Prime ®

**Operator's Guide
to Prime Networks**

Revision 21.0

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Operator's Guide to Prime Networks

First Edition

Robert Canavello

*This guide documents the software operation of the
Prime Computer and its supporting systems and
utilities as implemented at Master Disk Revision
Level 21.0 (Rev. 21.0)*

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Contents

About This Book

The *The Operator's Guide to Prime Networks* provides reference information on running network-related programs and monitoring network activity. It is intended for operators who are familiar with PRIMOS® commands.

This guide contains twelve chapters and five appendices:

- Chapter 1 is an overview of the tasks that you are required to perform to keep a networked system running smoothly.

- Chapter 2 discusses controller downline loading and upline dumping procedures, as well as summarizing the syntax and options for the COMM_CONTROLLER command.

- Chapter 3 explains how to start up and shut down networks.

- Chapter 4 itemizes the operation and monitoring of half-duplex lines.

- Chapter 5 describes the network servers and how to keep track of them.

- Chapter 6 provides detailed instructions on FTS monitoring.

- Chapters 7 through 11 are devoted to the MONITOR_NET utility.

- Chapter 12 describes the various tools for diagnosing network problems.

- Appendix A lists START_NET and STOP_NET error messages.

- Appendix B lists START_NTS and STOP_NTS error messages.

- Appendix C lists MONITOR_NET error messages.

- Appendix D lists FTS error messages.

- Prime Network Glossary describes Prime networking terms. Networking terms are printed in boldface the first time they appear in the text.

Related Documentation

This guide is one of a series of six volumes on Prime networks, some of which may also be of interest to operators. The other books in the series are listed below.

- *User's Guide to Prime Network Services* (DOC10115-1LA)

- *Programmer's Guide to Prime Networks* (DOC10113-1LA)

- *NTS User's Guide* (DOC10117-1LA)

- *PRIMENET Planning and Configuration Guide* (DOC7352-3LA)

- *NTS Planning and Configuration Guide* (DOC10159-1LA)

Prime Documentation Conventions

The following conventions are used in command formats, statement formats, and in examples throughout this document. Examples illustrate the uses of these commands and statements in typical applications.

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.	NETLINK
lowercase	In command formats, words in lowercase indicate variables for which you must substitute a suitable value.	NETLINK -TO nodename
Abbreviations in format statements	If an uppercase word in a command format has an abbreviation, either the abbreviation is underscored or the abbreviation is placed beneath the name.	DEBUG -TERMINAL_TYPE -TTP
Brackets [ ]	Brackets enclose a list of one or more optional items. Choose none, one, or more of these items.	FTR -HELP $\begin{bmatrix} \text{subject} \\ \text{USAGE} \end{bmatrix}$
Braces { }	Braces enclose a list of items. Choose one and only one of these items.	CLOSE $\begin{Bmatrix} \text{file} \\ \text{outfile} \end{Bmatrix}$
Parentheses ( )	In command or statement formats, you must enter parentheses exactly as shown.	DIM array (row, col)
Hyphen –	Wherever a hyphen appears as the first character of an option, it is a required part of that option.	FTR -HELP
Bold italics in examples	In examples, user input is in bold italics but system prompts and output are not.	OK, *RESUME MY_PROG* This is the output of MY_PROG.CPL OK,
Angle brackets in messages < >	In messages, text enclosed within angle brackets indicates a variable for which the program substitutes the appropriate value.	Disk <diskname>

1
Operating a Prime System on a Network

The first part of this chapter defines some terms that may be helpful to you as an operator of a Prime system on a network. The remaining sections describe the responsibilities you may have when operating a Prime system on a network.

Although the job of configuring networks is usually the responsibility of a Network Administrator, network devices and network architectures are described briefly here to create a context for the operator tasks.

What Is a Network?

A network is a group of independent computer systems, or nodes, that are connected by physical or logical communication links. This connection enables nodes to communicate and share resources. A network can consist of systems that are physically connected and communicate over short distances. These systems are called Local Area Networks (LANs). Systems that communicate over long distances are called Wide Area Networks (WANs). WANs use temporary dialup lines or permanently leased lines to establish connections between nodes.

Packet Switched Data Networks (PSDNs) are networks that follow established rules, or protocol, to transmit data over long distances. Long data messages are divided into smaller units called packets. Examples of PSDNs include TELENET, UNINET, and TYMNET.

Network Devices

The devices that link the communication media to 50 Series™ systems are called communications controllers. A controller is a printed circuit board that plugs into the backplane of a computer system. The list that follows shows the different types of communications media that are supported by Prime systems and the controller(s) associated with each.

Medium	*Controller*
RINGNET™	PRIMENET Node Controller (PNC)
LAN300 Local Area Network	LAN Host Controller (LHC)
Full-duplex synchronous lines	Multiple Data Link Controller (MDLC) Intelligent Communications Subsystem (ICS)
Half-duplex synchronous lines	Multiple Data Link Controller (MDLC) Intelligent Communications Subsystem (ICS Model 3 only)
Packet Switched Data Network (PSDN)	Multiple Data Link Controller (MDLC) Intelligent Communications Subsystem (ICS)

These controllers are configured at cold start using PRIMOS directives. Refer to the *PRIMENET Planning and Configuration Guide* for detailed information on how to configure these controllers on your system.

Network Architectures

In addition to the physical connection media, networks require software to transfer data uncorrupted and in the correct order. Network software mechanisms are associated with the physical media to create network architectures. For example, PRIMENET™ is the network architecture that supports communications between Prime systems. Systems Network Architecture (PRIME/SNA)™ is the architecture that supports communications between Prime systems and IBM systems. You use a network configuration program to configure a network architecture. The configuration program produces a **network configuration file** that defines the network's environment and operation.

For example, the PRIMENET configuration file provides the following information:

- The node names for each node on the network

- The types of access permitted between nodes

To configure a particular network architecture, you or your Network Administrator need to refer to the configuration guide for each type of network that your site supports.

Responsibilities of the Network Operator

Your responsibilities as a network operator can include

- Booting, loading, and dumping intelligent network controllers
- Starting and stopping networks

- Running programs that support network event logging and network utilities
- Monitoring network activity for proper operation
- Diagnosing and correcting network problems

ting and Dumping Network Devices

Because intelligent controllers are independent processors, they must be booted and loaded before they can operate. To boot the controller the host system reads a load file and downline loads software to the controller. A self-verification procedure is typically performed before the downline load to ensure that the controller is operational. Once booted, the controller usually operates without further operator intervention.

If a controller fails, you can retrieve a controller's memory image and write that image to a file on disk with the **upline dump** procedure. An analyst can review the contents of the file to determine why the controller failed.

Use the COMM_CONTROLLER command to downline load and upline dump intelligent controllers. Chapter 2 of this guide, Booting and Dumping Communication Controllers, describes the COMM_CONTROLLER command and gives examples of its use.

Starting and Stopping Networks

Most of the networks for Prime systems are initialized automatically when the system is cold started. However, you can start and stop network software mechanisms independent of a PRIMOS cold start. The commands for starting and stopping networks are listed here and described in detail in subsequent chapters of this guide.

- START_NET initializes PRIMENET.
- STOP_NET terminates PRIMENET operation.
- START_NTS initializes the Network Terminal Service (NTS) subsystem. NTS supports communications between terminals and hosts over a LAN300 network.
- STOP_NTS shuts down NTS operation.
- NET assigns, starts, stops, and unassigns half-duplex lines.

The sample PRIMOS.COMI file below illustrates how to initialize these networks at cold start.

```
/* Startup file for SYSA.   Running 21.0 PRIMOS.
CONFIG -DATA CONFIG
ATTACH CMDNC0                     /* Make sure we're at CMDNC0
ADD 51460 3062 61062 100463 3260 61260   /* Add local disks
AMLC TTY  0 2413
AMLC TTY  1 2413
AMLC TTY  2 2413
AMLC TTY  3 2413
AMLC TTY  4 2413
AMLC TTY  5 2413
AMLC TTY  6 2413
AMLC TTY  7 2413
AMLC TTY 10 0213
ASSIGN AMLC TTYNOP 10
COMO -TTY
START_DSM                         /*Initiate DSM
COMM_CONTROLLER -LOAD -DEV LHC -ALL -NQ
/*Downline load LAN300 Host Controller
START_NET                         /*Initiate PRIMENET
START_NTS                         /*Initiate Network Terminal Service
OPR 1                             /* SHARE requires OPR 1
SHARE SYSTEM>ED2000 2000          /* SHARE the ED editor
SHARE SYSTEM>ML2222 2222          /* SHARE MAGLIB
R SYSTEM>ML4000 1/16
CO SYSTEM>BASICV.SHARE.COMI 7     /* SHARE BASICV compiler
CO SYSTEM>EMACS.SHARE.COMI 7      /* SHARE EMACS
CO SYSTEM>DBG.SHARE.COMI 7        /* SHARE DBG debugger
CO SYSTEM>FTS.SHARE.COMI 7        /* SHARE File Transfer Service
CO SYSTEM>SPOOL.SHARE.COMI 7
/* Share PRIMOS segments for reading.
SHARE 4 200
SHARE 6 200
SHARE 7 200
SHARE 10 200
SHARE 11 200
SHARE 12 200
SHARE 14 200
SHARE 16 200
SHARE 27 200
SHARE 30 200
SHARE 31 200
SHARE 33 200
SHARE 34 200
SHARE 37 200
SHARE 54 200
```

```
SHARE 67 200
SHARE 70 200
SHARE 141 200
SHARE 142 200
SHARE 600 200
SHARE 601 200
SHARE 717 200
OPR 0
ADD -ON S49 SYSS49 TPUBS TPUBS2 TPUBS3 TPUBS0 TPUB10 TPUB13
ADD -ON NET USRNET
CLOSE 7
FTOP -START_MNGR              /* Start the FTS manager YTSMAN
FTOP -START_SRVR FTP          /* Start FTS server under the name FTP
BATCH -START -RLV 1 -TS 30
MAX ALL
CO -END
```

Running Network Utilities

The START_DSM command initializes Distributed System Management (DSM) programs on your system. These programs support system and network administration and event logging. The STOP_DSM command shuts down DSM operation. These commands are described in Chapter 3, Starting and Stopping Network Programs.

The FTOP command starts and stops the File Transfer Service (FTS). The FTOP command is descibed in Chapter 6, Monitoring FTS.

Monitoring Network Activity

Monitoring a network involves primarily running programs to verify the operational state of different communications media and to gauge the amount of activity on each medium. The network monitoring utilities described in this guide are

- The MONITOR_NET utility
- The STATUS command

The MONITOR_NET utility provides information on network activity and condition. Four monitors comprise MONITOR_NET: the Ring Monitor, the Synchronous Line Monitor, the Virtual Circuit Monitor, and the LAN300 Monitor. Each of these monitors has its own displays that provide information particular to that monitor. You can either display live data interactively or store MONITOR_NET output in a file and display it at a later time. MONITOR_NET can also produce text file reports.

Three arguments to the STATUS command provide information about a network:

- STATUS NETWORK
- STATUS USERS
- STATUS NTS

STATUS NETWORK lists all of the nodes (Prime ...   ...-P..ne) to which the local no access. The display lists the state of the current connection for each media type.

STATUS USERS lists all the processes currently active on the system, including users who have logged in from a remote node. The display also lists phantom server processes that are associated with network services, such as PRIMENET or DSM.

STATUS NTS displays the operational state of the Network Terminal Service (NTS) and lists the pathname of the NTS configuration file.

Diagnosing Network Problems

Two administrative products based on DSM are System Information and Metering (SIM) and Remote System User (RESUS). SIM commands that relate to network monitoring are summarized in Chapter 12 of this guide. Refer to the *DSM User's Guide* for detailed information on SIM and RESUS.

Other utilities that you can run to diagnose network problems are listed here and described in detail in Chapter 12, Diagnosing Network Problems.

- The FIND_RING_BREAK program locates a break in the connection between the nodes on a RINGNET subnetwork.
- The LIST_LHC_STATUS command provides status information about LAN300 Host Controllers (LHCs).
- The LIST_LTS_STATUS command provides status information about LAN Terminal Servers (LTSs).
- The LOOPBACK command tests target components on a LAN300 network.

2
Booting and Dumping Communications Controllers

Communications controllers are hardware devices that link computers to networks. Intelligent controllers are able to execute software programs. Thus, controllers are able to share the job of communications operation with their host computer. This enables the host to devote more of its resources to user-oriented tasks.

This chapter describes the downline load and upline dump procedures for the LAN Host Controller (LHC300) and the LAN Terminal Server (LTS300). Downline loading provides the appropriate software and load parameters to controllers that do not self boot. Upline dumping writes a copy of a controller's memory image to a 50 Series disk file. This chapter also summarizes the COMM_CONTROLLER command, which allows you to downline load the LHC, the LTS, and ICS controllers. You can also upline dump the LHC with the COMM_CONTROLLER command.

The LHC Downline Load Procedure

You can inititiate the downline load procedure for an LHC by using the COMM_CONTROLLER command, either in the PRIMOS startup file or interactively. The Network Management server can also initiate the downline load procedure automatically. In all cases the LHC conducts a series of tests to determine its integrity. The controller provides sample data and analyzes the results of the tests. If the controller is found either to be operationally sound, or to have only marginal problems, the downline load proceeds as quickly as possible. If a critical fault is found in the controller, no boot can occur. All results are logged via DSM if you have invoked DSM on your system.

WARNING

Before you initiate a downline load procedure for an LHC, you should stop all network activity on that LHC. You do this by issuing the STOP_NET or STOP_NTS command, depending on what software is running on your system. This procedure ensures that no data will be lost.

The downline load procedure fetches an object file from the local host. Downline loading is not supported over the network. The downline load procedure processes the contents of this file and passes records down to the controller. The default pathname of this file is DOWN_LINE_LOAD*>LHC.DL. You should check with your Network Administrator to find out the names of the load files on each system. The downline load procedure concludes when the internal data structures have been updated and the operational state of the controller has been reported to the host.

The LHC Upline Dump Procedure

The LHC upline dump procedure transfers a controller's memory image to a disk file on the local host. Upline dumping is not supported to a remote host. By default the file is written to the directory CNTLR_DUMPS*>LAN300, and is named using the following format:

LHC_nodename.device_address.date.time

You or the Network Administrator can limit the size of this directory. You should periodically purge unwanted files.

The upline dump procedure is intitiated either automatically when a diagnostic procedure uncovers a fault, or when you issue the COMM_CONTROLLER command. Once the memory contents of the controller have been transferred and stored on disk, the LHC downline load procedure follows automatically if the upline dump was initiated automatically. Otherwise, you must use the COMM_CONTROLLER command to initiate the downline load.

Events such as errors, informational messages, and debugging conditions are reported via DSM.

The LHC Polling and Recovery Mechanism

The LHC Polling and Recovery mechanism provides continuous, automatic monitoring of LHC controllers. This function is performed by the Network Management server and works conjunction with PRIMENET, NTS, and the COMM_CONTROLLER command. The LHC Polling and Recovery mechanism is responsible for detecting failures of local LHC controllers and recovering from those failures.

Manual detection requires a network user to notice network performance degradation or failure and report the problem to a network operator. The network operator must then isolate the problem and initiate manual recovery procedure. Both manual detection and recovery may take a long time. The automatic polling and recovery mechanism shortens the detection and recovery time and eliminates the need for operator intervention.

The Network Management server periodically polls all operational LHC controllers. A failure is detected when an LHC repeatedly fails to respond to a poll message or when a response is judged to be abnormal. The failure of an LHC should be detected within 30 seconds.

Upon detection of an LHC failure, the Network Management server attempts automatic recovery of the LHC and tries to restore it to its proper operational state. The LHC failure recovery operation is composed of an upline dump (used to save the LHC's failed state for later analysis) followed immediately by a downline load. If the LHC failure recovery is successful, the controller is brought back online. The LHC Polling and Recovery operation does not require that the upline dump phase be successful for the LHC to be restored to its previous operation; however, an unsuccessful downline load terminates the recovery operation.

Frequent recovery from LHC failures is an indication that a larger problem exists. For this reason, the LHC Polling and Recovery mechanism counts the number failures of the LHCs. When the failure rate for an LHC reaches or exceeds the maximum number of failures allowed (three failures within an hour), the controller is marked DOWN and the recovery mechanism is disabled for that particular LHC. If you want the LHC to be returned to its previous operation, you can manually downline load the LHC using the COMM_CONTROLLER command.

The LTS Downline Load Procedure

The downline load services for the LAN Terminal Server (LTS) are similar to those of the LHC controller, with one exception: the terminal server can request a downline load, whereas the host controller cannot. The reason is that a failed host controller could write into an incorrect memory location in PRIMOS and thereby cause a system crash. When the server is reset, it runs diagnostic tests to determine its integrity and ability to access the network. If it cannot access the network properly, the server shuts itself down.

The LTS initiates the downline load procedure by broadcasting a request for downline load services to all of the boot servers on the network. You can also use the COMM_CONTROLLER command to initiate a downline load. If you issue the COMM_CONTROLLER command, the LTS is downline loaded by the host on which you issued the command.

The downline load procedure verifies that the server is a registered network access device. Any discrepancies are logged via DSM. The downline load procedure attempts to provide parallel downline loading when multiple servers issue requests. The object code file must be prebuilt by the Network Administrator. Its default name is DOWN_LINE_LOAD*>LTS.DL. When you use the COMM_CONTROLLER command you can specify which load file is to be used. Ask the Network Administrator for the names of the load files on each system.

The COMM_CONTROLLER Command

The COMM_CONTROLLER command enables you to accomplish the following tasks without having to perform a warm or cold start:

- Start up or shut down an ICS controller
- Load an ICS, LTS, or LHC controller
- Upline dump the memory of the LHC controller to a disk file
- Verify the integrity of an ICS controller

The format for the COMM_CONTROLLER command is

COMM_CONTROLLER {main_subcommand [options]}

COMM_CONTROLLER Subcommands

There are five main subcommands to the COMM_CONTROLLER command. Not all of them apply to every type of controller. You may specify only one main subcommand on a command line. The five main subcommands to the COMM_CONTROLLER command are as follows:

–INIT

Initiates an automatic shutdown on the specified ICS controller. An integrity check follows, and then the controller is reset.

–LOAD

Initiates a full downline load of a specified file or protocol combination to a designated controller. The controller is automatically shut down, verified, and loaded.

–SHUTDOWN

Freezes the designated ICS controller and breaks all logical connections to it.

–UPLINE_DUMP

–ULD

Initiates a request for a designated LHC controller to dump a memory image to a specified file on the host machine.

–HELP

Displays the associated help text. This is the default if you omit a main subcommand for the COMM_CONTROLLER command.

COMM_CONTROLLER Options

You may issue the options associated with the main subcommands at any point on the command line. However, the combinations of options for a specified subcommand are restricted, as described below.

–ALL

All controllers specified in the –DEVICE option. You cannot use the –DEVICE_ADDRESS option with –ALL.

–DEST_NODE_ADDRESS lts_address

–DNA

Specifies the *lts_address* of the destination terminal server. Specify *lts_address* in either the short format, nn-nn-nn, or the long format, nn-nn-nn-nn-nn-nn, in hexadecimal, with or without leading zeros. You cannot use the –DNA and –DNN options together on the same command line.

–DEST_NODE_NAME lts_name

–DNN

Specifies the *lts_name* of the destination terminal server. *node_name* can contain as many as 16 characters. You cannot use the –DNN and –DNA options together on the same command line.

–DEVICE device

Specifies the *device* type. The following devices are supported: ICS1, ICS2, ICS3, LHC, and LTS.

–DEVICE_ADDRESS device_address

–DA

Specifies the *device_address* of the designated device, which is a 2-digit octal number. You can determine this address by using either the STATUS COMM or the LIST_COMM_CONTROLLERS commands.

–PATHNAME pathname

Specifies the *pathname* of the object file to be used in the load or upline dump operation. If you specify the filename alone, the DOWN_LINE_LOAD* directory is assumed for the load operation and the UP_LINE_DUMP* directory is assumed for the upline dump operation. If you do not specify this option, a default file is used in the load and upline dump operations.

–PROTOCOL token

Specifies a communications protocol *token* combination used by the LHC, ICS2, or ICS3 controllers. The supplied protocol *token* combination is validated and subsequently mapped to an appropriate downline load file in the DOWN_LINE_LOAD* directory. The valid protocol tokens are

LHC Controller	*ICS2/3 Controller*
LLCX25	ASYNC
NTS	SDLC
TCP	HDLC
TEL	BSCRJE
	BCSX25

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-NO_QUERY

-NQ

Executes the command without prompting you for confirmation.

The COMM_CONTROLLER command allows the concurrent loading of multiple controllers of the same type, provided that they are connected to the same backplane and are using the same file and protocol combinations.

Some examples of how to use the COMM_CONTROLLER command are listed below.

COMM_CONTROLLER -LOAD -DEV ICS2 -DA 10

This command downline loads the controller at address 10. The controller must be an ICS2 device and it is loaded with the default (ASYNC) protocol.

COMM_CONTROLLER -INIT -DEV ICS3 -ALL

This command initializes all the ICS3 controllers.

COMM_CONTROLLER -LOAD -DA 51 -HELP

This command only takes notice of the -HELP option and displays help text. This is useful in situations when you are entering a command line and then require information on the arguments you used in the command line.

COMM_CONTROLLER -ULD -DEV LHC -DA 25 -PN MY_DIR>MY_FILE

This command upline dumps the LHC controller at address 25. The contents of the LHC controller are placed in the file MY_FILE in MY_DIR directory.

COMM_CONTROLLER -LOAD -DEV LTS -DNA 3-41-B

This command loads the LTS controller at LAN address of 08-00-2F-03-41-0B.

COMM_CONTROLLER -HELP

This command displays help text on your screen.

3
Starting and Stopping Network Programs

The following commands allow you to start up and shut down network programs on your system. These commands do not interrupt local PRIMOS operation.

- START_DSM and STOP_DSM
- START_NTS and STOP_NTS
- START_NET and STOP_NET

This chapter provides a description and the command line format for each command. Error messages for START_NET and STOP_NET are described in Appendix A. START_NTS and STOP_NTS error messages are described in Appendix B. Refer to the *DSM User's Guide* for information on DSM error messages.

Note

You can use the commands listed above only when you are working from the supervisor terminal.

The START_DSM Command

The START_DSM command invokes Distributed System Management (DSM) on the local system. START_DSM is usually included in the PRIMOS.COMI system startup file. In the PRIMOS.COMI file, the START_DSM command should always come after the CONFIG directive, after adding the local disks, and after installing the local text database, MSG_OBJ. You must issue the START_DSM command before the START_NTS command and before the START_NET command to ensure that messages from PRIMENET subsystems are properly processed.

The syntax for START_DSM is

$$
\text{START\_DSM} \left\{ \begin{array}{l} \text{-MULTI\_NODE} \\ \text{-HELP [-NO\_WAIT]} \\ \text{-USAGE} \end{array} \right\}
$$

The options are described below.

–MULTI_NODE

Specifies that your system is part of a network. If you specify this option the DSM network server is started.

–HELP [–NO_WAIT]

Provides information on how to use the command. Overrides other options. If you specify –NO_WAIT, the display is not paginated at your terminal. The same information is available through the PRIMOS HELP command.

–USAGE

Provides the command syntax in brief. This option overrides other options.

The STOP_DSM Command

The STOP_DSM command shuts down DSM operation by logging out all DSM server processes. The STOP_DSM command should not be issued if either PRIMENET or NTS are running on the system, because the STOP_DSM command will stop PRIMOS and PRIMENET event logging.

The syntax for STOP_DSM is

$$\text{STOP\_DSM} \left\{ \begin{array}{l} \text{–HELP [–NO\_WAIT]} \\ \text{–USAGE} \end{array} \right\}$$

The –HELP option provides information on how to use the command. If you specify –NO_WAIT, the display is not paginated at your terminal. The same information is available through the PRIMOS HELP command.

The –USAGE option provides the command syntax in brief.

Refer to the *DSM User's Guide* for further information on the START_DSM and STOP_DSM commands.

The START_NTS Command

The START_NTS command initiates terminal activity for a Prime host on a LAN300 network. You can issue the START_NTS command from the supervisor terminal, but usually it is part of system startup. Appendix B lists the error messages associated with START_NTS and STOP_NTS. For a complete description of NTS, refer to the *NTS User's Guide.*

The syntax for START_NTS is

START_NTS [config_pathname] [-HELP]

config_pathname specifies the pathname of the NTS configuration file. The default pathname is NTS*>NTS.CONFIG.

The -HELP option shows you how to use the command. The same information is available with the PRIMOS HELP command.

LAN Host Controllers (LHCs) are not automatically booted in this procedure. LHCs are downline loaded by issuing the COMM_CONTROLLER command before issuing the START_NTS command. Refer to Chapter 2, Booting and Dumping Communications Controllers, for more information.

The STOP_NTS Command

The STOP_NTS command shuts down the NTS function on the system. Shutdown of NTS affects terminal connections only and does not affect local asynchronous connections or PRIMENET activity.

The syntax for STOP_NTS is

STOP_NTS [-HELP]

The -HELP option shows you how to use the command. The same information is available with the PRIMOS HELP command.

Once you have entered STOP_NTS, the command prompts you with **REALLY?**. Any answer other than YES aborts the command. Users connected to this node through NTS are notified and logged out. Users who attempt to connect to the system via NTS after the STOP_NTS command has been issued are informed that the node is not on the LAN300 network.

The START_NET Command

Use the START_NET command to start PRIMENET on the system. START_NET determines where the system is located on the network from the information in the global network configuration file. If the system has been configured as a gateway node (a node that routes data between other nodes that are indirectly connected), START_NET automatically starts up the Route-through server (RT_SERVER). START_NET also starts up the LAN300 Network Management facility if the system is connected to a LAN300.

You can issue START_NET interactively, but normally it is part of system startup. The START_NET command must always be issued after the START_DSM command to ensure that PRIMENET events are logged. If you include the START_NET command in the PRIMOS.COMI file, network initialization is completed before execution of the command that follows

START_NET. However, even after START_NET has finished executing and the network is initialized, a little more time is required before communication with remote systems can occur.

START_NET must precede any ADDISK –ON commands because ADDISK checks to see if a remote node is configured before letting you add disks for that system. If you are using FTS, START_NET must appear before the COSYSTEM>FTS.SHARE.COMI command. You can place the START_NET command either before or after shared libraries.

Note

START_NET starts up PRIMENET, all ring and full-duplex connections, and the LAN300 Network Management facility. However, it does not start up half-duplex lines. The operator must start half-duplex lines as a separate task. Refer to Chapter 4 for information on half-duplex lines.

Invoking START_NET

The syntax for START_NET is

$$
\text{START\_NET}
\left[
\begin{array}{l}
\text{config\_pathname} \\
\text{–CACHE [cache\_pathname]} \\
\text{–HELP} \\
\text{–TRACING\_NODE} \\
\text{–NODE nodename}
\end{array}
\right]
$$

The options are described below.

config_pathname

The pathname of the network configuration file. If *config_pathname* does not end with .CONFIG, START_NET appends .CONFIG (and thus searches for *config_pathname*.CONFIG). If that search is unsuccessful, START_NET searches for *config_pathname* next. If you omit this option, the default pathname, PRIMENET*>PRIMENET.CONFIG, is used.

–HELP

Displays the syntax and options of the START_NET command.

–CACHE [cache_pathname]

Enables the cache file feature, which speeds up network initialization under specified conditions. With –CACHE enabled, START_NET stores local network configuration data in a cache file. In subsequent network startups, START_NET saves time by reading the cache file rather than the global configuration file. If you do not specify a *cache_pathname*, START_NET assumes a default *cache_pathname*. For more information, refer to the section The –CACHE Option, below.

-TRACING_NODE

Before the release of Rev. 21.0 of PRIMOS, this option was used to direct PRIMENET to gather ring traffic information for the local node. You no longer need to specify this option to gather that information, because the information is automatically gathered after you have invoked START_NET.

-NODE nodename

This option is now obsolete, because START_NET uses the node name provided with the SYSNAM directive. The command option is retained only for compatibility with earlier PRIMOS revisions.

When invoked, START_NET displays the following message to indicate that network initialization is beginning:

```
[START_NET Rev 21.0 (c) Prime Computer 1987]
Beginning Network Initialization.
File: CONFIG_PATH Rev. <N>
(Config_Net rev. 21.0)


*** Node: <NODENAME> ***
```

In this message, CONFIG_PATH is the pathname of the configuration file (usually PRIMENET*>PRIMENET.CONFIG). The number N is the revision number of CONFIG_PATH; N is incremented each time CONFIG_PATH is saved from within CONFIG_NET. NODENAME is the name of the local system. For example, on system SYSA, the message might appear as follows:

```
[Start_Net Rev 21.0 (c) Prime Computer 1987]
Beginning Network Initialization.
File: PRIMENET*>PRIMENET.CONFIG Rev. 159
(Config_Net rev. 21.0)


*** Node: SYSA ***
```

If the local system has indirect connections to other systems, these connections are displayed next as follows:

```
Indirect connection:   <nodename>intermediate_node>destination node>
```

The path indicated after **Indirect connection:** is the path between **nodename** and **destination node**. For example,

```
Indirect connection:   <SYSA>SYSB>SYSC>
```

If you specified the -CACHE option, you may also see messages pertaining to the cache file. These messages are described below.

The –CACHE Option

Whenever you run START_NET without the –CACHE option, START_NET reads the global configuration file, selects information relevant to the local node, and writes this information to a PRIMENET database in memory. The length of time PRIMENET needs to extract local information and initialize the network depends upon the specific global configuration. In general, larger configurations require more time. More time is also required if the local node has access rights to a remote node via Route-through.

You can use the –CACHE option to speed up network initialization. With the –CACHE option, START_NET stores the information it collects in a file called the cache file and writes the information to memory. During subsequent network startups, START_NET saves time by reading the cache file rather than the global configuration file.

If you do not specify a filename with the –CACHE option, START_NET either produces a file or reads from an existing file. This file is given a name in the following format:

config_file_name.sysname.NCACHE

For example, the command line

```
START_NET LAN300.CONFIG -CACHE
```

when run on system NODEA will either produce or read from a cache file named LAN300.NODEA.NCACHE.

If the cache file you specify does not exist, START_NET displays the following message:

```
Cache (CACHE_PATHNAME) not found,
creating anew from configuration master.
```

START_NET then reads the source configuration file, *config_pathname*, if you specified one. From this file, START_NET extracts the relevant information and creates the cache file. When the cache file creation is complete, START_NET displays the following message:

```
Cache (CACHE_PATHNAME) update completed.
```

You should always include the source configuration file name on the command line when you specify a cache file. If you specify a cache file that does not exist and do not specify a source configuration file, START_NET uses the default configuration file, PRIMENET*>PRIMENET.CONFIG, to start up the network. However, START_NET creates the cache file you specifed in the command line for output.

In the following example, START_NET creates a new cache file:

```
OK, START_NET -CACHE PRIMENET.A.NCACHE
[Start_Net Rev 21.0 (c) Prime Computer 1986]
Beginning Network Initialization.
Cache (PRIMENET.A.NCACHE) not found,
creating anew from configuration master.
File: PRIMENET*>PRIMENET.CONFIG Rev. 159
(Config_Net rev. 19.3)


*** Node: A ***
Cache (PRIMENET.A.NCACHE) update completed.
OK,
```

If you specify a cache pathname that does exist, START_NET displays the following message:

```
Reading configuration from local cache (CACHE_PATHNAME).
```

START_NET then reads the contents of the cache file into memory, as in the following example:

```
OK, START_NET -CACHE PRIMENET.A.NCACHE
[Start_Net Rev 21.0 (c) Prime Computer 1986]
Beginning Network Initialization.
Reading configuration from local cache (PRIMENET.A.NCACHE).
File: PRIMENET*>PRIMENET.CONFIG Rev. 159
(Config_Net rev. 19.3)


*** Node: A ***
OK,
```

Guidelines for the –CACHE Option

The first time you start up the network using a particular network configuration file, include the –CACHE option and create a new cache file. The next time you start up the network using the *same* configuration, use the same cache file for speedier initialization.

Before reading from a cache file, START_NET always checks to be sure the cache file is valid and current. If you edit the network configuration and then stop and restart the network, specifying the same cache file as before, START_NET reads the global configuration file rather than the cache. The old cache is overwritten with updated information. Invalid and obsolete cache files are discussed below.

Note

If you include START_NET with the –CACHE option in the PRIMOS.COMI file, you will need to edit that file if you want to change the cache pathname, but not if you just edit the configuration file.

You can create many different cache files, each corresponding to a different network configuration. When you start the network, you can specify the cache file that corresponds to the configuration you are using.

You cannot use a cache file created on one system on a different system. Unlike the global configuration file, the cache file contains information specific to the system on which it was generated.

In summary, the –CACHE option saves network startup time when you initialize the network with an unchanged configuration. For this reason, the –CACHE option is most useful in an environment in which you initialize the network more frequently than you edit the network configuration.

Invalid Cache Files: If the cache file you specify is invalid, START_NET displays the following message:

```
Cache (cache_pathname) is invalid.  Proceeding from configuration master.
Do you wish to overwrite the cache file
(NO, YES) ?
```

START_NET reads the global configuration file and starts the network, and will overwrite the cache file if you have so requested.

START_NET considers a cache file invalid if the file either does not have the expected format or if it is incomplete. For example, the cache file is considered invalid in the following situations:

- You supplied the name of an ASCII text file instead of a cache file created by START_NET.

- START_NET was interrupted while creating the cache file during a previous network initialization.

- The revision of CONFIG_NET that generated the network configuration file is incompatible with the current revision of START_NET.

- A file system error occurred while START_NET was trying to read the cache file.

Obsolete Cache Files: If the cache file you specify is valid but obsolete, START_NET displays the following message:

```
Cache (cache_pathname) is obsolete.  Proceeding from configuration master.
Cache will be updated!
```

START_NET then reads the global configuration file and starts the network, overwriting the obsolete cache file. You need not take any action.

START_NET considers a cache file obsolete in the following situations:

- The configuration file you specified is not the same configuration file that generated the cache file.

- Someone has used CONFIG_NET to modify (or at least save) the global configuration that generated the cache file since the last time the cache file was written or read.

Other error messages related to the cache feature are included in Appendix A, START_NET and STOP_NET Error Messages.

The STOP_NET Command

The STOP_NET command ·shuts down PRIMENET on the system. Invoking the STOP_NET command does not affect local PRIMOS operation. If FTS is running, the System Administrator must perform the following tasks before issuing the STOP_NET command:

- Stop the file servers with the FTOP –STOP_SRVR command.

- Stop the file manager (YTSMAN) with the FTOP –STOP_MNGR command.

The list below describes what happens on a node on which the STOP_NET command is issued.

- Remote disks are shut down.

- Open virtual circuits are cleared.

- NPX slaves go to sleep.

- The Route-through server logs out.

- NETMAN logs out.

- The LAN300 Network Management server is logged out if NTS is not currently running.

When a system is disconnecting from PRIMENET, remote users or applications attempting to access it are notified. Messages that appear for each type of remote access are listed below.

- Remote file access users see the following message:

   DISK HAS BEEN SHUT DOWN.

   Remote users (logged in with the LOGIN –ON command) see the following message:

   HOST DOWN.

   NETLINK users see the following message:

   <u><nodename></u> DISCONNECTED   (NETWORK SERVER LOGGED OUT).

Invoking STOP_NET

The syntax for STOP_NET is

STOP_NET [–HELP]

The –HELP option describes the complete syntax of the STOP_NET command.

4
Managing Half-duplex Lines

This chapter describes how to use the NET command to assign, start, stop, and unassign half-duplex lines. This chapter also summarizes operator tasks for half-duplex lines and describes how to use the HDXSTAT command.

Comparison of Half-duplex and Full-duplex Lines

PRIMENET's half-duplex (HDX) synchronous lines are temporary dialup telephone connections between Prime systems. A system that has a half-duplex line can use the line to call other Prime systems, just as you can use a telephone to call different people. One difference between a half-duplex PRIMENET line and a full-duplex PRIMENET line is that the latter is a permanent, leased connection between two systems. Figures 4-1 and 4-2 illustrate this difference.

Permanent
Physical
Connection
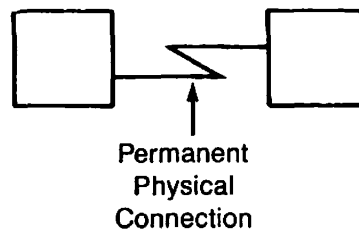
Figure 4-1
Full-duplex PRIMENET Line

HDX lines prior to startup

HDX lines during communication

Communication finished,
HDX lines shut down
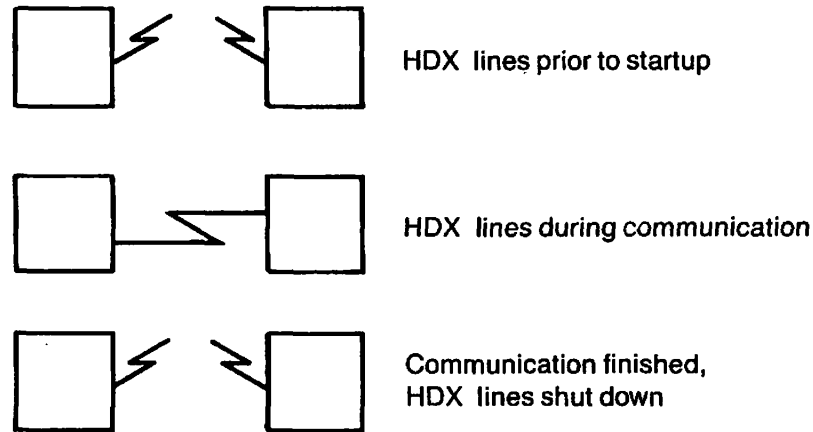
Figure 4-2
Half-duplex PRIMENET Line

Another difference between half-duplex and full-duplex lines is that data travels in only one direction at a time over a half-duplex line, whereas with a full-duplex line both systems may send and receive signals at the same time. A half-duplex PRIMENET connection is made when the calling system dials out on one of its half-duplex lines and the receiving system accepts the call on one of its half-duplex lines. A modem is required at each end of the connection.

Establishing Half-duplex Connections

At each end of a half-duplex PRIMENET link, system operators enter commands to make and break the connection. If a system expects an incoming call, the operator readies a line to receive the call by starting it up in passive mode. To make a call, an operator starts up a PRIMENET half-duplex line in active mode and dials a remote site. Once a call is successfully answered, the connection functions just like any other PRIMENET link. When communication is complete, an operator may break the connection. Thus, a PRIMENET half-duplex connection exists only for the duration of the phone call between two systems. By contrast, a full-duplex connection is established when the operator issues the START_NET command, and remains in effect until the operator issues the STOP_NET command or the system is brought down.

System operators can also reserve (or assign) half-duplex lines for PRIMENET's use, and reallocate (or unassign) lines for use by other communications applications such as RJE or DPTX. This feature is unique to half-duplex lines; a full-duplex line cannot be unassigned from

PRIMENET. PRIMENET's half-duplex communication uses BSC-ASCII framing. Half-duplex lines are supported by ICS3 and MDLC controllers. Within PRIMENET, half-duplex lines can be used only between Prime systems.

