PLS-345

Physical Layer Switch

User's Guide

western™
telematic inc.

⚠ Warnings and Cautions: ⚡

No Serviceable Parts Inside; Authorized Service Personnel Only

Do not attempt to repair or service this device yourself. Internal components must be serviced by authorized personnel only.

- **Shock Hazard - Do Not Enter**

Nameplate Power Warning

This device should only be operated with the type of power source indicated on the instrument nameplate. If you are not sure of the type of power service available, consult your local power company.

- **Connect unit only to a properly measured supply. Use only three wire cord which is provided with the unit.**

- **Reliable earthing of this equipment must be maintained. Particular attention should be given to supply connections when connecting to power strips, rather than direct connections to the branch circuit.**

Rack Mount Installation

When installing this device in an instrument rack, the following factors must be accounted for:

1. **Enclosed Racks:** Enclosed racks must provide adequate ventilation. Make certain that the rack is not overly crowded and note that each unit in the rack generates its own heat. An enclosed rack should have louvered sides and a fan to circulate cooling air.

   When mounting the unit in an enclosed rack with a ventilation fan at the top of the rack, note that excessive heat generated by devices at the bottom of the rack can be drawn upward and into the ventilation slots of units located at the top. Make certain to provide adequate ventilation for equipment installed at the bottom of the rack.

Rack Mount Installation (Continued)

1. **Enclosed Racks (Continued):**

   The ambient within the rack may be greater than room ambient. Installation should be such that the amount of air flow required for safe operation is not compromised. The maximum temperature for the equipment in this environment is 45°C. Consideration should be given to the maximum rated ambient.

   Installation should be such that a hazardous stability condition is not achieved due to uneven loading.

2. **Open Racks:** Make certain that the rack frame does not block the ventilation slots on the instrument cover. If the device is installed on sliders, check the unit when seated all the way into the rack to make certain that ventilation slots are not blocked.

Ventilation

Slots in the instrument cover are provided to allow ventilation for heat dissipation. To ensure safe, reliable operation, these openings must not be covered or blocked.

Disconnect Power

If any of the following events are noted, immediately disconnect the unit from the outlet and contact qualified service personnel:

1. If the power cord becomes frayed or damaged.

2. If liquid has been spilled into the device or if the device has been exposed to rain or water.

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1. Introduction

The PLS-345 Physical Layer Switch is a versatile A/B switching system, which can be controlled over any TCP/IP network using standard Telnet, or out-of-band using an external modem and basic VT100 type terminal emulation. Each of the three A/B circuits can be switched via code command, or locally via manual switches on the instrument front panel. Other intelligent features include password protected access to command mode functions, site I.D. Message, connector labels, status displays and more.

The PLS-345 is designed for applications that require automatic routing of Cat5 10/100Base-T signals between a common jack and an A and B jack. The PLS is also ideal for switching RS-232, DSL, RS-422/485, or telephone lines.

Monitor Mode

The Monitor Mode allows the PLS-345 to monitor an external RS-232 line or contact closure input and automatically switch selected A/B paths. Easily definable parameters allow the user to select the monitor signal trigger duration, circuits to switch, and the option to return circuits to their original A/B position.

Security Features

Address-specific IP security masks prevent unauthorized sources from accessing the PLS-345 menu through the network. The PLS-345 provides two levels of operational passwords; the system administrator level, which allows access to all configuration and switching functions, and the user level, which only allows switching of the circuits.

Easy to Configure, Easy to Use

The PLS-345 can be configured over the network, via modem, or from a local PC or terminal connected to the unit's Console Port. Easy to use commands let you assign a location name, set system parameters, and view circuit status. Circuits can be switched using numbers or names.

Applications

- Controlled A/B Switching of Cat5 Connections.
- A/B Routing of 10/100Base-T Ethernet, ISDN, DSL, Telco, or RS-232 Lines.
- Remote Switching to "Out-of-Service" or "Off-Line" Conditions.
- Switch to Backup Firewall or VPN.
- Disaster Recovery Switching.

Features

- Three Individually Controlled RJ-45 Circuits.
- IP and Password Security Features.
- Signal Monitoring for Automatic Switching.
- Retains Selected Position with Power Off.
- Independent 10Base-T Ethernet Control Port.
- Independent RS-232 Console Port.
- Independent Modem Port for Out-of-Band Management.

Typographic Conventions

Throughout this manual, typefaces and characters have been used to denote the following:

`COURIER FONT` Indicates characters typed on the keyboard. For example, `]S` or `]P 02`.

[Bold Font] Text set in bold face and enclosed in square brackets, indicates a specific key. For example, **[Enter]** or **[Esc]**.

2. Unit Description

2.1. Front Panel

As shown in Figure 2.1, the PLS-345 Front Panel includes the following components:
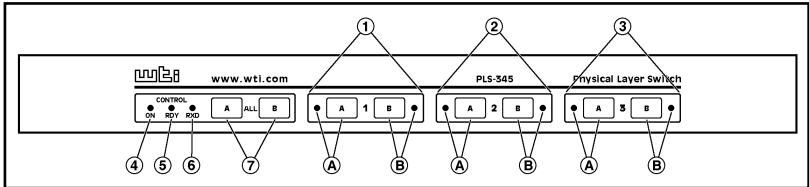
Figure 2.1: Front Panel

① **Circuit 1:** Status indicator lights and manual controls for Circuit 1. Includes the following:

   A) **Line "A" Selector Button and Status LED:** Press the "A" button to switch the common line for Circuit 1 to the "A" connector. The LED adjacent to the Selector Button will light when Line "A" is selected.

   B) **Line "B" Selector Button and Status LED:** Press the "B" button to switch the common line for Circuit 1 to the "B" connector. The LED adjacent to the Selector Button will light when Line "B" is selected.

Note: Each circuit can either be manually switched using the corresponding selector button, manually switched using the Master A/B Switch, switched in response to the /A and /B commands, or switched automatically by the Monitor feature.

② **Circuit 2:** Same as item 1 above, except these components control switching of common line 2.

③ **Circuit 3:** Same as item 1 above, except these components control switching of common line 3.

④ **ON:** Lights when AC Power is applied to the PLS-345.

⑤ **RDY:** Flashes when the PLS-345 is ready to receive commands.

⑥ **RXD:** Flashes when the PLS-345 receives commands.

⑦ **Master A/B Switch:** Used to manually switch all three circuits. When the "A" or "B" button is pressed, all three circuits will be switched to the corresponding "A" or "B" line, and the appropriate status LED on each circuit will light.

2.2. Back Panel
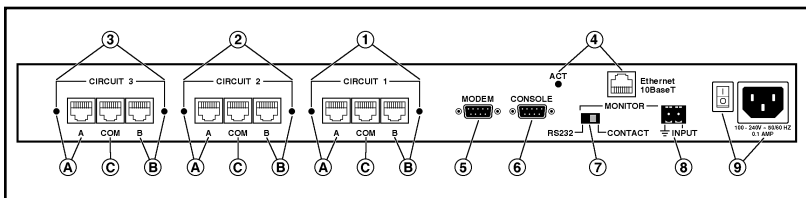
Figure 2.2: Back Panel

① **Circuit 1 Connectors and Indicators:** RJ45 connectors and LED status indicators for the Circuit 1 common line and "A" and "B" lines.

    A) **"A" Connector and Status LED:** The status LED will light when line "A" is selected.

    B) **"B" Connector and Status LED:** The status LED will light when line "A" is selected.

    C) **Common Connector:** For connection to Common Line 1.

② **Circuit 2 Connectors and Indicators:** Same as item 1 above, except these components are used for connection to the Circuit 2 "A", "B", and Common lines.

③ **Circuit 3 Connectors and Indicators:** Same as item 1 above, except these components are used for connection to the Circuit 3 "A", "B", and Common lines.

④ **Network Port and Activity Indicator:** An RJ45 Ethernet port, for connection to your TCP/IP network. To communicate via Network, please access the PLS-345 as described in Section 5.2.

   Note: The PLS-345 features a 10Base-T network interface. When connecting the PLS-345 to a 100Base-T interface, most router switches will autosense to determine if the device is 100Base-T or 10Base-T, and then configure the network interface accordingly. If your router switch does not autosense, the network interface port must be manually set to 10Base-T.

⑤ **Modem Port:** A male, RS-232, DB9 connector, DTE configuration. For connection to an external modem.

⑥ **Console Port:** A male, RS-232, DB9 connector, DTE configuration. For connection to a Local PC.

⑦ **Monitor Selector Switch:** A slide switch that is used to set the PLS-345 to monitor either an RS-232 line or a contact. When properly configured, the PLS-345 can perform A/B switching based on the signal level at either an RS-232 Line or a contact connected to the Monitor Input Connector. For more information on the Monitor feature, please refer to Section 5.7.

⑧ **Monitor Input Connector:** A two pin connector, which is used to attach the ground and input lines for an RS-232 line or contact circuit that you wish to monitor. When properly configured, the PLS-345 can perform A/B switching based on the signal level at the Monitor Input Connector. For more information on the Monitor feature, please refer to Section 5.7.

