

55450A

Local Craft Terminal

User's Manual

This manual will guide you through installing 55450A on your computer, connecting to a 55400A Network Synchronization Unit (NSU) and performing management tasks.

For assistance, contact:

Symmetricom, Inc.
2300 Orchard Parkway
San Jose, CA 95131-1017

U.S.A. Call Center:
888-367-7966 (from inside U.S.A. only – toll free)
408-428-7907

U.K. Call Center:
+44.7000.111666 (Technical Assistance)
+44.7000.111888 (Sales)

Fax: 408-428-7998

E-mail: ctac@symmetricom.com

Internet: <http://www.symmetricom.com>

Warning Symbols That May Be Used In This Book



Instruction manual symbol; the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual.



Indicates hazardous voltages.



Indicates earth (ground) terminal.



or



Indicates terminal is connected to chassis when such connection is not apparent.



Indicates Alternating current.



Indicates Direct current.

Chapter 1	
Introduction and General Information	1
What's in this manual?	1
Tips when using this manual	1
55450A Description	3
Related Documentation	4
Chapter 2	
Getting Started	5
Overview	5
Installing 55450A on your computer	5
Establish local connection with NSU	6
Set date and time for NSU	7
Set up security and log in	8
Chapter 3	
Basic System Administration	11
Overview	11
Status view	11
Set Up Database	12
Download Firmware	14
Chapter 4	
Communication Management	15
Overview	15
Connection Requirements	15
Configure Communication Parameters for X.25, TCP/IP, and TP4	17
Establish a Connection	23
After Connection	27
Chapter 5	
Configuration Management	29
Overview	29
Input Configuration	29
Output Configuration	32
Chapter 6	
Fault Management	35
Overview	35
Event Setup	35
Auto Msg	36
Threshold	37
Chapter 7	
Performance Measurement	41
Overview	41
Performance Screen Description	41
Save Performance Data Graph	42

Appendix A	
Events Description	43
Events Description	43

Chapter 1

Introduction and General Information

What's in this manual? Beginning with installing 55450A on your computer and connecting to an 55400A Network Synchronization Unit (NSU), this manual will guide you to perform management tasks supported by 55450A as described in the subsequent chapters:

- Chapter 2: Getting Started - descriptions of the most fundamental tasks a new user might want to perform when an NSU is first installed
- Chapter 3: Basic system administration - introduction to some daily management tasks, such as intuitively controlling the equipment status, hardware configuration lookup, and detection of system changes.

Chapters 4 through 8 demonstrate the more advanced management tasks:

- Chapter 4: Communication management - select the appropriate connection to establish communication between your PC and NSU
- Chapter 5: Configuration management - view and modify the configuration parameters for input and output channels
- Chapter 6: Fault management - set thresholds, set conditions for alarmed or non-alarmed events, and view system logs
- Chapter 7: Performance management - monitor performance measurement of input signals
- Chapter 8: Remote Manager - establish connections to multiple devices.

Tips when using this manual

Switches mentioned in this manual

Refer to *55400A Network Synchronization Unit User's Manual* for the detailed information about the switch (Sx-x) settings and locations mentioned in this manual.

Product revisions

All functions described in this manual apply to both 55450A local craft terminal software revisions, unless specifically indicated otherwise.

Naming Conventions used in this manual

This manual uses several names to refer to the same objects. Table 1-1 lists the naming conventions.

Table 1-1. Naming Conventions

Object	Names used for the Object
55450A local craft terminal	55450A
55400A Network Synchronization Unit	NSU, SSU, 55400A
55300A Global Positioning System Telecom Primary Reference Source	GPS, 55300A
55442A Network IMC	NIMC

Abbreviations used in this manual

The terms listed in Table 1-2 relate to the 55400A and are used throughout this manual.

Table 1-2. List of Terms

Terms	Definition
AIC	Alarm Interface Card
AIS	Alarm Indication Signal
ACO	Alarm Cutoff
CAS	Channel Associated Signaling
CCS	Common Channel Signaling
CRC4	Cyclic Redundancy Check
DCE	Data Communications Equipment
DTE	Data Terminal Equipment
E1	European Signal, 2048 kbps
GPS	Global Positioning System
ITH	Input Track and Hold card
IMC	Information Management Card
LOS	Loss of Signal
MRTIE	Maximum Relative Time Interval Error
MTIE	Maximum Time Interval Error
NSU	Network Synchronization Unit
OOF	Out of frame
PRC	Primary Reference Clock
SDH	Synchronous Digital Hierarchy

Table 1-2. List of Terms (continued)

Terms	Definition
SSM	Synchronization Status Message
SSU	Synchronization Supply Unit
TDEV	Time Deviation
TL1	Transaction Language 1
TNC	Transit Node Clock

55450A Description

55450A provides an easy-to-use graphic user interface (GUI) which allows communications with an NSU without TL1 language programming. 55450A includes the following key features:

- Local/remote control and view of the 55400A system settings
- Ability to manage multiple NSUs, one at a time
- Continual monitoring of multiple SSU and GPS devices
- Extensive control of fault management attributes, such as alarm prioritizing and event logging
- Continual monitoring and on-screen display of any automatic messages, such as alarms and events, generated by an NSU
- Graphical presentation of each type of performance data from any or all of the input channels
- Screen-based depiction of the 55400A front-panel. This can be monitored so that the depiction shows the current hardware configuration and state of most LEDs appearing on the master and expansion subrack cards of the 55400A
- Access almost all of the user administration features of the NSU, including new user logons, adding additional users, modification of user passwords, and ability to delete users or temporarily inhibit logon permission to the NSU
- Ability to download firmware to the 55400A
- Terminal window for direct communication with the 55400A (includes ability to log responses to file).

Note

When the 55400A security feature has been enabled, your logon security level may limit your access to the NSU.

Related Documentation

- 55400 Network Synchronization Unit User's Manual
- 55400 Network Synchronization Unit Programming Manual
- 55450A On-line Help (shipped with your 55450A software). Press F1 key within the application to access help information about active screen. Online help can also be accessed from Help on the menu bar.
- 55450A readme file (shipped with your 55450A software). The readme file (Readme.txt) is automatically copied into the same folder as the application during the installation.

Chapter 2

Getting Started

Overview The following topics are included in this chapter:

- Install 55450A software on a computer
- Establish a local connection with NSU
- Set date and time
- Set up security and log on to the NSU

Installing 55450A on your computer

Minimum requirements

Minimum hardware requirements

- Pentium Processor 90 MHz
- 10 MB Hard drive space
- 16 MB RAM
- 3.5" Floppy drive
- VGA Monitor (14" or larger)

Software requirements

- Windows 95 or Windows NT 4.0 running on the PC
- 55450A installation floppy disks

Note 55450A runs on both Windows 95 and Windows NT 4.0, but not on Windows 3.1.

Installation instructions

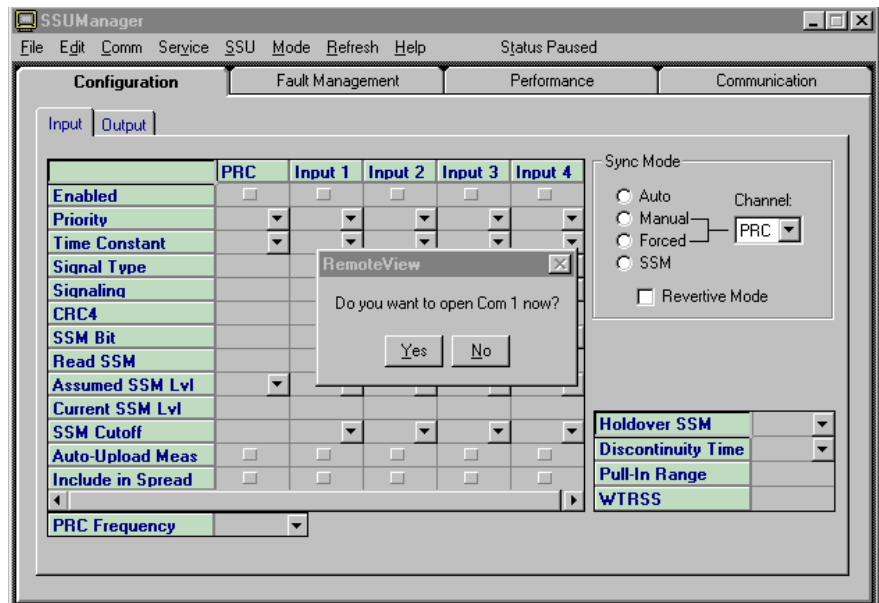
Caution If a previous version has been installed, uninstall it before installing a new copy.

1. Insert Disk # 1 into the floppy disk drive of your computer.
2. Select **Run...** from the **Start** menu.
3. Type `<drive>:\setup` in the **Open** field, where *drive* is the letter representing your floppy disk drive.
4. Click **OK** to continue and follow the on-screen instructions, the Setup Wizard will guide you to the end.

Note If installation requests to overwrite existing files, it should be allowed to do so. For this reason, you may want to make note of the files to be overwritten, cancel installation and copy those files to another location in case these files are needed for another application to run properly.

Finishing installation and starting 55450A

5. When the Setup is finished and a message asks you to restart your computer, remove any disks from the floppy disk drive and choose the **Reboot** button.
6. To open 55450A on Windows 95 or Windows NT 4.0 after installation, select: **Start | Programs | 55450A | 55450A V1.4**. The 55450A window appears.

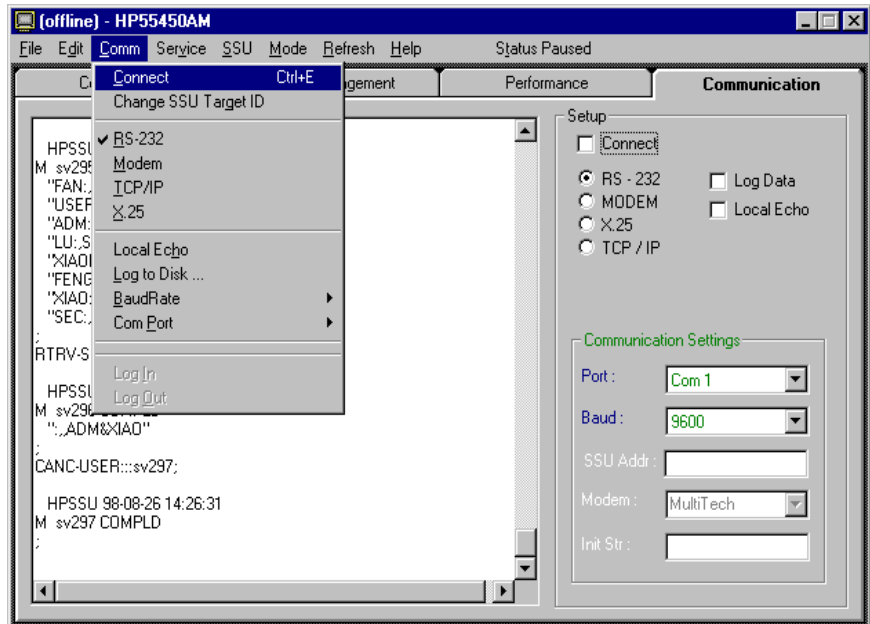


Establish local connection with NSU

The 55400A offers many different connection scenarios for your PC, refer to Chapter 4 on page 15 for more detailed information. This section only describes the local connection to the NSU through an RS-232 interface.

The following describes the procedure of establishing a local connection.

1. Make sure an IMC or an NIMC card is installed in the NSU, identify the location of the Local port which your PC will be connected to.
2. Connect your PC's **Com** port to the NSU **Local** port with a 9-pin female to 9-pin male straight-through cable.
3. Configure the 55450A to communicate with the NSU over the RS-232 interface.
 - i. Open 55450A, then click **NO** to use old connection settings.
 - ii. Configure RS-232 communication parameters by either one of the following:
 - From **Comm** menu bar, select **RS-232**, select the correct **Comm port** your connection is using, and select **Baud Rate** as *9600*, or
 - From **Communications** page, set the RS-232 communication parameters to the same values as above.



- iii. Initiate a connection by selecting **Connect** from **Comm** menu bar or by selecting **Connect** checkbox from **Communications** page.
 - iv. If the IMC/NIMC Security switch S4-1 is set to ON (Security enabled), a login window appears and prompts you to enter the correct user name and password.
4. When a connection has been successfully established, 55450A will retrieve the current settings of the 55400A and display the information.

Set date and time for NSU

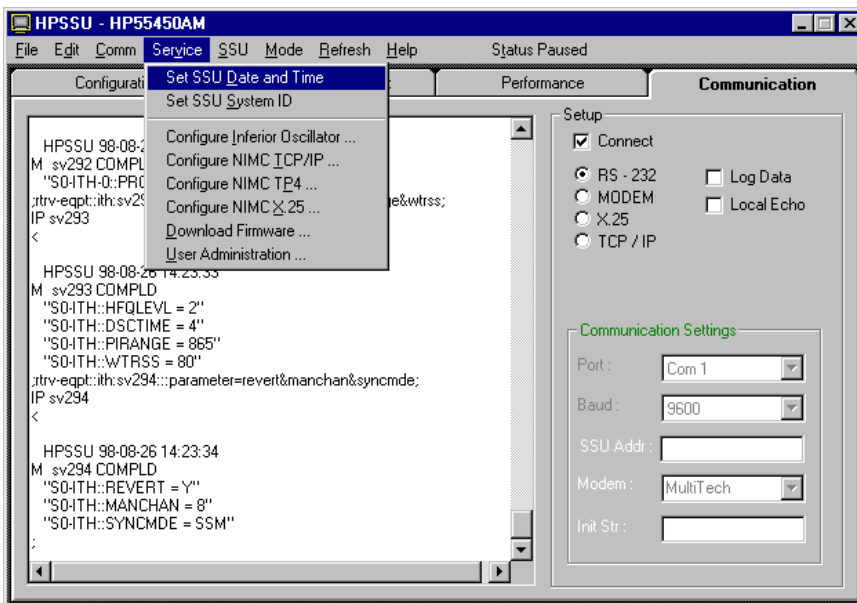
When the NSU is shipped from the factory, the date and time have not been set up for your time zone. One of the first tasks a new user should perform is setting the system date and time.