Half-duplex Lines and Network Configuration

The Network Administrator defines half-duplex PRIMENET lines during network configuration. As part of the network configuration task, the Network Administrator decides

- Which systems on the network will be half-duplex nodes, that is, which will have half-duplex lines.

- How many half-duplex lines will be configured for each half-duplex node.

- Which logical synchronous line numbers will be assigned to half-duplex lines on each half-duplex node. Which systems will be able to access one another over half-duplex lines. Each half-duplex node can call any other half-duplex node, as long as each system provides sufficient access rights.

As an operator, you need to know

- How many half-duplex lines your system has

- Which logical line numbers are assigned to half-duplex lines

- Which are the remote half-duplex nodes with which your system can communicate

- What systems you will call, and what systems will call you

Your Network Administrator should be able to provide you with this information. If you need information about network configuration, refer to the *PRIMENET Planning and Configuration Guide.*

PRIMENET supports a total of four configured synchronous lines per system, in any combination of half-duplex, full-duplex point-to-point, and full-duplex PSDN connections. A maximum of three of these lines may be active at one time. Unassigning a half-duplex line does not remove it from the PRIMENET configuration.

Additional synchronous lines, beyond the maximum allowed for use by PRIMENET, may be set up for use by DPTX or RJE. These lines are not included in the PRIMENET network configuration file.

Note

Only one PRIMENET half-duplex link may be active at one time between the same two systems.

Summary of Operator Tasks for HDX Lines

You are responsible for the following tasks related to HDX lines:

- Using the NET command to assign, start, stop, and unassign half-duplex PRIMENET lines

- Using the HDXSTAT command to monitor the status of the system's half-duplex PRIMENET lines

In addition, you can use the STATUS NET and MONITOR_NET commands to obtain information about half-duplex communication. The STATUS NET command, described in Chapter 5, indicates which network nodes are up, down, or offline. For half-duplex nodes, these states have the following meanings:

- Up: Currently in communication with the local system over a half-duplex line.

- Down: Should be in communication with the local system over a half-duplex line, but is not. May be initiating a call or recovering (for example, undergoing a warm start).

- Offline: Currently not in communication with the local system over a half-duplex line.

You can use the MONITOR_NET command to obtain information about synchronous lines. See Chapter 11, The Synchronous Line Monitor, for further information.

The NET Command

To issue the NET command, you must be at the supervisor terminal. The syntax for the NET command is

NET –option [parameters]

The options are described below.

–ASSIGN

Reserves a half-duplex line for use by PRIMENET.

–START

Initiates a half-duplex PRIMENET connection (that is, it starts a line in active mode), or enables a half-duplex PRIMENET line to accept incoming calls (that is, it starts a line in passive mode).

–STOP

Breaks a half-duplex PRIMENET connection.

–UNASSIGN

Removes a half-duplex line from PRIMENET's control, making it available to other applications.

Note

You must issue the START_NET command to start the network before you issue the NET command. If you enter the NET command before using START_NET, an error message is displayed.

The NET –ASSIGN Command

The syntax for the NET –ASSIGN command is

NET –ASSIGN line

where *line* is the name of a logical synchronous line (SMLCnn or SYNCnn), for example, SMLC00 or SYNC01. (*nn* is the logical line number.) The line you specify must be configured as a half-duplex line for your system in the global network configuration file.

This command reserves *line* for PRIMENET's use. Until the line is unassigned, no other application or subsystem may use it. If *line* is already assigned, the NET –ASSIGN command produces the error message **Line already assigned.**

The NET –ASSIGN command leaves *line* in an idle state. Communication cannot take place until you issue the NET –START command to start the line.

The NET –START Command

The syntax for the NET –START command is

NET –START line [–SITE sitename]

where *line* is the name of a logical synchronous line (SMLCnn or SYNCnn) that is configured as a half-duplex line, and the optional *sitename* is the name of a half-duplex node on the network.

This command activates, or starts, a half-duplex line. You must assign a line before you can start it; otherwise, NET produces the error message **Line not assigned.** Similarly, if a line has already been started, you cannot start it again without first stopping it.

Starting in Passive Mode: If you omit the –SITE option, *line* is started in passive mode. In passive mode, *line* waits to receive a call from a remote half-duplex node. Any network node configured as a half-duplex node with access to the local system may call in on *line*. As operator, you need not know which remote node will be calling. The node that calls initiates the communication and identifies itself to your system. After the call is established, the STATUS NET command indicates that the remote node is active.

Starting in Active Mode: If you include the –SITE option, *line* is started in active mode. Use this option when you are about to dial the remote node whose name is *sitename*. In this case, your system attempts to initiate communication with *sitename* by sending messages over *line*. At *sitename*, a half-duplex line should be waiting in passive mode to receive your call.

Note

For a half-duplex connection to succeed, the operator at one end of the link must start a line in passive mode and an operator at the other end must start a line in active mode. If both operators attempt to start their lines in active mode (using the –SITE option), the connection fails. Similarly, if both operators attempt to start their lines in passive mode (omitting the –SITE option), the connection fails.

Normally, communication proceeds without operator intervention once a half-duplex connection is established. When the connection is successful, users and applications may begin to take advantage of whatever access rights are assigned between the two systems in the global network configuration file. For example, remote login and remote file access may take place.

The NET –STOP Command

The syntax for the NET –STOP command is

$$\text{NET –STOP} \left\{ \begin{array}{l} \text{line} \\ \text{sitename} \end{array} \right\}$$

where *line* is the name of a logical synchronous line (SMLCnn or SYNC00) that is configured as a half-duplex line, and *sitename* is the name of a half-duplex node that is currently active (that is, listed as "up" in the STATUS NET display). You may specify either the line name or the site name; either one identifies the half-duplex link that is to be stopped.

The NET –STOP command shuts down a half-duplex connection and returns the line to an idle state. All virtual circuits on the link are cleared. After the line is stopped, it remains assigned (reserved for PRIMENET). However, you must start the line again before it can be used again for half-duplex communications.

The NET –STOP command drops the Data Terminal Ready (DTR) signal to the modem. Most modems respond to this change by breaking the established connection. For more information on broken connections, refer to Broken Half-duplex Connections, below.

The NET –UNASSIGN Command

The syntax for the NET –UNASSIGN command is

NET –UNASSIGN line

where *line* is the name of a logical synchronous line (SMLCnn or SYNCnn) that is configured as a half-duplex line.

This command unassigns *line* from PRIMENET, making it available to other communications applications. A half-duplex line that has been started must be stopped before it is unassigned. If you try to unassign an active line, an error message is displayed. Similarly, an error message is displayed if *line* was already unassigned (or was never assigned to PRIMENET).

Broken Half-duplex Connections

When a half-duplex connection is broken, the nodes on either end of the connection react as follows:

- At the initiating node (where the line was started in active mode), the half-duplex line returns to the idle state it was in after the NET –ASSIGN command was issued. The line is thus ready to be started again at any time.

- At the receiving node (where the line was started in passive mode), the half-duplex line returns to passive mode, that is, to the state it was in after the last NET –START command was issued. The line is thus ready to receive another call from any half-duplex node.

Thus, at a site where calls are only to be received, the operator can use NET –START only once, omitting the –SITE option. Remote sites can then establish, run, and shut down connections to the passive site in turn, with no further operator intervention at the passive site.

However, at a site that initiates a call, a broken connection leaves the line assigned but inactive. The operator must restart the line in order to make or receive more calls.

A half-duplex connection can be broken by either the initiating or the receiving node. The following is a list of conditions that will cause a connection to break:

- The NET –STOP command is issued. As mentioned above, this command drops the DTR signal to the modem, usually causing the connection to break.

- The initiating site is not recognized as a legal half-duplex node (that is, one that is configured in the global network configuration file). In this case, the receiving node drops the DTR signal for several seconds, breaking the connection.

- The initiating site provides a half-duplex password that does not match the password stored at the receiving site. Again, the receiving node drops DTR for several seconds. (For information on half-duplex passwords, refer to the *PRIMENET Planning and Configuration Guide.*)

- One of the nodes is warm started or master cleared. These events cause the node in question to drop the DTR signal on all lines; thus, all half-duplex connections to the node are broken. The remote node, detecting that the first node has gone down, then drops DTR on its side of the line.

In addition to these conditions, various problems with modems, cables, and communications lines can cause broken connections.

The HDXSTAT Command

As system operator, you need to keep track of which half-duplex lines on your system are active and which remote half-duplex nodes are in communication with your system. You can monitor this information by means of the HDXSTAT command, which you can issue from any terminal on the system. HDXSTAT causes the following information to be displayed:

- All configured HDX nodes in the network

- All half-duplex lines on the local system

- The association (where one exists) between individual sites and lines

- The state (if known) of the telephone connection

- The link status (described below)

The link status is one of the following:

Status	*Meaning*
Not assigned	The line is not assigned to PRIMENET.
Assigned	The line is assigned to PRIMENET but has not been started.
Awaiting call	The line has been started in passive mode and is awaiting a call.
Trying to establish	The line has been started in active mode. The connection to the remote site has not yet been established.
Running	The connection is active.
Stop in progress	The connection is in the process of shutting down.
Offline	No half-duplex connection to this site exists.

The following example shows a display produced by HDXSTAT:

```
[HDXSTAT Rev. 21.0 Copyright (c) 1986, Prime Computer, Inc.]
Status of HDX network on MON, NOV 28 1986 at 10:31:59


  node        line         phone        state

  NODEA       SYNC01       up           running
  NODEB       --           --           offline
  NODEC       --           --           offline
  NODED       SYNC03       up           trying to establish
  --          SMLC00       --           not assigned
  --          SMLC02       down         awaiting call
```

5
Monitoring Network Servers

This chapter provides information about

- The PRIMENET server, NETMAN
- The Route-through server, RT_SERVER
- Access to the PRIMENET* directory
- Distributed System Management (DSM) servers
- The LAN300 Network Management server and the NTS server
- The STATUS USERS command
- The STATUS NETWORK command
- The STATUS NTS command

Monitoring the PRIMENET Server Process (NETMAN)

The PRIMENET server process is called NETMAN. NETMAN appears on the STATUS USERS list after you have issued the START_NET command. A sample of the output from the STATUS USERS command is provided later in this chapter.

NETMAN does not have to be registered in the user validation file. However, NETMAN comes from the system pool of phantom processes, so your system must have at least one phantom configured exclusively for NETMAN's use. Refer to the *PRIMENET Planning and Configuration Guide* for information on configuration directives related to PRIMENET.

Monitoring the Route-through Server (RT_SERVER)

The Route-through server is a process that allows a system to act as a gateway for communication between nodes that either are not directly connected or are not on a ring. You can monitor the Route-through server with the STATUS USERS command.

In most cases, the Route-through server is started up automatically when you issue the START_NET command. However, if either of the following conditions is true, START_NET may not be able to start the Route-through server:

- The system has no available phantoms.

- The user SYSTEM cannot access the file PRIMENET*>RT.COMI, either because the file does not exist or because SYSTEM has insufficient access rights.

If START_NET does not start the Route-through server, you will need to check for (and if necessary, correct) the above two conditions. Then enter the following command at the supervisor terminal:

OK, *PH PRIMENET*>RT.COMI*

This command starts the Route-through server.

Access to PRIMENET* Directory

With the release of Rev 21.0 of PRIMOS, NETMAN no longer handles network event logging. Event logging is handled by DSM. Therefore, NETMAN no longer requires Protect, Add, and Write **access rights** to PRIMENET*. The list below shows the minimum access required to PRIMENET*.

SYSTEM:	ALURWX
SLAVE$:	UR
RT_SERVER:	UR
NETMAN:	UR
Network Administrator:	ALL
$REST:	NONE

DSM Servers

DSM has the following servers:

- DSMSR — the server that keeps DSM running on your system

- DSMASR — the user name for associated servers related to DSM applications

- DSMNETSR — the process that manages communication between DSM servers on different nodes

- SYSTEM_MANAGER — the server that controls event logging

These servers are started when you issue the START_DSM command. You can verify that they are running by using the STATUS USERS command. Refer to the *DSM User's Guide* for more information.

The LAN300 Network Management Server and the NTS Server

LAN300 Network Management (LAN300 NM) is a utility for the operation, control, and analysis of Prime LAN300 installations. LAN300 NM is a collection of software modules that run on multiple nodes throughout the network. These modules work together to monitor network operation and to provide network services to users.

LAN300 Network Management functionality is used by communications programs, Network Administrators and operators, and network users. LAN300 Network Management supports the operation of PRIMENET and the Network Terminal Service (NTS). LAN300 Network Management allows you to control, query, and test network components from local and remote locations.

LAN300 Network Management is composed of the following components:

- Network Management Application (NMA)
- Network Management Server (NM_SERVER)
- Network Management Extension (NME)
- Transient Servers (TSr)

The Network Management Applications (NMAs) are programs that provide the user interface to the LAN300 NM product. NMAs perform validation of user commands and translate them to network management commands. The LIST_LHC_STATUS command, the LIST_LTS_STATUS command, and the LOOPBACK command are NMAs.

The Network Management server (NM_SERVER) is a single, independent process on each 50 Series host on the network. This server coordinates the network management activity for that system, performs some network management tasks, and coordinates the execution of other tasks performed by its agents (NMEs and other NM_SERVERs).

The Network Management Extension (NME) is the local network management agent located on each of the access controllers (LHC300s and LTS300s) throughout the network. The NME is a unique process that is responsible for the ISO layer management tasks within the local environment. NME acts as an extension to the NM_SERVER.

Transient Servers (TSrs) are phantom processes that perform temporary network management tasks as required by the system. TSrs are PRIMOS processes initiated by the NM_SERVER or the COMM_CONTROLLER command to carry out a specific task. This distribution of tasks prevents overloading of the NM_SERVER. The LHC_DLL_SERVER, LHC_ULD_SERVER, and LTS_DLL_SERVER are all TSrs.

NM_SERVER and the transient servers are listed when you use the STATUS USERS command.

NTS_SERVER is initiated when you issue the START_NTS command. NTS_SERVER is listed when you issue the STATUS USERS command, and has the special phantom type "ncm" displayed in the Line field.

Using the STATUS USERS Command

The STATUS USERS command lists all active processes. The following example shows the output from the STATUS USERS command. The network servers have a line ID of "nsp" (network server process) and "rts" (Route-through server), respectively.

OK, *STATUS USERS*

```
                                   Line
User                      No    oct(   dec)  Devices
SYSTEM                    1      asr          <SYSDSK> AL077
STANDISH                 2      0(     0)  <BRANCH>
ANTHONY                  3      1(     1)  <BRANCH>
JONATHON                 4      2(     2)  <BRANCH> <LEAF>
MARY                     6      4(     4)  <BRANCH> <LEAF>
NETMAN                   85     nsp          <BRANCH>
RT_SERVER               92     rts          <BRANCH>
BACKUP_SERVICE          95     phant        <BRANCH> <LEAF>  (0)
YTSMAN                   98     phant        <BRANCH>
FTP                      99     phant        <BRANCH>
NTS_SERVER              100    ncn          <BRANCH>
DSMNETSR                101    DSM          <BRANCH>
DSMSR                   102    DSM          <BRANCH>
DSMASR                  103    DSM          <BRANCH>
NM_SERVER               104    phant        <BRANCH>
OK,
```

Note

You may also see a server that appears as type "nsr" in the display. This is associated with the START_NSR command, which grants access rights to certain ports for applications using the **Interprocess Communications Facility (IPCP)** subroutines.

Using the STATUS NETWORK Command

The STATUS NETWORK command lists all of the network nodes (Prime and non-Prime) to which the local node has access. The Network Administrator defines access between systems during network configuration. The following example shows the output of a STATUS NETWORK command on the system OAK. Note that the display includes a list of the nodes with which OAK communicates via gateway nodes.

OK, *STATUS NETWORK*

Full-duplex network

Node	State
OAK	****
TELENET	Up

Ring network

Node	State
OAK	****
LINDEN	Up
ASH	Up
PINE	Up
MAPLE	Up
FIR	Down

Public data network

Node	State
EUROPA	Idle

Route-through network

Node
VINE
BRANCH
LIMB
LADDER

Half-duplex network

Node	State
APPLE	Offline
PEACH	Up
PEAR	Offline

IEEE 802.3 networks

LAN1

Node	Status
ENG1	****
ENG2	Up
ENG3	Down

Using the STATUS NTS Command

The STATUS NTS command displays the operational state of the NTS and the pathname of the NTS configuration file if the NTS is currently started. An example of START NTS output is shown below.

```
OK, STATUS NTS

NTS is currently started
NTS config file <SYSTEM>NTS*>NTS.CONFIG
```

6
Monitoring FTS

This chapter explains how to monitor and maintain FTS. The chapter assumes that FTS has been installed on the system and configured using the FTGEN utility. You should refer to the *PRIMENET Planning and Configuration Guide* for information on FTGEN. This chapter describes the following operator responsibilities:

- Using the FTOP utility to start and stop FTS

- Starting the File Transfer Manager (YTSMAN) with FTOP

- Starting the file transfer servers with FTOP

- Managing user requests with the FTR utility

- Dealing with rush requests using FTGEN, FTR, and FTOP

- Monitoring the FTSQ* directory

- Monitoring and archiving FTS system log files

- Setting ACL rights related to FTS

The FTOP Command

The FTOP command is the FTS utility that allows you, as an operator, to start, stop, and monitor the operation of the file transfer servers. The FTOP command is available only if you are logged in as SYSTEM.

A server is a phantom process that handles file transfer requests for a single queue. Server processes must be started from the supervisor terminal. Each server can handle simultaneously as many as eight requests from a file request queue. A maximum of 9999 requests are possible.

The FTS manager phantom (YTSMAN) receives file transfer requests from remote sites and passes them to appropriate local servers.

The format of the FTOP command is

FTOP [option]

If *option* is omitted, FTOP displays a summary of the available options. Two options, -START_MNGR and -STOP_MNGR, apply to the FTS manager process, YTSMAN. All other FTOP options apply to file transfer server processes.

Summary of FTOP Options

The following list summarizes the FTOP options, which are fully described in the following section.

Option	*Description*
−ABND_SRVR −ASV	Aborts all requests and logs out specified server.
−ABRT_SRVR_LINK −ASVL	Aborts current request on specified server.
−HELP	Displays information on FTOP.
−LIST_SRVR_STS −LSVS	Lists server status.
−START_MNGR −STRMG	Starts the FTS manager phantom process.
−START_SRVR −STRSV	Starts an FTS server phantom process
−STOP_MNGR −STPMG	Stops the FTS manager process.
−STOP_SRVR −STPSV	Stops an FTS server process.

The options to the FTOP command are presented below in alphabetical order.

▶ **−ABND_SRVR server-name**
  −ASV

The −ABND_SRVR option causes the specified file transfer server to immediately abort all current file transfers, place the requests on hold and log out.

If the specified file server is not running an error message is displayed.

Note

It is recommended that you stop a server by using the −STOP_SRVR option. Forced logout of a server is not recommended.

▶ **−ABRT_SRVR_LINK server-name link-number**
  −ASVL

The −ABRT_SRVR_LINK option causes the specified file transfer server to abort the current file transfer on the specified link and place the request on hold. The server continues running; it does not log out.

Each file transfer server can handle a maximum of eight concurrent file transfers. To find the link number of an ongoing transfer use the following format:

FTOP –LIST_SRVR_STS server-name

This command lists transfers, identifying each by its link number in the range 1 through 8 inclusive. If the file transfer server you specified is not running or if the specified link is not active an error message is displayed.

Note

> You can also abort the current file transfer by using the FTR –ABORT option. Use FTR –ABORT if you do not know the server name or link number but you do know the request name or number.

▶ **–HELP [subject]**

The HELP option displays information on the requested FTOP subject. To obtain a list of subjects on which help is available type either

OK *FTOP –HELP SUBJECTS*

or simply

OK *FTOP –HELP*

To obtain an FTOP command usage display type either

OK *FTOP –HELP USAGE*

or simply

OK *FTOP*

▶ **–LIST_SRVR_STS [server-name]**
   –LSVS

The LIST_SRVR_STS option lists the status of the server you specified. It indicates the state of the actual server, that is whether it is running or not and lists the state of each of the eight possible file transfers that the server may be running. Each transfer is identified by a link number, in the range 1 through 8 inclusive. If you do not specify a server name the status of all the configured servers is listed.

For active server links the pathname of the local file is displayed without passwords.

If the local request is a send operation the pathname is the source file pathname. If the request is a get or fetch operation the pathname is the destination file pathname.

For requests initiated remotely the display is either the pathname of the local file being fetched or sent or the device type (LP) to which the remote file is being sent.

In addition, for both local and remote requests the –LIST_SRVR_STS command displays the following information.

- Whether the file is being sent (S) or fetched (F).

- The Remote site. This information is not always available to the local server. In that case **REMOTE** is displayed.

- The start time of the file transfer expressed in the form hh:mm.

The following example shows the new display for local and remote requests:

```
Link.  Request.    Start time. Status.             Remote site.


1    2        S    17:02     Active.              BIRCH
     Local file    - <TSTDSK>TEST>SEND_FILE1
2    3        S    17:04     Active.              ELM
     Local file    - <TSTDSK>TEST>SEND_FILE2
3    4        F    17:05     Active.              LINDEN
     Local file    - <TSTDSK>TEST>FETCH_FILE1
4    5        S    17:01     Active.              FIR
     Local file    - <TSTDSK>TEST>SEND_FILE3
5    REMOTE   S    16:55     Active.              ASH
     Local device  - LP
6    REMOTE   F    17:02     Active.              OAK
     Local file    - <TSTDSK>TEST>REMOTE_FETCH1
7    REMOTE   S    16:59     Active.              PINE
     Local file    - <TSTDSK>TEST>REMOTE_SEND1
8    REMOTE   S    17:02     Active.              WILLOW
     Local file    -. <TSTDSK>TEST>REMOTE_SEND2
```

▶ –START_MNGR [manager-name]
  –STRMG

The –START_MNGR option starts up the FTS manager phantom. The default manager name is YTSMAN.

Note

You should invoke the FTOP –START_MNGR command only from the supervisor terminal. If you attempt to use this command from any other terminal an error message is displayed.

You can include the FTOP –START_MNGR command in the PRIMOS.COMI file so that the FTS manager start up automatically at each cold start.

► **–START_SRVR server-name**
–STRSV

The –START_SRVR option starts up the specified file transfer server as a phantom. If that server is already running an error message is displayed.

You should invoke the FTOP –START_SRVR command only from the supervisor terminal. Doing so ensures that the server phantom is created with the user name of the server and that the process priority and timeslice are automatically set in accordance with the configuration of the server.

If you invoke this option from a terminal other than the supervisor terminal the specified server does not run under its proper user name and the configured priority and timeslice of the server are not set. The system defaults for these values are assigned instead.

It is particularly important in an ACL environment that the server phantom run with the configured server name because users must grant that particular server name appropriate access rights to the directories to and from which files are to be transferred.

You can add the FTOP START_SRVR command to the PRIMOS.COMI file so that the required file transfer servers start automatically at cold start.

► **–STOP_MNGR**
–STPMG

The –STOP_MNGR option causes the FTS manager to complete its current work and log out. If the manager is not running an error message is displayed.

Stopping the FTS manager prevents remote requests from being received and serviced. If one or more transfer server phantoms are running then local requests are processed as usual. However remote transfers of files to and from the local site will not succeed since the FTS manager phantom does not receive these incoming calls from PRIMENET and pass them on to the appropriate file transfer server. The remote file transfer server retries such requests at 30-minute intervals.

► **–STOP_SRVR server-name**
–STPSV

The –STOP_SRVR option causes the specified file transfer server to complete the file transfers that are currently in progress and then log out. If the server is not running an error message is displayed.

You should use –STOP_SRVR to close down an FTS server.

Even if a server is not running, users can still submit requests which are queued.

Starting, Stopping and Monitoring YTSMAN

YTSMAN is the FTS default name for the FTS file manager phantom process. You can provide another name with the START_MNGR command described below. You can monitor the FTS manager phantom process with the STATUS USERS command.

YTSMAN receives file transfer requests from remote nodes and passes them to the appropriate local file transfer servers. When running it maintains a command output file with the following pathname.

    FTSQ*>YTSMAN.COMO

Both the FTS manager and the FTS file servers must be started from the supervisor terminal. You can add the following command to the PRIMOS.COMI file so that the file transfer manager starts automatically at each cold start.

FTOP –START_MNGR [manager-name]

To stop the manager type the following command at the supervisor terminal:

```
FTOP  -STOP_MNGR
```

See the FTOP section earlier in the chapter for more information on these FTOP manager commands.

Starting, Stopping and Monitoring
File Transfer Servers

File transfer servers are the phantom processes that handle file transfer requests. The System Administrator configures file transfer servers and assigns server names.

FTS server phantoms maintain log files in the FTSQ* directory while they are running. You can display these log file names using FTGEN's LIST_SERVER command. You can monitor a command output file called FTSQ*>COMO.FTS>*server-name* which is maintained by active FTS server phantoms.

The operator uses the FTOP command to start, stop and monitor the operation of the file transfer servers. FTOP is available only to the operator logged in as SYSTEM. FTOP command options are fully described earlier in this chapter.

To start up an FT⸱ ⸱⸱ver process enter the following command:

```
FTOP  -START_  ⸱VR  se⸱ver_name
```

The above command is normally included i⸱ the PRIMOS.COMI file on your system.

To obtain a list of all configured servers including the status and user number of each server enter the following command.

```
FTOP -LIST_SRVR_STS
```

A few minutes before shutting down the system you should enter the following command to shut down each running FTS server as soon as that server completes any transfers in progress. You must be logged in as SYSTEM.

```
FTOP -STOP_SRVR server_name
```

Stopping the servers in this manner ensures that all transfers currently in progress will be successfully completed before the logout.

As each server shuts down it sends a message to the supervisor terminal.

Sometimes it may be necessary to shut down the FTS servers immediately even if they are currently transferring files. This is known as *abandoning* the FTS servers. When an FTS server is abandoned it places any file transfers it is currently processing on hold in the queue so that they can be started up again later. It then logs itself out. To abandon an FTS server enter the following command while you are logged in as SYSTEM:

```
FTOP -ABND_SRVR server_name
```

Note

When the local FTS server and YTSMAN are not running local users may still queue requests with FTR.

Remote Revision Recognition

When a transfer request is initiated the local and destination servers transmit an FTS revision identifier. The receiving server checks the revision against the local configuration record of that site and reports any discrepancy to the operator log as follows:

```
Warning: configuration mis-match; site xxx is issue nnn
```

where *xxx* is the name of the site and nnn is the FTS revision number of that site. This allows the System Administrator or operator to enter the correct revision number of the destination site in the local configuration file.

Managing and Monitoring User Requests

Although it is the responsibility of users to track their own requests you should check the general status of requests with the FTR -STATUS_ALL command. You should watch for requests that

have been repeated many times or that have been put on hold for a long period of time. Use either the FTR –STATUS_ALL command or the FTR –DISPLAY command to monitor user requests.

Typical causes for problems with file transfer requests are

- There is network congestion.

- The remote site is down.

- The remote server or manager has not been started.

One example of an FTR management option is to abort a request that is already in progress. To do this enter the following FTR management command:

```
FTR -ABORT request-name
```

The specified transfer request is aborted and put on hold. Later when you are ready to release the request and allow the transfer to take place enter this command:

```
FTR -RELEASE request-name
```

Rush Requests

Two methods allow you to rush the transfer of a request.

- You can change the priority of a request to 8 or 9 using the –PRIORITY option.

- If there are a number of 8 and 9 priority requests and you wish to rush one particular request you need to use a combination of the FTGEN, FTOP and FTR commands.

See the *PRIMENET Planning and Configuration Guide* for more information on the FTGEN command.

New requests queued during this procedure are not held. If this causes all free server links to be used up use the following procedure.

1. Block the file transfer queue on which the rush request(s) are queued. Use the FTGEN BLOCK_QUEUE command to prevent other requests from being added to the queue.

2. Use the FTR –HOLD command to suspend all waiting requests.

3. Use the FTOP –LIST_SRVR_STS command to discover if there are sufficient free server links available out of the maximum of eight to process the request(s) you want to rush.

4. If necessary use the FTOP –ABRT_SRVR_LINK command to put requests on hold. This command frees the server links of currently transferring files.

5. Use the FTR –RELEASE command to release the rush request(s).

6. When all rush requests have been completed use the FTR –RELEASE command to release all requests you had put on hold.

7. Finally use the FTGEN UNBLOCK_QUEUE command to allow new submissions of file transfer requests to previously blocked queues.

Note

Normally you might need to use only the –HOLD and –RELEASE options. The steps required depend on the activity of the FTS server when you want to rush one or more requests.

Monitoring the FTSQ* Directory

The FTSQ* directory holds copies of user files that are to be transferred as well as FTS log files. You should make sure adequate disk space is available to accommodate these copies. Use the LIST_QUOTA and AVAIL commands described in the *Operator's Guide to File System Maintenance* for information on monitoring disk space utilization.

Monitoring and Archiving FTS Log Files

FTS log files are maintained in the FTSQ* directory. The filenames are specified by the System Administrator as part of FTS configuration. Server log files record all events for incoming and outgoing file transfers and can be useful in providing a record of FTS usage when you are tracking the progress of a particular request. You should examine the server log daily to check the status of FTS. Use a text editor to locate the current date in the file and then locate RESULT.

Here is an example.

```
OK ED FTSQ*>FTP.LOG
EDIT L DECEMBER 1 00.00.18: [1.1] Request MEMO (53) started
Monday December 6 1986
L RESULT
00.00.19: [1.1] RESULT:
Transfer Aborted : Out of order.
X
9.31.59: [2.1] RESULT:
Transfer Rejected: File not available.
X
9.32.50: [2.1] RESULT:
Transfer Rejected: Problem with remote file.
X
9.38.08: [4.1]
RESULT: Transfer Terminated: Satisfactory and Complete.
```

Log files are not limited in size; you should therefore archive them regularly so that the FTSQ* directory does not become full.

Stopping FTS

To stop FTS use the FTOP –STOP_SRVR and the FTOP –STOP_MNGR commands to shut down the file servers and the file manager (YTSMAN). Do this before issuing the STOP_NET command.

Once the network has been started again with the START_NET command you can restart the servers and the manager with the FTOP START_SRVR and FTOP START_MNGR commands.

Setting ACL Rights Related to FTS

You should ensure that the FTSQ* directory on your master disk is properly protected. Use the following guidelines when assigning access rights:

- Every server, including YTSMAN needs ALL access rights to FTSQ*.

- The user ID SYSTEM needs ALL access rights to FTSQ*.

- The $REST default access for FTSQ* must be set to DALURW because users access FTSQ* through the FTR command. Also users need to be able to delete temporary request files with FTR –CANCEL.

7
Using MONITOR_NET

The MONITOR_NET command permits you to invoke the following monitors:

- The Ring Monitor
- The Virtual Circuit Monitor
- The Synchronous Line Monitor
- The LAN300 Monitor

This chapter describes the MONITOR_NET command and how to perform those functions common to all four monitors. For a detailed description of the Virtual Circuit Monitor, see Chapter 8, The Virtual Circuit Monitor; of the Ring Monitor, see Chapter 9, The Ring Monitor; of the LAN300 Monitor, see Chapter 10, The LAN300 Monitor; and of the Synchronous Line Monitor, see Chapter 11, Monitoring Synchronous Lines. Appendix C contains a complete list of MONITOR_NET messages and a description of each.

Overview of the Monitors

Each of the four monitors samples the PRIMENET database and displays the information on your terminal screen. The information is organized into two or more screen types. Each monitor has one or more Overview screens that summarize communications activity for that monitor. All of the monitors expand on the information presented in the Overview screen(s) with one or more Detailed screens.

- The Ring Monitor has an Overview screen that summarizes RINGNET activity, a Detailed screen and Extended Data screen that expand on the information displayed in the Overview screen, and also Error Totals and Trace Totals screens that show itemized breakdowns of totals displayed in the Detailed screen.

- The Virtual Circuit Monitor has 32 Overview screens and a Detailed Screen for each active virtual circuit.

- The Synchronous Line Monitor has an Overview screen that summarizes communications activity for all configured synchronous lines, and also a Detailed screen and a Configuration screen for each synchronous line.

- The LAN300 Monitor has an overview screen that summarizes communications activity for all configured LAN300s, and also a Trace screen and an Error screen for each LAN300.

Once you have invoked a monitor, you can perform a number of functions, such as changing the frequency of sampling from the PRIMENET database, turning file input on and off, freezing displays, moving among the screens of that monitor, or moving to the Overview screen of another monitor. You can also invoke any monitor via a phantom-process CPL program and save the monitor's output in a binary or COMO file for later analysis.

Enhancements to MONITOR_NET

Several enhancements to MONITOR_NET have been released with Rev. 21.0 of PRIMOS. They can be summarized as follows:

- The Ring Monitor's Error screen and Trace screen displays are now dynamically updated.

- The Virtual Circuit Monitor now supports a maximum of 255 virtual circuits.

- MONITOR_NET is now able to produce a report in a text file.

- You can access the input file stream by specifying a sample time.

- MONITOR_NET can receive input from a file and simultaneously write output to another file. This feature permits you to modify MONITOR_NET input files.

- The –TRACE option can now be specified alone.

- The Ring Monitor now has a **RING IS UP/RING IS DOWN** message.

- All screens (both overview and detailed level) can now be specified directly from the command line, except for the Virtual Circuit Detailed screens.

Invoking the Monitors

The MONITOR_NET command invokes any of the monitors. By specifying the appropriate options to the MONITOR_NET command, you can invoke a specific monitor, such as the Ring Monitor, or you can display the MONITOR_NET Main Menu, from which you can select the monitor that you wish to run.

The MONITOR_NET Command

The format of the MONITOR_NET command is

MONITOR_NET [option_1 ... option_n]

The MONITOR_NET options for screen selection are listed below.

Option	Screen
-RING	Ring Overview
-RING D	Ring Detailed
-RING E	Ring Error
-RING T	Ring Trace
-RING X	Ring Extended
-SYNC	Sync Overview
-SYNC [line_number]D	Sync Detailed
-SYNC [line_number]C	Sync Config
-VIRTUAL -VC	Virtual Circuit Overview
-LAN300	LAN300 Overview
-LAN300 [lan#]E	LAN300 Error
-LAN300 [lan#]T	LAN300 Trace

You can run only one monitor at a time; therefore, you are permitted to specify only one of the above options with each invocation of the MONITOR_NET command.

In addition to the options for specifying the monitor and screen, other options can be used either in combination with screen specification, or by themselves. The meaning of these remaining options is as follows:

▶ -HELP

Displays information about the MONITOR_NET options and then returns you to PRIMOS command level. If you use -HELP with any other options, an appropriate message is displayed and the other options are ignored.

▶ -LANGUAGE language

Displays text in a language other than English. This option is useful only when a foreign language is installed on your system. You must have a subdirectory PRIMENET*> MONITOR_NET>LANGUAGE, which contains subdirectories of properly formatted text files in the foreign language. If the appropriate language directory does not exist and you use this option, an error message is displayed.

Several different languages may be supported on the same system. Using the -LANGUAGE option is equivalent to using the global variable command

SET_VAR .LANGUAGE$ language

For information regarding foreign language displays, contact your Customer Support Center.

▶ **−PERIOD seconds**

Sets the time interval, in seconds, between samples of the PRIMENET database or the input file. *seconds* must be greater than 0 and less than or equal to 86,400 (24 hours). If you do not use this option, MONITOR_NET sets the period to 3 seconds.

▶ **−TIMES n**

Ends monitor operation after *n* samples. If you do not specify a number of updates or samples, MONITOR_NET continues to operate indefinitely.

▶ **−RESET_DAY**
   −RD

Resets cumulative and peak values on your terminal screen to zero at midnight. If you do not specify either −RESET_DAY or −RESET_HOUR cumulative and peak values are not reset. You cannot use the −RESET_DAY option with the −INPUT option.

▶ **−RESET_HOUR**
   −RH

Resets cumulative and peak values on your terminal screen to zero every hour on the hour including midnight. If you do not specify either −RESET_DAY or −RESET_HOUR cumulative and peak values are not reset. You cannot use the −RESET_HOUR option with the −INPUT option.

▶ **−INPUT filename**

Takes PRIMENET data from the file *filename* instead of taking data from the PRIMENET database. If you do not use this option MONITOR_NET collects "live" data from the PRIMENET database. You can use this option to display data that was collected at another time with the −OUTPUT option (for example data collected using a phantom). *filename* must not contain wildcards.

The PERIOD value displayed during file input is the amount of time (in seconds) MONITOR_NET waits between samples from the input file. It is not the period that was in force when the input file was created. Since the original sample times are displayed you can calculate the period used when collecting data by determining the amount of time between sample times.

During file input you can move back and forth in the file input stream. Enter a sample time and press G to restart.

► **–OUTPUT filename**

Enables and starts writing the data collected from the PRIMENET database to the file *filename*. Use the –INPUT option to display the data produced by this option. You can also use file output while reading from an input file. If you do not use this option data is displayed on your screen but not written to a file. *filename* must not contain wildcards.

Caution

Output files can become large rapidly. See Table 7-1, later in this chapter, for details.

► **–REPORT   filename**
  –RPT

From each monitor you can generate a report from live data or from an input file. You can press 0 to turn on and off report generation. The format of the report corresponds to the monitor you are viewing at the time.

► **–TRACE**

Trace data is available for the Ring Monitor and the LAN300 Monitor. You can specify the –TRACE option without having to specify –RING or –LAN300. If you do not specify –TRACE no trace data is collected.

Caution

Output files that include trace data can become large rapidly; delete such files or move them offline frequently. See Table 7-1, later in this chapter, for details.

▶ −TERMINAL_TYPE
   −TTP type

Specifies the type of terminal on which you are running MONITOR_NET. Valid terminal types are

Teleprinter	TTY
Prime	PT200, PST 100, PT45 (BEE), OWL, FOX, PT25
Adds (Viewpoint or Regent 40)	ADDS
TeleVideo	TV920, TV924, TV925, TV970 or TVI920, TVI924, TVI925, TVI970
DEC	VT200, VT100, VT52
Concept	C108
Lear Seigler	ADM3A

These terminal types are not supported when special terminal control sequences are in effect. Some of the above entries can be used for terminals other than (but similar to) the ones listed. For example you can use the TV920 or TV925 option for the TeleVideo 921 terminal.

When MONITOR_NET is invoked by a phantom-process CPL program, the terminal type must be NONE, NO or TTY.

The TTY terminal type produces simple line-by-line output without cursor addressing. This output can be captured in a COMOUTPUT file and printed. TTY output is acceptable to almost any terminal including printing terminals.

For a current list of supported terminals type

```
MONITOR_NET  −HELP
```

The default terminal type is PST 100 if you are running MONITOR_NET interactively or NONE if MONITOR_NET has been invoked by a phantom process.

<div align="center">

Note

</div>

The PST 100 and PT200 MONITOR_NET interfaces are the same.
Thus you can use the default terminal type (PST 100) if you have a
PT200™.

If you use the SET_VAR command to set the global variable .TERMINAL_TYPE$ to a MONITOR_NET terminal type then MONITOR_NET sets your terminal to that type. You can override the .TERMINAL_TYPE$ value with the −TERMINAL_TYPE option.

The PST 100 terminal type is ANSI X3.64 compatible.

