COMPUTERVISION

NTS Planning and Configuration Guide

DOC10159-2LA

NTS Planning and Configuration Guide

Second Edition

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This manual documents the software operation of the PRIMOS operating system on 50 Series computers and their supporting systems and utilities as implemented at Master Disk Revision Level 23.0 (Rev. 23.0).

Printing History

Credits

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ABOUT THIS BOOK

PURPOSE

The *NTS Planning and Configuration Guide* explains how to install and configure Network Terminal Service (NTS) and the LAN Network Management Facility.

Note

This guide briefly discusses how the NTS configuration file relates to TCP/IP networks, refer to the *TCP/IP User's Guide* for specific TCP/IP installation instructions.

AUDIENCE

This guide is intended for Network and System Administrators who are responsible for the installation and configuration of NTS.

ORGANIZATION

The *NTS Planning and Configuration Guide* contains eight chapters and three appendices.

Chapter 1, NTS Network Overview
    Describes the NTS network topology and individual hardware components.

Chapter 2, NTS Installation
    Describes software installation procedures and related access rights.

Chapter 3, PRIMOS Configuration Directives for NTS
    Describes the PRIMOS® configuration directives that enable NTS to run on the host.

Chapter 4, PRIMOS Commands for NTS
    Describes the PRIMOS commands that start, stop, and operate NTS.

Chapter 5, The NTS Configuration Worksheet
    Describes how to complete the NTS configuration worksheet, configure NTS, and build the NTS configuration file.

Chapter 6, The CONFIG_NTS Utility
Explains how to use CONFIG_NTS to create, modify, display, or print an NTS configuration file.

Chapter 7, Monitoring NTS
Describes how to monitor your NTS network with the LIST_LHC_STATUS, LIST_LTS_STATUS, and LOOPBACK commands.

Chapter 8, NTS Assignable Lines
Describes how to assign asynchronous lines with the NTS_ASSOCIATE, NTS_LIST_ASSOCIATE, and NTS_UNASSOCIATE commands.

Appendix A, CONFIG_NTS Example
Provides a step-by-step example of the CONFIG_NTS dialog generated to create and later edit a sample configuration.

Appendix B, Obsolete Directives
Describes the NTSBUF and NTSABF directives.

Appendix C, Extra Worksheets
Provides extra blank copies of the grids and worksheets used in this book.

RELATED DOCUMENTATION

These documents provide related information:

- *NTS User's Guide* (DOC10117-3LA)

- *LTS300 Installation Guide* (DOC11034-2LA) and (RLN11034-21A)

- *TCP/IP User's Guide* (DOC10155-3LA)

- *PRIMENET Planning and Configuration Guide* (DOC7532-4LA) and (UPD7532-41A)

- *Operator's Guide to Prime Networks* (DOC10114-1LA) and (UPD10114-11A)

- *Rev. 23.0 Prime Network Release Notes* (RLN10252-1LA)

- *DSM User's Guide* (DOC10061-3LA)

- *System Administrator's Guide, Volume I: System Configuration* (DOC10131-3LA)

- *System Administrator's Guide, Volume II: Communication Lines and Controllers* (DOC10132-2LA) and (RLN10132-21A)

- *System Administrator's Guide, Volume III: System Access and Security* (DOC10133-3LA)

PRIME DOCUMENTATION CONVENTIONS

The following conventions are used throughout this document. The examples in the table illustrate the uses of these conventions.

Convention	Explanation	Example
Uppercase	In command formats, words in uppercase indicate the names of commands, options, statements, and keywords. Enter them in either uppercase or lowercase.	SLIST
Italic	Variables in command formats, text, or messages are indicated by lowercase bold italic.	LOGIN *user-id*
Abbreviations	If a command or option has an abbreviation, the abbreviation is placed immediately below the full form.	SET_QUOTA SQ
Brackets	Brackets enclose a list of one or more optional items. Choose none, one, or several of these items.	LD $\begin{bmatrix} \text{-BRIEF} \\ \text{-SIZE} \end{bmatrix}$
Braces	Braces enclose a list of items. Choose one and only one of these items.	CLOSE $\begin{Bmatrix} \textit{filename} \\ \text{-ALL} \end{Bmatrix}$
Braces within brackets	Braces within brackets enclose a list of items. Choose either none or only one of these items; do not choose more than one.	BIND $\begin{bmatrix} \begin{Bmatrix} \textit{pathname} \\ \textit{options} \end{Bmatrix} \end{bmatrix}$
Monospace	Identifies system output, prompts, messages, and examples.	`address connected`
Underscore	In examples, user input is underscored but system prompts and output are not.	`OK, `<u>`RESUME MY_PROG`</u>
Hyphen	Wherever a hyphen appears as the first character of an option, it is a required part of that option.	SPOOL -LIST
Ellipsis	An ellipsis indicates that you have the option of entering several items of the same kind on the command line.	*pdev-1* $[\dots pdev\text{-}n]$
Subscript	A subscript after a number indicates that the number is not in base 10. For example, the subscript 8 is used for octal numbers.	200_8

NTS NETWORK OVERVIEW

Network Terminal Service (NTS) provides connection management, traffic control, event monitoring, and other network services for an IEEE 802.3 LAN. NTS supports up to 1024 Hosts and LAN Terminal Server (LTS) units, known as nodes, to connect to the backbone cable as shown in Figure 1-1. User terminals and other asynchronous devices attach to independant LTS units rather than directly to a single 50 Series™ host. This type of network allows users to connect to any host on the network and makes network resources, such as printers, available to any host or user. This chapter provides overview of NTS and describes the network hardware components.

IEEE 802.3 NETWORK

The NTS LAN is based on the IEEE 802.3 standard for local area networks. It has the following characteristics:

- Carrier Sense Multiple Access with Collision Detection (CSMA/CD) access method

- 10 megabits per second data rate

- Baseband signaling

HARDWARE COMPONENTS

IEEE 802.3 networks can contain several types of hardware components. Table 1-1 provides hardware specifications and installation guidelines. Your sales representative can provide you with a list of approved devices.
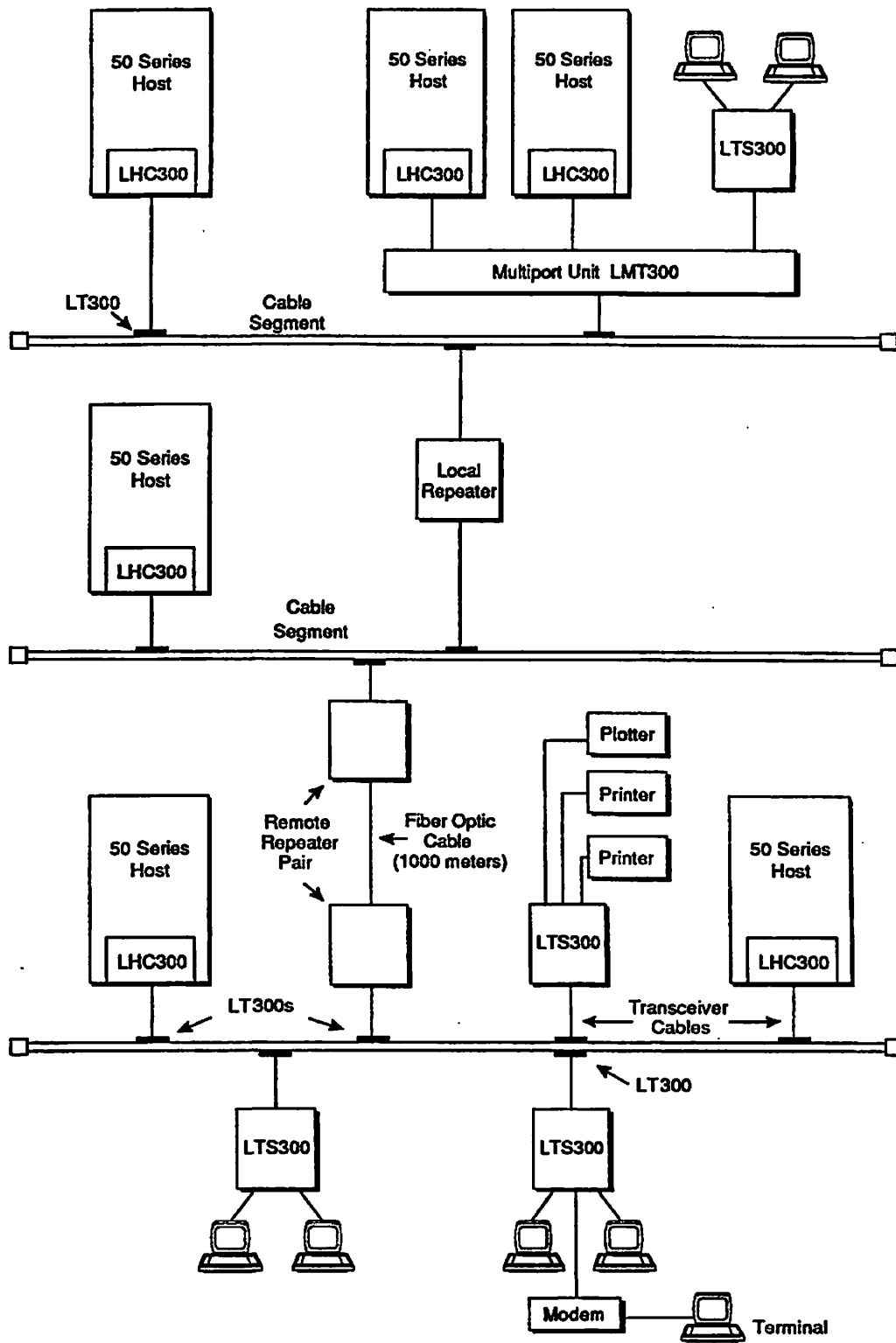
FIGURE 1-1.   Sample NTS Network Topology

TABLE 1-1. NTS LAN Specifications and Guidelines

LAN Specifications

Standard	Data Rate	Access Control
IEEE802.3	10Mb/sec	CSMA/CD

Signal	Maximum # of Nodes (host and LTS units)	Maximum distance between Nodes
Baseband	1024*	3500M

* Only 256 of the nodes can run PRIMENET

Cable Segments

Types	Resistance Rating	Termination
Yellow PVC	10Mb/sec	50 Ω resistor
Orange Teflon (heat and fire resistant)		

Maximum Length	MAU per Segment	MAU Spacing (minimum)
500M	100	2.5M

Repeaters

Types	Maximum Cable Length	Maximum Number of Repeaters between Nodes	Maximum LAN Size with Two Repeaters
Local	N/A	2	1500
Remote	1000M	2	3500

Transceivers

Types	Maximum Number of Node Connections	Maximum Number Cascaded	Cableless
LT300	1	N/A	N/A
LMT300	8	2	YES

Transceiver Cables

Types	Node or Repeater	Cascaded LTS Units	LMT300 Transceiver
PVC	50M	30M	44M*
Teflon			

* Includes the length of cable from the network transceiver to
  LMT300 transceiver and the cable from the LMT300 to the LHC board

LAN Host Controller (LHC) Boards

Maximum per Host	Maximum Boards Running:		Concurrent Terminal Connection:	
6	PRIMENET	NTS or Combination of	NTS	NTS w/ PRIMENET
	2	NTS and TCP/IP*	128	32
		4*		

* Maximum of two LHC boards running TCP/IP

LAN Terminal Server (LTS) Units

Maximum Number of Asynchronous Devices	Maximum Number Cascaded
8	4* (Total of 64 devices)

* All LTS units must be powered.

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Cable Segments

Most NTS networks consist of one or more 500-meter segments of standard IEEE 802.3 50-ohm coaxial cable. You can link individual cable segments to form a larger network. There are three types of cable segments: PVC, Teflon, and fiber optic. Fiber optic cables, also called link segments, are used only between remote repeaters. Unlike PVC and Teflon cables, you cannot pierce fiber optic cable.

Medium Access Units

A Medium Access Unit (MAU) tap attaches a repeater or a transceiver to the network cable. Cable segments are marked at regular intervals called MAU positions. There are two types of MAU taps:

Intrusive   Connects two separate cable segments.

Nonintrusive   Connects a device to the cable segment without cutting the segment.

Repeaters

Repeaters boost the signal on the LAN. Some repeaters contain a built-in MAU and attach directly to the cable. Others use a transceiver cable to connect to a separate MAU.

You can install a maximum of two repeaters between any two nodes on the network. There are two two types of repeaters:

Local   A single microprocessor-based repeater that connects two 500-meter coaxial cable segments.

Remote   A pair of microprocessor-based repeaters that connect to each end of a fiber optic cable.

Transceivers

A transceiver connects directly to the MAU to provide a connection to the cable for an LHC board, an LTS unit, or a repeater model that does not contain a built-in MAU. There are two types of transceivers:

LAN Transceiver 300 (LT300)
Provides network access for a single LHC board or LTS unit. See Figure 1-2.

LAN Multiport Transceiver 300 (LMT300)
Provides network access for up to eight LHC boards or LTS units. When used to connect hosts without a cable, an LMT is called a fanout unit or cableless LAN.

Transceivers require a cable to connect to an LHC board or LTS unit. Transceiver cables are also called drop cables because they are typically dropped from the ceiling.
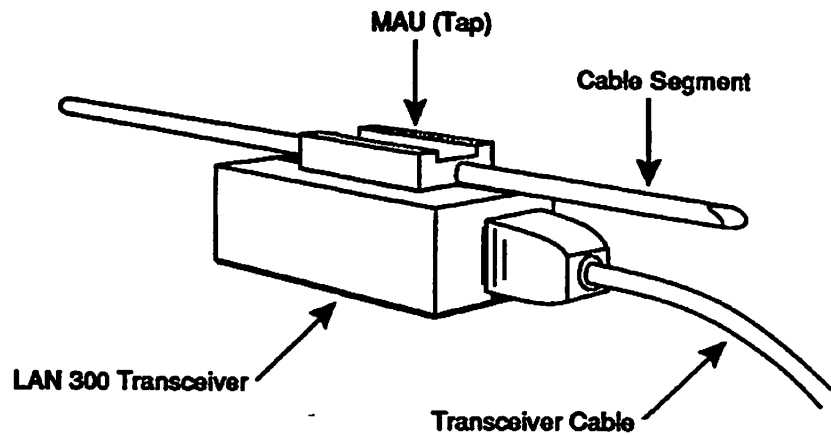
FIGURE 1-2.   LAN Transceiver 300 (LT300) Unit

LAN Host Controller

An LHC board is a communication controller that supports an IEEE 802.3 network. The LHC board plugs into the backplane of a 50 Series host and uses a transceiver cable to connect to either an LMT300 or LT300 transceiver unit. You can install multiple LHC boards in a single host provided that the system has sufficient power and available slots in the backplane. Use an LMT300 transceiver, if you install three or more LHC boards in the same host.

LHC boards use the Prime LAN Network Management Facility to log event and error messages, report status, gather statistics on the network, and downline load protocols. You can also downline load protocols to an LHC board interactively with the COMM_CONTROLLER command.

An LHC board can support four protocol suites:

    PRIMENET™
    NTS
    PRIMENET and NTS concurrently
    TCP/IP

LAN Terminal Server Unit

An LTS unit, as shown in Figure 1-3, provides IEEE 802.3 network access for eight asynchronous RS-232-C terminals, serial printers, modems, or other asynchronous devices. These asynchronous devices plug directly into the ports on an LTS unit.

If your NTS configuration allows unconfigured nodes, you can install an LTS unit by just plugging it into the network. You can downline load the LTS unit interactively without interrupting the network or halting traffic on the LAN.
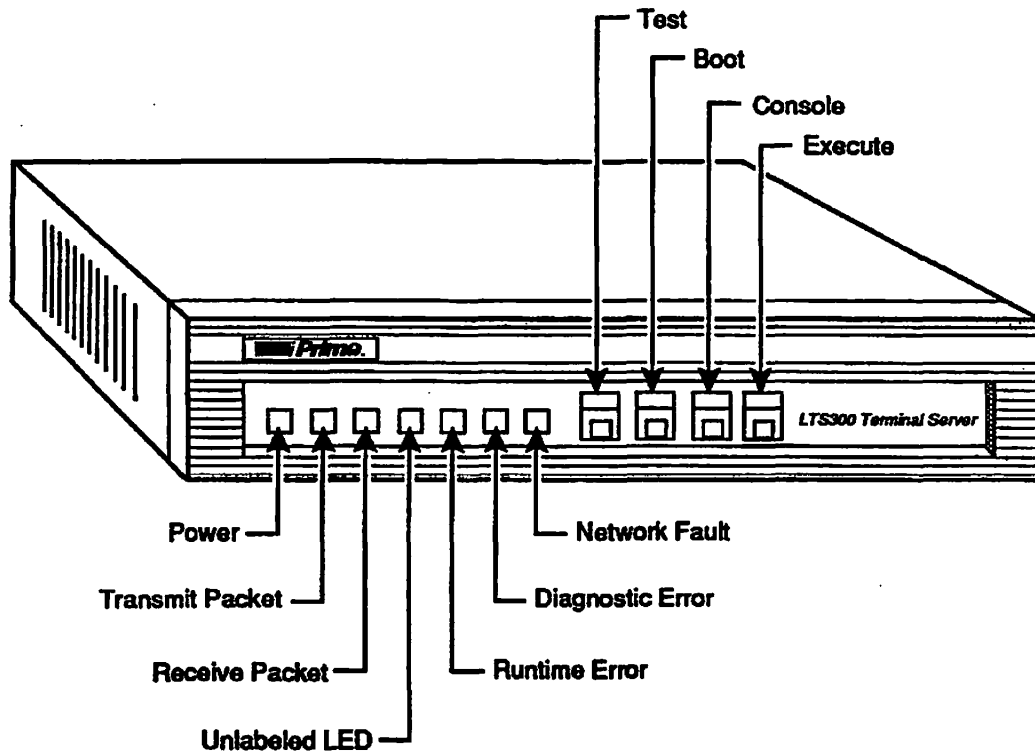
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FIGURE 1-3.   LTS Unit

Figure 1-4 shows the back panel of an LTS unit. Each LTS unit has eight standard RS-232-C 25-pin connector ports numbered 0 through 7. The XCVR port connects the LTS unit to the transceiver cable.
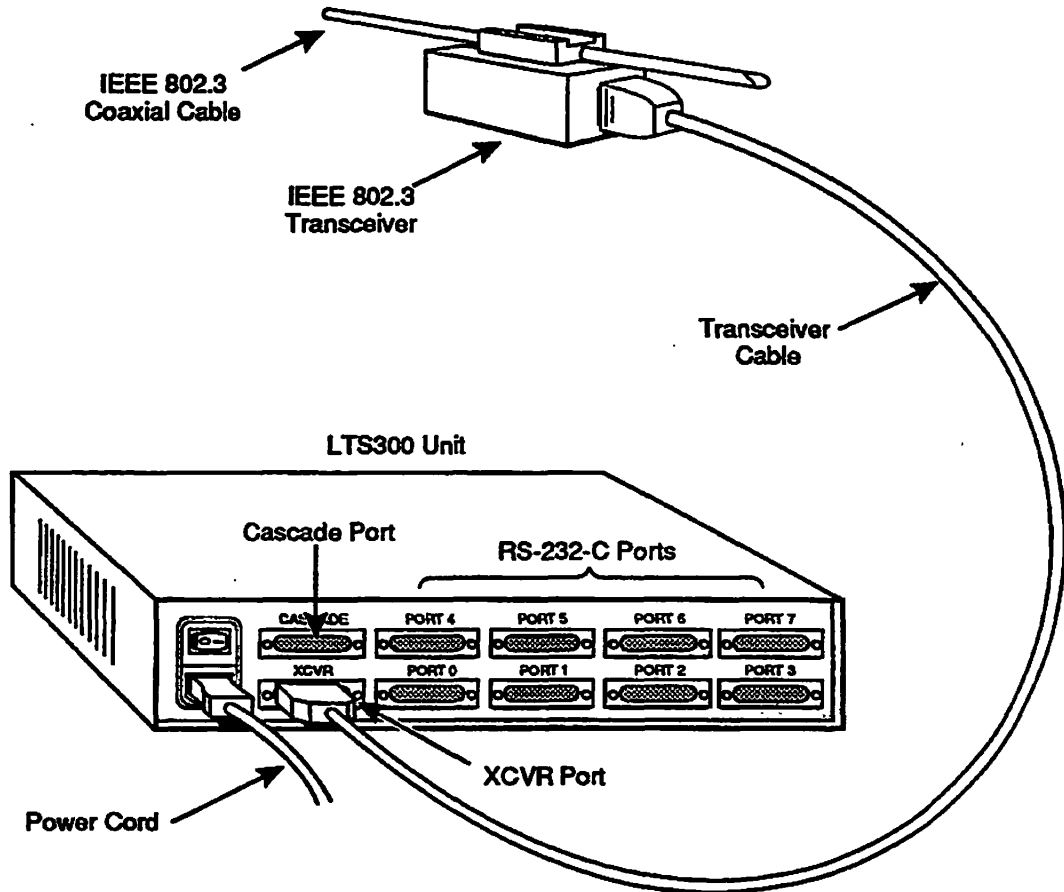
FIGURE 1-4. LTS Unit Back Panel and Connection to LT300

The CASCADE port connects an interconnection cable to the CASCADE port of another LTS unit rather than directly to a transceiver. Although LTS to LTS communication is not supported, you can cascade up to four LTS units together to share the same transceiver, as shown in Figure 1-5.
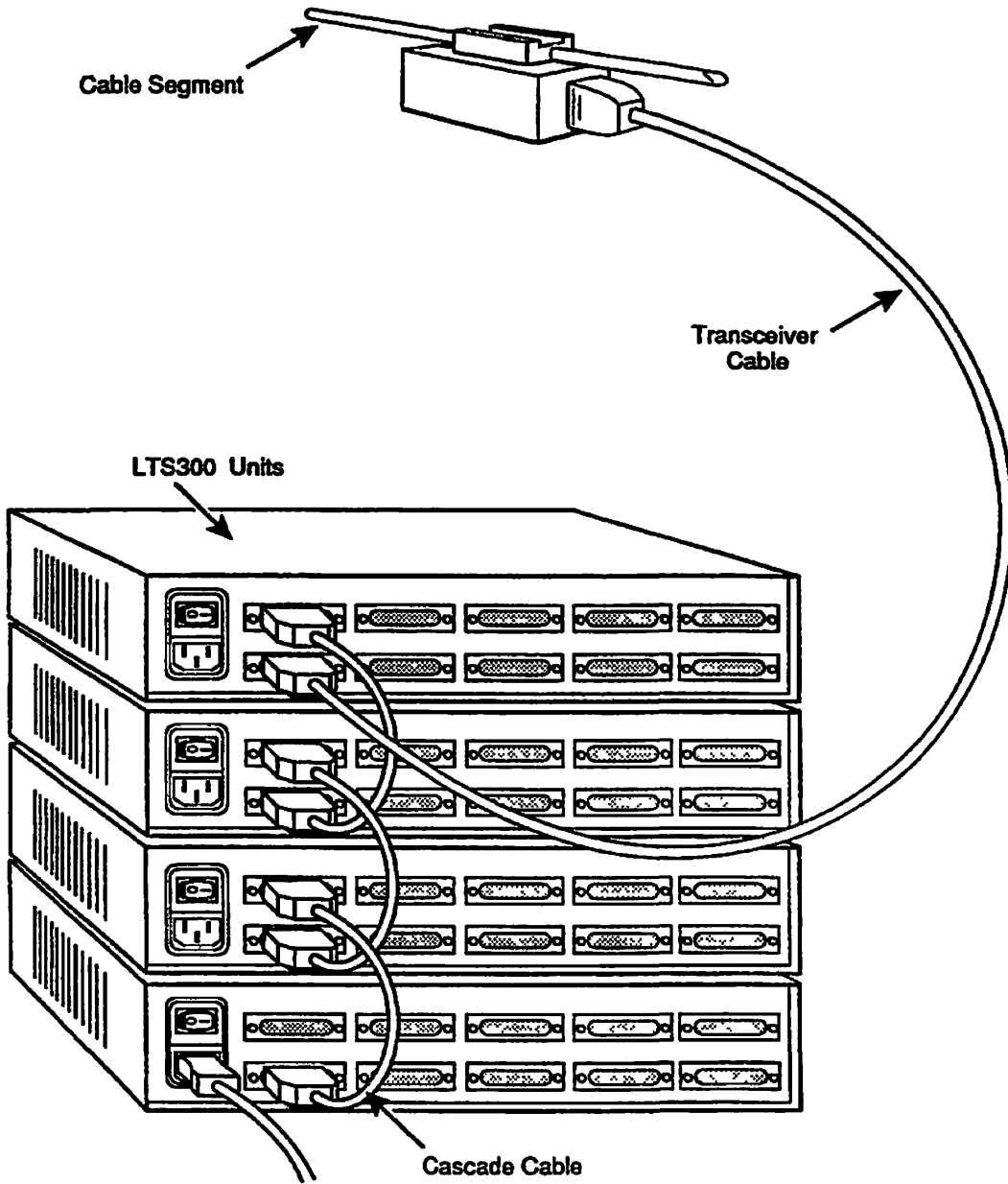
FIGURE 1-5.   Cascaded LTS Units

NTS INSTALLATION

This chapter describes how to install the NTS software and create Access Control Lists (ACLs) to protect the directories.

Note

You must install all hardware components before you install and configure NTS. Contact PrimeService℠ to perform a site inspection, provide recommendations for your NTS network, and install your network hardware.

NTS SOFTWARE INSTALLATION PROCEDURE

Follow this procedure to install NTS software:

1. Insert the NTS installation tape in the drive.

2. Attach to the Master File Directory (MFD).

   OK, A MFD

3. Use the MAGRST command to copy the NTS directory to your system. For information on MAGRST, see the *Operator's Guide to System Commands.*

4. Remove the tape from the drive.

5. Attach to the NTS* directory.

   OK, A NTS*

6. Use the RESUME command to run the NTS.INSTALL.CPL program which copies the appropriate files from the NTS subdirectories to the system directories. If the LAN Network Management Facility is not already running on your system, this program invokes the NETWORK_MGT.INSTALL.CPL program.

   OK, R NTS.INSTALL

NTS Directory

The NTS directory contains the NTS.INSTALL.CPL file and the five subdirectories shown in Figure 2-1. It does not contain the downline load files for LHC boards and LTS units. The DOWN_LINE_LOAD* directory on the master disk contains the downline load files for all network products. The following subsections describe each subdirectory.

NTS
File
NTS.INSTALL.CPL

CMDNC0
Files
CONFIG_NTS.RUN
START_NTS.RUN
STOP_NTS.RUN
NTS_LINE.RUN
NTS_ASSOCIATE.RUN
NTS_UNASSOCIATE.RUN
NTS_LIST_ASSOCIATE.RUN

NTS*
Files
CONFIG_MESSAGES_BINARY
CONFIG_NTS.GENERAL.HELP
NTS_SERVER.COMI
NTS_SERVER.RUN

HELP*
Files
CONFIG_NTS.GENERAL.HELP
CONFIG_NTS.HELP
START_NTS.HELP
STOP_NTS.HELP
NTS_LINE.HELP
NTS_ASSOCIATE.HELP
NTS_UNASSOCIATE.HELP
NTS_LIST ASSOCIATE.HELP

INFO
Files
NTS.RUNI
NTS.RUNO

SYSCOM
File
NTS.INS.PL1

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FIGURE 2-1. NTS Installation Directory

CMDNC0: CMDNC0 contains the seven PRIMOS commands listed below that operate NTS. The NTS.INSTALL.CPL program copies these commands to the system CMDNC0 directory. For more information, see Chapter 3, PRIMOS Commands or the reference sited below.

CONFIG_NTS   Invokes a utility to create or edit an NTS configuration file. For more information, see Chapter *CONFIG, PRIMOS Configuration Directives for NTS.

NTS_ASSOCIATE   Defines a path from a physical line attached to an LTS unit to a logical line number in the Prime host.

NTS_LINE   Returns your physical line to LTS command mode. This allows you to change your line characteristics and port parameters at the LTS unit. Refer to the *NTS User's Guide* for more information on this command.

NTS_LIST_ASSOCIATE   Displays a list of active connections by PRIMOS line number, LTS line number, and LTS name.

NTS_UNASSOCIATE   Breaks a connection between a physical line attached to the LTS unit to a logical line number in the Prime host.

START_NTS   Starts NTS and the LAN Network Management facility, if the facility is not already running on the host.

STOP_NTS   Halts NTS on the Prime host, releases all network resources, disconnects all NTS lines lines, and logs out all NTS users.

INFO: The INFO directory contains the files NTS.RUNI and NTS.RUNO. These files provide online documentation of any changes since the last software release.

NTS*: NTS* is the Initial Attach Point (IAP) for NTS_SERVER, the NTS connection manager server and contains the following five files.

CONFIG_MESSAGES_BINARY
     CONFIG_NTS configuration program text

CONFIG_NTS.GENERAL.HELP
     CONFIG_NTS internal help files. This help file is not available from the PRIMOS command line.

NTS.CONFIG
     NTS configuration parameters. (See Appendix A.) NTS* is the default directory for this file.

NTS_SERVER.COMI
     Spawns the NTS connection manager server, NTS_SERVER.

NTS_SERVER.RUN
     Used by the NTS_SERVER.

SYSCOM: SYSCOM contains NTS.INS.PL1, a file of constant declarations for PL1 programs that call the NT$LTS subroutine to return information about the network.

HELP*: HELP* contains the PRIMOS help text files for the PRIMOS commands contained in CMDNC0. These files are copied into the system HELP* directory during installation.