Note

Whenever the NSU is powered-off, you will need to set the NSU date and time again.

- To set the NSU date and time:

1. Navigate to the **Service** menu bar, select **Set SSU Date and Time**.



2. Enter the date and local time in the format: yy-mm-dd, hh-mm-ss.
For example, to set a date and time of March 7, 1997 and 4:10 p.m., enter: 97-03-07,16-10-00.
3. The current date and time, according to the PC, is offered as the default selection. Click on **OK**, when the entered time is synchronized with the time reference being used.

Set up security and log in

When shipped from the factory, the 55400A comes with the security feature disabled (Switch S4-1 on the IMC/NIMC card is set to OFF). With the security feature disabled, access to the 55400A is unrestricted. To control access to and protect integrity of the system, 55450A defines three user classes. Each user has an assigned security level which determines the extent of access to the 55400A that the user will have. Table 2-1 lists the user classes and their authorization. Refer to *55400 Network Synchronization Unit User's Manual* for more detailed information.

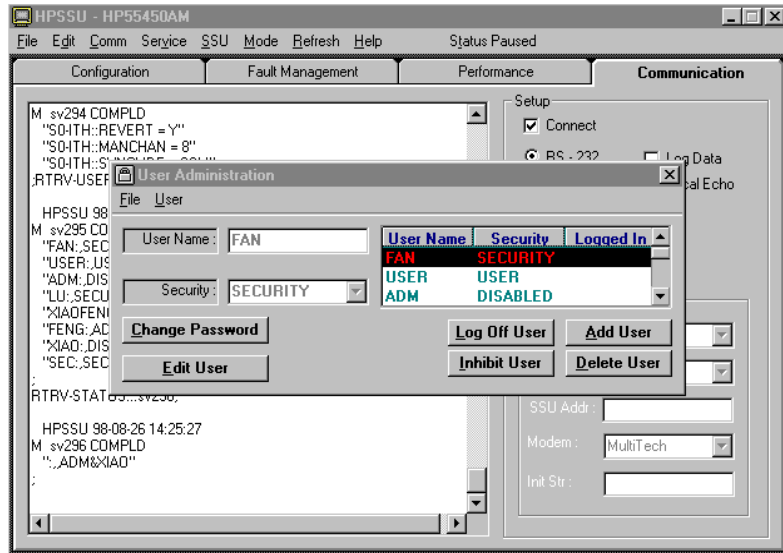
Table 2-1. User Classes

User Classes	Access
USER	Hardware setting retrieval only
ADMIN	Can retrieve and change settings of most hardware.
SECURITY	Can modify Security Database (e.g. add a user) and download firmware, as well as all of Admin's capabilities

In order to enable the security feature, you must add a new user with

SECURITY Level security to the Security Database first. The procedure is described below:

1. Open 55450A, then select the **User Administration** from the **Service** menu to bring up the **User Administration** screen.



2. With the Security Switch (S4-1 on the IMC card) set to OFF, add a new user with SECURITY level security. You can add the new user with the following steps:
 - i. Click on the **Add User** button within the **User Administration** screen.
 - ii. Enter the user name, select the security level, and enter a password for the new user in the proper field.

Note User Name can contain up to 10 alphanumeric characters and is not case sensitive. Password is case sensitive and can contain up to 10 characters, with at least 1 character not belonging to the alphabet and 1 character a special character (any printing character other than one from the alphabet, a number, comma, colon, or semicolon).

- iii. Once satisfied with your entries, click on the **Accept** button.
 - iv. If accepted, the new user information will appear in the user list.
3. Set the Security Switch (S4-1 on the IMC card) to ON to enable the security feature.
 4. Select **Log in** from the **Comm** menu, a Log in window will pop up. You can also use the **Database** of 55450A to log in to the NSU, refer to “Set Up Database” on page 12 in this manual for more information.
 5. Log on to the 55400A using the new user you have created in step 2.
 6. Now, you can perform all the management tasks provided by 55450A, because you are logged in with SECURITY-level security.

For example, you may do any of the following from 55450A:

- Add additional users to security database, or modify the existing users' properties (password, security level, logon expiration, etc).
- Find out what equipment and version is included in your system, as well as the status of the equipment, or download firmware. Please refer to Chapter 3 on page 11 for more information.
- Create multiple connection setups to different devices. Please refer to Chapter 3 on page 12 for more information.
- Establish a connection with the NSU via X.25, TCP/IP (AM only), or a modem (A or AM). Please refer to Chapter 4 on page 15 for more information.
- View or change the settings of input channels and output cards. Please refer to Chapter 5 on page 29 for more information.
- Retrieve the automatic messages, set thresholds for the input signal, and set conditions for alarmed or non-alarmed events. Please refer to Chapter 6 on page 35 for more information.
- Retrieve performance monitoring information about input channels. Please refer to Chapter 7 on page 41 for more information.
- Establish connections to multiple devices, one-at-a-time (AM only). Please refer to Chapter 8 on page 43 for more information.

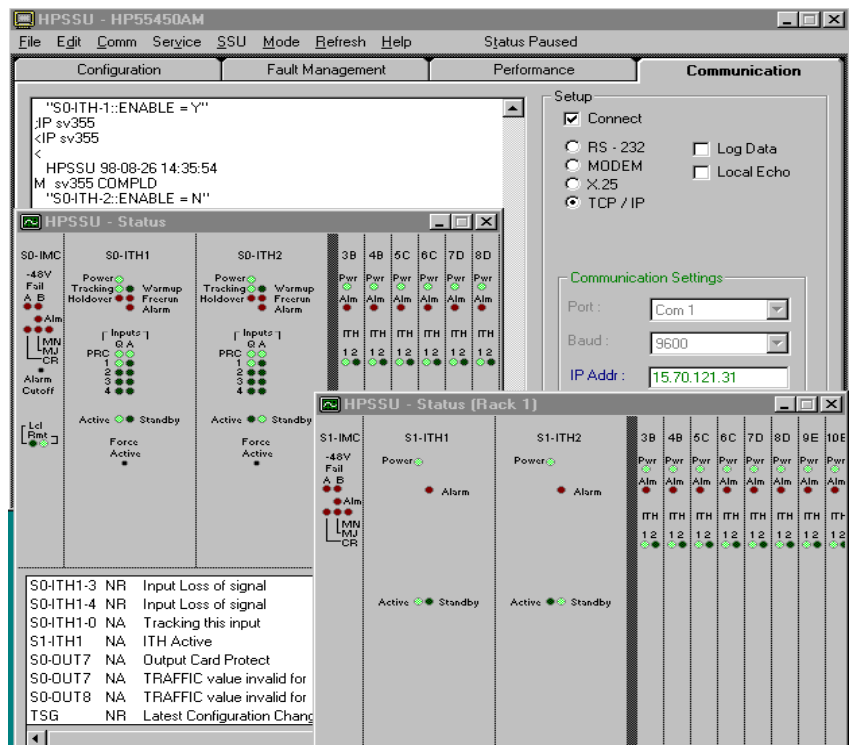
Chapter 3

Basic System Administration

Overview 55450A provides some functions that facilitate users to control and monitor NSUs. This chapter introduces some most often performed management tasks. These functions include:

- Status view - provides a visual representation of the NSU front panel
- Database Management - provides an easy way to access multiple devices without repeatedly entering connection information
- Download Firmware - provides an easy way to upgrade firmware for ITH and IMC cards

Status view The status view feature of 55450A provides a visual representation of the 55400A front panel on your computer screen. Both the physical configuration and the operating conditions that are presented via LEDs on the actual NSU front panel can be monitored and updated from your computer. Select **Show 55400A Status** from **SSU** menu bar. The SSU - Status view screen appears as below (shows both master and expansion subracks).



SSU Menu Bar

The SSU menu bar provides access to the selection options associated with the Status view. Choices on this menu are:

Show 55400A Status - used to open or close the Status view.

Always on Top - if selected, the Status view will remain the top window.

Show in List - specify whether the active conditions of the NSU should be shown at the bottom portion of the Status view.

ReInventory 55400A - if selected, the Status view will be updated whenever the physical configuration of the NSU changes. An alternative, but much less convenient way, to re-inventory is to close and re-open the Status view.

Update Now - immediately request status information from the NSU and refresh the information shown in the Status view. The primary purpose of this selection is to provide a simple way to update the view when the update interval is set to Pause.

Update Interval - provides access to a sub-menu where you can control how often the Status view will update the information from the 55400A.

Note Switching between Status Paused and Updating can be achieved by simply clicking on the portion of the menu bar labeled “Status Paused” or “Status Updating”.

Control the NSU through Status view

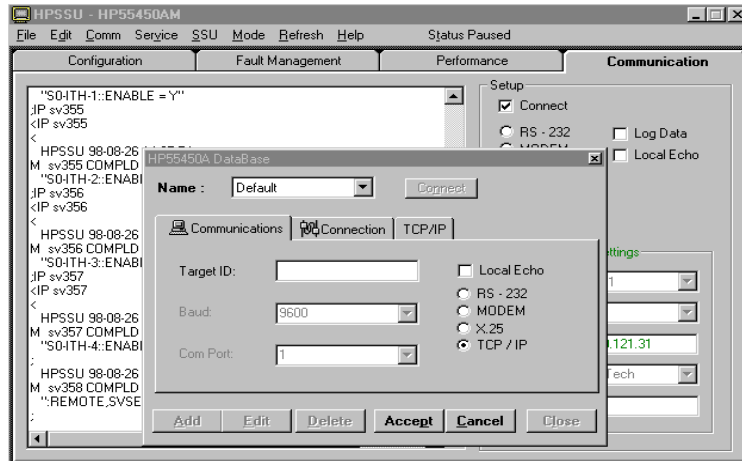
- Most of the above choices are also available by moving the mouse pointer over a specific card in the **Status** view and clicking the right button.
- The **Force Active** buttons on the ITH cards and **Alarm Cutoff** button on the IMC card can be activated directly from the **Status** view screen. Point the mouse at the desired control and click.
- By clicking the right mouse button on each specific card in the on-screen 55400A front panel, additional information, such as the model number and firmware version, can be obtained.

Set Up Database

The 55450A database feature provides a way to save multiple communication setups for 55400 NSUs and 55300 GPS sources. This makes it easy to use 55450A to configure and monitor different devices without repeatedly entering connection information each time you want to access a different device.

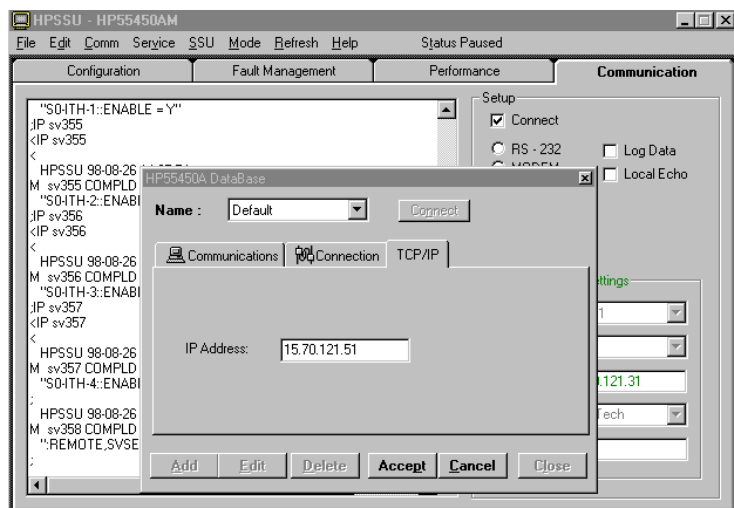
To set up Database:

1. Select **Database** from the **Mode** menu bar, an 55450A Database window will pop up.
2. Click the **Add** button and enter a name for the device connection.
3. Click **OK**, then return to the 55450A Database window.

