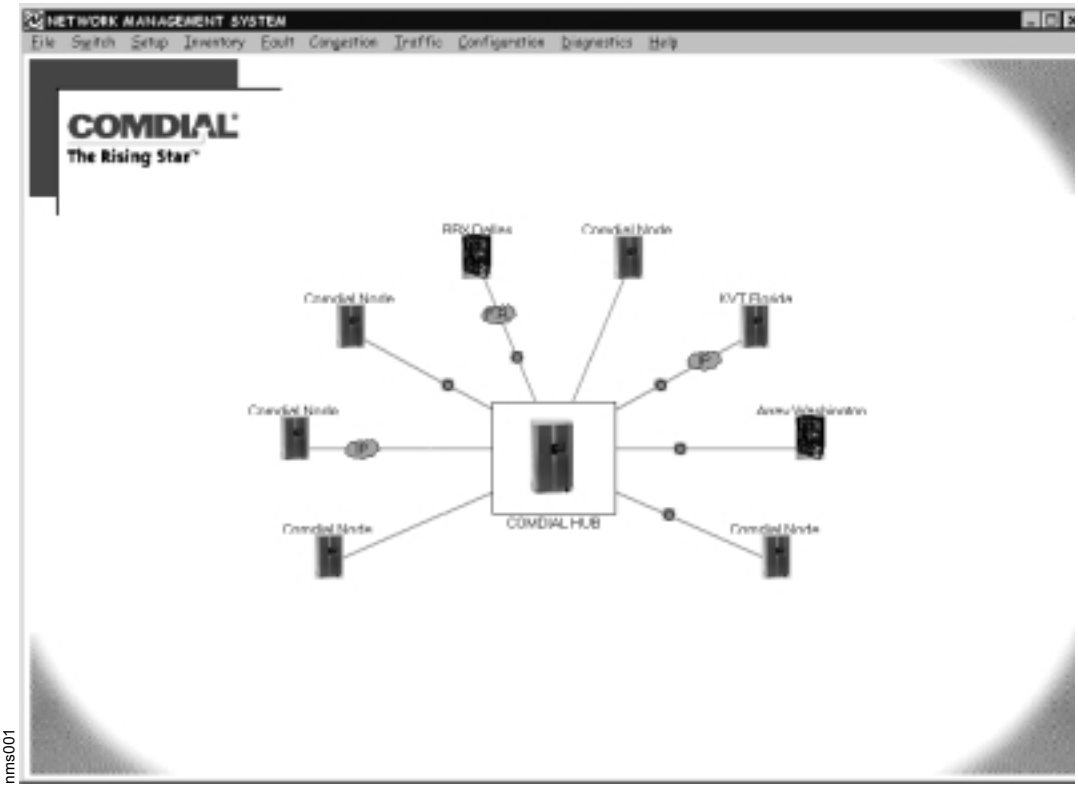
Double-clicking on a node opens the Node Information dialog. Once the Node Information dialog is open, you can select a different node using the Node ID drop-down menu. Clicking the **VMMI** button starts the VMMI program. VMMI must use a different COM port than the NMS program.

Icon Colors

If networking is disabled for a node, the color of that node is dimmed.

The color of a network link indicates the current connection status of the link. Green indicates a good status, red indicates that all boards in the link have a bad status, and yellow indicates that some of the boards in the link have a bad status and some have a good status.

A red dot appears on a network link if it fails. When you hold the mouse pointer over the dot for a few seconds, the time and date of the last failure appear. To remove the red dot, click on it to acknowledge the error.



Network Management System Main Screen

Using Drop-Down Menus

The drop-down menus provide access to the Network Management System's features. Most features are available through the drop-down menus, but some of the features are available on the main screen.

File Menu

The File drop-down menu contains the Open Database and Exit options.

Switch Menu

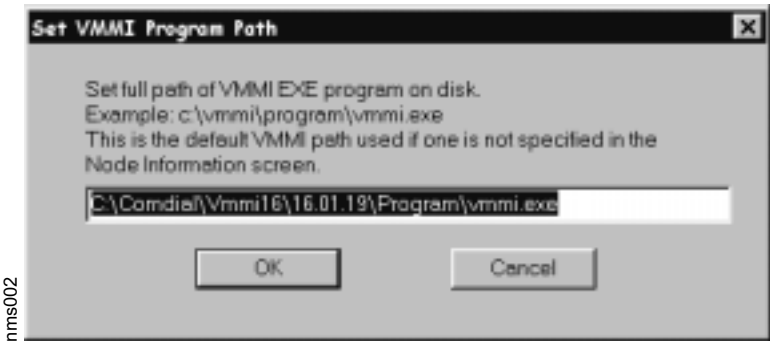
The Switch drop-down menu contains the Connect NMS and Disconnect NMS options.