ACCESS CONTROL LISTS

After you install the NTS software, you must set the ACLs on the NTS* directory and create the ACL group, .NETWORK_MGT$. For more information and instructions, see the *System Administrator's Guide, Volume III: System Access and Security.*

1. Use the PRIMOS SET_ACCESS utility on the NTS* directory to assign

   ● ALL access rights to the System Administrator

   ● LUR access rights to the SYSTEM supervisor terminal user

   ● LUR access rights to privileged users and network operators (Optional)

   ● NONE access rights to $REST

   Note
   NTS* is the default directory for the NTS configuration file. If you store the NTS configuration file in another directory, also set the ACLs listed above on that directory.

2. Use the PRIMOS CONFIG_USERS utility to create an ACL group called .NETWORK_MGT$ which includes anyone who configures and monitors the network. Members of the .NETWORK_MGT$ group can use the following PRIMOS network management commands: LIST_LHC_STATUS, LIST_LTS_STATUS, and LOOPBACK.

Caution
If a member of .NETWORK_MGT$ saves an NTS configuration file, any changes that affect LTS units take effect *immediately*. Other users must issue the STOP_NTS command to halt all network traffic and then restart the network with the new configuration file.

PRIMOS CONFIGURATION DIRECTIVES FOR NTS

This chapter describes the PRIMOS configuration directives that enable and regulate NTS on the all hosts in your network.   Determine the appropriate value for your system and include the directives in each host's system configuration file, CONFIG.   Table 3-1 list the directives that pertain to NTS, their meanings, and any default values.

See Appendix B, Obsolete Directives, for information on NTSBUF and NTSABF. For more information on configuration directives, see the *System Administrator's Guide, Volume I: System Configuration* and *Volume II: Communications Lines and Controllers.*

TABLE 3-1. PRIMOS Configuration Directives

Directive	Description	Default Value
AMLCLK	Sets the speed of the software programmable clock for asynchronous lines	22600_8 (9600)
AMLTIM	Sets time intervals for data set signal management	Grace 0, Ticks .2 secs, Disctime 3 min.
ASYNC JUMPER	Defines three alternate speeds for asynchronous lines	113_8 (75), 226_8 (150), 3410_8 (1800)
LHC	Assign physical addresses to LHC controllers	Site-specific
LOGLOG	Allows the user to issue the LOGIN command in succession to perform an implicit LOGOUT	Yes
LOTLIM	Specifies login time limit in minutes	3
LOUTQM	Sets the number of minutes before the system logs out an inactive user	1750_8 (16 hours and 40 minutes)
NPUSR	Sets the number of phantom users	4
NTSASL	Specifies the maximum number of NTS assignable asynchronous lines.	0
NTSUSR	Specifies the number of NTS terminal users.	0

AMLCLK Directive

AMLCLK specifies the baud rate for the software programmable clock for both local and NTS asynchronous lines.

AMLCLK *baudrate*

Sets the clock speed to the number of bits per second. NTS lines supports *baudrate* values from 62_8 through 45400_8 (50 through 19200 decimal). The default value is 22600_8 (9600 decimal). Select a baud rate from the ASYNC JUMPER Directive section.

AMLTIM Directive

AMLTIM controls the data set carrier signals that dialup lines and modems require to connect to Prime systems. *gracetime* (and indirectly *ticks*) limit the time that an NTS terminal user has to make a successful connection.

AMLTIM sets time intervals for the following three variable event timers in data set signal management:

- Ticks
- Disctime
- Gracetime

The carrier signal drops all inactive lines at regular intervals set by the ticks. Then PRIMOS removes the login buffer contents for each line. When the carrier signal returns, gracetime determines the amount of time you have to log in before the next drop of the carrier signal.

Format

AMLTIM *ticks disctime gracetime*

ticks sets the interval between carrier check operations. The default is 2 (.2 seconds). Assign a value greater than 0. The value of *ticks* does not directly effect NTS lines. Use a value that is appropriate for your locally connected asynchronous lines.

disctime sets the interval of time between a disconnect and a connect on a line. Set the *disctime* value greater than *ticks*. The default is 3410_8 (1800 decimal, which is 3 minutes). The value of *disctime* does not effect NTS lines. Use a value that is appropriate for your locally connected asynchronous lines.

gracetime sets the minimum time (in octal tenths of a second) for an NTS user to login once the line connects to the system. The actual grace period varies from *gracetime* to twice *gracetime*. The default value, 0, disables the grace period. The maximum value, 21450_8, establishes a gracetime of approximately 15 minutes. We recommend that you set gracetime to 1130_8 (one minute). This setting is long enough to allow normal users to log in but short enough to discourage unauthorized attempts to access the system.

ASYNC JUMPER Directive

ASYNC JUMPER defines three alternate line speeds available for assignable lines that connect to an LTS unit over the NTS network or lines that locally attach to ICS controllers. After you make your connection to the host, use the SET_ASYNC command to configure your NTS line to one of three speeds set by ASYNC JUMPER.

Format

ASYNC JUMPER *speeda speedb speedc*
Sets the line speeds in octal bits per second (bps). The default values are 113_8, 226_8, and 3410_8 bps which correspond to 75, 150, and 1800 bps, respectively.

NTS lines can select three of the following available speeds:

Speed (bps)	Octal Value	Speed (bps)	Octal Value
50	62_8	1800	3410_8
75	113_8	2400	4540_8
110	156_8	3600	7020_8
150	226_8	4800	11300_8
200	310_8	7200	16040_8
300	454_8	9600	22600_8
600	1130_8	19200	45400_8
1200	2260_8		

LHC Directive

LHC assigns a physical device address to an LHC logical device number.

You can not start NTS on a host unless there is an LHC directive for every LHC that is configured for the host in the NTS configuration file.

The last LHC directive in the PRIMOS configuration file overrides any existing address assignments.

Format

LHC *number address*

Arguments

number
> Specifies the logical device number of the LHC board. *logical-device-number* must be in the range from 0 through 7. You must use the LHC logical device number in the PRIMENET and/or NTS configuration files.

address
> Specifies the LHC board's physical device address. The LHC physical device address is set by a dip switch on the LHC. The most commonly used valid device addresses are: 15_8, 16_8, 17_8, 32_8, 37_8, and 56_8. If you have used one of these addresses for another controller, other addresses are available. Use the PRIMOS LIST_COMM_CONTROLLERS and the STAT COMM commands to show the device addresses of the LHC boards installed in the system.

If you enter invalid input for the LHC directive, PRIMOS displays an error message during system cold start and does not start your network products. For information about the LHC error messages, refer to the *System Administrator's Guide, Volume II: Communication Lines and Controllers.*

LOGLOG Directive

LOGLOG allows or prohibits use of the LOGIN command while the user is already logged into the system.

Note
> An NTS terminal user can have eight connections open at one time. PRIMOS treats each connection as a separate login.

Format

LOGLOG $\begin{Bmatrix} \text{YES} \\ \text{NO} \end{Bmatrix}$

Options

YES   Allows users to use the LOGIN command while already logged into the system. If a user logs in on a terminal that already has a logged-in user, PRIMOS first logs out the logged-in user, then logs in the new user. Setting LOGLOG to YES has an additional implication for NTS: the NTS connection is not broken upon logout of the initial logged-in user. The default value is YES.

NO   Prevents the use of LOGIN by a logged in user. If a user attempts to log in while already logged in, PRIMOS logs out the user and breaks the NTS connection. The user is prevented from logging in again.

LOTLIM Directive

LOTLIM specifies the number of minutes for a user to log into the system. The timer starts when the user first enters LOGIN at either a local or an NTS terminal.

Format

LOTLIM *minutes*
　　Specifies a positive octal integer that indicates the number of minutes allowed for a user to log into the system. Use the default value, 3, with NTS. This value allows users adequate time to type but prevents the wastage of system resources. There is no maximum value for minutes, but enter a value less than the time allowed by the LOUTQM directive.

LOUTQM Directive

LOUTQM specifies the maximum period of inactivity before PRIMOS automatically logs out users. This directive applies to users on both local and NTS terminals.

Format

LOUTQM *minutes*
　　Specifies the octal number of minutes of inactivity (minus one) allowed before PRIMOS automatically logs out the user. *minutes* must be greater than 1; the default value is 1750_8 (1000 decimal). Assign a value more than the time of the LOTLIM directive.

NPUSR Directive

NPUSR specifies the maximum number of phantom users on a host at one time. Use the following formula in Table 3-2 to calculate the value for NPUSR.

TABLE 3-2.   Total Number Of Processes at Rev. 23.1

NTUSR	Number of local terminal users
NPUSR	Number of phantom users
NRUSR	Number of remote PRIMENET users
NSLUSR	Number of slave users
+ NTSUSR	Number of NTS terminal users
< or = 960	Total number of interactive users
NAMLC	Number of local assignable lines
+ NTSASL	Number of NTS assignable lines
< 1024	Total number of processes

Format

NPUSR *number*

Specifies a positive octal integer that indicates the maximum number of phantom users allowed on the node. The minimum and default value is 4. The maximum value is the number of user processes supported by your CPU minus the number of terminal users (NTUSR), NTS terminal users (NTSUSR), PRIMENET remote users (NRUSR), slaves (NSLUSR), assignable lines (NAMLC), and NTS assignable lines (NTSASL). The maximum number of user processes is 17000_8 (960 decimal) for the 6350™ and 6550™ and 1130_8 (600 decimal) for all other models.

When setting NPUSR, ensure that there are enough phantom processes to support all the network services on the node. The following list of products provides the required servers.

LAN Network Management

Requires NM_SERVER and four transient servers, LHC_DLL_SERVER, LHC_ULD_SERVER, LTS_DLL_SERVER, and LTS_ULD_SERVER. Since it is unlikely that more than one transient server would be required at once, allow only two phantoms for LAN Network Management: one for NM_SERVER and one for the transient servers. If necessary, increase this number.

TCP/IP

Requires one TCPIP_MANAGER, TCPIPFTP_SERVER_PHANTOM*nn*, and TCPIPFTP_SERVER*nn* for each LHC dedicated to TCP/IP (maximum of two), one phantom for each simultaneous local FTP session, one phantom for each remote FTP session (initiated by a remote FTP user). The maximum number of simultaneous local and remote FTP sessions on a node is 25. For more information, see the *TCP/IP User's Guide*.

PRIMENET

Requires NETMAN.

Route-Through (for PRIMENET gateway nodes)

Requires RT_SERVER.

File Transfer Service (FTS)

Requires YTSMAN. and at least one file transfer server. As many as seven file transfer servers can be on a node, as described in the *PRIMENET Planning and Configuration Guide*.

Network-based applications on the node and spoolers can also require phantom processes.

NTSASL Directive

NTSASL specifies the maximum number of NTS assignable lines that users can assign simultaneously on your system. Before a user can assign an NTS line, you must use the NTS_ASSOCIATE command to map the line to a specific port on the specific LTS unit. For more information on NTS_ASSOCIATE, refer to Chapter 8, NTS Assignable Lines.

Once an assignable NTS line is associated and given a PRIMOS line number, users can assign it with the ASSIGN ASYNC command. For more information on the ASSIGN_ASYNC, see the *System Administrator's Guide, Volume II: Communications Lines and Controllers*. NTS assignable lines are typically used for printers, tape drives, and other asynchronous devices.

Format

NTSASL *number*

Specifies an octal number that indicates the maximum number of NTS assignable lines that you can assign simultaneously. Refer to the formula in Table 3-2 when you calculate the value of NTSASL. NTSASL + NTSUSR must be less than or equal to 1000_8 (512 decimal), the maximum number of NTS lines on a system.

NTSUSR Directive

NTSUSR specifies the maximum number of NTS and TCP/IP TELNET terminal users that simultaneously connect to your system. This number does not include PRIMENET remote terminal users, or any assignable lines.

Note

Set NTSUSR to reflect the expected number of *simultaneous* NTS and TCP/IP TELNET users, not the potential number of users. Although there can be thousands of NTS terminals and workstations on a network, a much smaller number of NTS and TELNET users are likely to connect to your system at any one time.

Format

NTSUSR *number*

Specifies the maximum number of NTS and TCP/IP TELNET terminal users that can simultaneously connect to your system. *number* must be a nonnegative octal integer; the default is 0, the maximum is 1000_8 (512 decimal). Refer to the formula in Table 3-2 to calculate the value of NTSUSR.

PRIMOS COMMANDS FOR NTS

This chapter describes five PRIMOS commands that activate NTS and network management functions at the host. These commands are order-sensitive. Include them in your system startup file PRIMOS.COMI in the order shown below.

1. START_DSM

2. COMM_CONTROLLER

3. START_NTS

4. CAB

5. SET_ASYNC

For more information on these commands, see the *Operator's Guide to System Commands*, the *Operator's Guide to Prime Networks*, the *DSM User's Guide*, and the *System Administrator's Guide, Volume II: Communications Lines and Controllers*.

START_DSM COMMAND

START_DSM activates Distributed Systems Management (DSM) on the host. In the system startup file, insert the START_DSM command

- After the CONFIG -DATA command that reads the system configuration file and the ADDISK commands that add the *local* disks.

- Before the COMM_CONTROLLER, START_NTS, and START_NET commands to ensure that their startup messages are logged.

For more information about DSM, refer to the *DSM User's Guide*.

COMM_CONTROLLER COMMAND

The COMM_CONTROLLER command downline loads and upline dumps the LHC board or LTS unit. You can issue the command interactively for one or more LHC boards or LTS units, provided that they are the same type and connect to the same system.

You must issue this command from the supervisor terminal. DSM logs unauthorized attempts to use the COMM_CONTROLLER command, if DSM is running when you issue the COMM_CONTROLLER command.

In the system startup file, insert the COMM_CONTROLLER command

● After the START_DSM command.

● Before the START_NET and START_NTS commands.

When you use COMM_CONTROLLER commands in your system startup file or in CPL programs, use the NO_QUERY option to suppress prompts.

Note

You must have the nonchargeable translator libraries and run files installed before you can use the COMM_CONTROLLER command.

The COMM_CONTROLLER command is a command interpreter. The command interpreter parses the command line, detects input errors, and invokes one of the subcommands. Each subcommand spawns a specialized phantom process, known as a server, to actually perform the desired operation.

Not all subcommands and options are available for every controller. Only three of the five subcommands apply to the LHC boards and LTS units. The following list provides a brief description of their functionality.

COMM_CONTROLLER -HELP
   Displays the command line format, a brief description of the five subcommands, and a list of options.

COMM_CONTROLLER -LOAD
   Reboots the controller and downline loads a specific file or protocol combination from the host to the controller.

COMM_CONTROLLER -UPLINE_DUMP
   Writes the contents of an LHC or LTS unit microprocessor's memory to a file in the host for analysis or storage.

Command Format

$$\text{COMM\_CONTROLLER} \begin{Bmatrix} \text{-HELP} \\ \text{-LOAD} \\ \text{-UPLINE\_DUMP} \end{Bmatrix}$$

$$\text{-DEVICE} \begin{Bmatrix} \text{LHC} \\ \text{LTS} \end{Bmatrix}$$

$$\begin{Bmatrix} \text{-DEVICE\_ADDRESS } nn \\ \text{-ALL} \\ \text{-DEST\_NODE\_ADDRESS } xx\text{-}xx\text{-}xx \\ \text{-DEST\_NODE\_NAME } \quad name \end{Bmatrix}$$

$$\begin{Bmatrix} \text{-PATHNAME } path \\ \text{-PROTOCOL } tokens \end{Bmatrix}$$

[-NO_QUERY]

Refer to the *System Administrator's Guide, Volume II: Communications Lines and Controllers* for information on all COMM_CONTROLLER subcommands.

COMM_CONTROLLER -HELP subcommand

The COMM_CONTROLLER -HELP subcommand displays detailed information on all COMM_CONTROLLER subcommands and arguments. When you choose the -HELP subcommand, all other subcommands and options are ignored.

Command Format

$$\text{COMM\_CONTROLLER} \begin{Bmatrix} \text{-HELP} \\ \text{-H} \end{Bmatrix}$$

When you issue the COMM_CONTROLLER command without specifying a subcommand, the command interpreter displays the help file.

COMM_CONTROLLER -LOAD Subcommand

The COMM_CONTROLLER -LOAD subcommand executes an automatic shutdown and reinitialization cycle followed by a downline load of a specific file or protocol combination to the specified controllers or loads NTS on the LTS units. It copies the object file and passes it to the onboard microprocessor.

WARNING

Do not attempt to downline load an operating device; the downline load operation will fail and the device may hang.

You must give the LHC_DLL_SERVER and LTS_DLL_SERVER phantoms LUR access rights to the directory DOWN_LINE_LOAD* and any other directory that contains downline load files. You must be a member of the .NETWORK_MGT$ access group to downline load an LTS unit. The supervisor terminal displays any error messages. If you configure network management functions on the host, DSM will log event messages.

Notes

Stop network activity before you downline load an LHC board. Issue the MAX ALL, STOP_NET, and STOP_NTS commands before you attempt to downline load any LHC boards.

The START_NET and START_NTS commands do not downline load LHC boards or LTS units. Both devices must be downline loaded explicitly with the COMM_CONTROLLER command before you can start the networks.

If you upgrade to Rev. 23.0, you must use the COMM_CONTROLLER command to downline load the new software to your LTS units to overwrite their obsolete downline load files.

Command Format

COMM_CONTROLLER -LOAD   -DEVICE   {LHC}
                                  {LTS}

{
-DEVICE_ADDRESS *nn*
-ALL
-DEST_NODE_ADDRESS *xx-xx-xx*
-DEST_NODE_NAME   *name*
}

{
-PROTOCOL *tokens*
-PATHNAME *path*
}

[-NO_QUERY]

Options

-DEVICE *type*
-DEV

Specifies the type of intelligent controller. For NTS, valid device types are LHC, or LTS. Use with either the -DA or the -ALL option.

-DEVICE_ADDRESS *nn*
-DA

Specifies an individual LHC controller's device address. You obtain this two-digit octal number with the STATUS COMM or LIST_COMM_CONTROLLERS commands. The most commonly used valid device addresses are: 15_8, 16_8, 17_8, 32_8, 37_8, and 56_8. If you have used one of these addresses for another controller, 10_8, 11_8, 35_8, 36_8, 50_8, 51_8, 52_8, 53_8, and 54_8 also work. Commands with invalid addresses are rejected and generate an error message that lists all available controllers and their addresses.

-ALL

Loads every controller of the *type* specified in the -DEVICE option on the system with identical protocol token combinations or the same downline load file. Use this option when you startup your network or when you want to upgrade every LTS device to a new software revision.

-DEST_NODE_ADDRESS *xx-xx-xx-xx-xx-xx*
-DNA

Specifies the unique 12-digit hexadecimal network address of an LTS unit. The manufacturer assigns this address and places a metal tag with the address on the LTS unit. All Prime LTS addresses begin with the three-digit string 08-00-2F-. When you enter only the last six digits of the device address, the COMM_CONTROLLER command adds the Prime LTS prefix automatically. Separate every two characters with a hyphen. You can also use the LIST_LTS_STATUS command to obtain the device address. Do not specify the -DNA option with the -DNN option. This option applies to LTS units only.

-DEST_NODE_NAME *name*
-DNN

Specifies the unique node name of an LTS unit. CONFIG_NTS assigns this name when the LTS unit is configured. Use the LIST_LTS_STATUS command to obtain the node name. Do not specify the -DNN option with the -DNA option. This option applies to LTS units only.

-PROTOCOL *tokens*
-PR

Specifies the protocol token combinations used to select a downline load file for an LHC. Where *token* can be TCP, NTS, PRIMENET, or NTS_PRIMENET. You must specify at least one token. You can also use the -PATHNAME option to successfully downline load a controller.

-PATHNAME *path*
-PN

> Transfers a file containing an executable program from storage to the controller. You must use either the -PROTOCOL or the -PATHNAME option to successfully downline load a controller. *path* is required and must be an existing PRIMOS filename no longer than 128 characters. If you attach to the source directory, you can specify just the filename. The DOWN_LINE_LOAD* directory contains the following pre-built object code files for each device type:

```
DOWN_LINE_LOAD*>LHC300_NTS_PRIMENET.DL
DOWN_LINE_LOAD*>LHC300_TCP.DL
```

-NO_QUERY
-NQ

> Suppresses the Continue? prompt. Use the -NQ option whenever you include this command in a CPL program or in your startup file.

Examples

Loading One LTS Unit

> The following command line in a startup file downline loads the LTS unit named PAYROL.

```
COMM_CONTROLLER -LOAD -DEV LTS -DNN PAYROL
-PN DOWN_LINE_LOAD}*>LHC300_NTS_PRIMENET.DL -NQ

OK, LTS HAS BEEN RESET.
```

Loading an LHC Controller

> LHC controllers that are running NTS and PRIMENET concurrently require two protocol tokens: NTS and PRIMENET. Use the -PROTOCOL option to load this combination. You must use either the -PROTOCOL or the -PATHNAME option to sucessfully downline load a device. Connect the tokens with an underscore as shown in the following example.

```
OK, COMM_CONTROLLER -LOAD -DEV LHC  -DA 37 -PRO PRIMENET_NTS

[COMM_CONTROLLER Rev. 23.0 Copyright (c) 1990, Prime Computer, Inc.]
LHC controller(s) 37 currently active.  Continue <Y or N>? Y

LHC prom self-verify diagnostics in progress...

LHC downline load in progress...

LHC downline load operation results:
     LHC at address 37: SUCCESSFUL
OK,
Phantom 180: Normal logout at 13:06
Time used: 00h 00m connect, 00m 07s CPU, 00m 06s I/O.
```

Loading Several Controllers

You can load several controllers with one command line provided that the controllers:

- Are the same type

- Are located in the same backplane

- Use the same downline load file or protocol combination

The following command line loads every LHC controller on this system with the NTS protocols.

```
OK, COMM_CONTROLLER -LOAD -DEVICE LHC -ALL -PROTOCOL NTS

[COMM_CONTROLLER Rev. 23.0 Copyright (c) 1990, Prime Computer, Inc.]

LHC prom self-verify diagnostics in progress...

LHC downline load in progress...

LHC downline load operation results:
     LHC at address 10: SUCCESSFUL
     LHC at address 11: SUCCESSFUL
OK,
Phantom 196: Normal logout at 10:55
Time used: 00h 00m connect, 00m 03s CPU, 00m 01s I/O.
```

COMM_CONTROLLER –UPLINE_DUMP Subcommand: The COMM_CONTROLLER -UPLINE_DUMP subcommand transfers the memory image from an LHC board or LTS unit to a disk file in the host for subsequent analysis. An LHC board or LTS unit can upline dump automatically when an uncorrectable software error occurs.

Only one controller can upline dump data to the host at a time. Do not attempt to upline dump an operating device; the controller disconnects all users and stops normal operation. Any error messages are displayed at the supervisor terminal and, if desired, logged by DSM.

If an uncorrectable software error forces an upline dump, an LTS unit or LHC board automatically requests a boot sequence from the host to reload the protocol suite. However, if you issue an on-demand upline dump, you must also issue a COMM_CONTROLLER -LOAD subcommand before you can use the controller.

Caution

Before the COMM_CONTROLLER -UPLINE_DUMP subcommand can open a file and write data, the LHC_ULD_SERVER and the LTS_ULD_SERVER must have LUR access rights to the directory containing the file specified by the -PATHNAME option or to UPLINE_DUMP*>LAN300 for the default case.

The ULD will fail unless there are enough records available in the directory specified.

Command Format

$$\text{COMM\_CONTROLLER} \begin{Bmatrix} \text{-UPLINE\_DUMP} \\ \text{-ULD} \end{Bmatrix} \text{-DEVICE} \begin{Bmatrix} \text{LTS} \\ \text{LHC} \end{Bmatrix}$$

$$\begin{Bmatrix} \text{-DEVICE\_ADDRESS } nn \\ \text{-DEST\_NODE\_ADDRESS } xx\text{-}xx\text{-}xx \\ \text{-DEST\_NODE\_NAME } name \end{Bmatrix}$$

-PATHNAME *path*

[-NO_QUERY]

Options

-DEVICE *type*
-DEV

Specifies the type of intelligent controller. For NTS, valid device types are LHC or LTS unit.

-DEVICE_ADDRESS *nn*
-DA

Specifies an individual LHC controller's device address. Obtain this two-digit octal number with the STATUS COMM or LIST_COMMS_CONTROLLER commands. Valid LHC addresses at Rev. 23.0 are 10_8, 11_8, 15_8, 16_8, 17_8, 32_8, 35_8, 36_8, 37_8, 50_8, 51_8, 52_8, 53_8, 54_8, and 56_8. Commands containing invalid addresses are rejected and generate an error message that lists all available controllers and their addresses.

-DEST_NODE_ADDRESS *xx-xx-xx-xx-xx-xx*
-DNA

Specifies the unique 12-digit hexadecimal network address of an LTS unit. The manufacturer assigns the address and places a metal tag with the address on the LTS unit. All Prime LTS addresses begin with the three-digit string 08-00-2F-. When you enter only the last six digits of the device address, the COMM_CONTROLLER command adds the Prime LTS prefix automatically. Separate every two characters with a hyphen. You can also use the LIST_LTS_STATUS command to obtain the device address. Do not specify the -DNA option with the -DNN option. This option applies to LTS units only.

-DEST_NODE_NAME *name*
-DNN

Specifies the unique node name of an LTS unit. CONFIG_NTS assigns this name when the LTS unit is configured. Use the LIST_LTS_STATUS command to obtain the node name. Do not specify the -DNN option with the -DNA option. This option applies to LTS units only.

-PATHNAME *path*
-PN

Opens the file specified by *path*, where *path* is a PRIMOS pathname of not more than 128 characters. If you specify just a filename, the file is opened in your currently attached directory.

When a pathname is omitted, the server retrieves the current memory image from the device and stores it in a file in the directory UP_LINE_DUMP*. The format of the default upline dump filename for an LHC board is *LHC_hostname-deviceaddress.dd-mm-yy.hhmm.* The format of the default upline dump filename for an LTS unit is *LTSxx-xx-xx-xx-xx-xx.ddmmyy.hhmm.* Where *hostname* is the Prime node name, *deviceaddress* is the physical device address on the Prime system, *xx-xx-xx-xx-xx-xx* is the network address of the LTS unit, *dd* is the day, *mm* is the month, *yy* is the year, and *hhmm* is the hour and minute the file was created.

-NO_QUERY
-NQ

Suppresses the Continue? prompt. Use the -NQ option whenever you include this command in a CPL program or in your startup file.

Examples

Using the DEVICE_ADDRESS Option

In the following example, the command line transfers the contents of an LHC board's on-board microprocessor to separate files in the host.

```
OK, COMM_CONTROLLER -ULD -DEV LHC  -DA 50
-PN UP_LINE_DUMP*>LAN300>LHC_02.ULD

[COMM_CONTROLLER Rev. 23.0 Copyright (c) 1990, Prime Computer, Inc.]
LTS has been put into UPLINE DUMP mode.

LHC_ULD_SERVER (user 197) logged in Friday, 27 Mar 90 10:54:24.
LHC controller(s) 50 currently active.  Continue <Y or N>? Y
OK,
LHC_ULD_SERVER (user 197) logged out Friday, 27 Mar 90 10:54:44.
Time used: 00h 00m connect, 00m 02s CPU, 00m 01s I/O.
Phantom 197: Normal logout at 10:54
Time used: 00h 00m connect, 00m 02s CPU, 00m 01s I/O.
```

Using the DESTINATION_NODE_ADDRESS Option

The COMM_CONTROLLER command can upline dump an LTS unit by network address as shown in the following example.

```
OK, COMM_CONTROLLER -ULD -DEV LTS -DNA F8-00-01
-PN DOWN_LINE_LOAD*>LTS_03.ULD
```

LTS unit has been put into UPLINE DUMP mode.

[COMM_CONTROLLER Rev. 23.0 Copyright (c) 1990, Prime Computer, Inc.]

LTS_ULD_SERVER (user 197) logged in Friday, 27 Mar 90 10:54:24.
LTS controller(s)08-00-2F-F8-00-01 currently active.Continue <Y or N>? Y

OK,
LTS_ULD_SERVER (user 197) logged out Friday, 27 Mar 90 10:54:44.
Time used: 00h 00m connect, 00m 02s CPU, 00m 01s I/0.

Phantom 197: Normal logout at 10:54
Time used: 00h 00m connect, 00m 02s CPU, 00m 01s I/0.

Using the DESTINATION_NODE_NAME Option

The COMM_CONTROLLER command can upline dump an LTS unit by node name as shown in the following example.

```
OK, COMM_CONTROLLER -ULD -DEV LTS -DNN SALES1
-PN DOWN_LINE_LOAD*>LTS_03.ULD
```

[COMM_CONTROLLER Rev. 23.0 Copyright (c) 1990, Prime Computer, Inc.]

LTS has been put into UPLINE DUMP mode.

LTS_ULD_SERVER (user 197) logged in Friday, 27 Mar 90 10:54:24.
LTS controller(s) SALES1 currently active. Continue <Y or N>? Y

OK,
LTS_ULD_SERVER (user 197) logged out Friday, 27 Mar 90 10:54:44.
Time used: 00h 00m connect, 00m 02s CPU, 00m 01s I/0.

Phantom 197: Normal logout at 10:54
Time used: 00h 00m connect, 00m 02s CPU, 00m 01s I/0.

START_NTS COMMAND

START_NTS starts the NTS software on the host and also starts LAN Network Management if it has not already been started by the START_NET command. In the startup file, insert the START_NTS command after the COMM_CONTROLLER and START_DSM commands, to give the NTS software adequate time to initialize itself.