⑨ **Power Components:** A Master Power Switch and an AC power cable receptacle. For more information on power ratings, please refer to the specifications printed adjacent to the power cable receptacle. Prior to connecting the PLS-345 to your power source, please refer to the warnings and cautions listed at the beginning of this User's Guide and in Section 4.1.

3. Quick Start / System Overview

This section provides a brief overview of basic PLS capabilities, and describes a simple test that can be performed to verify that you are able to communicate with the unit.

The Quick Start procedure is included primarily to provide a quick demonstration of PLS capabilities. In order to take full advantage of the complete range of features provided by this unit, it is strongly recommended that you should complete the entire Installation and Configuration sections after completing the Quick Start procedure.

1. **Apply Power:** Connect the PLS to an appropriate power source. Prior to connecting the unit to your power supply, make certain to review the safety precautions listed at the beginning of this User's Guide, and in Section 4.1.

2. **Connect Network Cable, External Modem or PC:** In order to configure and control the PLS, you must first decide how you will communicate with the unit; via network, modem, or local PC.

    a) **Network:** Connect your 10Base-T or 100Base-T network interface to the PLS Network Port. For more information, please refer to Section 4.4.

    Note: The PLS features a 10Base-T Interface. When connecting to a 100Base-T interface, most router switches will autosense to determine if the device is 100Base-T or 10Base-T, and then configure the network interface accordingly. If your router switch does not autosense, the network interface port must be manually set to 10Base-T.

    b) **Modem:** Use a standard serial modem cable to connect your external modem to PLS's Modem Port. For more information, please refer to Section 4.5.

    c) **Local PC:** Attach a standard null modem cable from your PC COM port to the Console Port connector on the PLS back panel. For a description of the port interface, please refer to Appendix A.

3. **Access the Command Mode:** In order to invoke commands and display status screens, you must first access the PLS command mode via Network, modem, or Console Port (local PC.) For more information, on command mode access, please refer to Section 5.2.

Notes:

- **Network Access:** The PLS includes a default IP Address and Subnet Mask. This allows initial contact with the unit via network without first defining an IP address (providing you are contacting the PLS from another node on the same subnet.) When installing the PLS in a working network environment, it is recommended to define network parameters as described in Section 5.6.

- **Modem & Console Port Access:** Factory set PLS parameters are as follows: 9600 bps, 8 Data Bits, One Stop Bit, No Parity. Although PLS parameters can be easily redefined, for this Quick Start procedure only, it is recommended that you configure your communications program to accept the default parameters.

a) **Network Access:** Start your Telnet program, then Telnet to the default PLS IP Address (192.168.168.168.) For example, on a UNIX system, the telnet command would be invoked as shown below.

$ telnet 192.168.168.168 [Enter]

After the telnet command is invoked, the PLS Circuit Status Screen (Figure 3.1) should be displayed, followed by the PLS> command prompt.

If you wish to contact the PLS from a node that is *not* on the same subnet you can either change your PC's IP address to an address that is on the same subnet as the PLS (e.g., 192.168.168.xxx), or access the PLS command mode via modem or Console Port, and define Network Parameters as described in Section 5.6.

```
Physical Layer Switch v1.00        Site ID: PLS-345_TEST_IRVINE_CALIFORNIA

CKT# | From             | To               | POS | MON | Default |
-----+------------------+------------------+-----+-----+---------|
  1  | PORT_11111111111 | PORT_BBBBBBBBBBB |  B  |     |    A    |
  2  | PORT_22222222222 | PORT_AAAAAAAAAAA |  A  |  *  |    A    |
  3  | PORT_33333333333 | PORT_AAAAAAAAAAA |  A  |  *  |    A    |
-----+------------------+------------------+-----+-----+---------|




Command Echo:           On
Inactivity Timeout:     30 Min
Command Confirmation:   On
Automated Mode:         Off
Monitor Mode:           On
Monitor Input Level:    1 - High



"/H" for help.

PLS>
```

Figure 3.1: The Circuit Status Screen

> b) **Modem Access:** Start your communications program,
>   and dial the number for the external modem. The PLS
>   Circuit Status Screen (Figure 3.1) should be displayed,
>   followed by the PLS> command prompt.
>
> c) **Console Port Access (Local PC):** Start your
>   communication program, make certain the
>   communications program is set for the PC COM port
>   that is attached to the PLS, and then press **[Enter]**. The
>   PLS Circuit Status Screen (Figure 3.1) should be
>   displayed, followed by the PLS> command prompt.

5. **Review Help Menu:** At the PLS> command prompt, Type
   /H and press **[Enter]** to display a help menu (Figure 3.2),
   which provides a basic listing of PLS commands.

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```
Physical Layer Switch v1.00        Site ID: PLS-345_TEST_IRVINE_CALIFORNIA

Display
/H      Display Help Screen
/S      Display Circuit Status
/SN     Display Network Status

Configuration
/G        View/Set General Parameters
/P [n]  View/Set Circuit Parameters
/N        View/Set Network Parameters
/M        View/Set Monitor Parameters
/DL       Download Configuration to File

Control                        +----------------------------------------+
/A <n>  Switch Circuit n to A  | [n] = optional ckt. common name or number |
/B <n>  Switch Circuit n to B  | <n> = required ckt. common name or number |
/D      Set Circuits to Default| n+n or n n = ckt. n and ckt. n         |
/T      Reset Network Interface| n:n = ckt. n through ckt. n            |
/X      Exit/Disconnect        | *   = all ckts.                        |
                               | ,y  = bypass "Sure? (y/n)"             |
                               +----------------------------------------+

PLS>
```

Figure 3.2: The Command Help Screen (System Mode)

6. **Test A/B Switching:** You may test both manual and command driven A/B switching as follows:

   a) **Manual:** Press one of the "A" or "B" Selector Buttons on the PLS Front Panel, the corresponding LED indicator should light.

   b) **Command Driven:** From the PLS> command prompt, type **/B 1** and press **[Enter]**. After the command is execute, the Circuit Status Screen should appear. Check the Circuit Status Screen to make certain that Circuit 1 has been switched to the "B" position.

7. **Exit Command Mode:** When you have finished testing the PLS unit, type **/X** and press **[Enter]** to exit from the PLS Command Mode. Note that it is recommended to always disconnect using the /X command. If the /X command is not invoked at the end of a command session, then the PLS will not exit from command mode until the No Activity Timeout feature closes the session. In this case, further access to the PLS command mode will not be allowed until the current session times out.

This completes the introductory overview of the PLS. Please proceed to Sections 4 and 5 for complete installation and configuration procedures.

4. Installation

4.1. Power Supply Connection

Connect the PLS-345 to an appropriate power supply.

CAUTIONS:

- **This device should only be operated with the type of power source indicated on the instrument nameplate. If you are not sure of the type of power service available, please contact your local power company.**
- **Reliable earthing (grounding) of this unit must be maintained. Particular attention should be given to supply connections when connecting to power strips, rather than directly to the branch circuit.**
- **Check nameplate ratings to ensure that there is no overloading of supply circuits that could have an effect on overcurrent protection and supply wiring.**

4.2. Initialization

If you are reinstalling a PLS-345 unit that has been previously installed, or if you wish to ensure that the PLS-345 is starting out with all parameters set in the default status, the PLS can be initialized to default values as described below.

> **Note:** This initialization procedure will set all parameters to defaults, and will clear all user defined values such as network settings, and plug names.

1. Make certain that the PLS-345 Power Switch is set in the "Off" position.

2. Locate the Master A/B Switches on the unit's front panel. Press and hold the "A" button, and then press the Power Switch to the "On" position.

3. The Circuit Status Indicator LEDs will flash briefly, indicating that the unit has been reset to defaults. Release the "A" button.

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4.3. Connecting Common and A/B Lines

Connect your Cat5 cables to the appropriate A, B, and common line connectors on the PLS back panel. For a description of port interfaces, please refer to Appendix A.

4.4. Connecting the Network Cable

The PLS Network Port is an RJ45, 10Base-T Ethernet Jack, for connection to a TCP/IP network. Connect your network interface to the PLS Network Port.

The PLS features a default IP Address (192.168.168.168.) Providing that you are communicating with the unit from a node on the same subnet, this allows you to initially contact the PLS without first accessing the PLS command mode to define an IP address. Note however, that when installing the PLS in a working network environment, it is strongly recommended to assign the IP Address, Gateway Address, and Subnet Mask as described in Section 5.6.

> **Note:** The PLS features a 10Base-T Interface. When connecting the PLS to a 100Base-T interface, note that most router switches will autosense to determine if the device is 100Base-T or 10Base-T, and then configure the network interface accordingly. If your router switch does not autosense, the network interface port must be manually set to 10Base-T.

4.5. Connecting an External Modem

Use an appropriate DB9 cable to connect your external modem to the Modem port on the PLS back panel. Use a standard serial modem cable. For a description of the Modem Port interface, please refer to Appendix A. Note that the PLS General Parameters Menu allows you to define a Modem Initialization string and Modem Disconnect string as described in Section 5.4.

4.6. Connecting a PC to the Console Port

Use an appropriate DB9 cable to connect the PLS Console Port to a free COM port on your PC or terminal. Use a standard null modem cable. For a description of the Console Port Interface, please refer to Appendix A.

5. SetUp and Configuration

5.1. System Mode and User Mode

In order to restrict access to sensitive command functions, the PLS-345 features two separate operating modes; System Mode and User Mode.

The System Mode allows access to all configuration menus, A/B switching functions and status screens, and the User Mode allows access only to A/B switching functions and the status screens; when the User Mode is active, you are not allowed to access the configuration menus or reset the PLS Network Port.

When the System Password has been defined, the PLS-345 will display a password prompt whenever the unit is contacted via the Console Port, Modem Port, or Network Port. The password entered at this prompt determines whether the unit will start-up in System Mode or User Mode. If the System Password is entered, the System Mode will be active. If the User Password is entered, the User Mode will be active. Both the System Password and User Password are defined via the PLS's General Parameters menu.

> **Note:** If the System Password is *not* defined as described in Section 5.4, the PLS will *not* display the password prompt, and will always start-up in System Mode; allowing all users to access the configuration menus without entering a password. Therefore, it is recommended to always define the System Password in order to restrict access to sensitive command functions.

5.2. Communicating with the PLS-345

In order to configure the unit or invoke command functions, you must first connect to the PLS-345 and access the command mode.

1. Start your communications program (e.g. Hyperterminal.) Make certain that the PLS and your communications program are set for the same parameters (e.g. COM port, baud rate, etc.)

2. Access the Command Mode:

    a) **Local Access (Console Port):** To access the command mode from a local PC connected directly to the PLS via the Console Port, press **[Enter]**.

        i. If you have already hit other keys, press **[Enter]** twice. There must be no other characters preceding **[Enter]**.

        ii. If the System Password has been defined, the password prompt will be displayed. Key in your System Password or User Password and press **[Enter]**. The PLS-345 will display the Status Screen (Figure 5.1), followed by the "**PLS>**" command prompt.

    Note: In order to change PLS configuration parameters, the unit must be operating in System Mode.

    b) **Modem Access:** To access the command mode via modem, proceed as follows (Note that an external modem must be installed at the PLS Modem Port):

        i. Dial the number for the external modem connected to the PLS Modem Port.

        ii. If you have already defined the System Password, a prompt will be displayed. Key in your System Password or User Password and press **[Enter]**. If the System Password has not been defined, then just press **[Enter]**. The PLS will display the Status Screen (Figure 5.1), followed by the "PLS" command prompt.