Setup Menu

The Setup drop-down menu has three options: VMMI Programming Path, Change NMS Program Password, and Debug.

VMMI Programming Path

Use this menu to enter the path to the vmmi.exe file.



Set VMMI Program Path Dialog

Change NMS PC Password

Use this menu to change the NMS password.

Debug

The Debug option is a password-protected feature for Comdial engineering use only.

Inventory Menu

The Inventory drop-down menu contains the following options:

System Boards

This dialog shows identification information for all of the hub or node's network boards. Use the **Node ID** drop-down menu to select the node you want to display.

System Resources—Voice Mail Ports

This dialog lists the total number of voice mail ports on the node you have selected, the extension number of each voice mail port, and each voice mail port's number.

System Resources—DTMF Receivers

The DTMF Receivers dialog contains a list of all the DTMF receiver cards in a node and what boards the cards are mounted on.

Serial Port Logins

The Serial Port Logins dialog contains a listing of the node's serial ports and which application, if any, is using each serial port. This dialog also contains a Voice Mail Used box indicating which type of voice mail the node uses:

NONE
this node uses no voice mail

LOCAL
this node uses a voice mail system that is locally connected to this node

REMOTE
this node uses a centralized voice mail system connected to the hub

Fault Menu

The Fault drop-down menu contains the following options:

Network Boards—Current Network Board Status

The Current Network Board Status dialog shows the following information:

- which slots contain network interface boards,
- the type of network board in each slot,
- which node is connected to each network interface board,
- the "presence" of each network interface board (Dead, Transition, Mapping, Present, Denied, and Disabled),
- the T1 status of each board (OK, Bad, Yellow Alarm, Red Alarm),
- information about each board's status (Invalid, Link Up, Link Down, Board Freeze, Reset Pending).

Network Boards—Node Connection Status History

The Node Connection Status History dialog shows the history of the connection between the hub and the selected node.

The hub checks each node's connection status at regular intervals. If a node is not operational or the hub gets an "OK" response from a node, the hub stores the result in the history log.

To view node connection history,

1. From the **Fault** drop-down menu, select **Network Boards/History Node Connection Status**. The Node Connection Status History dialog appears.

2. From the **Node ID** drop-down menu, select a node or select all nodes.

3. Click the **Start Time** button. The Reset Start Time dialog appears. You will use this dialog to set the beginning of the time period for which you want to view congestion history.

4. Use the drop-down menus to select the month and year. Select a day of the month by clicking on it. Set the hour, minute, and second using the boxes on the right.

   Alternately, if you want to start with the current time, click the **Current Time** button.

   Click **OK** when you are done.

5. Click the **Stop Time** button. The Reset Stop Time dialog appears. Following the instructions in step 4, use this dialog to set the end of the time period for which you want to view congestion history.

   Click **OK** when you are done.

6. Click the **Get Data** button.

   Each row represents one history event; the history events appear in order of occurrence. The data for each history event include node ID, peg count, and time and date of last occurrence.

   Possible results are as follows:

   - A connection status of "OK" indicates that the node responded to the connection check. This is a good status.

- A connection status of "ERROR—Disconnected" indicates that the node is not operational; it is not synchronized with the hub's network database. If a node is not operational, the hub does not attempt to check its connection status, producing an "ERROR" status.
- If a record from one of the status checks is missing, it indicates the node is operational, but that it did not respond to the connection status check in a timely manner. On the infrequent occasions when this occurs, it produces an "ERROR" status.

7. Click **Exit** when you are finished.

System Boards—Current System Board Status

The Current System Board Status dialog shows the following information:

- which slots contain system interface boards,
- the type of system board in each slot,
- which node is connected to each system board,
- the "presence" of each system board (Dead, Transition, Mapping, Present, Denied, Disabled),
- the T1 status of each board (OK, Bad, Yellow Alarm, and Red Alarm),
- information about each board's status (Invalid, Link Up, Link Down, Board Freeze, and Reset Pending).

System Boards—T1/E1 Event History

This dialog shows the T1/E1 event history for the selected node. You select the node and the time and date range.