The Main Menu

If you specify the MONITOR_NET command with no control arguments the Main Menu shown in Figure 7-1 appears. You can then select the monitor that you wish to run, request help or terminate MONITOR_NET. For example press R (not followed by a carriage return) to start up the Ring Monitor and display the first screen of the Ring Monitor the Ring Monitor Overview screen.

```
                        Welcome to MONITOR_NET
             [Rev. 21.0 Copyright (c) Prime Computer Inc. 1986]

                              MAIN MENU


             Type a single key command:

             R - Display RING Monitor Overview

             V - Display VIRTUAL CIRCUIT Monitor Overview

             S - Display SYNCHRONOUS LINE Monitor Overview

             L - Display LAN300 Monitor Overview

             H - Display Main Menu Help

             Q - Quit MONITOR_NET
```

Figure 7-1
MONITOR_NET Main Menu

Viewing an Individual Monitor

To view a specific monitor do one of the following:

- Select the monitor from the Main Menu. For example type S to start the Synchronous Line Monitor and display its Overview screen.

- Specify the appropriate option to the MONITOR_NET command. For example, to view the Virtual Circuit Monitor specify the –VIRTUAL option.

```
MONITOR_NET -VIRTUAL
```

• Move to the monitor from another monitor as described in Using MONITOR_NET below. For example typing R while you are viewing the Virtual Circuit Monitor stops the Virtual Circuit Monitor, starts the Ring Monitor and displays the the Ring Monitor Overview screen.

Using MONITOR_NET

Each monitor organizes the data that it collects into several screens. Once you have started a monitor you issue one-character commands to move among the screens and to perform several other functions. These functions include

• Moving from screen to screen within a monitor

• Requesting help

• Moving to the Overview screen of another monitor

• Freezing or unfreezing the screen display

• Changing the period (the amount of time, in seconds between taking samples from the PRIMENET database)

• Turning file or report output on and off (if you invoke the monitor with the –OUTPUT or –REPORT option)

• Exiting the monitor

Enter MONITOR_NET commands without carriage returns. In some cases a carriage return is a separate command that displays the next screen in a sequence of screens. For example, if you enter V followed by a carriage return from the Main Menu MONITOR_NET displays the second Virtual Circuit Overview screen. If you type an invalid command MONITOR_NET displays an appropriate message on line 24 of your terminal screen. Appendix C contains a complete list of MONITOR_NET messages.

If the network goes down while you are running one of the monitors MONITOR_NET displays an appropriate message and returns you to PRIMOS.

If the monitor terminates either because it has performed all of the dynamic display updates that you specified in a –TIMES option or because it has come to the end of an input file, the screen scrolls up by one line an appropriate message is displayed on line 24 of your terminal screen and control is returned to PRIMOS command level. If a MONITOR_NET software error occurs the Main Menu is displayed and an appropriate message appears on line 24 of your terminal screen.

MONITOR_NET Screen Formats

Each MONITOR_NET screen fills a terminal screen. Figure 7-2 shows a typical screen the Ring Monitor Overview screen. The first two lines of the screen contain the standard MONITOR_NET header. The header includes information such as the name of the monitor and the screen the

number of seconds between samples from the PRIMENET database or input file (PERIOD), the time the monitor started (START) and the time when the PRIMENET database or input file was sampled most recently (SAMPLE).

```
RING MONITOR - OVERVIEW        www mmm dd yyyy  PERIOD ppppp   FILE xxxxxxxxxx
START hh:mm:ss  FROZEN xxxxxxx SAMPLE hh:mm:ss  SYSTEM xxxxxx  RESET on xxxx


                        Period         Peak/Period     Cumulative        Total  Errors
       Frames   Xmit xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx  xxxxxx
                Recv xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx  xxxxxx

       Bytes    Xmit xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx
                Recv xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx

       WACKed Xmits xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx
       Non-Rt'd Frs      xxxxx        xxxxx hh:mm:ss        xxxxx   xxxxxxxxxx








              Ring Screens: D = Detailed, E = Error, T = Trace H = Help
```

Figure 7-2
Ring Monitor Overview Screen

Lines 4 through 23 display different information for different screens. For detailed descriptions of the screens and the meaning of the data displayed, see Chapters 8 through 11 which describe in detail each of the individual monitors.

Line 24 of each screen contains a list of the commands for moving to other screens of the monitor. For additional commands, type H. MONITOR_NET also displays messages including those associated with numeric input on line 24.

Status information and messages may be displayed in reverse video on lines 1, 2 and 24 of the screen for terminals that support reverse video. Column headings and other data on MONITOR_NET screens may be underscored on terminals that support underscoring.

Terminal echo is turned off during screen display and restored at exit from MONITOR_NET. For certain terminals the cursor is also turned off during screen display and restored at exit from MONITOR_NET.

All of the values displayed on the monitor screens are taken from the PRIMENET database or input file. The Ring Monitor and the Synchronous Line Monitor detect overflow of certain PRIMENET counters. Since it is possible for PRIMENET counters to overflow when

MONITOR_NET is not running all values displayed on any screens must be assumed to be relative not absolute values. If any data item does not apply for a given screen (for example "Receive Error Status" when there are no Receive Errors) that field is marked NA (Not Applicable).

MONITOR_NET screens are either dynamic or static. Dynamic screens are updated while you view them; static screens are not updated until you redisplay them. All Overview and Detailed screens are dynamic. All of the other Ring Monitor screens are dynamic. The Synchronous Line Monitor Configuration screens are static. The Virtual Circuit Detailed screen becomes static when the virtual circuit for which it is displaying information is disconnected. If you go to another Virtual Circuit Detailed screen or any other screen the display is again dynamic.

Specifying Numeric Input

When you perform MONITOR_NET functions such as changing the period or displaying the Detailed screen for a specific virtual circuit or synchronous line you must specify a number representing either the number of seconds, the virtual circuit ID (VCID) or the logical line number of the synchronous line. In all of these instances you specify numeric input in the same way.

To enter numeric input type the number. The number is echoed on line 24 of your screen as shown below.

```
NUMERIC INPUT: number            Terminator: terminator_list, <space>=Cancel
```

number is the number that you just typed and *terminator_list* is a list of the terminators that you can specify from the current screen. P is always one of the terminators because you can always change the period (the number of seconds between samples of the PRIMENET database). You can now do one of three things:

- Type a terminator to complete the operation (for example type P to change the period).
- Backspace over the number that you just typed and correct it.
- Press the space bar to cancel the operation.

If you type a number that is either too large or otherwise invalid a message is displayed on line 24. (Appendix C, MONITOR_NET Messages contains a complete list of messages and their meanings.) You can then either press the space bar to cancel the change or type in a valid value.

Moving Among the Screens of a Monitor

Most of the commands to move among the screens of a monitor require that you enter only one character. The commands may accept numeric input; for example to view the detailed screen for the virtual circuit with VCID 10 you must specify 10D.

A brief summary of the commands to move to other screens of the monitor that you are viewing is displayed at the bottom of every screen on line 24. (See Figure 7-2 for an example.) For more

information on the commands that you can specify from the screen you are viewing, type H, as described in the section on Requesting Help below.

Requesting Help

You can type H to request help while viewing any MONITOR_NET screen including the Main Menu.

The Main Menu help display describes MONITOR_NET in general. The help display associated with any other screen gives you a list of the commands that you can specify. Figure 7-3 shows the help screen that is displayed when you type H while viewing the Ring Monitor Overview screen when file input is not on.

```
                     RING MONITOR HELP MENU

                 Enter one of these commands:

        R - display  RING OVERVIEW screen
        D - display  RING DETAILED screen
        E - display  RING ERROR screen
        T - display  RING TRACE screen

        F - FREEZE/unFREEZE the display
        O - turn file OUTPUT on/off
  <time>G - goto the specified time of the file input stream
<number>P - change PERIOD of display in seconds

        S - initiate SYNCHRONOUS Line monitor
        V - initiate VIRTUAL Circuit monitor
        L - initiate the LAN300 monitor

        M - return to MAIN MENU for all monitors
        Q - QUIT and exit from MONITOR_NET program
        H - display this HELP message
  <space> - redisplay previous screen or cancel numeric input
```

Figure 7-3
Sample Ring Monitor Help Display

Moving to Other Monitors

To move to another monitor you can either type M to return to the Main Menu or type one of the commands R, V, S, or L. R, V, S, and L have the following functions:

- R starts up the Ring Monitor and displays its Overview screen.

- V starts up the Virtual Circuit Monitor and displays its first Overview screen.

- S starts up the Synchronous Line Monitor and displays its first Overview screen.

- L starts up the LAN300 Monitor and displays its first Overview screen.

If you move from one monitor to another the previous monitor stops running and the new monitor starts up. If you move back to the previous monitor, peak and cumulative values are reset. Similarly moving to the Main Menu stops a monitor; moving back starts the monitor with peak and cumulative values reset.

Freezing and Unfreezing Screens

The one-character command F freezes the screen display; typing F again unfreezes the display. You can move among the screens of a monitor after you have frozen any screen. The other screens are frozen too and remain frozen until you type a second F. One of two messages, **FROZEN INPUT** or **FROZEN DISPLAY** appears on the second line of your terminal screen along with the other standard header information.

You may exit the monitor after you freeze displays. If you return to the same monitor displays are no longer frozen. If you freeze the display and then go to another monitor the new monitor does not have frozen displays.

If you are using an input file (you invoked MONITOR_NET with the –INPUT option) and you type F sampling from the file and updating of screens stops until you type another F. The messages **FILE INPUT OFF** and **FROZEN INPUT** are displayed on the first and second lines of your terminal screen. You can also unfreeze the display by using the *<time>*G command.

If you are not using an input file and you type F, updating of screens stops but MONITOR_NET continues to sample the PRIMENET database. When you type a second F updating of screen displays starts again. If a peak (maximum) value occurred while the display was frozen that peak value is displayed.

Caution

File output continues while the display is frozen unless you turn output off.

Changing the Period

You can change the period (the amount of time, in seconds between samples taken by MONITOR_NET from the PRIMENET database) from any screen. The period must be greater than 0 and less than or equal to 86400 (24 hours).

If you change the period in any monitor and move to another monitor the period remains at the new value.

If you change the period while a monitor is running you may invalidate any maximum (peak) values displayed. For example a period of 120 seconds might have a peak activity of 20000 bytes; this peak would never be attained if you changed the period to 30 seconds. To change the period without invalidating the peak values move to the Main Menu (by typing M), change the period and return to the monitor.

Since this process stops and starts the monitor and therefore resets the peak values the new peak values are valid.

To change the period type the number representing the length of the new period in seconds followed by P. (See Specifying Numeric Input earlier in this chapter for more information.) If you change the period the following message is displayed for five seconds on line 24 of your terminal screen:

```
New Period value = <number> seconds
```

where *number* is the new value that you specified. The PERIOD value that appears on the first line of all screens is also changed to the new value.

Unless you change the period either interactively or with the –PERIOD option of MONITOR_NET the period is 3 (seconds). If your system is busy or your network has a great deal of activity MONITOR_NET may not be able to take samples every 3 seconds. Every screen displays a time labeled SAMPLE on the second line of the screen; if SAMPLE is consistently increasing by more than 3 seconds increase the period value appropriately to obtain consistent sample times.

Using File Input and Output

You can write the data collected and displayed by a monitor to an output file using the –OUTPUT option of the MONITOR_NET command. This option is particularly useful when MONITOR_NET is invoked by a phantom process. MONITOR_NET writes the data for every screen of the monitor to the output file every period. You can use the –INPUT option of MONITOR_NET to review an output file that was created previously.

During file input you can move foward and backward in the input file by specifying a sample time. The input file is ordered sequentially by time. You enter the sample time from where you want the input to restart in this format:

hh[:mm[:ss-mm/dd/yy]]

where the minutes, seconds and date are optional. Then press G to go to the specified time period in the file. MONITOR_NET begins displaying information with the record closest to the time you specified. To keep input files in chronological order file restart is not permitted while the –OUTPUT option is specified. MONITOR_NET displays an appropriate message when you reach the end of the input file.

If you invoked MONITOR_NET with the –OUTPUT option all data is both displayed on your terminal screen and written to an output file. (If MONITOR_NET was invoked by a phantom nothing is displayed on the screen.) Data is written to the output file for all screens of a monitor,

not just the one you are viewing. When file output is on or when you use the –REPORT option every MONITOR_NET screen contains the following phrase on the first line of the screen:

```
FILE OUTPUT ON
```

You can stop writing to the output file at any time by typing the one-character command O. The **FILE OUTPUT ON** message changes to **FILE OUTPUT OFF**. To start writing again type another O. If you turn file output off in one monitor it remains turned off when you move to another monitor.

The MONITOR_NET output file can grow very large rapidly. Make sure that you have enough file space to store any output files. Table 7-1 summarizes the maximum number of bytes that each monitor writes to an output file each period.

Caution

MONITOR_NET writes data to an output file every period even if the display that you are viewing is frozen or static.

TABLE 7-1
MONITOR_NET Output File Sizes

Monitor	Maximum Amount of Data Written Per Period
Ring Monitor	4039 bytes if –TRACE is specified 2055 bytes otherwise
Virtual Circuit Monitor	45530 bytes (255 virtual circuits in use)
Synchronous Line Monitor	2642 bytes (8 sychronous lines in use)
LAN300 Monitor	15,022 bytes if –TRACE is specified 172 bytes otherwise.

Generating Reports

MONITOR_NET can produce a report in the form of a text file. The report lists period values (the time difference between samples) for in the form of a text file. The various fields depending on which monitor you are running at the time. The data can be live or from an input file. To produce a report use the following option when you invoke MONITOR_NET:

–REPORT filename
–RPT

You can specify the number of lines of data per page (before a new header is printed again) with

-PAGE_LENGTH XXX
-P

where XXX is the number of lines. The default is 53.

Since the Virtual Circuit Monitor can have a maximum of 255 virtual circuits its report can be quite long. You can limit the report by specifying that only circuits that were connected for a certain length of time be reported. To specify a certain length of time with the -REPORT option add the option

-SELECT_VC time
-SVC

The report will only contain virtual circuits with a duration greater than or equal to the selected time.

The report generated corresponds to the type of monitor you are using. You turn on and off the report generation by typing O. When you specify the -OUTPUT option with the -REPORT option the O key acts upon both files.

Running MONITOR_NET as a Phantom

You can invoke MONITOR_NET via a phantom-process CPL program to collect data in an output file and/or to collect screen displays in a COMOUTPUT file. For information about phantoms see the *PRIMOS Commands Reference Guide*.

When MONITOR_NET is invoked by a phantom process the following options are required:

- The -TIMES option to make sure that MONITOR_NET terminates.

- The -OUTPUT or -REPORT option to provide a file for MONITOR_NET output and/or the -TTP TTY option to save screen displays in a COMOUTPUT file. If you specify -TTP TTY be sure to open a COMOUTPUT file before MONITOR_NET is invoked. The COMOUTPUT file can later be printed. A file created by the -OUTPUT option cannot be printed; however you can read the file at a later time by using the MONITOR_NET -INPUT option.

- One and only one monitor type (that is one of the options -RING, -VIRTUAL, -SYNC or -LAN300).

The terminal type must be either TTY (to capture screen displays in a COMOUTPUT file), NONE or NO. If you do not specify a terminal type MONITOR_NET assumes that the terminal type is NONE.

You are not permitted to use the following options when MONITOR_NET is invoked by a phantom process:

- -RESET_DAY

- -RESET_HOUR

The CPL program that runs the monitor should include a COMOUTPUT (COMO) command to open a COMOUTPUT file. If you specify the MONITOR_NET -TTP TTY option the COMOUTPUT file collects both the MONITOR_NET screen displays and any error messages MONITOR_NET generates. If you specify file output and do not specify -TTP TTY the COMOUTPUT file collects MONITOR_NET messages only. If the MONITOR_NET command is invalid or if an error occurs the phantom terminates normally with a MONITOR_NET message written to the COMOUTPUT file.

Output files can grow large rapidly. See Table 7-1, earlier in this chapter, for details.

Examples of Phantom Operation

The following three examples show each of the monitors run as a phantom process. HOURLY_RING.CPL, below, writes Ring Monitor information to an output file once every 10 minutes and creates a new output file every hour for four hours. To run HOURLY_RING.CPL type

```
PHANTOM HOURLY_RING.CPL
```

You can specify additional MONITOR_NET options to this phantom by appending them to the PHANTOM command; for example

```
PHANTOM HOURLY_RING.PH   -TRACE
```

specifies collecting RINGNET trace data hourly.

```
HOURLY_RING.CPL
```

```
/* HOURLY_RING.CPL runs the Ring Monitor as a phantom. MONITOR_NET messages   */
/* are collected in ring.como; there are 4 MONITOR_NET output files           */
/* hour1.ring_rpt, ... hour4.ring_rpt. A sample is taken every 10 minutes;    */
/* a new output file is started every hour for 4 hours.                       */
/*                                                                            */
&args cmd_line:rest;          /* ':rest' captures PRIMOS command line arguments */
como   ring.como -ntty    /* collect MONITOR_NET msgs; turn terminal off output */
monitor_net -ring %cmd_line% -out hour1.ring_rpt -period 600 -times 6
monitor_net -ring %cmd_line% -out hour2.ring_rpt -period 600 -times 6
monitor_net -ring %cmd_line% -out hour3.ring_rpt -period 600 -times 6
monitor_net -ring %cmd_line% -out hour4.ring_rpt -period 600 -times 6
como   -e
&return
```

VC.CPL, below takes one sample every two minutes for 10 minutes and writes the Virtual Circuit Monitor information to the output file. To run VC.CPL type

```
PHANTOM VC.CPL
```

```
VC.CPL
```

```
/* VC.CPL runs the Virtual Circuit Monitor as a phantom. MONITOR_NET messages */
/* are collected in vc.como; the MONITOR_NET output file is vc.rpt. A sample  */
/* is taken every 2 minutes for 10 minutes.                                   */
/*                                                                            */
&args cmd_line:rest;          /* ":rest" captures PRIMOS command line arguments */
como vc.como -ntty         /*collect MONITOR_NET msgs; turn off terminal output*/
monitor_net -virtual %cmd_line% -out vc.rpt -period 120 -times 5
como  -e
&return
```

HOURLY_SYNC.CPL, below creates a new output file every hour for four hours and writes the Synchronous Line Monitor information to it once every 10 minutes. To run HOURLY_SYNC.CPL type

```
PHANTOM HOURLY_SYNC.CPL
```

```
HOURLY_SYNC.CPL
```

```
/* HOURLY_SYNC.CPL runs the Synchronous Line Monitor as a phantom. MONITOR_NET*/
/* messages are collected in sync.como; there are 4 MONITOR_NET output files  */
/* hour1.sync_rpt, ... hour4.sync_rpt. A sample is taken every 10 minutes;    */
/* a new output file is started every hour for 4 hours.                       */
/*                                                                            */
&args cmd_line:rest;          /* ':rest' captures PRIMOS command line arguments */
como sync.como -ntty     /* collect MONITOR_NET msgs; turn off terminal output */
monitor_net -sync %cmd_line% -out hour1.sync_rpt -period 600 -times 6
monitor_net -sync %cmd_line% -out hour2.sync_rpt -period 600 -times 6
monitor_net -sync %cmd_line% -out hour3.sync_rpt -period 600 -times 6
monitor_net -sync %cmd_line% -out hour4.sync_rpt -period 600 -times 6
como  -e
&return
```

8

The Virtual Circuit Monitor

The Virtual Circuit Monitor of MONITOR_NET gathers and displays information about active virtual circuits. The first part of this chapter briefly describes virtual circuits in the PRIMENET environment. The second part of the chapter explains the Virtual Circuit Monitor of MONITOR_NET, how to use it, and how to interpret its information.

Virtual Circuits

If two processes need to exchange information over a PRIMENET network, one process makes an appropriate Interprocess Communications Facility (IPCF) subroutine call specifying the other process. PRIMENET then establishes a bidirectional link between the two processes through a **virtual circuit** (VC). A virtual circuit is a logical path from one process to another across the network.

Virtual circuits do not necessarily correspond exactly to physical communication lines. For example, one physical line may carry many virtual circuits, just as one telephone trunk line may carry many voices at the same time. Moreover, a virtual circuit between two given systems might use a different physical path each time it is established (if different physical paths exist).

Each virtual circuit has an identifying number to distinguish it from all others. PRIMENET currently allows a maximum of 255 virtual circuits at a time on each node. One VC across a PDN may traverse many physical links and nodes. PRIMENET applications may create virtual circuits on behalf of users. The Virtual Circuit Monitor of MONITOR_NET permits you to track communications activity on any virtual circuits attached to your node.

Using the Virtual Circuit Monitor

The MONITOR_NET command permits you to invoke four monitors: the Ring Monitor, the Virtual Circuit Monitor, the Synchronous Line Monitor, and the LAN300 Monitor. This section explains how to invoke the Virtual Circuit Monitor and how to peform those MONITOR_NET functions that are specific to the Virtual Circuit Monitor. Each Virtual Circuit Monitor screen type is described in this chapter, along with the meanings of each data field. Refer to Chapter 7, Using MONITOR_NET, for general information on all the monitors.

The Virtual Circuit Monitor gathers statistics relating to virtual circuits from the PRIMENET database and displays them. The Virtual Circuit Monitor displays its information in two types of screens:

- Virtual Circuit Overview screen

- Virtual Circuit Detailed screen (one per active virtual circuit)

There are a maximum of 32 Virtual Circuit Overview screens; together they summarize the activity of all active virtual circuits. There is one Detailed screen for each active virtual circuit; the Detailed screen expands on the information presented in the Overview screen. The Overview and Detailed screens are dynamic; that is, they are updated by the Virtual Circuit Monitor while they are displayed.

The Virtual Circuit Monitor updates the Overview and Detailed screens by taking a sample from the PRIMENET database every 3 seconds; you can change this period using either the –PERIOD option of the MONITOR_NET command or the P command from any screen.

Once you have invoked MONITOR_NET, you can move among the screens of a monitor or change to the Overview screen of another monitor. At any time, you can type H to get help, M to display the Main Menu, or Q to exit the monitor and return to PRIMOS command level.

Invoking the Virtual Circuit Monitor

The MONITOR_NET command invokes the Virtual Circuit Monitor. If you specify the command with no control arguments, as in

```
MONITOR_NET
```

then the Main Menu appears. Type V (without a carriage return) to start up the Virtual Circuit Monitor and display the first Virtual Circuit Overview screen. Figure 8-1 shows an Overview screen.

The command

```
MONITOR_NET -VIRTUAL
```

starts the Virtual Circuit Monitor and displays the first Overview screen without displaying the Main Menu. You can always return to the Main Menu by typing M (without a carriage return) at any screen. If you have already invoked MONITOR_NET, typing V from any screen starts up the Virtual Circuit Monitor and displays the first Overview screen. You can terminate the Virtual Circuit Monitor by either moving to another monitor or by terminating MONITOR_NET itself by typing Q.

For more information about invoking the monitors, refer to Chapter 7, Using MONITOR_NET.

Operating the Virtual Circuit Monitor Interactively

To get a list of those commands that you can issue from the current screen, type H to display a help screen. There are two ways to move among the Virtual Circuit Overview screens:

- Cycling through all of the Overview screens by typing a carriage return after each screen is displayed

  Moving directly to the screen that contains overview information for a specific virtual circuit

To move directly to the screen containing overview information for a specific virtual circuit, type the VCID of the virtual circuit, followed by V.

Each active virtual circuit also has a Detailed screen. To display the Detailed screen for a virtual circuit, type the VCID of the virtual circuit followed by D. If you type D without a VCID, you get the detailed screen for the active VCID that you most recently specified; if you have not specified any VCIDs, you get the Detailed screen for VCID = 1.

If you are displaying the Detailed screen for a virtual circuit and the virtual circuit is disconnected, the display becomes static (that is, is no longer updated while you view the screen) and an appropriate message appears on line 24 of your terminal screen. (When you redisplay the screen, it becomes dynamic.)

Several errors can occur when you are specifying Overview screens or Detailed screens. Appendix C contains a list of MONITOR_NET error messages and an explanation of each message.

Use the following commands to move to other monitors:

- R stops the Virtual Circuit Monitor, starts up the Ring Monitor, and displays its Overview screen

- S stops the Virtual Circuit Monitor, starts up the Synchronous Line Monitor, and displays its first Overview screen.

- L stops the Virtual Circuit Monitor, starts up the LAN300 Monitor, and displays its Overview screen.

Alternatively, you can type M to move to the Main Menu and select a monitor from the Main Menu. Moving to the Main Menu stops the Virtual Circuit Monitor and clears all values.

Output files can grow large rapidly. You create an output file using the –OUTPUT option of the MONITOR_NET commands. A maximum of 45,530 bytes of data are written to the output file each period when you are collecting data for 255 active virtual circuits.

Operating the Virtual Circuit Monitor as a Phantom

If the network goes down while you are running MONITOR_NET as a phantom, the phantom is stopped.

Values Displayed in Virtual Circuit Monitor Screens

All of the values displayed in the Virtual Circuit Monitor screens are taken from the PRIMENET database. Since it is possible for PRIMENET counters to overflow (with values of over four billion) when MONITOR_NET is not running, all values displayed on Virtual Circuit Monitor screens must be assumed to be relative, not absolute, values.

If any data item does not apply for a given screen (for example "Link ID" when the "Physical Link Type" is not synchronous), that field is marked NA (Not Applicable).

Note

The Virtual Circuit Monitor may temporarily fail to display information for active virtual circuits. The information will be displayed with appropriate updates when data is captured in a later sample.

Virtual Circuit Monitor Overview Screens

There are 32 Virtual Circuit Overview screens, each of which contains overview information for eight active virtual circuits (except for the last screen). Figure 8-1 shows the screen format. The virtual circuits are arranged in order of increasing Virtual Circuit Identifier (VCID). The first screen contains information for the virtual circuits with VCIDs 1 through 8, the next for virtual circuits with VCIDs 9 through 16, and so on. You can either examine the next eight VCIDs by entering a carriage return, or you can move directly to the Overview screen that contains information for a particular VCID by typing

vcidV

where *vcid* is the VCID of the virtual circuit that you are interested in. The Overview screens are dynamic.

```
VIRTUAL CIRCUIT - OVERVIEW    www, mmm dd yyyy  PERIOD ppppp   FILE xxxxxxxxxx
START hh:mm:ss  FROZEN xxxxxxx SAMPLE hh:mm:ss  SYSTEM xxxxxx  RESET on xxxx

Max VCs: xxx  Active: xxx  High ID: xxx     Peak Active: XXX  Period: hh:mm:ss


          User  User  Remote       P    a    c    k    e    t    s   Connect Reset
VCID Port ID    Num   Name            Period     Total Unack  Duration Count
 xxx  xxx xxxxxx xxx  xxxxxxx Xmit xxxxxxxxxx xxxxxxxxxx       x hhh:mm:ss  xxx
                             Recv xxxxxxxxxx xxxxxxxxxx
 xxx  xxx xxxxxx xxx  xxxxxxx Xmit xxxxxxxxxx xxxxxxxxxx       x hhh:mm:ss  xxx
                             Recv xxxxxxxxxx xxxxxxxxxx
 xxx  xxx xxxxxx xxx  xxxxxxx Xmit xxxxxxxxxx xxxxxxxxxx       x hhh:mm:ss  xxx
                             Recv xxxxxxxxxx xxxxxxxxxx
 xxx  xxx xxxxxx xxx  xxxxxxx Xmit xxxxxxxxxx xxxxxxxxxx       x hhh:mm:ss  xxx
                             Recv xxxxxxxxxx xxxxxxxxxx
 xxx  xxx xxxxxx xxx  xxxxxxx Xmit xxxxxxxxxx xxxxxxxxxx       x hhh:mm:ss  xxx
                             Recv xxxxxxxxxx xxxxxxxxxx
 xxx  xxx xxxxxx xxx  xxxxxxx Xmit xxxxxxxxxx xxxxxxxxxx       x hhh:mm:ss  xxx
                             Recv xxxxxxxxxx xxxxxxxxxx
 xxx  xxx xxxxxx xxx  xxxxxxx Xmit xxxxxxxxxx xxxxxxxxxx       x hhh:mm:ss  xxx
                             Recv xxxxxxxxxx xxxxxxxxxx
 xxx  xxx xxxxxx xxx  xxxxxxx Xmit xxxxxxxxxx xxxxxxxxxx       x hhh:mm:ss  xxx
                             Recv xxxxxxxxxx xxxxxxxxxx
--MORE--    VC screens:  <number>V=Overview,  <number>D=Detailed,  Q=Quit, H=Help
```

Figure 8-1
Virtual Circuit Overview Screen

Overview Screen Header

The first two lines of the Overview screen form the standard header that all MONITOR_NET screens contain. The header consists of the following fields:

Heading	Meaning
VIRTUAL CIRCUIT - OVERVIEW	The name of the screen.
www, mmm dd yyyy	The date when the sample was collected; during interactive operation, the current date. www = day of week; mmm = month; dd = day of month; yyyy = year. For an input file, the date of the sample.
PERIOD xxxxx	The amount of time in seconds between samples from the PRIMENET database or from the input file.
FILE xxxxxxxxx	The status of file input (FILE INPUT ON) or output (FILE OUTPUT ON or FILE OUTPUT OFF) or both. These fields are displayed only if you invoked MONITOR_NET with either the –INPUT or –OUTPUT option.

START hh:mm:ss	The time when this monitor started running in hours, minutes, and seconds. If you are using an input file, the time when input file data was collected.
FROZEN xxxxxxx	FROZEN INPUT if the data comes ʳ an ˙ - ꝛꝛꝛ' ZEN DISPLAY otherwiᴄe; displaˣ ᴜnly iᴜ frozen with an F comˣ '
SAMPLE hh:mm:ss	The time in hours, minuᴜs, and seconds when the most re sample was collectedᵈ from the PRIMENET database or iꝛᴜ. the input file.
SYSTEM xxxxxx	The name of the node where MONITOR_NET is running; or, if you are using the –INPUT option, the name of the node on which MONITOR_NET was run to generate the input file.
RESET on xxxx	Either RESET on HOUR or RESET on DAY; only displayed if you invoked MONITOR_NET with either the –RESET_DAY or –RESET_HOUR option.

Summary Information

The third line of the Overview screen is blank; line four contains the following summary information.

Heading	*Meaning*
Max VCs:	The maximum number of virtual circuits allowed on this system.
Active	The number of virtual circuits currently active on this system.
High ID:	The highest VCID number in use when the last sample was taken. All active virtual circuits have VCIDs between 1 and this value. Since the VCIDs of active virtual circuits are not necessarily consecutive, this is not the number of active virtual circuits. The Overview screens for VCIDs higher than this number contain no virtual circuit data.
Peak Active:	The largest number of active virtual circuits since the Virtual Circuit Monitor started to run.
Period: hh:mm:ss	The time of the period during which the Peak Active value occurred. If the Peak Active value occurred several times, this is the most recent time.

Overview Screen Column Headings

The fifth line of the screen is blank. The sixth and seventh lines contain column headings for the rest of the screen display. The headings are VCID, Port, User ID, User Num, Remote Name, Packets (Period, Total, and Unack values), Connect Duration, and Reset Count. The headings are described below.

Heading	Meaning
VCID	The virtual circuit identifier, one for each virtual circuit attached to this machine.
Port	The number of the port that is the local endpoint of the virtual circuit. (For incoming calls only.)
User ID	The user ID associated with this virtual circuit; ****** if the ID is unknown. For example, a remote user's ID is unknown during login, that is, between the time NETLINK establishes the connection and the time login is completed.
User Num	The process ID number for the user associated with this virtual circuit.
Remote Name	The name of the remote system with which this virtual circuit is communicating; ****** if the remote system name is unknown. If the virtual circuit is not using Route-through, the remote name is the destination node name. If the virtual circuit is using Route-through, the remote name is the name of the next node in the path between the origin node and the destination node.
Packets	The number of data packets transmitted (Xmit) and received (Recv). For both transmitted and received packets, the Period and Total values are shown. The Period value is the number of data packets transmitted or received during the most recent period. The Total value is the total number of data packets transmitted or received since the virtual circuit started. In the column labeled Unack, the number of currently outstanding, unacknowledged, transmitted packets is also shown. Only data packets, not protocol packets, are counted.
Connect Duration	The total amount of time that this virtual circuit has been connected in hours, minutes, and seconds.
Reset Count	The total number of resets sent and received on this virtual circuit since it started running. (Resets are sent to clear error conditions that are detected on virtual circuits.)

Virtual Circuit Monitor Detailed Screen

Each active virtual circuit has a Detailed screen that gives more information about the connection. Figure 8-2 contains the Virtual Circuit Detailed screen. Line 24 of the screen display summarizes the commands to move to other Virtual Circuit Monitor screens. The Detailed screen is a dynamic screen.

If you are looking at the Detailed screen for a virtual circuit when the circuit goes down, the following message appears on line 24 of your terminal screen:

```
VC vcid IS DISCONNECTED - TYPE V FOR VC OVERVIEW
```

vcid is the VCID of the VC that just went down. The Detailed screen is still displayed with VC State changed to VC DISCONNECTED.

```
VIRTUAL CIRCUIT - DETAILED    www, mmm dd yyyy  PERIOD ppppp   FILE xxxxxxxxx
START hh:mm:ss  FROZEN xxxxxxx SAMPLE hh:mm:ss  SYSTEM xxxxxx  RESET on xxxx


                          P    a    c    k    e    t    s      Connect    Reset
VCID    Port                   Period         Total   Unack    Duration   Count
 xxx    xxx          Xmit xxxxxxxxxx  xxxxxxxxxx        x      hhh:mm:ss    xxx
                     Recv xxxxxxxxxx  xxxxxxxxxx

User IDxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx  VC State          xxxxxxxxxxxxxxxx
User Number                           xxx   Window Closed?    Xmit Y/N
User initiated this VC?               Y/N   Recv-not-ready?   Xmit Y/N   Recv Y/N

Remote Node Name                   xxxxxx   Packet Size       Xmit xxxx  Recv xxxx
Remote Node Address    xxxxxxxxxxxxxxxxx    Window Size       Xmit xxxx  Recv xxxx

VCN (VC Number)                      xxxx   Rvrs Charge? Y/N  RPOA?     Y/N xxxx
Physical Link Type              xxxxxxxxx   Fast Select? Y/N  Restricted R?   Y/N
Line Number                            xx   CUG?    Y/N xxxxx B CUG?    Y/N xxxxx
Link toxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx  Thruput bits/sec  Xmit xxxxx Recv xxxxx




VC screens:  V=Overview,  <number>V=Overview,  <number>D=Detailed,  Q=Quit,  H=Help
```

Figure 8-2
Virtual Circuit Detailed Screen

Detailed Screen Header

The first two lines of the Detailed screen form the standard header that all MONITOR_NET screens contain. The header consists of the following fields:

Heading	Meaning
VIRTUAL CIRCUIT - DETAILED	The name of the screen.
www, mmm dd yyyy	The date when the sample was collected; during interactive operation, the current date. www = day of week; mmm = month; dd = day of month; yyyy = year. For an input file, the date of the sample.

PERIOD ppppp	The amount of time in seconds between samples from the PRIMENET database or from the input file.
FILE xxxxxxxxxx	The status of file input (FILE INPUT ON) or output (FILE OUTPUT ON or FILE OUTPUT OFF) or both. These fields are displayed only if you invoked MONITOR_NET with either the –INPUT or –OUTPUT option.
START hh:mm:ss	The time when this monitor started running in hours, minutes, and seconds. If you are using an input file, the time when data collection began.
FROZEN xxxxxxx	FROZEN INPUT if the data comes from an input file or FROZEN DISPLAY otherwise; displayed only if the screen was frozen with an F command.
SAMPLE hh:mm:ss	The time in hours, minutes, and seconds when the most recent sample was collected from the PRIMENET database or the input file.
SYSTEM xxxxxx	The name of the node where MONITOR_NET is running; or, if you are using the –INPUT option, the name of the node on which MONITOR_NET was run to generate the input file.
RESET on xxxx	Either RESET on HOUR or RESET on DAY; displayed only if you invoked MONITOR_NET with either the –RESET_DAY or –RESET_HOUR option.

Detailed Screen Column Headings

The third line of the Detailed screen is blank. The fourth and fifth lines describe the contents of the six columns in lines 6 and 7. The column headings are VCID, Port, Packets (Period, Total, and Unack values), Connect Duration, and Reset Count. (Lines 6 and 7 contain information that is shown in the Overview screen.)

The headings in lines 4 and 5 are as follows:

Heading	*Meaning*
VCID	The virtual circuit identifier of this virtual circuit.
Port	The number of the port that is the local endpoint of the virtual circuit. (For incoming calls only).
Packets	The number of data packets transmitted (Xmit) and received (Recv). For both transmitted and received packets, the Period and Total values are shown. The Period value is the number of data packets transmitted or received during the most recent period, ending at the sample time. The Total value is the total number of data packets transmitted or received since the virtual circuit started. In the column labeled Unack, the number of currently outstanding, unacknowledged, transmitted packets is also shown. Only data packets, not protocol packets, are counted.

Connect Duration	The total amount of time that this virtual circuit has been connected in hours, minutes, and seconds.
Reset Count	The total number of resets sent and received on this virtual circuit since it started running. (Resets are sent to clear error conditions that are detected on virtual circuits.)

Connection Information

Line 8 of the Detailed screen is blank. Lines 9 through 19 of the left-hand side of the screen contain the following connection information:

Heading	*Meaning*
User ID	The user ID associated with this virtual circuit; "******" if the user ID is unknown.
User Number	The process ID number for the user associated with this virtual circuit.
User initiated (this VC?)	YES if the user is the caller, that is, the user made the call resulting in the virtual circuit; NO if the user is the person who received the call.
Remote Node Name	The name of the remote system with which this virtual circuit is communicating; ****** if the remote system name is unknown.
Remote Node (Address)	The network address of the remote node.
VCN (VC Number)	The X.25 logical channel (LCGN+LCN) for this virtual circuit. The value of this field ranges from 0 through 4095, inclusive.
Physical Link Type	The type of link that the virtual circuit is using; the types are SYNCHRONOUS LINE, RINGNET, LAN300, or LOOP-BACK CONNECTION.
Line Number	The logical line number when Physical Link Type is SYNCHRONOUS LINE; for other link types, NA.
Link to	The name of the system to which the physical link is connected.

Virtual Circuit State Information

The fields in lines 9 through 11 of the right-hand side of the Detailed screen describe the state of this virtual circuit. These fields are VC State, Window Closed?, and Recv-not-ready?. The following paragraphs explain each field.

VC State: This field appears on line 9 in the right-hand side of the Detailed screen. Any state may be transient; some of these states occur infrequently. The possible states are as follows:

State	Meaning
REMOTE LOGIN	This virtual circuit resulted from a remote login; it is now available for data transfer.
VC PASSOFF	This virtual circuit is being passed off to another process.
DATA TRANSFER	The virtual circuit is in data transfer state.
LOCAL CALL REQUEST	The local system is setting up the virtual circuit.
REMOTE CALL REQUEST	The local system received a call request and is responding to it.
LOCAL CALL CLEAR	The local system is clearing this virtual circuit.
CLEAR - NO MEMORY	The virtual circuit cannot be cleared because no memory is available. PRIMENET will automatically retry the clear.
REMOTE LOG THRU	A call is remotely logged through this system into another system and is available for data transfer.
WAIT CLEAR CONFIRM	The local system sent out a clear request and is waiting for confirmation.
VC DISCONNECTED	The virtual circuit was disconnected while you were looking at its Detailed screen.
AWAITING RESTART	The local system is restarting the link prior to issuing a call request.

