



---

PowerNet 3270  
*Reference Manual*

Connect number    CNT5000-5401  
Version 5.1        February 1998

---



---

**Important - Read carefully before opening sealed carton(s). by opening the sealed carton(s) containing enclosed software and/or hardware you indicate your acceptance of the following Connect Inc. license and warranty ( Agreement ).**

-----

**This is a legal agreement between you (either an individual or an entity) and Connect Inc. by opening this sealed carton you are agreeing to be bound by the terms of the agreement. if you do not agree to the terms of this agreement, promptly return the unopened carton(s) and the accompanying items (including printed materials and binders or other carton(s)) to the entity from which you obtained them for a full refund.**

-----

#### **Connect Inc. License and Warranty**

1. GRANT OF LICENSE. This license permits you to use one copy of the enclosed Connect/RF software program (the "SOFTWARE") on a single computer. The SOFTWARE is in "use" on a computer when it is loaded into temporary memory (i.e., RAM) or installed into permanent memory (e.g., hard disk, CD-ROM, or other storage device) of that computer. However, installation on a network server for the sole purpose of internal distribution shall not constitute "use" for which a separate license is required, provided you have a licensed copy of the SOFTWARE for each computer that can access the Software over that network.
2. COPYRIGHT. The SOFTWARE and all copyright, trade secrets and other right, title and interest therein is owned by Connect Inc., or its licensors, or suppliers and is protected by United States copyright laws and international treaty provisions. Therefore, you must treat the SOFTWARE like any other copyrighted material (e.g., a book or musical recording) except that you may either (a) make one copy of the SOFTWARE solely for backup or archival purposes, or (b) transfer the SOFTWARE to a single hard disk provided you kept the original solely for backup or archival purposes.
3. OTHER RESTRICTIONS. You may not sublicense, rent or lease any portion of the SOFTWARE, but you may transfer the SOFTWARE and accompanying written materials on a permanent basis provided you retain no copies and the recipient agrees to the terms of this Agreement. You may not reverse engineer, decompile, disassemble, or modify, translate, make any attempt to discover the source code of the SOFTWARE or create derivative works from the SOFTWARE. You may not copy the documentation which accompanies the SOFTWARE. If the SOFTWARE is an update or has been updated, any transfer must include the most recent update and all prior versions.
4. DUAL-MEDIA SOFTWARE. You may receive the SOFTWARE in more than one medium. Regardless of the type or size of medium you receive, you may use only the medium appropriate for your single designated computer or network server. You may not use the other medium on any other computer or computer network, or loan, sublicense, rent, lease, or transfer it to another user except as part of a permanent transfer (as provided above) or other use expressly permitted by this License.
5. EXPORT RESTRICTIONS. You agree that neither you nor your customers intends to or will, directly or indirectly, export or transmit (a) the SOFTWARE or related documentation and technical data or (b) your software product, or process, or service that is the direct product of the SOFTWARE, to any country to which such export or transmission is restricted by any applicable U.S. regulation or statute, without the prior written consent, if required, of the Bureau of Export Administration of the U.S. Department of Commerce, or such other governmental entity as may have jurisdiction over such export or transmission.
6. LIMITED WARRANTY. Connect warrants that (a) the media on which the Software is distributed will perform substantially in accordance with the accompanying written materials for a period of (30) days from the date of receipt of the SOFTWARE, and (b) any hardware accompanying the SOFTWARE will be free from defects in materials and workmanship under normal use and service for a period of one (1) year from the date of receipt. Any implied warranties on the SOFTWARE and hardware are limited to thirty (30) days and one (1) year, respectively. Some states/jurisdictions do not allow limitations on duration of an implied

warranty, so the above limitation may not apply to you. Connect Incorporated does not warrant that the SOFTWARE will meet your requirements or that operation of the SOFTWARE will be uninterrupted or that the SOFTWARE will be error-free.

7. CUSTOMER REMEDIES. Connect Inc., its licensors' and suppliers' entire liability and your exclusive and sole remedy in the event of a breach of the Limited Warranty will be, at Connect's option, either (a) refund of the price paid for the SOFTWARE and/or the hardware, or (b) repair or replacement of the SOFTWARE or hardware that does not meet Connect's Limited Warranty and which is returned to Connect within the warranty period with a copy of your purchase order/receipt. This Limited Warranty is void if failure of the SOFTWARE or hardware has resulted from accident, abuse, or misapplication. Any replacement SOFTWARE or hardware will be warranted for the remainder of the original warranty period or thirty (30) days, whichever is longer. Outside the United States, neither these remedies nor any product support services offered by Connect are available without proof of purchase from an authorized non-U.S. source.

8. No other warranties. the above warranty is exclusive and in lieu of all other warranties, whether express or implied, including, but not limited to, implied warranties of merchantability, fitness for a particular purpose and noninfringement, this limited warranty gives you specific legal rights. you may have others which vary from state/jurisdiction to state/jurisdiction.

9. Disclaimer of Damages. Regardless of whether any remedy set forth herein fails of its essential purpose, in no event shall Connect incorporated or its suppliers or licensors be liable for any special, consequential, indirect or similar damages whatsoever (including without limitation, damages for any loss of business profits, business interruption, loss of business information or data or any other pecuniary loss ) arising out of the use or inability to use the software and/or hardware, even if Connect Inc., has been advised of the possibility of such damages. because some states/jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages, the above limitation may not apply to you.

10. U.S. GOVERNMENT RESTRICTED RIGHTS. The SOFTWARE and documentation are provided with RESTRICTED RIGHTS. Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013 or subparagraphs (c)(1) and (2) of the Commercial Computer Software-Restricted Rights clause at 48 CFR 52.227-19, as applicable. Manufacturer is Connect Inc., 5400 Patton Dr., Suite 300, Lisle, IL 60532.

#### **GENERAL:**

If you acquired this product in the United States, this Agreement is governed by the laws of the State of Illinois. This Agreement may only be modified by a license addendum which accompanies this license or by a written document which has been signed both by you and Connect Inc.

If you have any questions concerning this Agreement, or if you desire to contact Connect for any reason, please write; Connect Inc., 5400 Patton Dr., Suite 300, Lisle, IL 60532.

---

---

**Copyright © 1994, 1995, 1996, 1997, 1998  
Connect, Inc.**

All rights reserved. This document may not be reproduced in full or in part, in any form, without prior written permission of Connect Inc., 5400 Patton Dr., Suite 300, Lisle, IL 60532.

Connect, Inc., makes no representation or warranties with respect to the contents of this document and specifically disclaim any implied warranties of merchantability or fitness for any particular purpose. Further, Connect, Inc., reserves the right to revise this publication and to make changes to it from time to time without obligation to notify any person or organization of such revision or changes.

**Trademarks**

Symbol and Spectrum One are registered trademarks of Symbol Technologies, Inc.,

UNIX is a registered trademark of X/Open Company, Limited.

Other product names mentioned in this manual may be trademarks or registered trademarks of their respective companies and are hereby acknowledged.

**Production**      This manual was written, edited, and  
                         produced by  
                         Connect, Inc.  
                         5400 Patton Dr., Suite 300  
                         Lisle, IL 60532

Printed in the U.S.A.



# Table of Contents

## 1. 3270 Connectivity Overview

|                           |     |
|---------------------------|-----|
| Introduction .....        | 1-1 |
| Features .....            | 1-1 |
| Menus.....                | 1-2 |
| Documentation.....        | 1-2 |
| Interface.....            | 1-3 |
| Product Information ..... | 1-3 |
| Related Documents.....    | 1-3 |

## 2. Host Connection Setup

|  |      |
|--|------|
| Introduction .....                                 | 2-1  |
| Hardware .....                                     | 2-1  |
| DIP Switch Configuration .....                     | 2-3  |
| SNA Controllers .....                              | 2-3  |
| 3270 Token Ring Network Menu.....                  | 2-4  |
| 3270 SDLC Network Menu.....                        | 2-4  |
| TN3270 Network Menu .....                          | 2-5  |
| 3270 Token Ring Host Link Setup Form - Fields..... | 2-7  |
| 3270 SLDC Link Setup.....                          | 2-9  |
| 3270 SDLC Host Link Setup Form - Fields .....      | 2-9  |
| Controller Setup Form - Fields.....                | 2-12 |
| Status Display Form - Fields .....                 | 2-16 |
| Line Trace.....                                    | 2-16 |

---

## 3 Configuration

|                                  |      |
|----------------------------------|------|
| Introduction .....               | 3-1  |
| Host List .....                  | 3-1  |
| 3270 Handler Setup Forms .....   | 3-4  |
| <i>Alarm Options Group</i> ..... | 3-8  |
| 3270 Terminal Emulator .....     | 3-20 |
| LU Mapping .....                 | 3-20 |

## 4 Dialog Language Objects

|                                  |     |
|----------------------------------|-----|
| Introduction .....               | 4-1 |
| 3270 Session Overview .....      | 4-1 |
| Script File Format .....         | 4-3 |
| Script Control Commands .....    | 4-7 |
| Parameter Control Commands ..... | 4-7 |
| Host Session Commands .....      | 4-7 |
| Terminal Session Commands .....  | 4-7 |
| Script Examples .....            | 4-7 |

## Appendix System Generations

|   |     |
|---|-----|
| Sample system generations for the IBM main-frame host ..... | 5-1 |
|---|-----|

---

# 1. 3270 Connectivity Overview

---

## Introduction

The PowerNet provides connectivity between 900 MHz LANs and/or Access Point LANs and a 3270 Host, when equipped with the PowerNet 3270 Connectivity Package. Five types of 3270 connectivity packages are available, SNA/SDLC V.24, SNA/SDLC V.35, SNA/Token Ring, TN3270/Ethernet, and TN3270/Token Ring.

During system operation, the wireless terminals appear to the host as 3278 model 2 terminals, while the server appears as a 3274-51C cluster controller.

This *PowerNet 3270 Reference Manual* describes the procedures necessary to install and support connections to the 3270 host. An SNA/SDLC environment, using V.24 and V.35 connectivity is discussed, as well as an SNA/Token Ring (TR) environment, using an IBM Token Ring 4/16 Network Interface Card (NIC).

## Features

The PowerNet 3270 Connectivity Package offers the following:

- **Easy Setup** - Forms are used to enter information for system setup and this process is completed from within the program. There are no files to edit or command line operations to perform.
- **Quick Start Operation** - The *Quick Start* mode and its default 3270 Handler allows the ability to use the system without customization. Scripting allows for even more efficient use with complete customization of keystrokes, host logon/logoff procedures, application use, and more.
- **Logs and Traces** - These features are available to help tune the system during setup and also for problem resolution if a problem occurs. Log levels may be set to collect various degrees of information, or none, during normal operation.
- **Easy Terminal Menu Modification** - Add Hosts or Applications to the RF terminal *Host List Menu* easily, and without editing files. Use the PowerNet *Host List* option and the *3270 Handler* for additions and/or modifications to this menu.

- Full Screen Emulator - A 3270 terminal emulator is available as a menu selection as a convenience.
- Screen Formatter Compatible - The Screen Formatter package allows customization of full-size host screens, to smaller RF terminal screens. Although purchased separately, it is fully integrated with this package in both operation and function.
- Variable PU Limit - By default, the system is set for a maximum of 4 PUs, with each PU supporting 254 LUs. The actual number of terminals that can be supported is determined by other factors discussed later in this document.

## **Menus**

Modifications to the server base menus, shown in the *PowerNet System Manual*, include two additions to the *Operations Menu*, following the *Startup RF Network* selection. These additions are either *SDLC Startup* and *SDLC Shutdown*, or *TR Startup* and *TR Shutdown* (depending on the package installed).

## **Documentation**

Instructions for setting up host connection parameters and checking connection status appears first. Modification of the *Host List* file which involves the 3270 Handler is next, followed by log examination. After these configurations are in place, the system can be used in *Quick Start* mode.

Customization of the system, by using scripts to automate a variety of terminal operations, is documented in Chapter 4. Scripts, which are created with the custom Dialog Language, are not absolutely necessary but help streamline operation. For example, terminal logon and logoff procedures can be added to the script, removing them from the operator's responsibilities. The full screen emulator, discussed in Chapter 3, can be quite useful during script development.

Information regarding the networks/hardware in place at the installation site is needed while reading and following the material in this manual. The host system administrator should be able to provide this. In addition, readers may find a background in the host network and SNA/SDLC, TCP/IP, or SNA/Token Ring protocols to be helpful.

## **Conventions**

This document uses the same typographical conventions as the *PowerNet System Manual*.

## **Interface**

Please see the *PowerNet System Manual* for information about the screen formats and keys used with this software.

## **Product Information**

| <b>Product Number</b> | <b>Description</b>                        |
|-----------------------|---|
| CNT5000-3208          | 3270 SNA/SDLC RS-232 Connectivity Package |
| CNT5000-3209          | 3270 SNA/SDLC V.35 Connectivity Package   |
| CNT5000-3207          | 3270 SNA/Token Ring Connectivity Package  |
| CNT5000-3502          | Screen Formatter Software Package         |
| CNT5000-3111          | TN3270 Ethernet Connectivity Package      |
| CNT5000-3112          | TN3270 Token Ring Connectivity Package    |

## **Related Documents**

Product Specification - PowerNet Architectural Overview  
Product Specification - TCP/IP Terminal Emulation  
Product Specification - SNA and TCP/IP 5250 Terminal Emulation  
Product Specification - Windows/NT Application Program Interface  
Product Specification - TCP/IP Client Streaming Interface  
Product Specification - Screen Formatter  
PowerNet Server Reference Manual  
PowerNet Soft Server Reference Manual  
PowerNet Client Reference Manual  
PowerNet 3270 Reference Manual  
PowerNet 5250 Reference Manual  
PowerNet VTerm User Manual  
PowerNet TCP/IP Reference Manual  
PowerNet Screen Formatter Reference Manual  
PowerNet Scan Editor Reference Manual

This page intentionally left blank.

## 2. Host Connection Setup

---

### **Introduction**

This chapter describes the procedures required to set up the communication link between a server and a 3270 host. Since SNA/SDLC, SNA/Token Ring, and TN3270 connectivity setup are similar, one set of instructions is given. Differences in setups are documented. Menus are almost identical, with differences indicating either SDLC, TR, or TN. Examples of menus are included.

If Token Ring connectivity is being implemented, one additional step must be taken—to determine whether the TR network is operating at 4 or 16 Mbps. If it is 16 Mbps, no additional work must be performed, other than the steps listed in the summary below. If the network is operating at 4 Mbps, a DIP switch on the Token Ring NIC must be changed. Please see *Token Ring NIC* on Page 2-3 for instructions.

If TN3270 is implemented, host connection setup must be completed prior to setting up the TN3270 handlers. Details for this host connection setup and configuration is covered in the TCP/IP setup manual.