Command Format

START_NTS *config_pathname*

Indicates the pathname of the NTS configuration file. The default pathname is NTS*>NTS.CONFIG. You must create the NTS configuration file before you issue the START_NTS command.

START_NTS Error Messages

The START_NTS error messages are listed below.

Insufficient access rights. (START_NTS)

You attempted to start the Network Terminal Service from a terminal other than the supervisor terminal.

LAN/Host/LTS naming conflict. (START_NTS)

You attempted to start the Network Terminal Service with a terminal configuration file that created a naming conflict. Check terminal and PRIMENET configurations for inconsistent naming.

LHCnn is not booted. (START_NTS)

You attempted to start the Network Terminal Service on an LHC that had not been previously booted. No action is taken on the command. You should boot the LHC with the COMM_CONTROLLER -BOOT command and then issue START_NTS.

LHCnn is not configured in Primos CONFIG file. (START_NTS)

You attempted to start the Network Terminal Service on a LHC that had not been previously configured. No action is taken on the command. You should configure the LHC with LHC directives and then cold start the system. Or, change the NTS configuration file to agree with the LHC directives and then issue START_NTS.

Network Terminal Service initialization failed (Network management failed to initialize). (START_NTS)

If ENM fails to initialize, START_NTS will not bring up the Network Terminal Service function. No action is taken on the command.

Network Terminal Service is currently running. (START_NTS)

You attempted to start the Network Terminal Service while NTS was running. No action is taken on the command.

`Network Terminal Service is not configured. (START_NTS)`

You attempted to start the Network Terminal Service with a valid terminal configuration file, but configuration directives NTSUSR and NTSASL are not specified or are both set to 0.

`Network Terminal Service is not configured for this node. (START_NTS)`

You attempted to start the Network Terminal Service with a terminal configuration file that does not have NTS configured for this node.

`Network Terminal Service requires a terminal configuration file. (START_NTS)`

You attempted to start the Network Terminal Service with a configuration file that was not created using the NTS terminal configurator (CONFIG_NTS).

`NMSr has started up network management for NTS service.`

NMSr is performing network management for NTS. This message indicates successful completion of START_NTS.

`No room. (START_NTS)`

You attempted to start the Network Terminal Service with a terminal configuration file that is too large to fit into the NSS database. This could occur either because the terminal configuration file is too large or because PRIMENET configuration takes up a lot of room.

`Not found. <filename> (START_NTS)`

You attempted to start the Network Terminal Service with an NTS terminal configuration file, but the file with the name *filename* was not found.

`Top level directory not found or inaccessible. (START_NTS)`

You attempted to start the Network Terminal Service with a configuration file from a directory that NTS could not find.

CAB COMMAND

The CAB command sets the buffer sizes for all types of asynchronous lines; for a full description, see the *System Administrator's Guide, Volume II: Communications Lines and Controllers.* Do not use the obsolete NTSBUF and NTSABF configuration directives, unless your PrimeService representative recommends that you change the flow control thresholds from their default values.

A CAB -NTSBUF command in your startup file sets the initial and default buffer sizes for all NTS terminal lines when they become active. A CAB -NTSABF command serves the same purpose for NTS assignable lines. There is no way to preset the buffer sizes for specific NTS lines, because they are not given line numbers until the lines connect to a system (NTS terminal lines) or are associated (NTS assignable lines). However, you can interactively use the CAB command to change the buffer sizes for specific NTS lines once they connect to a system or associated, because they then have a PRIMOS line number that you can use.

Command Format

$$\text{CAB} \quad \left\{ \begin{array}{l} \text{-NTSABF} \\ \text{-NTSBUF} \end{array} \quad \left[\begin{array}{ll} \text{-OBS} & size \\ \text{-IBS} & size \end{array} \right] \right\}$$

Options

-NTSABF

Specifies the initial and default buffer sizes for all NTS assignable lines. Use with the -IBS and OBS options.

-NTSBUF

Specifies the initial and default buffer sizes for all NTS terminal lines. Use with the -IBS and OBS options.

-OBS *size*

Sets the output buffer size. *size* is the decimal number of eight-bit characters that the buffer can store. The default value at cold start is 384 characters; the range is from 100 to 8190. If you omit -OBS or supply a value of 0, the CAB command uses the current output buffer size.

-IBS *size*

Sets the input buffer size. *size* is the decimal number of eight-bit characters that the buffer can store. The default value at cold start is 256 characters; the range is from 10 to 4096. If you omit -IBS or supply a value of 0, the CAB command uses the current input buffer size.

Verifying Buffer Sizes: To verify that the CAB command has established the correct NTS buffer sizes, issue the LAB command at the supervisor terminal

```
OK, LAB -NTSBUF -NTSABF
```

LAB presents a display similar to the following on the supervisor terminal:

```
-----------------------------------
|         || Initial Buffer Sizes |
|         ||----------------------|
|         ||   Input   |  Output  |
|---------||-----------|----------|
| NTSBUF  ||   1792    |   1792   |
|---------||-----------|----------|
| NTSABF  ||   1792    |   1792   |
-----------------------------------
```

Setting Buffer Sizes for Specific Lines: Once an NTS user connects to your node, an NTS line is active. You can enter the STAT USER command to display its line number, and then enter a CAB command to change its input and output buffer sizes. Likewise, once an NTS assignable line is associated with the NTS_ASSOCIATE command, enter NTS_LIST_ASSOCIATE to display its line number.

You can use CAB from the supervisor terminal to change the buffer sizes of any NTS line. However, if an application program running on the line changes the buffer sizes, your changes take effect after the application terminates. The following example shows how to use the CAB command to change the buffer sizes on line 1025: ·

```
OK, CAB -LINE 1025 -IBS 128 -OBS 128
```

You can also use CAB from a user terminal to configure a line, if you have DSM privileges to use CAB. Include the -ON option in your command line, even if the target line is on the local node. (For more information on DSM, see the *DSM User's Guide.*) The following example shows the CAB command to configure an NTS line from a user terminal:

```
OK, CAB -LINE 1026 -IBS 128 -OBS 128 -ON
```

You cannot use CAB in your PRIMOS.COMI file to configure a specific line unless it follows an NTS_ASSOCIATE command. NTS_ASSOCIATE maps an NTS assignable line to a specific port on a specific LTS unit. Once you have given the assignable line a PRIMOS line number with NTS_ASSOCIATE, use CAB to configure the line's buffers. For example:

```
OK,  NTS_ASSOCIATE -LINE 1027 -LTS_NAME HARRY -LTS_LINE 4
CAB -LINE 1027 -IBS 128 -OBS 128
```

SET_ASYNC COMMAND

The SET_ASYNC command defines terminal line characteristics for an individual asynchronous line or a range of consecutively numbered lines. These lines can be local lines connected to AMLC and ICS controllers, as well as NTS lines connected to an LTS unit.

Put SET_ASYNC commands in your PRIMOS.COMI file, so that all asynchronous lines are configured on your system at cold start. You can also use the SET_ASYNC command while the system is running to alter the characteristics of a particular line. Individual users can temporarily change the characteristics of their own line or any lines that they have assigned. These changes remain in effect until the user logs out or issues another SET_ASYNC command.

Certain options, such as -USER_NUMBER, -ASSIGNABLE, -DISLOG, -SPEED_DETECT, -LOOP_LINE, and their converses, are hardware or configuration dependent. These options are reserved for the system administrator and DSM privileged users.

WARNING

The -USER_NUMBER option is obsolete. You must use the CAB command to change the size of the buffers logically associated with the line instead.

Users also can issue the PORT command before they make a connection to change port parameters with equivalent functionality. For more information, see the *NTS User's Guide*.

SET_ASYNC accepts decimal numbers only. Octal numbers are *not* supported.

Command Format

$$\text{SET\_ASYNC} \begin{Bmatrix} \text{-DISPLAY [-LINE } n] \\ \text{-LINE } n \text{ [-TO n]} \\ \text{-HELP} \end{Bmatrix} \quad [options]$$

Arguments

-DISPLAY

Displays all the current characteristics for the line or specified line. Only -LINE and -TO can accompany this option. Use -DISPLAY with the -RESET_XOFF option to verify the suspension of data flow on a line.

-HELP

Displays the format of the command and a complete list of available options. The options that are restricted for the system administrator's use are clearly marked.

-LINE *n*

Configures a line (or lines) with the selected options, where n is the required *decimal* line number or, when used with the -TO option, the first line number in a series configured with identical options. Valid line numbers range from 0 to 511 for local lines and from 1024 to 1536 NTS lines.

-TO *m*

Configures a range of consecutively numbered lines with identical options, where m specifies the last line number in a series beginning at the line number n given in -LINE. The value m must be greater than n.

There are many options to the SET_ASYNC command. Table 4-1 provides an alphabetical list of options and any existing abbreviations. For explanations of each option, see the *System Administrator's Guide Volume II, Communication Lines and Controllers*.

TABLE 4-1.   SET__ASYNC Options and Abbreviations

-ASSIGNABLE * -ASGN	-NO__ECHO
-CHAR__LENGTH -CL	-NO__ERROR__DETECTION -NO__ERRDET
-DATA__SENSE__ENABLE -DSE	-NO__LINE__FEED -NOLF
-DATA__SET__CONTROL -DSC	-NO__LOOP__LINE * -NOLOOP
-DATA__SET__SENSE -DSS	-NO__REVERSE__XOFF -NOREVXOFF
-DEFAULT -DEF	-NO__SPEED__DETECT * -NOSD
-DISLOG *	-NO__XOFF
-DISPLAY -DP	-PARITY -PAR
-ECHO	-PROTOCOL -PRO
-ERROR__DETECTION -ERRDET	-RESET__XOFF
-HELP -H	-REVERSE__XOFF -REVXOFF
-LINE	-SPEED
-LINE__FEED -LF	-SPEED__DETECT * -SD
-LOOP__LINE * -LOOP	-STOP__BITS -SB
-NO__DATA__SENSE__ENABLE -NODSE	-SYSTEM -SYS
-NO__DATA__SET__CONTROL -NODSC	-TO
-NO__DISLOG *	-USER__NUMBER -USER
-RESET__XOFF	-XOFF

(*) = Restricted to the system administrator

The -DEFAULT option sets all parameters to the default settings shown in Table 4-2, unless you specify other options on the command line. These parameters may not be appropriate for an NTS line.

TABLE 4-2.   Default Settings for Asynchronous Lines
Provided by the SET_ASYNC -DEFAULT Option

Option	Default Setting
-ASSIGNABLE NO	Line is a login line.
-CHAR_LENGTH 8	Character length is 8 bits.
-DATA_SET_CONTROL	Enables modems and port selectors to recognize when information is being transmitted.
-ECHO	Full-duplex line.
-LINE_FEED	Echo both LINE FEED and RETURN for each RETURN.
-NO_DATA_SENSE_ENABLE	Data Set Sense is disabled.
-NO_DISLOG	Disables automatic disconnect.
-NO_ERROR_DETECTION	Input parity or input buffer overflow are not flagged with an ASCII NAK (negative acknowledgement) in the input buffer.
-NO_LOOP_LINE	Line is not in loopback mode.
-NO_REVERSE_XOFF	Reverse Flow Control is not enabled.
-NO_SPEED_DETECT	Disables Auto Speed Detect.
-PARITY NONE	Line parity disabled.
-PROTOCOL TTY	Line uses the terminal protocol.
-SPEED 1200[1]	Line speed is 1200 bits per second.
-STOP_BITS 1	One stop bit.
-XOFF	CONTROL-S stops and CONTROL-Q resumes the flow of data from the system to the terminal.

---

[1] Use the -SPEED option with the -DEFAULT option for terminals that operate at other speeds.

THE NTS CONFIGURATION WORKSHEET

This chapter provides a worksheet to use when you create your NTS configuration file. Read this chapter, follow the instructions, and fill out your worksheet before you run the CONFIG_NTS utility.

Use the NTS configuration worksheet, shown in Figure 5-1, to compile a complete description of your LAN including names, addresses, and network management host assignment.

PROCEDURE

1. Before you begin, sketch the topology of your own network to use in planning your configuration. See Figure 5-2. Appendix C, Extra Worksheets, contains blank network topology and NTS configuration worksheets.

2. Refer to the sketch in Fig 5-2 as your fill out your configuration worksheet. See Figure 5-3.

3. Use the same LAN names, host names, and device addresses that you used in your PRIMOS configuration for all network products. During system startup PRIMOS checks names. If names do not agree, PRIMOS aborts the START_NTS command. For example, if a host is identified as INFCTR in the PRIMOS SYSNAM configuration directive, use INFCTR as its host name in your NTS and PRIMENET configuration files.

4. Use the worksheets while you run CONFIG_NTS to create your NTS configuration file. If you complete the configuration worksheet before you start, the online configuration will proceed quickly.

5. File the worksheets in your system log book and update them whenever you change your configuration.

6. Once you have created your NTS configuration file, copy it to every host on your network. If you change your configuration, redistribute the file, and restart each host with the START_NTS command specifying the new file.

NTS Configuration Worksheet

Local Area Network Information

LAN Name: _____

Description: _____

_____

Allow Unconfigured Nodes: ☐ YES ☐ NO

Network Management:

Downline Load Host:	Upline Dump Host:	Event Reporting Host:
Primary: _____	Primary: _____	Primary: _____
Secondary: _____	Secondary: _____	Secondary: _____

Host Information

Host Name: _____	Host Name: _____	Host Name: _____
Description: _____	Description: _____	Description: _____
LHC: ____	LHC: ____	LHC: ____
LHC: ____	LHC: ____	LHC: ____
LHC: ____	LHC: ____	LHC: ____
LHC: ____	LHC: ____	LHC: ____

Host Name: _____	Host Name: _____	Host Name: _____
Description: _____	Description: _____	Description: _____
LHC: ____	LHC: ____	LHC: ____
LHC: ____	LHC: ____	LHC: ____
LHC: ____	LHC: ____	LHC: ____
LHC: ____	LHC: ____	LHC: ____

LTS Information

LTS Name: _____	LTS Name: _____
Address: 08-00-2F-____-____-____	Address: 08-00-2F-____-____-____
LTS Name: _____	LTS Name: _____
Address: 08-00-2F-____-____-____	Address: 08-00-2F-____-____-____
LTS Name: _____	LTS Name: _____
Address: 08-00-2F-____-____-____	Address: 08-00-2F-____-____-____
LTS Name: _____	LTS Name: _____
Address: 08-00-2F-____-____-____	Address: 08-00-2F-____-____-____

A04.01.D1015921A

FIGURE 5-1.   NTS Configuration Worksheet

NTS Network Topology Worksheet

LAN Name: _LAN-1_
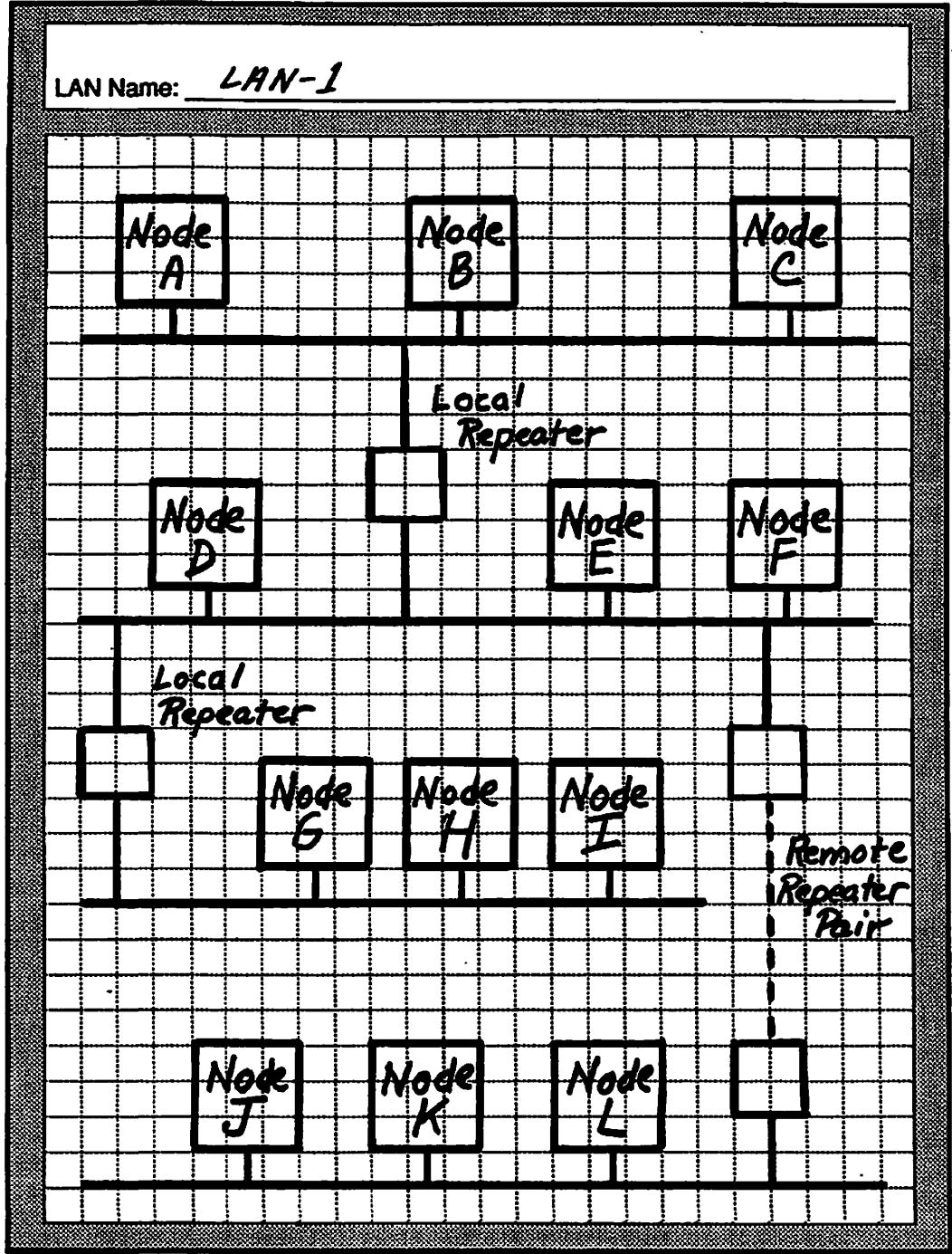
FIGURE 5-2.   NTS Network Sketch

CONFIGURATION WORKSHEET INSTRUCTIONS

The configuration worksheet organizes information into three parts: LAN Information, Host Information, and LTS Unit Information.

The following sections describe each field, discuss general guidelines, and provide instructions for completing the worksheet.

Worksheet Part I: LAN Information

NTS allows you to configure up to 32 LANs in a single NTS configuration file. Fill out a separate worksheet for each LAN. When you enter the LAN information on the worksheet,

- Name the LAN

- Describe it briefly

- Decide whether or not to allow unconfigured nodes.

- Decide whether or not to enable network management functions

LAN Name
Enter the logical LAN name. Since you can install up to six LHC boards in a single host and each one can connect to a separate LAN, provide each LAN with a name that conforms to the following rules.

- Every LAN name on the network must be unique.

- LAN names can contain a maximum of 32 characters.

- The first character of the LAN name must be a letter, but the other characters can be any combination of lowercase letters (a-z), or uppercase letters (A-Z), numbers (0-9), dollar signs ($), periods (.), or underscores (_).

- Use the same LAN name that you use in your PRIMENET configuration file, if you have one.

- If you do not specify a LAN name, CONFIG_NTS constructs a default name LAN300-*nn*, where *nn* is a number that ranges from 1 through 32.

Description
Enter a brief description of the LAN (maximum of 80 characters).

Unconfigured Nodes
Decide if you want to allow unconfigured nodes on your LAN. Check YES or NO. An unconfigured node is any LTS unit which is connected to the LAN but not identified in the configuration file. Normally, NTS checks the source address of every connection request to verify network management, login attempts, and device address range. When you add a new LTS unit, you must wait to update and redistribute the NTS configuration file before you can use the LTS unit. If you allow unconfigured nodes, you can connect an LTS unit and use it immediately without redistributing the configuration file to every host in your network. A LAN that allows unconfigured nodes is easy to maintain but not secure.

NTS Configuration Worksheet

LAN Name: _LAN - 1_

Description: _LAN-1 contains Host A and Host B._
Host B performs network management.

Allow Unconfigured Nodes: ☐ YES ☒ NO

Network Management:
Downline Load Host: Upline Dump Host: Event Reporting Host:
  Primary: _Host B_   Primary: _Host B_   Primary: _Host B_
  Secondary: _Host A_   Secondary: _Host A_   Secondary: _Host A_

Host Name: _Host A_   Host Name: _Host B_   Host Name: _____
Description: _____   Description: _____   Description: _____
  LHC: _01_   LHC: _01_   LHC: ____
  LHC: ____   LHC: _02_   LHC: ____
  LHC: ____   LHC: ____   LHC: ____
  LHC: ____   LHC: ____   LHC: ____

Host Name: _____   Host Name: _____   Host Name: _____
Description: _____   Description: _____   Description: _____
  LHC: ____   LHC: ____   LHC: ____
  LHC: ____   LHC: ____   LHC: ____
  LHC: ____   LHC: ____   LHC: ____
  LHC: ____   LHC: ____   LHC: ____

LTS Name: _LTS 1_   LTS Name: _LTS 2_
Address: 08-00-2F-_01_-_23_-_45_   Address: 08-00-2F-_01_-_23_-_46_

LTS Name: _LTS 3_   LTS Name: _LTS 4_
Address: 08-00-2F-_01_-_23_-_47_   Address: 08-00-2F-_01_-_23_-_48_

LTS Name: _____   LTS Name: _____
Address: 08-00-2F-___-___-___   Address: 08-00-2F-___-___-___

LTS Name: _____   LTS Name: _____
Address: 08-00-2F-___-___-___   Address: 08-00-2F-___-___-___

AE1.D1015P2LA

FIGURE 5-3.   A Completed NTS Configuration Worksheet

Note

You cannot issue any command that requires an LTS unit's name or device address for an unconfigured node.

Other network products, such as TCP/IP, interpret an unconfigured node as a host, workstation, or LTS/TCP unit that uses TELNET™ software to connect to 50 Series hosts.

Network Management

Network Management hosts provide an LTS unit with downline load files, upline dump storage, and event messages logs.

Downline Load Hosts: An LTS unit requires a downline load host because it has no permanent storage capability. When an LTS unit multicasts a downline load request on the network, the primary downline load host responds with a boot multicast channel address request and waits 15 seconds for further requests. The primary host then reboots any LTS unit that replied and copies an executable version of the NTS software into each unit's microprocessor. If the primary host does not respond after three requests, the secondary host reboots the LTS unit. If neither one responds, all other hosts on the network respond.

Upline Dump Hosts: When software failure occurs or a diagnostic procedure encounters a problem with an LTS unit, it transfers the memory image from the LTS unit to the primary upline dump host for subsequent analysis. If the primary host does not respond after three requests, the secondary host accepts the upline dump. If neither one responds, the first host on the network to respond accepts the dump.

Event Reporting Hosts: An event reporting host logs event, warning, and error messages generated by LTS units. When an LTS unit multicasts a message, the primary event reporting host responds and stores the message in the file NETWORK_MGT*>NMSR.LOG. This log is part of the DSM Unsolicited Message facility. If the file does not exist, you must create it. See the *DSM User's Guide* for more information. If the primary host does not respond after three requests, the secondary host logs the message. If neither one responds, all capable hosts on the network log the message.

Worksheet Part II: Host Information

A host is a 50 Series computer that connects to one or more networks by one or more LHC boards. Enter the following host information on your worksheet.

- Host name

- Description

- LHC number

Host Name
Enter a logical name that complies with the following rules for each host on your LAN.

- Each host name in your configuration file must be unique.

- The host name can contain a maximum of six characters.

- The first character must be a letter, but the other characters can be any combination of uppercase letters (A-Z), lowercase letters (a-z), numbers (0-9), periods (.), dollar signs ($), and underscores (_).

- Use the same host name that you use in your PRIMOS SYSNAM configuration directive and PRIMENET configuration file, if you have one.

If a host has multiple LHC boards that connect to the same network, NTS routes connection requests that specify host name to the LHC board with the least traffic to reduce congestion.

Description
Enter a brief description of the host (maximum 80 characters).

LHC Number
Identifies the logical number assigned by the PRIMOS LHC configuration directive to a specific LHC board on the host. *LHC number* is an octal number that ranges from 0 to 7.

Worksheet Part III: LTS Information

An LTS unit can only attach to one LAN. It receives network management services from the primary and secondary hosts configured above. Enter the information in this section to link the logical LTS name to the LTS unit's hexadecimal device address. After the unit is configured you can issue commands, such as NTS_ASSOCIATE, and specify the LTS name without knowing the location or device address of the LTS unit.

LTS Name
Enter a logical name that complies with the following rules:

- An LTS names can contain a maximum of sixteen characters.

- Each LTS name in your configuration file must be unique.

- The first character must be a letter, but the other characters can be any combination of uppercase letters (A-B), lowercase letters (a-z), numbers (0-9), periods (.), underscores (_), or dollar signs ($).

Address
Enter the LTS unit's six-character hexadecimal device address with the short format *nn-nn-nn*. All Prime LHC addresses begin with the three-digit string 08-00-2F-. When you enter *nn-nn-nn*, the command enters the Prime prefix automatically. The manufacturer assigns the hexadecimal address to the LTS and stamps it on the unit's identification tag. Copy the last three digits of the address from the tag to the NTS configuration worksheet.

Note

CONFIG_NTS does not configure the asynchonous lines attached to individual LTS units. Therefore, this worksheet does not include asynchronous line characteristics. You must configure the lines at the LTS unit after you configure your network. For more information, see the *NTS User's Guide*.

THE CONFIG_NTS UTILITY

CONFIG_NTS is an interactive utility that allows you to create and change your NTS configuration file.

CONFIG_NTS presents a series of screens for you to enter site-specific information to add hardware components to your configuration such as a LAN, an LTS Unit, or a host system. Your NTS Configuration Worksheet contains all the information required to use this utility painlessly. After you have created the configuration file, you can save, display, or spool it.

This chapter describes how to invoke the CONFIG_NTS utility, navigate between screens, and use the utility. Appendix A contains a step-by-step example of the CONFIG_NTS dialog generated to create and then edit a sample configuration.

Figure 6-1 shows the hierarchy of CONFIG_NTS screens, which are described separately throughout this chapter.
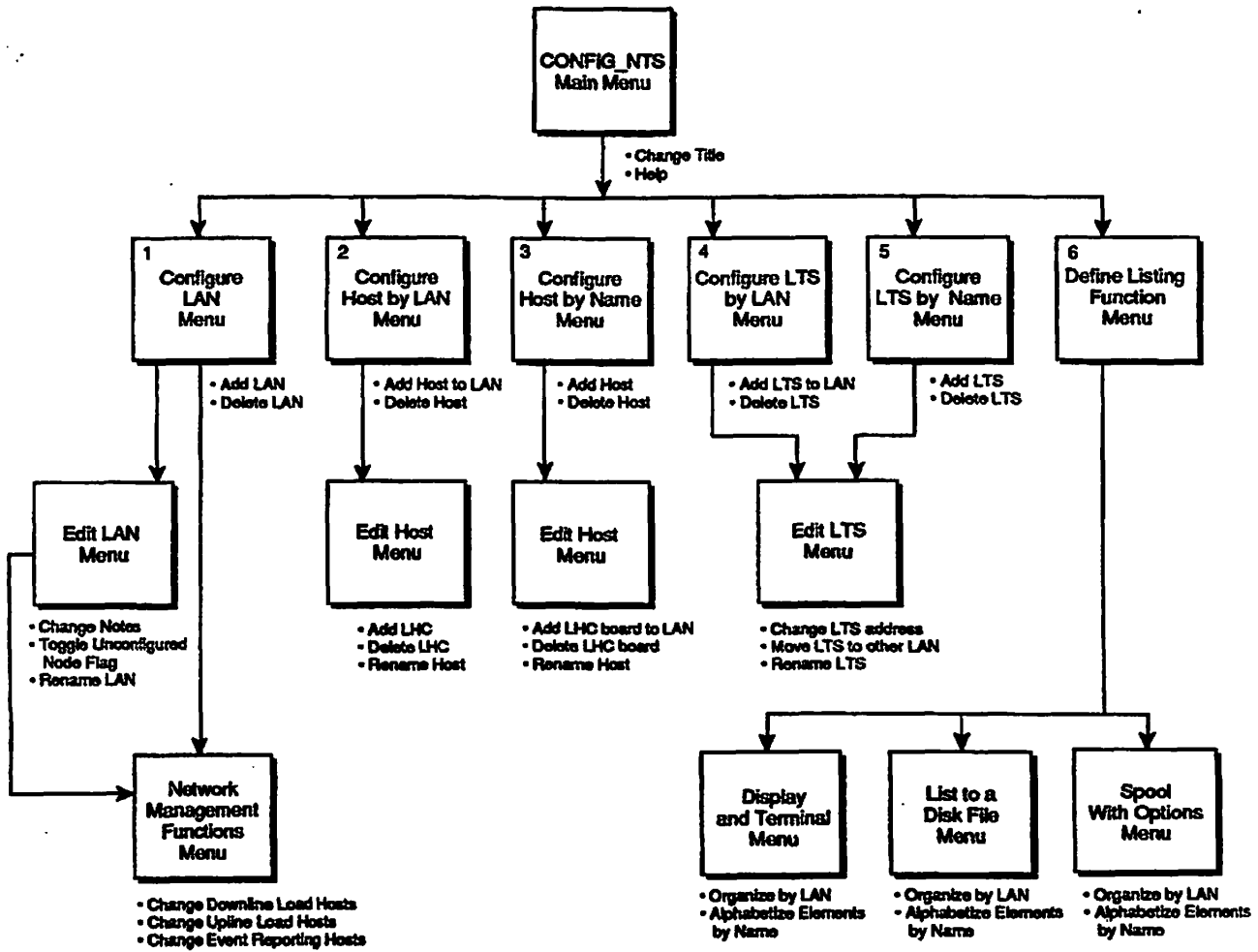
FIGURE 6-1.   Hierarchy of the CONFIG_NTS Menus

Special Characters

When you invoke the CONFIG_NTS utility, the software binds some commands to specific keys. Use these keys to navigate between screens, enter data, and confirm responses. At the bottom of each menu or screen display is a list of the special characters with their definitions that you can enter as a response to a configurator prompt.