The system stores each T1/E1 event from all nodes and all network boards in the history log.

System Boards—IP Board Event History

This dialog shows the IP event history for the selected node. You select the node and the time and date range.

For all nodes and all network boards, the system stores each IP event in the history log.

Congestion Menu

The Congestion menus display runtime error information where all resources, such as lines, are 100% in use. The Congestion drop-down menu contains the following options:

Network Links—Current Congestion Counts

The hub maintains a count of the number of congestion events that have occurred on each network link. A network link is one or more network boards. A congestion event occurs when a request for a voice channel fails because all voice channels are busy. The log of congestion events accrues until you clear it.

To display Current Congestion Counts for Network Links,

1. From the Congestion drop-down menu, select **Network Links/Current Congestion Counts**. The Network Links Congestion Count dialog appears.
2. From the **Node ID** drop-down menu, select a node or select all nodes.
3. Click the **Get Data** button.

   Each row represents one history event; the history events appear in order of occurrence. The data for each history event include node ID, peg count, and time and date of last occurrence.
4. To delete the congestion counts, click the **Clear Count** button.
5. Click **Exit** when you are finished.

Network Links—History Voice Channel Congestion

The hub maintains a history of congestion events for each network link. A congestion event occurs when a request for a voice channel fails because all voice channels are busy. The NMS PC downloads the congestion history from the hub and stores it in its database.

To display Congestion History for Voice Channels,

1. From the Congestion drop-down menu, select **System Trunk Groups/History Voice Channel Congestion**. The Network Links Congestion History dialog appears.

2. From the **Node ID** drop-down menu, select a node or select all nodes.

3. Click the **Start Time** button. The Reset Start Time dialog appears. You will use this dialog to set the beginning of the time period for which you want to view congestion history.

4. Use the drop-down menus to select the month and year. Select a day of the month by clicking on it. Set the hour, minute, and second using the boxes on the right.

   Alternately, if you want to start with the current time, click the **Current Time** button.

   Click **OK** when you are done.

5. Click the **Stop Time** button. The Reset Stop Time dialog appears. Following the instructions in step 4, use this dialog to set the end of the time period for which you want to view congestion history.

   Click **OK** when you are done.

6. Click the **Get Data** button. The congestion history details appear.

   Each row represents one history event; the history events appear in order of occurrence. The data for each history event include time and date of occurrence, connected node ID, and extension.

7. Click **Exit** when you are finished.

System Trunk Groups—Current Congestion Counts

The hub maintains a count of the number of congestion events that have occurred on each trunk group. A congestion event occurs when a request for a trunk fails because all trunks are busy. The log of congestion events accrues until you clear it.

The NMS reads the data from the specified hub or node. The data field contains the peg count. Clicking the **Clear** button clears the peg count on the node.

To display Current Congestion Counts for Trunk Groups,

1. From the Congestion drop-down menu, select **System Trunk Groups/Current Congestion Counts**. The Trunk Groups Congestion Count dialog appears.
2. From the **Node ID** drop-down menu, select a node or select all nodes.
3. Click the **Get Data** button.

   Each row represents one history event; the history events appear in order of occurrence. The data for each history event include node ID, peg count, and time and date of last occurrence.
4. To delete the congestion counts, click the **Clear Count** button.
5. Click **Exit** when you are finished.

System Trunk Groups—History Trunk Groups Congestion

The hub maintains a history of congestion events for each network link. A congestion event occurs when a request for a trunk fails because all trunks are busy. The NMS PC downloads the congestion history from the hub and stores it in its database.

To display Congestion History for Trunk Groups,

1. From the Congestion drop-down menu, select **System Trunk Groups/History Trunk Groups Congestion**. The Trunk Groups Congestion History dialog appears.

2. From the **Node ID** drop-down menu, select a node or select all nodes.

3. Click the **Start Time** button. The Reset Start Time dialog appears. You will use this dialog to set the beginning of the time period for which you want to view congestion history.

4. Use the drop-down menus to select the month and year. Select a day of the month by clicking on it. Set the hour, minute, and second using the boxes on the right.

   Alternately, if you want to start with the current time, click the **Current Time** button.

   Click **OK** when you are done.

5. Click the **Stop Time** button. The Reset Stop Time dialog appears. Following the instructions in step 4, use this dialog to set the end of the time period for which you want to view trunk congestion history.

   Click **OK** when you are done.