```
Physical Layer Switch v1.00        Site ID: PLS-345_TEST_IRVINE_CALIFORNIA

CKT# | From               | To               | POS | MON | Default |
-----+------------------+------------------+-----+-----+---------|
  1  | PORT_1            | PORT_B           |  B  |     |    A    |
  2  | PORT_2            | PORT_A           |  A  |  *  |    A    |
  3  | PORT_3            | PORT_A           |  A  |  *  |    A    |
-----+------------------+------------------+-----+-----+---------|




Command Echo:            On
Inactivity Timeout:      30 Min
Command Confirmation:    On
Automated Mode:          Off
Monitor Mode:            On
Monitor Input Level:     1 - High


"/H" for help.
PLS>
```

Figure 5.1: The Circuit Status Screen

c) **Network Access:** The PLS includes a default IP address (192.168.168.168), which allows you to contact the unit from any network node on the same subnet. When the PLS is installed in a working network environment, it is recommended that you redefined the IP Address, Subnet Mask, and Gateway Address as described in Section 5.6. To contact the PLS via network, proceed as follows:

i. Telnet to the PLS's IP address. For example, if the IP address is "192.168.168.168", then on a UNIX system, the Telnet command would be invoked as follows:

$ telnet 192.168.168.168 [Enter]

ii. Note that if the Telnet connection is refused, this may mean that either the IP Security feature (see Section 5.6.1), has denied the connection, or the unit is operating on a 100BaseT network that does not autosense for 10BaseT devices (see Section 4.4.)

iii. If the System Password has been defined, the password prompt will be displayed. Key in your System Password or User Password and then press **[Enter]**. The PLS will display the Status Screen (Figure 5.1), followed by the "PLS>" command prompt.

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5.3. PLS Command/Menu Conventions

When invoking PLS commands or selecting items from configuration menus, note the following:

- All PLS commands can be invoked at the PLS> command prompt, or from the General Parameters Menu, Circuit Parameters Menus, Monitor Parameters Menu, or Network Parameters Menu.

- PLS commands are not case sensitive.

- All PLS commands are invoked by pressing **[Enter]**.

- To select an item from a PLS menu, key in the number for the item and press **[Enter]**. To exit from a menu, press **[Esc]** at any time. Parameters defined up to that point will be saved.

- To display the Help Screen, type `/H` **[Enter]**.

- The "`,y`" option can temporarily suppress the "Sure" (confirmation) prompt. The "`,y`" option is entered at the end of the command line, immediately following the command or argument. For example, to reset the network port without displaying the "Sure" prompt, type `/T,y` and then press **[Enter]**.

- If you are configuring the PLS via network, network communication parameters will not be changed until your telnet connection to the PLS has been terminated

```
GENERAL PARAMETERS:

1.   System Password:      (defined)
2.   User Password:        (defined)
3.   Site ID:              PLS-345_TEST_IRVINE_CALIFORNIA
4.   Modem Init. String:   ATE0M0Q1&C1&D2S0=1
5.   Modem Disc. String:   (undefined)
6.   Baud Rate:            38400,N,8,1
7.   Command Echo:         On
8.   Inactivity Timeout:   30 Min
9.   Command Confirmation: On
10.  Automated Mode:       Off

A.   Default Parameters




Enter Selection or <ESC> to Exit ...
```

Figure 5.2: The General Parameters Menu

5.4. **Defining General Parameters**

When the "PLS>" prompt appears, type **/G [Enter]** to display the General Parameters menu (Figure 5.2). Note that this menu is only available in System Mode; if you have accessed the PLS Command Mode with the User Password, you must log out and then log back in using the System Password. The General Parameters Menu offers the following options:

1. **System Password:** When the System Password is defined, the PLS will display a prompt before allowing access to command mode. If the System Password is entered, the PLS will start-up in System Mode. To define the System Password, type **1**, press **[Enter]** and follow the instructions in the submenu. (Up to 16 characters, case-sensitive; Default = undefined.)

Notes:
- If the System Password is not defined, the password prompt will not be displayed, and the PLS will always start-up in System Mode.
- The PLS General Parameters Menu will not display the System Password. When the System Password has been defined, this field will read "(defined)".

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2. **User Password:** The User Password allows access to A/B switching commands and status screens, but does not allow access to the PLS configuration menus. To define the User Password, type **2**, press **[Enter]** and follow the instructions in the submenu. (Up to 16 characters, case-sensitive; Default = undefined.)

   Note: The PLS General Parameters Menu will not display the User Password. When the User Password has been defined, this field will read "(defined)".

3. **Site ID:** Defines a text string that can be used to denote the installation site or other unit-specific information. To define the Site ID message, type **3**, press **[Enter]** and follow the instructions in the submenu. (Up to 32 characters; Default = undefined.)

4. **Modem Initialization String:** To define the Modem Initialization String, type **4**, press **[Enter]**, and follow the instructions in the submenu. For more information on the initialization string, please refer to the user's guide for your external modem. Make certain that the external modem is set to auto-answer in one ring. (Up to 32 characters; Default = **ATE0M0Q1&C1&D2S0=1**.)

5. **Modem Disconnect String:** To define the disconnect string, type **5**, press **[Enter]** and follow the instructions in the submenu. For more information, please refer to the user's guide for your external modem. (Up to 32 characters; Default = undefined.)

6. **Baud Rate:** To select the baud rate for the Modem Port and Console Port, type **6**, press **[Enter]**, and follow the instructions in the submenu. Make certain to select a rate that is compatible with the external modem, and/or the device connected to the Console Port. (Default = 9600 bps, no parity, 8 data bits, and one stop bit.)

   Notes:
   - When this setting is changed, the new baud rate will not be applied until the user exits and then re-enters the PLS command mode.
   - Only the baud rate can be redefined. Bits and parity settings are always 8 data bits, 1 stop bit, no parity.

7. **Command Echo:** Enables/disables command echo. When enabled, commands sent to the PLS will be echoed back to your PC, allowing keystrokes to be displayed. To enable or disable the command echo, type **7**, press **[Enter]**, and follow the instructions in the submenu. (Default = Off.)

8. **Inactivity Timeout:** Determines how long the PLS will wait for additional commands. Type **8**, press **[Enter]**, and follow the instructions in the submenu. (Default = 2 Min.)

9. **Command Confirmation:** When enabled, the PLS will display a "Sure?" prompt before completing the /A, /B, /D, /T, and /X commands. When confirmation is "On", the PLS will also display the status screen after commands are successfully completed. When disabled, the "Sure?" prompt is suppressed, and the status screen is not sent when commands are completed. To enable/disable this feature, type **9**, press **[Enter]**, and follow the instructions in the submenu. (Default = "On".)

10. **Automated Mode:** When enabled, the PLS will execute the /A, /B, /D, /T, and /X commands without displaying the confirmation prompt, status screen or confirmation messages. When Automated Mode is enabled, the password prompt will also be suppressed, and the unit will always start up in System Mode. This allows the PLS to be controlled by a device which generates commands to control A/B switching without human interaction. To enable/disable this feature, type **10**, press **[Enter]**, and follow the instructions in the submenu. (Default = Off.)

A. **Default Parameters:** Resets the PLS to default values. In addition, all menu selected parameters, including circuit names and passwords will be lost. Note that if Command Confirmation is disabled, the "Sure" prompt will not be sent before this command is executed.

   Note: If the Default Parameters function is invoked via the Network Port, the IP Address is not reset. If this function is invoked via the Console Port or Modem Port, the IP Address and other network parameters will be reset.

After defining General Parameters, press **[Esc]** to exit from the General Parameters menu.

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```
CIRCUIT #1 PARAMETERS:

1. Common Name (From): PORT_11111111111
2. "A" Name (To):      PORT_AAAAAAAAAAA
3. "B" Name (To):      PORT_BBBBBBBBBBB
4. Default Position:   A




Enter Selection or <ESC> to Exit ...
```

Figure 5.3: The Circuit Parameters Menu

5.5. Circuit Parameters

The Circuit Parameters menus are used to assign names and select default A/B positions for each of the switched A/B circuits. There is a separate Circuit Parameters menu for each A/B circuit. Note that the Circuit Parameters menus are not available in User Mode.