Key	*Function*
;	Accepts your input to a field and moves you to the main prompt at the bottom of the screen instead of the next input field.
@	Returns you to the Main menu.
?	Displays help information.
BACK SPACE	Logically deletes the last character typed.
F	Returns you to the previous menu.
HELP	Displays help information on PT200, PT250, and PST100 terminals.
RETURN	Accepts the default value or your input.
Y	Confirm a choice.
N	Reject a choice
S	Saves the current configuration file to disk. Unless you select this option before you leave the program, the program discards all changes that you made during the program session.
Q	Closes the configuration file and terminates the program. The program warns you if changes have been made and will be lost, and prompts you for confirmation to quit.

THE CONFIG_NTS COMMAND

Use this command at the supervisor terminal to invoke the CONFIG_NTS utility. Members of the NETWORK_MGMT$ ACL group use CONFIG_NTS from any terminal. You must have delete, add, list, use, read, and write Access Control List (ACL) rights (DALURW). CONFIG_NTS displays an error message if it finds you have insufficient access rights.

Every command line option except -TERMINAL_TYPE is available from the Main menu.

Command Format

CONFIG_NTS -TERMINAL TYPE *type* [*pathname*] [-LANGUAGE *name*] $\left\{\begin{array}{l} \text{-CREATE} \\ \text{-EDIT} \\ \text{-LIST [\textit{outfile}]} \\ \text{-DISPLAY [-NO\_WAIT]} \\ \text{-SPOOL [\textit{spool\_options}]} \end{array}\right\}$

Options

-CREATE *filename.config*
-CR

Opens the specified filename and starts a configuration session. The default filename is NTS*>NTS.CONFIG. You can choose any filename provided you use the .config suffix. If you specsave the configuration file before you exit CONFIG_NTS, the utility deletes the file.

-DISPLAY [-NO_WAIT]

Displays the configuration file on your terminal's screen in a readable format. CONFIG_NTS pauses every 23 lines and displays the —More— prompt. Press Return to view the next screen of data, or enter Q or N to quit. If you want an uninterrupted display, include the -NO_WAIT suboption on the command line.

-EDIT
-ED

Opens an existing NTS configuration file and starts an editing session.

-LANGUAGE *name*
-LANG

Specifies the language to provide the user dialogue. The default name is English.

-LIST [*filename*]

Writes the configuration file into the specified *filename*. If you omit *filename*, the utility creates a default file configurationfilename.list.

-SPOOL *spool_options*

Spools the configuration file in a readable format to a printer. The following PRIMOS spool options are supported.

> **-AS** *alias*
> **-AT** *destination*
> **-COPIES** *number*
> **-DEFER** *time*
> **-FORM** *type*
> **-LNUM**
> **-NOHEAD**

-TERMINAL_TYPE *type*
-TTY

Specifies the type of terminal: PT250, PT200, PST 100, PT45, or TTY. Use TTY (teletype) for any other video or hard copy terminal. If you do not specify your terminal type on the command line, CONFIG_NTS checks your global variable .TTP and uses the value of the variable. If you do not use global variables, the utility scrolls through the prompts one line at a time.

Error Messages

If you enter an invalid configuration value, CONFIG_NTS displays an error message. On PT200, PT250, PST 100, and PT45 terminals, CONFIG_NTS displays this message on the bottom line of the screen and repositions the cursor in the field that had the error. On all other terminal types, CONFIG_NTS displays the error message and redisplays the prompt that had the error.

PROCEDURE

1. Fill out your NTS Configuration Worksheet

2. Issue the CONFIG_NTS command

3. At the `Enter the NTS configuration filename:` prompt, either type the full pathname or accept the default filename and press Return.

4. At the `The configuration file doesn't exist; OK to create it?`, enter **YES** to create a new configuration file or **NO** to re-enter the filename.

5. At the `Enter 1 or 2 lines of optional text to describe this configuration:` prompt, enter a brief description of your configuration. Press Return when you are done. If you type only one line of text, press Return twice.

6. Make the appropriate choices at the CONFIG_NTS Main menu display. Use the special characters to navigate between screens.

7. Enter **S** to save the configuration file before you exit the utility.

The CONFIG_NTS Main Menu

The CONFIG_NTS Main menu, shown in Figure 6-2, provides access to the main functions of the program. The following list provides a brief description of each selection.

```
CONFIG_NTS, Rev. 23.0          Edit config. file <MYSYS>NTS*>NTS.CONFIG

NTS.CONFIG IS FOR LAN-1, WHICH CONTAINS HOSTS A AND B,
AND LTS1 THROUGH LTS4.


      1. Configure LAN                H. Help
      2. Configure Host by LAN        S. Save current configuration
      3. Configure Host by Name       Q. Quit configuration session
      4. Configure LTS by LAN
      5. Configure LTS by Name
      6. Display, list or spool configuration
      7. Change configuration title


Enter selection:
```

FIGURE 6-2.   CONFIG_NTS Main Menu

Configure LAN
 Allows you to add, delete, or edit a LAN.

Configure Host by LAN
 Allows you add, delete, or edit multiple the hosts on the same LAN.

Configure Host by Name
 Allows you to add, delete, and edit multiple LANs on the same host.

Configure LTS by LAN
 Allows you add, delete, or edit multiple LTS units on the same LAN.

Configure LTS by Name
 Allows you to add, delete, edit individual LTS units.

Display, list or spool configuration
 Allows you to display the configuration on your terminal screen, write it to a disk file, or spool it to a printer.

Change configuration title
 Allows you to change the two-line description which appears on the top of the Main menu and the Configure LAN menu.

CONFIGURE LAN MENU

At the Main menu, enter 1 to select the Configure LAN menu shown in Figure 6-3. The menu lists any configured LANs or indicates that there are no existing LANS.

```
CONFIG_NTS, Revision 23.0                    Configuration file:
                                                   NTS*>NTS.CONFIG

NTS.CONFIG IS FOR LAN-1, WHICH CONTAINS HOSTS A AND B,
AND LTS1 THROUGH LTS4.

No lans are configured.

Enter:
     A to add a LAN                 F to finish (return to main menu)
                                    S to save current configuration
                                    Q to quit configuration session
Enter selection: [F]
```

FIGURE 6-3.   Configure LAN Menu

Note

If there is a previously-configured LAN, this menu also contains the Delete the Selected LAN and Edit the Selected LAN options.

The following list describes briefly the selections that can appear on this menu.

A   Add a LAN to the configuration.

D   Deletes the selected LAN, marked by the arrow on the menu, from the configuration without asking for verification.

E   Displays the Edit LAN menu for you to edit an existing LAN.

M   Displays the next screen of LANs. This selection appears if more than three LANs are configured.

P   Displays the previous screen of LANs. This selection appears if more than three LANs are configured and you are on the second (or a subsequent) screen.

number Applicable only if more than one LAN has been configured. This value appears in brackets next to the Enter selection: prompt. The number corresponds to a LAN on the menu. When you type the number for a LAN, the arrow moves to the configured LAN on the menu.

Note

Press Return to move the cursor to the next LAN in a list. Press Return at the end of the list to return to the Main menu.

Add a LAN

1. At the Configure LAN menu, enter A and press Return.

2. At the `Enter LAN name:` prompt, type the LAN name and press Return. The default name appears in brackets and has the format LAN300-*nn*, where *nn* is a number from 1 through 32. Press Return after the prompt to accept the default value.

Note

You must use the same LAN name in your PRIMENET configuration file, if you have one.

3. At the `Enter 1 or 2 lines of optional text to describe this LAN:` prompt, enter a brief description and press Return.

4. At the `Allow unconfigured nodes on this LAN?` prompt, enter YES if TCP/IP runs on the network or you want to allow unconfigured nodes. Enter NO if you want to restrict access to your network. Then press Return.

5. At the `Configure network management functions for this LAN?` prompt, enter YES to configure these functions for the LAN and press Return to proceed to the Network Management Menu. Enter NO if you do not wish to configure these functions.

6. To add mulitple LANs, repeat this procedure. When you have finished, type F and press Return to return to the Main Menu.

Network Management Menu: As shown in Figure 6-1, there are two ways to access the Network Management Function menu either directly from the Configure LAN menu or from the Edit LAN menu. Figure 6-4 shows the Network Management Functions menu.

```
Network management functions for the LAN are configured as follows:

    LTS Downline Load Hosts
        Primary  :
        Secondary:                    .

    LTS Upline Dump Hosts
        Primary  :
        Secondary:

    LTS Event Reporting Hosts
        Primary  :
        Secondary:

Enter:
  D to change downline load hosts    F to finish (return to prev menu)
  U to change upline dump hosts      S to save the current configuration
  E to change event reporting hosts  Q to quit the configuration session
```

FIGURE 6-4.   Network Management Functions Menu

The Network Management Functions menu shows the hosts currently configured for network management functions and list the following selections:

Selection   *Result*

D   Allows you to add or change the primary and secondary downline load hosts for the LAN.

U   Allows you to add or change the primary and secondary upline dump hosts for the LAN.

E   Allows you to add or change the primary and secondary event reporting hosts for the LAN.

Note

If you create a new configuration and you haven't added any hosts to the configuration, CONFIG_NTS displays this message and prompt:

host is not a configured host on *LAN*

Do you want to override errors due to unconfigured hosts?

Answer **YES** to the prompt.

To configure network management functions, select the appropriate letter and enter the correct host name. Repeat this step until you have finished. Enter an @ sign to return to the Main menu or **F** to return to the previous menu.

—

Delete a LAN

To delete a LAN without verification, enter **D** or the number of the LAN as it appears on screen and press Return.

Edit a LAN

To edit a LAN on your configuration, enter **E** or the number of the LAN as it appears on screen and press Return. The Edit LAN menu appears on the screen, illustrated in Figure 6-5.

```
CONFIG_NTS, Revision 23.0                          Edit LAN: LAN-2


The LAN is configured as follows:

    Notes:
      LAN IN BUILDING B
      ADDED MARCH 1990

    Physical LAN type:  IEEE 802.3 10M 500 meter LAN
    Unconfigured nodes allowed:  Yes
    Network management functions are not configured

Enter:
  N to change the notes            F to finish (return to prev menu)
  U to toggle the Unconfigured LTS flag  S to save the current configuration
  R to rename the LAN              Q to quit the configuration session
  M to configure ntwk mgmt functions
```

FIGURE 6-5.   Edit LAN Menu

The Edit LAN menu offers these selections:

Selection	Result
N	Allows you to change the two lines of text that describes this LAN.
U	Toggles the Unconfigured nodes allowed prompt between YES and NO.
R	Allows you to rename the LAN.
M	Displays the Network Management Functions menu.

Change the Notes: Perform the following procedure to change the text that appears on the Main menu and the Configure LAN menu.

1. Type N. The following prompt appears on the screen.

   `Enter 1 or 2 lines of (optional) text to describe this LAN:`

2. Type up to 80 characters of text on each line. Then press Return. The Edit LAN menu appears on the screen.

Note

Press Return twice if you enter only one line of text.

Toggle the Unconfigured LTS Flag: Type U to toggle the unconfigured LTS flag between YES and NO. The following message appears on the screen:

`Unconfigured nodes allowed:`*new value*

Then the Edit LAN menu appears on the screen.

Rename the LAN: Perform the following procedure to rename the LAN.

1. Type R to rename the LAN.

2. At the `Enter new LAN name:` prompt, type the LAN name and press Return. The Edit LAN menu appears on the screen.

CONFIGURE HOST BY LAN MENU

At the Main menu, enter type 2 to access the Configure Host by LAN menu. If you have more than one configured LAN selection, CONFIG_NTS displays the LAN Selection screen before you can access the Configure Host by LAN menu shown in Figure 6-6.

```
┌─────────────────────────────────────────────────────────────────────┐
│  CONFIG_NTS, Revision 23.0        Configure Host by LAN — LAN selection │
│                                                                       │
│  The following LANs are configured:                                   │
│                                                                       │
│  -> 1.  LAN-1                                                          │
│     2.  LAN-2                                                          │
│     3.  LAN-3                                                          │
│                                                                       │
│  Enter the item number of the LAN on which the host will be configured, or: │
│                            F to finish (return to main menu)           │
│                            S to save the current configuration         │
│                            Q to quit the configuration session         │
│                                                                       │
└─────────────────────────────────────────────────────────────────────┘
```
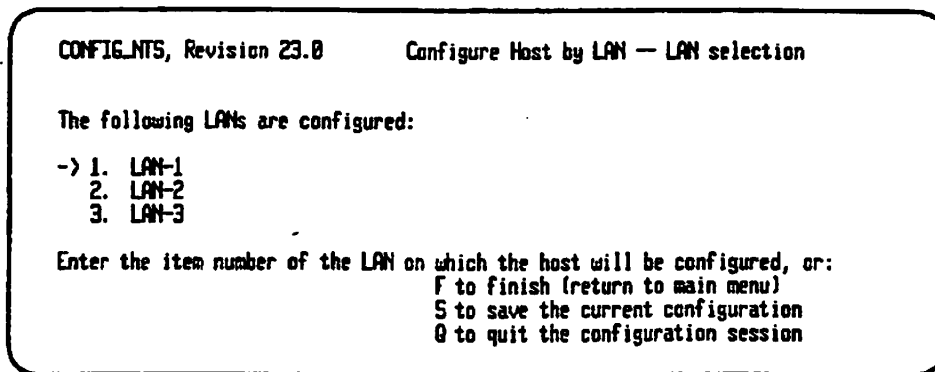
FIGURE 6-6.   LAN Selection Screen

Enter the LAN number and press Return twice to select the LAN.

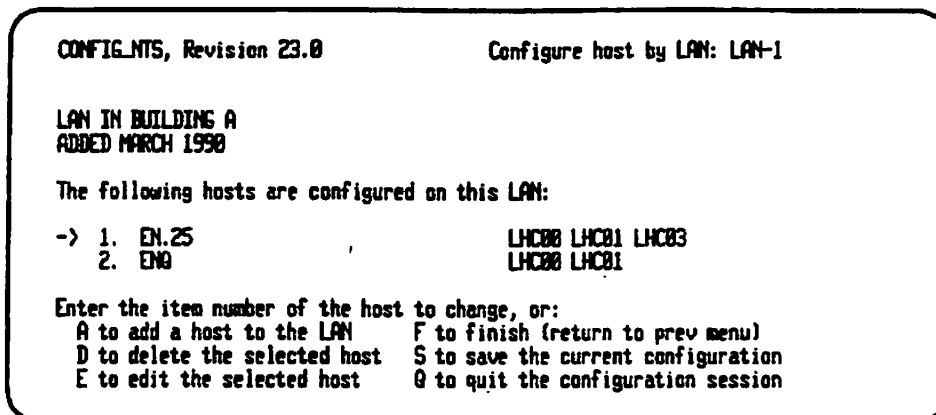The Configure Host by LAN menu appears on the screen, as shown in Figure 6-7.

```
┌─────────────────────────────────────────────────────────────────────┐
│  CONFIG_NTS, Revision 23.0              Configure host by LAN: LAN-1   │
│                                                                       │
│  LAN IN BUILDING A                                                    │
│  ADDED MARCH 1990                                                     │
│                                                                       │
│  The following hosts are configured on this LAN:                      │
│                                                                       │
│  -> 1.  EN.25                        LHC00 LHC01 LHC03                 │
│     2.  EN0                          LHC00 LHC01                       │
│                                                                       │
│  Enter the item number of the host to change, or:                     │
│    A to add a host to the LAN        F to finish (return to prev menu) │
│    D to delete the selected host     S to save the current configuration │
│    E to edit the selected host       Q to quit the configuration session │
│                                                                       │
└─────────────────────────────────────────────────────────────────────┘
```

FIGURE 6-7.   Configure Host by LAN Menu

The following list describes the configuration selections.

Selection	Result
A	Allows you to add a host to the LAN.
D	Deletes the selected host from the configuration.
E	Allows you to access the Edit Host menu to edit the configuration of the selected host.
M	Appears only if there are additional hosts.

P   Displays the previous screen of hosts. This selection is present only if you are on the second (or a subsequent) screen.

Add a Host

Perform the following procedure to add a host to the configuration for the selected LAN.

1. Type A at the Configure Host by LAN menu.

2. At the Enter host name: prompt, type the name of the host and press Return. The following prompt appears on the screen.

   Enter the (blank separated) list of LHCs that will be connected to this LAN:

   #### Note
   Do not enter the logical device numbers of LHC boards in the host that attach to other LANs. You must select the other LAN before you can configure the LHC boards to the host.

3. Type the logical device numbers of the LHC boards. If you have more than one LHC board in the host, separate each device number by a blank space. Press Return to redisplay the Configure Host by LAN menu.

Delete a Host

Perform the following procedure to delete a host from the configuration for the currently selected LAN but not from other LANS.

1. At the Configure Host by LAN menu, type the number that corresponds to the host. The arrow to the left of the hosts positions to the selected host.

2. Type D and press Return to delete the host. The program deletes the host without verification. Then the Configure Host by LAN menu reappears on the screen.

Edit Host Menu

Perform the following procedure to access the Edit Host menu.

1. At the Configure Host by LAN menu, type the number that corresponds to the host that you wish to edit and press Return. The arrow to the left of the hosts points to the selected host.

2. Type E to edit the LAN. The Edit Host menu appears on the screen, illustrated in Figure 6-8.

```
CONFIG_NTS, Revision 23.0                    Edit host: BIGBOY


The host is connected to LAN1 by the following host controllers:

    LHC00 LHC01

Enter:
    A to add an LHC          F to finish (return to prev menu)
    D to delete an LHC       S to save the current configuration
    R to rename the host     Q to quit the configuration session
```

FIGURE 6-8.   Edit Host Menu

The following list describes each edit selection.

Selection	Result
A	Allows you to add LHC boards to the host's configuration for the selected LAN.
D	Allows you to delete LHC boards from the host's configuration for the selected LAN.
R	Allows you to rename the host.

Add an LHC Board: Perform the following procedure to add an LHC board to a host for a selected LAN.

1. At the Edit Host menu, type A. The following prompt appears the screen:

   ```
   Enter the (blank separated) list of LHCs to add:
   ```

   Note

   Do not enter the logical device numbers of LHC boards in the host that attach to other LANs. You must select the other LAN before you can configure the LHC boards to the host.

2. Type the logical device numbers of the LHC boards. If you have more than one LHC board in the host, separate each device number by a blank space. Then press Return. The Edit Host menu reappears on the screen.

Delete an LHC: Perform the following procedure to delete a host's LHC board from the configuration for the currently selected LAN.

Note

You can configure multiple LHC boards per host. This selection does not delete a host's LHC board on another LAN.

1. At the Edit Host menu, type D. The following prompt appears on the screen:

   ```
   Enter the (blank separated) list of LHCs to delete:
   ```

Note

Do not enter the logical device numbers of LHC boards in the host that attach to other LANs. You must select the other LAN before you can delete the LHC boards from the host.

2. Type the logical device numbers of the LHC boards. To delete more than one LHC board of the host that connects to the LAN, separate each device number by a blank space. Then press Return. The Edit Host menu appears on the screen.

Rename the Host: Perform the following procedure to rename the host.

Note

This selection renames the host on all LANs.

1. At the Edit Host menu, type **R.**

2. At the `Enter new host name:` prompt, type the host name. Then press Return. The Edit Host menu appears on the screen.

CONFIGURE HOST BY NAME MENU

After you start CONFIG_NTS and access the Main menu, type **3** to access the Configure Host by Name menu, illustrated in Figure 6-9.

```
CONFIG_NTS, Revision 23.0                    Configure host by name


The following hosts are configured:

-) 1.  HOSTA
   2.  HOSTB
   3.  HOSTC

Enter the item number of the host to change, or:
   A to add a new host           F to finish
   D to delete the selected host  S to save the current configuration
   E to edit the selected host    Q to quit the configuration session
```

FIGURE 6-9.   Configure Host by Name Menu

The following list describes each configuration selection.

Selection   *Result*

A   Allows you to add a host to one or more LANs.

D   Deletes the selected host from the configuration.

E   Allows you to access the Edit Host menu to edit the configuration of the selected host.

M   ·   Appears only if there are more than one screen of hosts. Displays the next screen of hosts, if there is another one.

P   Displays the previous screen of hosts. This selection is present only if you are on the second (or a subsequent) screen.

Add a Host

Perform the following procedure to add a host to the configuration for one or more LANs.

1. Type **A** at the Configure Host by Name menu. The following prompt appears on the screen:

   `Enter the name of the LAN to which this host is connected:`

2. Type the name of LAN and then press Return.

3. At the `Enter host name:` prompt, type the name of the host. Then press Return. The following prompt appears on the screen:

   `Enter the (blank separated) list of LHCs that will be connected to this LAN:`

   Note

   Do not enter the logical device numbers of LHC boards in the host that attach to other LANs. The program prompts you for configuration of an additional LAN later in this procedure.

4. Type the logical device numbers of the LHC boards. If you have more than one LHC board of the host that connects to the LAN, separate each device number by a blank space. Then press Return. The following prompt appears on the screen:

   `Enter the name of the next LAN to which this host is attached:`

5. If you have an additional LAN to configure for the host, repeat this procedure from Step 2.

   If you do not have an additional LAN to configure for the host, press Return. The Configure Host by Name menu appears on the screen.

Delete a Host

Perform the following procedure to delete a host from the configuration.

Caution

You can configure a host to multiple LANs. This selection deletes a host from *all* LANs.

---

1. At the Configure Host by Name menu, type the number that corresponds to the host and press Return. The arrow to the left of the hosts positions to the selected host.

2. Type **D** and press Return to delete the host. The program deletes the host without verification. Then the Configure Host by Name menu appears on the screen.

Edit Host Menu

Perform the following procedure to access the Edit Host menu.

1. At the Configure Host by LAN menu, type the number that corresponds to the host that you wish to edit and press Return. The arrow to the left of the hosts points to the selected host. Press Return again.

2. Type **E** and press Return to select the Edit Host menu, illustrated in Figure 6-10.

```
CONFIG_NTS, Revision 23.8                    Edit host: HOSTA


The host is configured as follows:

   on LAN-1:                          LHC02
   on LAN-2:                          LHC00 LHC01 LHC03

Enter:
   A to add an LHC to a LAN           F to finish (return to prev menu)
   D to delete an LHC                 S to save the current configuration
   R to rename the host               Q to quit the configuration session
```

FIGURE 6-10.   Edit Host Menu

The following list describes the edit selections.

Selection	Result
A	Allows you to add LHC boards to the host's configuration for an existing LAN.
D	Allows you to delete LHCs from the host's configuration.
R	Allows you to rename the host.

When you have finished configuring the host, enter **F** to return to the previous menu.

Add an LHC Board. Perform the following procedure to add an LHC board to a host for a selected LAN.

1. At the Edit Host menu, type **A**. The following prompt appears the screen:

   Enter the LAN to which the host is connected:

2. Type the name of the LAN and press Return. The following prompt appears on the screen:

   ```
   Enter the (blank separated) list of LHCs to add:
   ```

3. Type the logical device numbers of the LHC boards. If you have more than one LHC board of the host that connects to the LAN, separate each device number by a blank space. Then press Return. The Edit Host menu appears on the screen.

Delete an LHC: Perform the following procedure to delete a host's LHC board from the configuration.

1. At the Edit Host menu, type **D.** The following prompt appears on the screen:

   ```
   Enter the (blank separated) list of LHCs to delete:
   ```

2. Type the logical device numbers of the LHC boards. To delete more than one LHC board of the host, separate each device number by a blank space. Then press Return . The Edit Host menu appears on the screen.

Rename the Host: Perform the following procedure to rename the host.

Note

This selection renames the host on all LANs.

1. At the Edit Host menu, type **R.**

2. At the `Enter new host name:` prompt, type the host name. Then press Return. The Edit Host menu appears on the screen.

CONFIGURE LTS BY LAN MENU

After you start CONFIG_NTS and access the Main menu, type **4** to access the Configure LTS by LAN menu. If you have more than one configured LAN selection, CONFIG_NTS displays the LAN Selection screen before you can access the Configure LTS by LAN menu. Figure 6-11 shows the LAN Selection screen. The LAN Selection screen allows you to select the LAN for which you want to configure hosts.

```
CONFIG_NTS, Revision 23.0        Configure LTS by LAN -- LAN selection


The following LANs are configured:

-> 1.  LAN-1
   2.  LAN-2
   3.  LAN-3
   4.  LAN-4
   5.  LAN-5

Enter the item number of the LAN on which the LTS will be configured,  or:
                            F to finish (return to main menu)
                            S to save the current configuration
                            Q to quit the configuration session
```

FIGURE 6-11.   LAN Selection Screen

Either press Return to select the LAN marked by the arrow or enter the number that corresponds to the LAN for which you want to configure hosts and press Return twice.

The Configure LTS by LAN menu appears on the screen, as shown in Figure 6-12.

```
CONFIG_NTS, Revision 23.0             Configure LTS by LAN: LAN-1

LAN IN BUILDING A
ADDED MARCH 1990


The following LTSs are configured on this LAN:

-> 1.  LTS1                        00-00-2F-00-00-01
   2.  LTS2                        00-00-2F-00-00-03
   3.  LTS3                        00-00-2F-00-00-04
   4.  LTS4                        00-00-2F-00-00-06
   5.  LTS5                        00-00-2F-00-00-07
   6.  LTS6                        00-00-2F-00-00-05
   7.  LTS7                        00-00-2F-00-00-02

Enter the item number of the LTS to change, or:
   A to add an LTS to the LAN    F to finish (return to prev menu)
   D to delete the selected LTS  S to save the current configuration
   E to edit the selected LTS    Q to quit the configuration session
```

FIGURE 6-12.   Configure LTS by LAN Menu

The following list describes the configuration selections.

Selection   Result

A   Allows you to add an LTS unit to the LAN.

D	Deletes the currently selected LTS unit (the one marked by the arrow) from the configuration.
E	Allows you to access the Edit LTS menu to modify the configuration for a selected LTS unit.

Add an LTS to a LAN

Perform the following procedure to add an LTS unit to the configuration for the selected LAN.

1. Type A at the Configure LTS by LAN menu and press Return.

2. At the Enter LTS name: prompt, type the name of the LTS unit and press Return. The following prompt appears on the screen:

   Enter LTS address (nn-nn-nn): 08-00-2F-

3. Type the last six digits of the LTS unit's address in the format *nn-nn-nn* and press Return. The Configure LTS by LAN menu appears on the screen.

Delete an LTS Unit

Perform the following procedure to delete an LTS unit from the configuration.

1. At the Configure LTS by LAN menu, type the number that corresponds to the LTS unit and press Return. The arrow to the left of the LTS units moves to the selected LTS unit.

2. Type D to delete the LTS unit. The program deletes the LTS unit without verification. Then the Configure LTS by LAN menu appears on the screen.

Edit LTS Menu

Perform the following procedure to access the Edit Host menu.

1. At the Configure LTS by LAN menu, type the number that corresponds to the LTS unit that you wish to edit and press Return. The arrow to the left of the LTS units points to the selected LTS unit. Press Return again.

2. Type E and press Return to select the Edit LTS menu, illustrated in Figure 6-13.

```
CONFIG_NTS, Revision 23.0                    Edit LTS: LTS1


The LTS is configured as follows:

    LAN:     LAN-1

    Address: 08-00-2F-0F-00-07

Enter:
  A to change the LTS address        F to finish (return to prev menu)
  M to move this LTS to another LAN  S to save the current configuration
  R to rename the LTS                Q to quit the configuration session
```

FIGURE 6-13.   Edit LTS Menu

The following list describes the edit selections.

Selection	Result
A	Allows you to change the address of the LTS unit.
M	Allows you to assign the LTS unit to a different LAN.
R	Allows you to rename the LTS unit.

When you finish the edit of the LTS unit configuration, enter F to return to the previous menu.

Change the Address of an LTS Unit: Perform the following procedure to change the address of an LTS unit

1. Type A and press Return. The following prompt appears on the screen:

   Enter new LTS address: 08-00-2F

2. Type the last six digits of the LTS unit's address in the format *nn-nn-nn* and press Return. The Edit LTS menu appears on the screen.

Assign the LTS unit to another LAN: Perform the following procedure to assign the selected LTS to an existing LAN in the configuration.

1. Type M at the Edit LTS menu and press Return. The following prompt appears on the screen:

   Enter LAN name to which to move this LTS:

2. Type the LAN name and press Return. The Edit LTS menu appears on the screen:

Rename the LTS Unit: Perform the following procedure to rename the selected LTS unit.

1. Type R at the Edit LTS menu and press Return.

2. At the Enter new LTS name: prompt, type the name of the LTS unit and press Return. The Edit LTS menu appears on the screen.