The following is a summary of the link setup process:

- Shut Down Host Link - Terminate any activity between the host and the server.
- Set Host Parameters - Complete the setup form with the parameters obtained from the host system administrator.
- Set Up Physical Connection - Connect all hardware, connectors, cables, etc., as required, for the link from the server to the host.
- Start Up Host Link - Activate the connection between the 3270 host and the server.
- Verify Link - Display status screens for checking the communication path between the server and the 3270 host.

### **Hardware**

System administrator's or the end users' services are responsible for all equipment and cabling *external* to the SDLC board, Token Ring NIC, or Ethernet connection,

which can include synchronous modems, modem eliminators, modem sharing units, MAU cables, HUBs, etc. All necessary equipment and configuration in each of these environments is specific to the host and site requirements for each installation. Therefore, the hardware connections for each site must be made on an individual basis, and only general information is given here.

### **SDLC Communications Board**

Each SNA/SDLC communications board has two, high density D-sub-miniature female port connectors. The cables have a DB-15 male connector on the board end and a DB-25 male connector on the peripheral end. Pinouts for each connector are as follows:

**Caution** The connectors on the SDLC board appear exactly like a VGA monitor connection or a multiport concentrator connection. **Do not** plug any devices other than the SDLC adapter cable into this board.

| <b>DB-15 Pin Number</b> | <b>Assignment</b>         |        |
|-------------------------|---------------------------|--------|
| 1                       | Not Connected             |        |
| 2                       | Transmitted Data (TXD)    | Output |
| 3                       | Received Data (RXD)       | Input  |
| 4                       | Request To Send (RTS)     | Output |
| 5                       | Clear To Send (CTS)       | Input  |
| 6                       | Data Set Ready (DSR)      | Input  |
| 7                       | Signal Ground             |        |
| 8                       | Data Carrier Detect (DCD) | Input  |
| 12                      | Receive Clock (RXC)       | Input  |
| 13                      | Transmit Clock (TXC)      | Output |
| 14                      | Transmit Clock (TXC)      | Input  |
| 15                      | Data Terminal Ready (DTR) | Output |

#### **DB-25 Pin NumberAssignment**

|    |                           |        |
|----|---------------------------|--------|
| 1  | Not Connected             |        |
| 2  | Transmitted Data (TXD)    | Output |
| 3  | Received Data (RXD)       | Input  |
| 4  | Request To Send (RTS)     | Output |
| 5  | Clear To Send (CTS)       | Input  |
| 6  | Data Set Ready (DSR)      | Input  |
| 7  | Signal Ground             |        |
| 8  | Data Carrier Detect (DCD) | Input  |
| 17 | Receive Clock (RXC)       | Input  |
| 24 | Transmit Clock (TXC)      | Output |

#### **DB-25 Pin NumberAssignment**

|    |                           |        |
|----|---------------------------|--------|
| 15 | Transmit Clock (TXC)      | Input  |
| 20 | Data Terminal Ready (DTR) | Output |

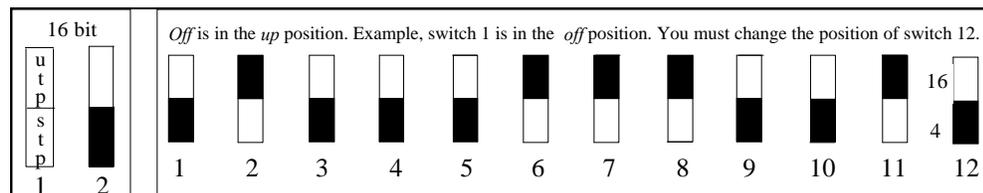
The board is set for external clocking, which requires a modem or modem eliminator between the server and the Host Front End Processor (FEP) or other communications equipment.

## Token Ring NIC

Each standard IBM Token Ring 4/16 NIC (Network Interface Card) provides one DB-9 female connector. The cables that connect from the server to the Multi-station Access Unit (MAU) for the Token Ring are customer provided. To change the operating data rate for the card, from 16 to 4 Mbps, follow the instructions below.

## DIP Switch Configuration

To gain access to the DIP switches on the TR NIC, the server cover must be removed and then the NIC removed from its card slot. A diagram of the DIP switch block on the card is shown in Figure 2-1.



**Figure 2-1 IBM 4/16 Token Ring NIC Dip Switches**

DIP switch #12 must be changed. It is factory-set in the up (*off*) position which is 16 Mbps operation. It must be reset in the down (*on*) position for 4 Mbps operation. Do not change any of the other DIP switches. Next, reconnect the card to the same card slot from which it was removed, then replace the PowerNet server cover.

For newer IBM cards, find detailed information at the IBM web site:  
<http://www.networking.ibm.com/nes/nestoken.htm#triau>

## SNA Controllers

The SNA/SDLC and SNA/Token Ring servers are configured for at least one line on the installed communications board or NIC. The default maximum of sixteen controllers can be configured for each SNA/SDLC V.35 or V.24 interface and four for each Token Ring interface. Each controller, as defined by the SNA protocol, supports up to 254 logical units (LUs). Each terminal must be assigned a logical unit and therefore, the maximum number of terminals is 254 per configured controller.

**Caution** The actual number of terminal supported is determined by many factors and is discussed later.

### 3270 Token Ring Network Menu

The *3270 Token Ring Network* option provides access to the setup screen and various other 3270 connectivity options that are summarized below. Select *3270 Token Ring Network* from the *Main Menu* and the menu shown in Figure 2-2 is displayed.

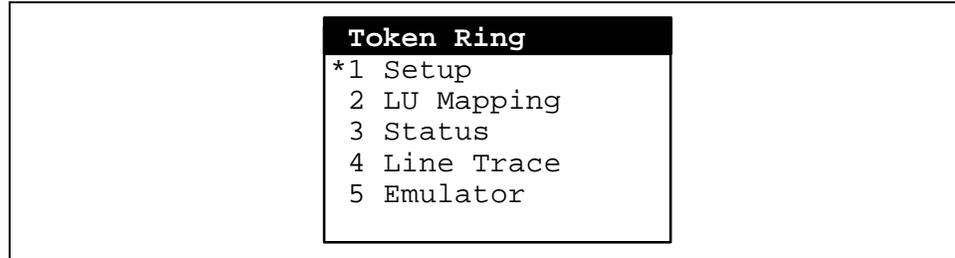


Figure 2-2 3270 Token Ring Network Menu

### 3270 SDLC Network Menu

The *3270 SDLC Network* option provides access to the setup screen and various other 3270 connectivity options that are summarized below. Select *3270 SDLC Network* from the *Main Menu* and the menu shown in Figure 2-3 is displayed.

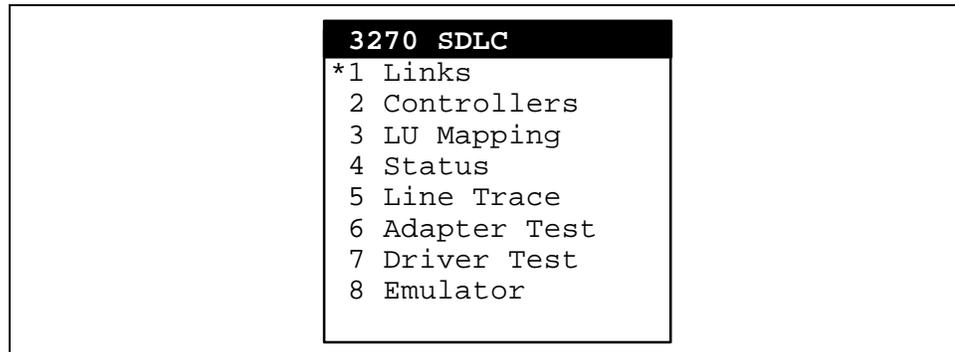


Figure 2-3 3270 SDLC Network Menu

### Menu Options

Menu options affecting the available 3270 setup menus (Token Ring and SDLC) shown above are described here. The functionality of the menu items are similar and the applicability of each menu option is indicated.

**Setup** —This option provides for host session addressing.

**Links** (3270 SDLC and Token Ring)—This option displays a form where host link parameters are specified. The Host System Administrator must supply configuration information which is then entered on this form.

**Controllers** (3270 SDLC and Token Ring)—This menu option allows the system administrator to configure the 3270 Controller parameters.

**LU Mapping** (3270 SDLC and Token Ring)—The PowerNet server assigns each RF terminal a default SNA PU and LU automatically. This option may be used to change these default LU assignments which are in sequential order. The mapping begins with terminal #065 assigned to LU 2, #066 to LU 3, etc.

**Status** (3270 SDLC and Token Ring)—This displays the status of PU(s) and LUs.

**Line Trace** (3270 SDLC and Token Ring)—Use this option to examine the host link data that was collected with the *Line Trace Facility*. The Line Trace Facility can be activated with this option and is used to collect a full display of link exchanges. The *Line Trace Facility* should be turned on prior to starting the host connection and should only be used while testing the initial installation.

Remember to turn the *Line Trace Facility* **off** after the link is tested and verified as operational. To turn off this facility, the *SDLC/Token Ring Shutdown* must be selected from the *Operations Menu*. Next, the **TRACE** option on the *Host Connection Setup Form* must be toggled to **OFF**. The link is then restarted (see *SDLC/TR Startup*).

**Adapter Test** (3270 SDLC only)—Use this option to test the SDLC host link adapter. This test is useful to ensure that the SDLC adapter is functioning internally with the PowerNet server software.

**Driver Test** (3270 SDLC only)—Use this option to test the SDLC host link adapter driver software. This test is useful to ensure that the SDLC driver is functioning internally with the PowerNet server software.

**Emulator** (3270 SDLC and Token Ring)—Full screen 3270 emulation is provided with this option. The emulator is useful for testing scripts and capturing host screens to a file which can be used by the *Screen Formatter*.

## **TN3270 Network Menu**

The *TN3270 Network* option provides access to the setup screen and emulator options that are summarized below. Select *TN3270 Network* from the *Main Menu* and the menu shown in Figure 2-4 is displayed. Specific TCP/IP setup options for the TCP/IP portion of the system are described in the TCP/IP system manual.



**Figure 2-4 TN3270 Network Menu**

**Setup**—This option provides for host session addressing, provided that the TCP/IP setup has been completed.

**Emulator**—Full screen 3270 emulation is provided with this option. The emulator is useful for testing scripts and capturing host screens to a file which can be used by the *Screen Formatter*.

### ***SNA Shutdown***

Before setting up the link, select the *SNA Shutdown* option from the *Operations Menu* and then press <Enter>. This terminates any link to the 3270 host. First, a prompt for a confirmation of the shut down action appears on the screen, followed by a list of events as they occur. An SDLC example is shown below.

```
Are you sure that you want to shut down the link to the SDLC
Network? (y/n)
```

Press <y>.

```
SDLC Shutdown
  Status check ...
  Terminal check ...
Deactivating SDLC Line and Station
Terminal check ...
Press <Enter> to continue
```

Press <Enter> and the *Operations Menu* reappears.

After all possible activity is terminated, the setup parameters for the link to the host can be entered.

### ***Link Setup - Token Ring***

Select *Setup* from the *3270 Token Ring Menu* to display the *Setup Form* shown in Figures 2-5. Connection information, supplied by the Host System Administrator, is entered on this form.

The Token Ring link setup form is discussed here. Form fields are explained following each figure. The type of field (toggle, text, or display) is also listed.

## 3270 Token Ring Link Setup

```

SNA Token Ring 3270 Setup
Local MAC Address [000000000000]
  SSAP/DSAP [04]

Host
  State [off]
  MAC Address [000000000000]
  XID [00000000]
Controller Start [TEST+XID]
Session Start [TEST+XID]
Session End [NOTIFY+UNBIND]
  XID Format [1]
MAX Frame size [1950]
Window Size [20]
  T1 Timer [3 ]
  LU Sessions [32 ]

<ESC>=QUIT  <ARROWS>=MOVE

```

Figure 2-5 3270 Token Ring Host Link Setup Form

## 3270 Token Ring Host Link Setup Form - Fields

Fields for up to four 3270 Host connections are provided with the Token Ring Setup Form. If only one is being implemented, use the Host 0 column.

**Local MAC Address** [Text Field] The media-access control (MAC) address used by the PowerNet server is its physical address, normally set by the manufacturer on the token ring NIC. If the address is not found on the card or the card is not properly initialized, NOT FOUND appears in the field. Certain hosts may specify an address that must be used regardless of the physical address. If so, enter the address thus overwriting the existing one. The software token ring driver uses the address supplied in this field. If this field is left to all zeros, the NIC card manufacturer's MAC address is used.

**SSAP/DSAP** [Toggle Field] Source Service Access Point/Destination Service Access Point contains the hex address values set to 04.

**State** [Toggle Field] The line may be set to either *ON*, or *OFF*.

**MAC Address** [Text Field] The host media-access control (MAC) address, is entered in this field. It should be obtained from the System Administrator.

**XID** [Text Field] The server Exchange Identification (XID), provided by the administrator, is entered in this field. In mainframe environments, the server XID is derived from the *Switched Major Node* definitions for IDBLK and IDNUM. The IDBLK value is 3 hexadecimal digits that

form the leading digits of the XID, and the IDNUM parameter is 5 hexadecimal digits that form the trailing digits of the XID.

**Controller Start** [Toggle Field] The *Controller Start* field has four selections that can be used for controller route binding to the host. These are *TEST*, *XID*, *TEST+XID*, and *PASSIVE*. All initialization options cause the server to generate Data Link Control (DLC) frames of varying types. The default initialization option, *TEST+XID*, generates Test and XID format 0 frames for this process. The *XID* option generates XID format zero frames.

**Session Start** [Toggle Field] The *Session Start* field has five selections that can be used for session route discovery to the host. These are *NONE*, *TEST+XID*, *XID+SABM*, *XID1*, and *XID3*. All initialization options cause the server to generate Data Link Control (DLC) frames of varying types. The default initialization option, *TEST+XID*, generates Test and XID format 0 frames for this process. The *XID* option generates XID format zero frames, and *XID-FMT1* generates XID format 1 frames. The *XID-SABM* option generates XID format 0 frames and SABM frames.

**Session End Protocol** [Toggle Field] The Session End Protocol Option determines the method used to end a 3270 session. The selections are *NOTIFY+UNBIND*, *TERMSELF*, *LUSTAT*, *LUSTAT+DRI*, and *NOTIFY*. The default is *NOTIFY+UNBIND* and can be used with the majority of mainframe hosts. Selections used here depend upon the host.

**Max Frame Size** [Toggle Field] The *Max Data* field is used to set the maximum size of the data blocks sent from the host system. The default value for this field is 265. This value is supplied by the host system administrator and must match the value as set on the host. Toggle values for this field are 261, 265, 517, 521, 1029, 1033, 2052, or 2057.

**Window Size** [Text Field] The *window size* field corresponds to the host setup field option of the same name. It controls the number of frames that can be transmitted before an acknowledgment is required. If this value does not match the host value, data frames may be missed, sessions may hang, and/or session drops may occur.