6. Click the **Get Data** button.

   Each row represents one history event; the history events appear in order of occurrence. The data for each history event include node ID, peg count, and time and date of last occurrence.

7. Click **Exit** when you are finished.

System Resources—Current Congestion Counts

The hub maintains a count of the number of congestion events that have occurred on each node. A congestion event occurs when a request for a resource fails because all resources are busy. The log of congestion events accrues until you clear it.

The NMS PC retrieves the data from the hub or node you specify. There is a box for the DTMF Receiver Congestion count and a box for the Voice Mail Port Congestion count. Clicking the **Clear** button beside a box clears the count.

To display Current Congestion Counts for System Resources,

1. From the Congestion drop-down menu, select **System Resources/Current Congestion Counts**. The System Resource Congestion Global Peg Count dialog appears.

2. From the **Node ID** drop-down menu, select a node or select the hub.

   There is a box for DTMF Receiver Congestion Global Peg Count and a box for Voice Mail Port Congestion Global Peg Count. Clicking the **Clear** button beside a box erases the count on the node.

3. To delete the congestion counts, click the **Clear Count** button.

4. Click **Exit** when you are finished.

System Resources—History DTMF Congestion

The hub maintains a history of congestion events for each DTMF receiver. A congestion event occurs when a request for a trunk fails because all trunks are busy. The NMS PC downloads the congestion history from the hub and stores it in its database.

To display Congestion History for DTMF Receivers,

1. From the Congestion drop-down menu, select **System Resources/History DTMF Congestion**. The DTMF Receiver Congestion History dialog appears.

2. From the **Node ID** drop-down menu, select a node or select all nodes.

3. Click the **Start Time** button. The Reset Start Time dialog appears. You will use this dialog to set the beginning of the time period for which you want to view congestion history.

4. Use the drop-down menus to select the month and year. Select a day of the month by clicking on it. Set the hour, minute, and second using the boxes on the right.

   Alternately, if you want to start with the current time, click the **Current Time** button.

   Click **OK** when you are done.

5. Click the **Stop Time** button. The Reset Stop Time dialog appears. Following the instructions in step 4, use this dialog to set the end of the time period for which you want to view trunk congestion history.

   Click **OK** when you are done.

6. Click the **Get Data** button.

   Each row represents one history event; the history events appear in order of occurrence. The data for each history event include node ID, peg count, and time and date of last occurrence.

7. Click **Exit** when you are finished.

System Resources—History DTMF Excessive Duration

The hub maintains a log of DTMF receivers that were in use for more than two minutes. The NMS PC downloads the DTMF excessive duration history from the hub and stores it in its database.

To display DTMF Receiver Excessive Duration,

1. From the Congestion drop-down menu, select **System Resources/History DTMF Excessive Duration**. The DTMF Receiver Excessive Duration History dialog appears.

2. From the **Node ID** drop-down menu, select a node or select all nodes.

3. Click the **Start Time** button. The Reset Start Time dialog appears. You will use this dialog to set the beginning of the time period for which you want to view congestion history.

4. Use the drop-down menus to select the month and year. Select a day of the month by clicking on it. Set the hour, minute, and second using the boxes on the right.

   Alternately, if you want to start with the current time, click the **Current Time** button.

   Click **OK** when you are done.

5. Click the **Stop Time** button. The Reset Stop Time dialog appears. Following the instructions in step 4, use this dialog to set the end of the time period for which you want to view trunk congestion history.

   Click **OK** when you are done.

6. Click the **Get Data** button.

   Each row represents one history event; the history events appear in order of occurrence. The data for each history event include node ID, peg count, and time and date of last occurrence.

7. Click **Exit** when you are finished.

System Resources—History Voice Mail Congestion

The hub maintains a log of voice mail port congestion events. A congestion event occurs when a request for a voice mail port fails because all receivers on the hub or node are busy. The NMS PC downloads the voice mail congestion history from the hub and stores it in its database.

To display Voice Mail Congestion History,

1. From the Congestion drop-down menu, select **System Resources/History Voice Mail Congestion**. The Voice Mail Congestion History dialog appears.

2. From the **Node ID** drop-down menu, select a node or select all nodes.

3. Click the **Start Time** button. The Reset Start Time dialog appears. You will use this dialog to set the beginning of the time period for which you want to view congestion history.

4. Use the drop-down menus to select the month and year. Select a day of the month by clicking on it. Set the hour, minute, and second using the boxes on the right.