Window Closed?:   This field is displayed on line 10 in the right-hand side of the Detailed screen.

The value displayed is Xmit followed by either YES or NO; YES indicates that the user's Level 3 window closed. The Level 3 window closes when the number of packets that were transmitted but not acknowledged (shown in the column labeled Unack) is equal to the transmit window size. When the window is closed, no more packets can be transmitted until one of the outstanding packets is acknowledged.

Recv-not-ready?:   This field is displayed on line 11 in the right-hand side of the Detailed screen.

Packet and Window Size

Line 12 is blank. The fields on lines 13 and 14 in the right-hand side of the Detailed screen provide information about packet and window size.

Heading	Meaning
Packet Size	The maximum packet size in bytes for the transmit direction (Xmit) and the receive direction (Recv).
Window Size	The maximum Level 3 window size, in packets, for the transmit direction (Xmit) and the receive direction (Recv). This number represents the maximum number of unacknowledged packets allowed over this connection.

X.25 Facility Information

Line 15 is blank. The fields on lines 16 through 19 in the right-hand side of the Detailed screen describe the X.25 facilities that are in effect for this virtual circuit.

Heading	Meaning
Rvrs Charge?	YES or NO; YES indicates that the virtual circuit was reverse charged.
RPOA?	Either YES or NO to indicate whether or not the X.25 Recognized Private Operating Agency (RPOA) facility was used for this virtual circuit. If YES, the RPOA number is displayed.
Fast Select?	YES or NO; YES indicates that this virtual circuit used the X.25 Fast Select facility.
Restricted R?	YES or NO; YES indicates that the X.25 Fast Select facility was used for this virtual circuit and that the response must be an X.25 Clear Request packet.
CUG?	YES or NO; YES indicates that the X.25 Closed User Group (CUG) facility was used for this virtual circuit. If YES, the CUG number is displayed.
B CUG?	YES or NO; YES indicates that the X.25 Bilateral Closed User Group facility was used for this virtual circuit. If YES the CUG number is displayed.
Thruput bits/sec	The maximum number of bits per second transmitted (Xmit) and received (Recv) on this virtual circuit. This value is relevant only for certain PSDN connections.

9
The Ring Monitor

The MONITOR_NET command permits you to invoke four monitors: the Ring Monitor, the Virtual Circuit Monitor, the Synchronous Line Monitor, and the LAN300 Monitor. This chapter explains how to invoke the Ring Monitor and how to perform those MONITOR_NET functions that are specific to the Ring Monitor. Each Ring Monitor screen type is described in detail, along with the meanings of each data field. Refer to Chapter 7, Using MONITOR_NET, for general information on all the monitors.

Overview of RINGNET

RINGNET is one of Prime's Local Area Networks (LANs), consisting of nodes connected through a high-speed, one-way, serial-synchronous co-axial cable. Each node in a RINGNET network is a Prime computer equipped with the following hardware:

- A PRIMENET Node Controller (PNC or PNC II) board to control the ring protocol and the flow of data between ring nodes. In this chapter, references to the PNC apply equally to the PNC II unless otherwise indicated.

- A junction box to connect the twin-axial cable to the computer. The junction box has a passive relay that switches to "pass-through" if it detects a power failure on the PNC. This feature preserves a ring's integrity.

RINGNET nodes must be located within 750 feet of each other, unless they are connected using one or more data repeaters. A RINGNET node contains exactly one PNC and junction box. Thus there is one input cable and one output cable for each node. Each PNC acts as an active data repeater for frames being transmitted between other ring nodes. In other words, a PNC transceives all frames passing through it.

How RINGNET Works

RINGNET uses a token ring protocol. A special bit pattern called the token circulates continuously around the ring. The token enters a node through the input cable of the junction box, and leaves the node through the output cable. Each node's output cable leads directly to one and only one next node.

Even though the nodes on the ring may not look as though they are arranged in a circle in the computer room, the input and output cables of the junction boxes define a unique order in which data and token travel around the ring from one node to the next and finally back to the transmitting node. Thus, the cables do define a circle.

You may want to make a sketch of the circle defined by the cables in your ring. The sketch will help you keep track of which node is connected to which, and thus may help you diagnose problems later on. If the output cable of node A leads directly to the input cable of node B, you would draw node B next to node A. The PRIMENET convention is to draw the circle formed by the nodes so that the order of data travel (from output of one node to input of the next) is counterclockwise.

A node cannot transmit data until it detects the token. When a node is ready to transmit data and detects the token, the PNC does the following:

1. Converts the token into a leading frame for the data packet

2. Issues a frame containing a 4-byte header and from 4 through 2044 bytes of data, inclusive

3. Immediately returns the token to the ring *behind* the frame

The frame travels around the ring to the destination node, at a data rate of eight megabits per second. As it passes through the PNCs of other nodes, each PNC performs a data integrity check to verify the integrity of the data. The PNC sets the CRC error bit in the ACK byte if an error has occurred.

When the frame arrives at the destination PNC, that PNC does the following:

1. Checks the header to find out if it is the destination node.

2. Performs a data integrity check.

3. Sets the ACK bit of the ACK byte to indicate whether the data frame is corrupt or not. (If the data frame is corrupt, the ACK byte is set to 0, and the frame is not accepted; it is returned to the transmitting node.)

4. Accepts the packet (if the data frame is not corrupt) into a receive buffer while allowing the frame to continue travelling on the ring.

5. Notifies upper level software that a frame has been received.

The frame travels around the rest of the ring back to the source PNC. The source PNC does the following:

1. Removes the frame from the ring

2. Checks the acknowledgement flag

3. Interrupts the source operating system to signal transmission completion

Using the Ring Monitor

The Ring Monitor gathers statistics relating to communications on RINGNET from the PRIMENET database and displays them. The Ring Monitor does not monitor the signals on the ring itself; it monitors ring traffic on the node from which you run it. Using the Ring Monitor, you can determine if the ring is working properly, if a situation exists that requires further analysis, or if the ring is malfunctioning.

The Ring Monitor displays its information in five types of screens:

- Ring Monitor Overview screen

- Ring Monitor Detailed screen

- Ring Monitor Extended Data screen (if a PNC II is installed)

- Ring Monitor Error Totals screen

- Ring Monitor Trace Totals screen

The Overview screen summarizes RINGNET activity. The Detailed screen expands on the information presented in the Overview screen. The Extended Data screen displays additional statistics gathered by the PNC II, and is only available if your system has a PNC II installed. The Error Totals and Trace Totals screens show an itemized breakdown of totals displayed in the Detailed screen.

All screens are dynamic; that is, they are updated by the Ring Monitor while you view the screen. The screens are updated by taking a sample from the PRIMENET database every 3 seconds; you can change this period using either the –PERIOD option of the MONITOR_NET command or using the P command from any screen. (Refer to Chapter 8 for more information on the P command.)

Once you are in MONITOR_NET, you can move among the screens of that monitor and change to the Overview screen of another monitor. At any time, you can type H to get help, M to display the Main Menu, or Q to exit the monitor and return to PRIMOS command level.

Invoking the Ring Monitor

The MONITOR_NET command invokes the Ring Monitor. If you specify the command with no control arguments, as in

```
MONITOR_NET
```

then the Main Menu appears. Type R (without a carriage return) to start up the Ring Monitor and display the first screen of the Ring Monitor, the Overview screen. Figure 9-1 shows the Overview screen. The command

```
MONITOR_NET  -RING
```

starts the Ring Monitor and displays the Overview screen without displaying the Main Menu. You can always return to the Main Menu by typing M (without a carriage return) at any screen.

If you have already invoked MONITOR_NET, typing R from any screen starts up the Ring Monitor and displays the Overview screen.

You can terminate the Ring Monitor by either moving to another monitor or by terminating MONITOR_NET itself by typing Q. Terminating the Ring Monitor resets all peak and cumulative values.

Operating the Ring Monitor Interactively

To get a list of those commands that you can issue at the current screen, type H to display a help screen.

Use the following one-character commands to move among the screens of the Ring Monitor:

- R displays the Ring Monitor Overview screen.

- D displays the Ring Monitor Detailed screen.

- X displays the Ring Monitor Extended Data screen (if your system has a PNC II installed).

- E displays the Ring Monitor Error Totals screen.

- T displays the first Ring Monitor Trace Totals screen.

A list of the screens that you are allowed to move to is displayed at the bottom of every screen on line 24. See Figure 9-1 for an example. The Extended Data screen is listed only if your system has a PNC II installed.

Use the following commands to move to the other monitors:

- V stops the Ring Monitor, starts up the Virtual Circuit Monitor, and displays its first Overview screen.

- S stops the Ring Monitor, starts up the Synchronous Line Monitor, and displays its first Overview screen.

- L stops the Ring Monitor, starts up the LAN300 Monitor, and displays its first Overview screen.

Alternatively, you can type M to move to the Main Menu and select a monitor from the Main Menu. Moving to the Main Menu stops the Ring Monitor; if you return to the Ring Monitor, peak and cumulative values are reset to 0.

If file output is on and RINGNET goes down, sampling continues, but nothing is written to the output file.

If RINGNET is either disabled or PRIMENET cannot initialize the PNC on your node, or RINGNET is in cold-start state, then you are not permitted to move from the Overview screen, except to go to another monitor or exit from MONITOR_NET. In each case, the Ring Monitor displays an appropriate message on line 24 of your terminal screen and continues file output, if you enabled file output.

If you are collecting RINGNET trace data in an output file (using the –OUTPUT and –TRACE options), make sure that you have enough space to store the output file; such files may grow rapidly. If you are collecting trace data, a maximum of 4,039 bytes of data are written to the output file each period. If you are not collecting trace data, a maximum of 2,055 bytes are written to the output file each period.

Operating the Ring Monitor as a Phantom

If the network goes down while you are running MONITOR_NET as a phantom, the phantom is stopped. If you are monitoring RINGNET with a phantom and RINGNET either is disabled or is unable to initialize the PNC, or is in cold start state, or is not configured, MONITOR_NET continues file output. If you try to collect trace data and tracing was not enabled, the phantom continues to run. Appendix C contains a complete list of MONITOR_NET messages.

Values Displayed in Ring Monitor Screens

All of the values displayed in the Ring Monitor screens are taken from the PRIMENET database. If the counter for either Total or Cumulative values in the PRIMENET database overflows its maximum value (with values of over four billion) while MONITOR_NET is sampling it, MONITOR_NET displays the value followed by an asterisk (*). On the Extended Data screen, an asterisk indicates that the value has overflowed since START_NET was last run.

Since it is possible for PRIMENET counters to overflow when MONITOR_NET is not running, all values displayed on Ring Monitor screens must be assumed to be relative, not absolute, values.

If any data item does not apply for a given screen (for example "Receive Error Status" when there are no Receive Errors), that field is marked NA (Not Applicable).

Ring Monitor Overview Screen

The Ring Monitor Overview screen, shown in Figure 9-1, contains overview information about your system's data flow on the ring. Line 24 of the screen display summarizes the commands to move to other Ring Monitor screens. The Overview screen is a dynamic screen.

```
┌─────────────────────────────────────────────────────────────────────────┐
│  RING MONITOR - OVERVIEW        www, mmm dd yyyy  PERIOD ppppp   FILE xxxxxxxxxx  │
│  START hh:mm:ss  FROZEN xxxxxxx SAMPLE hh:mm:ss   SYSTEM xxxxxx  RESET on xxxx    │
│                                                                           │
│                      Period         Peak/Period     Cumulative      Total   Errors│
│          Frames  Xmit xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx  xxxxxx│
│                  Recv xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx  xxxxxx│
│                                                                           │
│          Bytes   Xmit xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx  │
│                  Recv xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx  │
│                                                                           │
│          WACKed Xmits xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx  │
│          Non-Rt'd Frs      xxxxx       xxxxx hh:mm:ss       xxxxx  xxxxxxxxxx  │
│                                                                           │
│                                                                           │
│                                                                           │
│                                                                           │
│                                                                           │
│          Ring Screens: D = Detailed, E = Error, T = Trace, H = Help       │
│                                                                           │
└─────────────────────────────────────────────────────────────────────────┘
```

Figure 9-1
Ring Monitor Overview Screen

Overview Screen Header

The first two lines of the Overview screen form the standard header that all MONITOR_NET screens contain. The header consists of the following fields:

Heading	Meaning
RING MONITOR - OVERVIEW	The name of the screen.
www mmm dd yyyy	The date when the sample was collected; during interactive operation the current date. www = day of week; mmm = month; dd = day of month; yyyy = year. For an input file the date of the sample.
PERIOD ppppp	The amount of time in seconds between samples from the PRIMENET database or from the output file.
FILE xxxxxxxxxx	The status of file input (FILE INPUT ON) or output (FILE OUTPUT ON or FILE OUTPUT OFF) or both. These fields are displayed only if you invoked MONITOR_NET with either the –INPUT or –OUTPUT option.

START hh:mm:ss	The time when this monitor started running. If you are using an input file the time when data collection began.
FROZEN xxxxxxx	FROZEN INPUT if the data comes from an input file or FROZEN DISPLAY otherwise; displayed only if the screen was frozen with an F command.
SAMPLE hh:mm:ss	The time in hours, minutes and seconds when the most recent sample was collected either from the PRIMENET database or from the input file.
SYSTEM xxxxxx	The name of the node where MONITOR_NET is running; or, if you are using the –INPUT option the name of the node on which MONITOR_NET was run to generate the input file.
RESET on xxxx	Either RESET on HOUR or RESET on DAY; displayed only if you invoked MONITOR_NET with the –RESET_DAY or –RESET_HOUR option.

Note

All of the Ring Monitor screens display a message that describes the current status of the ring: either **RING IS UP** or **RING IS DOWN** is displayed in the left-hand side of the third line of the screen.

Overview Screen Column Headings

Line four contains column headings for the rest of the screen. The headings are Period, Peak/ Period, Cumulative, Total, and Errors. These headings are described below.

Heading	*Meaning*
Period	The number of items defined by the left-hand column processed in the most recent period. For example, the first value under Period is the number of frames transmitted in the most recent period, which ended at the sample time.
Peak/Period	The maximum value of all the Period values either from start time or time last reset to sample time and the time of the period when this maximum occurred.
Cumulative	The sum of all the Period values from start time or time last reset until sample time.
Total	The sum of all occurrences of the event from network startup (or network counter overflow) until sample time.
Errors	The sum of all transmit or receive errors. These errors are broken down by category in the Ring Monitor Detailed screen.

Items Sampled in the Overview Screen

The leftmost column of the Overview screen tells what items are being sampled; they are Frames Xmit and Recv, Bytes Xmit and Recv, WACKed Xmits, Non-Rt'd Frs. The meaning of these items is explained below.

Frames Xmit: This field shows the total number of frames transmitted by RINGNET. Frames Xmit is the sum of the following fields displayed on the Ring Monitor Detailed screen: OK Frames Xmit, Xmit Errors, Mutiply Accepted, Multiple Tokens, WACKed Xmit, Non-R'td Frames, and Non Acknowledged.

Frames Recv: This field show the total number of frames received by this node. Frames Recv is the sum of the following fields displayed on the Ring Monitor Detailed screen: OK Frames Recv and Recv Errors.

Bytes Xmit: This field contains the count of the bytes contained in the Packets Transmitted.

Bytes Recv: This field contains the count of the bytes contained in the Packets Received.

WACKed Xmits: This field shows the number of times that a receiving node was unable to accept a frame sent by the local node because its receive buffer was already full. For more information, see the description below of WACKed Xmit for the Ring Monitor Detailed screen.

Non-Rt'd Frs: This field shows the number of times the node sent out a frame and saw neither it nor the token return within a time-out period. For more information, see the description below of Non-Rt'd Frames for the Ring Monitor Detailed screen.

Ring Monitor Detailed Screen

The Detailed screen, shown in Figure 9-2, displays statistics for every data and control frame sent or received, shows the amount of activity on the node, and indicates the status of the ring and node. Line 24 of the screen display summarizes the commands to move to other Ring Monitor screens. The Detailed screen is a dynamic screen.

```
RING MONITOR - DETAILED        www, mmm dd yyyy  PERIOD ppppp    FILE xxxxxx
START hh:mm:ss  FROZEN xxxxxxx SAMPLE hh:mm:ss   SYSTEM xxxxxx   RESET on xxxx

                        Period         Peak/Period      Cumulative       Total
OK Frames Xmit       xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx
OK Frames Recv       xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx

Bytes Xmit           xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx
Bytes Recv           xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx

Inserted Tokens           xxxxx       xxxxx hh:mm:ss       xxxxx       xxxxx
Recv Errors               xxxxx       xxxxx hh:mm:ss       xxxxx       xxxxx
Xmit Errors               xxxxx       xxxxx hh:mm:ss       xxxxx       xxxxx
Multiply Accepted         xxxxx       xxxxx hh:mm:ss       xxxxx       xxxxx
Multiple Tokens           xxxxx       xxxxx hh:mm:ss       xxxxx       xxxxx

WACKed Xmit          xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx
Aborted Xmit              xxxxx       xxxxx hh:mm:ss       xxxxx       xxxxx
Non-Rt'd Frames           xxxxx       xxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx
Non Acknowledged     xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx

Broadcast Xmit            xxxxx       xxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx
Broadcast Recv            xxxxx       xxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx
          Ring screens: R = Ring Overview, E = Error, T = Trace, H = Help
```

Figure 9-2
Ring Monitor Detailed Screen

Detailed Screen Header

The first two lines of the Detailed screen form the standard header that all MONITOR_NET screens contain. The header consists of the following fields:

Heading	Meaning
RING MONITOR - DETAILED	The name of the screen.
www mmm dd yyyy	The date when the sample was collected; during interactive operation the current date. www = day of week; mmm = month; dd = day of month; yyyy = year. For an input file the date of the sample.
PERIOD ppppp	The amount of time in seconds between samples from the PRIMENET database or from the input file.
FILE xxxxxxxxxx	The status of file input (FILE INPUT ON) or output (FILE OUTPUT ON or FILE OUTPUT OFF) or both. These fields are displayed only if you invoked MONITOR_NET with either the –INPUT or –OUTPUT option.

START hh:mm:ss	The time when this monitor started running. If you are using an input file the time when data collection began.
FROZEN xxxxxxx	FROZEN INPUT if the data comes from an input file or FROZEN DISPLAY otherwise; displayed only if the screen was frozen with an F command.
SAMPLE hh:mm:ss	The time in hours, minutes and seconds when the most recent sample was collected from the PRIMENET database or from the input file.
SYSTEM xxxxxx	The name of the node where MONITOR_NET is running; or, if you are using the –INPUT option the name of the node on which MONITOR_NET was run to generate the input file.
RESET on xxxx	Either RESET on HOUR or RESET on DAY; displayed only if you invoked MONITOR_NET with either the –RESET_DAY or –RESET_HOUR option.

Detailed Screen Column Headings

The fourth line of the Detailed screen contains the column headings that describe the contents of the four vertical columns. The column headings are Period, Peak/Period, Cumulative, and Total. These headings are described below.

Heading	*Meaning*
Period	The number of items defined by the left-hand column processed in the most recent period, which ended at the sample time. For example, the first value under Period is the number of Frames successfully transmitted in the most recent period.
Peak/Period	The maximum value of all the Period values either from start time or time last reset to sample time and the time of the period when this maximum last occurred.
Cumulative	The sum of all the Period values either from start time or time last reset until sample time.
Total	The sum of all occurrences of the event from network startup (or network counter overflow) until sample time.

Items Sampled in the Detailed Screen

The leftmost column of the Detailed screen tells what items are being sampled. The following list summarizes the meaning of each of these items. Listed items are then described in detail.

Heading	Description
OK Frames Xmit OK Frames Recv	A count of all frames successfully transmitted and received.
Bytes Xmit Bytes Recv	The total number of data bytes in the OK Frames Xmit or OK Frames Recv.
Inserted Tokens Recv Errors Xmit Errors Multiply Accepted WACKed Xmit Aborted Xmit	These fields show a cound of various errors on the ring. Normally, the count is low or zero. Nonzero values do not always indicate a problem.
Non-R'td Frames	This field contains a count of frames not returned and assumed lost.
Non Acknowledged	This field contains a count of frames that were not received at the destination.
Broadcast Xmit Broadcast Recv	These fields contain a count of broadcast control frames. Each node periodically sends out status information to every other node in a broadcast packet.

OK Frames Xmit: This field contains the number of frames successfully transmitted by the local node. This count does not include any transmitted frames that are being counted as errors, for example, transmit errors. This number does, however, include transmitted broadcast packets, since these are successful transmits.

All the traffic transmitted from the local node, regardless of errors, is the sum of the following counts:

OK Frames Xmit	WACKed Xmit
Xmit Errors	Non-Rt'd Frames
Multiply Accepted	Non Acknowledged
Multiple Tokens	

OK Frames Recv: This field contains the number of frames successfully received by the local node, including the count of received broadcast packets (since they were successfully received). As with OK Frames Xmit, the count does not include received errors.

The count of OK Frames Recv (and Broadcast Recv, discussed below) includes any broadcast message transmitted by the node itself. The PNC sees that the frame is a broadcast message and receives it. The Broadcast Xmit packets are therefore counted as both transmitted and received.

Bytes Xmit: This field contains the total number of data bytes contained in the OK Frames Xmit.

Bytes Recv: This field contains the total number of data bytes contained in the Packets Received.

Inserted Tokens: This field contains the number of tokens inserted into the ring by the node. If the local node has a transmit pending and does not see a token within a reasonable amount of time, it assumes that the token is lost and inserts a new token into the ring.

If your system has a PNC II installed, the controller itself (as well as the host) may insert tokens into the ring. The Inserted Tokens field does not distinguish between tokens inserted by the host and tokens inserted by the PNC II. However, the PNC II Tokens Inserted field on the Ring Monitor Extended Data screen (described below) shows the number of tokens inserted by the PNC II.

Extra tokens are inserted when traffic cannot circle the ring. Extra tokens may indicate a break on the ring. Run FIND_RING_BREAK to determine if and where the ring is broken.

Occasionally, an extra token is inserted into a properly functioning ring. For example, the operation of the ring is disrupted for about 10 milliseconds when a node enters or leaves it. This amount of time is long enough to cause the token to be stripped off the ring. The RINGNET hardware and software recognize that the token has been removed and act immediately to maintain uninterrupted operation. One of the nodes reinserts the token. In this case, an occasional inserted token is acceptable and indicates that the ring is functioning normally.

A high count for Inserted Tokens may indicate a problem with the PNC. The PNC either may not recognize a token or the PNC of another node may be malfunctioning and inappropriately removing the token from the ring. Run FIND_RING_BREAK and check to see if other nodes are having the same problem to determine if there is a problem with a PNC.

Recv Errors: This field contains the number of frames received in error by the node. Normally, the count is zero. Use the Receive Errors Status description in the Error Totals screen to determine the cause.

Xmit Errors: This field indicates corrupt data. Transmit errors can be caused either by a CRC validation failure or by a frame that did not return before the next token was seen.

Causes of Receive Errors and Transmit Errors: These errors are caused by degradation of the data as it is sent along the ring. Because the ring is an extremely reliable medium, these errors are rare. The following four factors can cause receive and transmit errors:

1. A cable that is longer than 750 feet between active nodes

2. A loose connection on the ring

3. Noise generated by a node entering or leaving the ring corrupting the data portion of the packet and/or destroying the token

4. Faulty PNC hardware

Normally, a single count per incident indicates that a node is entering or leaving the ring. A multiple count per incident usually points to a hardware problem. These counts usually are very low in proportion to the traffic on the ring.

Multiply Accepted: This field indicates the number of times that the node transmitted a frame and had more than one node accept it. Because node IDs are unique, this should not occur. A node automatically disconnects from the ring if at startup it finds that another node has the same ring ID.

Note

Broadcast packets are not part of the Multiply Accepted count. They are expected to be accepted by all nodes.

Multiple Tokens: This field indicates that there have been multiple tokens on the ring. There should be only one. If the count is not zero, then the following has happened.

A node that is preparing to transmit has seen the token and taken it off the ring. Before the node has completed transmitting, another token is received by the node. The node's PNC strips this extra token off the ring. Thus, the PNC removes the extra token before it can interfere with the node's transmit operation.

WACKed Xmit: This field shows the number of times that a receiving node was unable to accept a frame sent by the local node because its receive buffer was already full. The PNC retransmits the frame a maximum of 32 times. If the frame still is not accepted, it is placed on the WACK list. The PNC then tries to deliver the frame a maximum of five more times. Each attempt occurs one second apart and consists of a maximum of 32 retransmissions. If all attempts fail, the frame is aborted and the receiving node is marked as down.

Usually, this is a transient failure. It may be, however, that the receiving node has halted without master clearing the PNC. Master clearing the PNC restores proper ring operation.

Aborted Xmit: This field shows the number of aborted frames. An aborted frame is one that could not be delivered successfully. Usually, the frame is aborted because the number of retries in the WACK procedure has been exhausted. However, it is possible for a frame to be negative acknowledged (NAKed) or multiply accepted a maximum of 20 times and then aborted.

Non-Rt'd Frames: This field shows the number of times the node sent out a frame and saw neither it nor the token return within a timeout period. The timeout period is long enough so that on an unbroken ring this behavior should not occur.

If the node sees neither the frame nor a token within the time-out period twice in a row, the frame is aborted and the receiving node is marked as down. If this happens to three frames in a row, the following message appears on the supervisor terminal:

****** RING MAY BE DOWN ******

The message is followed by a date and time stamp. Usually, this error occurs if a break has occurred in the ring. Use FIND_RING_BREAK to determine if a break has occurred and its location.

Non Acknowledged: This field contains the number of times the node has transmitted a frame and had it returned without any indication that the target node is on the ring. This situation results when configured nodes are not physically in the ring.

Broadcast Xmit: This field shows the number of broadcast packets that were sent by the node. A broadcast packet has a special node ID and is accepted by all nodes ready to receive. A broadcast packet is used to send the node status message from one node to all other active nodes on the ring. This message identifies the node and indicates that it is on the ring and able to communicate. Multiplying the Total Broadcast Xmit field (in the right most column) by ten gives an approximation of the number of seconds since the network was started.

Broadcast Recv: This field shows the number of broadcast packets received, including any packets sent by the local node.

<div align="center">

Note

The OK Frames Xmit and OK Frames Recv fields include Broadcast
Xmit and Recv counts.

</div>

Ring Monitor Extended Data Screen

If your system has a PRIMENET Node Controller II (PNC II) board installed, you can display the Ring Monitor's Extended Data screen, shown in Figure 9-3. This screen displays statistics gathered by the PNC II:

- The number of packets passing through the PNC II

- The number of times the token has passed through the PNC II

- The number of NAKs seen

- The number of NAKs and WACKs sent

- The number of local data packets sent to the host by the PNC II

The Extended Data screen is a dynamic screen.

<div align="center">

Note

If your system has a PNC II installed, a prompt for the Extended Data
screen is included in the summary of commands at the bottom of each
Ring Monitor screen. On the Overview screen, the prompt is **X =
Extended**; on the Detailed, Error Totals, and Trace Totals screens,
the prompt is **X = Ext'd**.

</div>

```
RING MONITOR - EXTENDED        www, mmm dd yyyy  PERIOD ppppp    FILE xxxxxxxxxx
START hh:mm:ss  FROZEN xxxxxxx SAMPLE hh:mm:ss   SYSTEM xxxxxx   RESET on xxxx


                             Period         Peak/Period      Cumulative       Total
Packets Seen                 xxxxxxxxxx     xxxxxxxxxx hh:mm:ss  xxxxxxxxxx   xxxxxxxxxx
Token Seen                   xxxxxxxxxx     xxxxxxxxxx hh:mm:ss  xxxxxxxxxx   xxxxxxxxxx
NAKs Seen                    xxxxxxxxxx     xxxxxxxxxx hh:mm:ss  xxxxxxxxxx   xxxxxxxxxx

NAKs Set                     xxxxxxxxxx     xxxxxxxxxx hh:mm:ss  xxxxxxxxxx   xxxxxxxxxx
WACKs Set                    xxxxxxxxxx     xxxxxxxxxx hh:mm:ss  xxxxxxxxxx   xxxxxxxxxx
PNC II Tokens Inserted xxxxxxxxxx          xxxxxxxxxx hh:mm:ss  xxxxxxxxxx   xxxxxxxxxx

Extended Data Recv           xxxxxxxxxx     xxxxxxxxxx hh:mm:ss  xxxxxxxxxx   xxxxxxxxxx






Ring screens: R = Ring Overview, D = Detailed, E = Error, T = Trace, H = Help
```

Figure 9-3
Ring Monitor Extended Data Screen

Extended Data Screen Header

The first two lines of the Extended Data screen form the standard header that all MONITOR_NET screens contain. The header consists of the following fields:

Heading	Meaning
RING MONITOR - EXTENDED	The name of the screen.
www mmm dd yyyy	The date when the sample was collected; during interactive operation the current date. www = day of week; mmm = month; dd = day of month; yyyy = year. For an input file the date of the sample.
PERIOD ppppp	The amount of time in seconds between samples from the PRIMENET database or from the input file.
FILE xxxxxxxxxx	The status of file input (FILE INPUT ON) or output (FILE OUTPUT ON or FILE OUTPUT OFF). This field is displayed only if you invoked MONITOR_NET with either the –INPUT or –OUTPUT option.

START hh:mm:ss	The time when this monitor started running. If you are using an input file the time when input file data was collected.
FROZEN xxxxxxx	FROZEN INPUT if the data comes from an input file or FROZEN DISPLAY otherwise; displayed only if the screen was frozen with an F command.
SAMPLE hh:mm:ss	The time in hours, minutes and seconds when the most recent sample was collected from the PRIMENET database or from the input file.
SYSTEM xxxxxx	The name of the node where MONITOR_NET is running; or, if you are using the –INPUT option the name of the node on which MONITOR_NET was run to generate the input file.
RESET on xxxx	Either RESET on HOUR or RESET on DAY; displayed only if you invoked MONITOR_NET with either the –RESET_DAY or –RESET_HOUR option.

Extended Data Screen Column Headings

The fourth line of the Extended Data screen contains the column headings that describe the contents of the four vertical columns. As in the Detailed Screen, the column headings are Period, Peak/Period, Cumulative, and Total. These headings are described below.

Heading	*Meaning*
Period	The number of items defined by the left-hand column processed in the most recent period, which ended at the sample time. For example, the first value under Period is the number of packets seen in the most recent period.
Peak/Period	The maximum of all the Period values from start time or time last reset to sample time; the time of the last period when this maximum occurred.
Cumulative	The sum of all the Period values from start time or time last reset until sample time.
Total	The sum of all occurrences of the event from network startup (or network counter overflow) until sample time.

Items Sampled in the Extended Data Screen

The leftmost column of the Extended Data screen tells what items are being sampled. These items are described below.

Packets Seen: This field shows the number of packets that have passed through the PNC II (destined either for the local node or for another node on the ring) since PRIMENET was last started.

Token Seen: This field shows the number of times the token has passed through the PNC II.

NAKs Seen: This field shows the number of packets with NAK set that have passed through the PNC II.

NAKs Set: This field shows the number of packets set to NAK by the PNC II.

WACKs Set: This field shows the number of packets WACKed by the PNC II.

PNC II Tokens Inserted: This field shows the number of tokens inserted by the PNC II. Note that both the host and the PNC II may insert tokens into the ring. The total number of tokens inserted by the host and the PNC II is shown in the Inserted Tokens field on the Ring Monitor Detailed screen. The PNC II inserts tokens more quickly than the host does; thus, most tokens are inserted by the PNC II.

Extended Data Recv: This field shows the number of local data packets sent to the local host by its PNC II. The Total Extended Data Recv field (in the rightmost column) is incremented by one every one to three seconds (depending upon system activity).

Note

On the Extended Data screen, an asterisk (∗) after an item indicates that the item's counter has overflowed its maximum value since START_ NET was last run. (On all other Ring Monitor screens, an asterisk indicates that the counter overflowed between MONITOR_NET samples.)

Ring Monitor Error Totals Screen

The Error Totals screen, shown in Figure 9-4, contains an itemized breakdown of error-related data in the Recv and Xmit fields of the Detailed screen. The values on the Error Totals Screen are the total values since RINGNET was started. The Error Totals screen indicates possible problems along the ring.

```
RING MONITOR - ERROR TOTALS   www, mmm dd yyyy  PERIOD  ppppp  FILE xxxxxx xxx
START hh:mm:ss  FROZEN xxxxxxx SAMPLE hh:mm:ss  SYSTEM xxxxxx  RESET on xxxx


Receive Errors                      xxxxx        Ring xxxxxxxxxxxxxxxxxxxxxxxxx
Receive Error Status      xxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Receive Error Node                  xxxxx  xxxxxx
Receive Bad Protocol                xxxxx
Transmit Errors                     xxxxx
Transmit Error Status     xxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Spurious Transmit Interrupt         xxxxx
Transmit WACK Node                  xxxxx  xxxxxx
Duplicate Node                      xxxxx


No Receive Buffer                   xxxxx            Receive Queue Count    xxxxx
Receive Queue Full                  xxxxx            Transmit Queue Count   xxxxx
WACKed Frames                   xxxxxxxxxx            WACK List Entry Count  xxxxx
Aborted Frames                      xxxxx            WACK List Max Entry    xxxxx


Fatal Errors:  PNC INA Failed                 xxxxx
               PNC OTA Received Failed         xxxxx
               PNC OTA Transmit Failed         xxxxx
               PNC DMA Failed                  xxxxx
               Spurious Receive Interrupt      xxxxx
Ring Screens:  R = Ring Overview, D = Detailed, T = Trace, H = Help
```

Figure 9-4
Ring Monitor Error Totals Screen

Error Totals Screen Header

The first two lines of the Error Totals screen form the standard header that all MONITOR_NET screens contain. The header consists of the following fields:

Heading	*Meaning*
RING MONITOR - ERROR TOTALS	The name of the screen.
www mmm dd yyyy	The date when the sample was collected; during interactive operation the current date. www = day of week; mmm = month; dd = day of month; yyyy = year. For an input file the date of the sample.
PERIOD ppppp	The time in seconds between samples from the PRIMENET database or from the input file.
FILE xxxxxxxxxx	The status of file input (FILE INPUT ON) or output (FILE OUTPUT ON or FILE OUTPUT OFF). This field is displayed only if you invoked MONITOR_NET with either the –INPUT or –OUTPUT option.

START hh:mm:ss	The time when this monitor started running. If you are using an input file the time when input file data was collected.
FROZEN xxxxxxx	FROZEN INPUT if the data comes from an input file or FROZEN DISPLAY otherwise; displayed only if the screen was frozen with an F command.
SAMPLE hh:mm:ss	The time in hours, minutes and seconds when the most recent sample was collected from the PRIMENET database or from the input file.
SYSTEM xxxxxx	The name of the node where MONITOR_NET is running; or, if you are using the –INPUT option the name of the node on which MONITOR_NET was run to generate the input file.
RESET on xxxx	Either RESET on HOUR or RESET on DAY; displayed only if you invoked MONITOR_NET with either the –RESET_DAY or –RESET_HOUR option.

Error Totals Screen Fields

The fields in the Error Totals screen are explained in detail below.

Receive Errors: This is the same counter that is shown in the Detailed screen.

Ring Status: The second half of the fourth line of the Error Totals screen displays the status of the ring as seen from the local node. One of the following two messages is displayed:

- **Ring is UP**

   RINGNET is running normally.

- **Ring has NO TRACE DATA AVAILABLE**

   The START_NET command that started up the network did not specify the –TRACING_NODE option. The Ring Monitor cannot display any trace information.

Receive Error Status: This field is a brief description of the error status. One or more of the following values is displayed:

Status	*Meaning*
DMA	End of Range before End of Buffer. This is a DMA transfer error; the CPU memory buffer became full while there was still data coming in. One possible cause is a bad PNC board. Alternatively, the buffer size of a system may have been changed through the configurator. If the node with the larger buffer transmits to the node with the smaller buffer, this error occurs.
BUF_PAR	PNC Receive Buffer Parity Error.

ACK_PAR	Indicates parity errors in a received ACK byte.
CRC	Bad CRC. This error can be generated by any node in the ring while the packet is being transceived.
WACK	Wait Acknowledge. A node recognized this packet as addressed to it, and verified the CRC as good. However, that node was not able to accept the packet because no receive buffer was available in the PNC.
MULT_ACK	Multiply Acknowledged. A node recognized this packet as addressed to it; however, bit 1 of the ACK Byte had already been set by another node.
PREV_ACK	Previous Acknowledge. A node recognized this packet as addressed to it.

Receive Error Node: This field identifies which node transmitted the frame that was received in error. The node ID and node name are shown.

If the error status (in the Receive Error Status field) is MULT_ACK or PREV_ACK, then this node may be running obsolete hardware; for further information, call your Customer Support Center.

Receive Bad Protocol: This field contains the number of frames received that have unrecognizable protocol bytes. Two protocol bytes are allowed. The first is for the broadcast node ID frame, which has a protocol field of 0. The second is X.25 level 3, which has a protocol field of :1000.

Any frame with a different protocol field is discarded.

Transmit Errors: This is the same counter that was shown on the Detailed screen.

Transmit Error Status: This field contains a brief description of the error status. One or more of the following values is displayed:

Status	Meaning
ACKB_or_CRC	This code indicates that a packet was returned with an ACK byte check or a bad CRC indication.
PKT_DNR	Packet did not return. A token was received after completion of the transmit and before the return of the packet header. These packets are counted in the Transmit Error field.
BUF_PAR	Transmit Buffer Parity Error.
ACK_PAR	These codes indicate parity errors in a returned ACK byte.
CRC	Bad CRC. This error can be generated by any node in the ring. The CRC validation occurs automatically during transceive.

WACK	Wait Acknowledge. The target node was not able to accept the packet because of receive congestion; however, the data was valid (no CRC error).
MULT_ACK	Multiply Acknowledged. More than one node recognized this packet as addressed to it. Unless this packet is a broadcast packet, a configuration error exists.
ACK	This is not an error. It indicates that this packet was accepted by the target node. This code is used in conjunction with the Multiple ACK or WACK fields to detect duplicate nodes.

Spurious Transmit Interrupt: This field shows the number of times that the local node has received a transmit interrupt from the PNC without a previous transmit frame command. A spurious transmit interrupt can occur when the node tells the PNC to issue a token. Therefore, spurious transmit interrupts do not indicate a problem on the ring unless this count is significantly greater than the number of inserted tokens (displayed on the Ring Monitor Detailed screen).

Transmit WACK Node: This field identifies the node to which the most recent aborted frame was addressed. The node ID and node name are shown.

Often, the identified node may have halted without doing a Master Clear and is therefore WACKing all frames addressed to it. Once a Master Clear is performed, that node can successfully transmit and receive frames.

Duplicate Node: The node ID of the target node for a packet that was not a broadcast packet and that was accepted by more than one node (Transmit Error Status of MULT_ACK or ACK and WACK). This field indicates that two nodes in the ring have the same node ID.

No Receive Buffer: This field shows the number of times that the RINGNET software attempts to allocate a buffer for receive, but one is not available.