To access the Circuit Parameters menus from the PLS> command prompt, type **/P n [Enter]**; where **n** is the number or common name of the desired A/B circuit. The Circuit Parameters Menu (Figure 5.3) offers the following options:

1. **Common Name (From):** Assigns a name to the common line (C) for this A/B circuit. When circuit names are assigned, A/B switching commands can be invoked using the number or common name of the desired A/B circuit. To assign a Common Name, type **1**, press **[Enter]**, and follow the instructions in the submenu. (Up to 16 characters; Default = undefined.)

2. **"A" Name (To):** Assigns a name to the "A" line for this A/B circuit. When a name is assigned to the "A" line, and the circuit is in the "A" position, this name will appear in the "To" column on the PLS Circuit Status Screen. To assign a name to the "A" line, type **2**, press **[Enter]**, and follow the instructions in the submenu. (Up to 16 characters; Default = undefined.)

3. **"B" Name (To):** Assigns a name to the "B" line for this A/B circuit. When a name is assigned to the "B" line, and the circuit is in the "B" position, this name will appear in the "To" column on the PLS Circuit Status Screen. To assign a name to the "B" line, type **3**, press **[Enter]**, and follow the instructions in the submenu. (Up to 16 characters; Default = undefined.)

4. **Default Position:** Determines how this A/B circuit will be set when the /D (default) command is invoked. When the /D command is invoked, each A/B circuit will be automatically set to the default A/B setting specified by the corresponding Circuit Parameters menu.   To assign the default position for this circuit, type **4**, press **[Enter]** and follow the instructions in the submenu. (Default = A.)

After defining Circuit Parameters, press **[Esc]** to exit from the Circuit Parameters menu.

5.6. Network Parameters

In order to effectively communicate with the PLS via network, the IP Address, Subnet Mask, and Gateway Address should be defined using the Network Parameters Menu. Note that although the PLS features a default IP Address (which allows communication with the unit before the network interface is completely configured), it is recommended to use the Network Parameters Menu to select more appropriate parameters when installing the PLS in a working network environment.

If desired, the PLS Network Parameters Menu also allows you to implement IP Security features, which can restrict network access based on the user's IP address as described in Section 5.6.1.

Note that settings for these network parameters will depend on the configuration of your individual network Please contact your network administrator for appropriate settings, and then assign parameters as described in this section.

To access the Network Parameters Menu (Figure 5.4), type **/N** and press **[Enter]**. Note that this menu is not available in User Mode. The following options are available:

```
NETWORK PARAMETERS:

1. IP Address:          65.106.93.114
2. Subnet Mask:         255.255.255.0
3. Gateway Address:     65.106.93.97
4. IP Security

MAC Address:            52-54-40-22-48-7a


Enter Selection or <ESC> to Exit ...
```

Figure 5.4: The Network Parameters Menu

> **Note:** Although new network port parameters can be specified via a network connection, newly selected parameters will not be applied until your telnet connection to the PLS has been terminated.

1. **IP Address:** Defines the IP Address for the PLS unit. Type **1**, press **[Enter]** and follow the instructions in the submenu. (Default = 192.168.168.168.)

2. **Subnet Mask:** Defines the Subnet Mask for the PLS unit. Type **2**, press **[Enter]**, and follow the instructions in the submenu. (Default = 255.255.255.0.)

3. **Gateway Address:** Defines the Gateway Address for the PLS unit. Type **3**, press **[Enter]** and follow the instructions in the submenu. (Default = undefined.)

4. **IP Security:** Sets up the IP Security feature as described in Section 5.6.1. (Default = undefined.)

5. **MAC Address:** Displays the unit's MAC address. Note that this item only displays the current address, and cannot be used to redefine the MAC address.

```
IP SECURITY:

1.  Security Mask #1:    (undefined)
2.  Mask #1 Action:      Permit
3.  Security Mask #2:    (undefined)
4.  Mask #2 Action:      Permit
5.  Security Mask #3:    (undefined)
6.  Mask #3 Action:      Permit
7.  Security Mask #4:    (undefined)
8.  Mask #4 Action:      Permit
9.  Security Mask #5:    (undefined)
10. Mask #5 Action:      Permit


Enter Selection or <ESC> to Exit ...
```

Figure 5.5: The IP Security Menu

5.6.1. Implementing IP Security

The PLS-345 can be configured to restrict unauthorized IP addresses from Telneting to the unit. This allows the user to grant Telnet access only to a specific group of IP Addresses, or block a particular IP address from gaining access. In the default state, the PLS accepts incoming IP connections from all hosts. To configure the IP Security feature, proceed as follows:

1. Access the Network Parameters menu as described in Section 5.6. Note that the Network Parameters Menu and IP Security Menu are not available in User Mode.

2. When the Network Parameters menu appears, type **4** and press **[Enter]** to access the IP Security menu (Figure 5.5).

3. The IP Security menu lists five IP Security "masks" along with the selected permit/deny action for each mask.

    a) Each Security Mask prompt is used to define a specific IP address or range of IP addresses. Each Mask Action prompt is used to define the permit/deny action for the corresponding Mask.

    b) Masks are listed in order of ascending priority; Mask 1 has the lowest priority, Mask 5 has the highest priority.

    c) Masks have a cumulative effect; high priority masks supersede the effect of lower priority masks.

    d) Each IP Address consists of a series of four eight bit numbers. The number 255 is used as a wild card.

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Example 1: Deny access to all hosts except 192.1.1.5:

Security Mask #1: 255.255.255.255   Mask #1 Action: Deny
Security Mask #2: 192.1.1.5   Mask #2 Action: Permit

Since 255 is a wild card, Mask #1 blocks all IP Addresses. Mask #2 then specifically grants access to 192.1.1.5 only.

Example 2: Allow access only by addresses that begin with 192.

Security Mask #1: 255.255.255.255   Mask #1 Action: Deny
Security Mask #2: 192.255.255.255   Mask #2 Action: Permit

Since 255 is a wild card, Mask 1 blocks all IP addresses. Mask 2 then grants access to all addresses that begin with 192.

Example 3: Allow access only by addresses that begin with 192, deny access to 192.1.1.5.

Security Mask #1: 255.255.255.255   Mask #1 Action: Deny
Security Mask #2: 192.255.255.255   Mask #2 Action: Permit
Security Mask #3: 192.1.1.5   Mask #3 Action: Deny

Since 255 is a wild card, Mask 1 blocks all IP addresses. Mask 2 then grants access to all addresses that begin with 192. Finally, Mask 3 specifically blocks access by 192.1.1.5.

Note:

- Mask #5 has priority over the other four masks. If Mask #5 is set to deny access by "255.255.255.255" (all wild cards), all IP Addresses will be blocked, and you will not be able to access the PLS Command Mode via network. Access will only be allowed via the Console Port or Modem Port.
- When using the wild card address "255.255.255.255" to block access by all IP Addresses, make certain that at least one higher priority mask permits access by your IP address.

5.7. The Monitor Mode

The Monitor Mode allows the PLS-345 perform automatic A/B switching in response to signal changes at the monitor port on the instrument back panel. The Monitor Mode can be set to monitor a Contact or an RS-232 Line.

5.7.1. Hardware Configuration

In order to employ the Monitor Mode, you must first connect the monitored line to the PLS unit, and configure the Monitor Selector Switch as follows:

1. Determine whether you will be monitoring a contact or an RS232 line. Locate the Monitor Selector Switch on the PLS back panel, and set the switch in the appropriate position.

2. Connect the line that you wish to monitor to the Monitor Input Connector on the PLS back panel.

    a) **RS232:** Connect the appropriate RS232 pin to the Monitor Input Connector.

    b) **Contact:** Connect a line from the contact that you wish to monitor to the Monitor Input Connector.

    c) **Ground Line:** Connect an appropriate ground line to the Ground Connector on the PLS back panel.