   Alternately, if you want to start with the current time, click the **Current Time** button.

   Click **OK** when you are done.

5. Click the **Stop Time** button. The Reset Stop Time dialog appears. Following the instructions in step 4, use this dialog to set the end of the time period for which you want to view trunk congestion history.

   Click **OK** when you are done.

6. Click the **Get Data** button.

   Each row represents one history event; the history events appear in order of occurrence. The data for each history event include node ID, peg count, and time and date of last occurrence.

7. Click **Exit** when you are finished.

System Resources—History Voice Mail Excessive Duration

The hub maintains a log of voice mail ports that were in use for more than fifteen minutes. The NMS PC downloads the voice mail excessive duration history from the hub and stores it in its database.

To display voice mail excessive duration history,

1. From the Congestion drop-down menu, select **System Resources/History Voice Mail Excessive Duration**. The Voice Mail Excessive Duration History dialog appears.

2. From the **Node ID** drop-down menu, select a node or select all nodes.

3. Click the **Start Time** button. The Reset Start Time dialog appears. You will use this dialog to set the beginning of the time period for which you want to view congestion history.

4. Use the drop-down menus to select the month and year. Select a day of the month by clicking on it. Set the hour, minute, and second using the boxes on the right.

   Alternately, if you want to start with the current time, click the **Current Time** button.

   Click **OK** when you are done.

5. Click the **Stop Time** button. The Reset Stop Time dialog appears. Following the instructions in step 4, use this dialog to set the end of the time period for which you want to view trunk congestion history.

   Click **OK** when you are done.

6. Click the **Get Data** button.

   Each row represents one history event; the history events appear in order of occurrence. The data for each history event include node ID, peg count, and time and date of last occurrence.

7. Click **Exit** when you are finished.

Traffic Menu

Information available from the Traffic drop-down menu includes runtime resource usage information such as number of trunks busy. Additional traffic information appears on the main screen if you hold the mouse pointer over a network link for several seconds.

The Traffic menu options are described below.

Snapshot View for Traffic

The NMS PC reads the traffic snapshot view data from the hub or node you specify. The information includes the time and date of the last time the screen was read, the current total number of DTMF receivers busy, the current total number of DTMF receivers reserved by OAI, and the total number of voice mail ports busy.

Each row of data represents one of the boards in the system. The data for each board includes logical slot number, board type (ex: DXPT1-NET), number of voice channels busy and available, and detailed busy status for each voice channel.

To view the Snapshot View dialog,

1. From the **Traffic** drop-down menu, select **Snapshot View**.

2. To retrieve the information for the Snapshot View dialog again, click the **Refresh** button.

3. To reset a board, highlight a board by clicking on it, then click the **Reset Board** button.

Network Links—Snapshot View

The NMS PC reads the network links data from the hub or node you specify. The information includes logical slot number, board type (ex: DXPTI-NET), current number of voice channels busy and available, and detailed busy status for each voice channel.

To view the Snapshot View dialog,

1. From the **Traffic** drop-down menu, select **Network Links/Snapshot View**.
2. To retrieve the information for the Snapshot View dialog again, click the **Refresh** button.
3. To reset a board, highlight a board by clicking on it, then click the **Reset Board** button.

Network Links—History Voice Channels Busy

The hub maintains an hourly history for each network link of the voice channels busy. A network link consists of one or more network boards. The NMS PC downloads the hourly history from each of the nodes and stores it in its database, where you can retrieve it.

To display network links busy history,

1. From the **Traffic** drop-down menu, select **Network Links/History Voice Channels Busy**. The Network Links Voice Channel Hourly Busy History dialog appears.

2. From the **Node ID** drop-down menu, select a node or select all nodes.

3. Click the **Start Time** button. The Reset Start Time dialog appears. You will use this dialog to set the beginning of the time period for which you want to view congestion history.

4. Use the drop-down menus to select the month and year. Select a day of the month by clicking on it. Set the hour, minute, and second using the boxes on the right.

   Alternately, if you want to start with the current time, click the **Current Time** button.

   Click **OK** when you are done.

5. Click the **Stop Time** button. The Reset Stop Time dialog appears. Following the instructions in step 4, use this dialog to set the end of the time period for which you want to view trunk congestion history.

   Click **OK** when you are done.

6. Click the **Get Data** button.

   Each row represents a one-hour history record for the link you selected; the history records appear in order of occurrence. The data for each history record include time and date of occurrence, number of available voice channels, number of calls on the voice channels, and peak number of voice channels used at one time.