Receive Queue Count: The receive queue is the data queue from the PNCDIM (lowest level software) to the PRIMENET Level 2 protocol module, RNGRCV. The receive queue holds buffers of data that have been received by the PNC (or transmit buffers that have been aborted by the PNCDIM). If the cumulative count in this counter indicates that most of the receive buffers are being held in this queue, then the higher level module is not able to process the frames as quickly as they are being received. The Receive Queue Count works in conjunction with the No Receive Buffer Count; it is increased only when an attempt to get a receive buffer fails.

Receive Queue Full: This queue is allocated to be large enough to hold all the buffers simultaneously. It is, therefore, an error for this queue to be full. If this situation does occur, the buffer being queued is discarded and an event is logged.

Transmit Queue Count: The transmit queue is the queue from the Level 2 module, RNGSND, to the PNCDIM. This queue holds buffers of data to be transmitted by the PNC. If this count indicates that most of the buffers are being held in this queue, then there is congestion on the ring and the buffers are not being transmitted quickly enough. This situation could happen when several nodes are issuing WACKs frequently.

WACKed Frames: This is the same counter that was shown on the Detailed screen.

WACK List Entry Count: If a frame is WACKed 32 times in a row, it is placed on the WACK List. If another frame for the same node is encountered, it is placed on this list behind the first frame. The list is held in sequence by node number. This count is a cumulative counter that shows the total number of frames that were placed on the WACK List since the node was cold started. The count does not indicate the current length of the list.

Aborted Frames: This field shows the number of aborted frames. An aborted frame is one that could not be delivered successfully. Usually, the frame is aborted because the number of retries in the WACK procedure has been exhausted. However, it is possible for a frame to be negative acknowledged (NAKed) or multiply accepted a maximum of 20 times and then aborted.

WACK List Max Entry: This value is the maximum number of frames on the WACK List since cold start.

The WACK List fields depict the pattern of issuing WACKs on the ring. If a single node is sending out WACKS frequently, usually only one or two frames are on the list at one time. If bursts of WACKS occur on the ring, then this count is much higher.

Fatal Errors: These errors concern hardware I/O operations and rarely occur If a fatal error occurs, RINGNET removes the node from the ring. The ring is marked as disa .cd, the PNC is told to disconnect (if possible), and all transmit frames are aborted. You should run PNC diagnostics before you attempt to restart the node on the ring. Fatal errors are logged to DSM. The Fatal Errors counters are not reset when PRIMENET is stopped and started; they represent the total number of such errors since the last cold start of the node.

Ring Monitor Trace Totals Screens

Each Trace Totals screen shows details of the traffic between the local node and all other nodes on the ring. This information assists you in monitoring traffic flows and in investigating problems between nodes.

A node is displayed on a Trace Totals screen if data has been transmitted to it or received from it since network startup. The Trace Totals screens display information for a maximum of 248 nodes consisting of as many as 14 Trace Totals screens; each screen displays data for 18 nodes, except for the last screen, which displays data for 14 nodes.

A Trace Totals screen is shown in Figure 9-5. The following message is displayed on the last Trace Totals screen after the data for the last active node:

```
All nonzero entries displayed
```

A Trace Totals screen displays individual node activity on the ring; it tracks only data that is sent by or received by the node on which the Ring Monitor is running.

To view the next Trace Totals screen (or the first one if you are viewing the last one), press the RETURN key.

```
RING MONITOR - TRACE TOTALS   www, mmm dd yyyy  PERIOD ppppp   FILE xxxxxxxxxx
START hh:mm:ss  FROZEN xxxxxxx SAMPLE hh:mm:ss  SYSTEM xxxxxx  RESET on xxxx

    Node Name  Node ID    Xmit        Recv        WACKed    Max Frame Size
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
    xxxxxx      xxx    xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx      xxxxx
--MORE--  Ring screens: R = Ring Overview, D = Detailed, E = Error, H = Help
```

Figure 9-5
Ring Monitor Trace Totals Screen

Trace Totals Screen Header

The first two lines of the Trace Totals screen form the standard header that all MONITOR_NET screens contain. The header consists of the following fields:

Heading	Meaning
RING MONITOR - TRACE TOTALS	The name of the screen.
www mmm dd yyyy	The date when the sample was collected; during interactive operation the current date. www = day of week; mmm = month; dd = day of month; yyyy = year. For an input file the date of the sample.
PERIOD ppppp	The amount of time in seconds between samples from the PRIMENET database or from the input file.

FILE xxxxxxxxxx	The status of file input (FILE INPUT ON) or output (FILE OUTPUT ON or FILE OUTPUT OFF). This field is displayed only if you invoked MONITOR_NET with either the –INPUT or –OUTPUT option.
START hh:mm:ss	The time when this monitor stated running. If you are using an input file the time when input file data was collected.
FROZEN xxxxxxx	FROZEN INPUT if the data comes from an input file or FROZEN DISPLAY otherwise; displayed only if the screen was frozen with an F command.
SAMPLE hh:mm:ss	The time in hours, minutes and seconds when the most recent sample was collected from the PRIMENET database or from the input file.
SYSTEM xxxxxx	The name of the node where MONITOR_NET is running; or, if you are using the –INPUT option the name of the node on which MONITOR_NET was run to generate the input file.
RESET on xxxx	Either RESET on HOUR or RESET on DAY; displayed only if you invoked MONITOR_NET with either the –RESET_DAY or –RESET_HOUR option.

Column Headings for the Trace Totals Screen

Line four contains headings for the five columns that make up the Trace Totals screen. The headings are Node Name, Node ID, Xmit, Recv, WACKed, and Max Frame Size. The headings are described below.

Node Name: This column shows the name of the node with which the local node is communicating.

Node ID: This column shows the ring ID of the node with which the local node is communicating.

Xmit: This column shows the number of frames correctly transmitted to that node. This total does not include any broadcast frames.

Recv: This column shows the number of frames correctly received from that node, including any broadcast packets sent by that node.

WACKed: This column shows the number of times the local node attempted to send a frame that was Wait Acknowledged by the other node.

Max Frame Size: This column shows the maximum frame size in bytes supported by the node.

10
The LAN300 Monitor

The MONITOR_NET command permits you to invoke four monitors: the Ring Monitor, the Virtual Circuit Monitor, the Synchronous Line Monitor, and the LAN300 Monitor. Refer to Chapter 7, Using MONITOR_NET, for general information on features common to all four monitors.

LAN300 is the term used to designate Prime's implementation of the industry standard IEEE 802.3 CSMA/CD Local Area Network. This chapter explains how to invoke the LAN300 Monitor and how to perform those MONITOR_NET functions that are specific to the LAN300. The chapter also contains descriptions of each screen type and its associated data fields.

Note

If the Network Terminal Service (NTS) shares the same LAN300 as PRIMENET, then the LAN300 Monitor will *not* accurately reflect the media usage. The reason is that NTS traffic is not measured by the LAN300 Monitor.

Using the LAN300 Monitor

The LAN300 Monitor displays information in three types of screens:

- LAN300 Monitor Overview screen

- LAN300 Monitor Trace screen

- LAN300 Monitor Error screen

The Overview screen summarizes PRIMENET traffic information for all the configured LAN300s. Currently PRIMENET supports a maximum of two LAN300s per system. The Trace screen displays detailed traffic information for each node. Only nodes that have had activity are displayed. The Error screen indicates possible problems on a specified LAN300.

The Overview, Error, and Trace screens are dynamic; that is, they are updated by the LAN300 Monitor while they are displayed. The LAN300 Monitor updates the screens by taking a sample from the PRIMENET database every 3 seconds; you can change this period by using either the –PERIOD option of the MONITOR_NET command or by typing *num*P from any screen.

Invoking the LAN300 Monitor

The MONITOR_NET command invokes the LAN300 Monitor. If you specify the command with no control arguments, as in

```
MONITOR_NET
```

then the Main Menu appears. Type L (without a carriage return) to select the LAN300 Monitor and display the first Overview screen. You can move from any MONITOR_NET screen to the first LAN300 Monitor Overview screen by typing L.

The command

```
MONITOR_NET -LAN300, -L3
```

starts the LAN300 Monitor and displays the first Overview screen without displaying the Main Menu. Once you invoke the LAN300 Monitor, you can move to other monitors by typing any of the following:

- M for the Main Menu screen

- S for the Synchronous Line Monitor Overview screen

- V for the Virtual Circuit Monitor Overview screen

- R for the Ring Monitor Overview screen

You can exit from the LAN300 Monitor either by moving to another monitor or by typing Q to return to PRIMOS. In either case, all peak and cumulative values are reset. See Chapter 7, Using MONITOR_NET, for further information.

Operating the LAN300 Monitor Interactively

The LAN300 Overview screen displays information for a maximum of two LAN300s. You can display the Overview screen for a particular LAN300 by typing the logical LAN300 ID number and then typing L. Do not use a carriage return in this sequence.

For each configured LAN300 shown in the Overview screen, there is a corresponding Trace Screen and an Error screen. To display the Trace screen for a LAN300, type

```
LAN300_numberT
```

where LAN300_*number* is the LAN300 number from the Overview screen for that system and T invokes the Trace screen. The LAN300 Monitor then displays the corresponding Trace screen. If you type T without a LAN300 number, you get Trace screen number one (1) supplied as the default. The message **LAN300 CONTROLLER NOT CONFIGURED** appears at the bottom of the screen if you select a LAN300 that is not currently configured. See Appendix C for a complete list of MONITOR_NET messages.

You select Error screens in the same way as Trace screens, except that you use the E command instead of the T command.

Operating the LAN300 Monitor as a Phantom

If the network goes down while you are running MONITOR_NET as a phantom, the phantom is stopped. If you try to monitor LAN300s by running MONITOR_NET as a phantom and no LAN300s are configured, MONITOR_NET writes a message to the COMOUTPUT file and returns you to PRIMOS.

Values Displayed in LAN300 Monitor Screens

Unless you invoke MONITOR_NET with an input file, all of the values displayed in the LAN300 Monitor screens are taken from the PRIMENET database. Since it is possible for PRIMENET counters to overflow when MONITOR_NET is not running, all values displayed on LAN300 Monitor screens must be assumed to be relative, not absolute, values.

The LAN300 Monitor Overview Screen

The LAN300 Monitor Overview screen, shown in Figure 10-1, is dynamic. The values displayed for each LAN300 are updated periodically. The bottom line of the display summarizes the commands you can use to move to other LAN300 Monitor screens. If no LAN300s are configured on your system, MONITOR_NET displays an appropriate message.

```
┌─────────────────────────────────────────────────────────────────────────┐
│  LAN300 MONITOR - OVERVIEW     FRI, MAR 07 1986  PERIOD 10                │
│  START 13:33:27                    SAMPLE 13:33:37  SYSTEM S37            │
│                                                                           │
│      Configured LANs:   1. PRODUCTION                                     │
│                         2. MARKETING                                      │
│                                                                           │
│                      Period        Peak/Period    Cumulative      Total   Attempt │
│  1 Frames  Xmit         1            1 13:33:37         1            2        2    │
│            Recv         1            1 13:33:37         1            2             │
│                                                                           │
│    Bytes   Xmit         1            1 13:33:37         1            2             │
│            Recv         1            1 13:33:37         1            2             │
│                                                                           │
│                                                                           │
│  2 Frames  Xmit         1            1 13:33:37         1            2        2    │
│            Recv         1            1 13:33:37         1            2             │
│                                                                           │
│    Bytes   Xmit         1            1 13:33:37         1            2             │
│            Recv         1            1 13:33:37         1            2             │
│                                                                           │
│                                                                           │
│  --MORE--  LAN300 screens: <n>L=Overview, <n>E=Error, <n>T=Trace, H=Help  │
│                                                                           │
└─────────────────────────────────────────────────────────────────────────┘
```

Figure 10-1
LAN300 Monitor Overview Screen

Overview Screen Header

The first two lines of the Overview screen form the standard header that all MONITOR_NET screens contain. The header consists of the following fields:

Heading	Meaning
LAN300 MONITOR - OVERVIEW	The name of the screen.
www mmm dd yyyy	The date when the sample was collected; during interactive operation the current date. www = day of week; mmm = month; dd = day of month; yyyy = year. For an input file the date of the sample.
PERIOD ppppp	The amount of time in seconds between samples from the PRIMENET database or from the input file.
FILE xxxxxxxxxx	The status of file input (FILE INPUT ON) or output (FILE OUTPUT ON or FILE OUTPUT OFF). This field is displayed only if you invoked MONITOR_NET with either the –INPUT or –OUTPUT option.

START hh:mm:ss	The time when this monitor started running in hours, minutes and seconds. If you are using an input file the time when input file data was collected.
FROZEN xxxxxxx	FROZEN INPUT if the data comes from an input file or FROZEN DISPLAY otherwise; displayed only if the screen was frozen by typing F.
SAMPLE hh:mm:ss	The time in hours, minutes and seconds when the most recent sample was collected from either the PRIMENET database or from the input file.
SYSTEM xxxxxx	The name of the node where MONITOR_NET is running or the node from which you collected the data (when using an input file).
RESET on xxxx	Either RESET on HOUR or RESET on DAY; displayed only if you invoked MONITOR_NET with either the –RESET_DAY or –RESET_HOUR option.

Line 3 of the screen is blank. Lines 4 through 7 list the logical numbers and names of the configured LAN300s.

Overview Screen Column Headings

Line 8 of the screen is blank; Line 9 contains column headings for the rest of the screen. The headings are Period, Peak-Period, Cumulative, Total, and Attempt. The meanings of the headings are as follows:

Heading	*Meaning*
Period	The number of items defined by the left-hand column processed in the most recent period. For example, the first value under Period is the number of frames transmitted along the logical line specified in column 1 in the most recent period which ended at the sample time.
Peak-Period	The maximum value of all the Period values from start time (or the time of the last reset) to sample time, and the time when this maximum occurred.
Cumulative	The sum of all the Period values from start time (or the time of the last reset) until sample time.
Total	The sum of all occurrences of the event from network startup (or network counter overflow) until sample time.
Attempt	The number of times PRIMENET connection recovery has been attempted.

The rest of the screen displays this information for the LAN300s. Four lines of data are displayed for each LAN300: one line each for Frames transmitted (Xmit), Frames received (Recv), Bytes

transmitted (Xmit), and Bytes received (Recv). The LAN300 Monitor supports a maximum of two LAN300s per system.

The LAN300 Monitor Trace Screen

Each Trace screen shows the amount of traffic on the individual nodes associated with the specified LAN300. This information can be helpful in monitoring traffic flow and in addressing configuration problems for that LAN300. Information is displayed only for those nodes that have had communications activity since the network started. Figure 10-2 shows a sample LAN300 Monitor Trace screen.

```
LAN300 MONITOR - TRACE        FRI, MAR 07 1986  PERIOD 10
START 13:33:27                SAMPLE 13:34:49  SYSTEM S37

Configured LAN:  1. PRODUCTION

Node Name          Xmit        Recv      Node Name        Xmit        Recv
SYS100              9           9
SYS104              9           9
SYS112              9           9
SYS116              9           9
SYS124              9           9
SYS136              9           9
SYS204              9           9
SYS216              9           9
SYS240              9           9
SYS252              9           9




        LAN300 screens: <n>L=Overview, <n>E=Error, <n>T=Trace, H=Help3
```

Figure 10-2
LAN300 Monitor Trace Screen

Trace Screen Header

The first two lines of the Trace screen form the standard header that all MONITOR_NET screens contain. The header consists of the following fields:

Heading	Meaning
LAN300 MONITOR - TRACE	The name of the screen.
www mmm dd yyyy	The date when the sample was collected; during interactive operation the current date. www = day of week; mmm = month; dd = day of month; yyyy = year. For an input file the date of the sample.
PERIOD ppppp	The amount of time in seconds between samples from the PRIMENET database or from the input file.
FILE xxxxxxxxxx	The status of file input (FILE INPUT ON) or output (FILE OUTPUT ON or FILE OUTPUT OFF). This field is displayed only if you invoked MONITOR_NET with either the −INPUT or −OUTPUT option.
START hh:mm:ss	The time when this monitor started running in hours, minutes and seconds. If you are using an input file the time when input file data was collected.
FROZEN xxxxxxx	FROZEN INPUT if the data comes from an input file or FROZEN DISPLAY otherwise; displayed only if the screen was frozen by typing F.
SAMPLE hh:mm:ss	The time in hours, minutes and seconds when the most recent sample was collected from either the PRIMENET database or from the input file.
SYSTEM xxxxxx	The name of the node where MONITOR_NET is running.
RESET on xxxx	Either RESET on HOUR or RESET on DAY; displayed only if you invoked MONITOR_NET with either the −RESET_DAY or −RESET_HOUR option.

Line 3 is blank. Line 4 displays the name and logical number of the selected LAN300.

Trace Screen Column Headings

Line 5 contains column headings for the rest of the screen display. The headings are Node Name, Transmit (Xmit), and Received (Recv). Their meanings are as follows:

Heading	Meaning
Node Name	The name of the node configured for that LAN300.
Xmit	The number of frames successfully transmitted from that node.
Recv	The number of frames successfully transmitted to that node.

Each column can display a maximum of 16 nodes. The column headings are repeated if there are more than sixteen nodes configured for that LAN300. One screen, then, displays a maximum of 32 nodes. A carriage return advances the display to show more nodes for that LAN300, if any exist.

The LAN300 Monitor Error Screen

The Error screen displays information that may be of use in determining the cause of failed transmissions for the selected LAN300. Figure 10-3 shows a sample Error screen.

```
LAN300 MONITOR - ERROR        FRI, MAR 07 1986  PERIOD 10
START 13:33:27                SAMPLE 13:34:07  SYSTEM S37

    Configured LAN:       1. PRODUCTION
    Configured Nodes:        5

    LHC300 Connection State:  Unknown connection state

    Recovery Attempts:        5
    No Primenet Recv Buffers: 5




            LAN300 screens: <n>L=Overview, <n>E=Error, <n>T=Trace, H=Help
```

Figure 10-3
LAN300 Monitor Error Screen

Error Screen Header

The first two lines of the Error screen form the standard header that all MONITOR_NET screens contain. The header consists of the following fields:

Heading	Meaning
LAN300 MONITOR - ERROR	The name of the screen.
www mmm dd yyyy	The date when the sample was collected; during interactive operation the current date. www = day of week; mmm = month; dd = day of month; yyyy = year. For an input file the date of the sample.
PERIOD ppppp	The amount of time in seconds between samples from the PRIMENET database or from the input file.
FILE xxxxxxxxxx	The status of file input (FILE INPUT ON) or output (FILE OUTPUT ON or FILE OUTPUT OFF). This field is displayed only if you invoked MONITOR_NET with either the –INPUT or –OUTPUT option.
START hh:mm:ss	The time when this monitor started running in hours, minutes and seconds. If you are using an input file the time when input file data was collected.
FROZEN xxxxxxx	FROZEN INPUT if the data comes from an input file or FROZEN DISPLAY otherwise; displayed only if the screen was frozen with an F command.
SAMPLE hh:mm:ss	The time in hours, minutes and seconds when the most recent sample was collected from the PRIMENET database or from the input file.
SYSTEM 'xxxxxx	The name of the node where MONITOR_NET is running.
RESET on xxxx	Either RESET on HOUR or RESET on DAY; displayed only if you invoked MONITOR_NET with either the –RESET_DAY or –RESET_HOUR option.

Error Screen Information

The LAN300 Monitor Error screens display six data fields on each screen. Their meaning is as follows:

Heading	Meaning
Configured LAN	Uses the number of the last LAN300 selected, or one (1) as the default.
Configured Nodes	The number of nodes currently configured for that LAN300.

LHC300 Connection State   The current state of the connection between PRIMENET and the LHC300 controller. The possible values are

- Not Created — The connection was never active.

- Up — The connection is operating successfully.

- Failed — The connection has failed; recovery may be attempted.

- Reinitializing — Recovery is being attempted.

- Down — Recovery has failed; the connection is disabled.

Recovery Attempts   The number of times connection recovery has been attempted.

No Primenet Recv Buffers   The number of times PRIMENET was unable to allocate a receive buffer to that LHC300 controller.

11
The Synchronous Line Monitor

The MONITOR_NET command permits you to invoke four monitors: the Ring Monitor, the Virtual Circuit Monitor, the Synchronous Line Monitor, and the LAN300 Monitor. This chapter explains how to invoke the Synchronous Line Monitor and how to perform those MONITOR_NET functions that are specific to the Synchronous Line Monitor. Each Synchronous Line Monitor screen type is described in this chapter, along with the meanings of each data field. Refer to Chapter 7, Using MONITOR_NET, for general information on all four monitors.

PRIMENET Synchronous Lines

In a PRIMENET environment, synchronous lines are either full-duplex synchronous lines or half-duplex synchronous lines. Both types of synchronous lines are described in this section.

Full-duplex Synchronous Lines

In a PRIMENET environment, a full-duplex synchronous line is a dedicated line between two Prime systems or between a Prime system and a PDN. Full-duplex lines are permanent links between the nodes they connect; they cannot be reallocated for purposes other than PRIMENET while PRIMENET is running.

PRIMENET's full-duplex synchronous lines use CCITT X.25 Level 2 protocol with either HDLC or BSC character framing (ASCII or EBCDIC encoding).

Half-duplex Synchronous Lines

PRIMENET's half-duplex synchronous lines are temporary dialup telephone connections between Prime systems. A half-duplex line is a connection over which data travels in only one direction at a time. This type of communication contrasts with the full-duplex mode, where both systems may send and receive signals at the same time.

A half-duplex PRIMENET connection between two nodes is made when the calling system dials out on one of its half-duplex lines and the receiving system accepts the call on one of its half-duplex lines. A modem is required at each end of the connection.

At each end of a half-duplex PRIMENET link, system operators enter commands to make and break the connection. Once a connection is made, it functions like any other PRIMENET link. However, the half-duplex connection exists only for the duration of the phone call between two systems.

PRIMENET's half-duplex communication uses BSC-ASCII framing. Half-duplex lines are supported by the MDLC, the ICS2, and the ICS3.

Using the Synchronous Line Monitor

The Synchronous Line Monitor gathers statistics relating to synchronous lines from the PRIMENET database and displays them. Using the Synchronous Line Monitor, you can observe communications activity on the synchronous lines connected to your system. You can also see how the lines were configured.

The Synchronous Line Monitor displays its information in three types of screens:

- Synchronous Line Monitor Overview screen

- Synchronous Line Monitor Detailed screen

- Synchronous Line Monitor Configuration screen

The Overview screen summarizes synchronous line activity. For each configured synchronous line, a Detailed screen expands on the information presented in the Overview screen, and a Configuration screen describes how the line was configured.

The Overview and Detailed screens are dynamic; that is, they are updated by the Synchronous Line Monitor while they are displayed. The Configuration screen is static; that is, it is not updated until you redisplay it.

The Synchronous Line Monitor updates the Overview and Detailed screens by taking a sample from the PRIMENET database every 3 seconds; you can change this period by using either the –PERIOD option of the MONITOR_NET command or the P command from any screen.

Once you have invoked MONITOR_NET, you can move from any screen of one monitor to the Overview screen of another. After selecting a monitor, you can either move among the screens of that monitor or change to the Overview screen of another monitor. At any time, you can type H to get help, M to display the Main Menu, or Q to exit the monitor and return to PRIMOS command level.

Invoking the Synchronous Line Monitor

The MONITOR_NET command invokes the Synchronous Line Monitor. If you specify the command with no control arguments, as in

```
MONITOR_NET
```

then the Main Menu appears. Type S (without a carriage return) to start up the Synchronous Line Monitor and display the first Synchronous Line Overview screen.

The command

```
MONITOR_NET -SYNC
```

starts the Synchronous Line Monitor and displays the first Overview screen without displaying the Main Menu. You can always return to the Main Menu by typing M (without a carriage return) at any screen.

If you have already invoked MONITOR_NET, typing S from any screen starts up the Synchronous Line Monitor and displays the Overview screen.

You can terminate the Synchronous Line Monitor by either moving to another monitor or by typing Q to terminate MONITOR_NET itself. Terminating the Synchronous Line Monitor resets all peak and cumulative values.

Operating the Synchronous Line Monitor Interactively

To get a list of those commands that you can issue at the current screen, type H to display a help screen.

Type S to diplay the first Synchronous Line Overview screen. If there is more than one Overview screen, type a carriage return to display the second screen.

Each configured synchronous line has a Detailed and a Configuration screen. To display the Detailed screen for a synchronous line, type

```
line_numberD
```

where *line_number* is the logical line number of the synchronous line. The Synchronous Line Monitor then displays the Detailed screen for that synchronous line. If you type D without a synchronous line number, you get the Detailed screen for the synchronous line number that you most recently specified; if you did not specify any synchronous line numbers, you get the Detailed screen for synchronous line number = 0. You select the Configuration screen similarly.

If no synchronous lines are configured for your node, you are not permitted to move from the Synchronous Line Monitor Overview screen. An appropriate message is displayed on line 24 of your terminal screen. If you enabled file output, only the record header is written to the output file. If all of the configured lines are disconnected or disabled, the Synchronous Line Monitor continues to update the display and to write to the output file if you enabled file output.

Several errors can occur when you are specifying Detailed or Configuration screens. Appendix C contains a list of MONITOR_NET messages and their meanings.

Use the following commands to move to other monitors:

- R stops the Synchronous Line Monitor, starts up the Ring Monitor, and displays its Overview screen.

- V stops the Synchronous Line Monitor, starts up the Virtual Circuit Monitor, and displays its first Overview screen.

- L stops the Synchronous Line Monitor, starts up the LAN300 Monitor, and displays its first Overview screen.

Alternatively, you can type M to move to the Main Menu and select a monitor from the Main Menu. Moving to the Main Menu stops the Synchronous Line Monitor; if you return to the Synchronous Line Monitor, peak and cumulative values are reset to 0.

Output files can grow large rapidly. (You create an output file with the −OUTPUT option of the MONITOR_NET command.) A maximum of 2,642 bytes of data are written to the output file each period if eight synchronous lines are in use.

Operating the Synchronous Line Monitor as a Phantom

If the network goes down while you are running MONITOR_NET as a phantom, the phantom is stopped. If you try to monitor synchronous lines by running MONITOR_NET as a phantom and no synchronous lines are configured, MONITOR_NET writes a message to the COMOUTPUT file and returns to PRIMOS. If all of the synchronous lines that you are monitoring with a phantom go down, MONITOR_NET continues to write screen headers to the output file. When one or more lines start up again, data is written to the file. Appendix C contains a complete list of MONITOR_NET messages.

Values Displayed in Synchronous Line Monitor Screens

All of the values displayed in the Synchronous Line Monitor screens are taken from the PRIMENET database. If the counter for either Total or Cumulative values in the PRIMENET database overflows its maximum value (with values of over four billion) while MONITOR_NET is sampling it, MONITOR_NET displays the value with an asterisk (*) after it.

Since it is possible for PRIMENET counters to overflow when MONITOR_NET is not running, all values displayed on Synchronous Line Monitor screens must be assumed to be relative, not absolute, values.

If any data item does not apply for a given screen, that field is marked NA (Not Applicable).

Synchronous Line Monitor Overview Screens

The Synchronous Line Monitor Overview screen, shown in Figure 11-1, contains information about each configured synchronous line attached to your system. If your system has 7 or 8 lines configured, there are two Overview screens. Enter a carriage return in response to the --MORE-- prompt that appears on line 24 on your terminal screen to view the second screen.

Line 24 of the screen display summarizes the commands to move to other Synchronous Line Monitor screens.

If a line protcol for a given line is disabled, then DISABLED appears next to the logical line number; no other statistics are shown for this line. If the line protcol is not in data transfer state, then DISCONNECTED is displayed next to the logical line number. Traffic information is shown only for those lines that are not disabled or disconnected.

The Overview screen is a dynamic screen.

If no synchronous lines are configured on your node, an appropriate message is displayed and no information is displayed.

```
SYNCHRONOUS LINE - OVERVIEW    www, mmm dd yyyy  PERIOD  ppppp  FILE  xxxxxxxxxx
START hh:mm:ss  FROZEN xxxxxxx  SAMPLE hh:mm:ss  SYSTEM xxxxxx  RESET on xxxx

Sync                            F R A M E S
Line          Period        Peak/Period      Cumulative       Total       Errors
  n    Xmit  xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx
       Recv  xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx

  n    Xmit  xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx
       Recv  xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx

  n    Xmit  xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxxx xxxxxxxxxx
       Recv  xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxxx xxxxxxxxxx

  n    Xmit  xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx xxxxxxxxxxx
       Recv  xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx xxxxxxxxxxx

  n    Xmit  xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx xxxxxxxxxxx
       Recv  xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx xxxxxxxxxxx

  n    Xmit  xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx xxxxxxxxxxx
       Recv  xxxxxxxxxx  xxxxxxxxxx hh:mm:ss  xxxxxxxxxx  xxxxxxxxxx xxxxxxxxxxx

--MORE--    Sync Screens: <line #>D= Detailed, <line #>C= Config, H=Help
```

Figure 11-1
Synchronous Line Monitor Overview Screen

Overview Screen Header

The first two lines of the Overview screen form the standard header that all MONITOR_NET screens contain. The header consists of the following fields:

Heading	*Meaning*
SYNCHRONOUS LINE - OVERVIEW	The name of the screen.
www mmm dd yyyy	The date when the sample was collected; during interactive operation the current date. www = day of week; mmm = month; dd = day of month; yyyy = year. For an input file the date of the sample.
PERIOD ppppp	The time in seconds between samples from the PRIMENET database or from the input file.
FILE xxxxxxxxxx	The status of file input (FILE INPUT ON) or output (FILE OUTPUT ON or FILE OUTPUT OFF). This field is displayed only if you invoked MONITOR_NET with either the –INPUT or –OUTPUT option.
START hh:mm:ss	The time when this monitor started running in hours, minutes and seconds. If you are using an input file the time when input file data was collected.
FROZEN xxxxxxx	FROZEN INPUT if the data comes from an input file or FROZEN DISPLAY otherwise; displayed only if the screen was frozen with an F command.
SAMPLE hh:mm:ss	The time in hours, minutes and seconds when the most recent sample was collected from either the PRIMENET database or from the input file.
SYSTEM xxxxxx	The name of the node where MONITOR_NET is running; or, if you are using the –INPUT option the name of the node on which MONITOR_NET was run to generate the input file.
RESET on xxxx	Either RESET on HOUR or RESET on DAY; displayed only if MONITOR_NET was invoked with the –RESET_DAY or –RESET_HOUR option.

Overview Screen Column Headings

Line 3 of the screen is blank; Lines 4 and 5 contain column headings for the rest of the screen. The headings are Sync Line, and FRAMES (centered above the remaining columns) in line 4; and in line 5, Period, Peak/Period, Cumulative, Total, and Errors. FRAMES refers to all frames sent or received, regardless of type. The meaning of the headings is as follows:

Heading	Meaning
Sync Line	The 1-digit logical line number of the synchronous line.
Period	The number of items defined by the left-hand column processed in the most recent period. For example, the first value under Period is the number of frames transmitted along the logical line specified in column 1 in the most recent period, which ended at the sample time.
Peak/Period	The maximum value of all the Period values from start time or the time of the last reset to sample time and the time of the period when this maximum occurred.
Cumulative	The sum of all the Period values from start time or the time of the last reset until sample time.
Total	The sum of all occurrences of the event from network startup (or network counter overflow) until sample time.
Errors	The sum of all transmit or receive errors for the logical line specified in column 1. These errors are itemized in the Detailed screen.

The rest of the screen displays this information for the first 6 synchronous lines (the lines with logical line numbers 0 through 5). Two lines of data are displayed for each synchronous line: one line for items transmitted (Xmit), and one line for items received (Recv). The second Overview screen contains the same information for the lines with logical line numbers 6 and 7.

Synchronous Line Monitor Detailed Screen

There is a Detailed screen for each configured synchronous line. The Detailed screen shows statistics for every data and control frame sent or received, shows the amount of activity on the node, and indicates the status of the line. Figure 11-2 shows the Detailed screen format.

The Detailed screen is dynamic.

```
SYNCHRONOUS LINE - DETAILED   www, mmm dd yyyy  PERIOD ppppp   FILE xxxxxxxxxx
START hh:mm:ss  FROZEN xxxxxxx SAMPLE hh:mm:ss  SYSTEM xxxxxx  RESET on xxxx


SYNC LINE # xx              TOTAL VCs xx
                        Period        Peak/Period        Cumulative        Total
C & S Frames xmit   xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx
C & S Frames recv   xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx
I Frames xmit       xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx
I Frames recv       xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx
Bytes xmit          xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx
Bytes recv          xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx


Too big             xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx
Too small           xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx
No packet           xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx
# Re-xmit           xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx
L2 addr error       xxxxxxxxxx   xxxxxxxxxx hh:mm:ss   xxxxxxxxxx   xxxxxxxxxx
High priority L2 to L1 Q overflow                        xxxxxx       xxxxxx
Low priority  L2 to L1 Q overflow                        xxxxxx       xxxxxx
Recv-not-ready  xmit Y/N   recv Y/N        Line status     xxxxxxxxxxxx
--------- CURRENT TIMER VALUES ---------   HDX state       xxxxxxxxxxxx
Re-xmit  Response    Idle    Recv timeout  Primary state   xxxxxxxxxxxx
xxxxxxx  xxxxxxxx  xxxxxxx     xxxxxxx      Secondary state xxxxxxxxxxxx
            Sync screens: S= Overview, <line #>C= Config, H=Help
```

Figure 11-2
Synchronous Line Monitor Detailed Screen

Detailed Screen Header

The first two lines of the Detailed screen form the standard header that all MONITOR_NET screens contain. The header consists of the following fields:

Heading	Meaning
SYNCHRONOUS LINE - DETAILED	The name of the screen.
www mmm dd yyyy	The date when the sample was collected; during interactive operation the current date. www = day of week; mmm = month; dd = day of month; yyyy = year. For an input file the date of the sample.
PERIOD ppppp	The amount of time in seconds between samples from either the PRIMENET database or from the input file.
FILE xxxxxxxxxx	The status of file input (FILE INPUT ON) or output (FILE OUTPUT ON or FILE OUTPUT OFF). This field is displayed only if you invoked MONITOR_NET with either the –INPUT or –OUTPUT option.

START hh:mm:ss	The time when this monitor started running in hours, minutes and seconds. If you are using an input file the time when input file data was collected.
FROZEN xxxxxxx	FROZEN INPUT if the data comes from an input file or FROZEN DISPLAY otherwise; displayed only if the screen was frozen with an F command.
SAMPLE hh:mm:ss	The time in hours, minutes and seconds when the most recent sample was collected from either the PRIMENET database or from the input file.
SYSTEM xxxxxx	The name of the node where MONITOR_NET is running; or, if you are using the –INPUT option the name of the node on which MONITOR_NET was run to generate the input file.
RESET on xxxx	Either RESET on HOUR or RESET on DAY; displayed only if you invoked MONITOR_NET with the –RESET_DAY or –RESET_HOUR option.

Synchronous Line Number

The heading SYNC LINE # is displayed on line 4 of the Detailed screen; it is followed by the logical line number of this synchronous line.

Total Number of Virtual Circuits

The heading TOTAL VCs is displayed on line 4 of the Detailed screen; it is followed by the total number of virtual circuits that are currently active (that is, set up) on this line.

Detailed Screen Column Headings

Line 5 contains column headings for the rest of the screen display. The headings are Period, Peak/Period, Cumulative, and Total; their meanings are as follows:

Heading	Meaning
Period	The number of items defined by the left-hand column processed in the most recent period.
Peak/Period	The maximum value of all the Period values from start time or time last reset to sample time and the time of the period when this maximum occurred.
Cumulative	The sum of all the Period values from start time or time last reset until sample time.
Total	The sum of all occurrences of the event from network startup (or network counter overflow) until sample time.

11-9

Information About Frames

The Detailed screen provides details about the information summarized on the Overview screen. The Frames Xmit information from the Overview screen is broken down into C & S Frames xmit, I Frames xmit, and Bytes xmit. The Frames Recv information from the Overview screen is broken down into C & S Frames recv, I Frames recv, and Bytes recv on this screen. The meanings of these fields are as follows:

Heading	Meaning
C & S Frames xmit	The number of Command and Supervisory frames transmitted over this synchronous line.
C & S Frames recv	The number of Command and Supervisory frames received over this synchronous line.
I Frames xmit	The number of Information frames transmitted over this synchronous line.
I Frames recv	The number of Information frames received over this synchronous line.
Bytes xmit	The number of data field bytes in Information frames transmitted over this synchronous line.
Bytes recv	The number of data field bytes in information frames received over this synchronous line.

Error Information

The following fields break down the number displayed under the Errors column heading on the Overview screen. The total number of receive errors on this synchronous line is broken down into Too big, Too small, No packet, and L2 addr error. Transmit errors are broken down into # Re-xmit. The meanings of these fields are as follows:

Heading	Meaning
Too big	The number of frames received on this synchronous line that were too big.
Too small	The number of frames received on this synchronous line that were too small.
No packet	The number of Information frames received on this synchronous line that did not contain a packet.
# Re-xmit	The number of frames retransmitted along this sychronous line.
L2 addr error	The number of frames received with an error in the X.25 Level 2 address.

Queue Overflow

The two fields "High priority L2 to L1 Q overflow" and "Low priority L2 to L1 Q overflow" describe the number of times the two X.25 Level 2 to Level 1 queues overflowed. These two queues are used by the Level 2 software to pass frames down to the hardware controllers (that is, Level 1) for transmission. The high-priority queue contains Command and Supervisory frames; the low-priority queue contains Information frames.

Queue overflow occurs when the Level 2 software tries to place a frame on the queue, but the queue is full. When the high-priority queue overflows, Command and Supervisory frames are lost. When the low-priority queue overflows, the Information frame is retransmitted using the standard X.25 retransmit mechanism.

Receive Not Ready Frames: The Recv-not-ready field shows whether or not any Receive Not Ready (RNR) frames have been transmitted (xmit) or received (recv) on this synchronous line during the last period. RNR frames are used for flow control when a system is busy.

Current Timer Values

These fields display the current timer values for the four timers (Re-xmit, Response, Idle, Recv timeout) used with synchronous lines. Timer values are one of the following: a negative integer, EXPIRED, STOPPED, or NA. A negative value for a timer means that the timer is running; the value is the number of seconds before the time expires (for example, –4 means the timer will expire in 4 seconds). EXPIRED means that the timer went off and PRIMENET is taking some action. STOPPED means that the timer was turned off and is not in use. NA means that the timer is not applicable for this line.

The timers function as follows:

Timer	Description
Re-xmit	The retransmission timer is used to protect against loss of data during transmission. If the receiving node does not acknowledge a frame before this timer expires, the frame is retransmitted. This timer is used with all framing and protocol types.
Response	The response timer is started up when a Set Asynchronous Response Mode (SARM) frame is transmitted to start up or reset a line. If the timer expires before it receives an appropriate response (another SARM), the line is disconnected. This time is used with LAP protocol (both HDLC and BSC framing) only.
Idle	The idle timer is used to determine when a remote line or node has gone down. The idle timer is turned on when the line does not have any data to send. When the idle timer expires, the node sends a frame out to inform any systems connected to it that it has not gone down. The idle timer is used with LAP protocol (both HDLC and BSC framing) and LAPB protocol (BSC framing only).