5.7.2. Selecting Monitor Mode Parameters

After the monitored line is connected to the PLS, you must then use the Monitor Mode Parameters Menu to configure the Monitor Mode and determine which A/B circuits will be switched.

From the PLS> command prompt, type **/M** and press **[Enter]**. The Monitor Mode Parameters Menu will be displayed (Figure 5.6). Note that the Monitor Mode Parameters Menu is not available in User Mode. The Monitor Mode Parameters Menu offers the following options:

> **Note:** Do not enable the Monitor Mode (Item 1) until you have finished selecting the other Monitor Mode parameters. This will prevent the A/B circuit(s) from being accidentally switched when Monitor Mode parameters are changed.

```
MONITOR PARAMETERS:

1. Monitor Mode:       On
2. Switch If Level:    0 - Low
3. Switch to Position: B
4. Delay Period:       .5 Secs
5. Return:             On
6. Circuits to Switch: 2, 3




Enter Selection or <ESC> to Exit ...
```
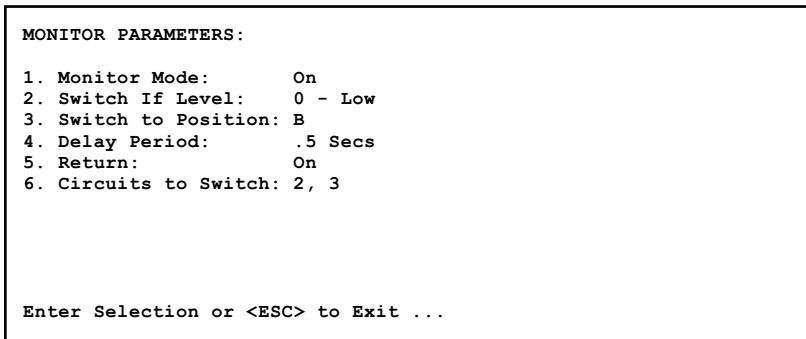
Figure 5.6: The Monitor Mode Parameters Menu

1. **Monitor Mode:** Enables/disables the Monitor Mode feature. Do not enable the Monitor Mode until you have finished selecting the other Monitor Mode parameters. (Default = Off.)

2. **Switch If Level:** Determines which line condition will cause the selected A/B circuits to switch. This item can either be set to "0 - Low" or "1 - High". When this item is set at "0 - Low", the selected A/B circuit(s) will be switched when the line goes low. When this item is set at "1 - High", the selected A/B circuit(s) will be switched when the line goes high. (Default = "0 - Low".)

3. **Switch to Position:** Determines which A/B line will be automatically selected when the line goes to the target level (Item 2.) For example, if Item 2 is set at "0 - Low" and Item 3 is set at "B", then the monitored line goes low, the selected A/B circuit(s) will be switched to Line B. (Default = B.)

4. **Delay Period:** Determines how long the monitored line must remain at the target level (Item 2) in order to trigger automatic A/B switching. For example, if the target level is "1 - High" and the Delay Period is 1 minute, then the selected A/B circuits will be switched when the monitored line remains high for 1 minute. (Default = 5 Seconds.)

    Note: When Item 5 (Return) is enabled, the Delay Period also determines how long the line must return to (and remain at) the normal state in order for the A/B line to be switched back to it's original setting.

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5. **Return:** When enabled, the Monitor Mode will return the switched A/B circuit(s) to the original A/B position if the monitored signal also returns to its normal state. (Default = Off.)

    For example, assume the Monitor Mode is configured as follows:

    - **Switch if Level:** 1 - High
    - **Switch to Position:** B
    - **Return:** On

    If the circuit starts in position "A", and the monitored line goes high, then the circuit will be switched to the "B" position. However, since the Return feature is enabled, if the line later returns to the "low" state, the circuit will also be switched back to the "A" state.

    Note: When Item 5 (Return) is enabled, the Delay Period also determines how long the line must return to (and remain at) the normal state in order for the A/B line to be switched back to it's original setting.

6. **Circuits to Switch:** Determines which of the PLS's three switched A/B circuits will be controlled by the Monitor Mode. Note that when this item is used to enable the Monitor Mode at a given A/B circuit, then the Circuit Status Screen will display an asterisk in the "MON" column for that circuit. To choose the circuits that will be controlled by the Monitor Mode, proceed as follows:

    a) From the Monitor Mode Parameters Menu, type **6** and press **[Enter]**; the PLS will display a menu that lists all three available A/B Circuits.

    b) Key in the number for the desired circuit, and press **[Enter]**; the PLS will display another menu which allows you to include or exclude the circuit from the Monitor Mode.

    c) To assign the circuit to Monitor Mode, select "On", to remove the circuit from Monitor Mode, select "Off".

After you have finished selecting parameters for the Monitor Mode, make certain to return to Item 1 in the Monitor Mode Parameters Menu and enable the Monitor Mode feature. The Monitor Mode will not function unless it has been enabled.

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5.8. Save Configuration Parameters

After the unit has been completely configured, it is recommended to save parameters to an ASCII file as described in Section 8. This allows quick recovery in the event that the unit is reset to default parameters, or if the configuration is accidentally deleted or altered.

6. The Status Screens

The PLS Status Screens are used to display current conditions of the three switched A/B circuits and the network interface. There are two status screens; the Circuit Status Screen (/S), and the Network Status Screen (/SN).

6.1. The Circuit Status Screen

The Circuit Status Screen lists the current A/B settings for the PLS-345's three switched circuits, and also summarizes user-selected parameters, such as Command Echo, Inactivity Timeout, and Command Confirmation.

As shown in Figure 6.1, the Circuit Status Screen lists the following items:

1. **Site ID Message:** The currently defined Site ID message. Note that the site ID message is defined via the General Parameters Menu (/G).

2. **Ckt #:** The circuit numbers for the PLS's three A/B circuits.

```
Physical Layer Switch v1.00        Site ID: PLS-345_TEST_IRVINE_CALIFORNIA

CKT# | From             | To               | POS | MON | Default |
-----+------------------+------------------+-----+-----+---------|
  1  | COMMON_LINE_1    | LINE_B1          |  B  |     |    A    |
  2  | COMMON_LINE_2    | LINE_A2          |  A  |  *  |    A    |
  3  | COMMON_LINE_3    | LINE_A3          |  A  |  *  |    A    |
-----+------------------+------------------+-----+-----+---------|




Command Echo:          On
Inactivity Timeout:    30 Min
Command Confirmation:  On
Automated Mode:        Off
Monitor Mode:          On
Monitor Input Level:   1 - High


"/H" for help.
```

Figure 6.1: The Circuit Status Screen

3. **From:** The user-defined name for the Common Line (C) for each of the three A/B circuits. Note that if the Common Line name has not been defined, this field will remain empty.

4. **To:** The user defined name for the currently selected "A" or "B" line for each of the three A/B circuits. Note that if the A/B line names have not been defined, this field will remain empty.

5. **POS (Position):** The currently selected "A" or "B" line for each of the three A/B circuits. This field will list either "A" or "B" to indicate which line is currently connected to the Common Line.

6. **MON (Monitor Mode):** An asterisk will appear in this field for each circuit that has been configured for the Monitor Mode. An asterisk indicates that the circuit will be monitored if the Monitor Mode is enabled. Note that if the Monitor Mode has been configured at this circuit, but not actually enabled, an asterisk will still appear in this field.

7. **Default:** The default A/B position that has been defined for this circuit using the Circuit Parameters Menu. This does not reflect the currently selected A/B Line, but indicates which A/B line will be selected if the PLS is reset to default settings.

8. **Other Parameters:** The lower half of the status screen lists currently selected values for most of the parameters that are selected via the General Parameters Menu, plus the status of the Monitor Mode.

```
Physical Layer Switch v1.00      Site ID: PLS-345_TEST_IRVINE_CALIFORNIA
NETWORK STATUS:         52-54-40-22-48-7a

TCB        SRC PORT     STATE               SOURCE IP ADDR
1             16128     Established           65.106.93.98

PORT            TCB     STATE
Telnet            1     Connected


PLS>
```

Figure 6.2: The Network Status Screen

6.2. The Network Status Screen

The Network Status Screen lists the TCP port number, source port, source IP address and other Network related parameters. Note that the Network Status Screen is used primarily for diagnostic purposes, for a listing of current network parameters such as the IP Address and Subnet Mask, please refer to the Network Parameters Menu. As shown in Figure 6.2, the Network Status Screen includes the following information:

1. **Site ID:** The currently defined Site ID message. Note that the site ID message is defined via the General Parameters Menu (/G).

2. **MAC Address:** The MAC Address assigned to the PLS Network Interface card is listed in the second line of the Network Status Screen, adjacent to the text which reads "NETWORK STATUS."

3. **TCB:** Transmission Control Block (Always 1.)

   a) **SRC PORT (Source Port):** The port number of the PC or terminal that has contacted the PLS via network.

   b) **State:** The current status of the TCB connection.

   c) **Source IP Address:** The IP Address of the network node that has currently accessed the PLS-345 Command Mode.

4. **Port:**

   a) **TCB:** Transmission Control Block (Always 1.)

   b) **State:** The current status of the Telnet Port.