7. Click **Exit** when you are finished.

System Trunk Groups—Snapshot View

The NMS PC reads the system trunk groups data from the hub or node you specify. The information includes current total number of trunk groups. Each row of data represents one of the trunk groups in the system. The data for each trunk group include trunk group number, current number of available trunks, and current number of busy trunks.

To view the Trunk Groups Snapshot dialog,

1. From the **Traffic** drop-down menu, select **System Trunk Groups/Snapshot View**.
2. From the **Node ID** drop-down menu, select a node.
3. Click **Exit** when you are finished.

System Trunk Groups—History Trunk Groups Busy

The hub maintains an hourly history for each trunk group of the number of available trunks and number of trunks in use. The NMS PC downloads the hourly history from each of the nodes and stores it in its database, where you can retrieve it.

To view the Trunk Groups Hourly Busy History dialog,

1. From the **Traffic** drop-down menu, select **System Trunk Groups/History Trunk Groups Busy**. The Trunk Groups Hourly Busy History dialog appears.

2. From the **Node ID** drop-down menu, select a node or select all nodes.

3. Click the **Start Time** button. The Reset Start Time dialog appears. You will use this dialog to set the beginning of the time period for which you want to view congestion history.

4. Use the drop-down menus to select the month and year. Select a day of the month by clicking on it. Set the hour, minute, and second using the boxes on the right.

   Alternately, if you want to start with the current time, click the **Current Time** button.

   Click **OK** when you are done.

5. Click the **Stop Time** button. The Reset Stop Time dialog appears. Following the instructions in step 4, use this dialog to set the end of the time period for which you want to view trunk congestion history.

   Click **OK** when you are done.

6. Click the **Get Data** button.

   Each row represents a one-hour history record for the node you selected; the history records appear in order of occurrence. The data for each history record include time and date of occurrence, number of available trunks, and peak number of trunks used at one time.

7. Click **Exit** when you are finished.

System Resources—Snapshot

The NMS PC reads the resources snapshot data from the hub or node you specify. The dialog shows the number of DTMF receivers reserved, the number of DTMF receivers in use, and the number of voice mail ports in use.

To view the Resource Snapshot dialog,

1. From the **Traffic** drop-down menu, select **System Resources/Snapshot**.
2. From the **Node ID** drop-down menu, select a node.
3. Click **Exit** when you are finished.

System Resources—History DTMF Receivers Busy

The hub and nodes maintain an hourly history of the DTMF receivers busy. The NMS PC downloads the hourly history from each of the nodes and stores it in its database, where you can retrieve it.

To view the DTMF Hourly Peak Usage History dialog,

1. From the **Traffic** drop-down menu, select **System Resources/History DTMF Receivers Busy**. The DTMF Hourly Peak Usage History dialog appears.

2. From the **Node ID** drop-down menu, select a node or select all nodes.

3. Click the **Start Time** button. The Reset Start Time dialog appears. You will use this dialog to set the beginning of the time period for which you want to view congestion history.

4. Use the drop-down menus to select the month and year. Select a day of the month by clicking on it. Set the hour, minute, and second using the boxes on the right.

   Alternately, if you want to start with the current time, click the **Current Time** button.

   Click **OK** when you are done.

5. Click the **Stop Time** button. The Reset Stop Time dialog appears. Following the instructions in step 4, use this dialog to set the end of the time period for which you want to view trunk congestion history.

   Click **OK** when you are done.

6. Click the **Get Data** button.

   Each row represents a one-hour history record for the node you selected; the history records appear in order of occurrence. The data for each history record include time and date of occurrence and peak number of DTMF receivers used at one time.

7. Click **Exit** when you are finished.

System Resources—Voice Mail Ports Busy

The hub maintains an hourly history of voice mail ports busy. The NMS PC downloads the hourly history from each of the nodes and stores it in its database, where you can retrieve it.

To view the Voice Mail Port Hourly Peak Usage History dialog,

1. From the **Traffic** drop-down menu, select **System Resources/Voice Mail Ports Busy**. The Voice Mail Port Hourly Peak Usage History dialog appears.

2. From the **Node ID** drop-down menu, select a node.

3. Click the **Start Time** button. The Reset Start Time dialog appears. You will use this dialog to set the beginning of the time period for which you want to view congestion history.