Recv timeout	The receive timeout timer is used to determine when a line or remote node is down. If a system is receiving no data and the receive timeout timer expires, the system sends out a frame that requires a response from other systems to which it is connected. The timer is used with LAPB protocol (both BSC and HDLC framing) and LAP protocol (BSC framing only).

Line Status

This field contains the status of the line; it is one of the values DISCONNECTED, DISABLED, or CONNECTED. DISCONNECTED means that the line protocol is not in data transfer state. DISABLED means that the line controller board to which this line is connected was turned off. CONNECTED means that the line protocol is in data transfer state.

HDX State

This field is displayed for half-duplex lines only. It is one of the following values:

State	*Meaning*
NOT ASSIGNED	The line has not been assigned for use by PRIMENET; it can be used by other subsystems.
ASSIGNED	The line has been assigned but is not started.
LINE IS UP	The line is being started. If another node is in the WAITING state, this state changes rapidly.
STOPPING	The line is coming down.
BAD RESTART	The system to which the line is attached received a packet containing a restart but the packet was corrupted. The line will be stopped.
WAIT FOR TMR	The line is waiting for a restart packet.
WARM START	A PRIMOS warm start is in progress and the line is being stopped.

Primary State

This field describes the state of the primary station part of link level. The primary station sends commands and accepts their responses. The states are as follows:

State	*Meaning*
DISCONNECTED	The line is disconnected.
STARTING	The line has received a Set Asynchronous Balanced Mode (SABM) frame for LAPB or a SARM frame for LAP.

RUNNING	The line (the Level 2 software) is transferring data.
TIMER RECVRY	A timer expired and an appropriate action is taking place.
RESET	The system to which this line is connected has sent a reset frame to initiate a reset. It is waiting for an Unnumbered Acknowledgement (UA) frame.
START/RESTART	The line is either being reset or is being started. This state applies to half-duplex lines only.
LVL 2 SHUTDN	This is a special disconnected state used by the STOP_NET command. This state differs from DISCONNECTED in that LVL 2 SHUTDN does not allow the line to come back up.
ADM DISCONN	This is a special disconnected state used by some PDNs (for example, DATEX-P in Germany). A special sequence of frame exchanges puts Prime software into this state.

Secondary State

This field describes the state of the secondary station part of link level. The secondary station receives commands and sends their responses. The states are as follows:

State	*Meaning*
DISCONNECTED	The line is disconnected.
STARTING	The line has received a command to start up and is responding to that command.
RUNNING	The line (the Level 2 software) is now ready to receive data.
FRAME REJECT	The secondary station rejected a frame. It is waiting for a link reset.
RESET	The secondary station has received a reset command.
START/RESTART	The line is either being reset or is being started. This state applies to half-duplex lines only.
LVL 2 SHUTDN	This is a special disconnected state used by STOP_NET. This state differs from DISCONNECTED in that LVL 2 SHUTDN does not allow the line to come back up.
ADM DISCONN	This is a special disconnected state used by some PDNs (for example, DATEX-P in Germany). A special sequence of frame exchanges puts Prime software into this state.

Synchronous Line Monitor Configuration Screen

There is a Configuration screen for each synchronous line. The Configuration screen describes how the synchronous line was configured. Figure 11-3 shows the Configuration screen format.

The Configuration screen is static.

```
SYNCHRONOUS LINE - CONFIG      www, mmm dd yyyy  PERIOD ppppp   FILE xxxxxxxxxx
START hh:mm:ss  FROZEN xxxxxxx SAMPLE hh:mm:ss  SYSTEM xxxxxx  RESET on xxxx

To: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx          My Node Type: xxx

   Sync        Physical     Controller     Controller     Protocol
   Line #      Line #       Address        Type           Type
   xx          xx           xx             xxxx           xxxx

   Frame       Duplex       Window         Max            Max #
   Type        Type         Size           Frame Size     Retries
xxxxxxxxxxx    xxxx         xxx            xxxxx          xxx

-------- INITIAL TIMER VALUES ---------      DSS      --- PATTERN ---
Re-xmit  Response  Idle   Recv timeout       Enabled  Assert  Required
xxxxxxx  xxxxxxx   xxxxxxx   xxxxxxx          xxxxxxx  xxx     xxx




          Sync screens: S=Overview, <line #>D= Detailed, H=Help
```

Figure 11-3
Synchronous Line Monitor Configuration Screen

Configuration Screen Header

The first two lines of the Configuration screen form the standard header that all MONITOR_NET screens contain. The header consists of the following fields:

Heading	Meaning
SYNCHRONOUS LINE - CONFIG	The name of the screen.
www mmm dd yyyy	The date when the sample was collected; during interactive operation the current date. www = day of week; mmm = month; dd = day of month; yyyy = year. For an input file the date of the sample.

PERIOD ppppp	The amount of time in seconds between samples from either the PRIMENET database or from the input file.
FILE xxxxxxxxxx	The status of file input (FILE INPUT ON) or output (FILE OUTPUT ON or FILE OUTPUT OFF). This field is displayed only if you invoked MONITOR_NET with either the –INPUT or –OUTPUT option.
START hh:mm:ss	The time when this monitor started running in hours, minutes and seconds. If you are using an input file the time when input file data was collected.
FROZEN xxxxxxx	FROZEN INPUT if the data comes from an input file or FROZEN DISPLAY otherwise; displayed only if the screen was frozen with an F command.
SAMPLE hh:mm:ss	The time in hours, minutes and seconds when the most recent sample was collected from either the PRIMENET database or from the input file.
SYSTEM xxxxxx	The name of the node where MONITOR_NET is running; or, if you are using the –INPUT option the name of the node on which MONITOR_NET was run to generate the input file.
RESET on xxxx	Either RESET on HOUR or RESET on DAY; displayed only if you invoked MONITOR_NET with either the –RESET_DAY or –RESET_HOUR option.

Configuration Information

The rest of the screen contains the following configuration information:

Heading	Meaning
To	Either the PRIMENET system name to which this node is connected or the name of the Public Data Network (PDN) to which this node is connected.
My Node Type	Either DTE for Data Terminal Equipment or DCE for Data Circuit-terminating Equipment. DTE and DCE are the X.25 node types. A point-to-point synchronous line must have a DTE at one end of the connection and a DCE at the other end. In a PRIMENET to PDN connection the PDN is always the DCE.
Sync Line #	The logical line number of this line.
Physical Line #	The physical line number in octal indicating the port on the controller to which this line is connected.
Controller Address	The address in octal of the controller board to which this line is connected.

Controller Type	The type of the controller to which this line is connected; it is either MDLC or ICS1.
Protocol Type	Either LAP or LAPB to indicate the line protocol for this line.
Frame Type	Either HDLC or BSC to indicate the type of framing used for this line.
Duplex Type	Either HDX for a half-duplex line or FDX for a full-duplex line.
Window Size	The size of the protocol window, that is, the maximum number of frames that the node can transmit along this line before it has to wait for an acknowledgement.
Max Frame Size	The maximum size in bytes for a frame.
Max # Retries	The maximum number of times that this node will retransmit a frame; if the maximum is exceeded, the node tries to reset the line.
INITIAL TIMER VALUES	The inital value of the timers described on the Detailed screen. Timer values are either a negative integer, EXPIRED, STOPPED or NA. For a description of the timers and their values, see the section Current Timer Values in the description of the Detailed screen.
DSS Enabled	ENABLED or DISABLED. If the data set status is enabled the CPU is interrupted when the data set status changes.
PATTERN Assert	Either RTS or DTR to indicate which RS-232C pins are set high by the controller before it transmits data.
PATTERN Required	Either CD, CTS or DTR to indicate which RS-232C pins must be high before the controller transmits or receives data.

12
Diagnosing Network Problems

This chapter describes the tools that you, as an operator, have available to find and diagnose network problems. These tools include

- The MONITOR_NET program
- The FIND_RING_BREAK program
- The LIST_LHC_STATUS program
- The LIST_LTS_STATUS program
- The LOOPBACK program
- The System Information and Metering (SIM) Commands

Using MONITOR_NET to Detect RINGNET Errors

A number of events can interfere with the normal operation of RINGNET. For example, the token may disappear from the ring or a node may not be able to accept messages. The following section briefly describes some common conditions that can occur during RINGNET operation. MONITOR_NET can be used to detect such problems.

inserted token

If a token is lost, an active node inserts a token into the ring to allow communication between nodes to continue uninterrupted.

lost token

Infrequently, a token is lost because of interference or noise on the ring, usually from a node entering or leaving the ring.

multiply accepted

A node has transmitted a frame and has had more than one node accept it. Because node IDs are unique, this should not occur.

NAK

Negative Acknowledgement; indicates that a data frame failed CRC, or an ACK byte did not pass parity checking. When the node that sent the frame receives the NAK, it retransmits the data.

node is down

When node A has never heard from or cannot transmit to node B, node B is considered down.

node is up

When node A can receive from node B, node B is up.

NON ACKNOWLEDGED

A frame sent by the transmitting node returns with the ACK byte unchanged. This message indicates that the target node is not physically in the ring. No attempt is made to retransmit.

NOT RETURNED

The transmitting node sees a token before it sees the frame it sent; this is an indication of corrupt data. The node retransmits the data when this condition occurs.

timeout

The transmitting node saw neither a token nor the frame within a certain time period. The ring may be broken or going through token recovery. The node waits for a token and retransmits the frame. If a second timeout occurs for the same frame, no further attempt to retransmit is made.

token recovery

The mechanism PRIMENET uses to replace a lost token.

WACK

Wait Acknowledge; the receiving node acknowledges the frame, but does not have a buffer free to receive it. The transmitting node retransmits the frame.

WACK linked list

A linked list of WACKed frames in node number sequence (in time sequence within a node number). The PNCDIM maintains this list and attempts to deliver these frames a set number of times before marking the receiving node as down and aborting the frames.

The FIND_RING_BREAK Program

You use the FIND_RING_BREAK program to locate a break in the ring. This program works only for breaks that cause complete interruption of the signals on the ring. FIND_RING_BREAK does not detect malfunctioning RINGNET repeaters; it does, however, isolate the break in the ring to between two active nodes. Whenever a break occurs between two active nodes, check all RINGNET repeaters between them. You run the FIND_RING_BREAK when

- The Ring Monitor indicates a break.

- The **RING MAY BE DOWN** error message appears on the supervisor terminal.

- The START_NET command indicates "down" nodes.

The following sections describe

- How FIND_RING_BREAK works

- How to invoke FIND_RING_BREAK

- What the input file is and how to create it

- How to locate a break in the ring

- FIND_RING_BREAK error messages

How FIND_RING_BREAK Works

To determine the location of a break in the ring, FIND_RING_BREAK analyzes the local node's ability to communicate with the other nodes in the ring. Specifically, the local node is able to hear from most active nodes that are both downstream of a break and upstream from the local node. An example is shown in Figure 12-1. Note that there are six nodes along a ring, configured to communicate with each other. Node A is the node on which FIND_RING_BREAK is being run. There is a break somewhere between Node D and Node E.
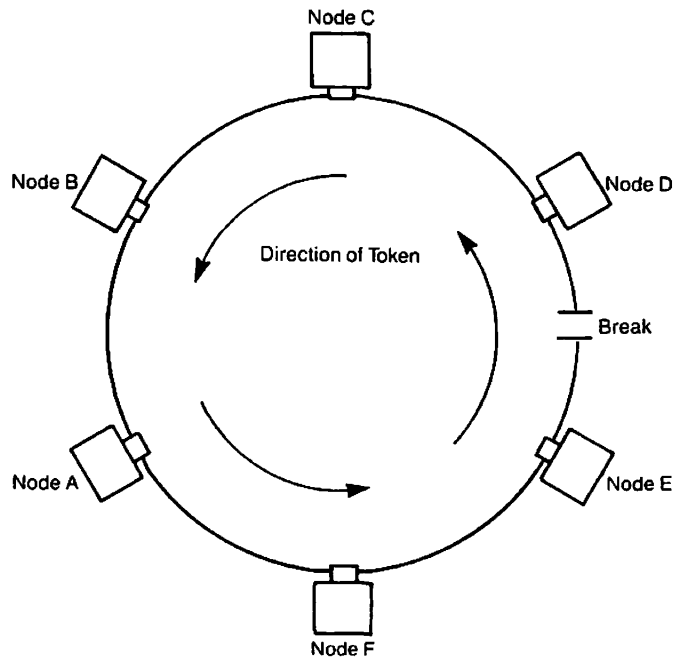
Figure 12-1
Locating a Break in a Ring

When FIND_RING_BREAK is run on Node A, the following sequence of events occurs. Node A recognizes that it is hearing from, but cannot send to, Nodes B and C. The reason that Node A can determine that Nodes B and C are active is that Node D is still transmitting a token. Node B and Node C are using this token to transmit. Node C, the first node downstream of the first active node after the break (Node D) can use that token to transmit data. Node D cannot transmit data because no node upstream of Node D is sending out a token; it can only issue a token onto the ring.

Once FIND_RING_BREAK determines the node farthest upstream from which it is receiving data (Node C), it then looks upstream for the next node that has been active (Node D). It knows that Node D must be active for Node C to transmit data. The program then identifies the break as being somewhere between Node D and the next active node. In this case, the break in the ring is at or after Node E.

Note

The node issuing a token may not be seen as active if it is running a version of the software earlier than Rev. 19.3 and is not configured to talk to the node on which FIND_RING_BREAK is being run. Therefore, the inactive nodes have to be taken into consideration.

Normally, a problem with a connector in the ring is the cause of the break. But occasionally, a defective PNC board or ring cable may be the cause.

Invoking FIND_RING_BREAK

T' syntax of the FIND_RING_BREAK command and an explanation of the options are shown be w.

$$\textbf{FIND\_RING\_BREAK} \left\{ \begin{array}{l} \textbf{-HELP} \\ \textbf{-INPUT filename} \end{array} \right\}$$

The -HELP option displays the syntax and describes the options of this command. -INPUT *filename* is the name of a file that contains the physical configuration of the ring. The default is no file.

Before invoking FIND_RING_BREAK, you may want to create an input file that describes the physical configuration of the ring.

The FIND_RING_BREAK Input File

Because ring nodes are not necessarily located either in sequence of node ID or in the sequence in which they are entered into the configurator, it is useful to tell FIND_RING_BREAK what the actual physical configuration of the ring is. You put this information into a file that FIND_RING_BREAK uses to specify the location of a break.

When you run FIND_RING_BREAK using an input file, FIND_RING_BREAK displays all the nodes specified in the file in the configuration sequence, beginning with the local node and going downstream. Down nodes, active nodes, and inactive nodes are listed. After this list, FIND_RING_BREAK prints the names of three nodes and an interpretation of where the break is. FIND_RING_BREAK assumes that the node names in the input file are correct; it does not check them.

When run without an input file, FIND_RING_BREAK does not attempt to interpret the location of the break. The program only prints the names of those nodes in the network configuration file that are active. The table below compares using FIND_RING_BREAK with and without an input file.

TABLE 12-1
FIND_RING_BREAK With and Without an Input File

Feature	Input File	No Input File
Shows actual configuration	Yes	No
Shows all configured nodes	Yes (if in file)	Yes
Lists inactive nodes	Yes	No
Displays node names	Yes	Configured nodes only
Displays node IDS	Yes	Yes
Interprets location of break	Yes	No
Lists active nodes	Yes	Yes
Lists down nodes	Yes	Yes

Creating the FIND_RING_BREAK Input File

The FIND_RING_BREAK input file describes the physical arrangement of the nodes on the ring. You create this file with any editor. The file may begin with any node. From that point on, you list the remaining nodes in the order in which the token travels around the ring from that first node. Include only one entry or line per node. On each line put the node ID and the node name. For example, use the ring shown in Figure 12-2 to construct a sample file.
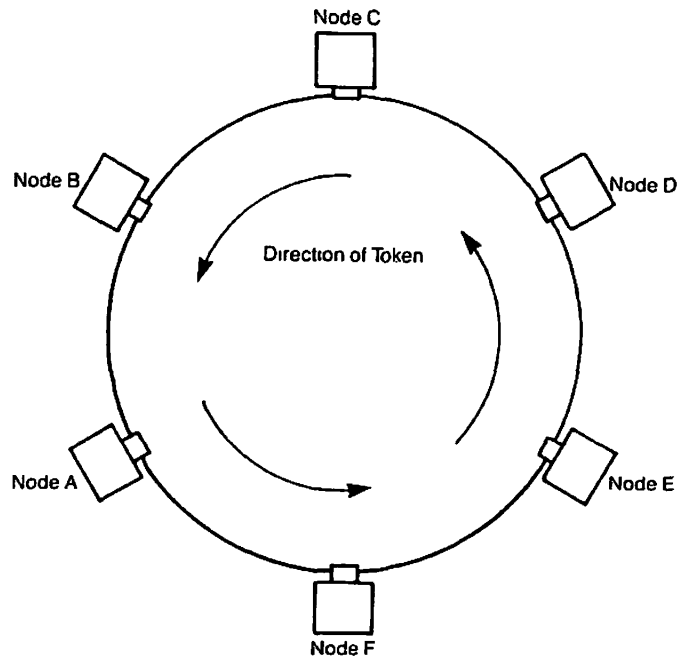
Figure 12-2
Sample Ring

Begin the file with the node ID and node name of Node A. Then enter the remaining nodes in the order in which data travel around the ring: Node F, Node E, Node D, Node C, and Node B. The example below shows how the file would look.

001 A
006 F
005 E
002 D
004 C
003 B

Node IDs must contain three digits. Leading zeros are required. Node names can contain a maximum of six alphanumeric characters. You must leave a space between the node number and name.

Invoking FIND_RING_BREAK With an Input File

If you invoke FIND_RING_BREAK with the –INPUT option, the program attempts to locate and read the specified input file.

If FIND_RING_BREAK is unable to read the specified input file, you are asked

```
Shall we continue without a file?   [YES/NO]
```

If you answer NO, the program ends. If you answer YES, FIND_RING_BREAK uses the information in the network configuration and proceeds as if no file was specified. Refer to the next section, Invoking FIND_RING_BREAK Without an Input File.

If FIND_RING_BREAK can read the input file, you are asked

```
Do You Want To Reset the Information? [YES/NO]
```

Normally, you answer NO to this prompt. If you suspect a break exists and FIND_RING_BREAK does not indicate it, you should wait several minutes before you reinvoke the program. Reset the FIND_RING_BREAK database only if repeated running of FIND_RING_BREAK shows that the network is up when the Ring Monitor or ring operation indicates that the ring is down. If you answer YES, FIND_RING_BREAK displays the current information, and then resets the database.

If you answer NO or press the RETURN key, FIND_RING_BREAK accesses its database, which contains the data on the current condition of the ring.

Note

If FIND_RING_BREAK successfully locates your node ID, it then prints out the following display. (nnn) indicates a 3-digit node ID. XXXXXX represents a 6-digit node name.

```
OK, FIND_RING_BREAK
Do You Want To Reset the Information? [YES/NO] NO
LIST OF NODES IN CONFIGURATION SEQUENCE
(nnn) XXXXXX - DOWN
(nnn) XXXXXX - INACTIVE
(nnn) XXXXXX - DOWN
(nnn) XXXXXX - DOWN
(nnn) XXXXXX - UP
****************
(nnn) XXXXXX
(nnn) XXXXXX
****** BREAK ******
(nnn) XXXXX
******************
Retry? [Y/N] N
```

Each time the program has printed 20 lines, it stops and prints the following message:

```
More - hit cr
```

If you wish to continue, press RETURN.

Invoking FIND_RING_BREAK Without an Input File

If you do not specify an input file with the –INPUT option, FIND_RING_BREAK uses the information in the network configuration, as shown here:

```
OK, FIND_RING_BREAK
Do You Want to Reset the Information? [YES/NO] YES
List of Active Nodes in Node Id Sequence
(nnn) - UP
(nnn) - UP
(nnn) - DOWN
(nnn) - UP
Retry? [Y/N] N
```

When you do not use an input file, FIND_RING_BREAK cannot attempt to specify the location of the break. You must now apply the information about which nodes are up and which are down to your specific physical configuration. Remember that the node that is issuing the token and not receiving data is shown as down.

FIND_RING_BREAK Error Messages

Two errors can occur when FIND_RING_BREAK attempts to read the database. Both of these errors cause FIND_RING_BREAK to discontinue the program and return to PRIMOS command level:

Ring Not Configured

The local node is not aware of the ring network.

Node Not In Ring

The local node is disconnected from the ring.

The LIST_LHC_STATUS Command

The LIST_LHC_STATUS command displays status information pertaining to a LAN Host Controller 300 (LHC300), a component of the Prime LAN300 network installation.

LIST_LHC_STATUS may be used to determine the integrity of an LHC that is attached to either the local host system or to a remote system on a LAN300 network to which the local host system is attached.

The LIST_LHC_STATUS command

- Provides identification and performance data on the LHC controller

- Summarizes and lists current connection data from the LHC controller

- Reports operating system and network management status information from the LHC controller

The syntax of the LIST_LHC_STATUS command is

LIST_LHC_STATUS [options]

The options to the LIST_LHC_STATUS command are described below.

–DEST_NODE_NAME host_name
–DNN

Identifies the host on which the LHC resides. *host_name* cannot be greater than 6 characters. You cannot use this option with the –DEST_NODE_ADDRESS option.

Use –DNN in combination with the –DEST_LHC_NUMBER option or with the –LAN_NAME option to identify a specific LHC on the host. If you do not specifically identify an LHC, the default LHC on the destination host is used.

–DEST_NODE_ADDRESS lhc_address
–DNA

Identifies the destination Local Area Network LAN300 address for the LHC. Specify *lhc_address* in either the short format, nn-nn-nn, or the long format, nn-nn-nn-nn-nn-nn, in hexadecimal, with or without leading zeros. When you use the short format, the standard Prime LAN300 address extension is added before the given address.

You cannot use this option with the –DEST_NODE_NAME, –DEST_LHC_NUMBER, or –LAN_NAME options.

–DEST_LHC_NUMBER lhc_number
–DLHC

Identifies the LHC on a particular node. When used with the –DEST_NODE_NAME option, –DEST_LHC_NUMBER identifies the target LHC on the network. *lhc_number* is an octal number and must be in the range 0 through 7, inclusive. You cannot use this option with the –LAN_NAME or –DEST_NODE_ADDRESS options. If you specify this option without the –DEST_NODE_NAME option, the LHC is assumed to be on the local host.

–LAN_NAME lan_name

–LN

Identifies the name of the Local Area Network (LAN300) to which the LHC is attached. *lan_name* identifies the LHC when the node address or the LHC number is not known. You cannot use this option with the –DEST_NODE_ADDRESS or the –DEST_LHC_NUMBER options. The maximum size of *lan_name* is 32 characters.

–PERFORMANCE

Selects the Performance screen, which displays information about the operational state of the host controller. Specifically, this screen identifies the controller, displays a comprehensive review of MAC and LLC statistics, and displays several operating system and error statistics. You cannot use this option with either the –CONNECTION or –MANAGEMENT options.

–CONNECTION connection_type

Selects the Connection screen. *connection_type* may be either PRIMENET or NTS. PRIMENET selects PRIMENET connection information. NTS selects NTS connection information. If you do not specify a *connection_type*, both types are selected.

The Connection screen presents a comprehensive review of all connections currently active on the controller and provides a higher layer view of controller activity than that given by the Performance screen.

Note

The amount of data displayed in the individual connection listing section for an LHC can be quite substantial, because of the maximum number of connections allowed. An LHC running both PRIMENET and NTS can have a maximum of 288 active connections at any one time (255 PRIMENET and 32 NTS). An LHC running PRIMENET exclusively can have a maximum of 255 active connections. An LHC running NTS exclusively can have a maximum active connection count of 128.

You cannot use this option with either the –PERFORMANCE or –MANAGEMENT options.

–MANAGEMENT

–MGMT

Selects the Management screen, which displays operating system and network management statistics pertinent to the current operation of the controller. The operating system statistics report current CPU utilization and I/O bus traffic rates as well as error conditions detected. The network management values report local management functions supported and alarms generated by individual applications.

You cannot use this option with either the –CONNECTION or the –PERFORMANCE options.

–ALL

Displays all the information provided by the –PERFORMANCE and –MANAGEMENT options and an overview of the information provided by the –CONNECTION option. The –ALL option is the default if you specify no screen option.

–HELP

Displays online information about the usage of this command and its options.

The LIST_LHC_COMMAND uses three screen formats: Performance, Connection, and Management. A sample of each screen type is shown below, along with explanations of the fields used in each screen.

The LIST_LHC_STATUS Performance Screen

The command line shown in Figure 12-3 after the prompt generates this Performance screen:

```
OK, LIST_LHC_STATUS -DEST_NODE_NAME HOST1 -DEST_LHC_NUMBER 2 -PERFORMANCE
[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>DOWN_LINE_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 12-3
LIST_LHC_STATUS Performance Screen

The fields in the Performance screen have the following meanings:

Field	Meaning
Host Name	The name of the local 50 Series host.
LHC Number	The logical controller number of the LHC on the local node that was specified with the −DLHC option of the LIST_LHC_STATUS command.
Address	The 48-bit LAN300 address of the LHC.
Hw/Fw Rev	Hardware and firmware revision levels of the LHC.
Slot Number	The slot number of the LHC in the backplane of the 50 Series host.
Device Address	The device address of the LHC entered in the CONFIG file.
State	The current condition of the LHC. OPERATIONAL is the only state used at this time.
Active Protocols	The communications protocols currently active on the LHC.
LAN Name	The name of the LAN300 to which this LHC is attached.
Load File	The filename of the LHC downline load file.
Load File Rev	The revision of the LHC downline load file.
Active connections	The number of link layer connections currently active on the LHC.
Frames transmitted	The number of link layer frames transmitted by the LHC.
Frames transmitted with error	The number of link layer frames transmitted by the LHC with error. Transmitted with error implies that while sending a frame the LHC detected a physical network error (for example, carrier loss, too many collisions and so on) and was forced to abort the transmission.
Frames retransmitted	The number of link layer frames retransmitted by the LHC. Frames are retransmitted by the link layer protocol because they were not received by the destination.
Frames received	The number of link layer frames received by the LHC.
Frames received with network (CRC/Alignment) error	The number of link layer frames received by the LHC with CRC or alignment errors. CRC and alignment errors are network error conditions that can be detected by the LHC.
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 necessary to receive frames, for example buffer space.
Percent CPU idle time	A percentage value indicating the amount of time that the LHC CPU is idle, that is not occupied processing network activity.

Current percent data buffer availability	A percentage value indicating the amount of data buffer space currently available for use on the LHC.
Lowest percent data buffer availability	A percentage value indicating the lowest amount of data buffer space available on the LHC since it began operation.
Alarms reported	The number of alarms reported by the LHC.

The LIST_LHC_STATUS Connection Screen

The command line shown in Figure 12-4 after the prompt generates this Connection screen:

```
OK, LIST_LHC_STATUS -DEST_NODE_ADDRESS 00-01-02  -CONNECTION
[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 12-4
LIST_LHC_STATUS Connection Screen

The fields in the Connection screen have the following meanings:

Field	*Meaning*
Host Name	The name of the local 50 Series host.
LHC Number	The logical controller number of the LHC on the local node that was specified with the −DLHC option of the LIST_LHC_STATUS command.
Address	The 48-bit LAN300 address of the LHC.

Current active connections	The number of link layer connections currently active on the LHC.
Current active multicast addr	The number of link layer multicast addresses currently active on the LHC.
Total connection count	A cumulative count of active connections on the LHC over total time.
Greatest connection count	The largest number of active connections on the LHC at any one time.
Primenet active connections	The number of PRIMENET link layer connections currently active on the LHC.
Primenet inactive connections	The number of PRIMENET link layer connections currently inactive on the LHC. An inactive connection identifies a configured host to which PRIMENET does not currently have an active connection.
NTS active connections	The number of NTS link layer connections currently active on the LHC.
NTS transitional connections	The number of NTS link layer connections currently in transition on the LHC. A transitional connection is currently in the connecting or disconnecting state and cannot be strictly counted as active.
ACTIVE CONNECTIONS	A list of currently active PRIMENET and NTS connections on the LHC.
Type	The type of the connection, that is PRIMENET or NTS.
State	The state of the connection, that is, Active, Connecting or Disconnecting.
Line no	The line number associated 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 will identify the remote 50 Series host and LHC number to which the connection is established. For NTS connections this field will identify the remote LTS and port number to which the connection is established.
Data Characters Tx/Rx	The number of data characters transmitted and received with respect to the LHC on the connection.

The LIST_LHC_STATUS Management Screen

The command line shown in Figure 12-5 after the prompt generates this Management screen:

```
OK, LIST_LHC_STATUS -DNN HOST1 -LAN_NAME LAN1 -MANAGEMENT
[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: 06.2%      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 12-5
LIST_LHC_STATUS Management Screen

The fields in the Management screen have the following meanings:

Field	Meaning
Host Name	The name of the local 50 Series host.
LHC Number	The logical controller number of the LHC on the local node that was specified with the –DLHC option of the LIST_LHC_STATUS command.
Address	The 48-bit LAN300 address of the LHC.
OPERATING SYSTEM STATISTICS	A set of statistics that relate to the LHC operating system.
Running Time	The running time of the LHC in days, hours, minutes and seconds.

Percent CPU Usage	A set of percentage values indicating the current CPU usage of the LHC. The CPU usage information is broken down into 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	A set of counts that record identifiable error conditions detected by the LHC operating system. The counts are categorized as Total, 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.
I/O Bus buffers Tx/Rx	The number of data buffers transmitted and received by the LHC across the active I/O bus connections.
I/O Bus commands Tx/Rx	The number of commands transmitted and received by the LHC across the active I/O bus connections.
I/O Bus bytes Tx/Rx	The number of data bytes transmitted and received by the LHC across the active I/O bus connections.
NETWORK MANAGEMENT STATISTICS	A set of statistics that relate to the LHC network management services.
Alarms reported	A set of counts that record alarm conditions reported on the LHC. The alarm counts are grouped as Logged, Suppressed, Dropped, Total, Operating System, LLC, Primenet, NTS and Network Management.
Primary management support	An indication of the primary network management responsibilities on the LHC. Management support includes MANAGEMENT NTS and PRIMENET.
Primary NTS support	An indication of the primary NTS services provided by the LHC. NTS support includes LOG, DUMP and BOOT services.

The LIST_LTS_STATUS Command

The LIST_LTS_STATUS command displays status information pertaining to a LAN Terminal Server (LTS), a component of the Prime LAN300 network installation. LIST_LTS_STATUS may be used to determine the integrity of an LTS attached to the network.

The LIST_LTS_STATUS command

- Provides identification and performance data from the LTS terminal server

- Summarizes and lists current connection data from the LTS terminal server

- Reports operating system and network management status information from the LTS terminal server

The format of the LIST_LTS_STATUS command is

LIST_LTS_STATUS [options]

The options to the LIST_LTS_STATUS command described below.

–DEST_NODE_NAME lts_name
–DNN

> Identifies the LTS by its name in the configuration file. *lts_name* cannot be greater than 16 characters. You cannot use this option with the DEST_NODE_ADDRESS option.

–DEST_NODE_ADDRESS lts_address
–DNA

> Identifies the destination Local Area Network (LAN300) address for the LTS. Specify *lts_address* in either the short format, nn-nn-nn, or the long format, nn-nn-nn-nn-nn-nn, in hexadecimal, with or without leading zeros. When you use the short format, the standard Prime LAN300 address extension is added before the given address. You cannot use this option with the DEST_NODE_NAME option.

–PERFORMANCE

> Selects the Performance screen, which displays information about the operational state of the terminal server. Specifically, this screen identifies the terminal server, displays a comprehensive review of MAC and LLC statistics, and displays several operating system and error statistics. You cannot use this option with either the –CONNECTION or –MANAGEMENT options.

–CONNECTION connection_type

> Selects the Connection screen. The Connection screen presents a comprehensive review of all connections currently active on the terminal server. This screen provides a higher layer view of server activity than that given by the Performance screen. You cannot use this option with either the –PERFORMANCE or –MANAGEMENT options.

–MANAGEMENT

> Selects the Management screen, which reports operating system and network management statistics pertinent to the current operation of the terminal server. The operating system statistics report current CPU utilization and error conditions detected. The network management values report local management functions supported and alarms generated by individual applications. You cannot use this option with either the –PERFORMANCE or –CONNECTION options.

–ALL

> Displays all the information provided by the –PERFORMANCE and –MANAGEMENT options and an overview of the information provided by the –CONNECTION option. The –ALL option is the default if you do not specify a screen option.

–HELP

Displays only information about the usage of this command and its options.

The LIST_LTS_STATUS command uses three screen formats. Eash of these formats is shown below, as well as descriptions of the fields for each screen.

The LIST_LTS_STATUS Performance Screen

The command line listed in Figure 12-6 after the prompt generates this Perfomance screen:

```
OK, LIST_LTS_STATUS -DEST_NODE_NAME LTS1 -PERFORMANCE
[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 12-6
LIST_LTS_STATUS Performance Screen

The fields in the Performance screen have the following meanings:

Field	Meaning
LTS Name	The name of the LAN300 Terminal Server (LTS).
Address	The 48-bit LAN300 address of the LTS.
Hw/Dia/Dll Rev	Hardware and diagnostic/downline load firmware revision levels of the LTS.
Active Ports	The number of ports that have an active connection established to a host.

State	The current condition of the LTS. OPERATIONAL is the only state used at this time.
Active Protocols	The communications protocols currently active on the LTS. NTS is the only active protocol on an LTS.
Booting Host	The name of the host that downline loaded the LTS with its executable image.
LAN Name	The name of the LAN300 to which this LTS is attached.
Load File	The filename of the LTS downline load file.
Load File Rev	The revision of the LTS downline load file.
Active connections	The number of link layer connections currently active on the LTS.
Frames transmitted	The number of link layer frames transmitted by the LTS.
Frames transmitted with error	The number of link layer frames transmitted by the LTS with error. Transmitted with error implies that while sending a frame the LTS detected a physical network error (for example, carrier loss, too many collisions and so on) and was forced to abort the transmission.
Frames retransmitted	The number of link layer frames retransmitted by the LTS. Frames are retransmitted the link layer protocol because they were not received by the destination.
Frames received	The number of link layer frames received by the LTS.
Frames receivedwith network (CRC/Alignment) error	The number of link layer frames received by the LTS with CRC or alignment errors. CRC and alignment errors are network error conditions that can be detected by the LTS.
Frames lost due to internal (resource) error	The number of link layer frames dropped by the LTS because it was unable to allocate the resources necessary to receive frames, for example buffer space.
Percent CPU idle time	A percentage value indicating the amount of time that the LTS CPU is idle, that is not occupied processing network activity.
Current percent data buffer availability	A percentage value indicating the amount of data buffer space currently available for use on the LTS.
Lowest percent data buffer availability	A percentage value indicating the lowest amount of data buffer space available on the LTS since it began operation.
Alarms reported	The number of alarms reported by the LTS.

The LIST_LTS_STATUS Connection Screen

The command line listed in Figure 12-7 after the prompt generates this Connection screen:

```
OK, LIST_LTS_STATUS -DEST_NODE_ADDRESS F8-00-11 -CONNECTION
[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/LHC02              357/204           00:02:06:45
Active   05     HOST1/LHC02              314/94            00:00:56:12
Active   06     HOST1/LHC02              85/58             00:00:00:34
OK,
```

Figure 12-7
LIST_LTS_STATUS Connection Screen

The fields in the Connection screen have the following meanings:

Field	Meaning
LTS Name	The name of the LAN300 Terminal Server (LTS).
Address	The 48-bit LAN300 address of the LTS.
Current active connections	The number of link layer connections currently active on the LTS.
Current active multicast addr	The number of link layer multicast addresses currently active on the LTS.
Total connection count	A cumulative count of active connections on the LTS over total time.
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 on the LTS.
State	The state of the connection, that is, Active, Connecting or Disconnecting.
Port	The port number on the LTS that is currently connected.
Remote Station	The remote station at the other end of the connection. This field will identify the remote 50 Series host and LHC number to which the NTS connection is established.
Data Characters Tx/Rx	The number of data characters transmitted and received with respect to the LTS on the 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 command line listed in Figure 12-8 after the prompt generates this Management screen:

```
OK, LIST_LTS_STATUS -DEST_NODE_NAME LTS1 -MANAGEMENT
[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: 02.7%        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 12-8
LIST_LTS_STATUS Management Screen

The fields in the Management screen have the following meanings:

Field	Meaning
LTS Name	The name of the LAN Terminal Server (LTS).
Address	The 48-bit LAN300 address of the LTS.
OPERATING SYSTEM STATISTICS	A set of statistics that relate to the LTS operating system.
Running Time	The running time of the LTS in days, hours, minutes and seconds.
Percent CPU Usage	A set of percentage values indicating the current CPU usage of the LTS. The CPU usage information is broken down into 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	A set of counts that record identifiable error conditions detected by the LTS operating system. The counts are categorized as Total, Correctable memory errors and Watchdog timer expired.
NETWORK MANAGEMENT STATISTICS	A set of statistics that relate to the LTS network management services.
Alarms reported	A set of counts that record alarm conditions reported on the LTS. The alarm counts are grouped as Logged, Suppresed, Dropped, Total, Operating System, LLC, NTS and Network Management.

The LOOPBACK Command

The LOOPBACK command sends test data packets between target components on the network and reports the network operation back to the network user. This loopback is accomplished while the network is online and is used to verify the integrity of the network software operation and the network path between target components.

The syntax of the LOOPBACK command is

LOOPBACK [options]

The loopback test is an echo operation: a source point sends a test message to a destination point which, in turn, echoes the packet back to the source. The two messages are then compared at the source and the results are reported to the user. You can add a third point to the loopback test so that the results are sent to a point that is different from the source point. This third point might be a network operator station from which validation is wanted on a communications path between two other end points.

The options to the LOOPBACK command are described below.

–DEST_LBK_LAYER loopback_layer

–DLL

Identifies the loopback layer at which the test packet will loop back. *loopback_layer* must have a value of either NMSR or NME. If you do not specify –DEST_LBK_LAYER, the default destination loopback layer depends on the destination node. If the destination node is an LTS, then the default destination loopback layer is the NME. If the destination node is a host, then the default destination loopback layer is the NMSR.

–DEST_LHC_NUMBER lhc_number

–DLHC

Identifies the LHC on a particular node. This option, used with the –DEST_NODE_NAME option, identifies the target LHC to which the test packet is sent. *lhc_number* is an octal number and must be in the range 0 through 7, inclusive. You cannot use this option with the –LAN_NAME and –DEST_NODE_ADDRESS options. If you do not use this option with the –DEST_NODE_NAME option, the specified LHC is assumed to be on the local host.

–DEST_NODE_ADDRESS node_address

–DNA

Specifies the destination network address for the LHC or LTS to which the test packet is sent. You may specify *node_address* in either the short format, nn-nn-nn, or the long format, nn-nn-nn-nn-nn-nn, in hexadecimal, with or without leading zeros. When you use the short format, the standard Prime LAN300 address extension is added before the given address.

You cannot use the –DEST_NODE_ADDRESS option with other options that define addresses in the network, for example, –DEST_NODE_NAME, –DEST_LHC_NUMBER, or –LAN_NAME.

–DEST_NODE_NAME node_name

–DNN

Identifies the node (either a host or an LTS) on which the test packet will loopback. *node_name* cannot be greater than 16 characters.

–LAN_NAME lan_name

–LN

Identifies the name of the Local Area Network (LAN300) to which the LHC and/or LTS is attached. Use the –LAN_NAME option to identify the LHC and/or LTS when no other information (for example, the node address, the LHC number, or the node name for an LTS) is known. You cannot use the –LAN_NAME option with the –DEST_NODE_ADDRESS, –DEST_LHC_NUMBER, –SRC_NODE_ADDRESS, or –SRC_LHC_NUMBER options.

–SRC_LBK_LAYER loopback_layer

–SLL

Identifies the loopback layer from which the test packet is sent. *loopback_layer* must have a value of either NMSR or NME. If you do not specify the –SRC_LBK_LAYER, the default source loopback layer depends upon the source node. If the source node is an LTS, then the default source loopback layer is the NME. If the source node is a host, then the default source loopback layer is the NMSR.

–SRC_LHC_NUMBER lhc_number

–SLHC

Identifies the LHC on a particular node. When you use this option with the –SRC_NODE_NAME option, the target LHC to which the test packet is sent is identified. *lhc_number* is an octal number and must be in the range 0 through 7, inclusive. You cannot use this option with the –SRC_NODE_ADDRESS or the –LAN_NAME options. If you use this option without specifying –SRC_NODE_NAME, it is assumed that the specified LHC is on the local host.

–SRC_NODE_ADDRESS node_address

–SNA

Specifies the network address for an LHC or LTS on the network from which the test packet is sent. Specify *node_address* in either the short format, nn-nn-nn, or the long format, nn-nn-nn-nn-nn-nn, in hexadecimal, with or without leading zeros. When you use the short form, the standard Prime LAN300 address extension is added before the given address.

You cannot use the –SRC_NODE_ADDRESS option with other options that define an address on the network, for example, –SRC_NODE_NAME, –SRC_LHC_NUMBER, or –LAN_NAME.

–SRC_NODE_NAME node_name

–SNN

Identifies the node (either an LHC or an LTS) from which the test packet is sent. *node_name* cannot be greater than 16 characters.

The –SRC_NODE_NAME option should be used with either the –SRC_LHC_NUMBER option or the –LAN_NAME option to specify an LHC or LTS. If you do not specify an LHC or LTS, then the default LHC or LTS will be determined by the local LAN300 Network Management database.

–HELP

Displays online information about the usage of this command and its options. You cannot use this option with any of the other options.

Figure 12-9 shows how to use 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-F8-00-14
Destination Loopback Layer: NME


Lan Name:                  LAN1


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


S:   AAAA5555AAAA55550101020204040808101020204040808O0FEFEFDFDFBFBF7F7EFEF


R:   AAAA5555AAAA55550101020204040000101020204040808O0FEFEFDFDFBFBF7F7EFEF
```

Figure 12-9
Use of the LOOPBACK Command

The fields in the LOOPBACK command have the following meanings:

Field	Meaning
Source Node Name	The name of the node that was the source of the loopback test. The node name may be either a Prime 50 series host or an LTS300. For LTS300 devices that are not configured, the string "-unconfigured-" is displayed.
Source LHC	The LHC number that was the source of the loopback test on the source node. The LHC number is a number between 0 - 7, inclusive. If the source node is an LTS300, the Source LHC field is not displayed.
Source Address	The network address of the device that was the source of the loopback test. The loopback test can be executed only over a LAN300 network; therefore the source device (either an LHC300 or LTS300) must have a network address.
Source Loopback Layer	The layer, at the Source Node Name, where the loopback test started from. The Source Loopback Layer can be either NMSR or NME. The NMSR layer signals that the loopback test started at the Network Management server on the source host. The NME layer signals that the loopback test started at the controller level (LHC or LTS) at the source node.