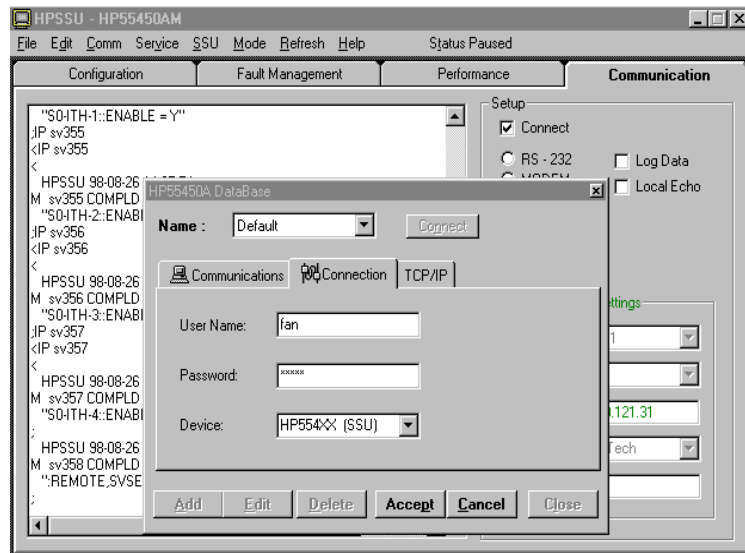


4. Click the **Communications** tab in the 55450A Database window.
5. (Optional Step) Click the **Target ID** field and enter a Target ID, which must match the System ID (created by selecting **Set SSU System ID** from the **Service** menu bar. It can contain up to 20 characters. For example, SSU_1.). This field can also be left blank.
6. Select the **Baud Rate** and **Com Port** to be used for the connection.
7. Select the **Connection Type**: RS-232, MODEM, X.25, or TCP/IP (55450A supports RS-232 and Modem only). Notice that selecting Modem, X.25, or TCP/IP connections will add a new **Modem**, **X.25**, or **TCP/IP** tab respectively, within the 55450A Database window.
8. Skip this step if **RS-232** connection will be used. Otherwise click on the **Modem**, **X.25**, or **TCP/IP** tab and proceed with the configuration.

For example, enter the IP address of the target device if TCP/IP connection is selected.



- Click on the **Connection** tab, enter a valid **User Name** and **Password**. (Those that have already been established by using **Service | User Administration**).



- Using the Device pull-down field, click on SSU or GPS, as needed.
- Click on the **Accept** button to complete the database entry.

To use the Database:

- Select **Database** from the **Mode** menu bar.
- Select the desired device from the **Name** pull-down field.
- Click on the **Connect** button.

Download Firmware

55450A supports downloading of new firmware to the IMC/NIMC card and the ITH cards in the master subrack, as well as the expansion communications card and expansion synchronization cards in the expansion subrack. This is accessible only by a user with a SECURITY level. Downloading firmware can have serious consequences if done incorrectly. Never download to an Active ITH or Expansion Sync card. Do not perform a firmware download unless provided with supplemental information describing a procedure to follow, including how to use the controls on this screen.

Note

Do not use this form unless you have been given explicit instructions to perform a firmware upgrade on some part of the 55400A. Experimenting with controls on this form could result in erasure of firmware in one of the cards in the 55400A. Firmware upgrade may also erase previously saved configuration information.

Chapter 4

Communication Management

Overview Control and monitoring of the NSU can be performed in 55450A. However, you must establish a connection between your 55450A and the NSU first. Aside from the connection described in Chapter 2, 55450A also provides several alternatives to establish communication with the NSU.

Note Parameters set up for any type of connections (listed in Table 4-1) can be performed in 55450A revisions. 55450A supports RS-232 and modem connections only.

Connection Requirements Table 4-1 is a complete list of the types of cards needed and ports used for each type of connection. Table 4-2 lists the types of cables recommended for each supported connection. If you choose to make your own cable, see Figure 4-1 and Figure 4-2.

Table 4-1. Requirements for Connection

Connection Type	Information Card	Connecting Port	Notes
RS-232 (local)	IMC/NIMC	Local	
RS-232 (remote)	IMC	Remote	
MODEM	IMC	Remote	S 4-4 on IMC card OFF (modem control enabled)
X.25	NIMC with Option 002	Remote	LAN port inactive
TCP/IP (LAN)	NIMC	LAN	Remote port inactive

Table 4-2. Cabling Requirements

Connection Type	Cabling
RS-232 (local)	9-pin Female to 9-pin Male "Straight-through" cable, to connect PC Com port directly to NSU Local port
RS-232 (remote)	9-pin Female to 25-pin Male Serial cable (HP 24542G or equivalent, please refer to Figure 4-1), to connect PC Com port directly to NSU Remote port

Table 4-2. Cabling Requirements (continued)

Connection Type	Cabling
MODEM	1. 9-pin Female to 25-pin Male Serial cable (refer to Figure 4-2 for specifics), for the connection between the PC Com port and the modem (for PC) RS-232 port; 2. 25-pin Male to 25-pin Male "Straight-through" cable (HP 40242M), for the connection between the NSU Remote port and another modem (for NSU) RS-232 port; 3. two telephone cords, to connect modems to their respective phone jacks
X.25	consult with your network manager
TCP/IP (LAN)	consult with your network manager

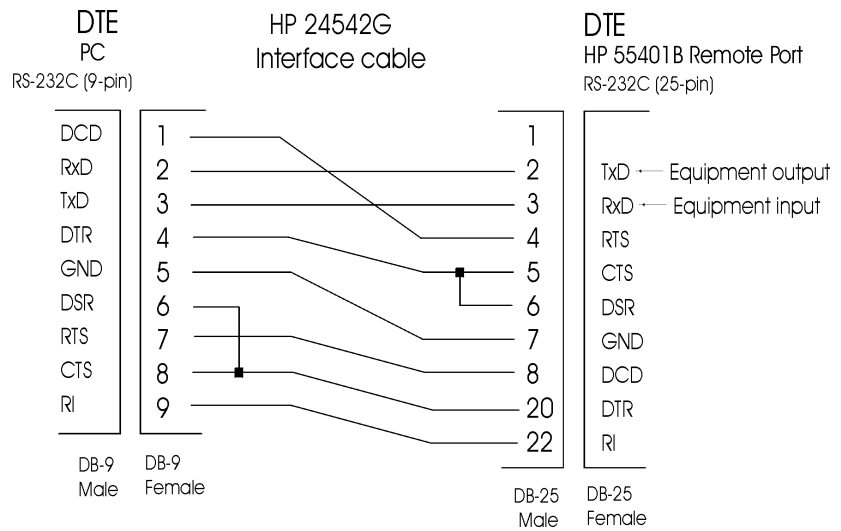


Figure 4-1. Cabling illustration - 1

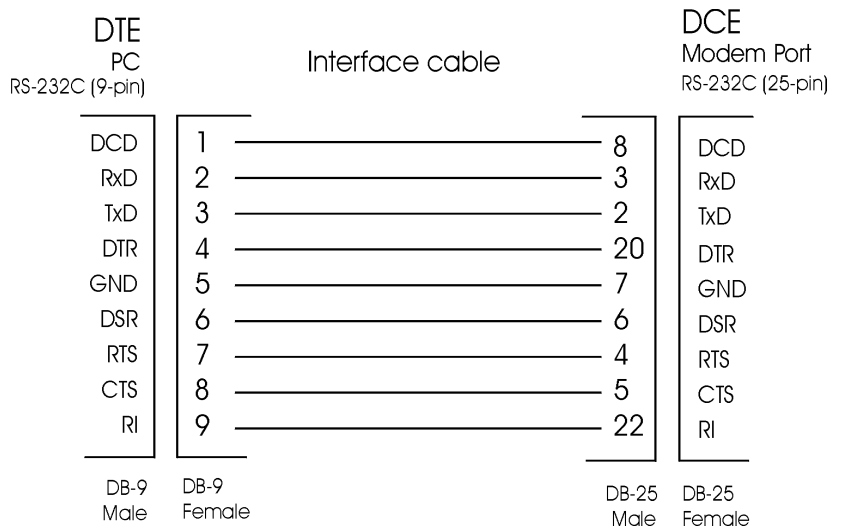


Figure 4-2. Cabling illustration - 2

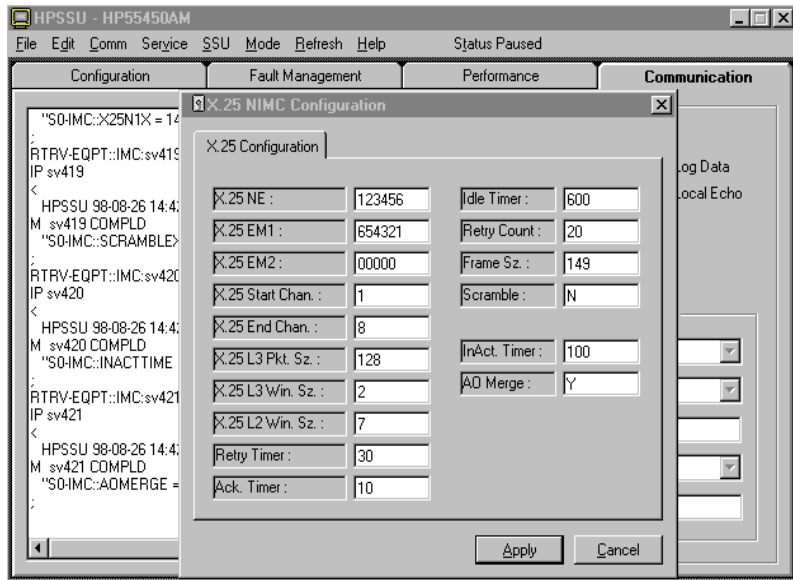
Configure Communication Parameters for X.25, TCP/IP, and TP4

All the communication parameters for X.25, TCP/IP and TP4 must be configured through local connection first. The procedure is:

1. Establish a local connection with the NSU through RS-232 interface. Refer to “Establish local connection with NSU” on page 6.
2. Set up the communication parameters.

• **For an X.25 connection:**

- i. Navigate to **Service** menu bar and select **Configure NIMC X.25**, an X.25 NIMC Configuration window pops up.



- ii. Consult with your network manager to set the parameters in the pop-up window. The first three parameters must be set, default values can be used for the rest. Table 4-3 describes the parameters.

Table 4-3. X.25 Parameter Descriptions

Parameters	Range of Values	Description
X.25 NE	5 to 15 digits (0-9)	X.25 address of the network element. Sometimes referred to as the X.121 address
X.25 EM1	5 to 15 digits (0-9)	X.25 address of the primary/alternate element manager. The alternate address is used for event reporting in the case of communication failure with the primary element manager.
X.25 EM2		
X.25 Start Chan.	1 to 4095 (default=1)	Starting/Ending Logical Channel Number. Specify the number of bi-directionally switched virtual channels (SVC) for use by the NSU. The Ending number must be larger than the starting number.
X.25 End Chan.	2 to 4095 (default=8)	
X.25 L3 Pkt Sz.	128, 256, or 512 (default=128)	Level 3 Packet Size. Specify the maximum packet size to be transferred across the X.25 interface.

Table 4-3. X.25 Parameter Descriptions (continued)

Parameters	Range of Values	Description
X.25 L3 Win Sz.	1 to 7 (default=2)	Level 3 Window Size. Specify the default value for the maximum number of packets that can be transmitted without an acknowledgment over a switched virtual circuit.
X.25 L2 Win Sz.	1 to 7 (default=7)	Level 2 Window Size. Specify the maximum number of frames that may be transmitted without an acknowledgment.
Retry Timer	1 to 255, in units of 0.1s (default=30)	Retransmission Timer. Specify how long X.25 Network should wait before it resends command frame that needs to be acknowledged.
Ack. Timer	1 to 255, in units of 0.1s (default=30)	Acknowledgment Timer. Specify how long X.25 Network should wait from the time when it receives the first information frame to the time when it sends a "Receiver Ready" frame.
Idle Timer	1 to 100000, in units of 0.1s (default=600)	Idle Timer. Sets the amount of time that a line can be idle before it is declared disconnected.
Retry Count	0 to 255 (default=20)	Retransmission Count. Specify the maximum number of times that a command frame will be resent before an error is generated. A setting of zero is not recommended because there will be no retries if a frame is not sent successfully.
Frame Sz.	149 to 4103 (default=149)	Frame Size. Specify the maximum number of octets that may be transmitted in a single frame.
Scramble	Y or N (default=N)	Scramble Feature. Encryption method that scrambles communication to and from 55400A over a network connection. Do not enable unless using NSU with 55451A or 55452A.
InAct. Timer	1 to 100000, in units of 0.1s (default=10)	Inactivity Timer. Specify how long a connection will continue to stay open without the occurrence of an automatic output message from the NSU.
AO Merge	Y or N (default=N)	Automatic Output Merge. Specify whether to merge commands to NSU with automatic messages from NSU onto the one command port.

- iii. Click **Apply**, then a dialog box pops up and prompts you to verify these parameters for X.25 are correctly set.
- iv. Click **Yes**. This action will cause the NIMC card to reboot. It will be unavailable for 30 seconds.

