Volume

2

Diamond Lane® Communications

The Speedlink™ System

Installation

TABLE of CONTENTS

Speedlink Documentation

Introduction   Speedlink documentation provides complete detailed instructions on how to install, test, and turn-up a Speedlink System. This documentation complies with all requirements in Bellcore Technical Reference TR-TSY-000454 *Supplier Documentation for Network Elements* and IP 0260 *Standards for Task Oriented Practices (TOPS)* requirements.

Target Audience   Speedlink documentation volumes are written at different levels of detail based on the reader's needs. Below is a list of the various volumes and the intended target audience for each.

VOLUME	TITLE	TARGET AUDIENCE
Volume 1	General	Anyone with a need to understand more about the Speedlink System and planning requirements.
Volume 2	Installation	Installation and Testing Technicians, and Engineers (Detailed Level Procedures)
Volume 3	Acceptance Testing	Testing Technicians and Engineers (Detailed Level Procedures)
Volume 4	Provisioning	Provisioning Technicians and Engineers (Detailed Level Procedures)
Volume 5	Maintenance and Testing	Maintenance and Testing Technicians and Engineers (Detailed Level Procedures)
Volume 6	DiamondView	Network Management Technicians (Tutorial and Reference Manual for DiamondView)
Volume 7	DiamondCraft	Testing and Installation Technicians and Engineers (Tutorial and Reference Manual for DiamondCraft)

Information Mapping Style	All documents are written in Information Mapping style, which presents information in small units or blocks. Each information block is identified by a "subject label" in the left margin and is separated from the next information block by a horizontal line. "Subject labels" make the document easy for the reader to scan and to find information.

Each Detailed Level Procedure states the required equipment and tools to perform the job, provides step by step instructions, with integrated graphics, to help the reader perform each task. |

SECTION 1   HARDWARE INSTALLATION

Chapter 1   Master Control Shelf (MCS)

Introduction

The Speedlink system Multiplexer consists of the following components: Master Control Shelf (MCS), Line Card Shelves (LCS), Low Pass Filter Shelves (LPFS), ADSL Link IDs, and Auxiliary Common Systems Interface Panels (ACSIP).

This procedure provides detailed instructions on how to install a Speedlink Master Control Shelf in a standard telco relay rack. These instructions may seem too detailed if you are experienced in the installation of central office equipment.

Use the labels in the left margin to scan this document for tasks you need to review, or to quickly find those tasks specific to the installation of the Speedlink system.

Speedlink System Configurations

The Speedlink Multiplexer can be configured three different ways based on the needs of your network service provider. These configurations are:

Configuration A   Data and voice service, <u>Low Pass Filter Shelf required</u>.   LPFS co-located with the Speedlink Multiplexer Master Control Shelf and Line Card Shelves.

Configuration B   Data and voice service, <u>Low Pass Filter Shelf required</u>. LPFS located remotely, within 655 cable feet, from the Speedlink Multiplexer (MCS and LCS).

Configuration C   Data service only, <u>no Low Pass Filter Shelf required</u>.

The graphic below shows a possible Speedlink Multiplexer configuration (Configuration A) to support data plus voice service; a Master Control Shelf, Auxiliary Common Systems Interface Panels (3), the maximum number of Line Card Shelves (12), and Low Pass Filter Shelves (12):

Master Control Shelf (MCS)	Auxiliary CSIP	Auxiliary CSIP	Auxiliary CSIP
Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)
Low Pass Filter Shelf (LPFS)	Low Pass Filter Shelf (LPFS)	Low Pass Filter Shelf (LPFS)	Low Pass Filter Shelf (LPFS)
Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)
Low Pass Filter Shelf (LPFS)	Low Pass Filter Shelf (LPFS)	Low Pass Filter Shelf (LPFS)	Low Pass Filter Shelf (LPFS)
Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)
Low Pass Filter Shelf (LPFS)	Low Pass Filter Shelf (LPFS)	Low Pass Filter Shelf (LPFS)	Low Pass Filter Shelf (LPFS)

Figure 1: Configuration A—Speedlink Multiplexer Data and Voice Service, LPFS Co-Located

The graphic below shows a possible Speedlink Multiplexer configuration (Configuration C) to support data service only; a Master Control Shelf, Auxiliary Common Systems Interface Panels (2), and the maximum number of Line Card Shelves (12). No Low Pass Filter Shelves are required in this configuration:

Master Control Shelf (MCS)	Auxiliary CSIP	Auxiliary CSIP
Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)
Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)
Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)
Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)

Figure 2: Configuration C—Speedlink Multiplexer, Data Only, No LPFS Required

Required Equipment and Tools

You must have the following equipment and tools to install the Master Control Shelf:

■   Standard 23" wide, telco relay rack

■   Large Phillips head screwdriver

■   2 ft. step ladder (optional)

■   Master Control Shelf Assembly Kit (DLCC Part Number: 50-0010)

■   (4) 12-24 thread forming screws (DLCC Part Number: 61-0065[1])

■   A second person to help lift and position the Master Control Shelf assembly. Approximate weight of the MCS is 52 lbs. (assembly without cards), 74 lbs. (fully loaded).

Master Control Shelf Assembly and Components

The Master Control Shelf assembly is designed for placement in a standard 23" wide telco relay rack. The figure below diagrams the components of a fully installed unit.

Figure 3: Master Control Shelf Assembly and Components

A hinged front panel covers the front of the Master Control Shelf assembly. The panel is removable but it is intended to remain fastened to the MCS under normal conditions.

The MCS assembly includes a pre-installed Fan Tray. The Fan Tray is required for forced air cooling.

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[1]   Thread forming screws are also included in the MCS/ACSIP Installation Kit (DLCC Part Number: 50-0060).

Master Control Shelf Assembly Placement

Install the Master Control Shelf assembly in the bay area, relay rack and mounting plates designated by the engineering work order. The Master Control Shelf assembly is installed using a minimum of four 12-24 thread forming screws (2 screws on each side). Follow these steps to complete the placement procedure:

Table 1: Master Control Shelf Assembly Placement

STEP	PROCEDURE
1	Lift the MCS assembly to its assigned position in the relay rack.
2	Line up flange holes with holes on both sides of the relay rack. Raise or lower the assembly until 2 flange holes line up with holes on both sides of the relay rack. Figure 4: MCS Assembly—Side View
3	Place and tighten four to six screws (minimum two on each side) to secure the assembly to the relay rack. **NOTE:** An optional method for Master Control Shelf assembly installation is provided on page page 5.
4	The MCS is shipped with the Fan Tray in place. Continue with the following procedures to make sure that the Fan Tray is properly locked into position.

Table 1: Master Control Shelf Assembly Placement (continued)

STEP	PROCEDURE
5	To release the installed Fan Tray, slide both latches toward the center and pull the Fan Tray partially or completely out. Slide Fan Tray into position. Figure 5: Assembly with Fan Tray Partially Removed
6	To return the Fan Tray to its proper position: ■ Hold it level and slide it into the MCS assembly. ■ Push the Fan Tray in until you feel a solid connection at the backplane. The Fan Tray connection is "keyed" so it plugs into its correct position on the backplane. CAUTION: DO NOT force the Fan Tray into position. If it does not plug in easily, slide it back out and check for any obstructions or bent pins on the connector that might prevent the Fan Tray from sliding easily into place.
7	Lock the Fan Tray into position using the latches on either side. Slide both latches toward the center and release to lock into place. The front panel of the Fan Tray should be recessed with the front panel of the MCS.
8	The Master Control Shelf procedure is complete.

OPTION: You can use the keyhole slots at the top of the mounting flange to hold the assembly unit in place while you place and tighten additional mounting screws. To do this partially tighten a 12-24 thread forming mounting screw on each side of the relay rack, leaving about ¼ inch of space between the rack and the screw head. Position the assembly so keyhole slots are over the partially installed mounting screws. Lower the assem-

bly until the top of both keyhole slots rest on the mounting screws. Place and tighten additional screws (minimum two on each side) to secure the assembly.

To use this option you must <u>install Speedlink components from the bottom of the rack</u> first (Low Pass Filter Shelves and Line Card Shelves first, Master Control Shelf last) to allow room to position the units.

IMPORTANT: Do not install Master Control printed circuit boards until all Installation procedures (Chapter 1 through Chapter 13) are complete. Volume 3—*Acceptance Testing*, Chapter 1—"MCS Card Installation" describes installation of printed circuit boards in detail.

SECTION 1   HARDWARE INSTALLATION

Chapter 2   Line Card Shelf (LCS)

Introduction

The Speedlink system Multiplexer consists of the following components: Master Control Shelf (MCS), Line Card Shelves (LCS), Low Pass Filter Shelves (LPFS), ADSL Link IDs, and Auxiliary Common Systems Interface Panels (CSIP).

This procedure provides detailed instructions on how to install a Speedlink Line Card Shelf in a standard telco relay rack. These instructions may seem too detailed if you are experienced in the installation of central office equipment.

Use the labels in the left margin to scan this document for tasks you need to review, or to quickly find those tasks specific to the installation of the Speedlink system.