CONFIGURE LTS BY NAME MENU

After you start CONFIG_NTS and access the Main menu, type 5 to access the Configure LTS by Name menu, illustrated in Figure 6-14.

```
CONFIG_NTS, Revision 23.0              Configure LTS by name


The following LTSs are configured:

-> 1. LTS0                        00-00-2F-00-0F-0C
                                    on LAN-1
   2. LTS1                        00-00-2F-0F-0F-0F
                                    on LAN-1
   3. LTS2                        00-00-2F-00-00-01
                                    on LAN-1
   4. LTS3                        00-00-2F-00-00-02
                                    on LAN-1
   5. LTS5                        00-00-2F-00-00-03
                                    on LAN-1

Enter the item number of the LTS to change, or:
  A to add an LTS            F to finish (return to prev menu)
  D to delete the selected LTS   S to save the current configuration
  E to edit the selected LTS   Q to quit the configuration session
  M for more LTSs (next page)
```

FIGURE 6-14.   Configure LTS by Name Menu

This screen displays all the LTS units in the configuration, along with their addresses and the LAN to which they are attached. The following list describes the configuration selections.

Selection	Result
A	Allows you to add an LTS unit to a LAN.
D	Deletes the currently selected LTS unit (the one marked by the arrow) from the configuration.
E	Allows you to access the Edit LTS menu to modify the configuration for a selected LTS unit. For more information on the Edit LTS menu, refer to the Edit LTS Menu subsection under the Configure LTS by LAN Menu section earlier in this chapter.

Add an LTS to a LAN

Perform the following procedure to add an LTS unit to the configuration.

1. Type **A** at the Configure LTS by Name menu and press Return. The following prompt appears on the screen:

   Enter the name of the LAN to which this LTS is connected:

2. Type the name of the LAN and press Return.

3. At the Enter LTS name: prompt, type the name of the LTS unit and press Return. The following prompt appears on the screen:

   Enter LTS address (nn-nn-nn): 08-00-2F-

4. Type the last six digits of the LTS unit's address in the format *nn-nn-nn* and press Return. The Configure LTS by Name menu appears on the screen.

Delete an LTS Unit

Perform the following procedure to delete an LTS unit from the configuration.

1. At the Configure LTS by Name menu, type the number that corresponds to the LTS unit and press Return. The arrow to the left of the LTS units moves to the selected LTS unit.

2. Type **D** to delete the LTS unit. The program deletes the LTS unit without verification. Then the Configure LTS by Name menu appears on the screen.

SAVE A CONFIGURATION SELECTION

Selection **S** on the CONFIG_NTS Main menu, Save Current Configuration, saves the configuration file on disk. The **S** selections on the other menus also perform the same function. Unless you save the configuration on disk before you quit from the CONFIG_NTS program, the program discards any changes you made during the session. Perform the save operation frequently to protect your work in case of system crash or terminal hangup.

During the save operation, CONFIG_NTS checks the configuration file for inconsistencies, such as Network Management Functions configured for a host not included in the configuration. CONFIG_NTS informs you when it finds an inconsistency. You can then abort the save operation to correct the fault, or continue to collect all the inconsistencies. In either case, you are returned to the Main menu so that you can make the corrections.

LTS configuration changes take effect dynamically when you save the configuration if you are at the supervisor terminal or are a member in the network management ACL group (.NETWORK_MGT$). CONFIG_NTS automatically updates the LTS portion of the NTS online database and displays this message:

```
Configuration saved; active configuration updated.
```

During the save operation, CONFIG_NTS adds the following information to the configuration file:

- NTS configuration file identification

  This information is a character string and a simple checksum that serve to identify the file as an NTS configuration file. Both CONFIG_NTS and START_NTS check this information before using an NTS configuration file and reject files that do not have it.

- File format revision level

  The file format revision level identifies the software release for which the configuration file was created. This will be used if future software releases require older configuration files to be converted, or updated, before they are used.

- Creation date and time stamps

  The creation date and time stamps document the date and time when the file was created. They also show the name of the administrator who created the file. CONFIG_NTS displays these stamps when you begin to edit the file and in listings of the file.
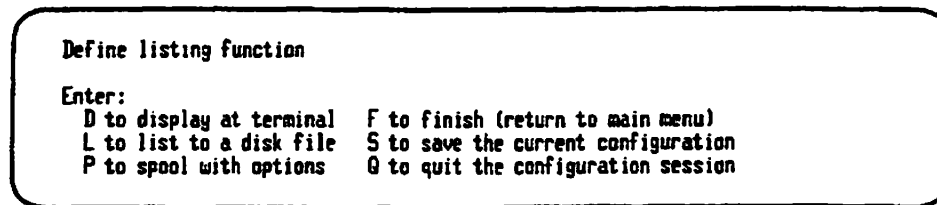
- Last edit date and time stamps

  These stamps show the time and date when the file was last edited, along with the name of the administrator who performed the edit. CONFIG_NTS displays this information when you begin to edit the file and in listings of the file.

DEFINE LISTING FUNCTION MENU

To display, list, or spool the configuration file, type 6 on the CONFIG_NTS Main menu. The Define Listing Function menu appears on the screen, illustrated in Figure 6-15. This menu allows you to display the configuration file on your terminal, write it to a disk file, or spool it to a printer. The -DISPLAY, -LIST, and -SPOOL command line options, described in the section entitled Invoking CONFIG_NTS earlier in this chapter, serve the same functions.

Note

Although NTS configuration files are segment directories, this selection presents them in a readable format.

```
Define listing function

Enter:
    D to display at terminal   F to finish (return to main menu)
    L to list to a disk file   S to save the current configuration
    P to spool with options    Q to quit the configuration session
```

FIGURE 6-15.   Define Listing Function Menu

This screen offers you the following selections:

Selection	Function
D	Displays the configuration file on your terminal in segments of 23 lines followed by a —More— prompt. Press Return to view the next screen of the configuration, or enter N or Q to terminate the display.
L	Writes the configuration file into a readable text file on disk. CONFIG_NTS prompts you to name this file. The default name for this file is the name of the configuration file with the .CONFIG suffix (if any) removed and the .LIST suffix appended.
P	Sends the configuration file to the spool queue for printing. CONFIG_NTS prompts you for options, then passes on these options as keywords and parameters to the SPOOL command. The configuration file is broken up into 54-line segments to correspond to the usual page size.

The remainder of the selections, F, S, and Q, are the same as for the other screens in the program.

No matter which listing function you choose (display, list, or spool), CONFIG_NTS prompts you for the report format, as illustrated in Figure 6-16.
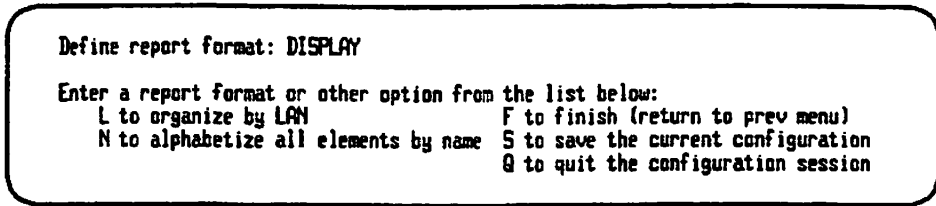
```
┌─────────────────────────────────────────────────────────────────┐
│  Define report format: DISPLAY                                    │
│                                                                   │
│  Enter a report format or other option from the list below:      │
│      L to organize by LAN              F to finish (return to prev menu) │
│      N to alphabetize all elements by name  S to save the current configuration │
│                                        Q to quit the configuration session │
└─────────────────────────────────────────────────────────────────┘
```

FIGURE 6-16.   Define Report Format Menu

This screen offers you the following selections:

Selection	Function
L	Organizes the display by LAN, with sections for all the hosts and LTS units connected to each LAN.
N	Alphabetically lists all elements of the configuration, including LANs, hosts, and LTS units.

The remainder of the selections, F, S and Q, are the same as for the other screens in the program.

Listing Organized by LAN

This section contains an example of a listing organized by LAN. There is a separate section for each LAN, with subsections for the hosts and LTS units that attach to the LAN.

```
CONFIG_NTS Revision 23.0              Dump of configuration file:
                                           NTS*>NTS.CONFIG


CONFIGURATION FOR LAN-1
BACKUP IN BACKUP>NTS

File created on 17 Mar 90 at 18:32 by SYSADMIN




                  - - - LAN: LAN-1 - - -

LAN IN BUILDING A
ADDED MARCH 1990

Physical LAN type:  IEEE 802.3 10M 500 meter LAN
Unconfigured nodes are permitted.

Network management functions:

                      Primary          Secondary
LTS Downline Load     HOSTA            HOSTB
LTS Upline Dump       HOSTA            HOSTB
LTS Event Reporting   HOSTA            HOSTB
ENR              ENS
Host name                       LHCs
```

```
---------------------------------    -------------------
HOSTA                                LHC00 LHC01 LHC02 LHC07
HOSTB                                LHC00
HOSTC                                LHC00



LTS name                             Address
---------------------------------    -------------------
LTS1                                 08-00-2F-00-00-00
LTS2                                 08-00-2F-00-00-01
LTS3                                 08-00-2F-00-00-03
LTS4                                 08-00-2F-00-00-05
LTS5                                 08-00-2F-00-00-04
```

Alphabetically Organized Listing

This section contains an alphabetically organized listing of a configuration file. In this type of listing, all the elements of the configuration file are listed alphabetically. These elements include LANs, hosts, and LTS units.

```
CONFIG_NTS Revision 23.0                     Dump of configuration file:
                                                  NTS*>NTS.CONFIG


CONFIGURATION FOR LAN-1
BACKUP IN BACKUP>NTS

File created on 17 Mar 90 at 18:32 by SYSADMIN

         - - - Alphabetized Listing of Configuration Elements - - -


Name                                 Description
---------------------------------    -------------------------------------
HOSTC                                Host  on LAN LAN-1: LHC00
HOSTA                                Host  on LAN LAN-1:
                                          LHC00 LHC01 LHC02 LHC07
HOSTB                                Host  on LAN LAN-1: LHC00
LAN-1                                LAN   (IEEE 802.3 10M 500 meter LAN)
LTS1                                 LTS   on LAN LAN-1
                                          (08-00-2F-00-00-00)
LTS2                                 LTS   on LAN LAN-1
                                          (08-00-2F-00-00-01)
LTS3                                 LTS   on LAN LAN-1
                                          (08-00-2F-00-00-03)
LTS4                                 LTS   on LAN LAN-1
                                          (08-00-2F-00-00-04)
LTS5                                 LTS   on LAN LAN-1
                                          (08-00-2F-00-00-05)
```

TERMINATING CONFIG_NTS

Type **Q** on the CONFIG_NTS Main menu to terminate CONFIG_NTS. Before you exit the program, the program prompts you for confirmation.

Note

The program discards any changes that you made since the last save operation when you leave the program.

If you want to save your work, always enter S, Save Current Configuration, before you terminate CONFIG_NTS.

HOW TO START NTS

After you save a new NTS configuration file, cold start the system.

If NTS is currently running on your system and you save an edited configuration file, only LTS configuration changes take effect dynamically (automatically). CONFIG_NTS displays this message after it updates the NTS online database:

    Configuration saved; active configuration updated.

The **active configuration** is the one that is loaded into the NTS database.

Note

Dynamic updates occur only if you are at the supervisor terminal or are a member of the .NETWORK_MGMT$ network management Access Control List group (ACL group).

To make LAN and host configuration changes take effect when NTS is running on the system, the network operator must

1. Stop each Prime host on the network with the STOP_NTS command.

2. Restart each host with the START_NTS command, using the name of the new configuration file as an argument.

START_NTS loads the updated configuration file into the NTS online database. Stop and restart only hosts that require the configuration changes.

MONITORING NTS

This chapter describes three commands that monitor NTS: LIST_LHC_STATUS, LIST_LTS_STATUS, and LOOPBACK.

THE LIST_LHC_STATUS COMMAND

The LIST_LHC_STATUS command displays status information for any LHC board on the network. The LIST_LHC_STATUS command returns three levels of screen information for an individual LHC board:

Screen   *Description*

PERFORMANCE   Provides identification and performance data

CONNECTION   Provides summary and specific connection data

MANAGEMENT   Provides system and network management statistics

Command Format

$$
\text{LIST\_LHC\_STATUS} \left\{ \begin{array}{l} \text{-PERFORMANCE} \\ \text{-CONNECTION} \\ \text{-MANAGEMENT} \\ \text{-ALL} \\ \text{-HELP} \end{array} \right. \left[\begin{array}{l} \text{-DLHC} \\ \text{-DNN} \\ \text{-DNA} \\ \text{-LN} \end{array} \right] \left. \right\} \text{[-FREQ } F\text{] [-TIMES } T\text{] [-NW]}
$$

Parameters

Select one of the following screen types. A detailed example of each screen type follows the list of options.

-PERFORMANCE
-PERF

 Provides identification and performance data including statistics returned by the Medium Access Control (MAC) layer, Logical Link Control (LLC) layer, and the operating system.

-CONNECTION *type*
-CONN

 Provides a summary of all active connections and returns Session layer statistics for individual connections. You can specify *type* as either PRIMENET or NTS. If you do not specify *type*, the display includes information on both types of connections.

Note

 This display contains an entry for every active connection up to the maximum of 288 concurrent connections. To capture this large amount information in a file for easier use, open a COMO file first and issue the command with the -NW option.

-MANAGEMENT
-MGMT

 Provides system and network management statistics including current CPU utilization, I/O bus traffic rates, and error conditions.

-ALL

 Provides the summary portion of the connection display and the complete performance and management screens (default).

-HELP
-H

 Displays the format of this command and a list of options. When you select -HELP all other options are ignored.

Options

-DEST_NODE_NAME *host*
-DNN

 Specifies the unique host name where the LHC board resides. This six character name is assigned during configuration. To identify a specific LHC board on the host, use -DNN in combination with either the -DLHC or -LN option. If you do not specify an individual LHC board, the host's default LHC board is selected. Do not specify the -DNN option with the -DNA option.

-DEST_NODE_ADDRESS *address*
-DNA

 Identifies the LHC board's hexadecimal device address with either the short format, nn-nn-nn, or the long format, nn-nn-nn-nn-nn-nn. This address is assigned by the manufacturer and is used during configuration. All Prime LHC addresses begin with the three-digit string 08-00-2F-. When you use the short form, the command enters Prime prefix automatically. Do not use the -DNA option with either the -DNN, -DLHC, or -LN options.

-DEST_LHC_NUMBER *number*
-DLHC

Used with the -DNN option to identify the logical LHC number for a specific board on a particular host. *number* is an octal number that ranges from 0 to 7 and is assigned by the PRIMOS LHC configuration directive. Do not use the -DLHC option with the -DNA or LN options.

-LAN_NAME *lan*
-LN

Specifies the 32 character name used during configuration to identify the name of the LAN to which the LHC board is attached. Use this option when you do not know the LHC board's address or logical LHC number. Do not use the -LN option with either the -DNA or the -DLHC options.

-FREQUENCY *seconds*
-FREQ

Specifies the automatic sampling rate in *seconds*.

-NO_WAIT
-NW

Suppresses the --MORE-- prompt. Use the -NW option whenever you include the command in a CPL program or a .COMO file.

-TIMES *number*

Specifies the total *number* of times to repeat the sample.

The LIST_LHC_STATUS Performance Screen

The following command line generates the Performance screen shown in Figure 7-1. A description of each field follows the illustration.

    OK, LIST_LHC_STATUS -PERFORMANCE -DNN HOST1 -DLHC 2

```
[LIST_LHC_STATUS Rev. 21.0 Copyright (c) 1987, Prime Computer, Inc.]
Host Name: HOST1          LHC Number:  02   Address: 08-00-2F-00-01-02
Hw/Fw Rev: 08.00/02.14    Slot Number: 13   Device Address: 32

State    : OPERATIONAL          Active Protocols: PRIMENET/NTS
LAN Name : LAN1
Load File: <LNMPAK>DOWNLINE_LOAD*>LHC.DL
Load File Rev: 01.01
Performance Statistics                        Count
_____

Active connections                          : 5
Frames transmitted                          : 8014
Frames transmitted with error               : 6
Frames retransmitted                        : 6
Frames received                             : 11118
Frames received with network (CRC/Alignment) error : 0
Frames lost due to internal (resource) error : 1
Percent CPU idle time                       : 89.3%
Current percent data buffer availability    : 96.4%
Lowest  percent data buffer availability    : 95.8%
Alarms reported                             : 0
OK,
```

FIGURE 7-1.   LIST_LHC_STATUS Performance Screen

Host Name
The name of the local 50 Series host.

LHC Number
The logical LHC controller number of the LHC board specified by the -DLHC option.

Address
The 12-digit hexadecimal address of the LHC board.

Hw/Fw Rev
Hardware and firmware revision levels of the LHC board.

Slot Number
The slot number of the LHC board in the backplane of the 50 Series host.

Device Address
The device address of the LHC board in the configuration file.

State
The current condition of the LHC board. OPERATIONAL is the only state at this time.

Active Protocols
The communications protocols currently active on the LHC board.

LAN Name
The name of the LAN to which this LHC board attaches.

Load File
The filename of the LHC board downline load file.

Load File Rev
The revision of the LHC board downline load file.

Active connections
The number of link layer connections currently active on the LHC board.

Frames transmitted
The number of link layer frames that the LHC board transmitted.

Frames transmitted with error
The number of link layer frames that the LHC board transmitted with error. This statistic implies that the LHC board detects a physical network error (for example, carrier loss or too many collisions) while sending a frame and aborted the transmission.

Frames retransmitted
The number of link layer frames not received by the destination that the LHC board retransmitted.

Frames received
The number of link layer frames that the LHC board received.

Frames received with network (CRC/Alignment) error
The number of link layer frames received by the LHC with CRC or alignment errors.

Frames lost due to internal (resource) error
The number of link layer frames dropped by the LHC because it was unable to allocate the resources (for example, buffer space) necessary to receive frames.

Percent CPU idle time
A percentage value that indicates the amount of time that the LHC CPU was not occupied processing network activity.

Current percent data buffer availability
A percentage value that indicates the amount of data buffer space currently available for use on the LHC board.

Lowest percent data buffer availability
A percentage value that indicates the lowest amount of data buffer space available on the LHC board since it began operation.

Alarms reported
The number of alarms that the LHC board reported.

The LIST_LHC_STATUS Connection Screen

The following command line generates the Connection screen shown in Figure 7-2. A description of each field follows the illustration.

OK, <u>LIST_LHC_STATUS -CONNECTION -DNA 00-01-02</u>

```
[LIST_LHC_STATUS Rev. 21.0 Copyright (c) 1987, Prime Computer, Inc.]
Host Name: HOST1         LHC Number: 02     Address: 08-00-2F-00-01-02

Current active connections   : 5    Total connection count : 25
Current active multicast addr: 3    Greatest connection count   : 7

Primenet active connections  : 2    NTS active connections  : 3
Primenet inactive connections: 4    NTS transitional connections: 0

ACTIVE CONNECTIONS
Type      State    Line no   Remote Station        Data Characters Tx/Rx
PRIMENET  Active    —        HOST2/LHC00           82674/109363
PRIMENET  Active    —        HOST3/LHC07           871/1982
NTS       Active   1024      LTS1/PORT1            197/276
NTS       Active   1025      LTS1/PORT5            87/285
NTS       Connect  1026      LTS1/PORT6            15/34
```

FIGURE 7-2.   LIST_LHC_STATUS Connection Screen

Host Name
 The name of the local 50 Series host.

LHC Number
 The logical LHC number of the LHC board specified by the -DLHC option.

Address
 The 12-digit hexadecimal address of the LHC board.

Current active connections
 The number of link layer connections currently active on the LHC board.

Current active multicast addr
 The number of link layer multicast addresses currently active on the LHC board.

Total connection count
 A cumulative count of active connections on the LHC board since it began operation.

Greatest connection count
 The largest number of active connections on the LHC board at any one time.

PRIMENET active connections
 The number of PRIMENET link layer connections currently active on the LHC board.

PRIMENET inactive connections

The number of configured but inactive PRIMENET link layer connections to hosts.

NTS active connections

The number of NTS link layer connections currently active on the LHC board.

NTS transitional connections

The number of NTS link layer connections currently in transition on the LHC board. The connection is either connecting to or disconnecting from the LHC board and cannot be counted as active.

ACTIVE CONNECTIONS

A list of currently active PRIMENET and NTS connections on the LHC board.

Type

The type of the connection, that is PRIMENET or NTS.

State

The state of the connection. The states are Active, Connecting, or Disconnecting.

Line no

The PRIMOS line number that associates with the NTS connection at the local 50 Series host. This field has no meaning for PRIMENET connections.

Remote Station

The remote station at the other end of the connection. For PRIMENET connections, this field identifies the remote 50 Series host and LHC board number for the current connection. For NTS connections this field identifies the remote LTS and port number the current connection.

Data Characters Tx/Rx

The number of data characters that the LHC board transmitted and received.

The LIST_LHC_STATUS Management Screen

The following command line generates the Management screen shown in Figure 7-3. A description of each field follows the illustration.

OK, LIST_LHC_STATUS -MANAGEMENT -DNN HOST1 -LAN_NAME LAN1

```
[LIST_LHC_STATUS Rev. 21.0 Copyright (c) 1987, Prime Computer, Inc.]
Host Name: HOST1        LHC Number: 02      Address: 08-00-2F-00-01-02

OPERATING SYSTEM STATISTICS
  Running Time: 00:05:41:16
  Percent CPU Usage  —  Idle: 89.3%
    LLC: 86.2%      Primenet: 01.6%    NTS: 02.4%   Net Mgmt: 00.5%
  Error Counts  —  Total: 0
    Correctable memory errors: 0          Watchdog timer expired: 0

  Active I/O Bus connections: 7
    I/O Bus buffers Tx/Rx   : 5866/5824
    I/O Bus commands Tx/Rx  : 324/12
    I/O Bus bytes Tx/Rx     : 1205441/179696

NETWORK MANAGEMENT STATISTICS
  Alarms reported  —  Total: 0
    Logged: 0    Suppressed: 0    Dropped: 0
    OS: 0    LLC: 0    Primenet: 0    NTS: 0    Net Mgmt: 0

  Primary management support: MANAGEMENT    NTS    PRIMENET
  Primary NTS support       : LOG          DUMP   BOOT
OK,
```

FIGURE 7-3.   LIST_LHC_STATUS Management Screen

Host Name
The name of the local 50 Series host.

LHC Number
The logical LHC number of the LHC board specified by the -DLHC option.

Address
The 12-digit hexadecimal address of the LHC board.

OPERATING SYSTEM STATISTICS
A set of statistics that relate to the LHC board's operating system.

Running Time
The running time of the LHC board in days, hours, minutes, and seconds.

Percent CPU Usage

Indicates the current CPU usage of the LHC. The total CPU usage values are separated into percentages of Idle, LLC, PRIMENET, NTS, and Network Management activity. CPU usage is measured over the time period since the last LIST_LHC_STATUS command retrieved this information.

Error Counts

Total identifiable error conditions detected including Total errors, Correctable memory errors, and Watchdog timer expired.

Active I/O Bus Connections

The number of currently active I/O bus connections that traverse the local 50 Series host backplane to the LHC board.

I/O Bus buffers Tx/Rx

The number of data buffers that the LHC board transmitted and received across the active I/O bus connections.

I/O Bus commands Tx/Rx

The number of commands that the LHC board transmitted and received across the active I/O bus connections.

I/O Bus bytes Tx/Rx

The number of data bytes that the LHC board transmitted and received across the active I/O bus connections.

NETWORK MANAGEMENT STATISTICS

Statistics that relate to the LHC network management services.

Alarms reported

The number of alarm conditions reported. The types of alarm counts are Total, Logged, Suppressed, Dropped, Operating System, LLC, PRIMENET, NTS, and Network Management.

Primary management support

An indication of the primary network management responsibilities. Management support includes MANAGEMENT, NTS, and PRIMENET.

Primary NTS support

An indication of the primary NTS services provided including LOG, DUMP, and BOOT services.

THE LIST_LTS_STATUS COMMAND

The LIST_LTS_STATUS command displays status information for any LTS unit on the network. The LIST_LTS_STATUS command returns three levels of screen information for an individual LTS unit:

Screen   *Description*

PERFORMANCE   Provides identification and performance data

CONNECTION   Provides summary and specific connection data

MANAGEMENT   Provides system and network management statistics

Command Format

$$
\text{LIST\_LTS\_STATUS}
\left\{
\begin{array}{l}
\text{-PERFORMANCE}\\
\text{-CONNECTION}\\
\text{-MANAGEMENT}\\
\text{-ALL}\\
\text{-HELP}
\end{array}
\right\}
\left\{
\begin{array}{l}
\text{-DNN}\\
\text{-DNA}
\end{array}
\right\}
\quad
\text{[-NO\_WAIT]}
$$

Parameters

Select one of the following screen types. A detailed example of each screen type follows the list of options.

-PERFORMANCE
-PERF
   Provides identification and performance data including statistics returned by the Medium Access Control (MAC) layer, Logical Link Control (LLC) layer, and the operating system.

-CONNECTION *type*
-CONN
   Provides a summary of all active connections and returns Session layer statistics for individual connections. You can specify *type* as either PRIMENET or NTS. If you do not specify *type*, the display includes information on both types of connections.

-MANAGEMENT
-MGMT
   Provides system and network management statistics including current CPU utilization, I/O bus traffic rates, and error conditions.

-ALL

Provides the summary portion of the connection display and the complete performance and management screens (default).

-HELP

-H

Displays the format of this command and a list of options. When you select -HELP all other options are ignored.

Options

-DEST_NODE_NAME *name*

-DNN

Specifies the unique, sixteen-character name assigned to the LTS unit during configuration. Do not specify the -DNN option with the -DNA option.

-DEST_NODE_ADDRESS *address*

-DNA

Identifies the LTS unit's hexadecimal device address with either the short format, nn-nn-nn, or the long format, nn-nn-nn-nn-nn-nn. This address is assigned by the manufacturer and is used during configuration. All Prime LTS addresses begin with the three-digit string 08-00-2F-. When you use the short form, the command enters Prime prefix automatically. Do not use the -DNA option with either the -DNN option.

-NO_WAIT

-NW

Suppresses the --MORE-- prompt. Use the -NW option whenever you include the command in a CPL program or a .COMO file.

The LIST_LTS_STATUS Performance Screen

The following command line generates the Performance screen shown in Figure 7-4. A description of each field follows the illustration.

OK, <u>LIST_LTS_STATUS -PERFORMANCE -DNN LTS1</u>

```
[LIST_LTS_STATUS Rev. 21.0 Copyright (c) 1986, Prime Computer, Inc.]
LTS Name:  LTS1              Address: 08-00-2F-F8-00-11
                            Active Ports: 3
Hw/Diag/Dll Rev: 01.00/01.00/01.00
State       : OPERATIONAL    Active Protocols: NTS
Booting Host: HOST1          LAN Name : LAN1
Load File   : <LNMPAK>DOWN_LINE_LOAD*>LTS.DL
Load File Rev: 01.00
Performance Statistics                      Count

Active connections                        :  3
Frames transmitted                        :  7372
Frames transmitted with error             :  0
Frames retransmitted                      :  0
Frames received                           :  32464
Frames received with network (CRC/Alignment) error :  0
Frames lost due to internal (resource) error :  0
Percent CPU idle time                     :  86.5%
Current percent data buffer availability  :  94.4%
Lowest  percent data buffer availability  :  89.6%
Alarms reported                           :  0
OK,
```

FIGURE 7-4.   LIST_LTS_STATUS Performance Screen

LTS Name
   The name of the LTS unit.

Address
   The 12-digit hexadecimal address of the LTS unit.

Active Ports
   The number of ports that have an active connection.

Hw/Diag/Dll Rev
   Hardware and diagnostic/downline load firmware revision levels of the LTS unit.

State
   The current condition of the LTS unit. OPERATIONAL is the only state at this time.

Active Protocols
   The communications protocols currently active on the LTS unit. NTS and TCP are the only active protocols on an LTS unit at this time.

Booting Host

The name of the host that downline loaded the LTS unit with its executable image.

LAN Name

The name of the LAN to which this LTS unit connects.

Load File

The filename of the LTS downline load file.

Load File Rev

The revision of the LTS downline load file.

Active connections

The current number of active link layer connections.

Frames transmitted

The total number of transmitted link layer frames.

Frames transmitted with error

The total number of link layer frames transmitted with errors. This statistic implies that the the LTS unit detected a physical network error (for example, carrier loss, or too many collisions) while sending a frame and aborted the transmission.

Frames retransmitted

The number of link layer frames not received by the destination that the LTS unit restransmitted.

Frames received

The number of link layer frames that the LTS unit received.

Frames received with network (CRC/Alignment) error

The number of link layer frames received by the LTS unit with CRC or alignment errors.

Frames lost due to internal (resource) error

The number of link layer frames dropped by the LTS unit because it was unable to allocate the resources (for example, buffer space) necessary to receive frames.

Percent CPU idle time

A percentage value indicating the amount of time that the LTS CPU was not occupied processing network activity.

Current percent data buffer availability

A percentage value that indicates the amount of data buffer space currently available for use on the LTS unit.

Lowest percent data buffer availability

A percentage value that indicates the lowest amount of data buffer space available on the LTS unit since it began operation.

Alarms reported

The number of alarms that the LTS unit reports.

The LIST_LTS_STATUS Connection Screen

The following command line generates the Connection screen shown in Figure 7-5. A description of each field follows the illustration.