**T1 Timer** [Text Field] The *T1 Timer* field specifies the amount of time to wait for a response to transmitted commands or data before requesting re-transmission. Normal setting of the T1Timer should be set in the range of 1 to 3 seconds. A setting above 3 seconds may result in noticeable delays to responses that must be retransmitted (typically than 3% of the frames).

**LU Sessions** [Text Field] The *LU Sessions* field corresponds to the allowable number of LU sessions that the host system will be supporting over this link.

When the form is complete, press <Esc>. If changes were made to the form, a confirmation prompt is presented. Press <Y> to save the changes.

## Link Setup - SDLC

Select *Links* from the *3270 SDLC Network Menu* to display the *Setup Forms* shown in Figure 2-5 and 2-6. Connection information, supplied by the host system administrator, is entered on this form.

The SDLC links setup form is discussed here. Form fields are explained following each figure. The type of field (toggle, text, or display) is also listed.

### 3270 SDLC Link Setup

| SNA SDLC Link Setup     |                 |                 |
|-------------------------|-----------------|-----------------|
|                         | Line 1          | Line 2          |
| State                   | [on ]           | [on ]           |
| Clock Source            | [EXTERN]        | [EXTERN]        |
| Line Speed              | [9600 ]         | [9600 ]         |
| Duplex                  | [full]          | [full]          |
| Half Duplex RTS Delay   | [10 ]           | [10 ]           |
| NRZ/NRZI Encoding       | [NRZ ]          | [NRZ ]          |
| MAX Data                | [521 ]          | [521 ]          |
| MAX Outstanding Frames  | [2 ]            | [2 ]            |
| Primary Station Address | [FF]            | [FF]            |
| Link Access Protocol    | [NRM ]          | [NRM ]          |
| Session End Protocol    | [NOTIFY+UNBIND] | [NOTIFY+UNBIND] |

<ESC>=QUIT   <SPACE>=CHANGE   <ARROWS>=MOVE

**Figure 2-6 3270 SDLC Host Link Setup Form**

This form describes the physical connection parameters to the host system using the SDLC connection. Notice that there are two lines described for each host connection possible on the SNA/SDLC card.

### 3270 SDLC Host Link Setup Form - Fields

**State** [Toggle Field] The line may be set to either *ON*, or *OFF*.

**Clock Source** [Toggle Field] The line may be set to either *EXTERN* (default), or *INTERN*. Please note that most connections use the *EXTERN* option. Use of the *INTERN* option should only be used in explicit cases as a special cable and other considerations need to be made when using this option.

**Line Speed** [Toggle Field] Line speeds selections are 300, 1200, 2400, 4800, 9600, 19200, 38400, 56000, 57600, 64000, 100K, 200K, 500K, and 1.544M Baud. Toggle to the speed setting provided by the System Administrator.

**Duplex** [Toggle Field] Line communication can be either *FULL* or *HALF* duplex. It must be half-duplex if more than one line is connected to an MSU (Multi-station Sharing Unit - Line Sharing Device or MUX) otherwise, the server does not release control of the line to other devices on the MSU.

**Half Duplex RTS Delay** [Text Field] When implementing half duplex data communication schemes, it is common for the host to experience a slight delay in line turnaround time, especially if a line sharing device (MSU or MUX) is used. This value is in milliseconds. The default value (10ms) should be used as a starting point in controller setup. If you are experiencing data errors, missing frames, data timeouts, etc., setting this to a higher value increases the amount of time the controller waits for a line turnaround to occur. Values for this field can range from 0 to 999.

**NRZ/NRZI Encoding** [Toggle Field] The method for encoding data for transmission can be either *NRZ* (non-return to zero) or *NRZI* (non-return to zero inverted). This value must match the encoding parameter as set on the host system and is provided by the host system administrator. If this value does not match the host parameter, the system does not operate.

**Max Data** [Toggle Field] The Max Data field is used to set the maximum size of the data blocks sent from the host system. The default value for this field is 521. This value is supplied by the host system administrator and must match the value as set on the host. Toggle values for this field are 261, 265, 517, 521, 1029, 1033, 2052, or 2057. If this value does not match the value as set on the host system, intermittent session and/or line drops may occur.

**Max Outstanding Frames** [Text Field] The max outstanding frames field corresponds to the host setup field option of the same name. It controls the number of SNA frames that can be transmitted before an acknowledgment is required. If this value does not match the host value, data frames may be missed, sessions may hang, and/or session drops may occur.

**Primary Station Address** [Text Field] Enter the unique SDLC address of the line, which is 2 hex digits (01 to FF). The default value of FF is used

in most cases, but may be different depending on the host system. Verify this value with the host system administrator.

**Link Access Protocol** [Toggle Field] The link access protocol defines which manner the server interprets the protocol from the host system. This is a toggle field with values of *NRM*, *QLLC*, and *LLC2* and values must match the parameters as set by the host system administrator as these may vary depending on the host computer system. The default for this field is *NRM* and can be used with most host systems. Selection at this field depends on the host computer environment.

**Session End Protocol** [Toggle Field] The Session End Protocol Option determines the method used to end a 3270 session. The selections are *NOTIFY+UNBIND*, *TERMSELF*, *LUSTAT*, *LUSTAT+DRI*, and *NOTIFY*. The default is *NOTIFY+UNBIND* and can be used with the majority of mainframe hosts. Selections used here depend upon the host.

When the form is complete, press the <Esc> key. If changes were made to the form, a confirmation prompt is presented. Press <Y> to save the changes.

### **Controller Setup - 3270 Token Ring and SDLC**

Select *Controllers* from the *3270 Token Ring Network Menu* or from the *3270 SDLC Network Menu* to display the *Controller Setup Forms* shown in Figures 2-5 (Token Ring) and 2-6 (SDLC). Connection information, supplied by the Host System Administrator, is entered on this form. The SDLC and TR forms have no differences and both are discussed here. Form fields are explained following each figure. The type of field, toggle, text, or display is also listed.

| SNA SDLC 3270 Controller Setup |        |      |         |            |         |
|--------------------------------|--------|------|---------|------------|---------|
|                                | Status | Line | Address | XID        | Devices |
| 1                              | [on ]  | [1]  | [01]    | [01700001] | [32 ]   |
| 2                              | [off]  | [1]  | [02]    | [01700002] | [32 ]   |
| 3                              | [off]  | [1]  | [03]    | [01700003] | [32 ]   |
| 4                              | [off]  | [1]  | [04]    | [01700004] | [32 ]   |
| 5                              | [off]  | [1]  | [05]    | [01700005] | [32 ]   |
| 6                              | [off]  | [1]  | [06]    | [01700006] | [32 ]   |
| 7                              | [off]  | [1]  | [07]    | [01700007] | [32 ]   |
| 8                              | [off]  | [1]  | [08]    | [01700008] | [32 ]   |
| 9                              | [off]  | [2]  | [09]    | [01700009] | [32 ]   |
| 10                             | [off]  | [2]  | [0A]    | [0170000A] | [32 ]   |
| 11                             | [off]  | [2]  | [0B]    | [0170000B] | [32 ]   |
| 12                             | [off]  | [2]  | [0C]    | [0170000C] | [32 ]   |
| 13                             | [off]  | [2]  | [0D]    | [0170000D] | [32 ]   |
| 14                             | [off]  | [2]  | [0E]    | [0170000E] | [32 ]   |
| 15                             | [off]  | [2]  | [0F]    | [0170000F] | [32 ]   |
| 16                             | [off]  | [2]  | [10]    | [01700010] | [32 ]   |

<ESC>=QUIT   <SPACE>=CHANGE   <ARROWS>=MOVE

**Figure 2-7 SDLC 3270 Controller Setup Form**

### Controller Setup Form - Fields

**Status** [Toggle Field] This field activates or deactivates the controller from the host link. Values for this field are *ON* or *OFF*.

**Line** [Toggle Field] The line parameter is used to select which host connection or line number (as set in the *Links* setup form) is used to attach to the host system.

**Address** [Text Field] Enter the unique SDLC address of the controller attached to the line, which is 2 hex digits (01 to FF). The default value *nn* of this field must be matched to the controller address as provided by the host system administrator. Typically, but not always, this value matches the last two characters of the controller's XID. Again, this value must match the controller address setting as defined by the host system administrator.

**XID** [Text Field] This value is provided by the host system administrator because controller XID (exchange identifier) addresses are set in the host system at the controller definition level. These values are sometimes generated by the controller definition on the host or they can be set by the host system administrator. In any case, this value must match the XID parameter for the controller definition on the host system.

**Devices** [Toggle Field] This setting allows configuration of the maximum number of LUs (logical units) that can be established on the defined controller. Values for this field can be 8, 16, 32, 64, 128, or 254. This value sets the number of LUs that can be managed by the PowerNet server. This setting should match the controller settings as defined on the host system. If the value for this field as set on the server exceeds the allowable number of LUs as defined on the host, terminals mapped to unallowed LUs are not be able to attach to the host system.

**Caution** Keep in mind that this value can be set to exceed the number of active terminal sessions that the server may be configured to support. Although this may be true, the server as configured only permits the allowable number of active terminals in session with the host computer at any one time.

### TN3270 Setup

Select *Setup* from the *TN3270 Network Menu* to display the *TN3270 Setup Form* shown in Figures 2-9. Connection address information, supplied by the host system administrator, is entered on this form. Selection of the station addresses is accomplished by toggling through the available connections as set under TCP/IP Addresses from the TCP/IP Network Menu. See the TCP/IP manual for TPC/IP address setup information.

```

                                TN3270 Setup

                                Hosts
0 [trn2501p      ] 4 [trn2001a      ]
1 [trn2001a     ] 5 [trn2501a     ]
2 [trn10001    ] 6 [trn2501p     ]
3 [trn1000r    ] 7 [ttysrv       ]

<ESC>=QUIT  <SPACE>=CHANGE  <ARROWS>=MOVE

```

**Figure 2-8 TN3270 Setup Form**

### SNA Startup

After configuring the necessary host connection links and controllers, the host network link must be started. Return to the *Operations Menu* and select *SNA Startup*, then press <Enter>. The process begins and an on-screen list of events are displayed as they occur, as illustrated below.

```

SDLC Start UP
Status check ...

```

```

SDLC Server
Server ...
Entering GCOM event monitor at Fri Aug 13 13:51:19
Press <Enter> to continue

```

Press <Enter> and the *Operations Menu* reappears.

## LU Mapping

LU mapping, common to 3270 SDLC and Token Ring, is used to map specific terminal addresses to specific LU sessions on the host computer system. This setup aids in locating specific terminals/LU sessions in determining any systems related issues. In some environments, it is also possible to tie applications to specific LUs, thus eliminating, in some cases, extra security requirements. An example of the LU mapping screen is shown below in figure 2-9.

To allow terminals to map to different LU sessions, simply type the terminal address in the field next to the LU session number.

| SNA LU Session Mapping |      |      |            |    |      |            |    |      |   |
|------------------------|------|------|------------|----|------|------------|----|------|---|
| CONTROLLER             | LU   | TERM | CONTROLLER | LU | TERM | CONTROLLER | LU | TERM |   |
| SD-1                   | 3270 | 2    | [65        | ]  | SD-1 | 3270       | 18 | [81  | ] |
| SD-1                   | 3270 | 3    | [66        | ]  | SD-1 | 3270       | 19 | [82  | ] |
| SD-1                   | 3270 | 4    | [67        | ]  | SD-1 | 3270       | 20 | [83  | ] |
| SD-1                   | 3270 | 5    | [68        | ]  | SD-1 | 3270       | 21 | [84  | ] |
| SD-1                   | 3270 | 6    | [69        | ]  | SD-1 | 3270       | 22 | [85  | ] |
| SD-1                   | 3270 | 7    | [70        | ]  | SD-1 | 3270       | 23 | [86  | ] |
| SD-1                   | 3270 | 8    | [71        | ]  | SD-1 | 3270       | 24 | [87  | ] |
| SD-1                   | 3270 | 9    | [72        | ]  | SD-1 | 3270       | 25 | [88  | ] |
| SD-1                   | 3270 | 10   | [73        | ]  | SD-1 | 3270       | 26 | [89  | ] |
| SD-1                   | 3270 | 11   | [74        | ]  | SD-1 | 3270       | 27 | [90  | ] |
| SD-1                   | 3270 | 12   | [75        | ]  | SD-1 | 3270       | 28 | [91  | ] |
| SD-1                   | 3270 | 13   | [76        | ]  | SD-1 | 3270       | 29 | [92  | ] |
| SD-1                   | 3270 | 14   | [77        | ]  | SD-1 | 3270       | 30 | [93  | ] |
| SD-1                   | 3270 | 15   | [78        | ]  | SD-1 | 3270       | 31 | [94  | ] |
| SD-1                   | 3270 | 16   | [79        | ]  | SD-1 | 3270       | 32 | [95  | ] |
| SD-1                   | 3270 | 17   | [80        | ]  | SD-1 | 3270       | 33 | [96  | ] |

<ESC>=QUIT   <ARROWS>=MOVE

**Figure 2-9 SDLC LU Mapping Setup Form**

## Status

Once the appropriate host setup procedures have been implemented and the host communications link has been started, the *Status Form* should be consulted in order to determine the link, controller, and device status of all units configured to the host. Information on this form can help determine if the link is established and if the PU(s) are configured properly.

Select *Status* from the *SDLC Network Menu* or the *3270 Token Ring Network Menu* and the *Status Display Form* shown below appears.

```

*** All Controllers and Links ***
UPA  MODULE  DLPI_STATE  LPA  MUX  BIND  LAP_TYPE  PRIM  SEC  XMIT  RCV
-----
  1   hdlc   info_xfer   1   88   01   nrm_sec   -   01   111   166
Select Controller:

```

**Figure 2-10 Status Display Form**

When this form is displayed, the operator can select the controller to gather the station status from. In this form, the following fields are used:

**UPA** (Upper Point of Attachment) This relates to the controller number of the internally emulated controller of the server. If multiple host connections and adapters are implemented in a server, then multiple controllers (UPAs) are listed here. In order to select a particular controller to examine, select the controller's UPA number, and enter it after the prompt `Select Controller:`

**Module** This field defines the software module associated with the UPA. In the 3270 environment, this is always HDLC.

**DLPI\_STATE** This field provides information regarding the connection state of the emulated controller. Normally, this field displays `info_xfer` for a properly configured controller. Any other display in this field should be noted and controller and/or host parameters adjusted accordingly to correct the situation.

**SEC** This field displays the controller address.

**XMIT** This field displays the number of frames transmitted to the host.

**RCV** This field displays the number of frames transmitted to the controlled from the host.

**Note:** If this value does not contain a number greater than zero (0), a configuration problem is occurring. This problem usually is in the cabling between the host and the server.