Required Equipment and Tools

To begin this task you must have the following equipment and tools:

- Standard 23" wide, telco relay rack

- Large Phillips head screwdriver

- 2 ft. step ladder (optional)

- Line Card Shelf Assembly(ies) Kit (DLCC Part Number: 50-0020)

- (4) 12-24 tread forming screws for each LCS (DLCC Part Number: 61-0065[1])

- A second person to help lift and position the Line Card Shelf assembly. Approximate weight of a LCS is 39 lbs. (assembly only, no Fan Tray or line cards), 65 lbs. (fully loaded).

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[1] Thread forming screws are also included in the LCS/LPFS Installation Kit (DLCC Part Number 50-0070).

Line Card Shelf Assembly and Components

The Line Card Shelf assembly is designed for placement in a standard 23" wide telco relay rack. The figure on the next page diagrams the components of a fully installed unit without a front panel.
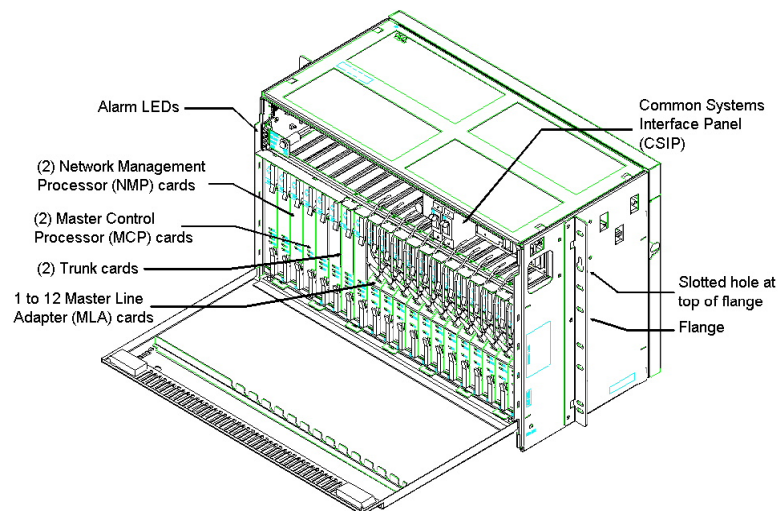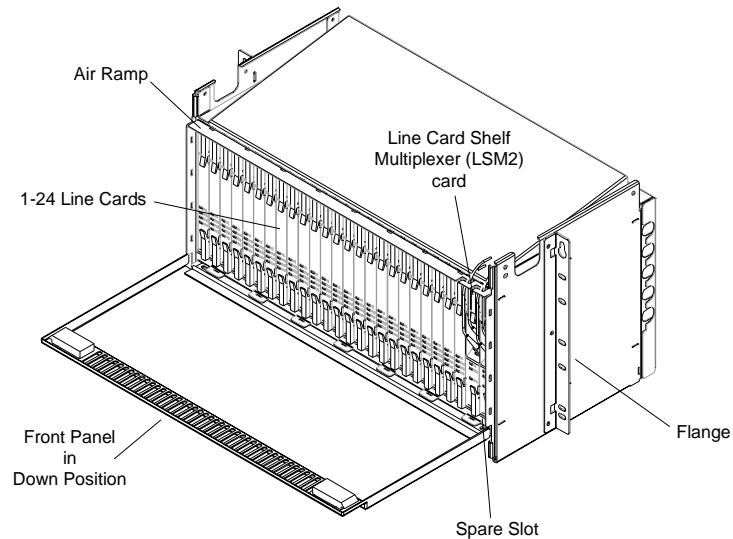

Figure 6: Line Card Shelf Assembly and Components

A hinged front panel covers the front of the Line Card Shelf assembly. The panel is removable but it is intended to remain fastened to the LCS under normal conditions.

The LCS assembly includes a Fan Tray. It is installed after the LCS assembly is in place.

Line Card Shelf Assembly Placement   Install the Line Card Shelf assembly in the bay area, relay rack and mounting plates designated by the engineering work order. The Line Card Shelf assembly is installed using a minimum of four 12-24 thread forming screws (2 screws on each side). Follow these steps to complete the placement procedure:

Table 2: Line Card Shelf Assembly Placement
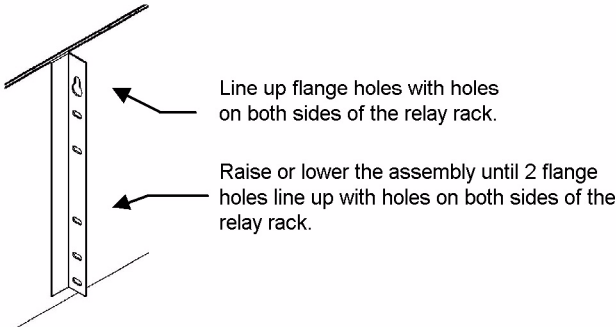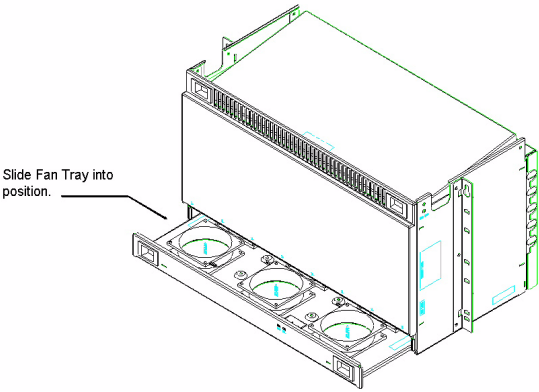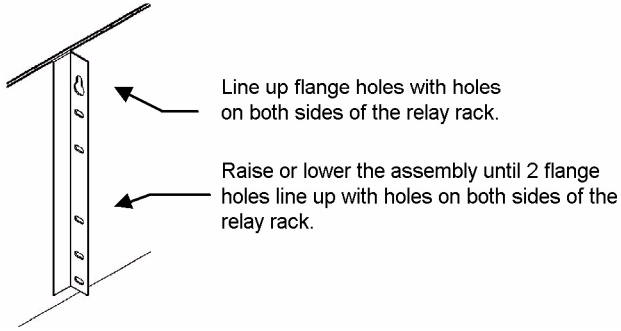
STEP	PROCEDURE
1	Lift the LCS assembly to its assigned position in the relay rack.
2	 Line up flange holes with holes on both sides of the relay rack. Raise or lower the assembly until 2 flange holes line up with holes on both sides of the relay rack. Figure 7: LCS Assembly—Side View
3	Place and tighten four to six screws (minimum two on each side) to secure the assembly to the relay rack. **NOTE:** An optional method for Line Card Shelf assembly installation is provided on page 11.
4	The LCS is shipped with the Fan Tray in place. Continue with the following procedures to make sure that the Fan Tray is properly locked into position.

VOLUME 2   **INSTALLATION**
Section 1   **Hardware Installation**
                           Line Card Shelf Assembly Placement

Table 2: Line Card Shelf Assembly Placement (continued)

STEP	PROCEDURE
5	To release the installed Fan Tray, slide both latches toward the center and pull the Fan Tray partially or completely out. Figure 8: Line Card Assembly with Fan Tray Partially Removed
6	To return the Fan Tray to its proper position: ■ Hold it level and slide it into the MCS assembly. ■ Push the Fan Tray in until you feel a solid connection at the back-plane. The Fan Tray connection is "keyed" so it plugs into its correct position on the backplane. **CAUTION:** DO NOT force the Fan Tray into position. If it does not plug in easily, slide it back out and check for any obstructions or bent pins on the connector that might prevent the Fan Tray from sliding easily into place.
7	Lock the Fan Tray into position using the latches on either side. Slide both latches toward the center and release to lock into place. The front panel of the Fan Tray should be recessed with the front panel of the MCS.
8	Does the engineering work order designate installation of a Low Pass Filter Shelf? ■ If YES, proceed to the Low Pass Filter Shelf installation procedure beginning on page 13. ■ If NO, continue to STEP 9.

Chapter 2   Line Card Shelf (LCS)
Release 3.0   **10/28/98**
Line Card Shelf Assembly Placement

Table 2: Line Card Shelf Assembly Placement (continued)

STEP	PROCEDURE
9	Does the engineering work order designate installation of an ADSL Link ID? ■ If YES, proceed to the ADSL Link ID installation procedure beginning on page 19. If NO, continue to STEP 10.
10	Does the engineering work order designate additional Line Card Shelves? ■ If YES, repeat Steps 1 through 7 to install each Line Card Shelf and Fan Tray assembly. ■ If NO, the Line Card Shelf assembly and Fan Tray installation procedure is complete.

OPTION: You can use the keyhole slots at the top of the mounting flange to hold the assembly unit in place while you place and tighten additional mounting screws. To do this partially tighten a 12-24 thread forming mounting screw on each side of the relay rack, leaving about ¼ inch of space between the rack and the screw head. Position the assembly so keyhole slots are over the partially installed mounting screws. Lower the assembly until the top of both keyhole slots rest on the mounting screws. Place and tighten additional screws (minimum two on each side) to secure the assembly.

        To use this option you must <u>install Speedlink components from the bottom of the rack</u> first (Low Pass Filter Shelves and Line Card Shelves first, Master Control Shelf last) to allow yourself room to position the units.

IMPORTANT: Do not install Line Card printed circuit boards until all Installation procedures (Chapter 1 through Chapter 13) are complete. Volume 3—*Acceptance Testing*, Chapter 2—"LCS Card Installation" describes installation of printed circuit boards in detail.