4. Use the drop-down menus to select the month and year. Select a day of the month by clicking on it. Set the hour, minute, and second using the boxes on the right.

   Alternately, if you want to start with the current time, click the **Current Time** button.

   Click **OK** when you are done.

5. Click the **Stop Time** button. The Reset Stop Time dialog appears. Following the instructions in step 4, use this dialog to set the end of the time period for which you want to view trunk congestion history.

   Click **OK** when you are done.

6. Click the **Get Data** button.

   Each row represents a one-hour history record for the node you selected; the history records appear in order of occurrence. The data for each history record include time and date of occurrence and peak number of voice mail ports used at one time.

7. Click **Exit** when you are finished.

Configuration Menu

The dialogs available from the Configuration drop-down menu allow you to check nodes for network configuration errors. You can also start VMMI from the Configuration menu.

Network Configuration Validation Dialog

The Network Configuration Validation dialog allows you to run up to eight tests to test a node's network configuration for errors. The dialog has a list of tests with a check box to the left of each one. Checking a box causes that test to run immediately. The Result box to the right of each test name shows the test outcome—either "OK" or "Error." If a result is "Error," a **Detail** button may appear next to the Result box. Clicking the **Detail** button opens a dialog which shows more information about the error.

The tests available from the Network Configuration Validation dialog are:

Test All
Checking this box causes all tests to run immediately.

Network Extensions Exist in Station Configuration
This test verifies that all station extensions defined in VMMI under the **System/Networking/Extension Provisioning** menu are programmed in VMMI under the **Stations/Station Programming/Intercom Numbering** menu for the specified hub or node.

Duplicate Extensions
Verifies that network extensions are not duplicated in local station extensions (defined in **VMMI System/Networking/Extension Provisioning**), Feature Numbers (defined in **VMMI System/Feature Numbers**), or Group Intercom Extensions (defined in **VMMI Group Intercoms**) for the hub or node you select.

Station Extensions Exist in Network Configuration
Verifies if some station extensions defined in **VMMI Stations/Station Programming/Intercom Numbering** are not defined in **VMMI System/Networking/Extension Provisioning** for the specified hub or node. This is usually a normal situation so this is only a warning, not an error.

Networking is Enabled
Verifies that networking is enabled in **VMMI Networking/Node Configuration/Enabled** for the hub or node you specified.

Network Channels are Enabled

Verifies that all networked channels are enabled in **VMMI/Lines/Line Programming/Line Attributes/Disabled** for the hub or node you specified.

Network Line Group

Verifies that if the network channels are in a line group, there are no non-network channels in the group for the hub or node you specified.

DID Table Extensions in Network and Station

Verifies that all DID table extensions defined in **VMMI Lines/DID Block Programming/Blockx/Translation Table** and in **VMMI Lines/DID Block Programming Blockx/Enhanced Ringing** on all nodes are programmed in **VMMI System/Networking/Extension Provisioning** and **VMMI Stations/Station Programming/Intercom Numbering** for the hub or node you specified.

Network Voice Mail Configuration

Verifies that the network voice mail extensions in **VMMI Peripherals/Voice Mail/Extension Table** are all network extensions and that they are linked in a closed loop (the last extension is equal to the first extension).

QOS Traps

The IP QOS Traps dialog allows you to set parameters for Quality of Service traps. If a condition exceeding the parameters occurs, the system generates a diagnostic report.

To set parameters for IP QOS traps,

1. From the **Configuration** drop-down menu, select **IP QOS Configuration/QOS Traps**. The IP QOS Traps dialog appears.

2. Using the drop-down menus, select the node and slot number of the IP board(s) you want to monitor.

3. The part of the dialog labeled IP QOS Traps contains boxes in which you enter parameters the system will use to generate IP QOS reports. The categories are as follows:

   Lost Packets Trap

   The percentage of lost packets that will trigger a diagnostic report. For example, if you enter 15 in the box, the system will generate a Lost Packets report when the percentage of lost packets is 15 or more.

   Lost Packets Time

   The time period, in seconds, over which the system calculates the percentage of lost packets. During a call, the percentage of lost packets is calculated over consecutive time intervals until the completion of the call.

   Average Jitter Trap

   Threshold, in milliseconds, at which the system will generate a report on jitter average.

   Average Jitter Time

   The time, in seconds, over which the jitter average is calculated.