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Destination Node Name	The name of the node that was the destination of the loopback test. The node name may be either a Prime 50 series host or an LTS300. For LTS300 devices that are not configured, the string "-unconfigured-" is displayed.
Destination LHC	The LHC number that was the destination of the loopback test on the destination node. The LHC number is a number between 0 - 7, inclusive. If the destination node is an LTS300, the Destination LHC field is not displayed.
Destination Address	The network address of the device that was the destination of the loopback test. The loopback test can be executed only over a LAN300 network; therefore the destination device (either an LHC300 or LTS300) must have a network address.
Destination LoopbackLayer	The layer at the Destination Node Name where the loopback test was sent to and transposed back to the source node. The Destination Loopback Layer can be either NMSR or NME. The NMSR layer signals that the loopback test looped back at the Network Management server on the destination host. The NME layer signals that the loopback test looped back at the controller (LHC or LTS) level at the destination node.
Lan Name	The name of the LAN300 where the loopback test was performed.
Test Results	Shows 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 pattern sent was the same that was received.

COMPARISON ERROR

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

LENGTH ERROR

The length of the sent and received test patterns were not the same. Check the Bytes Sent and Bytes Received fields for the actual number of test pattern characters sent and received.

Bytes Sent

The number of test pattern bytes that were sent from the source node to the destination node.

Bytes Received

The number of test pattern bytes that were received at the source node from the destination node.

S: and R:

> The actual Sent and Received test patterns are displayed. Any discrepancies within the sent and received patterns are marked with a caret (^) indicator. If any of the test patterns exceed a certain limit, the end of the test pattern is appended with an ellipsis (...).

System Information and Metering Commands

The System Information and Metering (SIM) commands provide information about the state and performance of both standalone and networked systems. Many of the SIM commands provide information about the network as a whole. These are summarized below. Refer to the *DSM User's Guide* for a complete description of the SIM commands.

LIST_COMM_CONTROLLERS

> This command displays information on each controller on the system, including name, type, device address, the number of synchronous lines attached, and the number of asynchronous lines attached.

LIST_LAN_NODES

> This command displays information about LAN300 networks.

LIST_PRIMENET_LINKS

> This command displays the status of PRIMENET links, including the node or PSDN to which the link is connected, the number of active virtual circuits, and the link's availability for traffic routing.

LIST_PRIMENET_NODES

> This command displays all remote nodes configured by PRIMENET, the paths to those nodes, and the access rights to those paths.

LIST_PRIMENET_PORTS

> This command displays a system's port assignments.

LIST_SYNC

> This command displays the configuration of all enabled synchronous lines.

LIST_VCS

> This command displays the state of all virtual circuits.

You can use the –USAGE or –HELP options of these commands to see how to use them.

Appendices

A
START_NET and STOP_NET
Error Messages

This appendix contains the error messages that may occur while you are using the START_NET command and the STOP_NET command.

START_NET Error Messages

The START_NET error messages are listed below.

[nnnn Errors (Net_Init)]

If START_NET encounters errors, this message indicates how many errors are found. The network is not initiated.

Already exists. The network was already started. (START_NET)

You must use STOP_NET before restarting the network. The network is already in operation. You must stop the network with the STOP_NET command before restarting it on the local node.

Bad cache file block type!
Bad cache file status after read!
Bad cache file check sum!

These messages indicate that part of the cache file was unreadable. This may be due to a system crash or other interruption while START_NET was writing out the cache file. START_NET disregards the cache file and starts the network from the configuration source file.

Bad error code (NET_MSG)

START_NET has encountered an unfamiliar error code while reading configuration data into memory. The network is not initialized. The START_NET command you used may be from an earlier revision than the PRIMOS revision currently running on your system.

Cache is invalid. Proceeding from configuration master.

Do you wish to overwrite the cache file

(NO, YES)?

This message indicates that the cache file you specified either explicitly or implicitly in the START_NET command line may not have the expected format. You also may have specified the wrong file.

START_NET reads the global configuration file and starts the network, and will overwrite the cache file if you have so requested.

START_NET has set the PRIMOS severity code to indicate a WARNING.

Cache is obsolete. Proceeding from configuration master.

Cache will be updated!

The cache file, *cache*, that was specified (either explicitly or implicitly) in the START_NET command line is obsolete. This message usually means that someone has used CONFIG_NET to modify (or at least resave) the global configuration that generated this cache file. This modification occurred since the last time START_NET was run using the existing cache file.

START_NET reads the global configuration file and starts the network, overwriting the obsolete cache file. You need not take any action.

Cache not found, creating anew from configuration master.

The cache file, *cache*, that was specified (either explicitly or implicitly) in the START_NET command line does not exist. This condition is not considered an error. (If you expected the cache file to be found, check to be sure you entered the correct pathname.) START_NET reads the global configuration file and creates the cache file you specified, writing node-specific configuration data into it.

Cache update terminated, cache purged.

Cache update terminated, cache purged!

Either of these messages indicates that START_NET could not finish creating or overwriting the cache file *cache*. This condition may arise because of a file system error, in which case the message may be embedded in a PRIMOS file system error message.

START_NET closes the cache file. If START_NET was in the process of creating the cache file, START_NET attempts to delete the cache file that was being created. START_NET continues with network initialization but does not attempt to write data to a cache file.

Error: LHC number must be between 0-7.

The LHC number in the network configuration file was out of range.

Error: LHC line spec has an invalid name.

The LHC name in the network configuration file is invalid.

Error: No phantoms available to run the NMSr.

No phantoms were available when you invoked the START_NET command. Ensure that sufficient phantoms are configured before reinvoking START_NET.

Error: NMSr initialization failed. See the DSM log file.

The NMSr failed to intialize itself. If the DSM server is running, invoke the DISPLAY_LOG command and access the NMSr log file to determine the reason for the NMSr initialization failure.

Error: DSM is not up for the NMSr.

The NMSr could not establish a path to the DSM server. Ensure that the START_DSM command is invoked prior to the START_NET command.

Error: The NMSr COMI file is not found.

START_NET could not find the file NMSR.COMI in the NETWORK_MGT* top-level directory.

Error: Insufficient access rights to access the NMSr COMI file.

The ACLs for the user that invoked START_NET are incorrectly set. Only User 1 or ACL group .NETWORK_MGT$ can access this file.

Error: Timeout while waiting to establish a path to the NMSr.

START_NET timed out while waiting to establish a path to the NMSr.

Error: Timeout while waiting for the NMSr initialization results.

START_NET waited 60 seconds for the NMSr initialization results. If the DSM server is running, invoke the DISPLAY_LOG command and access the NMSr log file to determine the reason for the NMSr initialization failure.

Error: Failed to create a path to the NMSr. Reason: xxx.

START_NET failed to create a path to the NMSr.

Error: A PRIMOS "type" operation failed. Reason: xxx.

Identifies the PRIMOS operation that failed and the reason for the failure.

Error: Event synchronizer operation failed. Reason: xxx.

Identifies the synchronizer operation that failed and the reason for the failure.

Error: Failed to create config message for the NMSR. PRIMOS code: xxx.

START_NET failed to access the node status database.

Error: Unknown user called to start the NMSr.

Only START_NET or START_NTS can start the NMSr.

Error: No path to node <name> in <nn> steps. Either recompile the INDIRECT_CONNECT subroutine with a larger MAX_STEPS parameter, or change the data file. Connection ignored (Net_Init).

According to the network configuration, the local node and the node named in the error message are connected by a route-through connection. However, START_NET has determined that either the nodes are not physically connected, or they are *directly* connected rather than connected by Route-through, or the route-through path between them is too long (has too many nodes).

Error: PDN's not available with this version.

The PRINET product does not support PDNs.

Error: PNC line spec has an invalid name <net> -> <Node>/<Line>

Ring configuration was not completely specified.

Error: SMLC line spec has an invalid name "name"

The SMLC line number was either not configured or was configured as unknown.

The following error occurs occured while processing the cache file

This message is displayed when an error occurs during the processing of a cache file. A standard PRIMOS error message appears after this message. You can decide whether or not to overwrite the existing cache file based on the PRIMOS message. Sometimes these errors do not reflect the validity of the cache file. In these cases you need not overwrite the cache file.

Generated cache treename too long. Cache read aborted.
Proceeding from configuration master. Cache will NOT be updated!

The cache pathname that was generated form the global configuration file is too long (more than 32 characters). If you do not provide an explicit cache pathname, START_NET generates the pathname according to rules explained in Chapter 3, Starting and Stopping Network Programs. The generated cache pathname can be up to 14 characters longer than the configuration pathname specified in the START_NET command line. (For example, the default configuration pathname, PRIMENET*>PRIMENET.CONFIG, results in a cache pathname of PRIMENET*>PRIMENET.MYNODE.NCACHE if the node name is MYNODE.)

START_NET proceeds with network initialization as though you had not specified the –CACHE option.

Insufficient Access Rights. Only System User May Invoke This Command.

The START_NET command was issued from a terminal other than the supervisor terminal.

Insufficient Access Rights. Can't Attach to PRIMENET*

The ACLs for PRIMENET* are incorrectly set.

Insufficient Access Rights. PRIMENET*>NETWORK_SERVER.COMI

The ACLs for the server file are incorrectly set.

LAN/Host/LTS naming conflict.

This message indicates that NTS is already running on this system and there is a system or LAN300 naming conflict between the PRIMENET configuration file and the NTS configuration file. Either an LHC in the PRIMENET configuration file is associated with a different LAN300 name than the NTS configuration file, or a network name conflicts with a host name between the two configuration files.

LAN300 buffer init error, BHA "address" (EHFMAP) LAN300 buffer init error, BHA "address" (EHFPOST)

Internal data structures are not consistent.

LAN300 was not started, Network Mgmt not operating (EHFMAP)

You issued a START_NET command and the LAN300 could not be started.

LHC not configured in Primos CONFIG file.

The configuration file being used to start up the network indicates that this system is connected to a LAN300 via an LHC for which no PRIMOS configuration directive was given during cold start. The result is that START_NET does not start up that LAN300, but continues to bring up the rest of the network. The user must cold start the system with the CONFIG directive, downline load the LHC, then start up the network again to successfully start up the LAN300.

LHC not downline loaded.

The LHC specified in the configuration file to connect this system to a LAN300 has not been downline loaded successfully. START_NET does not configure that LAN300, but continues to bring up the rest of the network. The user must downline load the LHC, then start up the network again to successfully start up the LAN300.

LHC/LTS MAC address conflict.

There is a MAC address conflict between the PRIMENET and the NTS configuration files for this system.

LHC is down.

The LHC specified as being connected to this system is not operational.

Max addrs exceeded

Internal table space has been exceeded. Change the network configuration so that the local node has fewer connections to remote nodes (or has access to fewer remote nodes).

Max HCB's exceeded

Internal table space has been exceeded. Change the network configuration so that the local node has fewer connections to remote nodes (or has access to fewer remote nodes).

Max names exceeded

Internal table space has been exceeded. Change the network configuration so that the local node has fewer connections to remote nodes (or has access to fewer remote nodes).

No right to N$INIT (Net_Init) !

You attempted to start up the network from a terminal other than the supervisor terminal.

No room in alloc database

The network configuration is too big to fit into available memory. Try making the configuration smaller and contact your Customer Support Center. You may get several of these messages.

Node not in database!

The local system's name has not been defined in the network global configuration file.

Not Found. Can't Attach to PRIMENET*

START_NET could not find the PRIMENET* directory.

No Phantoms Available. Can't Start Network server.

No phantoms were available when the START_NET command was given. Ensure that sufficient phantoms are configured before reinvoking START_NET.

No Phantoms Available. Can't Start R-T server

No phantoms were available when the START_NET command was given. The Route-through server could not be started. Refer to the chapter on START_NET for a description of how to manually start RT_SERVER.

Not Found. PRIMENET*>RT.COMI

START_NET could not find the file RT.COMI.

Not Found. PRIMENET*>NETWORK_SERVER.COMI

START_NET could not find the file NETWORK_SERVER.COMI.

Object "pathname" is not a valid treename.

You explicitly specified a *config_pathname* or *cache_pathname* that was too long or contained illegal filename characters.

Operation Illegal on Directory. PRIMENET*>NETWORK_SERVER.COMI

NETWORK_SERVER.COMI was created as a directory instead of a file.

Operation Illegal on Directory. PRIMENET*>RT.COMI

RT.COMI was created as a directory instead of a file.

Specified nodename does not match the system name (START_NET) System name is <system_name>.

The node you specified with the –NODE option conflicts with the name that is specified with the SYSNAM directive in the configuration source file.

Too many paths specified

The maximum number of paths in the path table exceeded Ring 0 limits.

Unknown state: <state number>, (STARTNET.VALIDATE_CACHE)

If this message occurs, contact your Customer Support Center. Supply a complete description of the events leading up to the error and of your operating environment. Include the state number displayed in the message and copies of the cache and network configuration files. When this message occurs, START_NET terminates without initializing the environment. Until a solution can be found, use START_NET without the –CACHE option.

Unrecognized Internal Error Code: <error number>
(START_NET.VALIDATE_CACHE)

If this message occurs, contact your Customer Support Center. Supply a complete description of the events leading up to the error and of your operating environment. Include the error number displayed in the message and copies of the cache and network configuration files. When this message occurs, START_NET terminates without initializing the environment. Until a solution can be found, use START_NET without the –CACHE option.

Warning: HDX not supported at this rev.

Half-duplex is not supported at PRIMOS Revision 19.3.

Warning: LHC failed to return node pkt in <count> attempts (EHFMAP)

The LAN Host Controller (LHC300) has failed with either a hardware or software error. The LAN300 network will not operate.

Warning – node "<name" has an unspecified incoming HDX password.
It will become a default value.>

Since node *name's* incoming HDX password was not specified in the configuration file, a default value is supplied.

Warning: Node <name does not have a specified <type> password.
It will become a default value.>

The specified type is NPX or HDX. Since passwords were not specified in the configuration file, default values are supplied.

STOP_NET Error Messages

STOP_NET error messages are listed below.

Error: Insufficient access rights to access network management gates.

The ACLs for the user that invoked STOP_NET are incorrectly set. Only User 1 or ACL group .NETWORK_MGT$ can access these gates.

Error: Unknown user called to stop the NMSr.

Only STOP_NET or STOP_NTS can stop the NMSr.

The Network Is Not Started Up

The STOP_NET command was given on a node that was not running on the network.

No Right To Shutdown The Network

The STOP_NET command was given from a terminal other than the supervisor terminal.

B
START_NTS and STOP_NTS
Error Messages

This appendix contains the error messages that can occur while you are using the START_NTS command and the STOP_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.

STOP_NTS Error Messages

STOP_NET error messages are listed below.

Command aborted. (STOP_NTS)

You attempted to stop the Network Terminal Service and your response to **REALLY?** was other than **yes** or **YES**.

Error: Insufficient access rights to access network management gates.

The ACLs for the user that invoked STOP_NTS are incorrectly set. Only User 1 or ACL group .NETWORK_MGT$ can access these gates.

Error: Unknown user called to stop the NMSr.

Only STOP_NTS can stop the NMSr.

Insufficient access rights. (STOP_NTS)

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

Network Terminal Service is not currently running. (STOP_NTS)

You attempted to stop the Network Terminal Service when it was not currently running.

Network Terminal Service is not configured. (STOP_NTS)

You attempted to stop the Network Terminal Service when the NTS database was not initialized. This message occurs when you stop NTS with NTSUSR and NTSASL directives both set to 0.

NMSr is shutting down NTS service support.

NMSr stopped performing network management for NTS. This message indicates successful completion of STOP_NTS.

C
MONITOR_NET Error Messages

This appendix contains an alphabetical listing of the messages generated by MONITOR_NET. Messages that are specific to the Ring, Virtual Circuit, LAN300, or Synchronous Line Monitors are noted as such. Other messages may appear when you issue the MONITOR_NET command, when you specify numeric values (for example, when you change the period while MONITOR_NET is running), or at other times while MONITOR_NET is running. While MONITOR_NET is running, file system messages may also appear. Such messages are in the following format:

message (MONITOR_NET)

where *message* is the standard file system message.

All MONITOR_NET messages are displayed on line 24 of your terminal screen when MONITOR_NET is running. If MONITOR_NET has not yet started, the message appears on your teminal screen after the command that generated it. For example, a message such as

```
Error: Primos version must be 21.0 or greater  (MONITOR_NET)
```

will not be displayed on line 24 because no monitor was running when it occurred.

Note

Messages listed below exclusively in uppercase occur only when you are running a monitor. The other messages occur when you initiate MONITOR_NET from PRIMOS either interactively or as a phantom.

MONITOR_NET Messages

-HELP is not allowed for Phantom process. (MONITOR_NET)

You specified the –HELP option while running MONITOR_NET as a phantom.

ERROR: > 5 digits

You typed a value that is more than 5 digits long. This message appears before you type a terminator for the numeric input.

Error: -INPUT filename missing. (MONITOR_NET)

You specified the –INPUT option and did not specify the name of the input file.

Error: -OUTPUT file specified is a segment directory or ufd. (MONITOR_NET)

You specified a segment directory or lower-level directory as the name of an output file.

Error: -OUTPUT filename missing. (MONITOR_NET)

You specified the –OUTPUT option and did not specify a name for the output file.

Error: -PAGE_LENGTH only allowed with -REPORT option. (MONITOR_NET)

You specified –PAGE_LENGTH without specifying the –REPORT option.

Error:-PAGE_LENGTH must be at least 10. (MONITOR_NET)

You specified a page length of less than 10 lines.

Error: -REPORT filename missing. (MONITOR_NET)

You specified the –REPORT option and did not specify a name for the output file.

Error: -RESET_DAY not allowed with -INPUT (MONITOR_NET)

MONITOR_NET does not reset counts every 24 hours when reading data from an input file.

Error: -RESET_HOUR not allowed with -INPUT (MONITOR_NET)

MONITOR_NET does not reset counts on the hour when reading data from an input file.

Error: -SELECT_VC only allowed with the -REPORT option. (MONITOR_NET)

You specified –SELECT_VC without specifying the –REPORT option.

Error: -T is not a valid option. See -TIMES, -TTP or -TR options. (MONITOR_NET)

You specified –T as an option.

Error: .TERMINAL_TYPE$ global variable <type> is invalid. Specify <type> with command option -TERMINAL_TYPE. (MONITOR_NET)

The global variable .TERMINAL_TYPE$ is set to the invalid terminal type *type*. Type MONITOR_NET –HELP for a list of valid terminal types. Either use the –TERMINAL_TYPE option to override the .TERMINAL_TYPE$ value, or correct the .TERMINAL_TYPE$ value with the SET_VAR command.

Error: File < file_name> exists. Delete it or specify a new filename before resta :ing. (MONITOR_NET)

You specified a. existing file *file_name* in the –OUTPUT option while running MONITOR_NET as a phantom.

Error: Invalid disk record (toc large). <file_name> (MONITOR_NET)

This message is displayed when the monitor is unable to read in a record from the file *file_name* (specified with the –INPUT option) because the record is too large.

Error: Invalid entry for LAN300 screen type. (MONITOR_NET)

You specified –LAN300 with a screen option that is not allowed.

Error: Invalid entry for RING screen type. (MONITOR_NET)

You specified –RING with a screen option that is not allowed.

Error: Invalid entry for SYNC screen type. (MONITOR_NET)

You specified –SYNC with a screen option that is not allowed.

Error: Invalid PERIOD. period_value exceeds 86400. (MONITOR_NET)

You specified the –PERIOD option with a *period_value* that is greater than 86,400 (24 hours).

Error: Invalid PERIOD. period_value less than 1. (MONITOR_NET)

You specified the –PERIOD option with a *period_value* that is less than or equal to zero or with a missing *period_value*.

Error: Invalid time entry. (MONITOR_NET)

You specified an invalid time with the –SELECT_VC option.

Error: Invalid TIMES. times_value less than 1. (MONITOR_NET)

You specified the –TIMES option with a *times_value* that is less than 1 or with a missing *times_value*.

Error: LAN300 controller not configured. (MONITOR_NET)

You specified an unconfigured LAN300 while running MONITOR_NET as a phantom.

Error: Monitor name is not allowed when –INPUT is specified. (MONITOR_NET)

You specified a monitor name while running MONITOR_NET from an input file.

ERROR: NETWORK IS NOT RUNNING (MONITOR_NET)

The PRIMENET network is not configured. MONITOR_NET returns you to PRIMOS command level. (Ring, Virtual Circuit, LAN300, or Synchronous Line Monitor message.)

Error: Old revision of text file found. <file name> (MONITOR_NET)

MONITOR_NET read in an old version of the text file during initialization.

Error: Only one monitor name may be specified. (MONITOR_NET)

You specified more than one monitor (that is, more than one of the options –RING, –SYNC, LAN300, or –VIRTUAL).

ERROR: PERIOD >86400

You specified a period value that is greater than 24 hours (that is, 86,400 seconds) and is five or fewer digits long.

ERROR: Period < 1

You specified a period less than 1 (0 or negative).

ERROR: PERIOD REQUIRES NUMERIC INPUT, TYPE H FOR HELP

You typed P to change the period without specifying a number for the new period.

Error: PERIOD too high (exceeds 3600) for hourly reset. (MONITOR_NET)

You specified –RESET_HOUR and a period value greater than 3,600 seconds.

Error: Phantom process must specify –OUTPUT or –REPORT. (MONITOR_NET)

You did not specify the –OUTPUT option when running MONITOR_NET as a phantom.

Error: Phantom process must specify –TIMES. (MONITOR_NET)

You did not specify the –TIMES option when running MONITOR_NET as a phantom.

Error: Phantom process must specify monitor name. (MONITOR_NET)

You did not specify a monitor name (that is, one of the options –RING, –SYNC, or –VIRTUAL) when running MONITOR_NET as a phantom.

Error: Primos version must be 21.0 or greater (MONITOR_NET)

MONITOR_NET requires PRIMOS Revision 21.0 or greater. You are returned to PRIMOS command level.

Error: Record unrecognizable. <file_name> (MONITOR_NET)

MONITOR_NET is unable to read in a record from the file *file_name* (that you specified with the –INPUT option) because the record is not recognizable. For example, if you type

```
MONITOR_NET  -INPUT MY_FILE
```

and the file MY_FILE was not created by MONITOR_NET, then this message appears.

Error: Terminal type "type" is invalid. (MONITOR_NET)

You specified an invalid terminal type in a –TERMINAL_TYPE or –TTP option to the MONITOR_NET command. Type MONITOR_NET –HELP for a list of valid terminal types.

Error: Terminal type "type" only valid for phantoms. (MONITOR_NET)

You specified NO or NONE as the terminal type but are not running MONITOR_NET as a phantom.

Error: Text file <file name> could not be opened (MONITOR_NET)

Error: Text file <file name> could not be read (MONITOR_NET)

Error: Too many text strings in the text file <file name> (MONITOR_NET)

Error: Unable to load text file <file name> (MONITOR_NET)

The above messages indicate that there is a problem with the MONITOR_NET text file. Contact a representative from your Customer Support Center.

ERROR: UNABLE TO INITIALIZE PNC

If PRIMENET is unable to initialize the PNC, MONITOR_NET displays this message on line 24 of your terminal screen. A common reason for this error is that the PNC board is not fully plugged into the backplane of the machine so that the Ring 0 software is not able to communicate with the PNC board. Another reason (usually rare) is that there are no Ring 0 resources for the PNC (for example, there are no Direct Memory Access channels or no segment 0 windows). (Ring Monitor message.)

Error: Unable to read response. (MONITOR_NET)

If MONITOR_NET is unable to read the response to the question **Warning: File file_name exists. Do you want to write over it? Y/N?**, it displays this message and returns you to PRIMOS.

Error: VC screen types are not allowed on command line. (MONITOR_NET)

You specified a Virtual Circuit screen option from the PRIMOS command line. VC screen options are specified from within MONITOR_NET.

FILE DOES NOT CONTAIN TRACE DATA

The input file that you are displaying does not contain RINGNET trace data. (Ring Monitor or LAN300 Monitor message.)

INVALID COMMAND

You entered an invalid command from MONITOR_NET's main menu.

INVALID COMMAND: FILE INPUT NOT ENABLED

You typed I but had not enabled file input when you invoked MONITOR_NET.

INVALID COMMAND: FILE OUTPUT NOT ENABLED

You typed O but had not enabled file output when you invoked MONITOR_NET.

INVALID COMMAND DURING FILE INPUT

You tried to change monitors during file input; you are not allowed to move to other monitors during file input.

INVALID COMMAND DURING FILE OUTPUT

You entered a command that is not valid when using the –OUTPUT option.

INVALID COMMAND: type H for Help

You typed a command that is not included on the help screen for the current screen.

INVALID PERIOD

You entered an invalid period.

INVALID TERMINATOR

You typed a terminator other than those shown as valid on line 24.

INVALID TIME ENTRY

You entered an invalid time.

LAN300 CONTROLLER NOT CONFIGURED

You selected a LAN300 with a number for which there is no LAN300 configured.

LINE <x> NOT CONFIGURED

You selected the synchronous line with logical line number x and that logical line is not configured. This message appears if you specify the line number x as a parameter to the –SYNC option of the MONITOR_NET command or if you type D or C from inside the Synchronous Line Monitor to invoke the Detail or Configuration screens for the synchronous line x. (Synchronous Line Monitor message.)

NO SYNCHRONOUS LINES CONFIGURED

You invoked the Synchronous Line Monitor on a node that has no synchronous lines configured. (Synchronous Line Monitor message.)

ONLY 1 RING PNC

You typed numberD while in the Ring Monitor. You cannot specify a number with D in the Ring Monitor because MONITOR_NET supports only one Ring Monitor Detailed screen.

PNC II BOARD SCREEN NA"

The screen you selected is not available.

SOFTWARE ERROR: <additional message>

These messages indicates a MONITOR_NET software problem. Consult a representative from your Customer Support Center.

SPECIFY # FIRST

You specified a terminator without the required numeric input.

SPECIFY VCID FIRST

You did not specify any numeric input with a V or D terminator.

SYNC# <line_number> TOO HIGH

You specified a synchronous line number *line_number* that is greater than 7.

RING # OUT OF RANGE

You selected a ring number greater than 1.

TERMINATED BY COMPLETION OF #### TIMES (MONITOR_NET)

MONITOR_NET terminated because it executed the number of times that you specified in the command line with the –TIMES option.

Type MONITOR_NET –HELP for help (MONITOR_NET)

You can use this option from PRIMOS to display help text about MONITOR_NET.

VC <vcid> IS DISCONNECTED – TYPE V FOR VC OVERVIEW

This message is displayed if the virtual circuit with ID *vcid* is disconnected while you are viewing its Detailed screen. (Virtual Circuit Monitor message.)

VC# <vcid> NOT ACTIVE

You tried to view the Detailed screen for the virtual circuit with ID *vcid* and that virtual circuit is not active.

VC# <vcid> TOO HIGH

You specified a virtual circuit ID *vcid* that is greater than 63 with a V or D terminator.

VC# <vcid> TOO LOW

You specified a virtual circuit ID *vcid* that is less than 1 with a V or D terminator.

Warning: File <file_name> exists. Do you want to write over it? Y/N?

You specified the –OUTPUT option and the output file *file_name* already exists. If you answer Y, MONITOR_NET overwrites the file and continues; if you answer N (or Q), MONITOR_NET returns to PRIMOS. (This message appears only when MONITOR_NET is not running as a phantom.)

When –HELP option is specified, other options are ignored. (MONITOR_NET)

You specified the –HELP option along with other options. MONITOR_NET ignores the other options, displays this message, and displays the HELP file.

–HELP is not allowed for Phantom process. (MONITOR_NET)

You specified the –HELP option while using MONITOR_NET as a phantom.

D
FTS Error Messages

This appendix lists and explains the error messages produced by FTS. The messages are divided into sections as follows:

- General error messages that any FTS utility may produce.

- Messages produced by the FTOP utility. FTOP is the operator utility for starting and stopping FTS servers and the FTS manager (YTSMAN).

- Messages sent to the server, site, queue, and request log files. The server, site, and queue log files are configured optionally by the System Administrator through the FTGEN utility, as described in the *PRIMENET Planning and Configuration Guide*. These logs normally reside in the FTSQ* directory. A request log file is associated with a particular file transfer request. The user who submits the request creates the request log file by including the –LOG option on the FTR commmmand line. The messages in this section generally indicate the progress of FTR requests and the nature of any errors encountered while requests are processed.

- Messages sent to the command output file FTSQ*>YTSMAN.COMO, which is generated by the FTS manager phantom. These messages usually pertain to the FTS network or the files used by the manager phantom.

- Messages produced when FTS is initialized.

Some messages appear in more than one section.

General Error Messages

The following errors can occur in any of the FTS utilities.

Argument too long. (F$ARTL)

You specified an argument that was longer than the maximum allowed argument length.

Argument too short. (F$ARTS)

You specified an argument that was shorter than the minimum allowed argument length.

FTS not ready for use. (Q$QNRD)

The FTS database has not been initialized with the FTGEN INITIALIZE_FTS command.

No help is available on the subject xxxxxx

You have requested help regarding a topic for which online documentation is unavailable.

The FTS database is invalid. (Q$NVDB)

The FTS database has been corrupted, or an FTGEN INITIALIZE_FTS command has not been performed after FTS installation.

FTOP Error Messages

The following messages may occur when you are using the FTOP utility.

Bad chap command. (F$BCHP)

The most likely cause of this error is that FTOP attempted to CHAP the server phantom after the phantom had already failed.

Command must be invoked from system console. (F$SUSC)

You tried to start the manager from a terminal other than the supervisor terminal.

Failed to phantom manager.

FTOP was unable to start the manager as a phantom. This message should be accompanied by one or more PRIMOS file system messages indicating the cause of the problem. Check the manager COMOUTPUT file, FTSQ*>YTSMAN.COMO, which may contain additional useful messages.

Failed to phantom server.

FTOP was unable to start the server as a phantom. This message should be accompanied by one or more PRIMOS file system messages that indicate the cause of the problem. Check the server log file in the FTSQ* directory for additional useful messages. (The server log file is configured and named by the System Administrator through the FTGEN utility.)

FTS manager already notified to close down. (F$MNAC)

You tried to stop the FTS manager (YTSMAN) with the –STOP_MNGR command, but it has already been notified to stop with a previous FTOP –STOP_MNGR command.

Manager NOT notified to stop.

This message should be accompanied by one or more PRIMOS file system messages indicating the cause of the problem.

No servers configured.

No FTS servers are configured.

Not found <xxx>.

Server *xxx* (where *xxx* is the server name) has not been configured. Use the FTGEN ADD_SERVER command to configure the server.

Problem opening named semaphore.

This message should be accompanied by one or more PRIMOS file system messages indicating the cause of the problem. If the problem recurs and the accompanying messages do not provide enough explanation, contact your Prime Customer Support representative. The semaphore mentioned is the file semaphore used for communication with the manager process. Semaphores are described in the *Subroutines Reference Guide, Volume III*.

Problem reading value of named semaphore.

This message should be accompanied by one or more PRIMOS file system messages indicating the cause of the problem. If the problem recurs and the accompanying messages do not provide enough explanation, contact your Prime Customer Support representative. The semaphore mentioned is the file semaphore used for communication with the manager process. Semaphores are described in the *Subroutines Reference Guide, Volume III*.

Problem when zeroising value of named semaphore.

This message should be accompanied by one or more PRIMOS file system messages indicating the cause of the problem. If the problem recurs and the accompanying messages do not provide enough explanation, contact your Prime Customer Support representative. The semaphore mentioned is the file semaphore used for communication with the manager process. Semaphores are described in the *Subroutines Reference Guide, Volume III*.

Problem with status file.

This message should be accompanied by one or more PRIMOS file system messages indicating the cause of the problem. Check to be sure the correct FTS-related access rights are assigned. Also check to be sure that the disk containing FTSQ* is not full, and that the quotas on FTSQ* and its disk are set to appropriate values.

Server already running. (F$SRDL)

You tried to start a server that has already been started.

Server link is not active. (F$SLNA)

You tried to abort a server link that is not active. Use the FTOP –LIST_SRVR_STS command to see which links are active.

Text follows last argument. (F$TFLA)

The argument to a particular command contains extra text. For example, if you invoke the following command

FTOP -STOP_MNGR FRED

the FTOP -STOP_MNGR command is acceptable, but FRED should not be there, as -STOP_MNGR does not require an argument.

The FTS manager is not running. (F$MNOR)

You tried to stop the manager, but it is already inactive. To start the manager, use the FTOP -START_MNGR command.

The manager has not been started up from the system console and thus is *not* running under its proper user name. Stop the manager using the FTOP -STOP_MNGR command. Then start the manager again using the FTOP -START_MNGR command from the supervisor terminal.

The server is not running. (F$SNOR)

You tried an FTOP -STOP_SRVR, -ABND_SRVR, or -ABRT_SRVR_LINK command when the server was not running.

This server has not been started up from the system console and thus is NOT running under its proper user name. It has also not had its configured priority or timeslice set. Stop the server using the FTOP -STOP_SRVR command. Then start the server again using the FTOP -START_SRVR command from the supervisor terminal.

Unexpected named semaphore value. (F$UNSV)

This error, although extremely unlikely, may appear after an FTOP -STOP_MNGR command. If it does appear, the FTS manager (YTSMAN) fails to stop. Inform your System Administrator, who can stop the manager by logging out the YTSMAN phantom. The semaphore mentioned is the file semaphore used for communication with the manager process. Semaphores are described in the *Subroutines Reference Guide, Volume IV.*

Unknown option. (F$UNOP)

You specified an unknown option in the command line. For example, the following is an invalid FTOP option:

FTOP UNICORN

You do not have operator privileges. (F$NOPP)

You attempted to invoke the FTOP command while not logged in as SYSTEM. You must log in as SYSTEM to use the FTOP command.

Messages Sent to the Server, Site, Queue, and Request Log Files

The following messages are sent to the server log file and also to the relevant queue, site, and request logs if they exist. Many of these messages indicate the progress of FTR requests and the nature of any errors encountered while requests are processed. Requests are often retried after these messages appear.

Except where otherwise noted, each of these messages can be caused by a variety of file system problems. Each message is usually accompanied by one or more PRIMOS messages indicating the specific file system problem. If the problem recurs and the accompanying messages do not provide enough explanation, contact your Customer Support Center.

Can't create subsystem from remote node.

Refer to the general comments at the beginning of this section.

Can't submit to queue.

Refer to the general comments at the beginning of this section.

Database locking mechanism error.

Refer to the general comments at the beginning of this section.

Dynamic memory allocation error.

Refer to the general comments at the beginning of this section.

Error modifying server entry

Refer to the general comments at the beginning of this section.

Error reading server entry

Refer to the general comments at the beginning of this section.

Error reading server queue

Refer to the general comments at the beginning of this section.

Error when positioning to end of queue log file

Check to be sure the correct FTS-related access rights are assigned. Also check to be sure that the disk containing FTSQ* is not full, and that the quotas on FTSQ* and its disk are set to appropriate values.

Failed to initialise the lock/status file

Refer to the general comments at the beginning of this section.

Failed to open the queue log file

Check to be sure the correct FTS-related access rights are assigned. Also check to be sure that the disk containing FTSQ* is not full, and that the quotas on FTSQ* and its disk are set to appropriate values.

Failed to open the server lock file

Check to be sure the correct FTS-related access rights are assigned. Also check to be sure that the disk containing FTSQ* is not full, and that the quotas on FTSQ* and its disk are set to appropriate values.

Failed to open the server log file

Check to be sure the correct FTS-related access rights are assigned. Also check to be sure that the disk containing FTSQ* is not full, and that the quotas on FTSQ* and its disk are set to appropriate values.

FTS not ready for use.

The FTS database has not been initialized with the FTGEN INITIALIZE_FTS command.