VOLUME 2   **INSTALLATION**
Section 1   **Hardware Installation**
                    Line Card Shelf Assembly Placement

SECTION 1   HARDWARE INSTALLATION

Chapter 3   Low Pass Filter Shelf (LPFS)

Introduction   The Speedlink system Multiplexer consists of the following components: Master Control Shelf (MCS), Line Card Shelves (LCS), Low Pass Filter Shelves (LPFS), ADSL Link IDs, and Auxiliary Common Systems Interface Panels CSIP).

Speedlink System Configurations   A Low Pass Filter Shelf is required for each Line Card Shelf if the Speedlink system Multiplexer is engineered for data plus voice applications. The Speedlink Multiplexer can be configured three different ways based on types of line cards installed and the needs of your network service provider. These configurations are:

Configuration A   Data plus voice service, <u>Low Pass Filter Shelf required</u>.   LPFS co-located with the Speedlink Multiplexer Master Control Shelf and Line Card Shelves.

Configuration B   Data plus voice service, <u>Low Pass Filter Shelf required</u>. LPFS located remotely, but within 655 cable feet from the Speedlink Multiplexer (MCS and LCS).

Configuration C   Data service only, <u>no Low Pass Filter Shelf required</u>.

The graphic on the next page shows a possible Speedlink Multiplexer configuration (Configuration A) to support data plus voice service.

Data plus Voice, LPFS Required   This graphic shows a Master Control Shelf, Auxiliary Common Systems Interface Panels (3), the maximum number of Line Card Shelves (12) and Low Pass Filter Shelves (12):
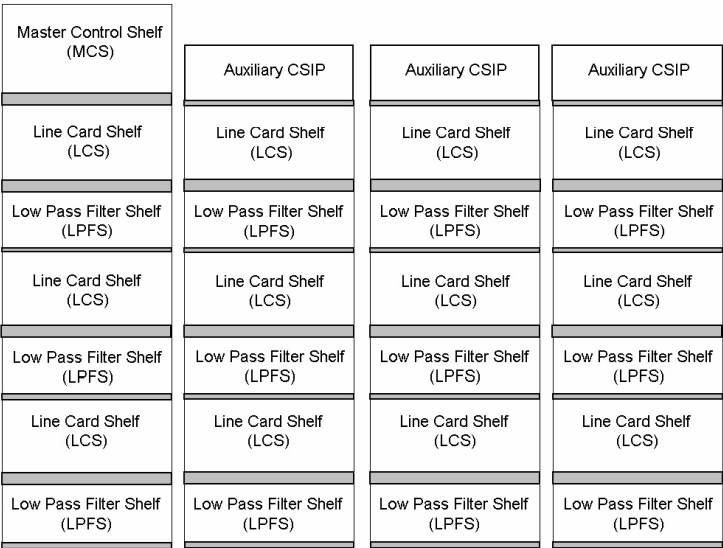
Figure 9: Configuration A—Speedlink Multiplexer
Data and Voice Service, LPFS Co-Located

This procedure provides detailed instructions on how to install a Low Pass Filter Shelf (LPFS) in a standard telco relay rack for Configurations A and B.

Required Equipment and Tools

To begin this task you must have the following equipment and tools:

- Standard 23" wide, telco relay rack

- Large Phillips head screwdriver

- 2 ft. step ladder (optional)

- Low Pass Filter Shelf Assembly(ies) Kit (DLCC Part Number: 50-0030)

- (4) 12-24 thread forming screws for each LPFS (DLCC Part Number: 61-0065[1])

- A second person to help you lift and position the Low Pass Filter Shelf assembly (optional). Approximate weight of the LPFS is 22 lbs. (assembly only, no line cards), 46 lbs. (fully loaded).

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[1] Thread forming screws are also included in the LCS/LPFS Installation Kit (DLCC Part Number: 50-0070).

Chapter 3   Low Pass Filter Shelf (LPFS)
Release 3.0   10/28/98
Low Pass Filter Shelf Assembly and Components

Low Pass Filter Shelf Assembly and Components

The Low Pass Filter Shelf assembly is designed for placement in a standard 23" wide telco relay rack. The figure below diagrams the components of a fully installed unit with the front panel open.
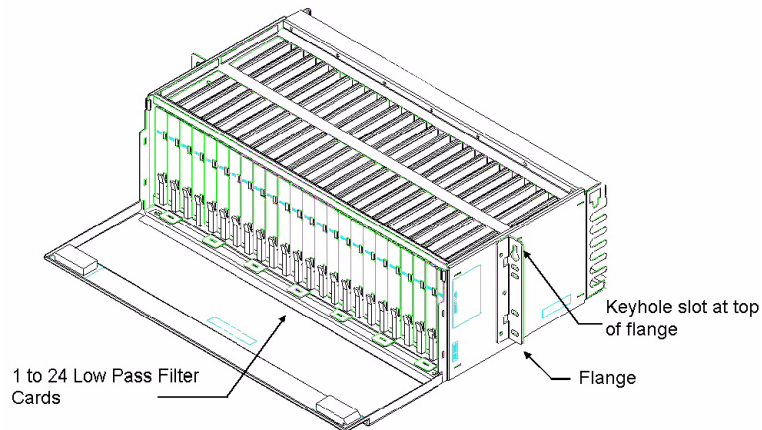
Figure 10: Low Pass Filter Shelf Assembly and Components

A hinged front panel covers the front of the Low Pass Filter Shelf assembly. The panel is removable but is intended to remain fastened to the LPFS under normal conditions.

LPFS Assembly Placement

Install the Low Pass Filter Shelf assembly in the bay area, relay rack and mounting plate designated by the engineering work order. The Low Pass Filter Shelf assembly is installed using four 12-24 thread forming screws (2 screws on each side).

In Configuration A (LPFS co-located with the MCS and LCS) the Low Pass Filter Shelf is installed directly beneath its associated Line Card Shelf.

Follow these steps to complete the placement procedure:

Table 3: LPSF Assembly Placement

STEP	PROCEDURE
1	Lift the LPFS assembly to its assigned position in the relay rack. Line up flange holes with holes on both sides of the relay rack. Raise or lower the assembly until 2 flange holes line up with holes on both sides of the relay rack. Figure 11: LPFS Assembly—Side View
2	Place and tighten four screws (minimum two on each side) to secure the assembly to the relay rack.
3	Does the engineering work order designate additional Line Card Shelves and Low Pass Filter Shelves? ■ If YES, repeat steps to install each Line Card Shelf and Low Pass Filter Shelf assembly. ■ If NO, the Low Pass Filter Shelf installation procedure is complete.

OPTION: You can use the keyhole slots at the top of the mounting flange to hold the assembly unit in place while you place and tighten additional mounting screws. To do this partially tighten a 12-24 thread forming mounting screw on each side of the relay rack, leaving about ¼ inch of space between the rack and the screw head. Position the assembly so keyhole slots are over the partially installed mounting screws. Lower the assembly until the top of both keyhole slots rest on the mounting screws.

Place and tighten additional screws (minimum two on each side) to secure the assembly.

To use this option you must <u>install Speedlink components from the bottom of the rack</u> first (Low Pass Filter Shelves and Line Card Shelves first, Master Control Shelf last) to allow yourself room to position the units.

IMPORTANT: Do not install Low Pass Filter printed circuit boards until all Installation procedures (Chapter 1 through Chapter 13) are complete. Volume 3—*Acceptance Testing*, Chapter 3—"Low Pass Filter Card Installation" describes installation of printed circuit boards in detail.

SECTION 1   HARDWARE INSTALLATION

Chapter 4   ADSL Link ID

Introduction
The ADSL Link ID is a rack mount peripheral unit for confirming ADSL line connectivity. It is designed for Dual and Quad ADSL data service only configurations. A continuous base-band "beep" signal, transmitted by the unit through each ADSL line, notifies technicians that the line(s) are provisioned and working.

The Speedlink Multiplexer consists of the following components: Master Control Shelf (MCS), Line Card Shelves (LCS), Low Pass Filter Shelves (LPFS), ADSL Link IDs, and Auxiliary Common Systems Interface Panels (ACSIP).

This procedure provides detailed instructions on how to install a Speedlink ADSL Link ID in a standard telco relay rack. These instructions may seem too detailed if you are experienced in the installation of central office equipment.

Use the labels in the left margin to scan this document for tasks you need to review, or to quickly find those tasks specific to the installation of the Speedlink.

Speedlink Configurations
The Speedlink Multiplexer can be configured three different ways based on types of line cards installed and the needs of your network service provider. These configurations are:

Configuration A   Data plus voice service, <u>Low Pass Filter Shelf required</u>. LPFS co-located with the Speedlink Multiplexer Master Control Shelf and Line Card Shelves.

Configuration B   Data plus voice service, <u>Low Pass Filter Shelf required</u>. LPFS located remotely, but within 655 cable feet from the Speedlink Multiplexer (MCS and LCS).

Configuration C Data service only, <u>no Low Pass Filter Shelf required</u>.

The ADSL Link ID is used with Configuration C, for systems supplying ADSL data service only.