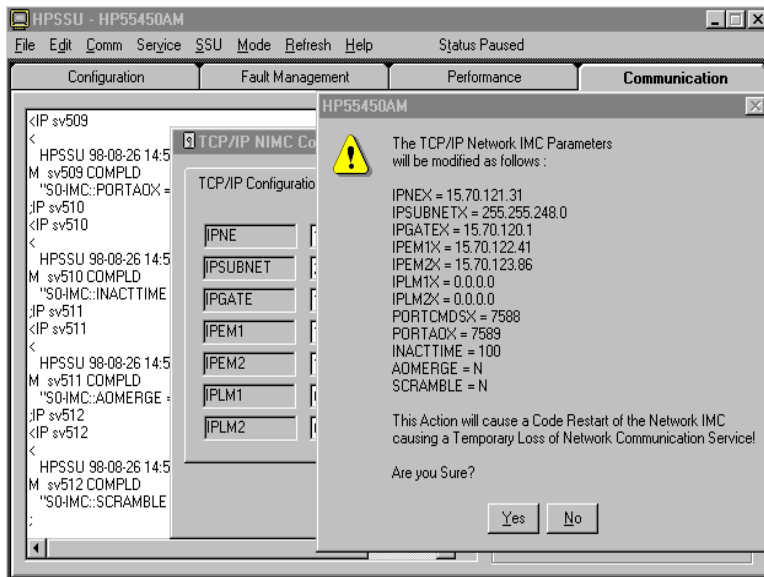
Table 4-4. TCP/IP Parameters Description

Parameters	Range of Value	Description
IPNE	0.0.0.0 to 223.255.255.255	IP address of the network element. Consult with your network manager for the value.
IPSUBNET	0.0.0.0 to 255.255.255.xxx ^a	Subnetwork mask. Used for extracting the network identifier from the IP address.
IPGATE	0.0.0.0 to 223.255.255.255	IP address of default gateway. Consult with your network manager for the value.
IPEM1	0.0.0.0 to 223.255.255.255	IP address of the primary and alternate element manager. The alternate address is used for event reporting in case of communication failure with the primary element manager.
IPEM2		
IPLM1	0.0.0.0 to 223.255.255.255	IP address of the primary and alternate local manager. The alternate address is used for event reporting in case of communication failure with the primary local manager. The local manager feature allows for the testing of the LAN connection using a local PC connected to the LAN port.
IPLM2		
PORTCMDS	5001 to 20000	Command Port Number. Used to specify the port number for the command/response reporting or event reporting.
PORTAO	5001 to 20000 ^b	Automatic Output Port Number. Used to specify the port number for the automatic event reporting.
INACTTIME	0 to 10000 in units of 100 ms (0.1 s)	Inactivity Timer. Used to specify the length of time a connection will continue without the occurrence of an automatic output message.
AOMERGE	Y or N	Automatic Output Merge. Applies only to a network manager (IPNE) connected to the LAN port. Specifies whether the automatic output messages and commands will be carried separately on two different ports or combined onto one.
SCRAMBLE	Y or N	Scramble Feature. Encryption method that scrambles communication to and from the 55400A over a network connection. Do not enable unless using NSU with 55451A or 55452A.

a. The last byte of the IP subnet mask can only be set to 0 or 128 (i.e., the last 7 bits must be zero).

b. Do not set the Command Port number and the Automatic Output Port number to the same value.

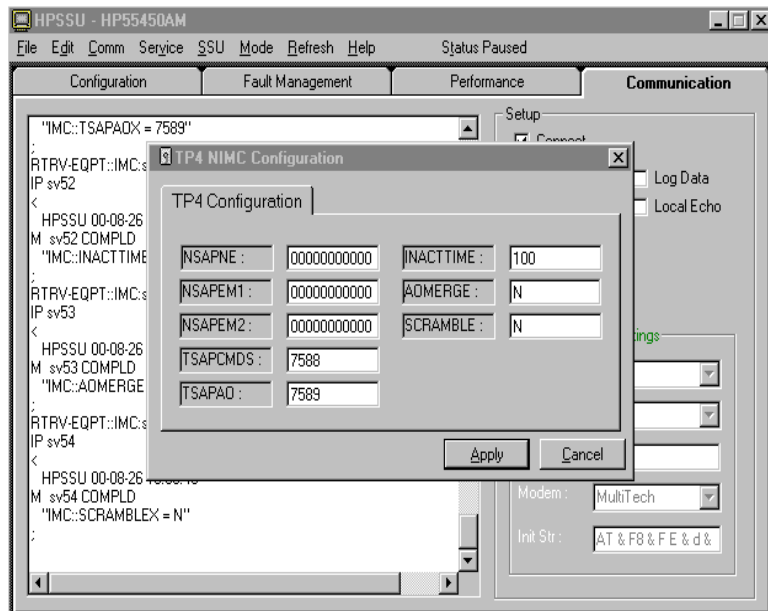
- iii. Click **Apply**, then a dialog box pops up and prompts for verification of TCP/IP parameters.
- iv. Click **Yes**, this action will cause a code restart of the NIMC card.



v. Disconnect the PC from the NSU Local port.

• **For TP4 parameters:**

i. Navigate to **Service** menu bar and select **Configure NIMC TP4**, a TP4 Configuration window pops up.



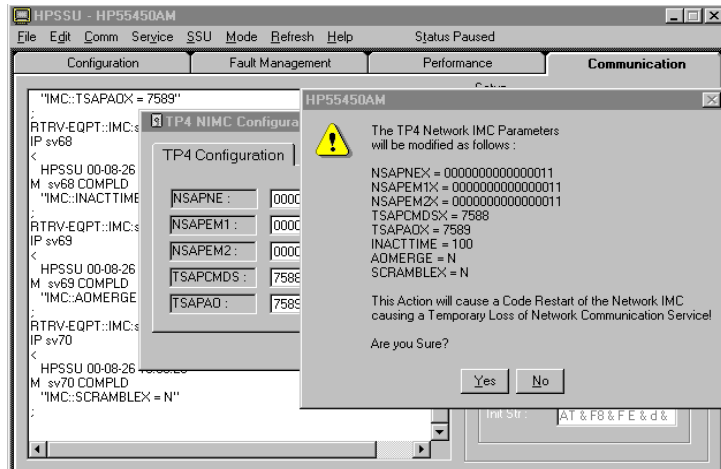
ii. Consult with your network manager to set the parameters in the pop-up window. Table 4-5 describes the parameters.

Table 4-5. TP4 Parameters Description

Parameters	Range of Value	Description
NSAPNE	8 to 20 bytes entered in hexadecimal format	NSAP (Network Service Access Point) address of the network element. Consult with your network manager for the value.
NSAPEM1 NSAPEM2	8 to 20 bytes entered in hexadecimal format	NSAP address of the Primary and alternate element manager. The alternate address is used for event reporting in case of communication failure with the primary element manager.
TSAPCMDS	1 to 32 characters. Default is 7588.	TSAP (Transport Service Access Point) Command Port Number. Used to specify the port number for the command/response reporting.
TSAPAO ^a	1 to 32 characters. Default is 7589.	TSAP Automatic Output Port Number. Used to specify the port number for the automatic event reporting.
INACTTIME	0 to 10000 in units of 100 ms (0.1 s). Default is 10.	Inactivity Timer. Used to specify the length of time a connection will continue without the occurrence of an automatic output message.
AOMERGE	Y or N	Automatic Output Merge. Only applies to control the SSU through the Network Management software. Specifies whether the automatic output messages and commands will be carried separately on two different ports or combined onto the Command port TSAP.
SCRAMBLE	Y or N	Scramble Feature. Encryption method that scrambles communication to and from the 55400A over a network connection. Do not enable unless using NSU with 55451A or 55452A.

a. TSAPCMDS and TSAPAO must be set to different values.

- iii. Click **Apply**, then a dialog box pops up and prompts for verification of TP4 parameters.

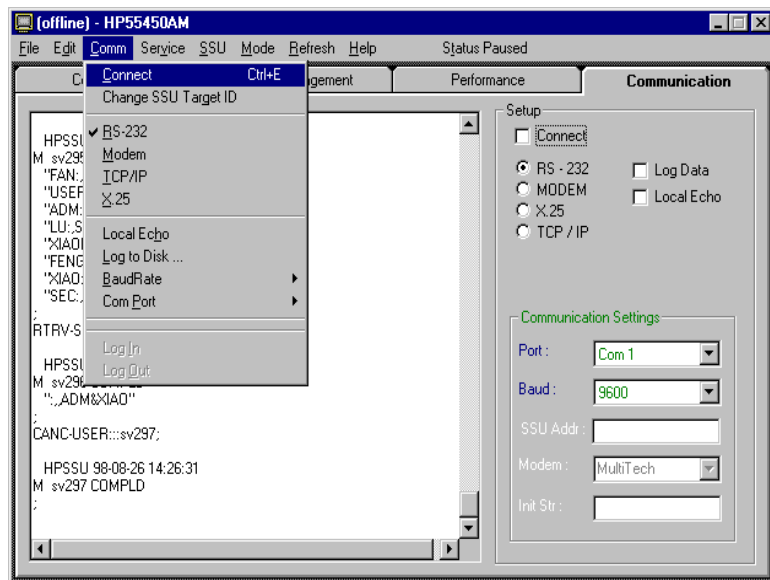


- iv. Click **Yes**, this action will cause a code restart of the NIMC card.
- v. Disconnect the PC from the NSU Local port.

Establish a Connection **RS-232 Connection (remote)**

Local connection to the NSU through RS-232 interface was described in Chapter 2. This section will describe the procedure to establish a remote connection between your PC and the NSU through RS-232 interface.

1. Review the related information in Table 3-1 and Table 3-2 to make sure that all the requirements needed to implement this type of connection are met.
2. Connect your PC **Com** port to the NSU **Remote** port with the proper 9-pin female to 25-pin male cable (HP 24542 or equivalent). Refer to Figure 4-1 on page 16 for details.
3. Configure the 55450A to communicate with NSU over the RS-232 interface, this is identical to Step 3 of “Establish local connection with NSU” on page 6.
4. Initiate a connection by selecting **Connect** from **Comm** menu bar or **Connect** checkbox from **Communications** page.



Modem Connection

This section describes the procedure to prepare the NSU for communication with your PC via modem.

1. Review the related information in Table 4-1 and Table 4-2 to make sure that all the requirements are met. Identify whether the modem for the PC and the modem for the NSU are of the supported type. The recommended modem is the MultiTech Systems MT2834 ZDX “MultiModemZDX”.

Note NSU will not detect a non-supported modem unless told to do so by specific commands sent through the local port.

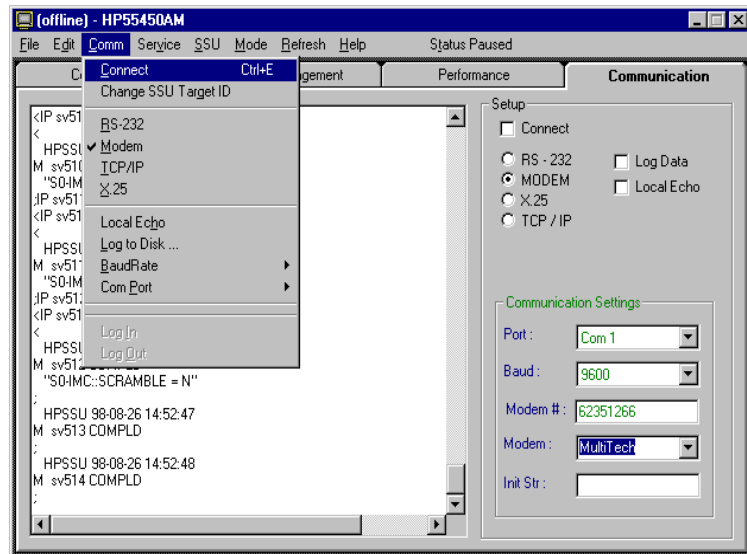
2. If the modem for NSU is of the supported type, you can skip this step and proceed to step 3. Otherwise, you must perform the following before connecting the modem to NSU remote port.
 - i. Connect the PC **Com** port to NSU **Local** port with the 9-pin female to 9-pin male straight-through cable.
 - ii. Establish a local port connection with the NSU.
 - iii. On the Communications page, send the following command:
Set-Modem::*ABC001::AT &F8 &F E &d &E13 &Q1 &S &SF1 S0=1 &W*; (type in the actual initial string of your modem in place of the italic string)
 - iv. Disconnect the PC from the NSU **Local** port.

Note To return to the default modem type, send the command string: **Set-Modem::*ABC001::Default***; When in default, to use the most recent modem type: **Set-Modem::*ABC001::User***

3. Connect your PC **Com** port to the modem **RS-232** port with a 9-pin Female to 25-pin male cable (refer to Figure 4-2 on page 16), and connect modem jack labeled “LINE” to phone jack with a telephone cord, then apply power to the modem.
4. Connect NSU **Remote** port to the modem **RS-232** port with a 25-pin Male to 25-pin Male Straight-through cable, and connect modem jack labeled “LINE” to phone jack with a telephone cord, then apply power to the modem.
5. Configure the 55450A to communicate with NSU via modems. You should make proper configuration depending on the modem type for your PC.

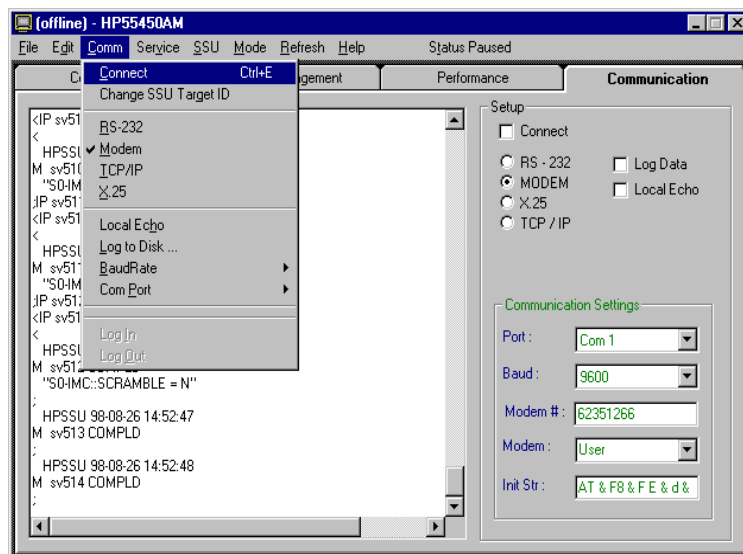
Note You do not need to provide Init String for the supported modem. The supported modem is the MultiTech Systems MT2834ZDX “MultiModemZDX”.