## Status Display Form - Fields

The *Status Display Form* is for information purposes only. Fields cannot be changed. The form may consist of multiple pages.

```

UPA MODULE DLPI_STATE LPA MUX BIND LAP_TYPE PRIM SEC XMIT RCV
-----
 1  hdlc  info_xfer   1  88   01  nrm_sec   -   01   111   166
Select Controller: 1
01 LU X25_State SNA mode hdx ff_state FMD_rcvd FMD_sent rcv_last snd_last
 2   Discon   2  FDX Contention          2         0 13:03:28
 3   Dataxfer 3  HDX BracketSnd          2         0 16:15:44
 4   Discon   2  FDX Contention          0         0
 5   Discon   2  FDX Contention          0         0
 6   Discon   2  FDX Contention          0         0
 7   Discon   2  FDX Contention          0         0
 8   Discon   2  FDX Contention          0         0
 9   Discon   2  FDX Contention          0         0
10   Discon   2  FDX Contention          0         0
11   Discon   2  FDX Contention          0         0
12   Discon   2  FDX Contention          0         0
13   Discon   2  FDX Contention          0         0
14   Discon   2  FDX Contention          0         0
15   Discon   2  FDX Contention          0         0
16   Discon   2  FDX Contention          0         0
17   Discon   2  FDX Contention          0         0
Press ENTER to continue

```

**Figure 2-11 Status Display Form, page 1**

**LU**—The number of the logical unit attached (configured) to the controller

**X.25\_State**—The status of the LU should be *Dataxfer* (active) during normal operation of the system. This indicates that the communications link has been established, is in use, and functioning properly.

When the state is *Discon*, it indicates that the LU is available for use but there has been no communication with the host. It also shows that there are no terminals in session with the host. The full-screen emulation option can be used to establish a terminal session with the host. If the emulator is being used, it is assigned to an active LU.

## Line Trace

The *Line Trace Facility* collects link data. The information is displayed with *Line Trace* option.

Understanding the formatted output of the SNA link trace requires some knowledge of SNA protocols. The most useful and comprehensive document is IBM document number GA27-3136-9, *SNA Formats*.

For LU type 2 links, which is the type used by 3270 controllers, the startup sequence requires that the host send an ACTPU frame followed by the appropriate number of ACTLU frames, each of which enables a terminal LU session. Each of

these frames should be responded to positively by the server. In the event negative responses are displayed, a sense code is included in the response. Sense codes and their meanings are described in the above-mentioned IBM, *SNA Formats* manual.

Remember to turn the *Line Trace Facility* **off** after the link is tested and verified as operational. To turn off this facility, the *SDLC/Token Ring Shutdown* must be selected from the *Operations Menu* (see Page 2-5). Next, the **TRACE** option on the *Host Connection Setup Form* must be toggled to **OFF**. The link is then restarted (see *SDLC/TR Startup*).

To select a line trace, select the Line Trace option from the 3270 SLDC menu. A screen similar to the one below appears, allowing the operator to select the particular adapter to trace.

```

*** All Controllers and Links ***
UPA MODULE DLPI_STATE LPA MUX BIND LAP_TYPE PRIM SEC XMIT RCV
-----
 1 hdlc idle_state 1 84 01 nrm_sec - 01 - 0
 2 hdlc idle_state 1 84 02 nrm_sec - 01 - 0
 3 frame UNBOUND 2 88 01 lapb 01 03 - 0
Select link for trace (LPA number):

```

**Figure 2-12 Line Trace Selection Form**

Once a link is selected, the line trace appears on the display of the console. The following pages contain part of a sample *Line Trace*.

### Sample Line Trace

```

NPI Trace Table on lpa 1 at (Rsys 842054650) 08/17/94 08:32:53
  No history table

sna level Trace Table:

IN BOUND: TH: 2c003a010037 OIS -Exp daf 58 oaf 1 Seq 55 : 214 at
841711600
    RH: 039040 FMD Req OIC: DR1 ERI EB
    RU: Length = 205
    f5 c2 11 c1 d4 13 11 more      5B.AM..

OUTBOUND: TH: 2c000143007f OIS -Exp daf 1 oaf 67 Seq 127 : 12 at
841714700
    RH: 0390a0 FMD Req OIC: DR1 ERI BB CDI
    RU: Length = 3
    7d c1 d4                        'AM

```

---

IN BOUND: TH: 2c004301009b OIS -Exp daf 67 oaf 1 Seq 155 : 231 at  
841715000  
RH: 039040 FMD Req OIC: DR1 ERI EB  
RU: Length = 222  
f5 c2 11 c6 d4 13 11 more 5B.FM..

OUTBOUND: TH: 2c0001430080 OIS -Exp daf 1 oaf 67 Seq 128 : 12 at  
841716300  
RH: 0390a0 FMD Req OIC: DR1 ERI BB CDI  
RU: Length = 3  
7d c6 d4 'FM

IN BOUND: TH: 2c004301009c OIS -Exp daf 67 oaf 1 Seq 156 : 231 at  
841716750  
RH: 039040 FMD Req OIC: DR1 ERI EB  
RU: Length = 222  
f5 c2 11 c6 d4 13 11 more 5B.FM..

OUTBOUND: TH: 2c000112000f OIS -Exp daf 1 oaf 18 Seq 15 : 27 at 841761450  
RH: 0390a0 FMD Req OIC: DR1 ERI BB CDI  
RU: Length = 18  
7d c1 60 11 c1 d4 f0 more 'A-.AM0

IN BOUND: TH: 2c0012010013 OIS -Exp daf 18 oaf 1 Seq 19 : 214 at  
841761850  
RH: 039040 FMD Req OIC: DR1 ERI EB  
RU: Length = 205  
f5 c2 11 c1 d4 13 11 more 5B.AM..

OUTBOUND: TH: 2c0001310012 OIS -Exp daf 1 oaf 49 Seq 18 : 37 at 841763200  
RH: 0390a0 FMD Req OIC: DR1 ERI BB CDI  
RU: Length = 28  
7d c2 6a 11 c1 d4 f0 more 'B|.AM0

OUTBOUND: TH: 2c0001120010 OIS -Exp daf 1 oaf 18 Seq 16 : 27 at 841763650  
RH: 0390a0 FMD Req OIC: DR1 ERI BB CDI  
RU: Length = 18  
7d c1 60 11 c1 d4 f0 more 'A-.AM0

IN BOUND: TH: 2c0031010016 OIS -Exp daf 49 oaf 1 Seq 22 : 214 at  
841763800  
RH: 039040 FMD Req OIC: DR1 ERI EB  
RU: Length = 205  
f5 c2 11 c1 d4 13 11 more 5B.AM..

IN BOUND: TH: 2c0012010014 OIS -Exp daf 18 oaf 1 Seq 20 : 214 at  
841764000  
RH: 039040 FMD Req OIC: DR1 ERI EB  
RU: Length = 205  
f5 c2 11 c1 d4 13 11 more 5B.AM..

OUTBOUND: TH: 2c0001300035 OIS -Exp daf 1 oaf 48 Seq 53 : 35 at 841767950  
RH: 0390a0 FMD Req OIC: DR1 ERI BB CDI  
RU: Length = 26  
7d c2 e8 11 c1 d4 f0 more 'BY.AM0

.

.

.

---

```

IN BOUND: TH: 2c002f01009c OIS -Exp daf 47 oaf 1 Seq 156 : 231 at
842035750
    RH: 039040 FMD Req OIC: DR1 ERI EB
    RU: Length = 222
    f5 c2 11 c1 d4 13 11 more      5B.AM..

OUTBOUND: TH: 2c00012f0091 OIS -Exp daf 1 oaf 47 Seq 145 : 38 at
842039650
    RH: 0390a0 FMD Req OIC: DR1 ERI BB CDI
    RU: Length = 29
    7d 40 d3 11 40 4c f1 more      ' L. <1

IN BOUND: TH: 2c002f01009d OIS -Exp daf 47 oaf 1 Seq 157 : 205 at
842039950
    RH: 039040 FMD Req OIC: DR1 ERI EB
    RU: Length = 196
    f5 c2 11 c1 d4 13 11 more      5B.AM..

IN BOUND: TH: 2d0011014cf1 OIS Exp daf 17 oaf 1 Seq 19697 : 11 at
842045700
    RH: 6b8000 SC Req FI OIC: DR1 -ERI
    RU: UNBIND (32) Normal End of Sesion, Length = 2
    32 01                          ..

OUTBOUND: TH: 2d0001114cf1 OIS Exp daf 1 oaf 17 Seq 19697 : 11 at
842045700
    RH: eb8000 SC Res FI OIC: DR1 -ERI
    RU: UNBIND (32) Length = 2
    32 01                          ..

IN BOUND: TH: 2c0011000016 OIS -Exp daf 17 oaf 0 Seq 22 : 76 at 842046100
    RH: 038000 FMD Req OIC: DR1 -ERI
    RU: Length = 67
    15 40 e6 c5 d3 c3 d6 more      . WELCO

OUTBOUND: TH: 2c0000110016 OIS -Exp daf 0 oaf 17 Seq 22 : 9 at 842046100
    RH: 838000 FMD Res OIC: DR1 -ERI

OUTBOUND: TH: 2c00012f0092 OIS -Exp daf 1 oaf 47 Seq 146 : 28 at
842051150
    RH: 0390a0 FMD Req OIC: DR1 ERI BB CDI
    RU: Length = 19
    7d c1 61 11 c1 d4 f5 more      'A/.AM5

IN BOUND: TH: 2c002f01009e OIS -Exp daf 47 oaf 1 Seq 158 : 233 at
842051550
    RH: 039040 FMD Req OIC: DR1 ERI EB
    RU: Length = 224
    f5 c2 11 c6 d4 13 11 more      5B.FM..

```

## sna level Probe Trace Table:

```

008500 Hist Type 44      ( 18) 2d 00 00 00 06 b1 6b 80
237955950 Hist Type 44      0A->0C DISC extra=0000 bfrp=0
othr=0
237959750 Hist Type 44      ( 18) 2d 00 00 00 51 83 6b 80
421899000 Hist Type 44      0A->0C DISC extra=0000 bfrp=0

```

```

othr=0
426460350 Hist Type 44      (  18) 2d 00 00 00 02 61 6b 80
550424450 Hist Type 44      0A->0C DISC extra=0000 bfrp=0
othr=0
561426800 Hist Type 44      (  18) 2d 00 00 00 02 3d 6b 80
203 03e OIt 84186 18 18 e8 11 52203 03e OIt 84186 18 18 e8
11 52203 03e OIt 84186 18 18 e8 11 52203 03e OIt 84186 18 18
e8 11 52203 03e OIt 84186 18 18

```

### Adapter Test (SDLC Only)

Adapter Test is used to test the SDLC host link adapter. This test ensures that the SDLC adapter is functioning internally with the server software. To activate the test, select *Adapter Test* from the *3270 SDLC* menu and follow the instructions on the screen.

**Caution** Do not run the adapter test on a live system! Doing so disconnects any active users because the active SDLC link needs to be brought down during this test.

```

SDLC Hardware Check
Are you sure you want to shutdown the SDLC network (y/n)?

```

**Figure 2-13 Adapter Check SDLC shutdown screen**

After shutting down the SDLC connection, the following tests and results are displayed for a properly operating adapter.

```

Are you sure you want to shutdown the SDLC network (y/n)? y

Starting dlpitst at Thu Sep 26 16:42:57 1996
Test 1 Connection established: lpa 1 bind 1 pid 8541
Data test 1 lasted 9 seconds.
Test 1 sent 50 msgs      6400 bytes for    5 msgs per second or    5688 baud.
Test 1 rcvd 50 msgs      6400 bytes for    5 msgs per second or    5688 baud.

Starting dlpitst at Thu Sep 26 16:43:06 1996
Test 1 Connection established: lpa 1 bind 1 pid 8542
Data test 1 lasted 15 seconds.
Test 1 sent 50 msgs      50 bytes for    3 msgs per second or    26 baud.
Test 1 rcvd 50 msgs      50 bytes for    3 msgs per second or    26 baud.

UPA MODULE DLPI_STATE LPA MUX BIND  LAP_TYPE PRIM  SEC      XMIT      RCV
-----
 1  hdlc    UNBOUND   1  74   01      abm   01   03      140      140

Deactivating SNA test server
Press ENTER to continue

```

**Figure 2-14 Adapter Check screen**

## Driver Test (SDLC only)

Use this option to test the SDLC host link adapter driver software. This test is useful to ensure that the SDLC driver is functioning internally with the server software.

**Caution** Do not run the driver test on a live system. Doing so disconnects any active users because the active SDLC link needs to be brought down during this test.

```
SDLC Driver Software Check
Are you sure you want to shutdown the SDLC network (y/n)?
```

**Figure 2-15 Driver Check SDLC shutdown screen**

After shutting down the SDLC connection, the following tests and results are displayed for a properly operating adapter.

```
Starting dlpitst at Thu Sep 26 16:49:50 1996
Test 1 Connection established: lpa 1 bind 1 pid 8556
Data test 1 lasted 7 seconds.
Test 1 sent 1000 msgs 128000 bytes for 142 msgs per second or 146285 baud.
Test 1 rcvd 1000 msgs 128000 bytes for 142 msgs per second or 146285 baud.

Starting dlpitst at Thu Sep 26 16:49:57 1996
Test 1 Connection established: lpa 1 bind 1 pid 8557
Data test 1 lasted 6 seconds.
Test 1 sent 1000 msgs    1000 bytes for 166 msgs per second or   1333 baud.
Test 1 rcvd 1000 msgs    1000 bytes for 166 msgs per second or   1333 baud.

UPA      CDI_State Frames-out  Frames-in  wd mf af      receive-errs  xmt-errs
-----  -
 1  INPUT_ALLOWED      6994       6994      0 0 0      0  0  0      0  0
-----  -

Deactivating SNA test server
Press ENTER to continue
```

**Figure 2-16 Driver Check Screen**

This page intentionally left blank.



To enter a new selection, use the right or down <Arrow> keys to place the cursor on a blank line under the *Menu Name* column. This is the name of option as shown on the RF terminal. Upper case and lower case keys can be used, and are reflected in the option name as it appears on the terminal. Press the right <<Arrow> to proceed to the *Handler* field. This is a toggle field and the <Tab> key is used to change the selection to 3270. The handler refers not only to the type of connectivity that the application or host work under, but also to the software that processes (handles) that application/host in the PowerNet server.