Data Service Only Configuration with ADSL Link ID

This graphic shows a Master Control Shelf, Auxiliary Common Systems Interface Panels (3), and the maximum number of Line Card Shelves (12) and ADSL Link IDs (12) for supporting ADSL data service only[1]:

Master Control Shelf (MCS)	Auxiliary CSIP	Auxiliary CSIP	Auxiliary CSIP
Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)
ADSL Link ID	ADSL Link ID	ADSL Link ID	ADSL Link ID
Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)
ADSL Link ID	ADSL Link ID	ADSL Link ID	ADSL Link ID
Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)
ADSL Link ID	ADSL Link ID	ADSL Link ID	ADSL Link ID

Figure 12: Configuration C—Speedlink Multiplexer
Data Service Only with ADSL Link ID

Required Equipment and Tools

To begin this task you must have the following equipment and tools:

- Standard 23" wide telco relay rack
- Large Phillips head screwdriver
- 2 ft. step ladder (optional)
- ADSL Link ID Kit (DLCC Part Number: 50-0106)
- (4) 12-24 thread forming screws for each ADSL Link ID (DLCC Part Number: 61-0065[2])

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[1] ADSL Link IDs and their corresponding LCSs can be located in separate racks (planned for a future release).

[2] Thread forming screws are also included in the ADSL Link ID Kit (DLCC Part Number: 60-0098-800).

Detailed Level Procedure

■ A second person to help you lift and position the ADSL Link ID assembly
   (optional). Approximate weight of the ADSL Link ID is 14 lbs.

**ADSL Link ID
Components**

The ADSL Link ID is designed for placement in a standard 23" wide telco relay
rack. It uses no internal cards, and the front and back panels are not removable.

The figure below diagrams a complete, self-contained unit.
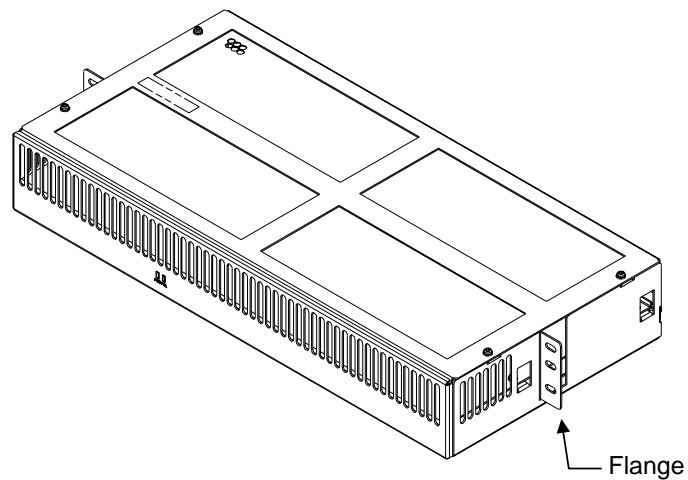
Figure 13: ADSL Link ID, Front View

ADSL Link ID
Assembly
Placement

Install the ADSL Link ID in the bay area, relay rack and mounting plate designated by the engineering work order. The ADSL Link ID assembly is installed using four 12-24 thread forming screws (2 screws on each side).

In Configuration C, the ADSL Link ID is installed directly beneath its associated Line Card Shelf (LCS).

Follow these steps to complete the placement procedure:

Table 4: ADSL Link ID Placement
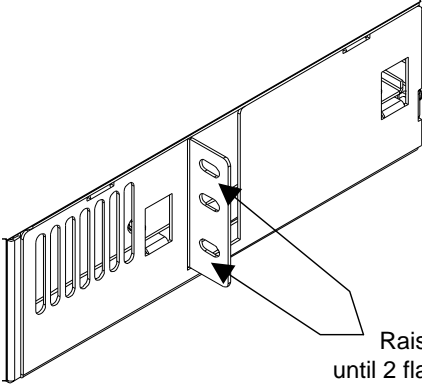
STEP	PROCEDURE
1	Lift the ADSL Link ID to its assigned position in the relay rack. Raise or lower the assembly until 2 flange holes line up with holes on both sides of the relay rack. Figure 14: ADSL Link ID Assembly—Side View
2	Place and tighten four screws (minimum two on each side) to secure the assembly to the relay rack.

Table 4: ADSL Link ID Placement (continued)

STEP	PROCEDURE
3	Does the engineering work order designate additional Line Card Shelves and ADSL Link IDs?
	■ If YES, repeat steps to install each Line Card Shelf and ADSL Link ID.
	■ If NO, the ADSL Link ID installation procedure is complete.
	NOTE: The ADSL Link ID requires power and alarm cabling to the MCS.
	For power connections, see Chapter 6, "Central Office Power to the Speedlink System," on page 31.
	For alarm connections, see Chapter 13, "Alarm Board Connections," on page 173.

SECTION 1　　HARDWARE INSTALLATION

Chapter 5　　Auxiliary Common Systems Interface Panel

Introduction　　The Speedlink system Multiplexer consists of the following components: Master Control Shelf (MCS), Line Card Shelves (LCS), Low Pass Filter Shelves (LPFS), ADSL Link IDs, and Auxiliary Common Systems Interface Panel (CSIP).

These instructions may seem too detailed if you are experienced in the installation of Central Office equipment. Use the labels in the left margin to scan this document for tasks you need to review, or to quickly find those tasks specific to the installation of the Speedlink system.

Speedlink System Configurations　　The Master Control Shelf Common Systems Interface Panel (CSIP) distributes central office battery (-48 volts DC) to Line Card Shelves 1 through 4. An Auxiliary CSIP is required to connect and distribute central office battery to Line Card Shelves 5 through 8. A second Auxiliary CSIP is required to connect and distribute power to Line Card Shelves 9 through 12. The graphic below shows a possible Speedlink Multiplexer configuration with two Auxiliary CSIP assemblies:

Master Control Shelf (MCS)	Auxiliary CSIP	Auxiliary CSIP
Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)
Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)
Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)
Line Card Shelf (LCS)	Line Card Shelf (LCS)	Line Card Shelf (LCS)
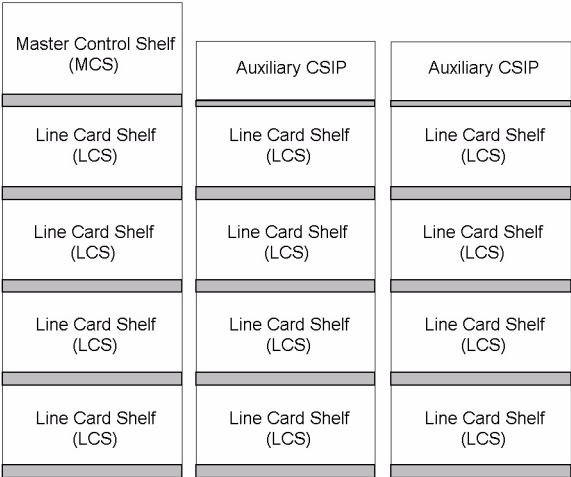
Figure 15: Speedlink Multiplexer with 12 Line Card Shelves and 2 Auxiliary CSIPs

The engineering work order designates the number of Auxiliary CSIPs required and the central office bay area, relay rack and mounting plate assignments.

Required Equipment and Tools

The following tools are required to install an Auxiliary CSIP:

- Standard 23" wide, telco relay rack

- Large Phillips head screwdriver

- 2 ft. step ladder (optional)

- Auxiliary CSIP Assembly(ies) Kit (DLCC Part Number: 50-0040)

- (4) 12-24 thread forming screws (DLCC Part Number: 61-0065[1])

- A second person to help you lift and position the Auxiliary CSIP assembly (optional).

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[1] Thread forming screws are also included in the MCS/ACSIP Installation Kit (DLCC Part Number 50-0060).

Auxiliary CSIP Assembly and Components

The Auxiliary CSIP assembly is designed for placement in a standard 23" wide telco relay rack. The figure below diagrams the components of a fully installed unit with the front panel open.

15 amp GMT fuses

-48 V Battery and Battery Return Lugs

Common Systems Interface Panel (CSIP) Power and Distribution Board

J1 LCS power connector

J5 LCS power connector

Power Switches "A" and "B"
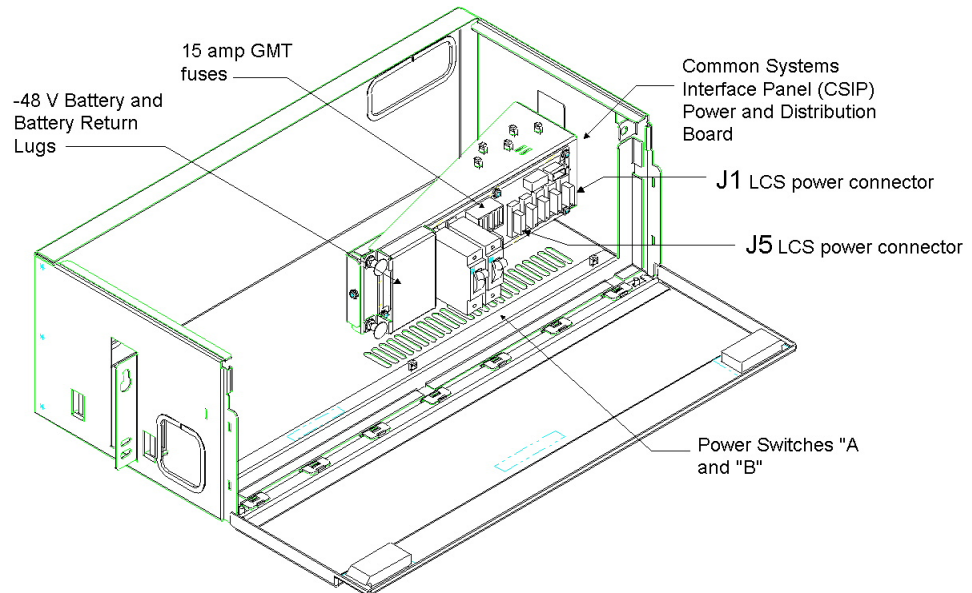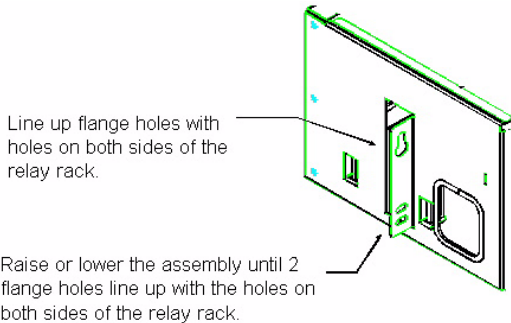
Figure 16: Auxiliary CSIP Assembly and Components