4. Repeat steps 2 and 3 for each IP board you want to monitor.

5. Click the **Apply** button, then click **Exit**.

Low Level Traps

The IP Low-Level Traps dialog allows you to set parameters for low level yellow and red alerts. For each alert type, you define the frequency of traps that will generate yellow and red alerts. During a call, errors are calculated over consecutive time intervals for the duration of the call.

To set parameters for IP Low Level traps,

1. From the **Configuration** drop-down menu, select **IP QOS Configuration/Low Level Traps**. The IP Low Level Traps dialog appears.
2. Using the drop-down menus, select the node and slot number of the IP board you want to monitor.
3. The part of the dialog labeled IP Low Level Traps contains boxes in which you enter parameters the system will use to generate yellow and red reports for low level IP traps.
4. To select an alert, check the box next to its name. To select all alerts, check the **Select All** box.
5. Repeat steps 2–4 for each IP board you want to monitor.
6. When you have selected and defined the low level alerts, click the **Apply** button, then click **Exit**.

Run VMMI

Selecting this option starts VMMI. From within VMMI you must select a PC serial port and log in to the hub or a node. NMS and VMMI cannot use the same serial port.

Diagnostics

Diagnostics shows the DTMF receivers in and out of service, and allows you to perform diagnostic tests.

ROM Checksum Test

This test checks to see if the system ROM (read-only program memory) is corrupted. When performing the test, it adds each byte of the system ROM and computes the value. The last byte in ROM contains a pre-programmed checksum value. The Checksum test passes when the sum of the calculated value and the pre-programmed value equals zero. This test is non-destructive.

To perform the ROM Checksum test,

1. From the **Diagnostics** menu, select **System Resources/Perform ROM Checksum Test**.

   The Perform ROM Checksum Test dialog appears.

2. From the **Node ID** drop-down menu, select the hub or the node you want to run the test on.

3. Click the **Start Test** button to start the test.

   The Test Status box shows the status of the test. When the test is over this box will indicate whether the test was completed successfully.

4. To abort the test, click the **Stop Test** button.

Scratch RAM Test

This tests if scratch RAM (temporary read-write data) hardware is bad. This test is non-destructive.

To perform the Scratch RAM Test,

1. From the **Diagnostics** drop-down menu, select **System Resources/Perform Scratch RAM Test**.
2. From the **Node ID** drop-down menu, select the hub or the node you want to run the test on.
3. Click the **Start Test** button to start the test.

   The Test Status box shows the status of the test. When the test is over, this box will indicate whether the test was completed successfully.
4. To abort the test, click the **Stop Test** button.

Nonvolatile Test RAM Test

Checks if nonvolatile RAM (semi-permanent read-write data such as system configuration information) hardware is bad. This test is non-destructive.

To perform the Nonvolatile RAM test,

1. From the Diagnostics drop-down menu, select **System Resources/Perform Nonvolatile RAM Test**.
2. From the **Node ID** drop-down menu, select the hub or the node you want to run the test on.
3. Click the **Start Test** button to start the test.

   The Test Status box shows the status of the test. When the test is over, this box will indicate whether the test was completed successfully.
4. To abort the test, click the **Stop Test** button.

DTMF Receiver Test

This test checks the DTMF receivers for proper operation. The results, displayed in the DTMF Receiver Test dialog, list the cabinet number, receiver number, and the failed keypad keys for each DTMF receiver that fails the test.

The DTMF Receiver test is destructive. We recommend not performing the test while the system is in use because some active calls will be dropped.

To perform the DTMF Receiver test,

1. From the **Diagnostics** drop-down menu, select **Perform DTMF Receiver Test**.
2. From the **Node ID**: drop-down, select the hub or the node you want to perform the test on.
3. When you are finished with the DTMF receiver tests, click **Exit** to close the DTMF Receiver Test Dialog.

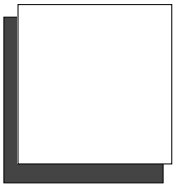
DTMF Receivers In/Out of Service

This test queries all DTMF receivers on the hub or the node you select and determines which are out of service and which are in service.

To perform the DTMF Receivers In/Out of Service test,

1. From the **Diagnostics** drop-down menu, select **Perform DTMF Receiver Test**.
2. From the **Node ID:** drop-down menu, select the hub or the node you want to perform on.
3. You can change the status of a DTMF receiver by highlighting it and clicking the **Change Status** button.
4. Click **Exit** to close the DTMF Receivers In/Out of Service dialog.

Notes



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