Once the *3270 Handler* is selected, press the <Enter> key to view the *3270 Handler Setup Form* (see Figure 3-2) to further customize the use of this software. If *Quick Start* operation is being implemented, customization should not be necessary.

```

[SD3270      ]          3270 Handler Setup  Page 1

      Keyboard
      End Key [pf10 ]
      Hot Key [pf1  ]
      Auto Send Key [tab  ]
      Key Click [on  ]
      Case Conversion [none ]
      Scanner
      Send Key [enter ]
      LXE Option [off]
      Scan Ahead [1  ]
      Display
      Quadrant Mode [on  ]]
      Lock Row [0  ]
      Lock Column [0  ]
      Scroll Mode [full]
      Wait Message [on  ]

      Alarm
      Mode [bell ]
      Volume [hi  ]
      Duration [150 ]
      Frequency [0  ]
      Scan Duration [300 ]
      Scan Frequency [0  ]
      Allow Multiple [yes]
      By Attribute [off]
      Protected [no  ]
      Unprotected [no  ]

      Printer
      Type [none  ]
      Init Object [    ]
      Flag Byte [0  ]
      Flag Row [0  ]
      Flag Column [0  ]
      Clear Key [noop ]

      Formatter
      Object [    ]
      Alt. Key [noop ]
      Dialog
      Object [DFLT  ]
      Timers
      Radio [120]
      Power [300]
      Backlight [0  ]
      TN3270
      Host Number [0  ]

      <ESC>=QUIT <SPACE>=CHANGE <ARROWS>=MOVE <CTRL><B>=PGUP <CTRL><F>=PGDN

```

**Figure 3-2 3270 Handler Setup Form - Page 1**

```

[SD3270      ]      3270 Handler Setup Advanced Page 2

      Keyboard
Mapping Object [      ] Mapping Object [      ] Source [0 ]
      Auto EOF [off]      Language [english ] Destination [0 ]
      Attribute Key
      Key [noop ]      Reverse Video [on ]      Row Count [0 ]
      Scan Field [off]      Default Data [off]      Move Blank [no ]
      Keyed Field [off]      Cursor [hard]
      Last Field Keys
      Scanned Input [noop ]      Double High [no ]      Keypalive
      Keyed Input [noop ]      Double Wide [no ]      Minutes [30]
      Multiple Fields [yes]      RF Polling
      Initial [4 ]
      Scanner
      Length Check [off]      AP Polling
      Truncation [off]      Primary/Min [2 ]      Final [32]
      Stripping [off ]      Max [0 ]
      Binary-128 [off]      Algorithm [0 ]
      Scanner Type [Laser      ]
      Scanner Objects
      Data Mapping [      ]
      Data Editor [      ]

      Relocation
      Destination [0 ]
      Row Count [0 ]
      Move Blank [no ]
      Keypalive
      Minutes [30]
      Send Key [noop ]
      Log Levels
      General [4]
      Display [0]
      Formatter [3]
      Dialog [0]
      Datastream [0]
      SNA [0]

      <ESC>=QUIT <SPACE>=CHANGE <ARROWS>=MOVE <CTRL><B>=PGUP <CTRL><F>=PGDN

```

Figure 3-3 3270 Handler Setup Form - Page 2

```

[SD3270      ]      3270 Handler Setup Advanced Page 3

      Alarm Messages
      Trigger Count [0 ]
      Starting Row [1]
      Message 1 [      ]
      Message 2 [      ]
      Printer
      Start [      ]
      End [      ]
      Start Convert [      ]
      End Convert [      ]
      VT100 Extension
      Start [      ]
      End [      ]
      Printer Convert
      Flag Byte [0 ]
      Conversion [crnl]
      Data Stream
      Send All MDT [yes]
      Send NULL [yes]
      <ESC>=QUIT <ARROWS>=MOVE <CTRL><B>=PAGEUP <CTRL><F>=PAGEDN

```

Figure 3-4 3270 Handler Setup Form - Page 3

```

[SD3270      ]      3270 Handler Setup Advanced Page 4

      Keyboard
      Clear First [off]
      Key Wrap [off]
      Display
      Show Prompt [off]

      <ESC>=QUIT <SPACE>=CHANGE <ARROWS>=MOVE <CTRL><B>=PGUP <CTRL><F>=PGDN

```

Figure 3-5 3270 Handler Setup Form - Page 4

If the *3270 Handler* is to be customized, proceed with the *3270 Handler Setup Form* section. If not, use the *Quick Start* instructions in the next paragraph.

For *Quick Start*, use the right <Arrow> key to proceed to the *Active* field on the *Host List Setup Form*. Initially, a *Host List* option is not active. Use the <Tab> key to toggle the *Active* field to *Yes*. It now appears in the *Host List* on the RF terminal when the list is displayed. The *Custom Options* field on this form should be left blank, unless Release Notes, which can accompany the package, indicate otherwise.

## 3270 Handler Setup Forms

This form (actually four pages of on screen material) contains fields for pulling together all available 3270 customization features, such as Dialog Scripts and reformatted Host screens, for Host List options. In addition, this *Handler Setup Form* lets you customize additional items, including RF terminal keys, bells, transmission modes, **tap500.HEX** operation, the data stream, and RF terminal logs. Toggle between setup pages by the <CTRL><B>=PAGEUP or <CTRL><F>=PAGEDN noted at the foot of each page. (In the name **tap500.HEX**, 500 is the version number.)

Certain fields may have sub-screens, which are included with the option. Once the sub-screen is explained, the discussion returns to the *3270 Handler Setup Form*. The setup form is divided into sections that allow the user to configure certain features of the remote terminal operations such as keyboard, display, printer, alarms, formatter, and relocation. Each section and its appropriate fields are described below.

**Menu Name** [Display Field] This field in the upper left corner of the screen displays the name of the Host or application as it appears on the *Host List*. This name is entered on the *Host List Setup Form*. It cannot be changed here.

### Setup Form - Page 1 Keyboard Section

**End Key** [Toggle Field] - Default pf10. Select the RF terminal key which must be pressed to terminate a session between an RF terminal and the host. The selections are *pf1-pf24*, *pa1-pa3*, *enter*, *tab*, *baktab*, *clear*, *sysreq*, *e\_eof*, *reset*, *noop* and *attn*.

**Hot Key** [Toggle Field] - Default *noop*. Using the Hot Key feature of the PowerNet server controller allows the operator to dynamically switch between active host sessions on the remote terminal. In other words, the operator can \switch between an active 3270 session, a VT100 session to another host, and a VT220 session to yet another host.—

All without having to logout of one system to attach to another. Up to 4 'hot' sessions can be active for a particular terminal at any given time. Keep in mind though each active terminal session essentially uses the equivalent processing needs of another physical remote RF terminal. Therefore, if a PowerNet Controller is configured to handle 16 terminals and the application requires two active sessions per terminal, then only 8 'real' terminals can be used on the system at any one time.

Select the RF terminal key which must be pressed to select hot sessions between an RF terminal and the host. The selections are *pfl-pf24*, *pa1-pa3*, *enter*, *tab*, *baktab*, *clear*, *sysreq*, *e\_eof*, *reset*, *noop* and *attn*.

**Auto Send Key** [Toggle Field] This field only applies to entries that are keyed in manually and does not affect scanned data. The key selected in this field is sent automatically as a key press after the data field is filled. This key is sent regardless of the entry in the previous field. When set to a value other than *noop*, this option instructs the terminal software to transmit the field data automatically when the user keys in the last character of an input field, followed by the specified Auto Send Key. This key does not affect scanned input; that is, even if the scanned data exactly fills the field, the designated *Scan Termination Key* is transmitted along with the data, rather than the *Auto Send Key*. The selections are *pfl-pf24*, *pa1-pa3*, *enter*, *tab*, *baktab*, *clear*, *sysreq*, *e\_eof*, *reset*, *noop* and *attn*. The default is *tab*

**Key Click** [Toggle Field] Field may be set to *on* or *off*. If *on*, the terminal or keyboard clicks when operated.

**Case Conversion** [Toggle Field] Applications may be case-sensitive or case-insensitive. Select the required case, *upper* or *lower* and all characters sent from the terminal are in that case. Select *none*, which is the default, if the application is not case sensitive.

## Setup Form - Page 1 Scanner Section

**Send Key** [Toggle Field] Select the key function that is sent to the 3270 Host after a bar code is scanned. The key is not pressed, but is entered automatically after the data, by the system. The selections are *pfl-pf24*, *pa1-pa3*, *enter*, *tab*, *baktab*, *clear*, *sysreq*, *e\_eof*, *reset*, *noop* and *attn*. The default is *enter*. Use *noop* (no operation) when a key should not be sent.

**LXE Option** [Toggle Field] Select *on* and scanner operates with LXE applications. Default is *off*.

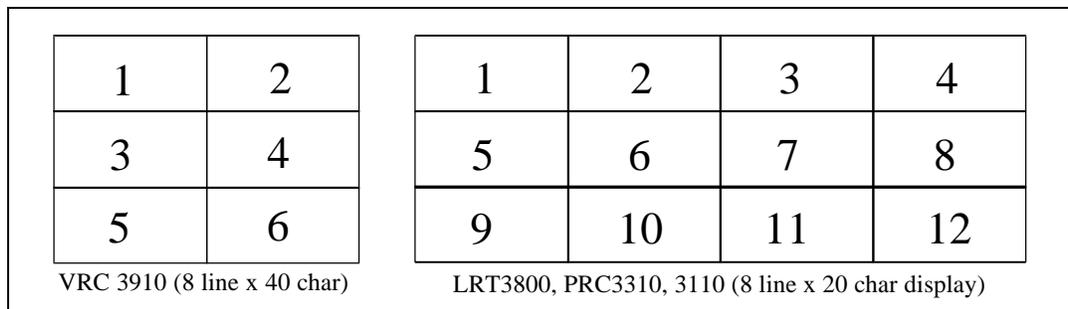
**Scan Ahead** [Text Field] This field makes use of a terminal buffer that allows the operator to quickly scan and store several bar codes. The scans are then sent to the host. Enter the number of scans that can be stored. The default is 1 and the valid entries are 0 - 24. When set to 0, the Scan Ahead feature is disabled and only one bar code can be scanned at a time.

### Setup Form - Page 1 Display Section

**Quadrant Mode** [Toggle Field] The field selections are *on*, *off*, *soft*, *hard*, or *lock*. Quadrants refers to the division of the terminal screen which varies for different types of terminals. Since different terminal types, due to their physically smaller screen sizes, can only display a portion of the whole host presentation space at any one time, the PowerNet controller only sends information to the terminal that can be shown to the user. This feature makes efficient use of the RF bandwidth by sending only pertinent data to the remote RF terminal at any given time. The VRC 3910, LRT 3800, and PRC 3310 quadrant areas are shown in Figure 3-4. The windowing keys for the terminal (usually the arrow keys) displays other areas.

**OFF**— The default for Quadrants option is *off*. Usually *off* gives the best view of the screen that the host is sending to the terminal since the display on the terminal screen follows the host input field cursor.

**ON**— When Quadrants is set to *on*, the terminal displays one defined area of the full host screen at a time. If a field crosses the boundary of quadrants, the terminal display centers on the field as if the option was *off*. If the host screens were designed with these divisions in mind, turning Quadrants *on* can improve screen display.



**Figure 3-6 Terminal Screen Quadrants**

**SOFT**—When Quadrants is set to *soft*, the terminal displays one defined area of the full host screen at a time, even if a field crosses a boundary.

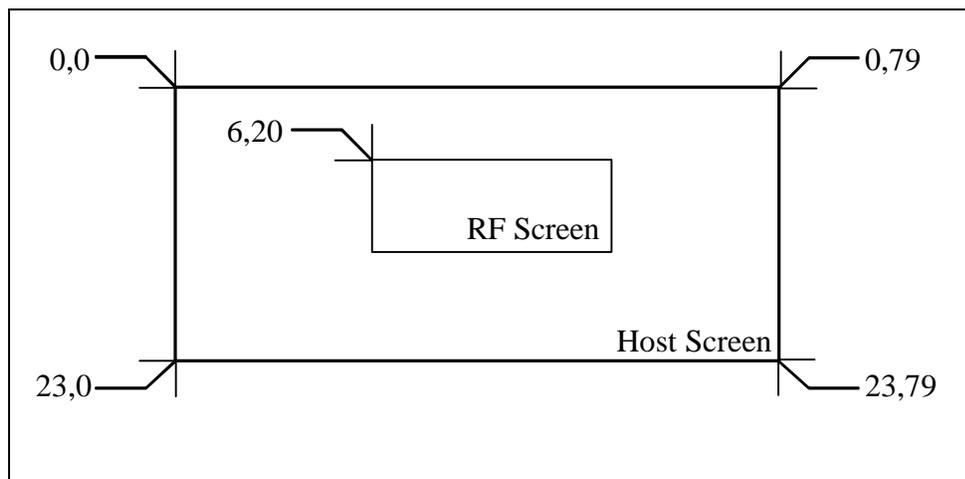
Windowing keys are available to change the display to different areas of the screen.

**HARD**—Setting the Quadrants option to *hard*, is similar to *soft*, except that the windowing keys are not available to change the display.

**LOCK**—When *lock* is selected, the display is locked into showing a certain area of the screen, which is specified with row and column coordinates. These positional coordinates define the upper left-hand corner of the display. Windowing keys are not available with this option. The **Lock Row** and **Lock Column** fields for lock coordinates are found on the second page of this form. With Quadrants set to *lock* and the **Lock Row** set to *6* and **Lock Column** set to *20*, Figure 3-5 shows the portion of the host screen displayed on the terminal screen.

**Lock Row** [Text Field] Applies only when quadrants is set to *lock*. Enter the row number of the host screen where the terminal display begins. The limits are 0 to 23. The default is zero (0).

**Lock Column** [Text Field] Applies only when quadrants is set to *lock*. Enter the column number of the Host screen where the terminal display begins. The limits are 0 to 79. The default is zero (0).



**Figure 3-7 Host Screen Coordinates With RF Screen**

**Scroll mode** [Toggle Field] The selections are full and half. Screen scrolling for up, down, left and right is controlled by this option. When *full* is selected for an 8 by 20 screen, the screen scrolls up/down 8 rows. If *half* is selected, it scrolls up/down 4 rows. For left/right, *full* scrolls 20 columns and *half* scrolls 10. The default is *full*.

**Wait Message** [Toggle Field] The wait message displays “Waiting for data” on the last line of the screen if the RF terminal is waiting for data or some response from the host after passing a transaction to the host. This message activity can be turned *on* or *off*. The default is *on*.

### Setup Form - Page 1 Alarm Section

The fields for *Alarm* options are available for application programmers to add features that enhance host screens on RF terminals.