The hinged front panel covers the front of the Auxiliary CSIP assembly. The panel is removable but it is intended to remain fastened to the assembly under normal conditions.

Auxiliary CSIP Assembly Placement

Install the Auxiliary CSIP assembly in the bay area, relay rack and mounting plates designated by the engineering work order. An Auxiliary CSIP assembly is installed using a minimum of four 12-24 thread forming screws (2 screws on each side). Follow these steps to complete the placement procedure:

Table 5: Auxiliary CSIP Assembly Placement

STEP	PROCEDURE
1	Lift the Auxiliary CSIP assembly to its assigned position in the relay rack.
2	Figure 17: Auxiliary CSIP Assembly Flange—Side View
3	Place and tighten four to six screws (minimum two on each side) to secure the assembly to the relay rack.
4	Does the engineering work order designate an additional Auxiliary CSIP? ■ If YES, repeat Steps 1 through 3 to install another Auxiliary CSIP. ■ If NO, the Auxiliary CSIP installation is complete.

OPTION: You can use the keyhole slots at the top of the mounting flange to hold the assembly unit in place while you place and tighten additional mounting screws. To do this partially tighten a 12-24 thread forming mounting screw on each side of the relay rack, leaving about ¼ inch of space between the rack and the screw head. Position the assembly so keyhole slots are over the partially installed mounting screws. Lower the assembly until the top of both keyhole slots rest on the mounting screws. Place and tighten additional screws (minimum two on each side) to secure the assembly.

To use this option you must <u>install Speedlink components from the bot-</u>

Chapter 5   **Auxiliary Common Systems Interface Panel**
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Auxiliary CSIP Assembly Placement

tom of the rack first (Low Pass Filter Shelves and Line Card Shelves first, Auxiliary CSIPs last) to allow yourself room to position the units.

SECTION 2   POWER CABLING

Chapter 6   Central Office Power to the Speedlink System

Introduction   The Speedlink system is powered by central office battery (-48 volts DC). Central office battery is connected to the Speedlink at the Master Control Shelf Common Systems Interface Panel (CSIP) Power and Distribution Board[1] and distributed to Line Card Shelves one through four.

Auxiliary CSIPs are required to connect and distribute power to Speedlink systems with more than four Line Card Shelves (LCS). Each Auxiliary CSIP distributes power to four Line Card Shelves.

This chapter provides detailed instructions on how to connect:

- Power cables from the Master Control Shelf (MCS) to four Line Card Shelves.
- Power cables from an Auxiliary CSIP to four Line Card Shelves.
- The Speedlink to central office battery and battery return.

The following chapter, "ADSL Link ID Power Cabling," provides instructions for connecting power cables from an ADSL Link ID to a Line Card Shelf.

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[1]   The CSIP Power and Distribution Board will be referred to as the CSIP throughout this procedure.

Non-Central Office Environment

IMPORTANT: These procedures are for supplying power to the Speedlink system in a Central Office environment. To supply power to the Speedlink system in a *non*-Central Office environment, CONTINUE WITH THE FOLLOWING TWO PROCEDURES, "LCS Power Cable(s) Installation at the CSIP" and "Power Cable Installation at the LCS Backplane." You will then be directed to Appendix A—"Power to the Speedlink in a Non-Central Office Environment." Do not go to Appendix A until you have completed these two procedures.

Common Systems Interface Panel (CSIP) Diagram

The drawing below diagrams the components of the CSIP.
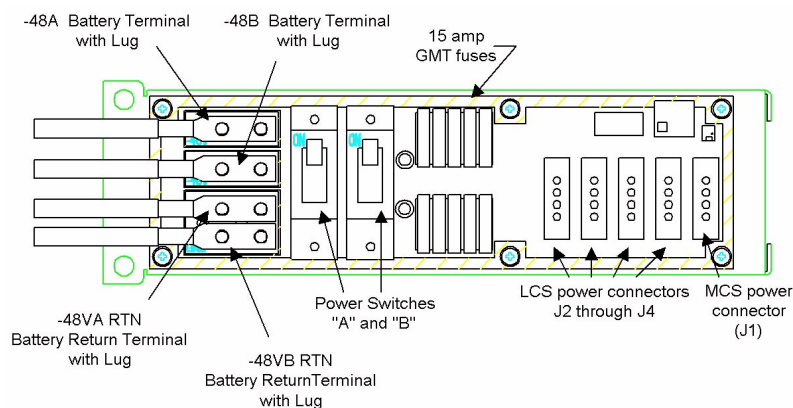
Figure 18: Common Systems Interface Panel (CSIP)

Required Equipment and Tools

To begin this task you must have the following equipment and tools:

■　Electrostatic Discharge (ESD) strap (DLCC Part Number 85-0012)

■　LCS Power Cable Assembly (DLCC Part Number: 40-0002-004

■　The number of cables shipped with the Speedlink system is based on the configuration of the Speedlink system ordered. Power cables come with Positronics connectors at both ends and a rubber vinyl grommet.

■　Two - Battery "A" and Battery "B" Cables (8 AWG[2] red wire) for each MCS or Auxiliary CSIP

■　Two - Battery Return "A" and Battery Return "B" Cables (8 AWG[6] black wire) for each MCS or Auxiliary CSIP

■　Crimping Tool

■　Diagonal Cutters

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[2] 8 AWG or better wire is required for a fully loaded Speedlink system, refer to local electrical code for requirements.

■   Four - 2 hole copper barrel lugs for Battery and Battery Return cables for each MCS or Auxiliary CSIP (DLCC Part Number: 85-0009-002[3])

■   Four - lug nuts for each MCS or Auxiliary CSIP[4]

■   Torque Wrench (rating: 18 to 20 inch pounds) with 3/8" nut socket

■   Volt OHM Meter

■   Step Ladder (optional)

MCS/Auxiliary CSIP and LCS Power Cables

The MCS and Auxiliary CSIP power cables are pre-installed at the factory. The required power cables and connectors—to connect power from the CSIP to each Line Card Shelf—are shipped with the Speedlink system. The number of power cables shipped is based on the configuration of the system ordered. For example: if the system ordered was for one LCS, only one LCS power cable is shipped. A system ordered with four Line Card Shelves includes four LCS power cables.

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[3] Two hole copper barrel lugs are also included in the MCS/ACSIP Installation Kit (DLCC Part Number: 50-0060).

[4] Lug nuts are included in the MCS/ACSIP Installation Kit (DLCC Part Number: 50-0060).

LCS Power Cable(s) Installation at the CSIP

Follow these steps to install the LCS power cables at the MCS Common Systems Interface Panel (CSIP) or at an Auxiliary CSIP:

Table 6: LCS Power Cable(s) Installation at the CSIP
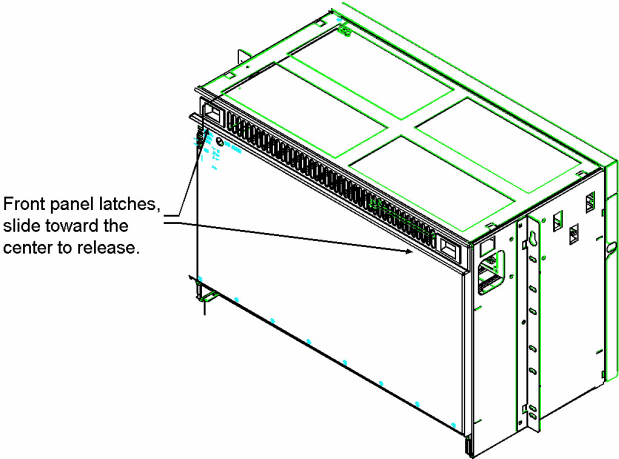
STEP	PROCEDURE
1	Unlatch and lower the MCS or Auxiliary CSIP front panel to access the Common Systems Interface Panel. The latches are located at the top of the front panel. Slide both latches inward to release and lower the panel. Front panel latches, slide toward the center to release. Figure 19: MCS Assembly—Front View
2	Remove the Master Control Shelf front panels during cabling procedures. Hold the panel on both sides and slide to the left about ¼ inch. Pull the panel towards you and release it from the holding clips. **IMPORTANT:** The front panels must be replaced and closed after all *Installation* (Volume 2) and *Acceptance Testing* (Volume 3) procedures are completed to ensure proper air flow through the Speedlink system.
3	Are you connecting LCS power cables to an Auxiliary CSIP? ■ If YES, skip STEP 4 and go to STEP 5. ■ If NO, continue to STEP 4 to remove the MCS top screen.