- **If the modem for the PC is of the supported type, do the following:**
 - i. Open 55450A, then click **NO** to using old connection settings.
 - ii. Navigate to **Communications** page, select **Modem**.
 - iii. Select correct **Comm port** and **baud rate**.
 - iv. From the pull down list of **Modem type** field, select **MultiTech**.
 - v. Supply NSU modem phone number in **Modem#** field.
 - vi. Select **Connect** checkbox and wait for connection to establish.



• **If the modem for the PC is of a non-supported type, do the following:**

- i. Open 55450A, then click **NO** to using old connection settings.
- ii. Navigate to **Communications** page, select **Modem**.
- iii. Select correct **Comm port** and **baud rate**.
- iv. From the pull down list of **Modem type** field, select **User**.
- v. Supply NSU modem phone number in **Modem#** field.
- vi. Consult Modem documentation for actual values, then fill **Init Str** field.
- vii. Select **Connect** checkbox and wait for connection to establish.



Note By default, it is necessary to log in within 60 seconds after a modem connection is established. With Security enabled (S4-1 on the IMC card is set to ON) a login box is automatically displayed. If Security is disabled, you must go to **Comm** on the menu bar and select **Log in**.

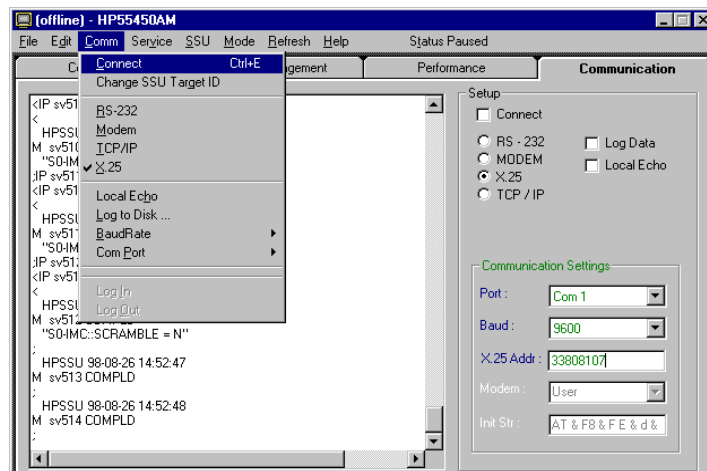
X.25 Connection

This section describes the procedure to prepare the NSU for connection to the X.25 network for the first time.

1. Review the related information in Table 4-1 and Table 4-2 to make sure that all the requirements are met. Verify the state of the S6-8 jumper switch on the NIMC card, refer to *55400 Network Synchronization Unit User's Manual* for more detailed information about the NIMC card.

Note Switch S6-8 on the NIMC card can be set to ON or OFF. ON means communication with the specified element manager X.25 address is to be accepted, and OFF means communication with any X.25 address will be accepted.

2. Before connecting the NSU to an X.25 port, refer to “Configure Communication Parameters for X.25, TCP/IP, and TP4” on page 17 to set X.25 network parameters.
3. Connect NSU **Remote** port to an X.25 port. Consult your network manager on cabling.
4. Connect your PC **Com** port to an X.25 port. Consult your network manager on cabling.
5. Initialize a connection with NSU via X.25 network.
 - i. Click **NO** to use old connection settings.
 - ii. Navigate to **Communications** page and select **X.25**.
 - iii. Fill in the **X.25 Addr** field with X.25 NE value.
 - iv. Select **Connect** checkbox and wait for connection to establish.



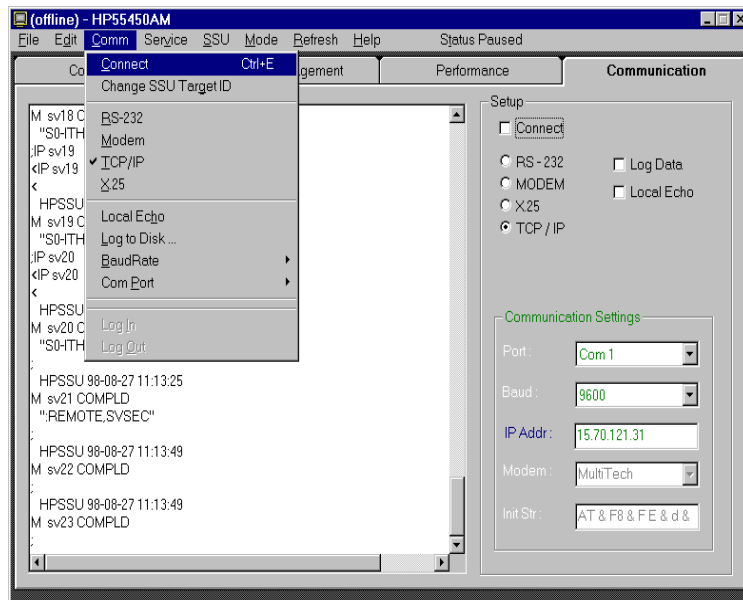
LAN Connection

This section describes the procedure to prepare the NSU for connection to a LAN for the first time.

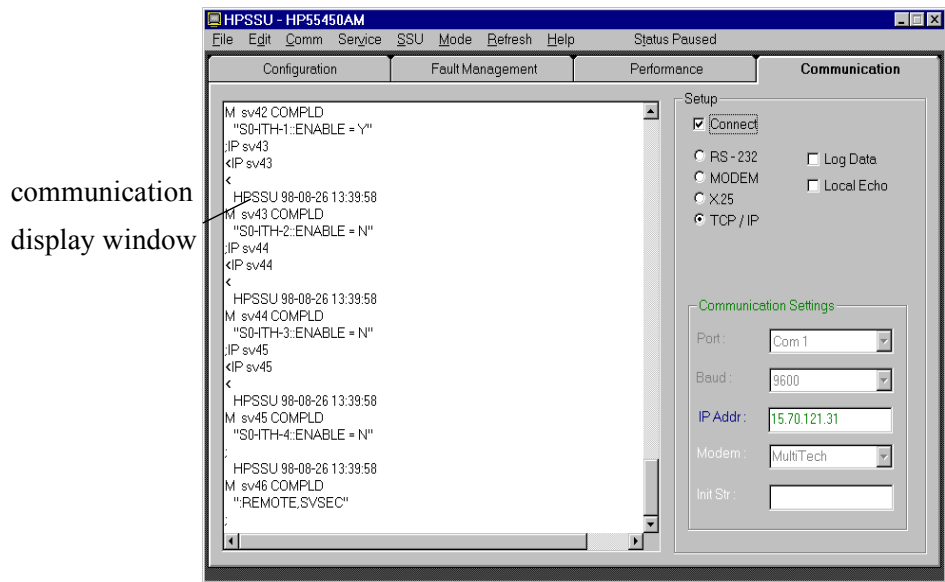
1. Review the related information in Table 4-1 and Table 4-2 to make sure that all the requirements are met. Verify the state of the S6-8 jumper switch on the NIMC card.

Note Switch S6-8 on the NIMC card can be set to ON or OFF. ON means communication with the specified element manager IP address is to be accepted, and OFF means communication with any IP address will be accepted.

2. Before connecting the NSU to a LAN port, refer to “Configure Communication Parameters for X.25, TCP/IP, and TP4” on page 17 to set TCP/IP LAN network parameters.
3. Connect the NSU LAN port (on NIMC card) to a LAN port of the network.
4. Connect your PC LAN port to a LAN port of the network.
5. Initialize a connection with NSU via TCP/IP.
 - i. Click **NO** to use old connection settings.
 - ii. Navigate to **Communications** page, select **TCP/IP**.
 - iii. Fill in the **IP Addr** field with IPNE value.
 - iv. Select **Connect** checkbox and wait for connection to establish.



After Connection Once connection to an NSU has been established, communication between the PC and the NSU can begin, and data traffic between your PC and the NSU is displayed in the communication display window.



Local Echo

The echo feature of the 55400A is enabled by default (set via switches on the IMC card), so data traffic between your PC and the NSU can be displayed in the communication display window. You can also send TL1 commands directly to the NSU from there.

- If you do not see what you have typed in on the screen, the echo feature has been disabled at the NSU. You can select the **Local_Echo** feature to enable it from the communication page of 55450A.
- If each character typed on the Communication display window is doubled, disable Local Echo because the echo feature has already been enabled at the NSU.
- Local Echo is enabled or disabled by one of the following actions:
 - From **Comm** menu Bar, clicking on **Local Echo**.
 - From **Communications** page, clicking on the **Local_echo** checkbox.

Log Data to Disk

The Log Data feature can be used to collect responses from the 55400A into a file. It is useful for collecting auto-upload performance data, but it can also create huge files if you are not careful. This feature can be enabled or disabled by one of the following actions:

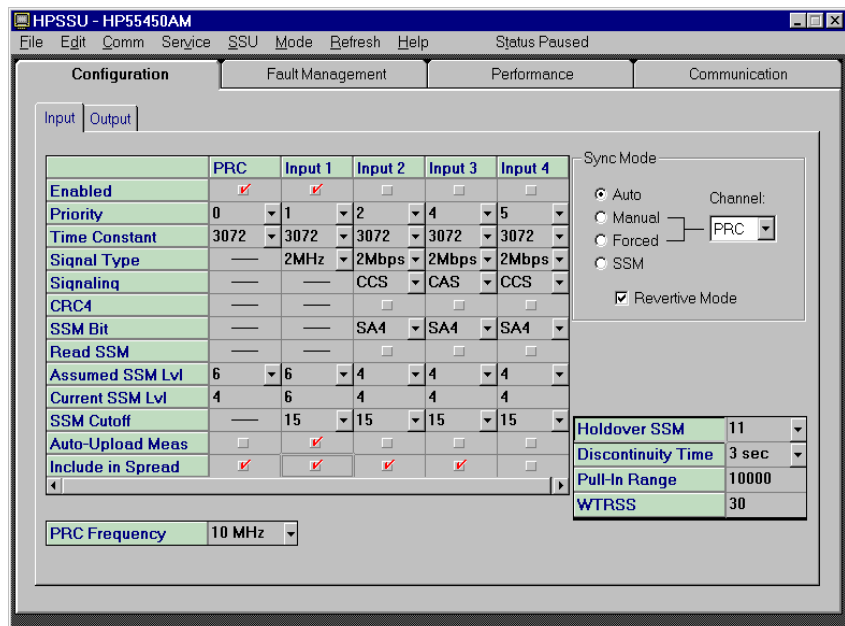
- From **Comm** menu Bar, clicking on **Log to Disk**.
- From **Communications** page, clicking on the **Log Data** checkbox.

Chapter 5

Configuration Management

Overview The 55400A factory default settings can be modified in the 55450A **Configuration** page. There are two basic categories of NSU settings: **Input** and **Output**, that can be modified.

Input Configuration The NSU system comes from the factory set in Automatic mode with all of the input channels enabled and each channel assigned a priority equal to its channel number plus one. You can use **Input** page to view current values of all input-related settings of the NSU or modify any of these settings to meet your network needs.



An input must be qualified before being used as an active reference input. The following describes some important settings related to input qualification.

Enabled, Signal Type, Signaling, CRC4

Enabled. An input must be enabled to be a candidate reference source. Enabling an input doesn't mean that the input will necessarily be selected to be the reference source, but disabling an input (unchecking enabled) assures that the input can not be selected as the reference source.

Signal Type. Used to specify whether 2 Mbps or 2 MHz signal is expected on a specific input channel.

Signaling. The selected E1 input channel can be monitored for correct CAS or CCS information. If the selected format is not detected, the input signal may be disqualified.

CRC4. The selected E1 input channel can be monitored for CRC4 errors. If it is enabled and CRC4 errors occur, the input signal may be disqualified.

Note The signal type, signaling and CRC4 settings are not used for PRC channel.

Note The signaling and CRC4 settings are ignored for non-E1 formats.

Priority

Priority indicates the order in which the qualified inputs will be selected as the active reference clock, assuming that all other factors are equal. The default order, from the highest to the lowest, is PRC, 1, 2, 3, 4, etc. The values that can be assigned to the inputs are 0 to 9, where 0 has the highest priority and 9 the lowest. The specific role of the priority setting in selection of the active input is dependent on the selected Synchronization Mode.

Auto-Upload Meas.

When enabled, the performance data of the selected input channel will be automatically output as an automatic message. The specific performance data that is output can be configured on the **Fault Management | Threshold** page. You can also log this performance data to a file by enabling the Auto-Upload capability and activating the Log all data traffic to disk feature.

Include in Spread

This setting decides which input channels are to be used in the performance measure Spread.

Holdover SSM, Discontinuity Time, Pull-in Range, WTRSS

Holdover SSM specifies the SSM quality level to be assumed for the local oscillator and causes an SSM message to be put onto the output stream when the SSU goes into Holdover mode.