7. Operation

The PLS-345 offers three different methods for switching A/B paths:

1. **Manual A/B Switching:** The manual A/B Switches on the PLS front panel are used to initiate switching of one or more A/B Circuits.

2. **Code Activated A/B Switching:** ASCII commands are sent to the PLS to initiate switching of one or more A/B Circuits.

3. **Automated A/B Switching (Monitor Mode):** The PLS monitors a signal received via the Monitor Input Port, and switches one or more A/B Circuits according to user-defined parameters.

These methods are discussed in the sections that follow.

7.1. Manual A/B Switching

The most basic method for switching A/B paths is accomplished using the manual A/B switches on the PLS front panel. When performing Manual A/B switching, note the following:

- The Master A/B Switch (Labeled "All") can be used to switch all three A/B Circuits.
- When an A/B Circuit is switched, the corresponding LED indicators on the instrument front panel and back panel will light.

7.2. Code Activated A/B Switching

The PLS offers three different commands for controlling A/B switching:

- The /A command, which is used to switch one or more circuits to the "A" line.

- The /B command, which is used to switch one or more circuits to the "B" line.

- The /D command, which is used to switch all three circuits to their user-defined default A/B positions.

All three of these commands are available in both System Mode and User Mode.

7.2.1. The /A Command and the /B Command

The /A command and the /B command can be used to control the "A" or "B" position of one or more of the A/B circuits. The /A command will switch one or more circuits to the "A" line, and the /B command will switch one or more circuits to the "B" line.

Both the /A command and the /B command use the following format:

/A <n> [Enter] or **/B <n> [Enter]**

Where, n is one of the following:

- **Switch One Circuit:** To switch one A/B circuit, enter the number or common name of the desired circuit. For example, to switch circuit 2 to the "A" position, type **/A 2 [Enter]**.

- **Switch Two Circuits:** To switch two circuits to the same A/B position, enter the numbers or common names of the desired circuits with a "plus" sign (+) between them (e.g. n+N). For example to switch circuits 1 and 3 to the "B" position, type **/B 1+3 [Enter]**.

- **Switch All Circuits:** To switch all three A/B circuits to the same A/B position, enter an asterisk (*) in place of the circuit number or name. For example, to switch all three circuits to the "A" position, type **/A * [Enter]**.

The Command Confirmation Prompt:
Normally, when the /A or /B commands are invoked, the PLS will prompt you for confirmation before actually implementing the command. If you wish to suppress this confirmation prompt, and execute commands without confirmation, you can employ one of the following methods:

- Include the ",y" option in the command line (e.g. **/A 1,y**.)

- Disable Command Confirmation as described in Section 5.4.

- Enable the Automated Mode as described in Section 5.4.

7.2.2. The /D Command

The /D command can be used to switch all three PLS-345 circuits to their user-defined default A/B positions. Default A/B positions are defined via the Circuit Parameters Menus (/P n.) When the /D command is invoked, the PLS will set all three circuits to their default A/B positions, and then display the status screen, followed by the PLS> command prompt.

The Command Confirmation Prompt:
Normally, when the /D command is invoked, the PLS will prompt you for confirmation before actually implementing the command. If you wish to suppress this confirmation prompt, and execute commands without confirmation, you can employ one of the following methods:

- Include the ",y" option in the command line (e.g. **/D,y**.)

- Disable Command Confirmation as described in Section 5.4.

- Enable the Automated Mode as described in Section 5.4.

7.3. The Monitor Mode

The Monitor Mode allows the PLS-345 perform automatic A/B switching in response to signal level changes at the monitor port on the instrument back panel. The Monitor Mode can be set to monitor a Contact or an RS-232 Line. For more information on the Monitor Mode, please refer to Section 5.7.

8. Saving and Restoring Configuration Parameters

After the PLS has been properly configured, parameters can be downloaded and saved as an ASCII text file. Later, if the configuration is accidentally altered, the file with the saved parameters can be uploaded to automatically reconfigure the unit without the need to manually assign each parameter.

Saved parameters can also be uploaded to other PLS units. This allows rapid set-up when several units will be configured with the same parameters.

The "Save Parameters" procedure can be performed from any terminal emulation program (e.g. HyperTerminal, ProComm, etc.), that allows downloading of ASCII files.

8.1. Sending Parameters to a File

1. Start your terminal emulation program (e.g. HyperTerminal) and access the PLS Command Mode. If the password prompt is displayed, enter the System Password.

2. When the PLS> command prompt appears, type **/DL** and press **[Enter]**. The PLS will prompt you to configure your terminal emulation program to receive an ASCII download.

   a) Set your terminal emulation program to receive an ASCII format download, and the specify a name for a file that will receive the saved parameters (e.g. PLS.PAR).

   b) Disable the Line Wrap function for your terminal emulation program. This will prevent command lines from being broken in two during transmission.

3. When the terminal emulation program is ready to receive the file, return to the PLS Save Parameter File menu, and press **[Enter]** to proceed with the download. PLS parameters will be saved on your hard drive in the file specified in Step 2 above.

4. The PLS will send a series of ASCII command lines which specify the currently selected PLS parameters. The last line of the file should end with a "**/G-00**" command. When the download is complete, press **[Enter]** to return to the "PLS>" command prompt.

8.2. Restoring Saved Parameters

This section describes the procedure for using your terminal emulation program to send stored parameters to the PLS.

1. Start your terminal emulation program and access the PLS Command Mode; if the password prompt is displayed, enter the System Password.

2. Configure your terminal emulation program to upload an ASCII text file.

3. Upload the ASCII text file with the saved PLS parameters. If necessary, key in the file name and directory path.

4. Your terminal emulation program will send the ASCII text file to the PLS. When the terminal program is finished with the upload, make certain to terminate the Upload mode.

Notes:

• If the PLS detects an error in the parameters file, it will respond with the "Invalid Parameter" message. If an error message is received, carefully check the contents of the parameters file, correct the problem, and then repeat the Upload procedure.

• When the configuration file is sent to the PLS via Telnet, the IP Address, Subnet Mask, and Gateway Address will not be changed until all Telnet connections to the unit are terminated (including the connection that was used to send the saved parameters file.)

5. If the parameter upload procedure is successful, the PLS will send a confirmation message, and then return to the "PLS>" command prompt. Type **/S** and press **[Enter]**, the PLS Status Screen will be displayed. Check the Status Screen to make certain the unit has been configured with the saved parameters.

9. Application Examples

9.1. Monitoring Signal Drop and/or Power Loss

In this application, the PLS-345 will monitor the DTR signal from a data device. If the signal drops or the data device loses power for more than one minute, the unit will automatically switch circuits 2 and 3 to the "B" line.
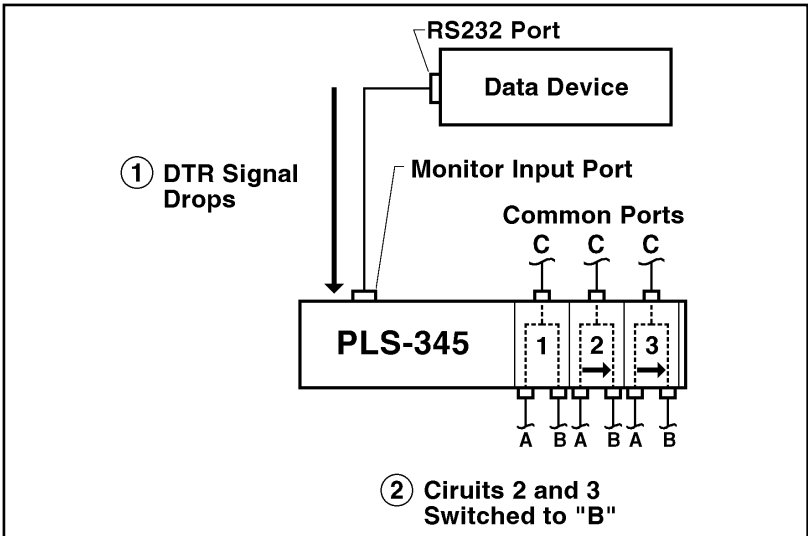
Figure 9.1: Monitoring Signal Drop

1. **Connect Line from Data Device:** Connect a line from the Data Device to the Monitor Input Connector as shown in Figure 9.1.

2. **Set Monitor Selector Switch:** Locate the Monitor Selector Switch on the PLS back panel. Slide the switch to the "RS232" position.

```
┌──────────────────────────────────────────────────────────┐
│         Monitor  Input          Tap from Data Device       │
│               Pin                    RS232 Port            │
│    Ground  ┌──┐ ─────────────────── Ground                 │
│     Input  └──┘ ─────────────────── Signal                 │
└──────────────────────────────────────────────────────────┘
```
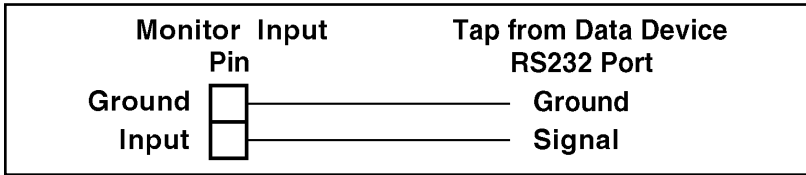
Figure 9.2: AUX Port Connection

3. **Configure Monitor Mode:** Access the PLS command mode as described in Section 5.2. At the PLS> command prompt, type **/M [Enter]** to display the Monitor Mode Parameters Menu. Note that the Monitor Mode Parameters Menu is not available in User Mode. Set Monitor Mode Parameters as follows:

    a) **Item 1 - Monitor Mode:** On.