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LCS Power Cable(s) Installation at the CSIP

Table 6: LCS Power Cable(s) Installation at the CSIP (continued)
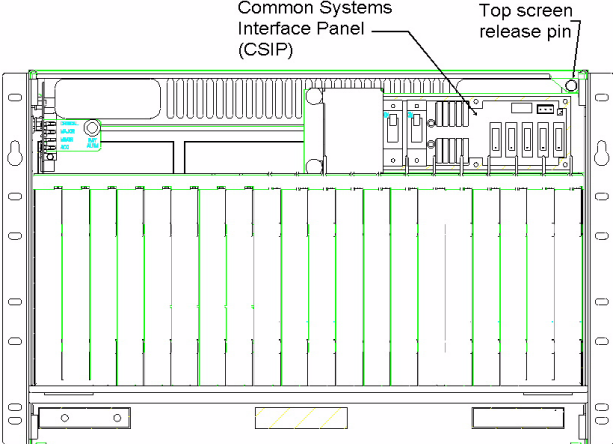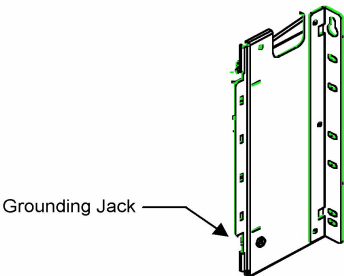
STEP	PROCEDURE
4	Remove the MCS top screen to allow room to run cabling in the space between the top of the CSIP and the screen. Release the top screen using the release pin located in the top right corner. Pull the release pin and slide out the top screen. Figure 20: Front View of Master Control Shelf
5	WEAR AN ELECTROSTATIC DISCHARGE (ESD) STRAP AT ALL TIMES when making connections on the CSIP. The Grounding jack is located on the side of the Master Control Shelf assembly. Figure 21: Grounding Jack Location—Side View of MCS Assembly

Table 6: LCS Power Cable(s) Installation at the CSIP (continued)
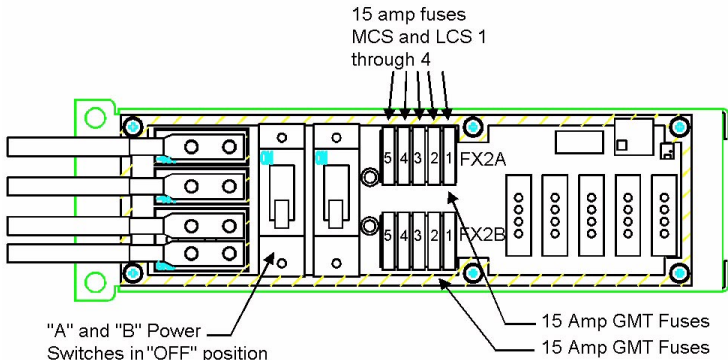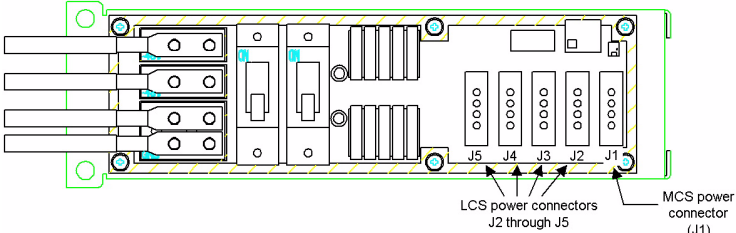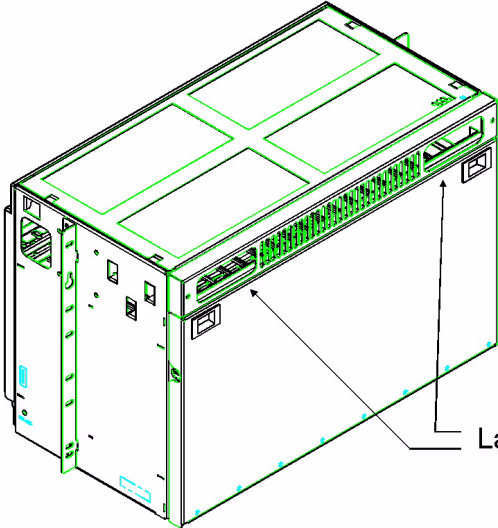
STEP	PROCEDURE
6	The CSIP is located in the upper right corner of the MCS and Auxiliary CSIP assemblies. **IMPORTANT:** Check to make sure "A" and "B" Power switches are set in the "OFF" or "Down" position. Figure 22: CSIP—Power Switches in the "OFF" Position
7	**IMPORTANT:** Check the fuse holders to insure fuses are not installed. 15 amp fuses are shipped separately as part of the Speedlink installation kit. Fuses are installed during test and turn-up procedures.
8	Select the power cable for the first Line Card Shelf. There is a vinyl rubber grommet pre-installed on the power cable. Position the grommet approximately 4 inches from the end of the cable with the "socket" connector.
9	Connect the power cable (the end with the "pin" connector) in the first LCS power connector (labeled "J2" in the drawing below). Figure 23: CSIP Power Connector Locations

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LCS Power Cable(s) Installation at the CSIP

Table 6: LCS Power Cable(s) Installation at the CSIP (continued)

STEP	PROCEDURE
10	Repeat Steps 8 and 9 to connect power cables for Line Card Shelves 2 through 4 (LCS power connectors J3, J4, and J5).
11	Bring the LCS power cables up and position over the Common Systems Interface Panel.
12	Push the cables to the back of the MCS or Auxiliary CSIP assembly and through the large cable port at the back. Large cable ports Figure 24: Master Control Shelf Assembly—Back View
13	Go to the back of the MCS or Auxiliary CSIP and pull the cables through the cable port.
14	Continue to the next procedure: Power Cable Installation at the LCS Backplane on page 38.

Power Cable Installation at the LCS Backplane

Follow these steps to install the power cables to the Line Card Shelf backplane:

Table 7: Power Cable Installation at the LCS Backplane
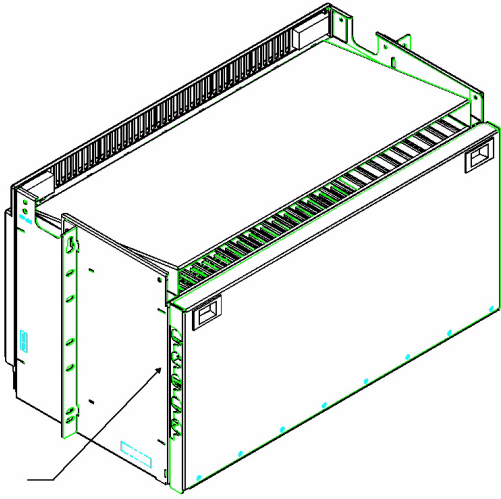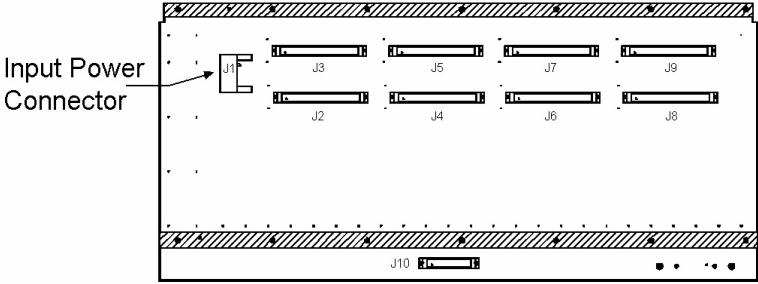
STEP	PROCEDURE
1	Route the power cables from the back of the MCS or Auxiliary CSIP, down the left rails of the relay rack rails following local procedures.
2	Unlatch and lower the <u>back</u> panel on the <u>first</u> Line Card Shelf to access the LCS cable slots and backplane. The latches are located at the top of the back panel. Slide both latches towards the center to release and lower the panel.
3	Remove the Line Card Shelf back panel during cabling procedures. Hold the panel on both sides and slide to the left about ¼ inch. Pull the panel towards you and release it from the holding clips. **IMPORTANT:** The back panels must be replaced and closed after all Installation procedures are completed to keep cables securely in place.
4	Select the power cable for the first Line Card Shelf and bring it through the <u>second</u> cable slot on the <u>left</u> side of the LCS assembly. (This is the cable connected to the LCS power connector (J2) at the CSIP.) Cable slots on side of LCS assembly. Figure 25: Line Card Assembly—Back View, Panel Closed

Table 7: Power Cable Installation at the LCS Backplane (continued)

STEP	PROCEDURE
5	Connect the power cable (the end with the "socket" connector) to the connector (J1) on the back of the LCS backplane. Figure 26: Back View of LCS Backplane
6	Reposition the grommet on the cable so it fits over the edge of the slot used to bring the cable into the LCS backplane. Push the grommet into the slot as far as you can so it doesn't interfere with the back cover. The grommet helps hold the cable in position and also protects it from the metal edge
7	Lift the LCS back panel back up into position. Slide the latches toward the center and release to lock into place.
8	Repeat <u>Steps 2 through 7</u> to connect power cables from the CSIP to Line Card Shelves 2 through 4. Make sure you are connecting each Line Card Shelf power cable to the correct LCS backplane.
9	Is your Speedlink system located in a Central Office environment? ■ If YES, continue to the next procedure, "Central Office Battery Cable Connection at the CSIP." ■ If NO (i.e., your Speedlink system is in a *non*-Central Office environment), go to Appendix A—"Power to the Speedlink in a Non-Central Office Environment," on page 197.