#### Alarm Options Group

|                      |                |   |
|----------------------|----------------|---|
| <b>Mode</b>          | [Toggle Field] | Defines the operation of the audible alarm and scanner light on the terminal. The default value is <i>bell</i> . <i>off</i> disables the audible alarm; <i>bell</i> enables the audible alarm as a double beep; <i>flash</i> enables the scan indicator light as alarm with no audible alarm; <i>both</i> enables the double beep and the scan indicator light as alarm; <i>spec1</i> enables audible alarm as a single beep; <i>spec2</i> enables a single beep and scan indicator light as alarm. |
| <b>Volume</b>        | [Toggle Field] | Defines the volume of the audible alarm on the terminal. Default value is <i>hi</i> .   |
| <b>Duration</b>      | [Text Field]   | Defines the duration of the audible alarm on the terminal in milliseconds. The alarm mode must be set to <i>spec1</i> or <i>spec2</i> for duration to take effect. The default value is <i>150</i> .  |
| <b>Frequency</b>     | [Text Field]   | Defines the frequency of the audible alarm on the terminal in Hertz. The alarm mode must be set to <i>spec1</i> or <i>spec2</i> for frequency to take effect. The default value is zero (0) which represents the factory set default frequency considered to be optimum for the particular model of terminal.   |
| <b>Scan Duration</b> | [Toggle Field] | Defines the duration of the audible alarm generated by a scan operation on the terminal, in milliseconds. The alarm mode must be set to <i>spec1</i> or <i>spec2</i> for scan duration to take effect. The default value is <i>300</i> .  |

|                                      |  |
|--------------------------------------|--|
| <b>Scan Frequency</b> [Toggle Field] | Defines frequency of audible alarm generated by a scan operation on the terminal, in Hertz. The alarm mode must be set to <i>spec1</i> or <i>spec2</i> for scan duration to take effect. The default value is 0 which represents the factory set default frequency considered to be optimum for the particular model of terminal. This parameter, combined with the <i>scan duration</i> parameter, allows system administrators to configure alarm sounds differently in order for users to differentiate between alarms and scan decode tones. |
| <b>Allow Multiple</b> [Toggle Field] | Enables/disables the processing of multiple alarm commands generated by the host application in a single terminal update sequence. If this field is set to <i>yes</i> and the host sends down multiple bells on a screen, the alarm on the terminal beeps as set for each of the bell commands. If this field is set to <i>no</i> , the bells are combined and the terminal only gives one alarm. The default value is <i>yes</i> .  |
| <b>By Attribute</b> [Toggle Field]   | Enables/disables alternate processing. Values are <i>off</i> (the default), <i>pen</i> for lightpen attribute, <i>num</i> for numeric, attribute, <i>hi</i> for high intensity attribute, <i>hal</i> for high intensity and lightpen.  |
| <b>Protected</b> [Toggle Field]      | Enables/disables alarms on protected fields  |
| <b>Unprotected</b> [Toggle Field]    | Enables/disables alarms on unprotected fields  |

### Setup Form - Page 1 Printer Section

**Type** [Toggle Field] This field selects printer type. Match this field with the desired printer type. Allowable printer types at the time of this writing are *none*, *ps1000*, *ps1001*, *ps1004*, *monarch*, *pddumb*, *comtec*, and *rascal*. Default is *none*. **Note: The print data limit is 1.5 K.**

**Init Object** [Toggle Field] This field contains the file name used for printer trouble shooting or printer initialization. This field toggles through any available printer initialization files that may exist on the PowerNet server. It is possible that for trouble shooting, a file could contain the actual target printer commands to print a test label. When *TAP* is booted, it sends the contents of the files, as is, to the printer. This procedure insure the proper printer type is selected, the cabling is

correct and the printer is functional. It can also be used to send printer setup commands to the printer if needed. Unless this object is used for printer initialization, remove this entry or it cause a test label to be sent every time the terminal is re-booted. The options are *rascal*, *comtec*, or *blank*; the default is *blank*.

**Caution** This file must be in the exact image that the printer requires. As an example some printer requires a Carriage Return and Line feed to end printer commands. If this file was created using a UNIX editor, each line only contains a line feed and not the carriage return. For additional information regarding printer commands, please reference the programming manual of the printer.

**Flag Byte** [Text Field] This is the byte used as the signal byte for printing. The presentation space of each screen from the host is examined for this byte (a decimal ASCII value as converted from the EBCDIC value). It signals that the data following is printer data rather than screen data. The starting byte location is defined in the following *Flag Row* and *Flag Column* handler options. After the *Flag Byte*, the handler searches the data stream for another flag byte to signal the end of the print data. In other words, the data encapsulated between the two *Flag Bytes* are sent to the printer. The selection of the flag byte should be a byte (within a range of 0 to 127) which normally does not occur within the host application or contained within the print data. Default is 0 (zero).

**Flag Row** [Text Field] This is the row (within a range of 0 to 23) where the flag byte starts. **Flag Row** allows the software to narrow its search for the flag byte. **Caution:** This is a zero (0) based number where the lowest row (top of the screen) is zero (0). Default is 0 (zero).

**Flag Column** [Text Field] This is the column number (within a range of 0 to 79) for the flag byte. **Caution**—This is a zero based number where the lowest row (leftmost side of the screen) is zero (0). Default is 0 (zero).

**Clear Key** [Toggle Field] Once printing is completed, this key is sent to the host application to signal that the printer has completed the printing of the label. This insures that the printer is not instructed to print another label before finishing printing the current label. The selections are *pf1-pf24*, *pa1-pa3*, *enter*, *tab*, *baktab*, *clear*, *sysreq*, *e\_eof*, *reset*, *noop* and *attn*. The default is *noop*.

### Setup Form - Page 1 Formatter Section

**Object** [Toggle Field] If the Formatter option is installed on the PowerNet server, select the name of the Formatter object if one has been created for the particular handler/application being configured. It contains the final formatted screens which are sent to the RF terminals. This object is created with the *Screen Formatter* package. Default is *Blank*.

**Alt. Key** [Toggle Field] This field is for use in conjunction with the *Screen Formatter*. When using this package, a key function, other than the **Standard Key**, can be sent to the 3270 Host after a bar code is scanned. Therefore, a choice of two keys, which can be used selectively, exists with the *Formatter*. The selections are *pf1-pf24*, *pa1-pa3*, *enter*, *tab*, *baktab*, *clear*, *sysreq*, *e\_eof*, *reset*, *noop* and *attn*. The default is *tab*. Use *noop* (no operation) when a second key is not used.

### Setup Form - Page 1 Dialog Section

**Object** [Toggle Field] The *Dialog Object* is the file name given to the *Dialog Script* that is executed when this option is selected from the *Host List* on the RF terminal. A default script, *DFLT* is used for *Quick Setup* operation. If a custom *Dialog Script* has been written, and the script is available on the PowerNet server, the script name appears on the selection list. Default is *blank*.

### Setup Form - Page 1 Timers Section

**Radio** [Text Field] Enter the amount of time, in seconds (within a range of 0 to 99), that the RF terminal remains on, while there is no response from the host. When the timer expires, and the host has not responded, the terminal is powered off. The default is 120 seconds. The value zero (0) turns this timer off.

**Power** [Text Field] Enter the amount of time, in seconds (within a range of 0 to 999), that the RF terminal remains powered on when there is no user activity. When the timer expires, the terminal is powered off. The default is 300 seconds. The value zero (0) turns this timer off.

**Backlight** [Text Field] Enter the amount of time, in seconds (within a range of 0 to 999), that the RF terminal has backlighting on the screen, once it is triggered by a key press or scan. When the timer expires, the backlighting on the screen is turned off. The default, zero (0), turns this timer off and the lamp has to be activated by pressing the *<func><l>* keys on the terminal to activate the backlight.

---

## Setup Form - Page 1 TN3270 Section

**Host Number** [Toggle Field] In configuring up to 8 host connection parameters in the TN3270 environment, each host connection setup is assigned a host number. This particular field allows the operator to select the particular host connection that the handler attaches to when selected. Default is 0 (zero).

## Setup Form - Page 2 Keyboard Section

**Mapping Object** [Toggle Field] Key mapping control can be selected from a list keyboard mapping object created using the key map object editors available in the *Object Editors* menu. Use the *Key Mapping Object Utility* to change the RF terminal key that performs the function of the standard 3270 key. When all the keys are mapped, press <Esc> to save this form and return to the *3270 Handler Setup Form*. The default is *blank*.

**Note** Key mapping is designed to be used with Symbol RF terminals that have 3270 keyboard overlays. See *Chapter 1* for ordering information.

**Auto EOF** [Toggle Field] Enables/disables automatic generation of the 3270 Clear to End of Field key. The automatic erase to end of field option can be toggled to either *on* or *off*. When set to *on*, before any data is entered into the field, the field is cleared of existing data, data is scanned or keyed into a field, and the EOF key is generated. In the event the terminal does not transmit any data for the input field (as is the case when only the tab key is pressed), no action is taken. Default is *off*.

## Setup Form - Page 2 Attribute Key Section

**Key** [Toggle Field] Specifies the key that is sent to the host following scanned or keyed input when the field attribute (see below) is present and enabled. Selections are *pf1-pf24*, *pa1-pa3*, *enter*, *tab*, *baktab*, *clear*, *sysreq*, *e\_eof*, *reset*, *noop* and *attn*. Default is *noop*.

**Scan Field** [Toggle Field] Specifies the 3270 field attribute that causes Key to be generated for scanned input. The default value is *off*. Available values for this field are *off*, *pen*, *num*, and *hi*.

**Keyed Field** [Toggle Field] Specifies the 3270 field attribute that causes Key to be generated for keyed input. The default value is *off*. Available values for this field are *off*, *pen*, *num*, and *hi*.

---

## Setup Form - Page 2 Last Field Keys Section

The last field keys section is designed to allow configuration as to how the handler acts when encountering the last available input field on the host presentation space. An example of how this section can be used is to auto-tab between fields on the screen when scanning information into the fields, but then auto-send (xmit) the page to the host after the last field on the screen is entered.

**Scanned Input** [Toggle Field] Specifies the key that is sent to the host if the current field is the last field on a host screen and the input is scanned. The default value is *noop*, which disables this function. The selections are *pf1-pf24*, *pa1-pa3*, *enter*, *tab*, *baktab*, *clear*, *sysreq*, *e\_eof*, *reset*, *noop* and *attn*.

**Keyed Input** [Toggle Field] Specifies the key that is sent to the host if the current field is the last field on a host screen and input is keyed. The default value is *noop*, which disables this function. The selections are *pf1-pf24*, *pa1-pa3*, *enter*, *tab*, *baktab*, *clear*, *sysreq*, *e\_eof*, *reset*, *noop* and *attn*.

**Multiple Fields** [Toggle Field] Specifies whether or not last field key processing takes place if the host display contains more than one input field. The default value is *yes*, which enables this function.

## Setup Form - Page 2 Scanner Section

**Length Check** [Toggle Field] Enables/disables local terminal field length checking. When set to a value of *on*, this option instructs the terminal software to generate an error message when the scanner is in use and the scanned data is longer than the input field. If the data is entered via the keyboard, and the *Auto Send* key is set to *noop*, an error message is generated if the operator fills the field and attempts to key in anything other than a control character, such as *Enter*, *tab*, or a function key. Default is *off*.

**Truncation** [Toggle Field] Enables/disables truncation of scanned inputs to the length of the input field. This option is not applicable if the *Length Check* option is set to *on*. A value of *on* also disables field wrapping. The default value is *off*. For example, if *off* is selected and the length check option is set to *off*, and 12 characters are scanned for entry into a form with three fields that are 4, 3, and 5 characters in length, the scanned data is then distributed across these fields.

**Stripping** [Toggle Field] Strips trailing spaces and/or underscore characters from scanned input. The default value is *off*. The options are *off*, *space*, *score*, and *both*. Allowable parameters for this field are *off*, *space*, *score*, and *both*.

**Binary-128** [Toggle Field] Enables/disables the processing of binary code 128 bar codes on the terminal. The default value is *off*.

**Scanner Type** [Toggle Field] Allows the set up of specific Symbol scanners. See Symbol documentation for details. The default is *Laser*.

### Setup Form - Page 2 Scanner Objects Section

**Data Mapping** [Toggle Field] Selects a previously defined data mapping object that describes how scanned input is mapped. The file name is *<object>.sdm* and is selected from files that exist on the controller. Default is *blank*. An example follows generated by the object editor:

```
#
# Sample scanner data mapping object
#
#BARCODE SCANNED=AID Key Sent;
#If you scan ROZ the gateway will send a tab key to the application.
#
JEFF=enter;
JENNIFER=PF1;
CHARLES=PF2;
ROZ=tab;
GREG=PF24;
```

**Data Editor** Defines the object that describes how scanned input is edited prior to delivery to the host. The object is created by the Scan Editor utility program (*scedit*). File is *<object>.sce*. Default is *blank*.

### Setup Form - Page 2 Display Section

**Mapping Object** Display character mapping object file created with the object editor function from the main menu having the file name *<object>.dcm*. Default is *blank*.

**Language** Defines the character set used for terminal error message displays. The default value is *english*. Allowable parameters for this field are *english, french, german, spanish, and italian*.

**Reverse Video** [Toggle Field] Enables/disables the display of the reverse video attribute on the terminal display. The screen display of the RF terminal can appear as either normal (dark text on a light background) or reverse (light text on a dark background) video provided that the reverse video attribute is used. The default value is *on*.

**Default Data** [Toggle Field] This field can be toggled to *on* or *off*. The default is *off*. When set to a value of *on*, this option causes the handler to include the contents of the input field in the *get* command transmitted to the terminal software. Thus the operator may edit the input field data. As a result, the entire contents of the input field is transmitted by the terminal back to the handler if anything other than a control key

such as *Enter*, *tab* or a function key is pressed. If set to *off*, the field appears as underscores, regardless of what the host is supplying.

**Cursor** [Toggle Field] The appearance of the cursor on the terminal can be set. A *hard* cursor appears as a solid one-character block while a *soft* cursor is an up or down arrow indicating case. Select *hide* to remove the cursor from the screen. The default is *hard*.

**Double High** [Toggle Field] Enables/disables double high display of characters on the terminal. Default value is *no*.

**Double Wide** [Toggle Field] Enable/disables double wide display of characters on the terminal. Default value is *no*.

### **Setup Form - Page 2 RF Polling Section**

**Initial** [Text Field] RF terminals running **tap500.HEX** uses polling as a method of communication with the transceiver. This operation places overhead on the terminal battery thus the poll rate is a factor in determining battery life. The faster the poll rate, the sooner the battery needs recharging. Two rates, and when to switch to them, can be set (see the next two fields). The *initial* poll rate is faster than the *final* poll rate, because it is used when the terminal begins operation and an urgent need to establish communication exists. This rate can then be modified to be relatively faster or slower within its rate boundaries by entering a value in this field. Valid entries are from 1-32, with 1 being the fastest poll rate within this very fast rate interval and 32 being the slowest. The default is 4.

**Final** [Text Field] This rate interval has rates slower than the initial poll rate. The rate can be further adjusted by entering a value from 1-32 as in the previous field. The value 1 gives you the shortest battery life, while 32, the default, gives the longest.

**Switch** [Text Field] This field also affects battery life in that the longer the initial poll rate is used, the more overhead on the battery. Enter the number of seconds after which polling ceases taking place at Poll Rate 1 and commences at the final poll rate. The default is 10 seconds and valid entries are from 1-99.

### **Setup Form - Page 2 AP Polling Section**

**Primary/Min** [Text Field] Sets the minimum polling interval for dynamic algorithms.

**Max** [Text Field] Sets the maximum polling interval for dynamic algorithms.

**Algorithm** [Text Field] Sets the polling algorithm for every nth poll. Polls are sent every 100 msec., so a value of 1 selects 10 polls per second. 1 provides the best performance while 10 provides the best power saving. A value of 11 selects a dynamic that varies from the minimum to the maximum settings above. Dynamic algorithms use minimum if network traffic, maximum if no traffic.