    Note: Do not enable the Monitor Mode until you have finished defining the other Monitor Mode parameters.

    b) **Item 2 - Switch if Level:** 0 - Low.

    c) **Item 3 - Switch to Position:** B.

    d) **Item 4 - Delay Period:** 1 Minute.

    e) **Item 5 - Return:** Off (Note that if you wanted the A/B circuits to return to their original positions if the monitored line goes high again, then this item would be enabled.)

    f) **Item 6 - Circuits to Switch:** Enable the Monitor Mode at circuits 2 and 3.

4. **Set Circuit Parameters:** From the PLS command prompt, type /P 2 [Enter] to display the Circuit 2 Parameters Menu. Use item 4 (Default Position) in the Circuit Parameters Menu to set the default state for Circuit 2 to "A". Repeat this procedure for Circuit 3 (use the /P 3 command to access the Circuit 3 Parameters Menu.)

5. **Operation:** When the DTR signal is present (high), Circuits 2 and 3 will remain in the default (A) position. If the DTR drops for more than one minute, PLS A/B Circuits 2 and 3 will be switched to the "B" position.
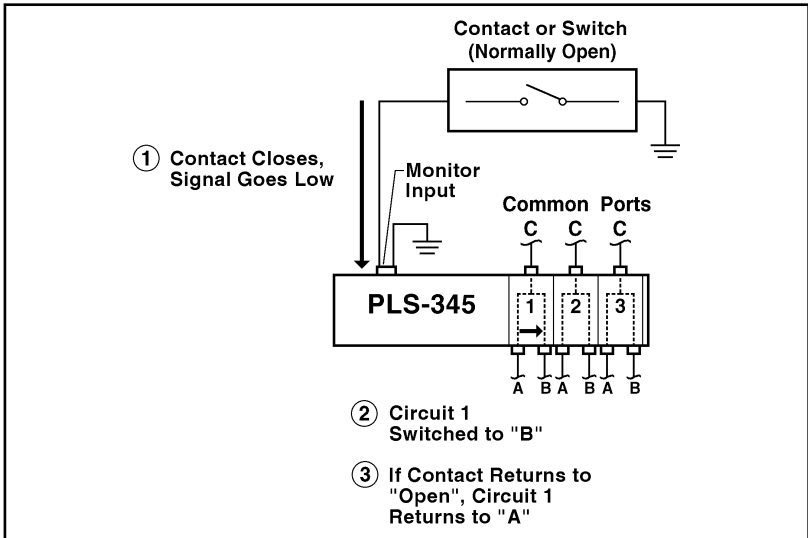
Figure 9.3: Monitoring a Switch or Relay

9.2. Monitoring a Contact

In this application, the PLS will monitor a switch or contact. When the contact closes (signal goes low) for more than one minute, the PLS will automatically switch module 1 to the "B" position. Later, if the contact returns to the open position, the PLS will return circuit 1 to the "A" position.

> **Note:** This example could also be used to monitor a contact or switch that is normally closed. To automatically switch A/B circuits when a contact is opened, use item 3 (Switch if Level) in the Monitor Mode Parameters Menu (Section 5.7.2) to select the "1 - High" option.

1. **Connect Line from Data Device:** Connect a line from the contact to the Monitor Input Connector as shown in Figure 9.3.

2. **Set Monitor Selector Switch:** Locate the Monitor Selector Switch on the PLS back panel. Slide the switch to the "CONTACT" position.
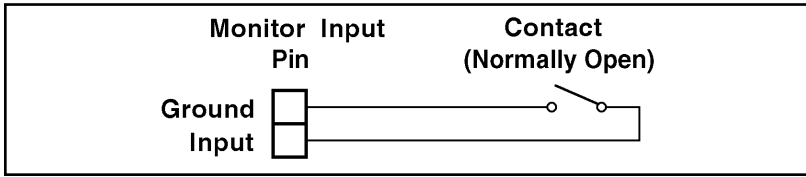
Figure 9.4: AUX Port Connection

3. **Configure Monitor Mode:** Access the PLS command mode as described in Section 5.2. At the PLS> command prompt, type **/M [Enter]** to display the Monitor Mode Parameters Menu. Note that the Monitor Mode Parameters Menu is not available in User Mode. Set Monitor Mode Parameters as follows:

    a) **Item 1 - Monitor Mode:** On.

    Note: Do not enable the Monitor Mode until you have finished defining the other Monitor Mode parameters.

    b) **Item 2 - Switch if Level:** 0 - Low.

    c) **Item 3 - Switch to Position:** B.

    d) **Item 4 - Delay Period:** 1 Minute.

    e) **Item 5 - Return:** On (This will instruct the PLS to switch Circuit 1 back to the "A" position if the signal goes high again, and remains high for one minute.)

    f) **Item 6 - Circuits to Switch:** Enable the Monitor Mode at circuit 1.

4. **Set Circuit Parameters:** From the PLS command prompt, type /P 1 [Enter] to display the Circuit 1 Parameters Menu. Use item 4 (Default Position) in the Circuit Parameters Menu to set the default state for Circuit 2 to "A".

5. **Operation:** When the switch is open, the input level will remain high, and Circuit 1 will remain in the "A" position. If the switch closes for more than one minute, the input level will drop, and Circuit 1 will be automatically switched to the "B" position. If the switch returns to the open position, and remains open for one minute, then Circuit 1 will return to the "A" position.

9-4

10. Command Summary

All PLS-345 commands conform to the following standards:

- All commands normally begin with the "**/**" (foreword slash) character. If you wish to temporarily suppress command echo, use the "****" (**backward** slash) character instead of a forward slash.

- All command lines are invoked by pressing the **[Enter]** key.

- Both the System Level Password and User Level Password are case sensitive.

10.1. Display Commands

These commands are used to display the help screen, circuit status and network status.

/H   Display Help Screen

Displays a Help Screen (Figure 3.2), which lists all available commands, along with a brief description of each command.

Command Format: /H [Enter]

Response: Displays Command Help Screen, followed by the PLS> command prompt.

Command Availability: System and User.

/S   Display Circuit Status

Displays a status screen (Figure 3.1), which lists the currently selected A/B line for each of the three circuits, and the selected values for features such as the Command Echo and Inactivity Timeout.

Command Format: /S [Enter]

Response: Displays Circuit Status Screen, followed by the PLS> command prompt.

Command Availability: System and User.

/SN Display Network Status

Displays a status screen (Figure 6.2), which lists current network parameters, such as the TCB port, Telnet port, and network status.

Command Format: /SN [Enter]

Response: Displays Network Status Screen, followed by the PLS> command prompt.

Command Availability: System and User.

10.2. Configuration Commands

These commands are used to access the configuration menus, which are used to select operating parameters for the PLS-345.

/G   View/Set General Parameters

Displays the General Parameters Menu (Figure 5.2), which is used to define parameters such as the System and User Passwords, Site ID, Modem command strings, and other features. The General Parameters menu also includes an option which allows the user to set all parameters to their default values. For more information on the General Parameters Menu, please refer to Section 5.4.

Command Format: /G [Enter]

Response: Displays General Parameters Menu.

Command Availability: System Only.

/P [n]   View/Set Circuit Parameters

Displays the Circuit Parameters Menus (Figure 5.3), which are used to select operating parameters for each of the PLS-345's three switched circuits. For more information on the Circuit Parameters Menus, please refer to Section 5.5.

Command Format: /P [n] [Enter]
  Where "n" is the common name or number of the circuit. For example, to configure Circuit 2, type **/P 2 [Enter]**, or to configure a circuit named "vpn", type **/P vpn [Enter]**

Response: Displays the Circuit Parameters Menus.

Command Availability: System Only.

10-2

/N   View/Set Network Parameters

Displays the Network Parameters Menu (Figure 5.4), which is used to define the IP Address, Subnet Mask, Gateway Address and access the IP Security Menu. For more information on the Network Parameters Menu, please refer to Section 5.6.

Command Format: /N [Enter]

Response: Displays Network Parameters Menu.

Command Availability: System Only.

/M   View/Set Monitor Mode Parameters

Displays the Monitor Mode Parameters Menu (Figure 5.6), which is used to enable and configure the Monitor Mode feature. The Monitor Mode allows the PLS to perform automatic A/B switching, based on the signal level of an RS-2323 line or contact connected to the Monitor Input Port. For more information on the Monitor Mode, please refer to Section 5.7.

Command Format: /M [Enter]

Response: Displays Monitor Mode Parameters Menu.

Command Availability: System Only.

/DL Download Configuration to File

Saves currently defined PLS configuration parameters to an ASCII file on your PC. This allows you to either "back-up" parameters as a safety measure, or download the parameters to another PLS-345 if several units will be configured with the same parameters. For more information on saving configuration parameters, please refer to Section 8.

Command Format: /DL [Enter]

Response: Prompts the user to configure terminal application to receive parameter file, waits for confirmation, and then downloads configuration parameters to an ASCII file on your hard drive when confirmation is given.