Central Office Battery Cable Connection at the CSIP

"A" and "B" battery cables are run from the central office Battery Distribution Fuse Bay (BDFB)—or other central office battery source—by the network service provider. "A" and "B" battery cables are connected to the Speedlink at the Common Systems Interface Panel (CSIP).

IMPORTANT: Make sure the "A" and "B" battery cables are <u>NOT</u> connected at the central office battery supply before beginning these procedures.

Follow these steps to connect battery cables to the Battery "A" and "B" lugs on the front of the CSIP:

Table 8: Central Office Battery Cable Connection at the CSIP
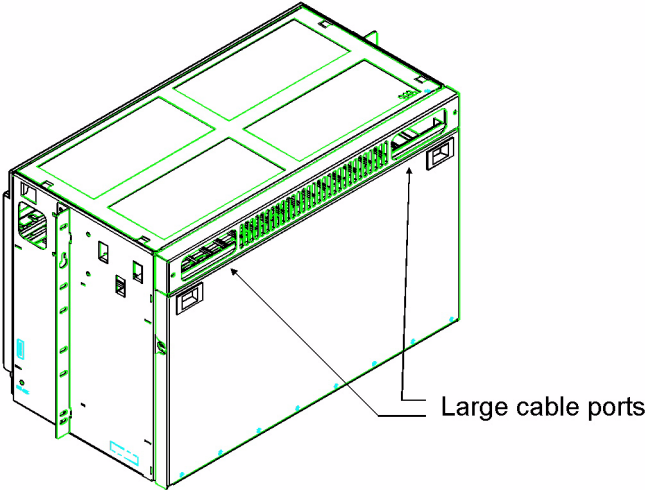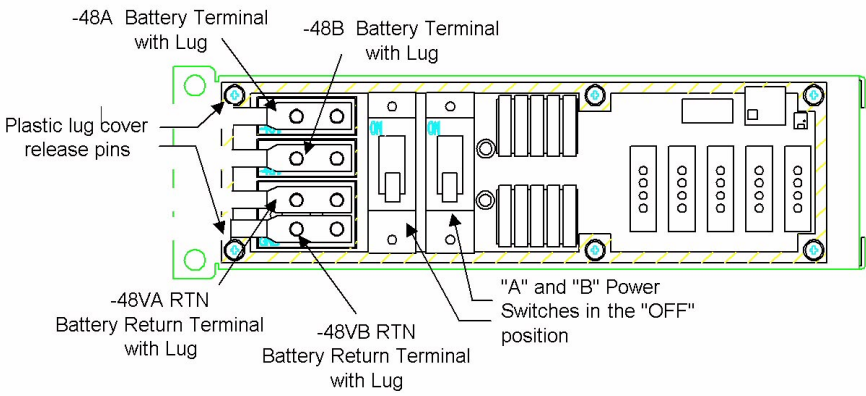
STEP	PROCEDURE
1	Route "A" and "B" battery (red) cables from the BDFB across the horizontal cable rack and down the relay rack rails to the Speedlink Master Control Shelf (MCS) or Auxiliary CSIP following local procedures.
2	Push the battery cables through one of the large cable ports at the back of the MCS or Auxiliary CSIP. Figure 27: Master Control Shelf Assembly—Back View
3	Go to the front of the MCS or Auxiliary CSIP. Pull the battery cables from the back of the assembly through to the front of the CSIP.
4	Cut the battery cables to the correct length using diagonal cutters.

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Central Office Battery Cable Connection at the CSIP

Table 8: Central Office Battery Cable Connection at the CSIP (continued)
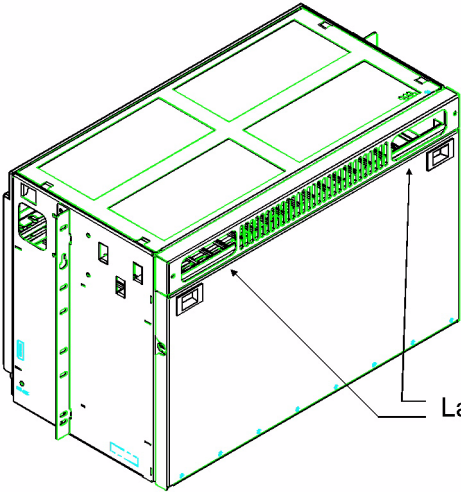
STEP	PROCEDURE
5	Using a crimping tool, attach the 2-hole barrel lugs to "A" and "B" red battery cables.
6	**IMPORTANT:** Check to make sure the Power switches are set in the "OFF" or "Down" position. Verify that all fuses are removed from the fuse holders. See STEP 6 on page 36 for an illustration of fuse locations.
7	Remove the protective plastic cover over the battery and battery return lugs: pull out on the two release pins (located on the left side, top and bottom) and remove. **IMPORTANT:** Do not lose this cover; place it where you can find it again. Figure 28: Release Pin and Lug Locations
8	Place the -48 Volts "A" BATTERY (red) cable lug on the –48A Battery terminal. **IMPORTANT:** Tighten lug nuts to <u>18-20</u> inch pounds torque.
9	Place the -48 Volts "B" BATTERY (red) cable lug on the –48B Battery terminal. **IMPORTANT:** Tighten lug nuts to <u>18-20</u> inch pounds torque.
10	Continue to the next procedure: Central Office Battery Return Cable Connection at the CSIP on page 42.

Central Office Battery Return Cable Connection at the CSIP

"A" and "B" battery return cables are run from the central office bus bar—or other central office battery return—by the network service provider. "A" and "B" battery return cables are connected to the Speedlink at the Common Systems Interface Panel (CSIP).

Follow these steps to connect battery return cables to the Battery Return "A" and "B" lugs on the front of the CSIP:

Table 9: Central Office Battery Return Connection at the CSIP

STEP	PROCEDURE
1	Route "A" and "B" battery return (black) cables from central office battery return across the horizontal cable rack and along the relay rack rails to the Speedlink Master Control Shelf (MCS) or Auxiliary CSIP following local procedures. **IMPORTANT:** Battery Return "A" and "B" must be connected to central office battery return if both Battery "A" and "B" leads are connected.
2	Push the battery return cables through one of the large cable ports at the back of the MCS or Auxiliary CSIP. Large cable ports Figure 29: Master Control Shelf Assembly—Back View
3	Go to the front of the MCS or Auxiliary CSIP. Pull the battery return cables from the back of the assembly through to the front of the CSIP.
4	Cut the battery return cables to the correct length using diagonal cutters.

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Central Office Battery Return Cable Connection at the CSIP

Table 9: Central Office Battery Return Connection at the CSIP (continued)

STEP	PROCEDURE
5	Using a crimping tool, attach the 2-hole barrel lugs to the battery return cables.
6	Place the "A" BATTERY RETURN (black) cable lug on the –48VA RTN Battery Return terminal. **IMPORTANT:** Tighten lug nuts to <u>18-20</u> inch pounds torque. Figure 30: Battery Return Lug Locations
7	Place the "B" BATTERY RETURN (black) cable lug on the –48VB RTN Battery Return terminal. **IMPORTANT:** Tighten lug nuts to <u>18-20</u> inch pounds torque.
8	Replace the protective plastic lug cover. Push in on the two release pins to secure.
9	Continue to the next procedure: Connect Power and Return Cables to the Central Office.

Connect Power and Return Cables to the Central Office

Follow these steps to connect battery and return cables to central office battery and return connectors:

Table 10: Connect Power and Return Cables to the Central Office

STEP	PROCEDURE
1	Check to make sure CSIP power switches are still in the "OFF" or "Down" position. Verify that fuses are not installed in the fuse holders.
2	Battery and battery return cables are ready for connection to the central office Battery Distribution Fuse Bay (BDFB) and central office battery return.
	Does the telecommunications company require that these connections be made by their own technicians?
	■ If YES, make arrangements with the telecommunications company for them to make central office battery and battery return connections.
	■ If NO, connect battery cables to the central office Battery Distribution Fuse Bay (BDFB) and battery return cables to central office battery return, following standard procedures.
3	Continue to the next procedure: Verify Continuity and Polarity.

Verify Continuity and Polarity

Follow these steps to verify continuity and polarity of cables:

Table 11: Verify Continuity and Polarity

STEP	PROCEDURE
1	Use a Volt Ohm Meter (VOM) to verify continuity of cables from the CSIP to the central office Battery Distribution Fuse Bay (BDFB) and battery return source.
2	Use a VOM to confirm polarity between the battery and battery return connections.
3	Continue to the next procedure: Verify Voltage.