### Setup Form - Page 2 Relocation Section

**Source**—Defines the starting (zero-based) row in a range of 0 to 23 in the host display that is relocated to the Destination row of the host display. The default value is zero (0).

**Destination** Defines the starting (zero-based) row in a range of 0 to 23 in the host display where the starting Source row is located. The default value is zero (0).

**Row Count**—Specifies the number of host display rows in a range of 0 to 23 to be relocated, starting with the row defined by the *Source* option and continuing from top to bottom of the display. A value of zero (0), which is the default, disables row relocation.

**Move Blank**—Enables/disables row relocation based on the absence of non-blank data in the host display area to be relocated. Blank data is defined as null or space characters. The default value is *no*.

### Setup Form - Page 2 Keepalive Section

The next field refers to the *Keepalive* functions. Some 3270 installations may have an inactivity timer to deactivate the session of an idle RF terminal. While this is appropriate for hard-wired terminals, it is not desirable for RF terminals. Inactivity is a measure of terminal activity, a period of time where there has been no entry. The *Keepalive* function allows the defeat of an inactivity timer. *Keepalive* sends a key of your choice to the host at a regular interval when there is no terminal activity. The time of the auto-key entry should be less than the host time out value.

**Minutes** [Text Field] The *Minutes* timer defeats RF terminal connection timeouts by having the PowerNet server send a keystroke to the host. This keystroke appears to be from the terminal and keeps the terminal session alive. Normally a terminal session with the host is terminated if there is no notification within a specific time interval. The host system administrator should supply this timeout interval. Valid data entries are 0-99 minutes. The default, zero (0), turns this timer off.

**Send Key** [Toggle Field] Specifies the key that is sent to the host after the setting *Minutes* of inactivity. The default value is *noop* which disables the *Keepalive* function. The selections are *pf1-pf24*, *pa1-pa3*, *enter*, *tab*, *baktab*, *clear*, *sysreq*, *e\_eof*, *reset*, *noop* and *attn*.

### Setup Form - Page 2 Log Levels Section

The six fields under the term *Log Levels* on the *3270 Handler Setup Form* control levels of information collected by the *RF Log* for various parameters. There are 10 log levels, from 0 to 9, with a level of 9 collecting the most information. Levels of 6 or greater gives hex dumps where appropriate. For all the listed items, a level of zero turns the feature off, and no information is collected.

**General** [Toggle Field] Refers to general log events such as startup and shutdown. The default is 1.

**Display** [Toggle Field] Refers to the 3270 full screen 24 by 80 character Presentation Space information. The default is zero (0).

**Formatter** [Toggle Field] Refers to the *Screen Formatter* information. The default is 0 (zero).

**Dialog** [Toggle Field] Refers to *Dialog Script* information. Default is 0 (zero).

**Datastream** [Toggle Field] Refers to the logical unit protocol debugging information of the data stream. Default is 0 (zero).

**SNA** [Toggle Field] Refers to SNA packet information. Default is 0 (zero).

### Setup Form - Page 3 Alarm Messages Section

The *Alarm Messages* field enables receiving an alarm from the host and sending a message other than that programmed in the host.

**Trigger Count** [Text Field] Sets the number of alarms in a range of 0 to 99 on a host display that triggers the transmission of the *Message* lines to the terminal. The default value is zero (0) which disables this function.

**Starting Row** [Toggle Field] Defines the row in a range of 0 to 23 on the terminal display where *Message 1* is displayed if the *Trigger Count* value is reached. The default value is 1.

**Message 1** [Text Field] The message to be displayed on the terminal after the *Trigger Count* is achieved.

---

**Message 2** [Text Field] The message to be displayed on the terminal on the line immediately following *Message 1*.

### **Setup Form - Page 3 Printer Section**

**Start** [Text Field] Specifies a unique character sequence that, when encountered in the host display area, indicates that all subsequent characters up to but not including the *End* character sequence are to be transmitted to the printer attached to the terminal. The default value is *blank* which also indicates that this option is not in use. **Note: The print data limit is 1.5 K.**

**End** [Text Field] Specifies a unique character sequence that terminates collection of data from the host display area for transmission to the printer attached to the terminal. The default value is *blank* which also indicates that this option is not in use.

**Start Convert** [Text Field] Specifies a unique character sequence within the print data collected with the Start and End options that indicates the subsequent character pairs are hexadecimal values that are converted to binary. A blank value indicates that this option is not in use, which is the default.

**End Convert** [Text Field] Specifies a unique character sequence that terminates binary conversion. The default value is *blank* which also indicates that this option is not in use.

### **Setup Form - Page 3 VT100 Extension Section**

**Start** [Text Field] Specifies a unique character sequence that, when encountered within the host display, indicates that all subsequent characters up to but not including the *End* sequence, are to be interpreted as a VT100 Extended Command. The default value is *blank* which indicates that the option is not in use.

**End** [Text Field] Specifies a unique character sequence that terminates the VT100 Extended Command.

### **Setup Form - Page 3 Printer Convert Section**

**Flag Byte** [Text Field] Specifies the ASCII value in an 0 to 127 range, in decimal, that is converted according to the setting of the *Conversion* option if encountered in a sequence of print data (See Print Options). The default value is zero (0), which disables this function. This is the byte used as the signal byte for printing. The presentation space of

each screen from the host is examined for this byte. It signals that the data following is printer data rather than screen data. The starting byte location must be known. The software then continuously looks for another flag byte to signal the end of the print data. The selection of the flag byte should not occur in normal print data.

**Conversion**—Specifies what the *Flag Byte* is converted to. The options are *crnl*, *cr*, and *nl* which represent ASCII carriage return newline, carriage return, and newline, respectively. The default value is *crnl*.

### **Setup Form - Page 3 Datastream Section**

The fields that affect the *Data Stream* follow. The entries that must be made are determined by Host requirements. Check with the host system administrator or host application programmer for the necessary entries.

**Send All MDT** [Toggle Field] Determines how fields with the *Modified Data* Tag bit set are selected for transmission to the host application. If set to *no*, only unprotected fields modified by the terminal operator are transmitted. If set to *yes*, all fields with the MDT bit set (protected and unprotected) is transmitted. The default value is *yes*.

**Send Null** [Toggle Field] The *Transmit Null* field can be set to either *yes* or *no*. The default is *yes*. If *yes* is selected, all null characters are transmitted to the host. **Note:** For AS400 Hosts, this field should be set to *yes*.

### **Setup Form - Page 4 Keyboard Section**

**Clear First** [Toggle Field] Enables/disables local clearing of the input field by the terminal with the strike of the first non-control key. The default value is *off*.

**Key Wrap** [Toggle Field] Enables/disables long input strings to wrap to then next line of the input field.

### **Setup Form - Page 4 Display Section**

**Show Prompt** [Toggle Field] Enables/disables local underlining of the input field at the terminal. The default value is *off*.

Press <Esc> to save the *Host List Setup Form* and return to the *SDLC/TR Network Menu*.

## 3270 Terminal Emulator

This option provides full screen, 24 by 80, 3270 terminal emulation. It can be run from either the service or dialup modem port. It is useful for verifying the initial installation and for developing Dialog Scripts.

Select *Emulator* from the *SDLC/TR Network Menu* and a prompt, for the LU that is used for establishing a session with the host, appears. Enter the number of an *IDLE LU*. See *Status* on Page 2-14. The host logon or screens (depending upon the script, etc.) appear on the terminal.

If the LU number that is entered has not been defined as *ACTIV*, the host returns the message *INACTIVE*. If the Host system defined the LU as something other than a 3278 Model 2 with a 24 by 80 presentation space, a *SESSION BIND* failure message is returned. Other emulator startup errors may require analysis using the *Line Trace Facility* (see Page 3-17).

The emulator provides the following keyboard translations to accommodate non-3270 keyboards

### Control Keys

<CTRL><Y>  
<CTRL><D>  
<CTRL><X>  
<CTRL><E>  
<DELETE>

### Action

Help  
PS Information  
Exit  
Escape to UNIX Shell  
Abort

### 3270 AID Key Mapping

<TAB>  
<ESC><TAB><ENTER>  
<ESC><C><ENTER>  
<ESC><E><ENTER>  
<ESC><1-24><ENTER>  
<ESC><P><1-3><ENTER>>  
<ESC><S><ENTER>

### Function

Tab  
Backtab  
Clear  
EOF (clear to end of field)  
PF1-24  
PA1-3  
SYSREQ

## LU Mapping

The mapping of LUs to terminals can be changed with this option. When it is selected from the *SDLC/TR Network Menu*, the *LU Mapping Form* shown in Figure 3-7 is displayed.

| SNA LU Session Mapping |      |      |            |    |      |            |    |      |   |
|------------------------|------|------|------------|----|------|------------|----|------|---|
| CONTROLLER             | LU   | TERM | CONTROLLER | LU | TERM | CONTROLLER | LU | TERM |   |
| SD-1                   | 3270 | 2    | [65        | ]  | SD-1 | 3270       | 18 | [81  | ] |
| SD-1                   | 3270 | 3    | [66        | ]  | SD-1 | 3270       | 19 | [82  | ] |
| SD-1                   | 3270 | 4    | [67        | ]  | SD-1 | 3270       | 20 | [83  | ] |

|      |      |    |     |   |      |      |    |     |   |
|------|------|----|-----|---|------|------|----|-----|---|
| SD-1 | 3270 | 5  | [68 | ] | SD-1 | 3270 | 21 | [84 | ] |
| SD-1 | 3270 | 6  | [69 | ] | SD-1 | 3270 | 22 | [85 | ] |
| SD-1 | 3270 | 7  | [70 | ] | SD-1 | 3270 | 23 | [86 | ] |
| SD-1 | 3270 | 8  | [71 | ] | SD-1 | 3270 | 24 | [87 | ] |
| SD-1 | 3270 | 9  | [72 | ] | SD-1 | 3270 | 25 | [88 | ] |
| SD-1 | 3270 | 10 | [73 | ] | SD-1 | 3270 | 26 | [89 | ] |
| SD-1 | 3270 | 11 | [74 | ] | SD-1 | 3270 | 27 | [90 | ] |
| SD-1 | 3270 | 12 | [75 | ] | SD-1 | 3270 | 28 | [91 | ] |
| SD-1 | 3270 | 13 | [76 | ] | SD-1 | 3270 | 29 | [92 | ] |
| SD-1 | 3270 | 14 | [77 | ] | SD-1 | 3270 | 30 | [93 | ] |
| SD-1 | 3270 | 15 | [78 | ] | SD-1 | 3270 | 31 | [94 | ] |
| SD-1 | 3270 | 16 | [79 | ] | SD-1 | 3270 | 32 | [95 | ] |
| SD-1 | 3270 | 17 | [80 | ] | SD-1 | 3270 | 33 | [96 | ] |

<ESC>=QUIT   <ARROWS>=MOVE

### Figure 3-7 LU Mapping Form

To change the terminal assigned to a particular LU, enter the terminal number in the bracketed field to the right of the LU. When changing assignments, you may wish to check the state of the LU first. Only *ACTIV* and *IDLE* LUs should be used.

When the form is complete, press <Esc> and a prompt to save the changes appears.

This page intentionally left blank.

---

## 4 Dialog Language Objects

---

### **Introduction**

Small installations can easily use the *Quick Start* features of the PowerNet 3270 Connectivity Package. Larger sites can benefit greatly from the more robust scripting capabilities that are included.

Dialog scripts are created using the system editor and the Dialog Language. Scripts reduce the impact of inherent differences between genuine, full screen terminals and handheld units. Although the entire host display area and keyboard are processed using both the *Quick Start* and scripting methods, there are two primary reasons for using the script facility—performance and operational simplicity.

The performance of the server is optimized by maintaining a block-oriented, half-duplex flip/flop environment when using *Dialog Language Scripts*. Block-oriented is a term indicating that each exchange consists of a single unit of information. Half-duplex flip/flop describes a network relationship in which the two partners alternate between transmit and receive states.

In contrast, the *Quick Start* environment is a full-duplex contention environment. The communicating partners are always ready to receive and may transmit simultaneously. Radio, being a multiple access network media, does not lend itself well to this kind of environment, due to the transmit collisions. When traffic is low, the collisions are infrequent, but as traffic increases, so do collisions, which affect network performance.

The Dialog Language Script allows the server, rather than the terminal, to deal with the logon screens and unsolicited host updates without involving the radio network. Also, this task is removed from the operator's responsibilities list.

### **3270 Session Overview**

Developing a dialog script for 3270 sessions requires some familiarity with the behavior and terminology associated with 3270 Hosts and terminal networks. The presentation space (PS) is the 24 by 80 character display area of the 3270 terminal. A 3270 PS may be field formatted, in which case data is entered into unprotected fields. The Dialog Language provides for program controlled data entry into both the formatted and unformatted PS and allows for field addressing within the formatted PS.

Mainframe 3270 installations perceive the PowerNet server as a terminal cluster controller. The server is connected to a front-end processor (FEP) running a Network Control Program (NCP), and the FEP is channel-attached to the Host running a communications control program, known as the Virtual Terminal Access Method (VTAM). VTAM supplies access to mainframe regions and application programs within those regions.

In the IBM SNA environment, the combination of NCP and VTAM provide a set of host network services known as the System Services Control Point (SSCP). Initially, the SSCP establishes two sessions with the server, one for Control Point (CP) exchanges, and another for Physical Unit (PU) exchanges. These command and control sessions use the first two addresses (0 and 1) of the 256 Logical Unit (LU) addresses available within each PU.

NCP and VTAM make use of configuration tables to determine what services are available to the terminal. While the NCP is deciding what to do with a terminal LU requesting activation, the LU is unowned. Depending on the configuration tables, the LU is then connected to VTAM and in session with the SSCP, which expects the terminal to select a host region. Following region selection, the terminal BINDs to a Host application, or transaction, which is known as the Primary LU (PLU).

On most hosts, the first host transaction is a security program requiring user name and password input. Following security clearance the terminal is generally able to select the desired application transaction.

### **Session States**

The state of the LU session and the data within the PS are both available to the Dialog Language Script programmer. The LU states are summarized as follows:

|                 |                           |
|-----------------|---------------------------|
| <i>inactive</i> | Link is down.             |
| <i>unown</i>    | Waiting for a session.    |
| <i>sscp</i>     | In session with VTAM.     |
| <i>plu</i>      | In session with host.     |
| <i>busy</i>     | In session, host is busy. |

Initially, a session on an active link is in the *unowned* state. The state changes to *sscp* after VTAM recognizes the terminal. In this state, the PS is normally unformatted. Depending on the host configuration, entry of a region name is required at this point. Once a region has been assigned and a host transaction is attached to the terminal, the state changes to *plu*.