Discontinuity time specifies a time period during which input discontinuities or short phase shifts will be tolerated without immediate disqualification of that input. The value can be set between 1 and 15 seconds.

Pull-in Range is used to specify how far off in fractional frequency deviation the input signal can be from the local oscillator on the ITH card.

WTRSS (Wait Time) defines a waiting period during which input signal condition criteria must be met (such as LOS, AIS, and any user-selected performance measures) before that input could possibly become qualified. The default value is 30 seconds.

Example: How these setting are used to qualify an input

An input must be qualified before it will be considered for use as an active reference input. The process of qualifying an input involves numerous evaluations of that input: Performance measurements, Signal conditions, Error conditions

1. The input must be enabled first.
2. (Optional) The 55400A continually evaluates each input using a variety of performance measurements. Any or all of these measurements can be selected as required for qualification of a particular input. You can set thresholds for these measurements that if exceeded, the input will be disqualified. See **Fault Management | Threshold** on page 37 for more information.
3. The input signal is continually monitored for error conditions, such as LOS or AIS. The specific type of evaluation depends on the type of input applied. Additionally, conditions such as CRC4 may be part of the evaluation, if enabled. Failure to meet any of these conditions may disqualify the input.
4. Once criteria 2 and 3 are met (note that criterion 2 is optional, based on user configuration), the 55400A will track the input.
5. While the attempt to track the input is proceeding, a wait time is applied, during which the conditions described in criteria 2 and 3 must remain OK. The wait time parameter **WTRSS**, can be set in the **Configuration | Input** form.
6. Once the tracking requirement is satisfied, the input signal is declared qualified and ready for use as a reference input.

Available Sync Mode

There are four major settings for the synchronization mode:

Table 5-1. Synchronization mode

Sync Mode	Description
Auto	In this mode, the qualified input with the highest priority setting will be selected. The highest priority is assigned with the lowest numerical value, which means value 0 has the highest priority, then 1, 2, 3, etc.
Manual	Provides a direct way to select a qualified input to become the active reference. The selection box next to this setting (titled Channel) provides the method for selecting the desired channel. If the selected input becomes disqualified, the synchronization mode behavior will return to Auto mode until the manually selected input becomes re-qualified, at which time it will again become active.

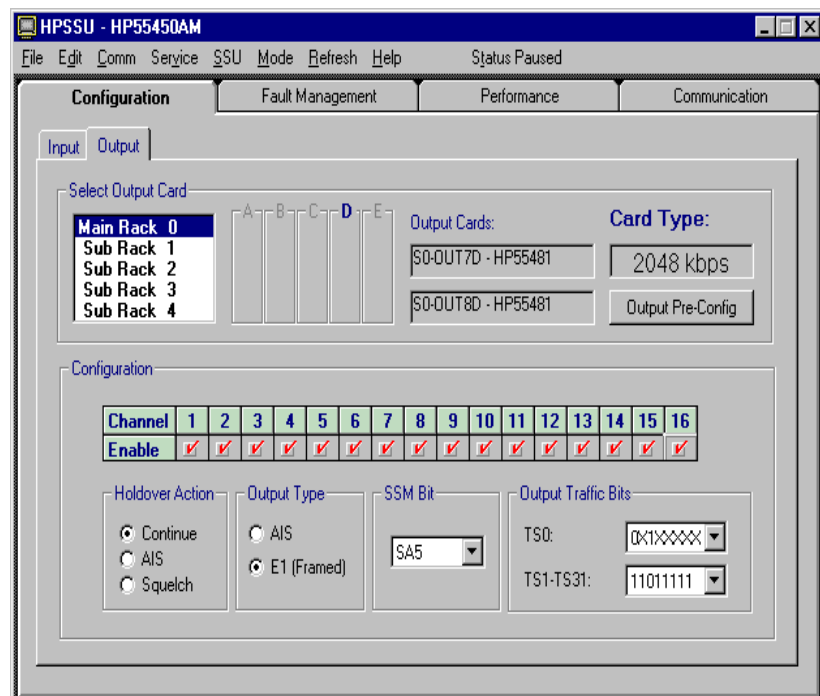
Table 5-1. Synchronization mode (continued)

Sync Mode	Description
Forced	Very similar to Manual Mode. The difference is that with Forced Mode, if the selected input becomes disqualified, the 55400A will go into holdover mode.
SSM	With this selection, the qualified input having the best SSM value will be selected as the active reference.
Revertive Mode	The Revertive mode dictates that whenever an input signal with a higher priority than the active reference becomes qualified, that signal becomes the active reference. This setting only affects the Auto and SSM Sync Modes .

For example, when Auto sync mode, together with the Revertive mode, is enabled and the current active reference has a priority level of 3, whenever an input signal with a priority level of 2 or higher becomes qualified, it will be automatically selected as the active reference, even though the level 3 input remains qualified.

Output Configuration

Like input channels, output cards have default system settings. All output cards and ports are enabled when shipped from the factory. You can use **Output** page to view current output settings of the NSU or modify any of these settings later.



Note Whether a user is allowed to view and/or to change settings on this screen depends on the user's security level, if Security is On.

Note In the **Select Output Card** area, **Main Rack 0** refers to master subrack (55401C), and **Sub Rack 1** through **4** refer to expansion subracks (55402C).

Select Output Card

A master subrack (55401C) can support up to four expansion subracks (55402C). In the **Select Output Card** area, you can select any subrack which is part of your SSU system. Each subrack has five pairs of slots for output cards, labeled A through E. Each slot may contain a single output card or a redundant pair of cards. Wherever a redundant pair exists, the settings for each card must be identical. However, the settings for each of the slots (A, B, C, D, and E) can be completely independent.

Using Output **Pre-Config**, it is possible to configure the settings for an output slot even if the slot is empty. If you do configure a slot that contains no output card and later insert a card into that slot, the card will be automatically programmed to the settings that you have selected.

Configuration Field

The grid area with rows titled **Channel** and **Enable** is used for viewing and setting individual output channels. A right mouse button click in this area opens a pop up menu, allowing easy enabling or disabling of the output channels in an output slot all at once.

Output Type selection applies only to E1 (2 Mbps) outputs but can be set even if a 2 MHz card is present in the slot. However, it will have no effect unless an E1 card is inserted.

Holdover Action defines output behavior when holdover occurs.

- **Continue** when selected, all enabled outputs in the slot will continue providing the output they were providing upon the occurrence of a holdover. For example, if slot B has a pair of E1 cards and the Output Type is selected as E1 Framed Data, when holdover occurs the outputs associated with slot B will continue to produce E1 Framed Data.
- **AIS** means all enabled outputs in the slot will produce AIS (Alarm Indication Signal) upon the occurrence of a holdover. For example, suppose there is a single E1 card in slot D with Output Type set to E1 Framed Data and Holdover Action set to AIS. During normal operation, the outputs will produce E1 Framed Data. If a holdover condition occurs, these outputs will generate AIS. When the holdover condition ends the outputs will again switch to E1 Framed Data.

- **Squelch** means that all enabled outputs in the slot should stop any output upon the occurrence of a holdover. This selection is applicable to both 2 Mbps and 2 MHz output cards. For example, suppose slot C has an E1 card with Output Type selected as AIS and the Holdover Action to Squelch. During normal operation, the outputs will produce AIS. If a holdover condition occurs, these outputs will be disabled (turned off). When the holdover condition ends these outputs will again become AIS.

Note AIS selection has no meaning for 2 MHz output cards since they can't produce AIS. However, this setting is always allowed by the 55400A. If the setting is AIS and a 2 MHz card(s) is in the slot, the holdover action will be Continue (it will continue to produce the 2 MHz output signal) even though the setting says AIS.

Example

Suppose only output #14 and #15 are desired from Slot D in the master subrack:

1. In the **Select Output Card** area, select **Main Rack 0**, highlight the field labeled **D**.
2. In the **Configuration** area, check outputs 14 and 15.

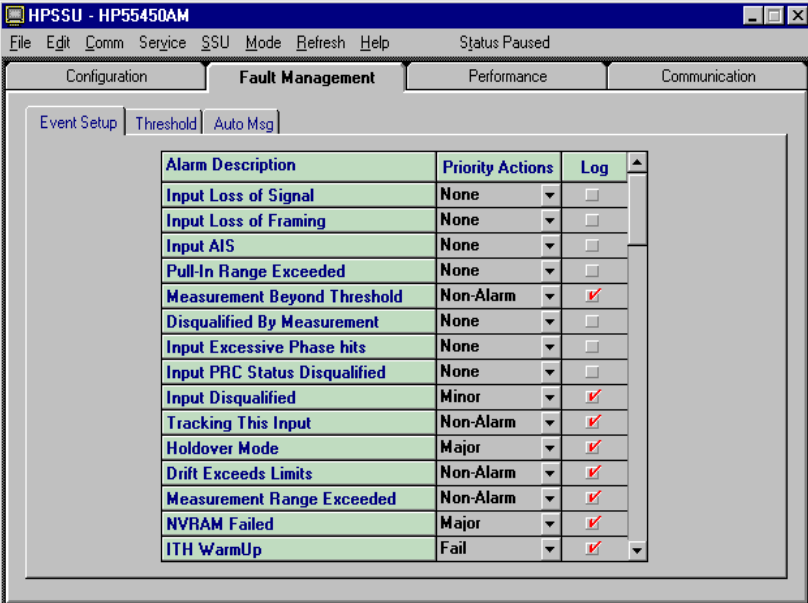
Chapter 6

Fault Management

Overview 55450A provides the capability to view and control actions associated with the occurrence of specific events in the 55400A. This can be performed within **Fault Management** page. There are three basic categories: **Event Setup**, **Threshold**, and **Auto Msg**.

Event Setup This page provides the capability to view and control actions associated with the occurrence of specific events in the NSUs.

Note Whether a user is allowed to view and/or to change settings on this screen depends on the security switch setting on the 55400A.



The screenshot shows a software window titled "HPSSU - HP55450AM" with a menu bar (File, Edit, Comm, Service, SSU, Mode, Refresh, Help) and a status bar (Status Paused). The main area has tabs for Configuration, Fault Management (selected), Performance, and Communication. Under Fault Management, there are sub-tabs for Event Setup, Threshold, and Auto Msg. A table lists various alarm events with columns for Alarm Description, Priority Actions, and Log.

Alarm Description	Priority Actions	Log
Input Loss of Signal	None	<input type="checkbox"/>
Input Loss of Framing	None	<input type="checkbox"/>
Input AIS	None	<input type="checkbox"/>
Pull-In Range Exceeded	None	<input type="checkbox"/>
Measurement Beyond Threshold	Non-Alarm	<input checked="" type="checkbox"/>
Disqualified By Measurement	None	<input type="checkbox"/>
Input Excessive Phase hits	None	<input type="checkbox"/>
Input PRC Status Disqualified	None	<input type="checkbox"/>
Input Disqualified	Minor	<input checked="" type="checkbox"/>
Tracking This Input	Non-Alarm	<input checked="" type="checkbox"/>
Holdover Mode	Major	<input checked="" type="checkbox"/>
Drift Exceeds Limits	Non-Alarm	<input checked="" type="checkbox"/>
Measurement Range Exceeded	Non-Alarm	<input checked="" type="checkbox"/>
NVRAM Failed	Major	<input checked="" type="checkbox"/>
ITH WarmUp	Fail	<input checked="" type="checkbox"/>

- The **Alarm Description** column identifies all of the conditions that are monitored by the 55400A. Refer to Appendix A for details.
- The **Priority Actions** column allows the user to view and control the action the 55400A should take when a particular condition is detected. The choices are described in Table 6-1.
- The **Log** column allows selected events to be placed in the event log.

Table 6-1. Priority Description

Priority Actions	Description
None	Occurrence and ending of event will trigger no alarm nor automatic message.
Non-Alarm	Automatic messages are generated upon the occurrence and ending of event, without accompanying alarms.
Minor	Occurrence of event will generate an automatic message and a Minor alarm. When event ends, another automatic message will be generated.
Major	This setting is similar to Minor, except the alarm is Major.
Fail	This setting is similar to Major except that if no standby unit is available to take over operation for the failed unit (or the standby unit has also in a Fail condition), the alarm level is promoted to Critical. If an alarm of Major severity is indicated and the standby unit later becomes unavailable (is removed or a Fail condition occurs), this alarm will be promoted to Critical, with a new automatic message generated.

Auto Msg

The primary benefit of automatic messages is that they provide a mechanism for external equipment to be informed of alarm conditions or other conditions of special interest without having to continually poll the 55400A. Sample automatic messages generated by the 55400A are shown below. Descriptions of the columns are given in Table 6-2.