OK, <u>LIST_LTS_STATUS -CONNECTION -DNA 00-01-02</u>

```
[LIST_LTS_STATUS Rev. 21.0 Copyright (c) 1986, Prime Computer, Inc.]
LTS Name: LTS1                    Address: 08-00-2F-F8-00-11

Current active connections   : 3   Total connection count :  8
Current active multicast addr: 2   Greatest connection count:  3

ACTIVE CONNECTIONS
State   Port  Remote Station    Data Characters Tx/Rx Duration
-------------------------------------------------------------
Active   01   HOST1/LHC82           357/204      00:02:06:45
Active   05   HOST1/LHC82           314/94       00:00:56:12
Active   06   HOST1/LHC82            85/58       00:00:00:34
OK,
```

FIGURE 7-5.   LIST_LTS_STATUS Connection Screen

LTS Name
. The name of the LTS unit.

Address
The 12-digit hexadecimal address of the LTS unit.

Current active connections
The number of link layer connections currently active.

Current active multicast addr
The number of link layer multicast addresses currently active.

Total connection count
A total number count of active connections on the since it began operation.

Greatest connection count
The largest number of active connections on the LTS at any one time.

ACTIVE CONNECTIONS
A list of currently active NTS connections.

State
The state of the connection. The states are Active, Connecting, or Disconnecting.

Port
The port number on the LTS that is currently connected.

Remote Station

Identifies the 50 Series host and LHC board at the other end of the connection.

Data Characters Tx/Rx

The number of data characters transmitted and received during the current connection.

Duration

The amount of time in days, hours, minutes, and seconds that the connection has been established.

The LIST_LTS_STATUS Management Screen

The following command line generates the Management screen shown in Figure 7-6. A description of each field follows the illustration.

OK, <u>LIST_LTS_STATUS -MANAGEMENT -DNN LTS1</u>

```
[LIST_LTS_STATUS Rev. 21.0 Copyright (c) 1986, Prime Computer, Inc.]
LTS Name: LTS1                    Address: 08-00-2F-F8-00-11

OPERATING SYSTEM STATISTICS
Running Time: 01:23:51:49
Percent CPU Usage  --  Idle: 86.5%
LLC: 82.7%        NTS: 10.0%    Net Mgmt: 00.8%
Error Counts  --  Total: 0
Correctable memory errors: 0        Watchdog timer expired: 0

NETWORK MANAGEMENT STATISTICS
Alarms reported  --  Total: 0
Logged: 0    Suppressed: 0    Dropped: 0
OS: 0       LLC: 0    NTS: 0    Net Mgmt: 0
OK,
```

FIGURE 7-6.   LIST_LTS_STATUS Management Screen

LTS Name
The name of the LTS unit.

Address
The 12-digit hexadecimal address of the LTS unit.

OPERATING SYSTEM STATISTICS
A set of statistics that relate to the LTS unit's operating system.

Running Time
The running time of the LTS unit in days, hours, minutes, and seconds.

Percent CPU Usage
Indicates the current CPU usage of the LTS. The total CPU usage values are separated into percentages of Idle, LLC, NTS, and Network Management activity. CPU usage is measured over the time period since the last LIST_LTS_STATUS command retrieved this information.

Error Counts
Identifiable error conditions detected including Total errors, Correctable memory errors, and Watchdog timer expired.

NETWORK MANAGEMENT STATISTICS
Statistics that relate to the LTS network management services.

Alarms reported
>The number of alarm conditions reported. The types of alarm counts are Total, Logged, Suppressed, Dropped, Operating System, LLC, NTS, and Network Management.

THE LOOPBACK COMMAND

The LOOPBACK command sends test data packet to a target destination which, in turn, echoes that packet back to the source. The source compares the two messages and reports the results to the user.

Note
>You can add an intermediate or external point to the loopback test to validate communication between two end points or across a network bridge.

Command Format

LOOPBACK $\left[\begin{array}{l}\textit{source-option destination-option} \text{ [-LAN\_NAME } \textit{name}] \\ \text{-HELP}\end{array}\right]$

Options

-DEST_LBK_LAYER *layer*
-DLL
>Identifies the loopback layer at which the test packet loops back, where *layer* specifies the destination as NMSR (a host) or NME (an LTS unit). If you do not specify -DLL, the default destination loopback layer depends on the destination node.

-DEST_LHC_NUMBER *number*
-DLHC
>Used with the -DNN option to identify the logical LHC number for a specific board on a particular host. *number* is an octal number that ranges from 0 to 7 and is assigned by the PRIMOS LHC configuration directive. Do not use the -DLHC option with the -DNA or -LN options.

-DEST_NODE_ADDRESS *address*
-DNA
>Specifies the destination network address for the LHC board or LTS unit to which the test packet is sent. Identifies the LHC board's hexadecimal device address with either the short format, nn-nn-nn, or the long format, nn-nn-nn-nn-nn-nn. This address is assigned by the manufacturer and is used during configuration. All Prime LHC addresses begin with the three-digit string 08-00-2F-. When you use the short form, the command enters Prime prefix automatically. Do not use the -DNA option with either the -DNN, -DLHC, or -LN options.

-DEST_NODE_NAME *name*
-DNN

Specifies the six-character *name* of the host or LTS unit which echoes the test packet back to the source.

-LAN_NAME *name*
-LN

Specifies the 32 character name used during configuration to identify the name of the LAN to which the LHC board is attached. Use this option when you do not know the LHC board's address or logical LHC number. Do not use the -LN option with either the -DNA or the -DLHC options.

-SRC_LBK_LAYER *layer*
-SLL

Identifies the sender's loopback layer, where *layer* specifies the source as NMSR (a host) or NME (an LTS unit). If you do not specify -SLL, the default source loopback layer depends on the source node.

-SRC_LHC_NUMBER *number*
-SLHC

Used with the -SNN option to identify the logical LHC number for a specific board on the source host. *number* is an octal number that ranges from 0 to 7 and is assigned by the PRIMOS LHC configuration directive. Do not use the -SLHC option with the -SNA or -LN options.

-SRC_NODE_ADDRESS *address*
-SNA

Specifies the destination network address for the LHC board or LTS unit which sends the test packet. Identifies the LHC board's hexadecimal device address with either the short format, nn-nn-nn, or the long format, nn-nn-nn-nn-nn-nn. This address is assigned by the manufacturer and is used during configuration. All Prime LHC addresses begin with the three-digit string 08-00-2F-. When you use the short form, the command enters Prime prefix automatically. Do not use the -SNA option with either the -SNN, -SLHC, or -LN options.

-SRC_NODE_NAME node_name
-SNN

Specifies the six-character *name* of the host or LTS unit which sends the test packet back to the source.

-HELP
-H

Displays the command format and a list of options. When you select -HELP all other options are ignored.

Figure 7-7 shows an example of the LOOPBACK command. Notice how the destination and source points are identified in the example.

```
OK, LOOPBACK -DEST_NODE_NAME LTS1
[LOOPBACK Rev. 21.0.T3 Copyright (c) 1986, Prime Computer, Inc.]

Source Node Name:        HOST1
Source LHC:              03
Source Address:          08-00-2F-00-01-02
Source Loopback Layer:   NMSR
Destination Node Name:   LTS1
Destination Address:     08-00-2F-F0-00-14
Destination Loopback Layer: NME

Lan Name:                LAN1

Test Results: COMPARISON ERROR! Bytes Sent:  72  Bytes
Received:  72

S:  AAAA5555AAAA5555010102020404080001010202040408080FEFEFDFDFBFBF7F7EFEF
                                        ^ ^

R:  AAAA5555AAAA5555010102020404080001010202040408080FEFEFDFDFBFBF7F7EFEF
```

FIGURE 7-7.   Use of the LOOPBACK Command

The fields in the LOOPBACK command display have the following meanings.

Source Node Name

The node that sent the test packet. This can be a 50 Series host name, an LTS unit's name, or the string -unconfigured- for an unconfigured LTS unit.

Source LHC

If an LHC board sent the test packet, this field contains the logical LHC number, a number between 0 and 7. If an LTS unit sent the test packet, the display does not include this field.

Source Address

The 12-digit hexadecimal address of the device that sent the test packet.

Source Loopback Layer

Indicates if the node that sent the test packet is an LTS unit (NMSR) or a 50 Series host (NME).

Destination Node Name

The name of the node that received the test packet. This can be a 50 Series host name, an LTS unit's name, or the string -unconfigured- for an unconfigured LTS unit.

Destination LHC

If an LHC board received the test packet, this field contains the logical LHC number, a

number between 0 and 7. If an LTS unit received the test packet, the display does not include this field.

Destination Address
The 12-digit hexadecimal address of the device that received the test packet.

Destination Loopback Layer
Indicates if the node that received the test packet is an LTS unit (NMSR) or a 50 Series host (NME).

Lan Name
The name of the LAN where the loopback test was performed.

Test Results
Indicates the results of the loopback test, determined at the source node.

The results of the loopback test may be any of the following:

PASS
The test packet that was sent was the same as the test packet that was received.

COMPARISON ERROR
Any number of discrepancies between the sent and received test packets were encountered. Check the caret (^) indicators for the mismatches.

LENGTH ERROR
The length of the test packet that was sent was different from the length of the test packet received. Check the Bytes Sent and Bytes Received fields for the actual number of test packet characters sent and received.

Bytes Sent
The number of bytes that were sent from the source node to the destination node.

Bytes Received
The number of bytes that were received at the source node from the destination node.

S: and R:
Displays the actual Sent and Received test packets. Any discrepancies within the sent and received packets are marked with a caret (^) indicator. If any of the test packets exceed a certain limit, the end of the test packet is appended with an ellipsis (...).

NTS ASSIGNABLE LINES

To assign an NTS asynchronous line to a specific device, use the following procedure.

1. Include the NAMLC and NTSASL directives in your configuration file to provide an adequate number of assignable lines.

2. Use a SET_ASYNC -LINE *n* -ASGN YES command in your PRIMOS.COMI file to indicate that the line is assignable.

3. Include the CAB command in your PRIMOS.COMI file to change the sizes of these buffers from their default settings, or issue the commands interactively (optional).

4. Issue an ASSIGN ASYNC -LINE *n* command from your terminal or the supervisor terminal to assign the line.

5. Issue an NTS_ASSOCIATE command to establish an NTS connection.

6. Issue a SET_ASYNC -LINE *n* [*options*] command from your terminal to change the speed, protocol, or configuration of the line (optional).

Note
. . Printers on the Spooler subsystem are assigned lines when the PROP -START command is issued. PROP -START only assigns lines for printers. You must assign lines for any other devices.

The following sections describe the NTS_ASSOCIATE, NTS_UNASSOCIATE, and NTS_LIST_ASSOCIATE commands.

NTS_ASSOCIATE COMMAND

The NTS_ASSOCIATE command defines a permanent or temporary path from a physical line attached to an LTS to a logical line number in the Prime host. The System Administrator must associate a line before a user can issue an ASSIGN, UNASSIGN, or interactive SET_ASYNC command for the line.

Note

The NTSDIM polls all NTS lines consecutively. Choose NTS assignable line numbers that are close to 1024 plus NTSUSR to avoid wasting system resources servicing unused lines and to improve performance.

Command Format

NTS_ASSOCIATE $\begin{Bmatrix} \text{-LINE } n \text{ -LTS\_NAME } name \text{ -LTS\_LINE } n \text{ [-PERM]} \\ \text{-HELP} \end{Bmatrix}$

Arguments

-LINE *n*

Indicates the *decimal* line number in the Prime host. Valid NTS line numbers range from 1024 through 1536. Assignable NTS line numbers usually start at 1024 plus the decimal value of NTSUSR.

-LTS_NAME *name*
-LNAME

Specifies the logical name of a particular LTS. The Network Administrator gives each LTS on a LAN a unique name when it is added to the configuration with CONFIG_NTS. LTS names can be a maximum of 16 characters long and must follow the same format and rules as PRIMENET node names. You can list LTS names with the LIST_LAN_NODES command.

-LTS_LINE *n*
-LLINE

Specifies the LTS line number. *number* can range from 0 through 7.

-PERMANENT
-PERM

Establishes a stable connection that is reconnected automatically if a disconnect occurs. A temporary connection cannot recover if the carrier signal is lost for three minutes and is unassigned automatically. A permanent connection is valid until the line is unassigned. A permanent connection can be removed by reissuing the NTS_ASSOCIATE command without supplying this option. Permanent connections are recommended for spooler lines.

-HELP
-H

Displays the command format and options.

Examples

Making a Temporary Association: The following NTS_ASSOCIATE command issued from the supervisor terminal maps the logical PRIMOS line number 1153 to the physical line number 1 attached to the LTS SCIENCE.LAB.

```
OK, NTS_ASSOCIATE -LNAME SCIENCE.LAB -LLINE 1 -LINE 1153
[NTS_ASSOCIATE Rev. 23.1 Copyright (c) 1991, Prime Computer, Inc.]
OK,
```

Making a Permanent Association: The NTS_ASSOCIATE command can create a permanent association to an LTS line supporting a printer. In the following example, the association between the PRIMOS line number 1154 and the printer attached to line 0 of the LTS MATH.DEPT is stable. The link to the printer recovers from network failures automatically.

```
OK, NTS_ASSOCIATE -LNAME MATH.DEPT -LLINE 0 -LINE 1154 -PERM
[NTS_ASSOCIATE Rev. 23.1 Copyright (c) 1991, Prime Computer, Inc.]
OK,
```

It is also possible to make an existing association permanent. Reissue the NTS_ASSOCIATE command with the -PERM option and specify the PRIMOS line number as shown in the next example.

```
OK, NTS_ASSOCIATE -LNAME MATH.DEPT -LLINE 1 -LINE 1155
[NTS_ASSOCIATE Rev. 23.1 Copyright (c) 1991, Prime Computer, Inc.]
OK, NTS_ASSOCIATE -LINE 1155 -PERM
[NTS_ASSOCIATE Rev. 23.1 Copyright (c) 1991, Prime Computer, Inc.]
OK,
```

NTS_ASSOCIATE Error Messages

If the syntax of the command line is incorrect, a resource is not available, or there is a problem with NTS, one of the following error messages appears on the screen and the command is rejected.

```
Insufficient access rights.  (NTS_ASSOCIATE)
```
An attempt has been made by an unauthorized user to associate an NTS PRIMOS line.

```
Line not associated.  PRIMOS line number, -LTS_NAME, and -LTS_LINE arguments
    must be supplied.  (NTS_ASSOCIATE)
```
An attempt has been made to associate a previously unassociated PRIMOS line number without all the proper arguments. In this case, all three arguments must be supplied.

```
LTS line already associated.  (NTS_ASSOCIATE)
```
An attempt has been made to associate an LTS that is already associated with another PRIMOS line number.

```
Network Terminal Service is not started.  (NTS_ASSOCIATE)
```
An attempt has been made to make an association when network terminal service is not currently started.

No NTS assignable lines are configured. (NTS_ASSOCIATE)
> An attempt has been made to associate an NTS PRIMOS line when there are no NTS assignable lines configured in the system (NTSASL = 0). This configuration directive must be changed if NTS assignable lines are to be utilized, and the system cold started.

No other options may be specified with -HELP. (NTS_ASSOCIATE)
> The command was issued when -HELP is found on the command line with -LINE, -LTS_NAME, or -LTS_LINE.

PRIMOS line already associated. (NTS_ASSOCIATE)
> An attempt has been made to associate a PRIMOS line number that is already associated.

PRIMOS line number is required. (NTS_ASSOCIATE)
> A PRIMOS line number has not been specified in the command when required.

The LTS line number must be between 0 and 7. (NTS_ASSOCIATE)
> An attempt has been made to issue an NTS_ASSOCIATE command for an LTS line number that is out of range. Valid LTS line numbers currently range from 0 through 7.

The PRIMOS line number must be between 1024 and 1279. (NTS_ASSOCIATE)
> An attempt has been made to associate a PRIMOS line that is not in the NTS line range. These lines cannot be associated.

The specified LTS is not configured. (NTS_ASSOCIATE)
> An attempt has been made to use an LTS name that has not been previously configured with a MAC address (by CONFIG_NTS). If necessary, this LTS can be added with NTS started by CONFIG_NTS (without stopping NTS).

The specified PRIMOS line is not assignable. (NTS_ASSOCIATE)
> An attempt has been made to associate a PRIMOS line that is not currently assignable.

When -LTS_NAME or -LTS_LINE is specified, the other is required. (NTS_ASSOCIATE)
> An attempt has been made to issue an NTS_ASSOCIATE command without both LTS name and LTS line number. This form of the command requires the presence of both.

NTS_LIST_ASSOCIATE COMMAND

The NTS_LIST_ASSOCIATE command displays the current associations between PRIMOS line numbers and LTS line numbers. Active connections can be specified by PRIMOS line number or by LTS name and LTS line number. If the command is issued without options, information for all associations is displayed. Permanent connections are indicated in the display by the letter P.

Command Format

$$NTS\_LIST\_ASSOCIATE \begin{cases} \text{-LINE } \textit{number} \\ \text{-LTS\_NAME } \textit{name} \text{ [-LTS\_LINE } \textit{number}] \\ \text{-HELP} \end{cases}$$

Arguments

-LINE *number*
Indicates the *decimal* line number in the Prime host. Valid NTS line numbers range from 1024 through 1536.

-LTS_NAME *name*
-LNAME
Specifies the logical name of a particular LTS. You can list LTS names with the LIST_LAN_NODES command.

-LTS_LINE *number*
-LLINE

Specifies the LTS line number. *number* can range from 0 through 7.

-HELP
-H
Displays the command format and options.

Examples

Listing All Active Associations:

```
OK, NTS_LIST_ASSOCIATE
[NTS_LIST_ASSOCIATE Rev. 23.1 Copyright (c) 1991, Prime Computer, Inc.]

Primos                     LTS
line #      LTS Name       line #
 1153       SCIENCE.LAB    1
 1154  [p] MATH.DEPT       0
 1155  [p] MATH.DEPT       1

* [p] denotes a permanent association.
OK,
```

Listing Associations for an LTS:

```
OK,NTS_LIST_ASSOCIATE -LNAME MATH.DEPT
[NTS_LIST_ASSOCIATE Rev. 23.1 Copyright (c) 1991, Prime Computer, Inc.]

Primos                          LTS
line #      LTS Name            line #
 1154  [p] MATH.DEPT            0
 1155  [p] MATH.DEPT            1


* [p] denotes a permanent association.
OK,
```

Listing Associations for an Individual Line:

```
OK, NTS_LIST_ASSOCIATE -LINE 1153
[NTS_LIST_ASSOCIATE Rev. 23.1 Copyright (c) 1991, Prime Computer, Inc.]

Primos                          LTS
line #      LTS Name            line #
 1153       SCIENCE.LAB         1
OK,
```

NTS_LIST_ASSOCIATE Error Messages

-LTS_LINE argument is not permitted without -LTS_NAME. (NTS_LIST_ASSOCIATE)
    Command was issued with insufficient arguments to identify the line's LTS.

Line is not associated. (NTS_LIST_ASSOCIATE)
    Command was issued for an unassociated PRIMOS line number.

Network Terminal Service is not started. (NTS_LIST_ASSOCIATE)
    The command was issued when network terminal service was not currently started.

No associations. (NTS_LIST_ASSOCIATE)
    There are no active associations on NTS.

No associations with the specified LTS. (NTS_LIST_ASSOCIATE)
    There are no active associations for the specified LTS.

No   associations   with   the   specified   LTS   and   LTS   line   number.
   (NTS_LIST_ASSOCIATE)
    There is no active association for the line number indicated on the specified LTS.

No other options may be specified with -HELP. (NTS_LIST_ASSOCIATE)
    The command was issued when -HELP is found on the command line with -LINE,
    -LTS_NAME, or -LTS_LINE.

PRIMOS line number not permitted with -LTS_NAME. (NTS_LIST_ ASSOCIATE)
    The PRIMOS line number must be specified alone.

The LTS line number must be between 0 and 7. (NTS_LIST_ASSOCIATE)
An attempt has been made to issue an NTS_LIST_ASSOCIATE command for an LTS line number that is out of range. Valid LTS line numbers currently range from 0 through 7.

The PRIMOS line number must be between 1024 and 1279. (NTS_LIST_ASSOCIATE)
The command was issued for a PRIMOS line that is not in the NTS line range.

The specified LTS is not configured. (NTS_LIST_ASSOCIATE)
An attempt has been made to use an LTS name that has not been previously configured with a MAC address (by CONFIG_NTS). If necessary, this LTS can be added with NTS started by CONFIG_NTS (without stopping NTS).

NTS_UNASSOCIATE COMMAND

The NTS_UNASSOCIATE command removes a path from a physical line attached to an LTS to a logical line number in the Prime host. Only the System Administrator can unassociate a line. If a line is currently assigned by another user, it cannot be unassociated until it is unassigned.

There are two ways to remove a connection: by specifying the PRIMOS linenumber or by specifying the LTS name and LTS line number. Use the NTS_LIST_ASSOCIATE command to display a list of all currently associated lines.

Command Format

$$
\text{NTS\_UNASSOCIATE} \quad \left\{ \begin{array}{l} \text{-LINE } \textit{number} \\ \text{-LTS\_NAME } \textit{name} \quad [\text{-LTS\_LINE } \textit{number}] \\ \text{-HELP} \end{array} \right\}
$$

Arguments

-LINE *number*
Indicates the *decimal* line number in the Prime host. Valid NTS line numbers range from 1024 through 1536.

-LTS_NAME *name*
-LNAME
Specifies the logical name of a particular LTS. You can list LTS names with the LIST_LAN_NODES command.

-LTS_LINE *number*
-LLINE
Specifies the LTS line number. *number* can range from 0 through 7.

-HELP
-H
   Displays the command format and options.

Examples

Unassociating an LTS line: The following command line breaks the connection between the host and line 1 on the LTS MATH.DEPT.

```
OK, NTS_UNASSOCIATE -LNAME MATH.DEPT -LLINE 1
[NTS_UNASSOCIATE Rev. 23.1 Copyright (c) 1991, Prime Computer, Inc.]
OK,
```

Unassociating a PRIMOS line: The following command line releases the PRIMOS line number 1153 from any active association.

```
OK, NTS_UNASSOCIATE -LINE 1153
[NTS_UNASSOCIATE Rev. 23.1 Copyright (c) 1991, Prime Computer, Inc.]
OK,
```


NTS_UNASSOCIATE Error Messages

Both an LTS name and an LTS line number are required. (NTS_UNASSOCIATE)
   One of these options was issued without the other on the command line. No action is taken on this command.

Either a PRIMOS line number, or an LTS name and line number is required. (NTS_UNASSOCIATE)
   No command arguments were issued on the NTS_UNASSOCIATE command line.

Insufficient access rights. (NTS_UNASSOCIATE)
   An attempt has been made by an unauthorized user to unassociate an NTS PRIMOS line.

LTS line not associated. (NTS_UNASSOCIATE)
   An attempt has been made to unassociate an LTS that is not associated.

Line <n> is assigned to username <user number>; it must be unassigned first. (NTS_UNASSOCIATE)
   The System Administrator has made an attempt to unassociate PRIMOS line number n that is already assigned to username *<user number>*. It must be unassigned first. Any line may be unassigned from the supervisor terminal using the UNASSIGN ASYNC command.

Network Terminal Service is not started. (NTS_UNASSOCIATE)
   An attempt has been made to break an association when network terminal service is not currently started (or not configured).

No other options may be specified with -HELP. (NTS_UNASSOCIATE)
   The command was issued when -HELP is found on the command line with -LINE, -LTS_NAME, or -LTS_LINE.

PRIMOS line not associated. (NTS_UNASSOCIATE)
An attempt has been made to unassociate a PRIMOS line number that is not associated.

The LTS line number must be between 0 and 7. (NTS_UNASSOCIATE)
An attempt has been made to issue an NTS_UNASSOCIATE command for an LTS line number that is out of range. Valid LTS line numbers currently range from 0 through 7.

The -LTS_NAME and -LTS_LINE arguments are not allowed when a PRIMOS line number is specified. (NTS_UNASSOCIATE)
Issued when an NTS_UNASSOCIATE command contains a PRIMOS line number and either an LTS name or an LTS line number. Reissue the command with just the PRIMOS line number, or both the LTS name and line number.

The PRIMOS line number must be between 1024 and 1279. (NTS_UNASSOCIATE)
An attempt has been made to unassociate a PRIMOS line that is not in the NTS line range. These lines cannot be associated or unassociated.

The specified LTS is not configured. (NTS_UNASSOCIATE)
An attempt has been made to use an LTS name that has not been previously configured with a MAC address (by CONFIG_NTS). If necessary, this LTS can be added with NTS started by CONFIG_NTS (without stopping NTS).

APPENDICES

CONFIG_NTS EXAMPLES

This appendix presents a step-by-step example of the CONFIG_NTS dialog generated to create LAN-1 and then edit the configuration to add LAN-2.

PROCEDURE I. CREATE A NEW CONFIGURATION

In this example, the components of LAN-1 are two hosts and four LTS units. HostB is the primary host and HostA is the secondary host for Network Management functions.

1. Sketch the network.

2. Fill out the NTS configuration worksheet.

3. Invoke CONFIG_NTS.

4. Configure a LAN.

5. Configure Network Management Functions.

6. Configure a host.

7. Add LTS Units to the configuration.

8. Save the configuration.

9. Quit the configuration session.

Step I. Sketch the Network

Figure A-1 shows the components of LAN-1.

NTS Network Topology Worksheet
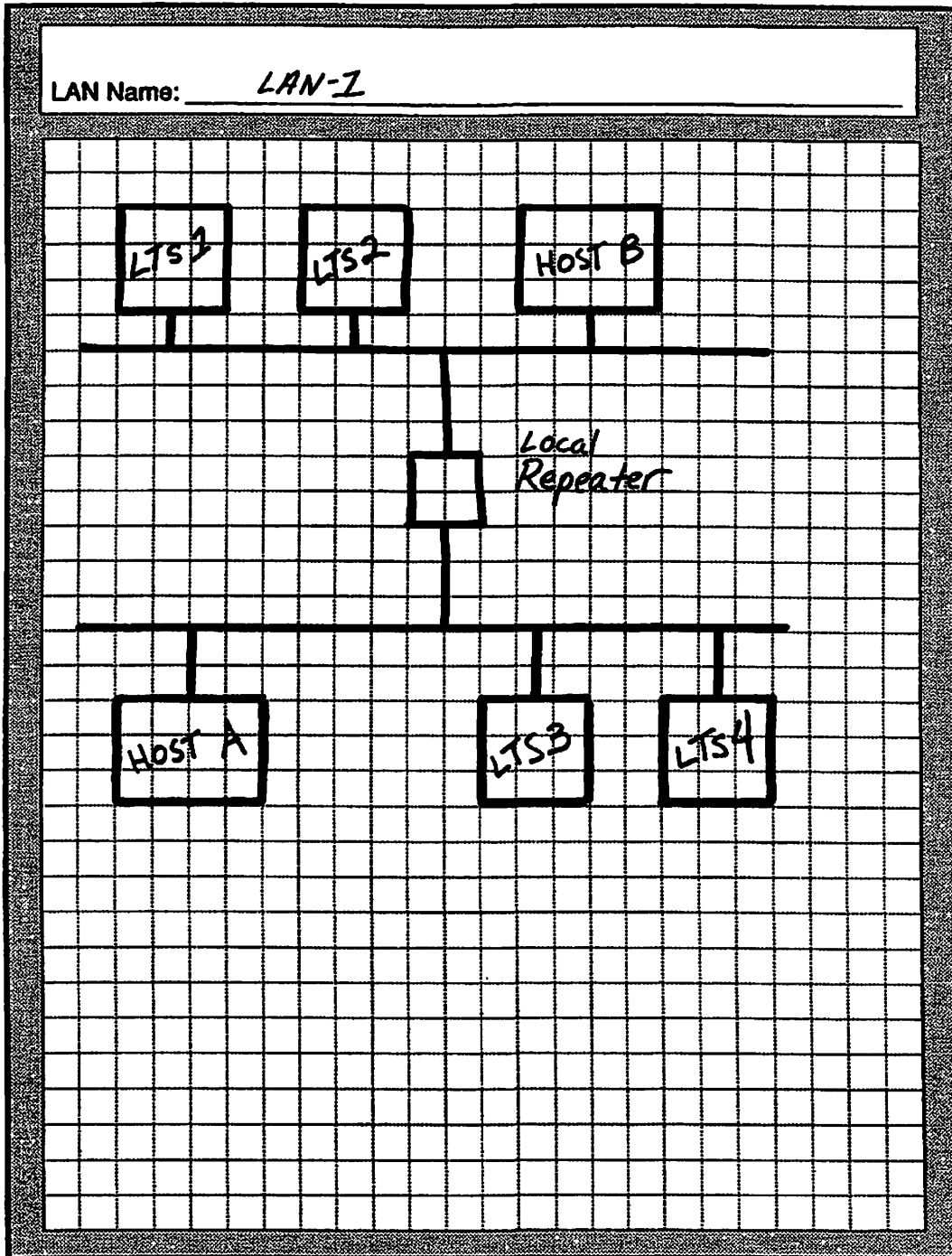
FIGURE A-1.   LAN-1 Network Sketch

Step II. Fill out the NTS Configuration Worksheet

Figure A-2 describes LAN-1.