Home ufd required.

Refer to the general comments at the beginning of this section.

Illegal address.

Refer to the general comments at the beginning of this section.

Item already modified by another user.

Refer to the general comments at the beginning of this section.

Item not found.

Refer to the general comments at the beginning of this section.

Item not modified.

Refer to the general comments at the beginning of this section.

Item not queued.

Refer to the general comments at the beginning of this section.

Item status not changed.

Refer to the general comments at the beginning of this section.

Local procedure error.

Refer to the general comments at the beginning of this section.

Message deleted, please rescan.

Refer to the general comments at the beginning of this section.

NETMAN server is not running (locally or remotely).

Check the STATUS USERS list to see if NETMAN is running on the local system. If NETMAN is not running locally, issue the STOP_NET command and then restart the network using the START_NET command, as described in Chapter 3. If NETMAN is running on the local system, then the problem is probably on the remote system. FTS should retry the request until the remote system is available.

Network error – <error code>

A network error has occurred. The error code is returned by one of the IPCF subroutines.

No more messages.

Refer to the general comments at the beginning of this section.

No queue available for item.

Refer to the general comments at the beginning of this section.

No queues configured.

You attempted to list all the queues, but none were configured. Ask your System Administrator about your system's current FTS configuration.

Parameter out of range.

Refer to the general comments at the beginning of this section.

Parameter required.

Refer to the general comments at the beginning of this section.

Parameter restricted.

Refer to the general comments at the beginning of this section.

Problem assigning server port

Refer to the general comments at the beginning of this section.

Problem modifying server configuration.

Refer to the general comments at the beginning of this section.

Problem reading server configuration.

Refer to the general comments at the beginning of this section.

Problem with Route-through call request.

Refer to the general comments at the beginning of this section.

Queue blocked.

You tried to submit a request to a queue that has been blocked with the FTGEN BLOCK_QUEUE command. The queue must be unblocked with the FTGEN UNBLOCK_QUEUE command so that requests can be accepted.

Queue does not exist.

The specified queue has not been configured with FTGEN.

Queue full.

The request queue is full.

Queue recently compressed.

Refer to the general comments at the beginning of this section.

Queue status not changed.

Refer to the general comments at the beginning of this section.

Remote Service is not running.

FTS should retry the request until remote service is available.

Remote system has no free users.

FTS should retry the request until remote service is available.

Remote system is busy.

FTS should retry the request until remote service is available.

Remote system is down.

FTS should retry the request until the remote system is available.

Remote system is not fully up.

FTS should retry the request until the remote system is available.

Request not applicable.

Refer to the general comments at the beginning of this section.

Route-through circuit timeout.

Refer to the general comments at the beginning of this section.

Route-through node has insufficient system memory.

Refer to the general comments at the beginning of this section.

Route-through protocol error.

Refer to the general comments at the beginning of this section.

Route-through server is not running.

The Route-through server, RT_SERVER, is not running.

Server queue not configured

The specified server queue is not configured. Use the FTGEN ADD_QUEUE command to add the queue to the configuration.

Shared memory is full.

Refer to the *System Administrator's Guide, Volume I* for information on managing shared memory.

The FTS database is invalid.

The FTS database has been corrupted, or an FTGEN INITIALIZE_FTS command has not been performed after FTS installation.

Timeout on call request to remote system.

This message indicates a network error. FTS may retry the request successfully.

Timeout on clear request to remote system.

This message indicates a network error. FTS may retry the request successfully.

Timeout on reset request to remote system.

This message indicates a network error. FTS may retry the request successfully.

Unable to create temporary file.

The number of temporary files in the FTSQ* directory may have reached the maximum number as a result of queued requests. The operator should investigate the possibility of any old requests being canceled. In addition, check to be sure the correct FTS-related access rights are assigned. Also check to be sure that the disk containing FTSQ* is not full, and that the quotas on FTSQ* and its disk are set to appropriate values.

Messages Sent to the Manager Command Output File

The following messages are sent to the command output file FTSQ*>YTSMAN.COMO, which is generated by the FTS manager phantom. Except where otherwise noted, each of these messages can be caused by a variety of file system problems. A message caused by a file system problem is accompanied by one or more PRIMOS messages indicating the problem. The various FTS log files may contain additional useful information. If the problem recurs and the accompanying messages do not provide enough explanation, contact your Prime Customer Support representative. Note that, especially in the case of network errors, FTR usually retries the request.

Can't create subsystem from remote node.

Refer to the general comments at the beginning of this section.

Can't submit to queue.

Refer to the general comments at the beginning of this section.

Circuit cleared by network

Refer to the general comments at the beginning of this section.

Circuit reset by network

The virtual circuit has been reset. Refer to the general comments at the beginning of this section.

Database locking mechanism error.

Refer to the general comments at the beginning of this section.

Dynamic memory allocation error.

Refer to the general comments at the beginning of this section.

FTS not ready for use.

The FTS database has not been initialized with the FTGEN INITIALIZE_FTS command.

Home ufd required.

Refer to the general comments at the beginning of this section.

Illegal address.

Refer to the general comments at the beginning of this section.

Item already modified by another user.

Refer to the general comments at the beginning of this section.

Item not found.

Refer to the general comments at the beginning of this section.

Item not modified.

Refer to the general comments at the beginning of this section.

Item not queued.

Refer to the general comments at the beginning of this section.

Item status not changed.

Refer to the general comments at the beginning of this section.

Local procedure error.

Refer to the general comments at the beginning of this section.

Message deleted, please rescan.

Refer to the general comments at the beginning of this section.

NETMAN server is not running (locally or remotely).

Check the STATUS USERS list to see if NETMAN is running on the local system. If NETMAN is not running locally, issue the STOP_NET command and then restart the network using the START_NET command, as described in Chapter 3. If NETMAN is running on the local system, then the problem is probably on the remote system. FTS should retry the request until the remote system is available.

Network error - <error code>

A network error has occurred. The error code is returned by one of the IPCF subroutines.

No more messages.

Refer to the general comments at the beginning of this section.

No queue available for item.

Refer to the general comments at the beginning of this section.

No queues configured.

You attempted to list all the queues, but none were configured. Ask your System Administrator about your system's current FTS configuration.

Parameter out of range.

Refer to the general comments at the beginning of this section.

Parameter required.

Refer to the general comments at the beginning of this section.

Parameter restricted.

Refer to the general comments at the beginning of this section.

Problem reading value of named semaphore.

The semaphore mentioned is the file semaphore used for communication with the manager process. Semaphores are described in the *Subroutines Reference Guide, Volume III.*

Problem with Route-through call request.

Refer to the general comments at the beginning of this section.

Protocol error – bad Transport System message

This message may not indicate a problem, unless it occurs during the processing of a request. If a request is affected, a serious internal error has been detected. Contact your Customer Support Center.

Protocol error – unexpected Transport System message

This message may not indicate a problem, unless it occurs during the processing of a request. If a request is affected, a serious internal error has been detected. Contact your Customer Support Center.

Queue blocked.

You tried to submit a request to a queue that has been blocked with the FTGEN BLOCK_QUEUE command. The queue must be unblocked with the FTGEN UNBLOCK_QUEUE command so that requests can be accepted.

Queue does not exist.

The specified queue has not been configured with FTGEN.

Queue full.

The request queue is full.

Queue recently compressed.

Refer to the general comments at the beginning of this section.

Queue status not changed.

Refer to the general comments at the beginning of this section.

Remote Service is not running.

FTS should retry the request until remote service is available.

Remote system has no free users.

FTS should retry the request until remote service is available.

Remote system is busy.

FTS should retry the request until remote service is available.

Remote system is down.

FTS should retry the request until the remote system is available.

Remote system is not fully up.

FTS should retry the request until the remote system is available.

Request not applicable.

Refer to the general comments at the beginning of this section.

Route-through circuit timeout.

Refer to the general comments at the beginning of this section.

Route-through node has insufficient system memory.

Refer to the general comments at the beginning of this section.

Route-through protocol error.

Refer to the general comments at the beginning of this section.

Route-through server is not running.

The Route-through server, RT_SERVER, is not running.

Shared memory is full.

Refer to the *System Administrator's Guide, Volume I* for information on managing shared memory.

The FTS database is invalid.

The FTS database has been corrupted, or an FTGEN INITIALIZE_FTS command has not been performed after FTS installation.

Timeout on call request to remote system.

This message indicates a network error. FTS may retry the request successfully.

Timeout on clear request to remote system.

This message indicates a network error. FTS may retry the request successfully.

Timeout on reset request to remote system.

This message indicates a network error. FTS may retry the request successfully.

Unable to create temporary file.

The number of temporary files in the FTSQ* directory may have reached the maximum number as a result of queued requests. The operator should investigate the possibility of any old requests being canceled. In addition, check to be sure the correct FTS-related access rights are assigned. Also check to be sure that the disk containing FTSQ* is not full, and that the quotas on FTSQ* and its disk are set to appropriate values.

Messages Produced When FTS Is Initialized

The following messages may appear when the System Administrator initializes FTS. Each message should be accompanied by one or more PRIMOS file system messages indicating the cause of the problem. For example, it might be that a disk is full, or that quotas or access rights are not assigned correctly. If file system messages do not appear, it is possible that FTS was installed or shared incorrectly; the System Administrator may need to perform these tasks again. The FTS log files may contain additional useful information. If the accompanying messages do not provide enough explanation, and resharing and reinstalling FTS do not solve the problem, contact your Prime Customer Support representative.

Failed to attach to home directory

Check to be sure the correct FTS-related access rights are assigned. Also check to be sure that the disk containing FTSQ* is not full, and that the quotas on FTSQ* and its disk are set to appropriate values.

Failed to initialise histogram portion of shared memory

Refer to the general comments at the beginning of this section.

Failed to initialize the FTS database

Refer to the general comments at the beginning of this section.

Failed to close lock file

Check to be sure the correct FTS-related access rights are assigned. Also check to be sure that the disk containing FTSQ* is not full, and that the quotas on FTSQ* and its disk are set to appropriate values.

Failed to close server ufd

Check to be sure the correct FTS-related access rights are assigned. Also check to be sure that the disk containing FTSQ* is not full, and that the quotas on FTSQ* and its disk are set to appropriate values.

Failed to open lock file

Check to be sure the correct FTS-related access rights are assigned. Also check to be sure that the disk containing FTSQ∗ is not full, and that the quotas on FTSQ∗ and its disk are set to appropriate values.

Failed to open server ufd

Check to be sure the correct FTS-related access rights are assigned. Also check to be sure that the disk containing FTSQ∗ is not full, and that the quotas on FTSQ∗ and its disk are set to appropriate values.

Failed to read histogram

Refer to the general comments at the beginning of this section.

Failed to set read/write locks

Check to be sure the correct FTS-related access rights are assigned. Also check to be sure that the disk containing FTSQ∗ is not full, and that the quotas on FTSQ∗ and its disk are set to appropriate values.

Failed to update histogram portion of shared memory

Refer to the general comments at the beginning of this section.

Problem opening lock file

Check to be sure the correct FTS-related access rights are assigned. Also check to be sure that the disk containing FTSQ∗ is not full, and that the quotas on FTSQ∗ and its disk are set to appropriate values.

E
LAN300 Network Management Error Messages

This appendix provides a list and description of error messages that may occur when you use LAN300 Network Management commands.

Insufficient access rights to invoke this command.

The command was invoked by an unauthorized user. Only User 1 or users that are configured for .NETWORK_MGT$ ACL group are authorized to invoke this command.

The Network Management Server is not running.

The command is unable to continue processing because the local Network Management server (NM_SERVER) is not running. Make sure that PRIMENET (configured for LAN300) or NTS is currently executing before invoking a Network Management command.

No response from the local Network Management Server.

A timeout occurred while waiting for a response from the local Network Management server (NM_SERVER).

Synchronizer operation failed, reason code: <number>.

A failure occurred during execution of a PRIMOS synchronizer routine.

Inter Server Communications operation failed, reason code: <number>.

A failure occurred during execution of a PRIMOS Inter Server Communications routine.

Node status database operation failed, reason code: <number>.

A failure occurred during execution of PRIMOS node status database routine. To use a Network Management command, make sure that PRIMENET (configured for LAN300) or NTS is started.

Internal system error.

A failure occurred during the execution of a PRIMOS routine.

Internal failure <number>.

An internal PRIMOS error. Retry the command.

No help available.

The command's help file is missing.

Option(s) <bad_option> not recognized by this command.

Invalid options were encountered by a particular Network Management command.

Cannot use source node name and address options together.

A source node name and source node address cannot be specified together. Enter either a source node name or source node address option, but not both.

Cannot use destination node name and address options together.

A destination node name and destination node address cannot be specified together. Enter either a destination node name or destination node address option, but not both.

Cannot specify LHC number and node address options together.

A source LHC number and source node address or destination LHC number and destination node address cannot be specified together. Enter either an LHC number option or a node address option for the same node.

Cannot specify LAN name and LHC number options together.

Entering a LAN name along with a source or destination LHC number is invalid. Issue either one or the other.

Cannot specify LAN name and node address options together.

Entering a LAN name along with a source or destination node address is invalid. Issue either one or the other.

Either a destination name or address must be entered.

Either the destination node name or destination node address option must be specified.

Cannot use screen options together.

When the LIST_LHC_STATUS or LIST_LTS_STATUS is invoked, either the performance (-PERF), connection (-CONN), or configuration (-CNFG) must be specified.

Node name must be entered when a node name option is used.

A valid node name must be entered whenever the source or destination node name options are used. LTS source and destination node names must begin with an alphabetic character and consist of a set of 1-16 legal characters. Host source and destination node names must begin with an alphabetic character and consist of a set of 1-6 legal characters. The set of legal characters are the letters A-Z, the digits 0-9, the period, underscore, and the characters - # $ * / &.

Node name length is invalid.

The specified source or destination node name must be 16 characters or less. LTS source and destination node names must begin with an alphabetic character and consist of a set of 1-16 legal characters. Host source and destination node names must begin with an alphabetic character and consist of a set of 1-6 legal characters. The set of legal characters are the letters A-Z, the digits 0-9, the period, underscore, and the characters - # $ * / &.

Invalid node name, the first character must be alphabetic.

The specified source or destination node name contains an illegal first character. LTS source and destination node names must begin with an alphabetic character and consist of a set of 1-16 legal characters. Host source and destination node names must begin with an alphabetic character and consist of a set of 1-6 legal characters. The set of legal characters are the letters A-Z, the digits 0-9, the period, underscore, and the characters - # $ * / &.

Invalid node name, it contains illegal characters.

The specified source or destination node name contains any number of illegal characters. LTS source and destination node names must begin with an alphabetic character and consist of a set of 1-16 legal characters. Host source and destination node names must begin with an alphabetic character and consist of a set of 1-6 legal characters. The set of legal characters are the letters A-Z, the digits 0-9, the period, underscore, and the characters - # $ * / &.

Host name is invalid.

The specified source or destination host name only is invalid. Host source and destination node names must begin with an alphabetic character and consist of a set of 1-6 legal characters. The set of legal characters are the letters A-Z, the digits 0-9, the period, underscore, and the characters - # $ * / &.

LHC number must be entered when an LHC number option is used.

A valid LHC number must be entered whenever the source or destination LHC options are used. LHC numbers must be in the range 0-7, inclusive.

LHC number must be in the range 0 - 7.

The specified source or destination LHC number did not fall within the valid range of LHC numbers. LHC numbers must be in the range 0-7, inclusive.

LHC number not configured.

The specified LHC number is not configured for any service.

LHC number not configured for the specified LAN.

The LHC number is not configured for the specified LAN. Find another LHC that is configured for the desired LAN.

Node address must be entered when a node address option is used.

A valid node address must be entered whenever the source or destination node address options are used. Source and destination node addresses can be entered in either of the following formats:

short form: xx-xx-xx
long form: xx-xx-xx-xx-xx-xx

Each *x* is a hexadecimal number in the range 0-F. For the pair *xx*, leading zeroes are not necessary. When the short form is used, the standard Prime LAN300 prefix 08-00-2F is automatically added before the given address.

Node address must be in hexadecimal digits.

The specified source or destination node address must consist of hexadecimal digits. Source and destination node addresses can be entered in either of the following formats:

short form: xx-xx-xx
long form: xx-xx-xx-xx-xx-xx

Each *x* is a hexadecimal number in the range 0-F. For the pair *xx*, leading zeroes are not necessary. When the short form is used, the standard Prime LAN300 prefix 08-00-2F is automatically added before the given address.

Bad node address format.

The specified source or destination node address does not conform to a valid format. Source and destination node addresses can be entered in either of the following formats:

short form: xx-xx-xx
long form: xx-xx-xx-xx-xx-xx

Each *x* is a hexadecimal number in the range 0-F. For the pair *xx*, leading zeroes are not necessary. When the short form is used, the standard Prime LAN300 prefix 08-00-2F is automatically added before the given address.

Bad node address, the first 6 hex digits must be 08-00-2F.

When using the long form, the specified source or destination node address must begin with the standard Prime LAN300 address 08-00-2F. Source and destination node addresses can be entered in either of the following formats:

short form: xx-xx-xx
long form: xx-xx-xx-xx-xx-xx

Each *x* is a hexadecimal number in the range 0-F. For the pair *xx*, leading zeroes are not necessary. When the short form is used, the standard Prime LAN300 prefix 08-00-2F is automatically added before the given address.

LAN name must be entered when the LAN name option is used.

A valid LAN name must be entered whenever the LAN name (–LAN_NAME) option is used. A LAN name must begin with an alphabetic character and consist of a set of 1-16 legal characters. The set of legal characters are the letters A-Z, the digits 0-9, the period, underscore, and the characters - # $ * / &.

LAN name length is invalid.

The specified LAN name must be 16 characters or less. A LAN name must begin with an alphabetic character and consist of a set of 1-16 legal characters. The set of legal characters are the letters A-Z, the digits 0-9, the period, underscore, and the characters - # $ * / &.

Invalid LAN name, the first character must be alphabetic.

The specified LAN name contains an illegal first character. A LAN name must begin with an alphabetic character and consist of a set of 1-16 legal characters. The set of legal characters are the letters A-Z, the digits 0-9, the period, underscore, and the characters - # $ * / &.

Invalid LAN name, it contains illegal characters.

The specified LAN name contains any number of illegal characters. A LAN name must begin with an alphabetic character and consist of a set of 1-16 legal characters. The set of legal characters are the letters A-Z, the digits 0-9, the period, underscore, and the characters - # $ * / &.

LAN not configured for specified node.

Unable to reach specified node on the given LAN.

LAN not configured.

The specified LAN name is not configured for any service.

The node status database not initialized.

The local node status database is not initialized. Therefore, no Network Management commands will execute properly.

The node status database is corrupted.

The local node status database is corrupt and as a result will prevent any Network Management commands from executing properly.

Node not found.

The specified source or destination node was not found in the local node status database.

LTS not configured.

The specified destination LTS is not found in the local node status database.

Local host not configured.

The local host is not found in the node status database.

Remote host not configured.

The specified destination host is not configured in the node status database.

Local host not configured to reach the remote site.

The local host is not connected to the same LAN as the destination node.

Path to local LHC not initialized.

No logical connection from the Network Management server (NM_SERVER) to the specified LHC exists.

Invalid information received from LHC.

The packet received from the specified LHC contains information that is invalid.

Invalid connection type, PRIMENET or NTS are valid.

When specifying the –CONNECTION option, the only option objects that are valid are PRIMENET or NTS.

Specified node address not an LHC.

Certain Network Management commands assume that a request is going to be sent to an LHC only. Therefore, when specifying a node address, you must specify a node address of an LHC.

Specified node address not an LTS.

Certain Network Management commands assume that a request is going to be sent to an LTS only. Therefore, when specifying a node address, you must specify a node address of an LTS.

Specified node name not a host.

Certain Network Management commands assume that a request is going to be sent to a host only. Therefore, when specifying a destination node name, make sure it is a host, not an LTS.

Specified node name not an LTS.

Certain Network Management commands assume that a request is going to be sent to an LTS only. Therefore, when specifying a destination node name, make sure it is an LTS, not a host.

No response from LHC.

The specified LHC did not respond within the allowed period of time.

Invalid information received from LTS.

The data received from the specified LTS is invalid.

No response from LTS.

The specified LTS did not respond within the allowed period of time.

Loopback layer must be entered when a loopback layer option is used.

Enter either NMSR or NME when entering a source and/or destination loopback layer.

No response from source node.

The source node did not respond within the allowed period of time.

No response from destination node.

The destination node did not respond within the allowed period of time.

Invalid source loopback layer.

. You cannot specify a source loopback layer of NMSR for a source node that is an LTS.

Invalid destination loopback layer.

You cannot specify a destination loopback layer of NMSR for a destination node that is an LTS.

Cannot specified the same source and destination points.

A source or destination point is either the source or destination entity of a Network Management command. A "point" is made-up of the combination of a node name, LHC number (when applicable), network address (in place of the above two), and loopback layer (when applicable).

Invalid information received from NME, bad packet length.

The NME received a packet that was of the wrong length.

Cannot specify a LHC number for an LTS device.

An LHC number option cannot be entered when the node type is that of an LTS.

Source and destination nodes cannot be on different LAN's.

It is invalid to issue a command that attempts to cross LANs. Both the source and destination nodes must be connected to the same LAN.

Prime Network Glossary

This chapter contains a glossary of terms that refer to Prime networks or data communications in general. Terms that are in italics in definitions are defined elsewhere in the glossary.

Access Control List (ACL)

A list of access pairs used to specify the *access rights* of users. An access pair is a pair of the form

```
identifier:access
```

where *identifier* is an individual user ID, an access group (beginning with a period), or the identifier $REST, and *access* is one or more of the following rights:

O	Sets all access rights (except P and ALL)
P	Protects a directory
D	Deletes entries from a directory
A	Adds entries to a directory
L	Reads contents of a directory
U	Attaches to a directory
R	Reads contents of a file
W	Changes contents of a file
X	Executes an Executable Program Format (EPF)
ALL	Allows all rights described above (OPDALURWX)
NONE	Allows no access rights whatsoever

An Access Control List (ACL) protects a file system object by allowing access only to the users listed in the ACL and by allowing those users only the access rights specified in the ACL. You associate an ACL with a file system object using the PRIMOS SET_ACCESS (SAC) command or the PRIMOS EDIT_ACCESS (EDAC) command. See the *Prime User's Guide* for more information on access control lists.

access right

Generally, the degree of access to information that a user or process has on a system or *network*. For example, the Read (R) access right allows someone to view a file.

When used in reference to *PRIMENET configuration*, access right describes the type of service enabled between systems. With *CONFIG_NET* (the network configuration utility), the Network Administrator sets up access rights between pairs of systems in the network. For example, CONFIG_NET permits granting of *remote login* privileges between systems. Thus, remote login is an access right. You can configure the following access rights for a network: NONE, IPCF, RLOG, RFA, and ALL.

ACK

The acknowledge character.

ACL

See Access Control List.

asynchronous communication

A method of transmitting data in which each character is preceded by a start *bit* and followed by a stop bit. The time interval between the characters may vary.

asynchronous line

A line that carries *asynchronous communication.*

bit

An acronym for binary digit. Eight bits constitute a *byte.*

boot server

A *server* that is responsible for either initiating or receiving a request to *downline load* executable code to a *LAN Terminal Server* (LTS300).

broadcast packet

See packet, broadcast.

byte

Eight *bits* of data. A character, for example, is one byte.

cache file

In the context of *START_NET,* an optionally created file containing the latest *network configuration* information relevant to the local *node.* A cache file speeds up network initialization when restarting the network with the same configuration.

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

The access method used to decide which *station* on a *LAN300* takes control of the communication medium and transmits the next message.

CCITT

See Consultative Committee for International Telephony and Telegraphy.

communication line

See communication link.

communication link

The connecting medium between two systems that allows them to transmit and/or receive data. At Rev. 21.0, types of communication links include *LAN300*, *RINGNET*, *synchronous lines* (*full-duplex* and *half-duplex*), and *Packet Switched Data Network* (PSDNs). Two systems can also be linked by one or more intervening *gateway nodes*.

CONFIG_NET

PRIMENET's global *network configuration* utility (or configurator). Also, the command used to invoke the configurator.

CONFIG_NTS

A menu-driven and prompt-driven program for configuring *Network Terminal Service* (NTS) networks.

Consultative Committee for International Telephony and Telegraphy (CCITT)

An advisory committee established under the auspices of the United Nations to recommend worldwide standards.

CSMA/CD

See Carrier Sense Multiple Access with Collision Detection access method.

cyclic redundancy check (CRC)

A check performed by a *PRIMENET Node Controller* (PNC) on every *data packet* that it *transceives*. If a packet fails this test, the PRIMENET Node Controller (PNC) sets the *ACK byte* accordingly.

Distributed System Management (DSM)

A set of software products and services that support the administration and day-to-day management of single and networked Prime computer systems. DSM enables systems to be administered and controlled collectively from any convenient point on the *network* and simplifies administrative tasks such as resource monitoring and *event* logging.

downline load

The process of reading software and load parameters into a controller that cannot self-boot.

DSM

See Distributed System Management.

dump server

A *server* that is responsible for either initiating or receiving an upline dump (memory image) from a *LAN300 Terminal Server* (LTS300).

event

A significant system or *network* occurrence such as a cold start, machine check, disk error, or network link problem.

FDX

See full-duplex.

File Transfer Generation (FTGEN)

The *File Transfer Service* (FTS) utility that a *System Administrator* or *Network Administrator* uses to configure the FTS data base. FTGEN is described in the *PRIMENET Planning and Configuration Guide.*

File Transfer Manager

See YTSMAN.

File Transfer Operator (FTOP)

The *File Transfer Service* (FTS) utility that an operator uses to manage the FTS system. FTOP is described in the *Operator's Guide to Prime Networks.*

File Transfer Request (FTR)

The *File Transfer Service* (FTS) utility for submitting transfer requests.

File Transfer Service (FTS)

A queued file transfer program that enables files to be transferred between Prime systems in a *network.* FTS comprises the following utilities: *File Transfer Request* (FTR), *File Transfer Generation* (FTGEN), and *File Transfer Operator* (FTOP).

FTOP

See File Transfer Operator.

FTR

See File Transfer Request.

FTS

See File Transfer Service.

full-duplex

A communication mode in which both systems can send and receive signals at the same time. In a *PRIMENET* environment, full-duplex communication occurs over a permanently configured, dedicated connection (cables or leased telephone lines). Full-duplex lines can link a Prime system to a PSDN or to another Prime system.

gateway

See gateway node.

gateway access

The *access rights* between two systems that communicate through a *gateway node*. For example, consider the configuration shown in Figure GL-1. Systems A and C communicate through gateway node B. The gateway access from node A to node C is IPCF; the gateway access from node C to node A is RLOG. Gateway access is defined during *network configuration*.

IPCF

A ⚡ B ⚡ C

Gateway

RLOG
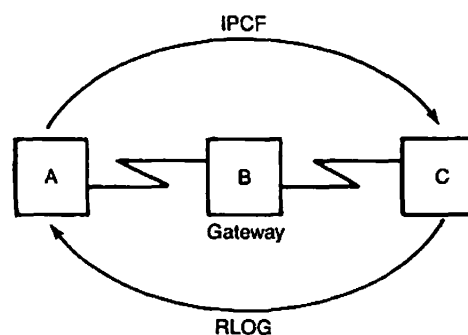
FIGURE 1
Gateway Access

gateway node

A system on which the *Route-through Server* is configured. A gateway node can route messages between two other systems. Two systems may communicate via a gateway node even if they are not directly connected.

half-duplex

A communication mode in which data transmission occurs in only one direction at a time. Each system alternates between sending and receiving signals. In a *PRIMENET* environment, half-duplex communication occurs over temporary connections (generally, dialup telephone lines). Half-duplex PRIMENET lines may link two Prime systems, but may not link a Prime system to a non-Prime system or to a *Packet Switched Data Network* (PSDN).

HDX

See half-duplex.

HDX node

A node that has a *half-duplex* line attached to it.

ICS1, ICS2, ICS3

See Intelligent Communications Subsystem, Model 1, 2 or 3.

Intelligent Communications Subsystem, Model 1, 2 or 3

Microprocessor-based communications controllers that manage *asynchronous lines* or *synchronous lines* or both. The ICS1 and ICS2 support asynchronous serial communication lines. The ICS3 can support synchronous and asynchronous serial *communication lines* concurrently. These lines can be configured to support a variety of *protocols* and electrical interfaces for communication with various terminal devices and controllers, other Prime computers, and the computers of other manufacturers.

Interprocess Communications Facility (IPCF)

A set of subroutines that permit applications to send and receive messages within a Prime *network*, or to transfer messages between processes on the same system. Also, an *access right* (selected through *CONFIG_NET*) that enables systems to communicate using IPCF subroutines only. IPCF access is the minimum access that you can configure between systems.

International Organization for Standardization (ISO)

Organization responsible for developing Open Systems Interconnection (OSI) model, a 7-layered network architecture.

IPCF

See Interprocess Communications Facility.

LAN

See Local Area Network.

LAN300

Prime's IEEE 802.3 compliant *Local Area Network* that uses a bus topology. A standard LAN300 is composed of bus segments, each of which can be a maximum of 500 meters in length. Devices are connected to a LAN300 at a *station*, where a controller, *transceiver*, and tap are attached to the bus segment. A station supports a host or a cluster of terminal or serial printers or both. The LAN300 uses the *Carrier Sense Multiple Access with Collision Detection (CSMA/CD) access method*.

LAN Host Controller 300 (LHC300)

An intelligent controller that is plugged into the backplane of a 50 Series host and provides the interface between PRIMOS and a LAN300. The code on the LHC300 is a combination of Prime written software and the microprocessor. This controller transmits and receives data on a LAN300.

LAN300 Network Management Facility

LAN300 network management software. This facility supports services such as *LAN Host Controller* (LHC300) and *LAN Terminal Server* (LTS300) *downline loading*, LHC300 and LTS300 upline dumping, LHC300 and LTS300 name and address translation, and network event reporting and monitoring. The LAN300 Network Management Facility also provides a user interface that consists of loopback and status commands.

LAN Terminal Server 300 (LTS300)

A remote microprocessor-based asynchronous communications server that provides the *LAN300* interface for a maximum of eight asynchronous devices.

Level 1

PRIMENET's hardware interface. This level (or layer) acts as an intermediary between the physical transmission medium (twin-axial cable or transmission line) and *Level 2*.

Level 2

PRIMENET's link level. It describes a *protocol* for transferring data between two directly connected systems.

Level 3

PRIMENET's packet level. It creates and controls connections across the *network*, handles error recovery, and controls the flow of data between processes on a pair of communicating systems.

LHC300

See LAN300 Host Controller.

Local Area Network (LAN)

A *network* in which independent computer systems are physically connected and communicate at a high speed over a short distance, such as within a building or building complex. *RINGNET* is Prime's Local Area Network that uses a ring configuration. *LAN300* is Prime's IEEE 802.3 compliant LAN that uses a bus configuration.

local system

A system on a *network* from which a user issues commands to communicate with another *remote* system.

LTS300

See LAN300 Terminal Server.

MDLC

See Multiple Data Link Controller.

Multiple Data Link Controller (MDLC)

A communications controller that handles *full-duplex* and *half-duplex synchronous lines*.

NAK

Negative acknowledgment. A NAK indicates that either a *RINGNET data packet* failed a *cyclical redundancy check* (CRC), or an *ACK byte* did not pass *parity checking*. When the *node* that sent the packet receives the NAK, it retransmits the data.

NETLINK

A *PRIMENET* utility that enables a user to gain access to another networked Prime system or a non-Prime system across a *Packet Switched Data Network* (PSDN) if that non-Prime system adheres to the *CCITT PAD protocols (X.3/X.28/X.29)*.

NETMAN

See Network Manager Process.

network

A group of independent computer systems that are connected by communication media such as PSDNs, LANs, and *synchronous lines* and that communicate and share resources. A network can consist of systems that are all physically connected and communicate over short distances, as in a LAN, or of systems that use different communication media to communicate over long distances.

The term network is sometimes used synonymously with *subnetwork*; for example, *ring network* or *HDX network* can refer to subsets of a larger network.

Network Administrator

The person responsible for maintaining the proper and continuous operation of a *network*. Tasks include using *CONFIG_NET* to configure the network, ensuring that appropriate security measures are taken, and maintaining the daily network operation. Sometimes, the same person serves as Network Administrator and *System Administrator*. *See also* System Administrator.

network configuration

A description of the systems, services, and communication media that make up a *network*.

network configuration file

The file that contains the network configuration in binary format. The *Network Administrator* creates this file through *CONFIG_NET*. At network startup time, this file is loaded into *PRIMENET* by the *START_NET* command (unless a *cache file* is used).

Network Manager Process (NETMAN)

A process that handles network activity. NETMAN is X.25 Level 2 and Level 3 PRIMENET. NETMAN appears on the STATUS USERS list as nsp (network server process).

Network Process Extension (NPX) facility

An internal PRIMOS facility that provides a remote procedure call mechanism between any two *PRIMENET* systems. *Remote File Access* (RFA) uses NPX.

network protocol

See protocol.

node

An independent computer system that is part of a *PRIMENET network.*

Network Terminal Service (NTS)

A collection of software designed to support communications between terminals and hosts over a *LAN300 network.*

NPX

See Network Process Extension Facility.

NTS

See Network Terminal Service.

packet

A sequence of data and control characters that are arranged in a specific format and transmitted as a unit.

Packet Switched Data Network (PSDN)

A *network* in which the *X.25* protocol defines communication between X.25-compatible equipment called Data Terminal Equipment (DTE) and processors called Data Circuit Termination Equipment (DCE). To transmit data, PSDNs divide long messages into shorter units with a fixed maximum length (*packets*). Examples of PSDNs include TELENET, UNINET, TYMNET, PSS or an equivalent private network.

path

The sequence of intervening systems between two given systems in a *network.*

PNC

See PRIMENET Node Controller.

PNC II

See PRIMENET Node Controller II.

port

An address within a *node* to which an incoming *network* request can be routed. Each node in a *PRIMENET* network has a pool of available ports that a program running under PRIMOS can assign.

PRIMENET

Prime's distributed networking software that offers local and wide-area networking facilities.

PRIMENET address

A numeric address that *PRIMENET* uses internally to identify a *node. CONFIG_NET* generates this address based on the name of the node.

PRIMENET Node Controller (PNC)

PRIMENET hardware that controls ring *protocol* and the flow of data between *nodes* on a ring.

PRIMENET Node Controller II (PNC II)

PRIMENET hardware that controls ring *protocol* and the flow of data between *nodes* on a ring.

protocol

A set of rules governing communication between two systems in a *network.*

PSDN

See Packet Switched Data Network.

PSDN gateway

A *communication link* between two different PSDNs. Can be referred to as an *X.25 gateway.*

Remote File Access

See RFA.

remote login

See RLOG.

remote system

A system that can communicate with the *local system* through a *network.*

remote user

A user on a *remote system.*

RFA

Remote File Access. A *PRIMENET* intersystem service or *access right* (selected through *CONFIG_NET*) that enables a user to access files on a *remote system* as though the files were on the *local system.*

ring

See ring network.

ring network

A type of *Local Area Network* (LAN). Prime's ring LAN, *RINGNET*, is a token-passing ring network.

RINGNET

One of Prime's LANs for Prime-to-Prime communications. A RINGNET *network* is composed of Prime systems that are connected by cable in a ring configuration. Each system is logically connected to all other systems on the ring. RINGNET uses a token-passing *protocol* to control communication around the ring.

ring node ID

A number from 1 through 247 that identifies, and is unique to, a particular *node* on a *RINGNET network.*

RLOG

Remote login. A *PRIMENET* service that enables users to log in to a *remote system* from a local terminal without logging in to the *local system* first. The local and remote systems must be connected directly or connected through one or more gateway *nodes*. The *Network Administrator* must assign remote login access rights (selected through *CONFIG_NET*) during network configuration. These access rights are checked only on the remote system.

Route-through

The message-routing operation performed on a *gateway node* that connects two systems or *networks.*

Route-through server (RT_SERVER)

The *server* that performs *Route-through* and enables a system to act as a *gateway node* for communication between *nodes* not directly connected through a ring, PDSN, or *synchronous line.*

server

A cooperating set of processes available to perform one or more functions. FTS servers service local request queues and incoming requests from *remote systems.*

slave process

A process on a *local system* that handles a request that a user on another system makes to access files or to attach to a directory on the local system. A slave acts for a single *remote user* until the remote user releases the slave process. The number of slave processes available (configured by the *System Administrator*) depends on whether the local system is using the *Route-through Server* or the *File Transfer Service* (FTS) or both.

SMLCnn

The logical line number of a *synchronous communication* line on a Prime system.

START_DSM

Command that brings up *Distributed System Management* (DSM) on the system.

START_NET

Command that starts up *PRIMENET* on a *local system*. This command works without interrupting local PRIMOS operation.

START_NTS

Command that starts up the *Network Terminal Service* (NTS).

STOP_DSM

Command that shuts down *Distributed System Management* (DSM) by logging out all DSM server processes.

STOP_NET

Command that shuts down *PRIMENET* on a *local system*. This command works without interrupting local PRIMOS operation.

synchronous communication

Transmission in which data, characters, and *bits* are transmitted at a fixed rate. The transmitting and receiving systems are synchronized, thus eliminating the need for start and stop bits.

Generally, synchronous communication offers more efficient line usage, better error checking, and higher speeds of transmission than *asynchronous communication*.

synchronous line

A line that carries *synchronous communication*.

System Administrator

The person responsible for maintaining the proper and continuous operation of a system. The System Administrator's duties can include network-related tasks such as setting *PRIMENET*-related ACL rights, and setting up the *File Transfer Service* (FTS). At times, the same person serves as System Administrator and *Network Administrator*. *See also* Network Administrator.

timeout

The condition that occurs when a transmitting *RINGNET node* sees neither a token nor the *packet* within a certain time period. A break in the ring or *token recovery* can cause a timeout. The node waits for a token and retransmits the packet. If a second timeout occurs for the same packet, no further attempt to retransmit is made.

token ring protocol

The communications protocol used by *RINGNET*. The token, a special *bit* pattern, circulates continuously around the ring. A *node* cannot transmit data until it detects the token.

user validation

The process of checking a *remote user*'s ID before allowing that user to access information on a system. The user must have established the remote ID with the ADD_REMOTE_ID (ARID) command.

virtual circuit

A logical *network* connection that enables transmission of data between two processes. IPCF subroutines are used to establish virtual circuits in *PRIMENET*. PRIMENET supports 255 virtual circuits.

WACK

Wait acknowledge. A receiving *RINGNET node* acknowledges the *packet*, but does not have a buffer free to receive it. The transmitting node retransmits the packet.

window size

The maximum number of *frames* or *packets* that can be sent before an acknowledgment must be received. Window size is configurable only for *Packet Switched Data Network* (PSDN) links.

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Surveys

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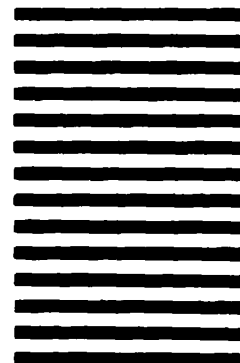
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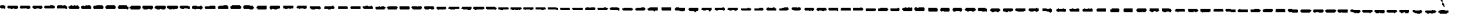
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