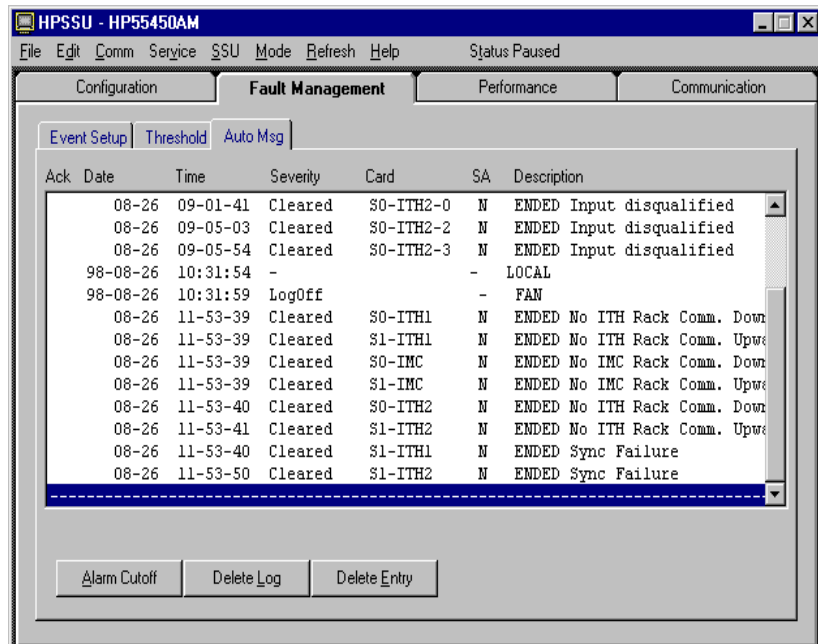


Table 6-2. Auto Msg Screen Description

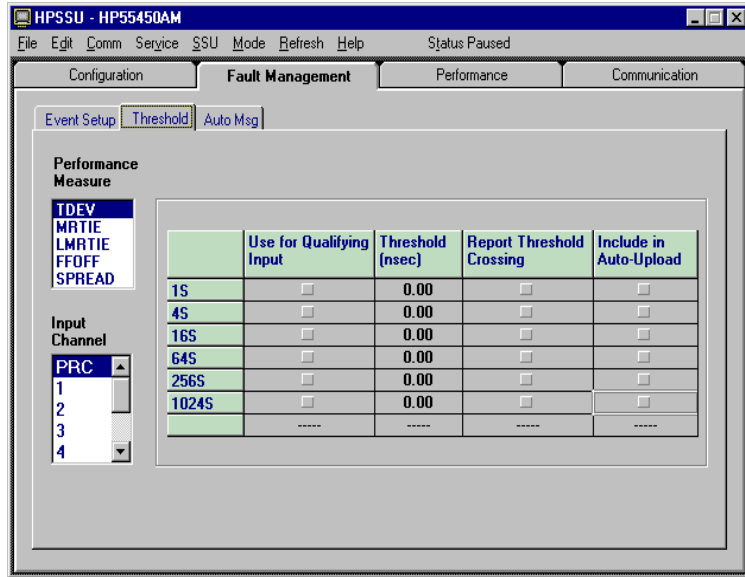
Field	Description
Ack	Indicates whether the message is a new one. An "X" indicates the message is not new.
Date	shows the date (as year-month-day) of the automatic message
Time	shows the time (as hours:minutes:second) the automatic message was generated
Severity	shows the severity level (non-alarm, minor, major, critical or fail) of the event
Card	identifies the card in the 55400A in which the reported event occurred.
SA	indicates if the event is service affecting.
Description	provides a brief description of the event. This column will also identify if the event has just set or cleared.

There are three controls at the bottom of the Auto Msg screen:

- **Alarm Cutoff** performs the same action as pressing the Alarm Cutoff button on the IMC card. This task can also be accomplished on the **Status** view by pointing to the representation of the Alarm Cutoff button and clicking the left mouse button. Refer to Status view on page 11 in this manual.
- **Delete Log** removes all entries from the Auto Msg screen. This does not delete the automatic output log in the 55400A. If for some reason the log has been mistakenly deleted, the log will be retrieved again by selecting **Refresh Active Screen** from the **Refresh** menu bar.
- **Delete Entry** deletes the highlighted Auto Msg from the display.

Threshold The NSU makes continuous performance measurements on the input reference signals and checks for certain input conditions. You can set thresholds for these measurements from this screen.

Note Inappropriate settings may increase the amount of communication traffic between the 55450A and the 55400A, resulting in a reduction of responsiveness of 55450A.



Note Whether a user is allowed to view and/or to change settings on this screen depends on the user’s security level, if Security is On.

To view or change settings on this screen, you should always begin by selecting the desired input channel under **Input Channel** and the type of performance measurement under **Performance Measure** (Refer to *55400A Network Synchronization Unit User’s Manual* for more information.)

Table 6-3 gives a detailed description of each column on the Threshold screen.

Table 6-3. Threshold Parameters

Columns	Description
Use for Qualifying Input	When checked, the threshold will be applied to qualify an input.
Threshold	Enter a specific value to define the boundary for each particular performance measurement interval.
Report Threshold Crossings	When checked, crossing of this threshold will trigger a Measurement Beyond Threshold event, with subsequent alarm setting and/or generation of automatic messages.
Auto-Upload	Must be used in conjunction with the Auto Upload Measurements option, set up from the Configuration->Inputs form.

Example

To generate a Minor alarm when TDEV of the PRC input exceeds 10 ns:

1. Navigate to the **Fault Management | Threshold** screen.
2. Select *PRC* from the **Input Channel** area.
3. Select *TDEV* from the **Performance Measure** area.
4. Set every value to *10* in the **Threshold** column, indicating the threshold value for all the TDEV performance measurements (any interval) for the PRC input will be 10ns.
5. Check every box in the **Report Threshold Crossings** column, indicating if any TDEV performance measure on the PRC input exceeds 10ns, it should be reported.
6. Navigate to the **Fault Management | Event Setup** screen.
7. Choose the entry *Measurement Beyond Threshold* in the Alarm Description column.
8. Set the **Priority Action** for this entry to *Minor*.

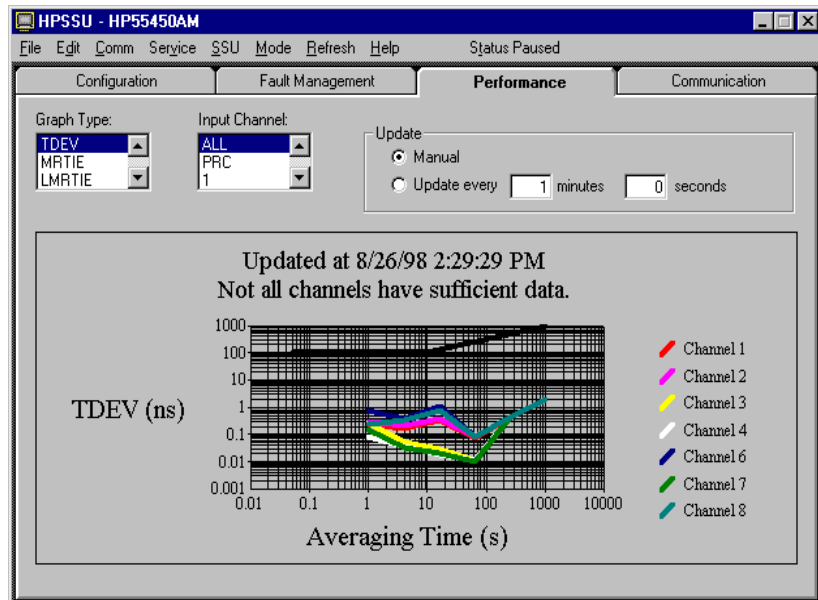
Now, when a TDEV value in excess of 10 ns occurs on the PRC, a minor alarm will be generated, and an associated automatic message will be produced. Also, when the event occurs, it will be detected and placed in the Auto Msg log, which can be viewed on the **Fault Management | Auto Msg** screen. One benefit of this scheme is if you wanted to discontinue generating the alarms, but didn't want to lose all of the custom settings on the **Fault Management | Threshold** screen, you could set the Priority Action to None on the **Fault Management | Event Setup** screen. This would block the reporting of the threshold crossings.

Chapter 7

Performance Measurement

Overview The 55400A is constantly measuring network performance. You can retrieve the result through 55450A. The performance screen provides graphical presentation for each of the input performance measurements the NSU is continually performing. Performance measurements are used to evaluate the quality of each input signal. Once this information has been collected and analyzed, you can take actions to improve network performance and identify possible future problems.

Performance Screen Description This screen is used to setup and display various performance measurement graphs.



Use **Input Channel** and **Graph Type** to select input and specific measurement.

Use **Update** to select the desired update scheme:

- If the Update setting is **Manual**, the graph will not be automatically updated. Access the **Refresh | Refresh Active Screen** menu to force an update.
- If the Update setting is **Update every...**, the graph will be updated periodically. You can also force an update at any time using the **Refresh | Refresh Active Screen** menu.
- The data will be automatically re-queried from the 55400A each time you bring up the performance screen, change Graph Type, or change Input Channel.

Save Performance Data Graph

To make a permanent record of a particular performance data graph, you need to save it before changing to another graph type, input channel selection, or leaving the performance screen. The next time you come back to this specific graph it might be updated and may be different from the data you originally had on the graph.

To save the performance data graph:

-- Select **Save Graph** from the **File menu** bar.

To print the performance data graph:

-- Select **Print Graph** from the **File menu** bar.

Appendix A

Events Description

Events Description

This appendix lists most of the events that are monitored by the 55400A. Details about each of these events are provided below.

BTT Mode Active (BTTMODE): This event is generated when the system goes into the bulk text transfer mode. This mode is used for downloading firmware to the IMC, NIMC, and ITH cards.

Complete Response Not Received (NORESP): This event can only be generated in response to a RTRV-ALM-TSG or RTRV-COND-TSG command. The event indicates that a card in the system fails to respond to the request to report its conditions and alarms. When this condition is reported, the IMC card will only be able to report (using the SNFAIL event) the alarms that the non-responsive card is indicating on the backplane alarm lines, but will not be able to report any details of these alarms. If this condition does occur, it is recommended that the RTRV command be sent again because the reporting failure could have been the result of too much traffic on the communication loop.

Configuration Changed (CFGCHD): This event indicates that there is a possibility that a change to a parameter of the NSU has occurred.

Configuration Reset (CFGRST): This event is reported whenever the ITH card configuration is reset to its default or switch-defined values.

Disqualified by Measurement (INMEAS): This event indicates that an input has been disqualified because a performance measurement threshold was exceeded and that particular measurement had been selected by the user to be a cause for disqualification for that input.

Drift Exceeds Limits (SNDRIFT): This event indicates that a discrepancy was detected in the process of measuring the input signal and comparing it to the LO. This could indicate a problem with an input signal or an ITH card. This event by itself does not disqualify an input signal, but does serve as an indication that a problem condition may be developing, based on what other events may occur.

Duplicate Subrack Number (RACKDUP): This event occurs in a multiple-subrack system when two or more subracks have their backplane switches set to the same value. It is extremely important that each of the subracks has unique switch setting and the master subrack always has its switch set to the '0' position. The backplane switch is located behind the IMC/NIMC card.

Event Log Cleared (LOGCLR): This event indicates that the event log has been cleared.

Rack Alarms 1-8 (Ext Rack Power Alarm, Ext Cesium 2 Alarm, Ext GPS Reports Critical Alarm, Ext GPS Reports Major Alarm, Ext Rack Alarm 5, 6, 7, 8) (RACKALM [1-8]): The network IMC cards have a front-panel connector that can be used to generate up to eight different events. For example, one of these might be connected to an alarm line from an external GPS receiver, thereby causing the NSU to report an alarm when one occurs in that unit. Rack alarms 1-4 have been

assigned specific messages, while alarms 5-8 provide a generic message. Rack alarms 1 through 7 indicate a major alarm. Rack alarm 8 is a minor alarm.

Freerun Mode (SNFREE): This event indicates that the ITH card is capable of generating an output but without use of any information from a reference input (because there are no qualified inputs).

Holdover Available (SNHAVL): This event indicates that this ITH card has tracked a qualified input for a sufficient duration that holdover is now possible (as opposed to freerun).

Holdover Mode (SNHOLD): This event indicates that the 55400A has entered holdover mode.

IMC Card Beginning Reset (IMCCRST): This event indicates a change was made to the addressing parameters of the Network IMC and that card is being reinitialized.

IMC Configuration Reset (IMCRST): This event is reported whenever the Information Management Card is reset to its default or switch-defined values.

Inferior ITH is Active (SECACTV): This event is generated when an inferior ITH card takes over as the active ITH.

Input AIS (INPAIS): This event indicates that an E1 input reference is generating AIS (Alarm Indication Signal). This condition will cause the input signal to be disqualified for use as a reference.

Input Disqualified (INDISQ): This event indicates that this particular input has been disqualified for some reason.

Input Excessive Phase Hits (INEXPH): This event indicates that phase hits have been detected on this input for a duration in excess of the discontinuity time. Another possibility is that phase hits of duration less than the discontinuity time have occurred on three or more separate occasions in the past 5 minutes.

Input Loss of Framing (INPOOF): This event indicates that an out of frame error has occurred on an E1 input. This could indicate a condition such as missing framing bits or that CRC4 is not being received correctly.

Input Loss of Signal (INPLOS): This event indicates that the amplitude of an input signal has dropped below the minimum required level.

Input PRC Status Disqualified (INPRCDQ): This event occurs when the PRC status signal being monitored by the NSU has changed state to indicate that the PRC input signal should not be used as a reference.

Input SSM Changed (INPSSM): This event indicates that the SSM value of this particular input has changed. This would only be applicable to E1 inputs where Read SSM has been enabled.

Istate Not Identical (XFER): The two ITH cards in an NSU must operate with the same settings (for example, inputs, formats, etc.). When a new ITH card is inserted, the two cards negotiate over which will send the instrument state to the other. Until the state has been transferred, the two cards could operate differently. This event is raised during the transfer. For ITH cards with the same firmware revision, the transfer takes less than one minute. For mismatched ITH firmware revisions, it can take five to ten minutes.