NTS Configuration Worksheet

LAN Name: _LAN-1_

Description: _LAN-1 contains Host A and Host B._
Host B performs network management

Allow Unconfigured Nodes: ☐ YES ☒ NO

Network Management:

Downline Load Host:	Upline Dump Host:	Event Reporting Host:
Primary: _Host B_	Primary: _Host B_	Primary: _Host B_
Secondary: _Host A_	Secondary: _Host A_	Secondary: _Host A_

Host Name: _Host A_	Host Name: _Host B_	Host Name: _____
Description: _____	Description: _____	Description: _____
LHC: _01_	LHC: _01_	LHC: ____
LHC: ____	LHC: _02_	LHC: ____
LHC: ____	LHC: ____	LHC: ____
LHC: ____	LHC: ____	LHC: ____

Host Name: _____	Host Name: _____	Host Name: _____
Description: _____	Description: _____	Description: _____
LHC: ____	LHC: ____	LHC: ____
LHC: ____	LHC: ____	LHC: ____
LHC: ____	LHC: ____	LHC: ____
LHC: ____	LHC: ____	LHC: ____

LTS Name: _LTS 1_	LTS Name: _LTS 2_
Address: 08-00-2F-_01_-_23_-_45_	Address: 08-00-2F-_01_-_23_-_46_
LTS Name: _LTS 3_	LTS Name: _LTS 4_
Address: 08-00-2F-_01_-_23_-_47_	Address: 08-00-2F-_01_-_23_-_48_
LTS Name: _____	LTS Name: _____
Address: 08-00-2F-___-___-___	Address: 08-00-2F-___-___-___
LTS Name: _____	LTS Name: _____
Address: 08-00-2F-___-___-___	Address: 08-00-2F-___-___-___

AE1 D1015921A

FIGURE A-2.   NTS Configuration Worksheet for LAN-1

Step III. Invoke CONFIG_NTS

These steps to invoke the CONFIG_NTS utility.

1. To invoke CONFIG_NTS and format the screen for a PT200 terminal, enter **CONFIG_NTS -TTP PT200** and press Return.

```
OK, CONFIG_NTS -TTP PT200

CONFIG_NTS, Revision 23.0                    Define configuration file

Enter the NTS configuration filename: [NTS*>NTS.CONFIG] <Return>

The configuration file doesn't exist; OK to create it? YES

Enter 1 or 2 lines of optional text to describe this configuration:
NTS.CONFIG IS FOR LAN-1, WHICH CONTAINS HOSTS A AND B,

AND LTS1 THROUGH LTS4.
```

2. Press Return to accept the default filename, **NTS.CONFIG.**

3. Enter **YES** to create the new configuration file.

4. Enter one or two lines of optional text to describe the new configuration.

5. Press Return to display the main menu.

Step IV. Configure a LAN

These steps configure LAN-1.

1. From the Main menu enter **1** to select the Configure LAN option.

```
CONFIG_NTS, Revision 23.0              Create configuration file:
                                           <MYSYS>NTS*>NTS.CONFIG

NTS.CONFIG IS FOR LAN-1, WHICH CONTAINS HOSTS A AND B,
AND LTS1 THROUGH LTS4

     1.  Configure LAN             H. Help
     2.  Configure Host by LAN     S. Save current configuration
     3.  Configure Host by Name    0. Quit configuration session
     4.  Configure LTS by LAN
     5.  Configure LTS by Name
     6.  Display, list or spool configuration
     7.  Change configuration title

Enter selection:
```

2. From the Configure LAN screen enter **A** to add a LAN to the configuration.

```
CONFIG_NTS, Revision 23.0                        Configuration file:
                                                        NTS*>NTS.CONFIG

NTS.CONFIG IS FOR LAN-1, WHICH CONTAINS HOSTS A AND B,
AND LTS1 THROUGH LTS4.

No lans are configured.

Enter:
      A to add a LAN              F to finish (return to main menu)
                                  S to save current configuration
                                  Q to quit configuration session
Enter: [F]
```

3. From the ADD LAN screen, enter **LAN-1**.

4. Enter a one or two line description of LAN-1.

5. At the Allow unconfigured nodes on this LAN? prompt, enter **NO**.

6. Enter **YES** to configure Network Management functions for LAN-1.

```
CONFIG_NTS, Revision 23.0                               Add LAN

Enter LAN name: [LAN300-1]  LAN-1

Enter 1 or 2 lines of optional text to describe this LAN:
LAN-1 CONTAINS HOSTA AND HOSTB.   HOSTB PERFORMS NETWORK MANAGEMENT.

Allow unconfigured nodes on this LAN? NO

Configure network management functions for this LAN? YES
```

Step V. Configure Network Management Functions

These steps configure HOSTB as the primary host and HOSTA as the secondary host for network management functions.

1. Choose the Configure Network Management Functions and enter D to select the Change Downline Load Hosts option.

```
CONFIG_NTS, Revision 23.0                               LAN: LAN-1

Network management functions for the LAN are configured as follows:

        LTS Downline Load Hosts
            Primary  :
            Secondary:

        LTS Upline Dump Hosts
            Primary  :
            Secondary:

        LTS Event Reporting Hosts
            Primary  :
            Secondary:

Enter:
 D to change downline load hosts    F to finish (return to prev menu)
 U to change upline dump hosts      S to save the current configuration
 E to change event reporting hosts  Q to quit the configuration session
Enter selection: [F]
```

The following prompt appears on the Configure Network Management Functions screen:

Enter LTS downline load primary host name:

2. Enter HOSTB to specify that as the primary downline load host, HOSTB will respond to requests for downline loads of software.

CONFIG_NTS displays the following error message because we have not yet configured HOSTB.

HOSTB is not a configured host on LAN LAN-1.
Do you want to override errors due to unconfigured hosts?

Enter YES to override error messages and continue to configure LAN-1 before you configure any hosts. You must configure hosts in Step VI before CONFIG_NTS allows you to save the configuration file.

3. At the Enter LTS downline load secondary host name: prompt, Enter HOSTA to specify that as the secondary downline load host, HOSTA will respond to requests for downline loads of software whenever HOSTA does not respond.

4. From the Configure Network Management Functions screen, enter U to select the Change Upline Dump Hosts option.

```
CONFIG_NTS, Revision 23.0                              LAN: LAN-1

Network management functions for the LAN are configured as follows:

      LTS Downline Load Hosts
         Primary  : HOSTB
         Secondary: HOSTA

      LTS Upline Dump Hosts
         Primary  :
         Secondary:

      LTS Event Reporting Hosts
         Primary  :
         Secondary:
Enter LTS downline load secondary host name:
Enter:
   D to change downline load hosts   F to finish (return to prev menu)
   U to change upline dump hosts     S to save the current configuration
   E to change event reporting hosts Q to quit the configuration session
Enter selection: [F]
```

The following line appears on the Configure Network Management Functions screen:

`Enter LTS upline dump primary host name:`

5. Enter **HOSTB** to specify that as the primary upline dump host, HOSTB will respond to requests to store upline dumps of software.

6. At the `Enter LTS upline dump secondary host name:` prompt, enter **HOSTA** to specify that as the secondary upline dump host, HOSTA will respond to requests to store upline dumps of software whenever HOSTA does not respond.

7. From the Configure Network Management Functions screen, enter **E** to select the Change Event Reporting Hosts option.

```
CONFIG_NTS, Revision 23.0                              LAN: LAN-1

Network management functions for the LAN are configured as follows:

      LTS Downline Load Hosts
         Primary  : HOSTB
         Secondary: HOSTA

      LTS Upline Dump Hosts
         Primary  : HOSTB
         Secondary: HOSTA

      LTS Event Reporting Hosts
         Primary  :
         Secondary:
Enter LTS downline load secondary host name:
Enter:
   D to change downline load hosts   F to finish (return to prev menu)
   U to change upline dump hosts     S to save the current configuration
   E to change event reporting hosts Q to quit the configuration session
Enter selection: [F]
```

The following prompt appears on the Configure Network Management Functions screen:

`Enter LTS event reporting primary host name:`

8. Enter **HOSTB** to specify that as the primary event reporting host, HOSTB will log all LTS unit event messages.

9. At the `Enter LTS event reporting the secondary host name:` prompt, enter **HOSTA** to specify that as the secondary event reporting host, HOSTA will log all LTS unit event messages whenever HOSTB does not respond.

10. Review your entries. If they are correct, enter an @ sign to return to the Main menu.

```
CONFIG_NTS, Revision 23.0                              LAN: LAN-1
Network management functions for the LAN are configured as follows:

     LTS Downline Load Hosts
        Primary  : HOSTB
        Secondary: HOSTA

     LTS Upline Dump Hosts
        Primary  : HOSTB
        Secondary: HOSTA

     LTS Event Reporting Hosts
        Primary  : HOSTB
        Secondary: HOSTA
Enter LTS event reporting secondary host name:
Enter:
  D to change downline load hosts   F to finish (return to prev menu)
  U to change upline dump hosts     S to save the current configuration
  E to change event reporting hosts Q to quit the configuration session
Enter selection: [F]
```

Step VI. Configure a Host

These steps configure both and assign logical names to their LHC boards.

1. From the Main menu, enter **2** to select the Configure Host by LAN option.

```
CONFIG_NTS, Revision 23.0              Create configuration file:
<MYSYS>NTS*>NTS.CONFIG

NTS.CONFIG IS FOR LAN-1, WHICH CONTAINS HOSTS A AND B


     1.  Configure LAN               H. Help
     2.  Configure Host by LAN       S. Save current configuration
     3.  Configure Host by Name      0. Quit configuration session
     4.  Configure LTS by LAN
     5.  Configure LTS by Name
     6.  Display, list or spool configuration
     7.  Change configuration title

Enter selection:
```

2. Enter **A** to select the Add a Host to the LAN option.

```
CONFIG_NTS, Revision 23.0              Configure host on LAN: LAN-1

LAN-1 CONTAINS HOSTA AND HOSTB. HOSTB PERFORMS NETWORK MANAGEMENT.

No hosts are configured on this LAN.

Enter:
    A to add a host to the LAN      F to finish (return to prev menu)
                                    S to save the current configuration
                                    0 to quit the configuration session
Enter selection: [F]
```

3. At the `Enter host name:` prompt, enter **HOSTA** to configure the first host.

4. At the LHC prompt, enter **LHC01** to enter the name of the LHC board that resides in HOSTA.

```
CONFIG_NTS, Revision 23.0                    Add host to LAN: LAN-1

Enter host name: HOSTA

Enter the (blank separated) list of LHCs that will be connected to this
LAN: LHC01
```

5. Enter A to select the Add a Host to the LAN option to add HostB.

Note

The arrow -> denotes the currently selected host.

```
CONFIG_NTS, Revision 23.0                    Configure host on LAN: LAN-1

LAN-1 CONTAINS HOSTA AND HOSTB. HOSTB PERFORMS NETWORK MANAGEMENT.

The following hosts are configured on this LAN:

-> 1.  HOSTA                         LHC01

Enter the item number of the host to change, or:
   A to add a host to the LAN      F to finish (return to prev menu)
   D to delete the selected host   S to save the current configuration
   E to edit the selected host     Q to quit the configuration session
Enter selection: [F]
```

6. At the Enter host name: prompt, enter **HOSTB** to add the remaining host.

7. At the LHC prompt, enter **LHC01**, skip a blank space, and **LHC02** to add the names of LHC boards connected to HOSTB.

```
CONFIG_NTS, Revision 23.0                    Add host to LAN: LAN-1

Enter host name: HOSTB

Enter the (blank separated) list of LHCs that will be connected to this
LAN:
LHC01 LHC02
```

8. Review your entries. If they are correct, enter an @ sign to return to the Main menu.

```
┌─────────────────────────────────────────────────────────────────┐
│                                                                   │
│  CONFIG_NTS, Revision 23.0              Configure host on LAN: LAN-1 │
│                                                                   │
│  LAN-1 CONTAINS HOSTA AND HOSTB. HOSTB PERFORMS NETWORK MANAGEMENT. │
│                                                                   │
│  The following hosts are configured on this LAN:                  │
│                                                                   │
│  -> 1.  HOSTA                         LHC01                        │
│     2.  HOSTB                         LHC01 LHC02                  │
│                                                                   │
│  Enter the item number of the host to change, or:                 │
│     A to add a host to the LAN        F to finish (return to prev menu) │
│     D to delete the selected host     S to save the current configuration │
│     E to edit the selected host       Q to quit the configuration session │
│  Enter selection: [ ]                                             │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```

Step VII. Add LTS Units to the Configuration

These steps add LTS1, LTS2, LTS3, and LTS4 to the configuration.

1. Enter **4** to select the Configure LTS by LAN option.

```
CONFIG_NTS, Revision 23.0              Create configuration file:
                                           <MYSYS>NTS*>NTS.CONFIG

NTS.CONFIG IS FOR LAN-1, WHICH CONTAINS HOSTS A AND B,
AND LTS1 THROUGH LTS4.

     1.  Configure LAN              H.  Help
     2.  Configure Host by LAN      S.  Save current configuration
     3.  Configure Host by Name     Q.  Quit configuration session
     4.  Configure LTS by LAN
     5.  Configure LTS by Name
     6.  Display, list or spool configuration
     7.  Change configuration title

Enter selection:
```

2. Enter **A** to select the Add an LTS to the LAN option.

```
CONFIG_NTS, Revision 23.0              Configuring LTS on LAN: LAN-1

LAN-1 CONTAINS HOSTA AND HOSTB. HOSTB PERFORMS NETWORK MANAGEMENT.

No LTSs are configured on this LAN.

Enter:
  A to add an LTS to the LAN     F to finish (return to prev menu)
                                 S to save the current configuration
                                 Q to quit the configuration session
Enter selection: [F]
```

3. At the prompt, enter **LTS1** to name the LTS unit.

4. The address prompt contains the standard Prime address prefix **08-00-2F-**. Enter **01-23-45** to specify the last six characters of the first LTS unit's address.

```
CONFIG_NTS, Revision 23.0                    Add LTS to LAN: LAN-1

Enter LTS name: LTS1

Enter LTS address (nn-nn-nn): 08-00-2F-01-23-45
```

5. Enter A to select the Add an LTS to the LAN option.

```
CONFIG_NTS, Revision 23.0                 Configuring LTS on LAN: LAN-1

LAN-1 CONTAINS HOSTA AND HOSTB. HOSTB PERFORMS NETWORK MANAGEMENT.

The following LTSs are configured on this LAN:

-> 1.  LTS1                               08-00-2F-01-23-45

Enter the item number of the LTS to change, or:
     A to add an LTS to the LAN      F to finish (return to prev menu)
     D to delete the selected LTS    S to save the current configuration
     E to edit the selected LTS      Q to quit the configuration session
Enter selection: [F]
```

6. At the LTS name prompt, enter **LTS2** to name the LTS unit.

7. At the address prompt, enter **01-23-46** to specify the second LTS unit's address.

```
Enter LTS name: LTS2

Enter LTS address (nn-nn-nn): 08-00-2F-01-23-46
```

8. Enter A to select the Add an LTS to the LAN option.

```
CONFIG_NTS, Revision 23.0                 Configuring LTS on LAN: LAN-1

LAN-1 contains HOSTA and HOSTB. HOSTB performs NETWORK MANAGEMENT.

The following LTSs are configured on this LAN:

-> 1.  LTS1                               08-00-2F-01-23-45
   2.  LTS2                               08-00-2F-01-23-46

Enter the item number of the LTS to change, or:
     A to add an LTS to the LAN      F to finish (return to prev menu)
     D to delete the selected LTS    S to save the current configuration
     E to edit the selected LTS      Q to quit the configuration session
Enter selection: [2]
```

9. At the LTS name prompt, enter **LTS3** to name the LTS unit.

10. At the address prompt, enter **01-23-47** to specify the third LTS unit's address.

```
Add LTS to LAN: LAN-1

Enter LTS name: LTS3

Enter LTS address (nn-nn-nn): 08-00-2F-01-23-47
```

11. Enter A to select the Add an LTS to the LAN option.

```
CONFIG_NTS, Revision 23.0              Configuring LTS on LAN: LAN-1

LAN-1 CONTAINS HOSTA AND HOSTB. HOSTB PERFORMS NETWORK MANAGEMENT.

The following LTSs are configured on this LAN:

-> 1. LTS1                            08-00-2F-01-23-45
   2. LTS2                            08-00-2F-01-23-46
   3. LTS3                            08-00-2F-01-23-47

Enter the item number of the LTS to change, or:
   A to add an LTS to the LAN      F to finish (return to prev menu)
   D to delete the selected LTS    S to save the current configuration
   E to edit the selected LTS      Q to quit the configuration session
Enter selection: [2]
```

12. At the LTS name prompt, enter LTS4 to name the LTS unit.

13. At the address prompt, enter 01-23-48 to specify the forth LTS unit's address.

```
Add LTS to LAN: LAN-1

Enter LTS name: LTS4

Enter LTS address (nn-nn-nn): 08-00-2F-01-23-48
```

Step VIII. Save the Configuration

Use these steps to save your configuration file in a disk file from any menu.

1. Enter S to save the current configuration to disk.

2. Press Return to save the configuration file in the default file name.

```
CONFIG_NTS, Revision 23.0          Configuring LTS on LAN: LAN-1

LAN-1 contains HOSTA and HOSTB. HOSTB performs NETWORK MANAGEMENT.

The following LTSs are configured on this LAN:

-)  1.  LTS1                       08-00-2F-01-23-45
    2.  LTS2                       08-00-2F-01-23-46
    3.  LTS3                       08-00-2F-01-23-47
    4.  LTS4                       08-00-2F-01-23-48

Enter the item number of the LTS to change, or:
    A to add an LTS to the LAN      F to finish (return to prev menu)
    D to delete the selected LTS    S to save the current configuration
    E to edit the selected LTS      Q to quit the configuration session
Enter selection: [2]

Enter configuration filename: [NTS.CONFIG] <Return>
Saving configuration...

Configuration saved.
```

Step IX. Quit the Configuration Session

Enter Q and press Return to terminate the CONFIG_NTS session.

PROCEDURE II. EDIT AN EXISTING CONFIGURATION

In this example, you add a second LAN to the existing configuration. The components of LAN-2 are HOSTA and three LTS units. As the only host, HOSTA performs all network management functions.

1. Update the network sketch.

2. Fill out a configuration worksheet for LAN-2.

3. Invoke CONFIG_NTS.

4. Add a new LAN.

5. Configure Network Management Functions.

6. Add a new HOST

7. Add the new LTS units to the configuration.

8. Save the configuration.

9. Quit the configuration session.

Step I. Update the Network Sketch

Figure A-3 show the components of LAN-1 and LAN-2.

NTS Network Topology Worksheet
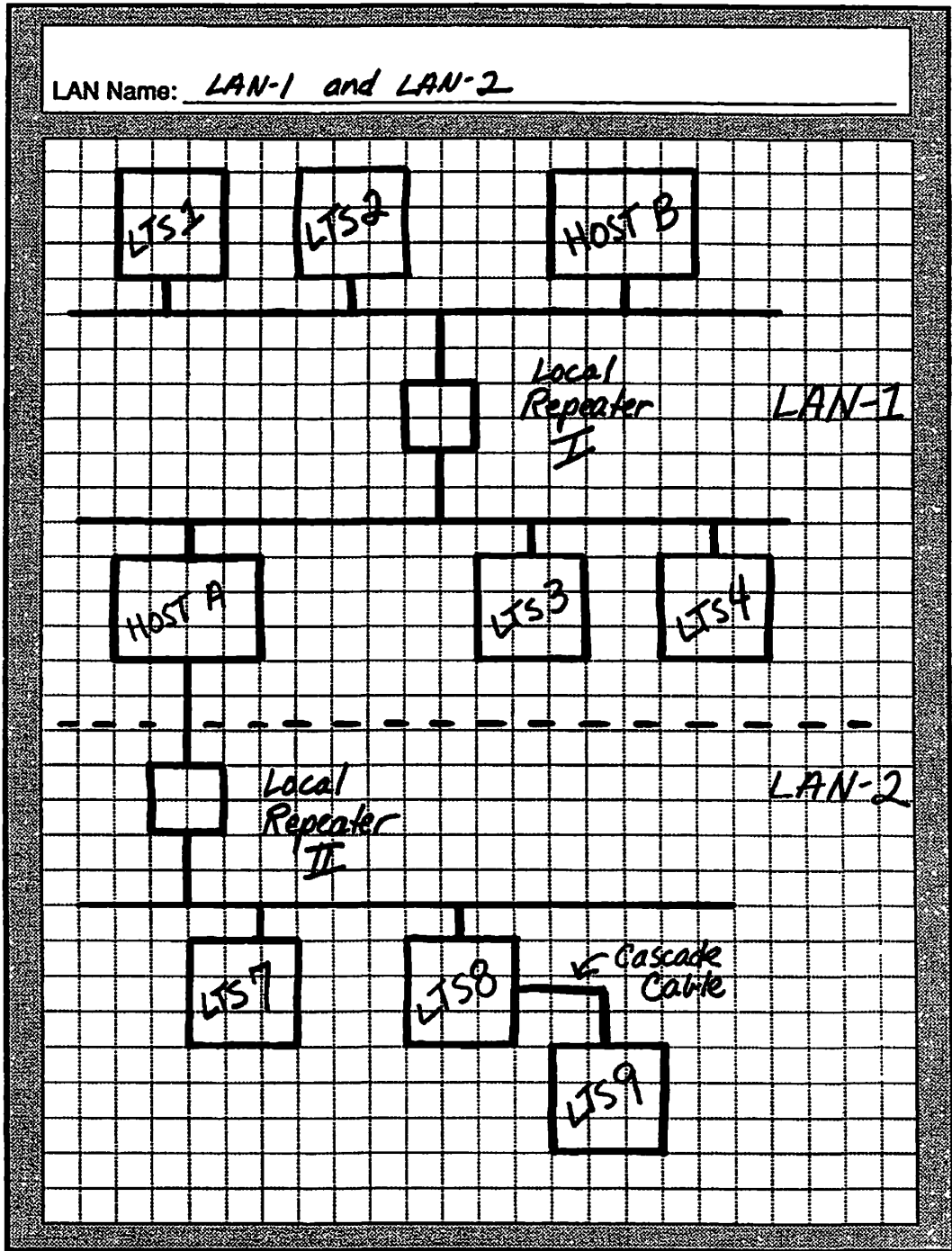
FIGURE A-3.   Updated Network Sketch Including LAN-1 and LAN-2

Step II. Fill out a Configuration Worksheet for LAN-2

Figure A-4 describes LAN-2.

NTS Configuration Worksheet

LAN Name: _LAN-2_

Description: _LAN-2 contains Host A, which performs network management. It also has LTS7, LTS8, and LTS9._

Allow Unconfigured Nodes: ☐ YES ☒ NO

Network Management:

Downline-Load Host:	Upline-Dump Host:	Event Reporting Host:
Primary: _Host A_	Primary: _Host A_	Primary: _Host A_
Secondary: _____	Secondary: _____	Secondary: _____

Host Name: _Host A_   Host Name: _____   Host Name: _____
Description: _____   Description: _____   Description: _____
  LHC: _00_   LHC: _____   LHC: _____
  LHC: _____   LHC: _____   LHC: _____
  LHC: _____   LHC: _____   LHC: _____
  LHC: _____   LHC: _____   LHC: _____

Host Name: _____   Host Name: _____   Host Name: _____
Description: _____   Description: _____   Description: _____
  LHC: _____   LHC: _____   LHC: _____
  LHC: _____   LHC: _____   LHC: _____
  LHC: _____   LHC: _____   LHC: _____
  LHC: _____   LHC: _____   LHC: _____

LTS Name: _LTS7_   LTS Name: _LTS8_
Address: 08-00-2F-_01_-_34_-_12_   Address: 08-00-2F-_01_-_34_-_13_

LTS Name: _LTS9_   LTS Name: _____
Address: 08-00-2F-_01_-_34_-_14_   Address: 08-00-2F-___-___-___

LTS Name: _____   LTS Name: _____
Address: 08-00-2F-___-___-___   Address: 08-00-2F-___-___-___

LTS Name: _____   LTS Name: _____
Address: 08-00-2F-___-___-___   Address: 08-00-2F-___-___-___

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FIGURE A-4.   NTS Configuration Worksheet for LAN-2

Step III. Invoke CONFIG_NTS

These steps to invoke the CONFIG_NTS utility.

1. To invoke CONFIG_NTS to edit the existing configuration file and format the screen for a PT200 terminal, enter **CONFIG_NTS NTS.CONFIG -EDIT -TTP PT200** and press Return.

```
OK, CONFIG_NTS NTS.CONFIG -EDIT -TTP TTY

CONFIG_NTS, Revision 23.0                    Edit configuration file:
                                                <MYSYS>NTS*>NTS.CONFIG

NTS.CONFIG IS FOR LAN-1, WHICH CONTAINS NODES A AND B,
AND LTS1 THROUGH LTS4.

File created on 18 Oct 90 at 16:44 by GEHRIG

    1.  Configure LAN                H.  Help
    2.  Configure Host by LAN        S.  Save current configuration
    3.  Configure Host by Name       Q.  Quit configuration session
    4.  Configure LTS by LAN
    5.  Configure LTS by Name
    6.  Display, list or spool configuration
    7.  Change configuration title

Enter selection:

Enter 1 or 2 lines of configuration title:
NTS.CONFIG FILE FOR LAN-1 AND LAN-2
```

2. Enter **7** to select the Change Configuration Title option.

3. Enter one or two lines of optional text to describe the new configuration.

4. Press Return to display the main menu.

Step IV. Add a new LAN

These steps add LAN-2 to the existing configuration file.

1. Enter **1** to select the Configure LAN option.

```
CONFIG_NTS, Revision 23.0                    Edit configuration file:
                                               <MYSYS>NTS*>NTS.CONFIG

NTS.CONFIG FILE FOR LAN-1 AND LAN-2

File created on 18 Oct 90 at 16:44 by GEHRIG

     1.  Configure LAN                 H.  Help
     2.  Configure Host by LAN         S.  Save current configuration
     3.  Configure Host by Name        Q.  Quit configuration session
     4.  Configure LTS by LAN
     5.  Configure LTS by Name
     6.  Display, list or spool configuration
     7.  Change configuration title

Enter selection:
```

2. Enter A to add a LAN to the configuration.

```
CONFIG_NTS, Revision 23.0                    Configuration file:
                                               NTS*>NTS.CONFIG

NTS.CONFIG FILE FOR LAN-1 AND LAN-2

The following LANs are configured:

-> 1. LAN-1
        LAN-1 CONTAINS HOSTA AND HOSTB. HOSTB PERFORMS NETWORK
MANAGEMENT.

Enter the number of the LAN to change or delete, or:
    A to add a LAN              F to finish (return to main menu)
    D to delete the selected LAN    S to save the current configuration
    E to edit the selected LAN      Q to quit the configuration session
Enter selection: [F]
```

Note

You can include as many as 32 LANs in an NTS configuration file.

3. Enter LAN-2 to specify the LAN name.

4. At the Description prompt, enter a brief line description of LAN-2

5. At the Allow unconfigured nodes on this LAN? prompt, enter NO.

6. Enter YES to configure Network Management Functions for this LAN.

```
CONFIG_NTS, Revision 23.0                                    Add LAN

Enter LAN name: [LAN-2] <Return>

Enter 1 or 2 lines of (optional) text to describe this LAN:
LAN-2 CONTAINS HOSTA, WHICH PERFORMS NETWORK MANAGEMENT.
IT ALSO HAS LTS7 LTS8 AND LTS9.

Allow unconfigured nodes on this LAN? NO

Configure network management functions for this LAN? YES
```

Step V. Configure Network Management Functions

These steps configure HOSTA as the primary and only network management host on LAN-2.

1. Enter **D** to select the Change Downline Load Host option.

```
CONFIG_NTS, Revision 23.0                                  LAN: LAN-2

Network management functions for the LAN are configured as follows:

       LTS Downline Load Hosts
           Primary  :
           Secondary:

       LTS Upline Dump Hosts
           Primary  :
           Secondary:

       LTS Event Reporting Hosts
           Primary  :
           Secondary:

Enter:
   D to change downline load hosts  F to finish (return to prev menu)
   U to change upline dump hosts     S to save the current configuration
   E to change event reporting hosts Q to quit the configuration session
Enter selection: [F]
```

2. Enter **HOSTA** to specify that as the primary downline load host, HOSTA will respond to requests for downline loads of software.

   CONFIG_NTS displays the following error message because we have not yet configured HOSTA on LAN-2.

   ```
   HOSTA is not a configured host on LAN LAN-2.
   Do you want to override errors due to unconfigured hosts?
   ```

   Enter **YES** to override error messages and continue to configure LAN-2 before you configure any hosts. You must configure HOSTA before CONFIG_NTS allows you to save the configuration file.

3. At the Secondary: prompt, press Return.

4. Enter **U** to select the Change Upline Dump Hosts option.

```
CONFIG_NTS, Revision 23.0                                    LAN: LAN-2

Network management functions for the LAN are configured as follows:

        LTS Downline Load Hosts
            Primary  : HOSTA
            Secondary:

        LTS Upline Dump Hosts
            Primary  :
            Secondary:

        LTS Event Reporting Hosts
            Primary  :
            Secondary:
Enter LTS downline load secondary host name:
Enter:
  D to change downline load hosts   F to finish (return to prev menu)
  U to change upline dump hosts      S to save the current configuration
  E to change event reporting hosts  Q to quit the configuration session
Enter selection: [F]
```

5. Enter **HOSTA** to specify that as the primary upline dump host, HOSTA will respond to requests to store upline dumps of software.

6. At the Secondary: prompt, press Return.

7. Enter **E** to select the Change Event Reporting Hosts option.

```
CONFIG_NTS, Revision 23.0                                    LAN: LAN-2

Network management functions for the LAN are configured as follows:

        LTS Downline Load Hosts
            Primary  : HOSTA
            Secondary:

        LTS Upline Dump Hosts
            Primary  : HOSTA
            Secondary:

        LTS Event Reporting Hosts
            Primary  :
            Secondary:
Enter LTS upline dump secondary host name:
Enter:
  D to change downline load hosts   F to finish (return to prev menu)
  U to change upline dump hosts      S to save the current configuration
  E to change event reporting hosts  Q to quit the configuration session
Enter selection: [F]
```

8. Enter **HOSTA** to specify that as the primary event reporting host, HOSTA will log all LTS unit event messages.

9. At the Secondary: prompt, press Return.

10. Review your entries; if they are correct, enter an @ sign to return to the main menu.