## 3270 Keystrokes

Several special keys are defined for 3270 sessions. The <Enter> key forces a transmission to the host. Within an unformatted PS, all data entry is followed by the <Enter> key. Within a formatted PS, the <Tab> or <Backtab> key is used to move between entry fields. Once the required data has been entered, the <Enter> key is usually used to send the field information up to the host. Some host transactions also call for the use of the clear and programmable function <pf> keys during the logon procedure. The Dialog language provides for the generation of all of these keystrokes.

## Script File Format

The script file is a text file created and edited with the system editor. Each line in the file is a single entry that may contain one of the following constructs:

*Command*  
*Comment*  
*Blank line*

The command verbs and their arguments are presented in the following sections. Comments entries must begin with the # character on the left margin. Tabs and spaces may precede all other entries. The script file is named using the convention of up to 8 lower case characters followed by **.cmd** (lower case). The script is placed in the **crf** directory of the server.

If necessary, multiple scripts can be created and used in diverse situations. These are linked to specific Host List entries with the 3270 handler. Terminal operators can then select options from the Host List which appears on the RF Terminal.

## Command Verbs and Arguments

The command verbs provide conditional branching and control over both the terminal and host sessions. Many commands require arguments. In the case of verbs with multiple arguments, the arguments are separated by commas and the command line requires a semicolon character for termination. Verbs with less than two arguments must **not** have a semicolon terminator.

Those verbs with argument lists require that all arguments are supplied. If an argument is blank, indicated this with a hyphen (-).

## Substitutable Parameters

Up to 10 substitutable parameters may be used for string and numeric data storage and manipulation within the script. They are numbered from 0 to 9. The parameter

value is substituted for the argument when preceded by the \$ character. In the event argument strings actually begin with this character, the character may be changed using the *Host List Custom Options* field.

To change the \$ character, enter the following in the Custom Options field:

```
-sparm # >
```

Here, # is the decimal value of the desired ASCII character.

## Command Verb Descriptions

The following sections describe each verb and its arguments in detail. A quick reference summary is provided following the detailed information.

**label target**—Defines a branch target for the conditional verbs, *onfail*, *equal*, *compare*, *host state*, and *host scan*, and the unconditional branch verb, *goto*. The target name may be up to 20 characters long.

**goto target**—Script execution begins unconditionally and immediately at the named target.

**onfail target**—Provides for the handling of script syntax errors and for errors that occur within session verbs, such as **host on**. Upon detection of a line or system error, script execution continues at target.

**equal 0-9,value,target;**—Script execution resumes at target, if the value of the substitutable parameter indicated by the first argument, equals value. Otherwise, execution continues with the next verb in the file.

**compare 0-9,operator,value,target;**—Script execution resumes at target if the result of comparing the value of the substitutable parameter, indicated by the first argument, and the value argument, is true. The possible comparison operators are the following:

|      |                           |
|------|---------------------------|
| \$=  | String equality.          |
| \$!= | String inequality.        |
| =    | Numeric equality.         |
| !=   | Numeric inequality.       |
| <<   | Numerically less-than.    |
| >>   | Numerically greater-than. |

Execution continues with the next verb in the file, if the comparison is not true.

**host state statename,target;**—Script execution resumes at target if the host session is in the state indicated by statename, which may be one of the following: *inactive*, *unown*, *busy*, *sscp*, or *plu*. Execution continues

with the next verb in the file if the host session is not in the specified state.

**host scan top,bot,searchstring,target;**—Script execution resumes at target if *searchstring* is found within the range of PS lines specified by the first two arguments; otherwise, script execution continues with the next verb in the file. The top and bottom line values may range from 0 to 23.

**host copy row,column,length,variablename;** - Copies length bytes starting at the specified row and column into the given substitutable parameter. Row must be between 0 and 23, and column must be between 0 and 79. Length must be greater than 0 and less than 100.

**exit**—Unconditionally terminates script execution and the terminal process.

**log message string;**—Writes the message string argument to the terminal process log file.

**sleep seconds**—Suspends script execution for the specified number of seconds.

**setparm 0-9,value;**—Sets the substitutable parameter indicated by the first argument to value.

**modify 0-9,operator,value;**—Adds to, or subtracts from, the value of the substitutable parameter indicated by the first argument by the amount indicated in the second argument. The + operator indicates addition, and the - operator indicates subtraction.

**concat 0-9,string;**—Concatenates string to the substitutable parameter indicated by the first argument.

**insert 0-9,string;**—Inserts string to the beginning of the substitutable parameter indicated by the first argument.

**host on**—Request establishment of a host session.

**host off**—Terminates the host session.

**host update hsec**—Waits up to *hsec* half-seconds for an update of the host PS or state. This verb must be called to obtain the current PS and state prior to use of the host scan or host state verbs.

**settle dsec**—Operation is similar to the host update command with the following exception. It does not return until the specified number,

*dsec*, of deciseconds has been reached, regardless of the number of host screen updates that have occurred.

**host send field\_number,value,key;**—Places value and key into the host PS. In the case of an unformatted host PS, the field number argument is ignored and the value is placed at the current cursor position within the PS. Within a formatted host PS, value is placed at the start of the indicated field (field numbers start at 0).

A value of - indicates that no data is to be placed in the PS and only the key is generated. The key may be one of the following:

|                         |               |               |              |                |
|-------------------------|---------------|---------------|--------------|----------------|
| <i>enter</i>            | <i>clear</i>  | <i>sysreq</i> | <i>tab</i>   | <i>backtab</i> |
| <i>pf1 through pf24</i> | <i>pfexit</i> | <i>eof</i>    | <i>reset</i> |                |

**term clear**—Transmits a clear screen command to the terminal.

**term logoff**—Transmits a logoff command to the terminal.

**term wait**—Waits for terminal input. The returned string is discarded; this command is useful at startup while waiting for the terminal network logon message, and is also useful when an operator controlled pause is needed.

**term display row,string;**—Transmits a display command to the terminal that displays the string value at the indicated terminal row. Terminal row numbers begin at 1.

**term input 0-9,row,column,length;**—Transmits an input command to the terminal and waits for a response; the string value of the response is stored in the substitutable parameter indicated by the first argument. The row and column numbers start at 1.

**term noecho 0-9,row,col,length;**—Performs the same function as the term input verb, except that the terminal is instructed not to echo the keystrokes entered. This is used for password entry.

**Session**—Places the terminal into session with the host. This verb does not complete until an *endkey* is generated by the terminal. By default, the *endkey* is FNC 10.

## Command Verb Summary

The following is a quick reference summary of all of the verbs and their arguments.

## Script Control Commands

```
label target
goto target
onfail target
equal 0-9,string|-,target;
compare 0-9,$|=|$!|=|!|=|<<|>>,value,target;
host state busy|sscp|plu|unown|inactive,target;
host scan top,bot,searchstring,target;
host copy row,col,len,target
exit
log message string;
sleep seconds
```

## Parameter Control Commands

```
setparm 0-9(or a-z),value;
modify 0-9(or a-z),+|- ,value;
concat 0-9(or a-z),string;
insert 0-9(or a-z),string;
```

## Host Session Commands

```
host on
host off
host update hsec
host send field_number,string|-,KEY;
```

## Terminal Session Commands

```
term clear
term logoff
term wait
term display row,string;
term input 0-9(or a-z),row,col,length;
term noecho 0-9(or a-z),row,col,length;
session
```

## 3270 Keystrokes

```
enter    clear    sysreq   tab      backtab  pf1 through pf24
pfexit   eof      reset
```

## Script Examples

Three script examples follow.

## Session Startup

The following script demonstrates the startup of a 3270 terminal session with the host. The start routine waits for the CCP logon message from the terminal before activating the session. It then enters the `get_screen` loop. Within this loop, the state of the host session is used to control subroutine branches.

```
label start
    onfail err_fail
#### set loop counters
    setparm 9,0;
    setparm 8,0;
    setparm 7,0;
    log Waiting for terminal logon;
    term wait
    term display 8,CONNECTING TO HOST;
    log Connecting to host;
    host on

#### place logon collection routine here
    goto get_screen

label get_screen
    modify 7,+,1;
    compare 7,>,20,err_loop;
    host update 5
    host state busy,busy;
    host state inactive,inactive;
    host state unown,unown;
    host state sscp,sscp;
    host state plu,plu;
    goto get_screen

label busy
    log BUSY;
    term display 8,BUSY          ;
    sleep 2
    goto get_screen

label inactive
    log INACTIVE;
    term display 8,LU INACTIVE    ;
    term wait
    goto end_session
```

```
label unown
    log UNOWN;
    term display 8,UNOWN      ;
    goto get_screen

label sscp
    log SSCP;
    term display 8,SSCP      ;
    goto session

label plu
    log PLU;
    term display 8,PLU;
    goto session

label session
    session
    goto end_session

label err_loop
    log ERROR: loop;
    term display 8,LOOP ERROR  ;
    term wait
    goto end_session

label err_fail
    log ERROR: failure;
    term display 8,SESSION FAILURE  ;
    sleep 5
    term logoff
    exit

label end_session
    term logoff
    host off
    exit
```

### **Logon Data Collection**

The following script fragment demonstrates the collection of logon data. The *userid* is stored in parameter 0, the password in parameter 1, the CICS region in parameter 2.

```
label get_info
    term display 1,LOGON INFO      ;
    term display 3,NAME;
```

```

term input 0,3,6,14;
equal 0,-,err_badlogon;
term display 4,PSWD;
term noecho 1,4,6,13;
equal 1,-,err_badlogon;
term display 5,REGN;
term input 2,5,6,12;
equal 2,-,err_badlogon;
insert 2,/for ;
term clear
log Logon info collected;
goto get_screen

label err_badlogon
log BAD LOGON;
term display 8,BAD LOGON      ;
term wait
goto end_session

```

### Logon Automation

The following script fragment demonstrates how the original *sscp* and *plu* routines can be modified to make use of the collected logon information for an automated logon.

```

label sscp
log SSCP;
term display 8,SSCP      ;
modify 8,+,1;
compare 8,,10,err_loop;
host scan 1,23,CONNECTION IN PROGRESS,get_screen;
host scan 1,23,INVALID TERMINAL,err_terminal;
term display 8,REGION    ;
host send -,$2,enter;
goto get_screen

label plu
log PLU;
term display 8,PLU      ;
modify 9,+,1;
compare 9,>,10,err_loop;
host scan 1,23,LOGON COMPLETE,session;
host scan 1,23,LOGON IN PROGRESS,get_screen;
host scan 1,23,INVALID USERID,send_clear;
host scan 1,23,PASSWORD EXPIRED,err_expired;

```

```
    host scan 1,23,USERID:,logon;
    goto send_clear
label logon
    log LOGON;
    term display 8,LOGON      ;
    host send 0,$0,tab;
    host send 1,$1,enter;
    goto get_screen
label send_clear
    log Sending CLEAR;
    term display 8,CLEAR      ;
    host send -,-,clear;
    goto get_screen
label err_expired
    log EXPIRED PASSWORD;
    term display 8,PASSWORD EXPIRED  ;
    term wait
    goto end_session
```

This page intentionally left blank.

## Appendix System Generations

### Sample system generations for the IBM main-frame host.

These system generations have been found to be suitable for the following host machines (308X, 309X, 43XX, etc)

#### 3270 SDLC Line Description

|           |       |                    |                          |
|-----------|-------|--------------------|--------------------------|
| DGROUP04  | GROUP | LNCTL = SDLC       | Line Protocol            |
|           |       | DIAL = NO          | Non-switched link        |
|           |       | OWNER = SSCP20     | Owner SSCPID             |
|           |       | TYPE = NCP         | Mode of line operation   |
| SYMSDLCL1 | LINE  | ADDRESS = 021      | Line interface address   |
|           |       | SPEED = 9600       | Bits per second          |
|           |       | CLOCKING = EXT     | Clocking from modem      |
|           |       | DATRATE = HIGH     | Rate for data transfer   |
|           |       | INTPRI = 1         | Interrupt priority       |
|           |       | NEWSYNC = NO       | Feature on modem         |
|           |       | DUPLEX = HALF      | 2-wire modem support     |
|           |       | NRZI = NO          | NRZ encoding             |
|           |       | PAUSE = 0,2        | Avg polling cycle        |
|           |       | POLLED = YES       | Polling for stations     |
|           |       | RETRIES = (7,10,4) | Retry on errors          |
|           |       | ISTATUS = ACTIVE   | VTAM status when active  |
| DXPU      | PU    | MAXLU = 64         | Max logical units for PU |
|           |       | PUTYPE = 2         | 3274 mod 51c             |

### Terminal Control Table

| TCT   | Title  |  |
|-------|--------|--|
| TCTC2 | DFHTCT | CICS Terminal Control Table<br><br>TYPE = INITIAL, SUFFIX = C2, OPNDLIM = 25,<br>STARTER = YES, RAMAX = 256,<br>RAPOOL = 10, RATIMES = 8,<br>RESP = FME,<br>ACCMETH = (NONVTAM, VTAM)<br>MODNAME = BTMLR32T,<br>APPLID = DCICS,<br>GMTEXT = 'WELCOME TO CICS/VS'   |
| DX42  | DFHTCT | TYPE = TERMINAL,<br>TRMIDNT = DX42, TRMTYPE = LUTYPE2,<br>TRMMODL = 2,<br>FEATURE = (DCKYBD, 3270E), CHNASSY = YES,<br>DEFSCRN = (24,80), ALTSCRN = (24,80),<br>CLASS = (CONV, VIDEO), TIOAL = (3000,4000),<br>RELREQ = (NO, YES), NETNAME = DX42,<br>TCTUAL = 50, BUFFER = 1536, RUSIZE = 256,<br>TRMSTAT = TRANSCEIVE, CONNECT = AUTO,<br>ACCMETH = VTAM |

---

**ACF/VTAM - Network Resources**

|       |        |  |
|-------|--------|--|
| SWSNA | VBUILD | TYPE = CA                                    |
| DXPU4 | PU     | ADDR = C1                                    |
|       |        | IDBLK = 017, [used only for switched line]   |
|       |        | IDNUM = 76011, [used only for switched line] |
|       |        | IRETRY = YES,                                |
|       |        | DISCNT = NO,                                 |
|       |        | ISTATUS = ACTIVE,                            |
|       |        | LOGAPPL = DCICS,                             |
|       |        | MAXDATA = 265,                               |
|       |        | MAXOUT = 7,                                  |
|       |        | PASSLIM = 7,                                 |
|       |        | PUTYPE = 2,                                  |
|       |        | USSTAB = USSTBL,                             |
|       |        | SSCPFM = USSSCS                              |
| DX42  | LU     | LOCADDR = 2,                                 |
|       |        | DLOGMOD = D4C32782,                          |
|       |        | ISTATUS = ACTIVE,                            |
|       |        | PACING = 0,                                  |
|       |        | VPACING = 0                                  |

This page intentionally left blank.

---

Connect number    CNT5000-5401  
Version 5.1        February 1998

---