ITH Active (ITHACTV): This event indicates that this ITH card is now the synchronization source for all output cards.

ITH Card Missing (ITHGONE): This transient event indicates that one of the ITH cards has been removed or is not being properly detected. The default alarm level is FAIL.

ITH Communications Failure (ITHNCOM): This event indicates that there is a problem with communication between the ITH cards or between an ITH card and the IMC card.

ITH Disagree On Chan Quality (ITHDISA): During normal operation the standby ITH card sends its measurement results of each input's performance behavior and other criteria (LOS, AIS, etc.) to the active ITH for comparison. If there is a significant difference between the results for a sufficient period of time (usually this is triple the amount of time required for the questionable measurement), the active ITH card will generate this event that has a default alarm condition of MAJOR. The channel number of the questionable input will be reported. The input signal will be disqualified by the ITH card that has concluded there is a problem. Possible causes of measurement disagreement include:

- There is a hardware problem with one ITH card.
- A square wave signal (kHz) is connected to an ITH card input configured as E1 (kbps).
- An input signal has a measured parameter that is very close to the limit of acceptability.

ITH Failed (ITHFAIL): This event indicates that the identified ITH card has failed. This is a serious condition requiring service of the NSU.

ITH Marginal Failure (ITHHLTH): This event for an ITH card occurs when a jittering power supply voltage is detected. This condition can sometimes occur shortly after power is restored to the card.

ITH Offline (ITHOFFL): This event indicates that there is a detectable reason to doubt the function of one ITH card, but not so much doubt as to put it into a FAIL mode, so it is taken off-line. The most obvious reason is a failure of the standby ITH card to sync with the active ITH.

ITH Warmup (ITHWARM): This event indicates that the oscillator in this ITH card is warming to operating temperature, but the card is not yet ready to become either active or standby.

Latest Configuration Changed (LSTCFG): This event is reported to provide information such as the date and time when the last configuration change was made to the NSU. The execution of any command that may change the configuration from either communication port, will update this time, regardless of whether a configuration change actually occurred. It may be that a command was sent that only reset an existing condition. In addition, the resetting of the entire configuration, as would occur with a Configuration Reset or an IMC Configuration Reset, will be recorded as a latest configuration change. This event is only reported by the RTRV-COND-TSG command and is not automatically reported when the configuration changes. It can be retrieved either by the generic RTRV-COND-TSG command or by using the same command to specifically request this condition.

Measurement Beyond Threshold (MEASRP): This event indicates that a performance measure has exceeded the user-selected threshold value.

Measurement range exceeded (MEASRNG): This event indicates that one of the performance measurements has gone beyond the established boundaries for the measurement.

Modem Online at Remote Port (MODMONL): This event indicates the modem connected to the remote port of the NSU has established communication with a remote modem.

Modem Ready at Remote Port (MODMRDY): This event indicates that the modem connected to the remote port of the NSU has been initialized and is ready to receive an incoming call.

Network Connection Closing (NETCLOS): This event indicates that a change was made to the network parameters of the Network IMC and that the network connection must be closed. It is then necessary for the user to reestablish network connections for communication to continue.

No IMC Rack Comm Downwards (IMCNCDN): In a multiple-subrack system, the IMC/NIMC communication link is a ring supporting communications in two directions: up and down. This event indicates that there is a break in the downward direction (Expansion Comm Port J6).

No IMC Rack Comm Upwards (IMCNCUP): In a multiple-subrack system, the IMC/NIMC communication link is a ring supporting communications in two directions: up and down. This event indicates that there is a break in the upward direction (Expansion Comm Port J5).

No ITH Rack Comm Downwards (ITHNCDN): In a multiple-subrack system, the ITH communication link is a ring supporting communications in two directions: up and down. This event indicates that there is a break in the downward direction (Expansion Comm Port J6).

No ITH Rack Comm Upwards (ITHNCUP): In a multiple-subrack system, the ITH communication link is a ring supporting communications in two directions: up and down. This event indicates that there is a break in the upward direction (Expansion Comm Port J5).

NVRAM Failed (ITHNVFL): This event indicates that a failure of non-volatile RAM has been detected. This is a serious condition requiring service of the NSU.

Other ITH Card Inserted (ITHCDIN): This event indicates that the other ITH card has been inserted into the designated location.

Other ITH Card Removed (ITHCDRM): This event indicates that the other ITH card has been removed.

Output Card Failed (OPCNFL): This event indicates that this output card has failed. This is a serious condition requiring service of the 55400A.

Output Card Inserted (OPCDIN): This event indicates that the other output card has been inserted into the designated location.

Output Card Mismatch (OPCDMS): This event indicates that the two different types of output cards have been inserted into protected pair slots. The output cards must be of the same type. This event will only be generated if the protect switches on the cards that are supposed to be the protected pair have been set properly (see 55400A Network Synchronization Unit User's Manual).

Output Card Not Accessible (OPCDNA): This event is reported when an ITH card is not able to communicate with an output card. This could indicate that an output card has been removed. By default this event is logged by the ITH cards.

Output Card Not Present (OPCDNP): This transient event indicates that one of the output cards has been removed or that only one card of a pair is present, but its switch setting indicates that it is part of a protected pair.

Output Card Protect Mismatch (OPCDPMM): This event indicates that there is a setting mismatch of the protection switches on two output cards that have been inserted into a protected pair slot (for example 3B and 4B). See the 55400A Network Synchronization Unit User's Manual for details about switch settings.

Power Supply A Failed or Power Supply B Failed (SNPWRA or SNPWRB): This event indicates that the indicated supply voltage has dropped significantly from the expected -48Vdc level.

Pull-In Range Exceeded (INPULL): This event indicates that an input has drifted in excess of the Pull-In Range Threshold.

SmartClock Available (SNSAVL): This event indicates that this ITH card has tracked a qualified input for a sufficient duration that a smart holdover is now possible. The smart aspect is that the characteristics of the ITH oscillator have been learned while a qualified input was available, this learning can now be used to improve holdover performance in the event that all qualified references are lost.

Software Download Mode (SWDL): This transient event from the IMC indicates that the download mode has been activated. Activities that are not associated with a firmware download are inhibited.

SSM Algorithm Executed (SNSSM): This transient event indicates that the NSU performed a task that had to do with evaluating an input reference based on NSU status messages. Most often this indicates an input signal has been qualified or disqualified. Another cause could be an NSU level change on one of the inputs.

Subrack Inventory Mismatch (SRINVMM): The IMC/NIMC and each ITH card in the master subrack maintain an inventory of their corresponding cards in any expansion subracks using the IMC/NIMC, ITH1, and ITH2 subrack communication rings. These three separate inventories should agree. This event is reported if these inventories do not agree. Usually this is the result of adding or removing an expansion subrack, although it can indicate a more serious communication failure. Ensure that the condition clears once the subrack communication has been established. Note that a card is added to the inventory whenever communication is established with the card but is only removed from the inventory when a closed communication ring is detected that does not include the card.

Subrack Number Out of Range (RACKOOR): This event occurs when a subrack backplane switch has been set to a number outside of the established range. The only allowable setting for the master subrack is '0'. The expansion subracks can be set to '1', '2', '3', or '4'. The backplane switch is located behind the IMC/NIMC card.

SWDL Mismatch, IMC Shows CLEAR (SWDLMMC): This event is generated by the IMC when a card reports it is in the download mode, but the IMC was not aware of this condition. This might be caused, for example, if the IMC card is removed and re-inserted while another card is in download mode. To correct this mismatch, execute the CANC-SWDL command and then send the command to activate the download mode for the desired card (ACT-SWDL). (Error messages may be received when the command is executed.)

SWDL Mismatch, IMC Shows SET (SWDLMMS): This event is generated by the IMC when it believes a card is in the download mode, but that card does not report that it is in the download mode. This might be caused, for example, if a card is removed and re-inserted while it is in download mode. To correct this mismatch, send the command to activate the download mode for the desired card (ACT-SWDL). (Error messages may be received when the command is executed.)

Synchronization Fail (SNFAIL): This condition can be reported with different severities as the result of different causes. The severities include: FAIL, MAJOR, MINOR. It occurs when an ITH or output card signals an alarm condition of a specific severity (an LED on the front panel of the problem card also will light) but does not report the exact cause of the alarm to the IMC. The IMC will generate an SNFAIL alarm with the reported severity level.

Sync in Normal Operating Mode (SNOPER): This transient event indicates that the specified time constant value for the reported ITH card is being used by the system IO to track the active reference.

Tracking this Input (SNTRCK): This event indicates that the input is now being tracked, which is a necessary pre-requisite for qualification of the input. Note that the only available settings for this event are None and Non-Alarm.

Traffic Value Invalid for Card (TRAOOR): This event indicates that the traffic value specified for the subrack slot could not be supported by the output card currently installed in that slot. Review the Output Traffic Bits setting on the Configuration: Outputs screen. The 55481A card can only carry an all ONES pattern.

TRSC Buffer Input Loss of Signal (TRCBLOS): This event, generated by the Traffic Re-synchronization Card, indicates the input signal to the buffered channel has been lost or severely attenuated. The buffered output signal will go to AIS or squelch, depending on the board's switch setting.

TRSC Input Loss of Signal (TRCLOS): This event, generated by the Traffic Re-synchronization Card, indicates the input signal to the re-timed channel has been lost or severely attenuated. The output signal will squelch or transmit AIS, depending on the board's switch setting.

TRSC Input High Slip (TRCHSLP): This event, generated by the Traffic Re-synchronization Card, indicates multiple slips are occurring at a rate greater than, or equal to, the HSLIMIT threshold value.

TRSC Input Out of Frame (TRCOOF): This event, generated by the Traffic Re-synchronization Card, indicates a frame loss at the input has occurred or there is a mismatch between the board's switch settings for the channel and the input signal type.

TRSC Input Slip (TRCSLIP): This event, generated by the Traffic Re-synchronization Card, indicates a frame has been repeated or lost on the output of this re-timed channel. A slip event will also occur if a repeated frame is input to the channel.

A

Abbreviations, 2
About this manual, 1
AIS, 33
Alarm Cutoff, 12, 37
Alarm level, 36
Alarm Viewer, 44
Auto message, 36

B

BTT Mode Active, 43

C

Cable, 16
Configuration
 Input, 29
 Output, 32
Configure
 Modem (non-supported type) for PC, 25
 Modem (supported type) for PC, 24
 Modem for NSU, 24
 TCP/IP network parameter, 19
 TP4 network parameter, 21
 X.25 network parameter, 17
Connection
 Modem, 23
 RS-232 (remote), 23
 TCP/IP or LAN, 27
 X.25, 26
Control
 Using the soft panel, 11

D

Discontinuity time, 30
Download Firmware, 14
Drift Exceeds Limits, 43

E

Event Setup, 35
 Log, 35
 Priority Actions, 35
Events Description, 43

F

Fault Management, 35
Freerun Mode, 44

G

General introduction, 3
Global Positioning System, 2
GPS, 2

H

Holdover, 33
HP 55300A, 2
HP 55450A, 2
HP 55450A features, 3

I

Inferior ITH, 44
Input AIS, 44
Input Excessive Phase Hits, 44
Input Loss of Framing, 44
Input Loss of Signal, 44
ITH Active, 45
ITH Communications Failure, 45
ITH Disagree On Chan Quality, 45
ITH Failed, 45
ITH Marginal Failure, 45
ITH Offline, 45
ITH Warmup, 45

L

Local Echo, 28
Log Data to Disk, 28
Log in, 9

M

Manual description, 1
Mode
 Database management, 12

N

NIMC, 2
NSU, 2
NSU soft front panel, 11

O

Output Card Mismatch, 46
Output Card Not Accessible, 47
Output Card Protect Mismatch, 47

P

Performance data graph
 print, 42
 Refresh Active Screen, 41
 save, 42
 update, 41
Performance Measurement, 41
Priority of input channels, 30
Pull-in Range, 30

R

Rack Alarms 1-8, 43
Related Documentation, 4

S

SA?, 37
Security level, 8
Security management, 8
Set up
 Database, 12
 Date and Time, 7
 Threshold, 37
Set Up Database, 12
SmartClock, 47
Software installation, 5
Squelch, 34
SSU menu
 Always on Top, 12
 ReInventory 55400A, 12
 Show 55400A Status, 12
 Show in List, 12
 Update Interval, 12
 Update Now, 12
SSU Menu description, 11
Subrack Inventory Mismatch, 47
SWDL Mismatch
 IMC Shows CLEAR, 47
 IMC Shows SET, 48
Sync in Normal Operating Mode, 48
Sync Mode, 31
Synchronization Fail, 48

T

TCP/IP Parameters, 20
TP4 Parameters, 22
Tracking this Input, 48
Traffic Value Invalid for Card, 48
TRSC Bufer Input Loss of Signal, 48
TRSC Input High Slip, 48
TRSC Input Loss of Signal, 48
TRSC Input Out of Frame, 48
TRSC Input Slip, 48

U

User Administration, 9

V

Version, 1
View
 Auto message, 36
 Performance Data Graph, 41
 Status, 11

W

What's SSU, NSU, 2
WTRSS, 30

X

X.25 Parameters, 17