Command Availability: System Only.

10.3. Control Commands

These commands are used to switch A/B lines at each circuit, set circuits to default status, and reset the network interface.

/A <n> Switch Circuit "n" to Line "A"

Switches the target circuit(s) to Line "A". Note that this command can be used to switch one circuit, a combination of circuits or all circuits to the "A" state. For more information, please refer to Section 7.2.1.

Command Format: /A <n> [Enter]
Where **n** is the number or common name of the target circuit, and can either indicate a single circuit, a combination of circuits, or all circuits as described in Section 7.2.1.

Command Arguments:
,y Suppress Confirmation (Sure) Prompt. For example, "**/A 1,y**" switches circuit 1 to Line "A" *without* displaying the confirmation prompt.

Response: Displays message indicating circuit(s) to be switched, waits for user confirmation (unless suppressed), switches target circuit(s) to "A", then displays Status Screen.

Command Availability: System and User.

/B <n> Switch Circuit "n" to Line "B"

Switches the target circuit(s) to Line "B". Note that this command can be used to switch one circuit, a combination of circuits or all circuits to the "B" state. For more information, please refer to Section 7.2.1.

Command Format: /B <n> [Enter]
Where **n** is the number or common name of the target circuit, and can either indicate a single circuit, a combination of circuits, or all circuits as described in Section 7.2.1.

Command Arguments:
,y Suppress Confirmation (Sure) Prompt. For example, "**/B 1,y**" switches circuit 1 to Line "B" *without* displaying the confirmation prompt.

Response: Displays message indicating circuit(s) to be switched, waits for user confirmation (unless suppressed), switches target circuit(s) to "B", then displays Status Screen.

Command Availability: System and User.

/D   Set Circuits to Default

Switches all PLS-345 circuits to their default A/B state. Note that the default A/B state is set using the Circuit Parameters Menu, as described in Section 7.2.2.

Command Format: /D [Enter]

Command Arguments:
   ,y   Suppress Confirmation (Sure) Prompt. For example, "**/D,y**" switches all circuits to their default states *without* displaying the confirmation prompt.

Response: Displays message indicating that circuits will be set to defaults, waits for user confirmation (unless suppressed), switches all circuits to user-defined default positions, and then displays Status Screen.

Command Availability: System and User.

/T   Reset Network Interface

Terminates the Telnet connection and then resets the network interface.

> **Note:** In order to prevent remote users from being "locked out" of command mode, the /T command cannot be invoked via the Network Port. The Network Port is not allowed to reset itself.

Command Format: /T [Enter]

Command Arguments:
   ,y   Suppress Confirmation (Sure) Prompt. For example, "**/T,y**" resets the Network Port *without* displaying the confirmation prompt.

Response: Displays message indicating that network port will be reset, waits for user confirmation (unless suppressed) and then resets network port.

Command Availability: System and User

/X   Exit/Disconnect

Exits from command mode. When you have contacted the PLS via network, the unit will exit command mode and the network connection will be terminated. When you have contacted the PLS via modem, the unit will exit command mode and the modem will hang up. When you have contacted the PLS via a local PC connected to the PLS Console Port, the unit will exit command mode.

> **Note:** When communicating with the PLS, it is recommended to always disconnect using the /X command. If the /X command is not invoked at the end of a command session, then PLS will not exit from command mode until the No Activity Timeout feature closes the session. In this case, further access the PLS command mode will not be allowed until the current session times out.

Command Format: /X [Enter]

Command Arguments:

,y   Suppress Confirmation (Sure) Prompt. For example, "**/X,y**" will cause the PLS to exit the current command mode session *without* displaying the confirmation prompt.

Response: Displays message indicating that you are about to exit command mode, waits for user confirmation (unless suppressed) and then exits from command mode.

Command Availability: System and User.

A. Interface Descriptions

A.1 Console Port Interface
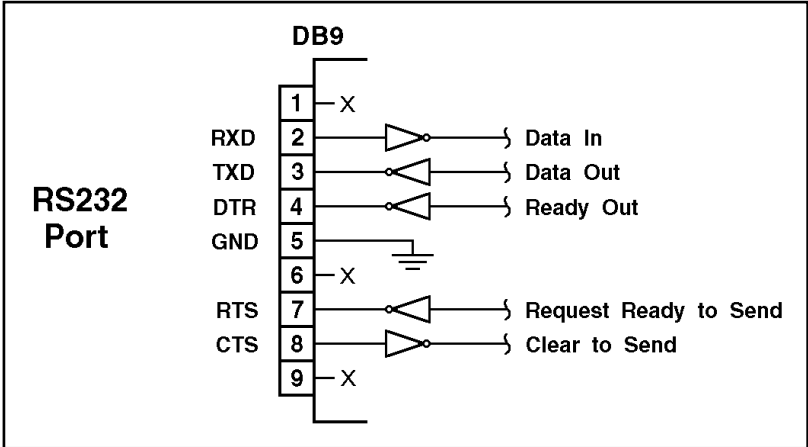
Figure A.1: Console Port Interface

A.2 Modem Port Interface
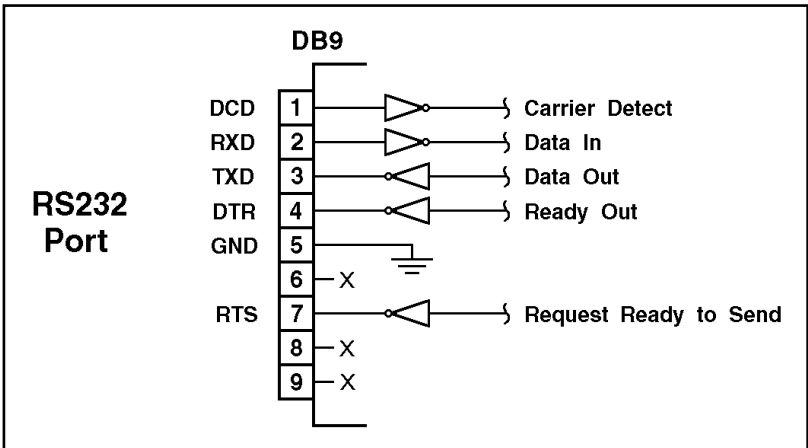
Figure A.2: Modem Port Interface

A.3 Common Ports and A/B Ports
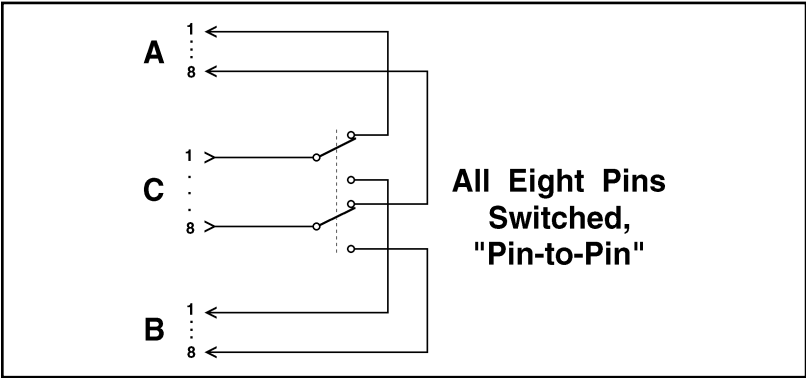
Figure A.3: Common Ports and A/B Ports

B. Specifications

Interface: RJ-45, three jacks, Cat5 compliant, capable of switching 10/100Base-T with minimum dB loss, 8 pins switched, Common Jack to "A" or "B" Jack.

Contacts: High reliability, mechanical relays, break-before-make contacts with 1 amp @ 30 VDC rating, 100 million cycle life.

Switching:
  Manual: Individual or ALL from front panel controls.
  Code: By circuit number or name.

Network Port: 10BaseT Ethernet, RJ45.

Console Port: RS-232, DB-9M, DTE pinout.
  Coding: Serial ASCII, 8 bits, no parity.
  Data Rate: 2400, 9600, 19.2K, 38.4K bps.

Modem Port: RS-232, DB-9M, DTE pinout. Sends auto-setup command strings (user definable.)

Memory: Non-volatile parameter storage.

Size:
  Height: 1.75" (4.4 cm), 1 Rack Unit.
  Width: 19.00" (48.3 cm) with rack mounting.
  Depth: 6.75" (17.2 cm)

Shipping Weight: 6.0 Lbs. (2.7 kg.)

Power: IEC-320 inlet, 100/240 VAC, 50/60 Hz, 5 Watts.

Operating Temperature: 32°F to 122°F (0°C to 50°C.)

Humidity: 10 to 90% RH.

C. Customer Service

Customer Service hours are from 8:00 AM to 5:00 PM, PST, Monday through Friday. When calling, please be prepared to give the name and make of the unit, its serial number and a description of its symptoms. If the unit should need to be returned for factory repair it must be accompanied by a Return Authorization number from Customer Service.

WTI Customer Service
5 Sterling
Irvine, California   92618

Local Phone: (949) 586-9950
Toll Free Customer Service Line: 1-888-280-7227
Customer Service Fax: (949) 457-8138
E-mail: service@wti.com

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