```
CONFIG_NTS, Revision 23.0                                LAN: LAN-2

Network management functions for the LAN are configured as follows:

     LTS Downline Load Hosts
        Primary  : HOSTA
        Secondary:

     LTS Upline Dump Hosts
        Primary  : HOSTA
        Secondary:

     LTS Event Reporting Hosts
        Primary  : HOSTA
        Secondary:
Enter LTS event reporting secondary host name:
Enter:
   D to change downline load hosts   F to finish (return to prev menu)
   U to change upline dump hosts     S to save the current configuration
   E to change event reporting hosts Q to quit the configuration session
Enter selection: [F]
```

Step VI. Add the New Host

These steps add the existing HOSTA to LAN-2.

1. Enter 3 to select the Configure Host by Name option

```
CONFIG_NTS, Revision 23.0               Edit configuration file:
                                           <MYSYS>NTS*>NTS.CONFIG

NTS.CONFIG FILE FOR LAN-1 AND LAN-2

File created on 18 Oct 90 at 16:44 by GEHRIG .

     1.  Configure LAN              H.  Help
     2.  Configure Host by LAN      S.  Save current configuration
     3.  Configure Host by Name     Q.  Quit configuration session
     4.  Configure LTS by LAN
     5.  Configure LTS by Name
     6.  Display, list or spool configuration
     7.  Change configuration title

Enter selection: 3
```

2. Enter E to select the Edit the selected host option.

```
CONFIG_NTS, Revision 23.0              Configure host by name

The following hosts are configured

->1.  HOSTA
   2.  HOSTB


Enter the item number of the host to change, or:
   A to add a host to the LAN       F to finish (return to prev menu)
   D to delete the selected host    S to save the current configuration
   E to edit the selected host      Q to quit the configuration session
Enter selection: [E]
```

3. Enter **A** to select the Add an LHC to a LAN option

4. At the `Enter the LAN name to which the LHC is connected:` prompt, enter **LAN-2.**

5. At the LHC prompt, enter **LHC00** to add the LHC board to the configuration.

6. Enter an **@** sign to return to the Main menu.

```
CONFIG_NTS, Revision 23.0                         Edit host: HOSTA

The host is configured as follows:

     on LAN-2:                     LHC00
     on LAN-1:                     LHC01

Enter:
   A to add an LHC to a LAN        F to finish (return to prev menu)
   D to delete an LHC              S to save the current configuration
   R to rename the host            Q to quit the configuration session
Enter selection:

Enter: @
       _
```

Step VII. Add the New LTS Units to the Configuration

These steps add LTS7, LTS8, and LTS9 to the configuration.

1. Enter **4** to select the Configure LTS by LAN option.

```
CONFIG_NTS, Revision 23.0                    Edit configuration file:
                                                <MYSYS>NTS*>NTS.CONFIG

NTS.CONFIG FILE FOR LAN-1 AND LAN-2

File created on 10 Oct 90 at 16:44 by GEHRIG

        1.  Configure LAN              H.  Help
        2.  Configure Host by LAN      S.  Save current configuration
        3.  Configure Host by Name     Q.  Quit configuration session
        4.  Configure LTS by LAN
        5.  Configure LTS by Name
        6.  Display, list or spool configuration
        7.  Change configuration title

Enter selection:
```

2. Enter 2 to select the second LAN on the list, LAN-2.

```
CONFIG_NTS, Revision 23.0          Configure LTS by LAN — LAN selection

The following LANs are configured:

-> 1.  LAN-1
   2.  LAN-2

Enter the item number of the LAN on which the LTS will be configured,
or:
                             F to finish (return to main menu)
                             S to save the current configuration
                             Q to quit the configuration session
Enter selection: [1]

Enter: 2·
```

3. Enter A select the Add an LTS to the LAN option.

```
CONFIG_NTS, Revision 23.0               Configuring LTS on LAN: LAN-2

LAN-2 CONTAINS HOSTA, WHICH PERFORMS NETWORK MANAGEMENT.
IT ALSO HAS LTS7 LTS8 AND LTS9.
No LTSs are configured on this LAN.

Enter:
    A to add an LTS to the LAN      F to finish (return to prev menu)
                                    S to save the current configuration
                                    Q to quit the configuration session
Enter selection: [A]
```

4. Enter LTS7 to name the LTS unit.

5. The address prompt contains the standard Prime address prefix 08-00-2f-. Enter 01-34-12 to specify the last six characters of the seventh LTS unit's address.

```
CONFIG_NTS, Revision 23.0                      Add LTS to LAN: LAN-2

Enter LTS name: LTS7

Enter LTS address (nn-nn-nn): 00-00-2F-01-34-12
```

Enter **A** to select the Add an LTS to the LAN option.

```
CONFIG_NTS, Revision 23.0              Configuring LTS on LAN: LAN-2

LAN-2 CONTAINS HOSTA, WHICH PERFORMS NETWORK MANAGEMENT.
IT ALSO HAS LTS7 LTS8 AND LTS9.
The following LTSs are configured on this LAN:

-> 1. LTS7                             00-00-2F-01-34-12

Enter the item number of the LTS to change, or:
    A to add an LTS to the LAN       F to finish (return to prev menu)
    D to delete the selected LTS     S to save the current configuration
    E to edit the selected LTS       Q to quit the configuration session
Enter selection: [A]
```

6. Enter **LTS8** to name the LTS unit.

7. Enter **01-34-13** to specify the eighth LTS unit's address.

```
CONFIG_NTS, Revision 23.0                      Add LTS to LAN: LAN-2

Enter LTS name: LTS8

Enter LTS address (nn-nn-nn): 00-00-2F-01-34-13
```

8. Enter **A** to select the Add an LTS to the LAN option.

```
CONFIG_NTS, Revision 23.0              Configuring LTS on LAN: LAN-2

LAN-2 CONTAINS HOSTA, WHICH PERFORMS NETWORK MANAGEMENT.
IT ALSO HAS LTS7 LTS8 AND LTS9.
The following LTSs are configured on this LAN:

-> 1. LTS7                             00-00-2F-01-34-12
   2. LTS8                             00-00-2F-01-34-13

Enter the item number of the LTS to change, or:
    A to add an LTS to the LAN       F to finish (return to prev menu)
    D to delete the selected LTS     S to save the current configuration
    E to edit the selected LTS       Q to quit the configuration session
Enter selection: [A]
```

9. Enter **LTS9** to name the LTS unit.

10. Enter **01-34-14** to specify the ninth LTS Unit's address.

```
CONFIG_NTS, Revision 23.0                    Add LTS to LAN: LAN-2

Enter LTS name: LTS9

Enter LTS address (nn-nn-nn): 08-00-2F-01-34-14
```

Step VIII. Save the Configuration

Use these steps to save your configuration file in a disk file from any menu.

1. Enter S to save the current configuration to disk.

2. Press Return to save the configuration file in the default file name.

```
CONFIG_NTS, Revision 23.0              Configuring LTS on LAN: LAN-2

LAN-2 contains HOSTA, which performs NETWORK MANAGEMENT.
It also has LTS7 LTS8 and LTS9.
The following LTSs are configured on this LAN:

-> 1.  LTS7                         08-00-2F-01-34-12
   2.  LTS8                         08-00-2F-01-34-13
   3.  LTS9                         08-00-2F-01-34-14

Enter the item number of the LTS to change, or:
    A to add an LTS to the LAN        F to finish (return to prev menu)
    D to delete the selected LTS      S to save the current configuration
    E to edit the selected LTS        Q to quit the configuration session
Enter selection: [2]
```

The following message appears at the bottom of the screen.

```
Enter configuration filename: NTS.CONFIG <Return>
Saving configuration...

Configuration saved.
```

Step IX. Quit the Configuration Session

Enter Q and press Return to terminate the CONFIG_NTS session.

OBSOLETE DIRECTIVES

This appendix contains the obsolete NTSBUF and NTSABF configuration directives.

NTSBUF

NTSBUF sets the I/O buffer sizes and flow control thresholds for the NTS and TCP/IP TELNET terminal lines. Do not use this directive for any other type of line.

Format

NTSBUF *number in-buff-size out-buff-size XOFF-lag XON-lag*

where:

number
Indicates the PRIMOS line number for the NTS or TCP/IP TELNET terminal line. Enter 0.

in-buff-size
Indicates the terminal input buffer size in halfwords (two characters per halfword). If you enter 0, the input buffer size remains unchanged. The default value is 200_8 (128 decimal). The minimum value allowed is 10_8 (8 decimal); the maximum is 7777_8 (4095 decimal) halfwords.

out-buff-size
Indicates the terminal output buffer size in halfwords (two characters per halfword). If you enter 0, the input buffer size remains unchanged. The default value is 300_8 (192 decimal). The minimum value allowed is 10_8 (8 decimal); the maximum is 7777_8 (4095 decimal).

XOFF-lag
Specifies the number of halfwords in the input buffer that will cause PRIMOS to send

an XOFF flow control signal to the terminal. This number must be less than the terminal input buffer size. The default value is 60 percent of the input buffer size, meaning that PRIMOS will flow control the terminal when the input buffer is 60 percent full.

XON-lag

Specifies the number of halfwords in the terminal input buffer that will cause PRIMOS to send an XON flow control signal to the terminal. (PRIMOS sends this signal to reactivate terminal input after it has been suspended with XOFF.) The default value is 20 percent of the input buffer size. In other words, when the buffer falls back to 20 percent utilization, PRIMOS reenables terminal input.

If you attempt to use the NTSBUF directive when NTSUSR is 0, PRIMOS displays this message at the supervisor terminal:

```
Warning: NTSBUF directive issued with no NTS terminal users
configured. This directive is ignored. (CINIT).
```

NTSABF

NTSABF sets the I/O buffer sizes and flow control thresholds for NTS assignable lines; that is, the set of lines that can be associated with NTS_ASSOCIATE and then assigned by users. NTSABF is for NTS assignable lines only; use the NTS BUF for TELNET lines and the CAB command for any other type of line.

Format

NTSABF *number in-buff-size out-buff-size XOFF-lag XON-lag*

where:

number
Indicates the PRIMOS line number for the NTS assignable line. Enter 0.

in-buff-size
Indicates the input buffer size in halfwords (two characters per halfword). If you enter 0, the input buffer size remains unchanged. The default value is 200_8 (128 decimal). The minimum value allowed is 1; the maximum is 7777_8 (4095 decimal).

out-buff-size
Indicates the output buffer size in halfwords (two characters per halfword). If you enter 0, the input buffer size remains unchanged. The default value is 300_8 (192 decimal). The minimum value allowed is 1; the maximum is 7777_8 (4095 decimal).

XOFF-lag
Specifies the number of halfwords in the input buffer that will cause PRIMOS to send

an XOFF flow control signal to the asynchronous device. This number must be less than the device's input buffer size. The default value is 60 percent of the input buffer size, meaning that PRIMOS will flow control the device when the input buffer is 60 percent full.

XON-lag

Specifies the number of halfwords in the terminal input buffer that will cause PRIMOS to send an XON flow control signal to the asynchronous device. (PRIMOS sends this signal to reactivate device input after it has been suspended with XOFF.) The default value is 20 percent of the input buffer size. In other words, when the buffer falls back to 20 percent utilization, PRIMOS reenables device input.

If you attempt to use the NTSABF directive when NTSUSR is 0, PRIMOS displays this message at the supervisor terminal:

```
Warning: NTSABF directive issued with no NTS terminal users
configured. This directive is ignored. (CINIT).
```

EXTRA WORKSHEETS

This appendix contains multiple copies of grids and worksheets to use when you plan or change your NTS configuration.

NTS Network Topology Worksheet
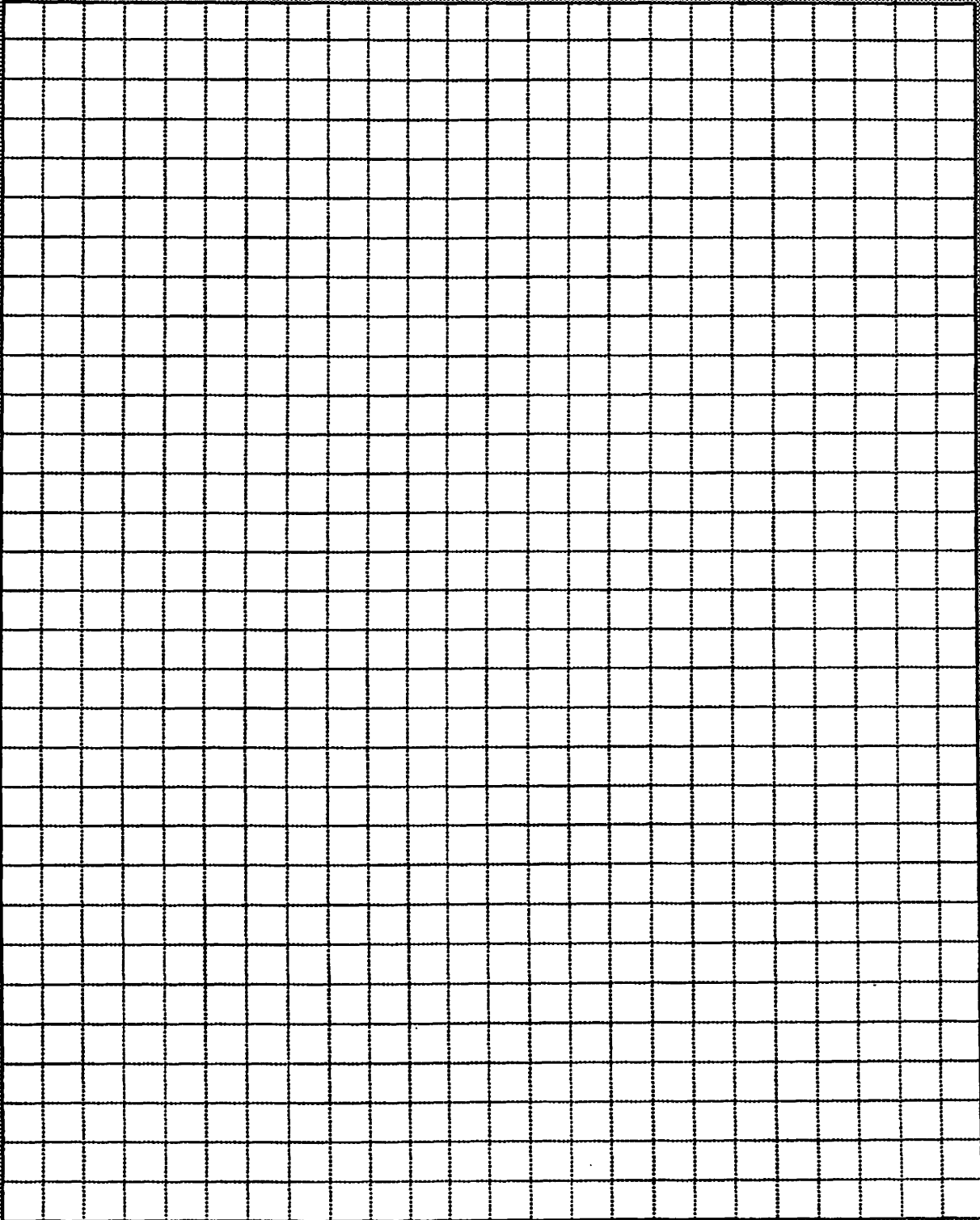
LAN Name: _____

NTS Network Topology Worksheet

LAN Name: _____

NTS Network Topology Worksheet

LAN Name: _____

ADI.DI0139.2LA
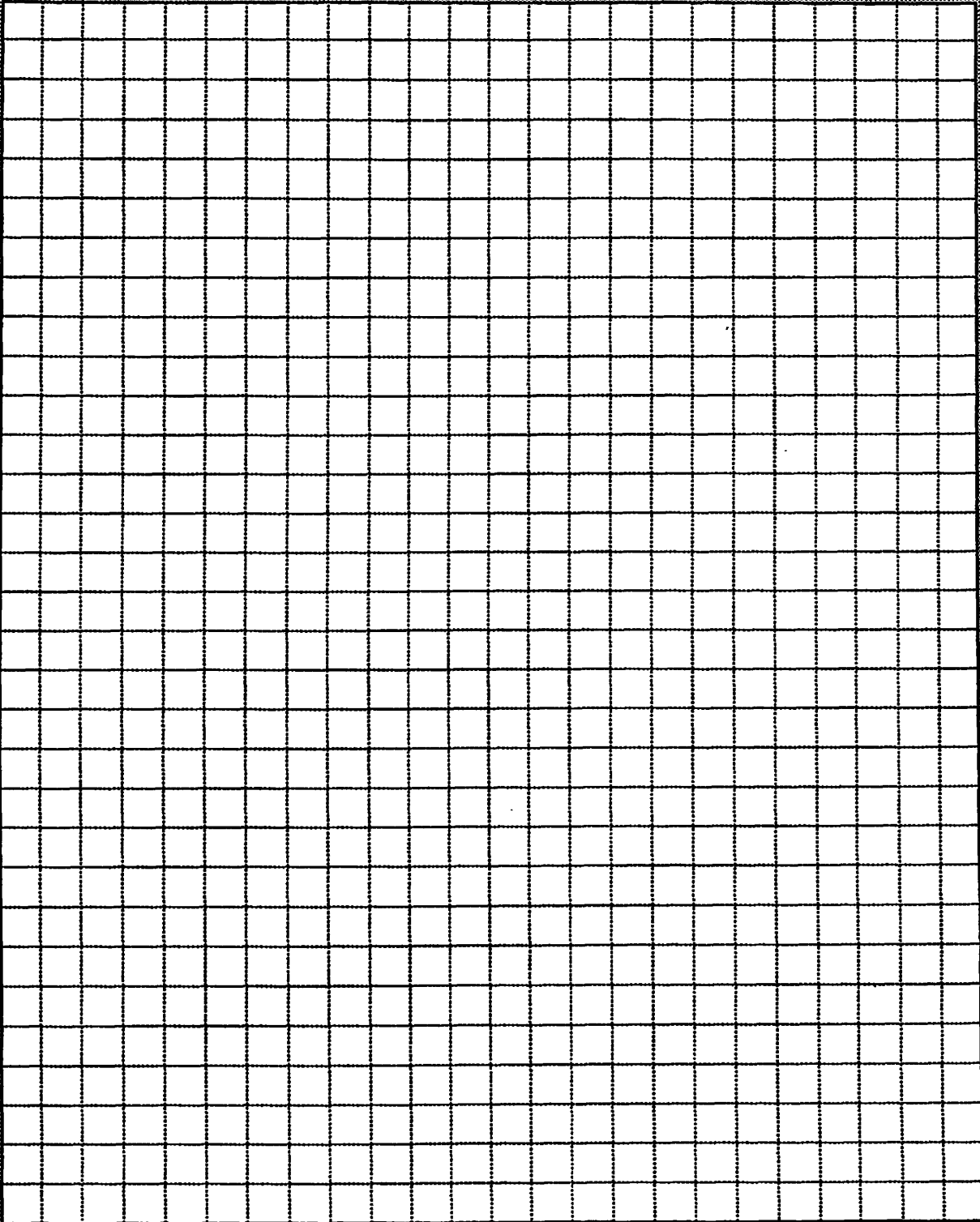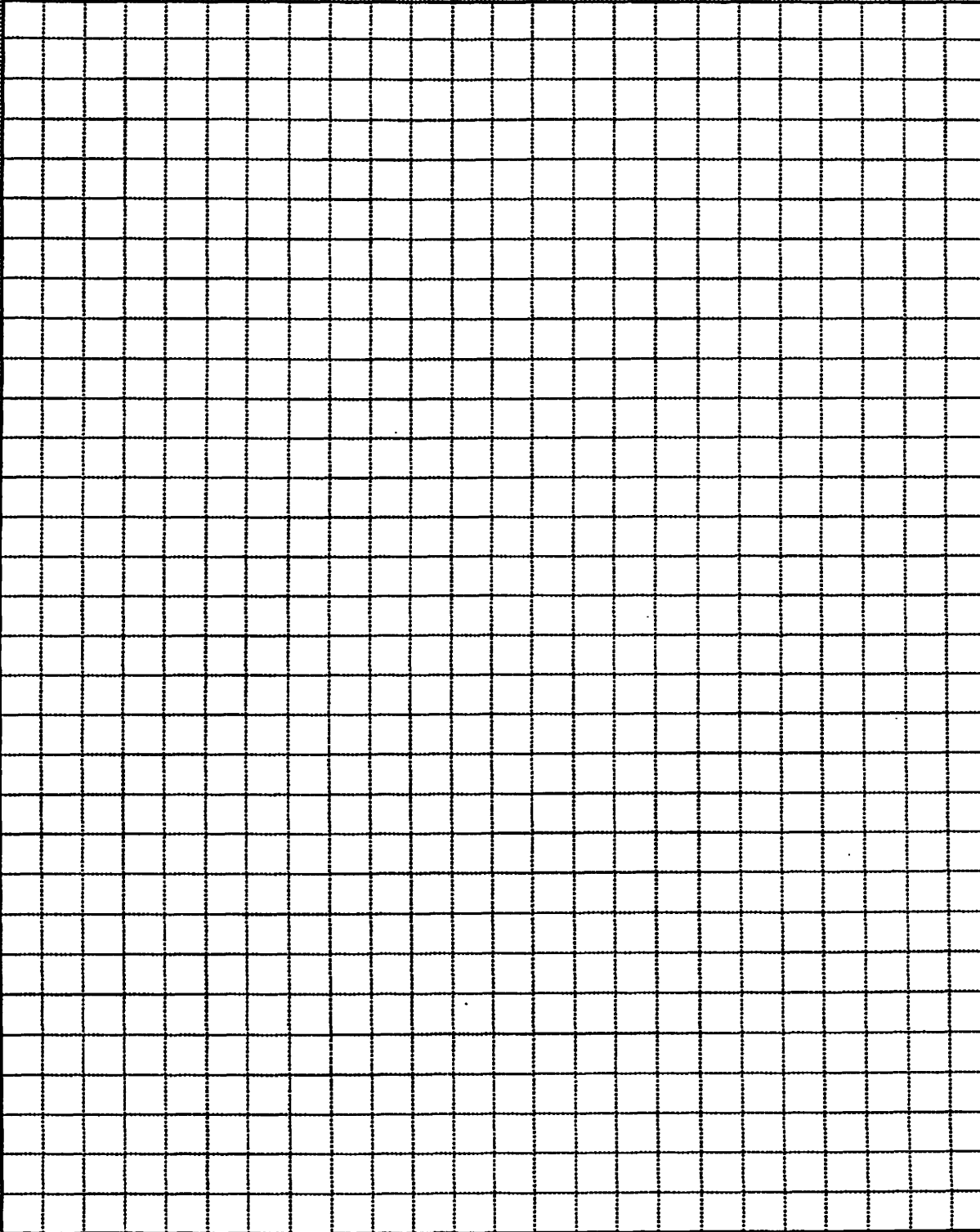
NTS Network Topology Worksheet

LAN Name: _____

NTS Configuration Worksheet

LAN Name: _____

Description: _____

_____

Allow Unconfigured Nodes: ❏ YES ❏ NO

Network Management:

Downline Load Host:	Upline Dump Host:	Event Reporting Host:
Primary: _____	Primary: _____	Primary: _____
Secondary: _____	Secondary: _____	Secondary: _____

Host Name: _____ **Host Name:** _____ **Host Name:** _____

Description: _____ **Description:** _____ **Description:** _____

LHC: _____   LHC: _____   LHC: _____

LHC: _____   LHC: _____   LHC: _____

LHC: _____   LHC: _____   LHC: _____

LHC: _____   LHC: _____   LHC: _____

Host Name: _____ **Host Name:** _____ **Host Name:** _____

Description: _____ **Description:** _____ **Description:** _____

LHC: _____   LHC: _____   LHC: _____

LHC: _____   LHC: _____   LHC: _____

LHC: _____   LHC: _____   LHC: _____

LHC: _____   LHC: _____   LHC: _____

LTS Name: _____   **LTS Name:** _____

Address: 08-00-2F-__ __ - __ __ - __ __   Address: 08-00-2F-__ __ - __ __ - __ __

LTS Name: _____   **LTS Name:** _____

Address: 08-00-2F-__ __ - __ __ - __ __   Address: 08-00-2F-__ __ - __ __ - __ __

LTS Name: _____   **LTS Name:** _____

Address: 08-00-2F-__ __ - __ __ - __ __   Address: 08-00-2F-__ __ - __ __ - __ __

LTS Name: _____   **LTS Name:** _____

Address: 08-00-2F-__ __ - __ __ - __ __   Address: 08-00-2F-__ __ - __ __ - __ __

AD2_DR0159.2LA

NTS Configuration Worksheet

LAN Name: _____

Description: _____

_____

Allow Unconfigured Nodes: ❏ YES ❏ NO

Network Management:

Downline Load Host:	Upline Dump Host:	Event Reporting Host:
Primary: _____	Primary: _____	Primary: _____
Secondary: _____	Secondary: _____	Secondary: _____

Host Name: _____	Host Name: _____	Host Name: _____
Description: _____	Description: _____	Description: _____
LHC: _____	LHC: _____	LHC: _____
LHC: _____	LHC: _____	LHC: _____
LHC: _____	LHC: _____	LHC: _____
LHC: _____	LHC: _____	LHC: _____

Host Name: _____	Host Name: _____	Host Name: _____
Description: _____	Description: _____	Description: _____
LHC: _____	LHC: _____	LHC: _____
LHC: _____	LHC: _____	LHC: _____
LHC: _____	LHC: _____	LHC: _____
LHC: _____	LHC: _____	LHC: _____

LTS Name: _____	LTS Name: _____
Address: 08-00-2F-__ __ - __ __ - __ __	Address: 08-00-2F-__ __ - __ __ - __ __
LTS Name: _____	LTS Name: _____
Address: 08-00-2F-__ __ - __ __ - __ __	Address: 08-00-2F-__ __ - __ __ - __ __
LTS Name: _____	LTS Name: _____
Address: 08-00-2F-__ __ - __ __ - __ __	Address: 08-00-2F-__ __ - __ __ - __ __
LTS Name: _____	LTS Name: _____
Address: 08-00-2F-__ __ - __ __ - __ __	Address: 08-00-2F-__ __ - __ __ - __ __

NTS Configuration Worksheet

LAN Name: _____

Description: _____

_____

Allow Unconfigured Nodes: ☐ YES ☐ NO

Network Management:

Downline Load Host:

Primary: _____

Secondary: _____

Upline Dump Host:

Primary: _____

Secondary: _____

Event Reporting Host:

Primary: _____

Secondary: _____

Host Name: _____

Description: _____

  LHC: _____

  LHC: _____

  LHC: _____

  LHC: _____

Host Name: _____

Description: _____

  LHC: _____

  LHC: _____

  LHC: _____

  LHC: _____

Host Name: _____

Description: _____

  LHC: _____

  LHC: _____

  LHC: _____

  LHC: _____

Host Name: _____

Description: _____

  LHC: _____

  LHC: _____

  LHC: _____

  LHC: _____

Host Name: _____

Description: _____

  LHC: _____

  LHC: _____

  LHC: _____

  LHC: _____

Host Name: _____

Description: _____

  LHC: _____

  LHC: _____

  LHC: _____

  LHC: _____

LTS Name: _____

Address: 08-00-2F-__ __ - __ __ - __ __

LTS Name: _____

Address: 08-00-2F-__ __ - __ __ - __ __

LTS Name: _____

Address: 08-00-2F-__ __ - __ __ - __ __

LTS Name: _____

Address: 08-00-2F-__ __ - __ __ - __ __

LTS Name: _____

Address: 08-00-2F-__ __ - __ __ - __ __

LTS Name: _____

Address: 08-00-2F-__ __ - __ __ - __ __

LTS Name: _____

Address: 08-00-2F-__ __ - __ __ - __ __

LTS Name: _____

Address: 08-00-2F-__ __ - __ __ - __ __

NTS Configuration Worksheet

LAN Name: _____

Description: _____

_____

Allow Unconfigured Nodes: ❑ YES   ❑ NO

Network Management:

Downline Load Host:	Upline Dump Host:	Event Reporting Host:
Primary: _____	Primary: _____	Primary: _____
Secondary: _____	Secondary: _____	Secondary: _____

Host Name: _____	Host Name: _____	Host Name: _____
Description: _____	Description: _____	Description: _____
LHC: _____	LHC: _____	LHC: _____
LHC: _____	LHC: _____	LHC: _____
LHC: _____	LHC: _____	LHC: _____
LHC: _____	LHC: _____	LHC: _____
Host Name: _____	Host Name: _____	Host Name: _____
Description: _____	Description: _____	Description: _____
LHC: _____	LHC: _____	LHC: _____
LHC: _____	LHC: _____	LHC: _____
LHC: _____	LHC: _____	LHC: _____
LHC: _____	LHC: _____	LHC: _____

LTS Name: _____	LTS Name: _____
Address: 08-00-2F-__ __ - __ __ - __ __	Address: 08-00-2F-__ __ - __ __ - __ __
LTS Name: _____	LTS Name: _____
Address: 08-00-2F-__ __ - __ __ - __ __	Address: 08-00-2F-__ __ - __ __ - __ __
LTS Name: _____	LTS Name: _____
Address: 08-00-2F-__ __ - __ __ - __ __	Address: 08-00-2F-__ __ - __ __ - __ __
LTS Name: _____	LTS Name: _____
Address: 08-00-2F-__ __ - __ __ - __ __	Address: 08-00-2F-__ __ - __ __ - __ __

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