Verify Voltage   Follow these steps to verify voltage at the CSIP:

Table 12: Verify Voltage

STEP	PROCEDURE
1	Use a VOM to measure the voltage present at the -48A and -48VA RTN lugs, and at the -48B and -48VB RTN lugs.
2	Is the voltage between -42.75 and -56 Volts DC? ■ If YES, continue to STEP 3. ■ If NO, re-verify continuity of the battery and battery return cables from the CSIP to the central office Battery Distribution Fuse Bay (BDFB) and battery return source.
3	The Central Office Power to the Speedlink procedure is complete.

IMPORTANT: Leave Power switches in the "OFF" or "Down" position. Volume 3—
Acceptance Testing, Chapter 6—"Speedlink Test and Turn-up"
provides instructions for central office power turn-up.

SECTION 2   POWER CABLING

Chapter 7   ADSL Link ID Power Cabling

Introduction   A Speedlink system relay rack can support up to three ADSL Link IDs. Power is supplied to a single ADSL Link ID through a power cable from the Common Systems Interface Panel (CSIP), located inside the Master Control Shelf (MCS), or separately as an Auxiliary CSIP. Power is supplied to multiple ADSL Link IDs in a "daisy chain" arrangement:

- the power cable for the *second* ADSL Link ID connects to a power connector on the *first* ADSL Link ID

- the power cable for the *third* ADSL Link ID connects to a power connector on the *second* ADSL Link ID
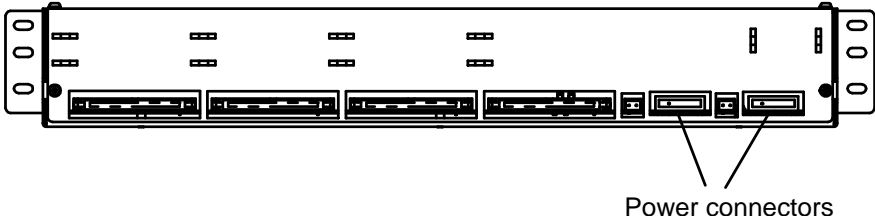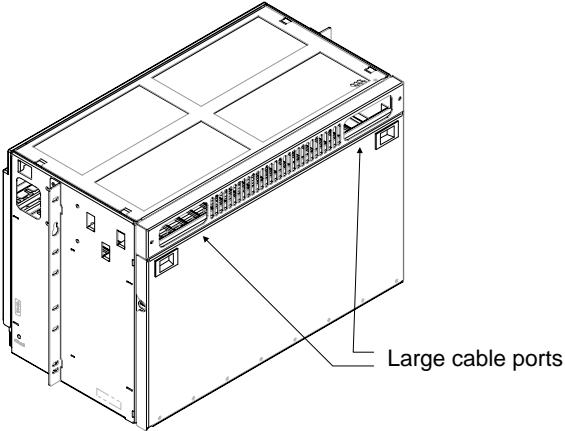
Required Tools and Equipment   To begin this task you must have the following equipment and tools:

One ADSL Link ID power cable per ADSL Link ID (DLCC Part Number: 40-0002-002)

ADSL Link ID to MCS Power Connection

Follow these steps to install power cables from the ADSL Link ID to the MCS[1]:

Table 13: ADSL Link ID to MCS Power Connection

STEP	PROCEDURE
1	Connect the power cable to a power connector on the ADSL Link ID backplane. **NOTE:** Power connectors can be used for either input or output connections. Figure 31: ADSL Link ID Backplane Power Connectors
2	Route the power cable up the relay rack and push it through one of the large cable ports at the back of the MCS. Figure 32: MCS Cable Ports
3	Go to the front of the MCS.

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[1] These procedures are for cabling one or more ADSL Link IDs within a single relay rack. Alternative ADSL Link ID installation and cabling configurations are planned for a future release.

Table 13: ADSL Link ID to MCS Power Connection (continued)
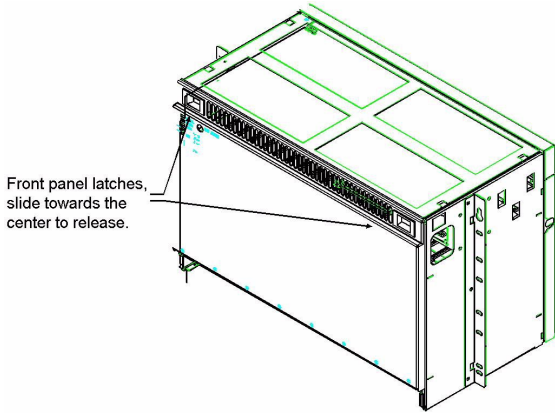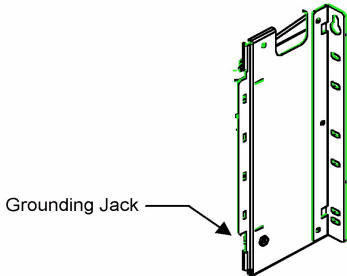
STEP	PROCEDURE
4	Unlatch and lower the MCS front panel to access the Common Systems Interface Panel (CSIP). The latches are located at the top of the panel. Slide both latches inward to release and lower the panel.

Front panel latches, slide towards the center to release.

Figure 33: MCS Front Panel Release Latches

STEP	PROCEDURE
5	Pull the power cable from the cable port to the front of the CSIP.
6	WEAR AN ELECTROSTATIC DISCHARGE (ESD) STRAP AT ALL TIMES when making connections on the CSIP. The Grounding jack is located on the side of the Master Control Shelf assembly.

Grounding Jack

Figure 34: Grounding Jack Location—Side View of MCS Assembly

Table 13: ADSL Link ID to MCS Power Connection (continued)
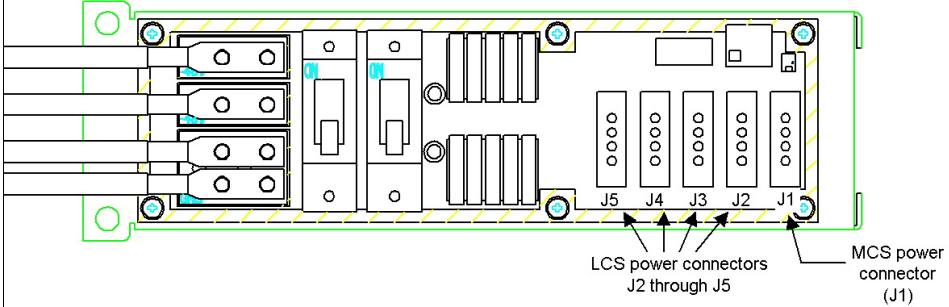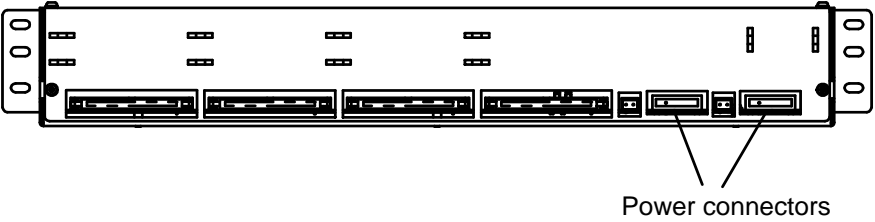
STEP	PROCEDURE
7	Connect the power cable to connector J5 on the CSIP. Figure 35: CSIP LCS Power Connectors
8	Lift the MCS front panel back into position. Slide the latches toward the center and release to lock in place. Are there additional ADSL Link IDs in the same relay rack? ■ If YES, continue to STEP 9. ■ If NO, skip to STEP 13.
9	For an additional ADSL Link ID, connect a power cable to a power connector on the ADSL Link ID backplane. **NOTE:** Power connectors can be used for either input or output connections. Power connectors
10	Route the power cable up the relay rack to the ADSL Link ID above it.
11	Connect the power cable to the available power connector on the ADSL Link ID.

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Table 13: ADSL Link ID to MCS Power Connection (continued)

STEP	PROCEDURE
12	Are there additional ADSL Link IDs in the same relay rack? ■ If YES, repeat Steps 9 through 11. ■ If NO, continue to STEP 13.
13	Are there additional ADSL Link IDs in *another* relay rack? ■ If YES, continue to the next procedure, ADSL Link ID to Auxiliary CSIP Power Connection. ■ If NO, the ADSL Link ID Power Cabling Procedure is complete.

ADSL Link ID to Auxiliary CSIP Power Connection

Follow these steps to connect power cables from the ADSL Link ID to the Auxiliary CSIP:

Table 14: ADSL Link ID to Auxiliary CSIP Power Connection

STEP	PROCEDURE
1	Connect the power cable to a power connector on the ADSL Link ID backplane. **NOTE:** Power connectors can be used for either input or output connections. Power connectors Figure 36: ADSL Link ID Backplane Power Connectors
2	Route the power cable up the relay rack and push it through one of the large cable ports at the back of the Auxiliary CSIP.
3	Go to the front of the Auxiliary CSIP.

Table 14: ADSL Link ID to Auxiliary CSIP Power Connection (continued)
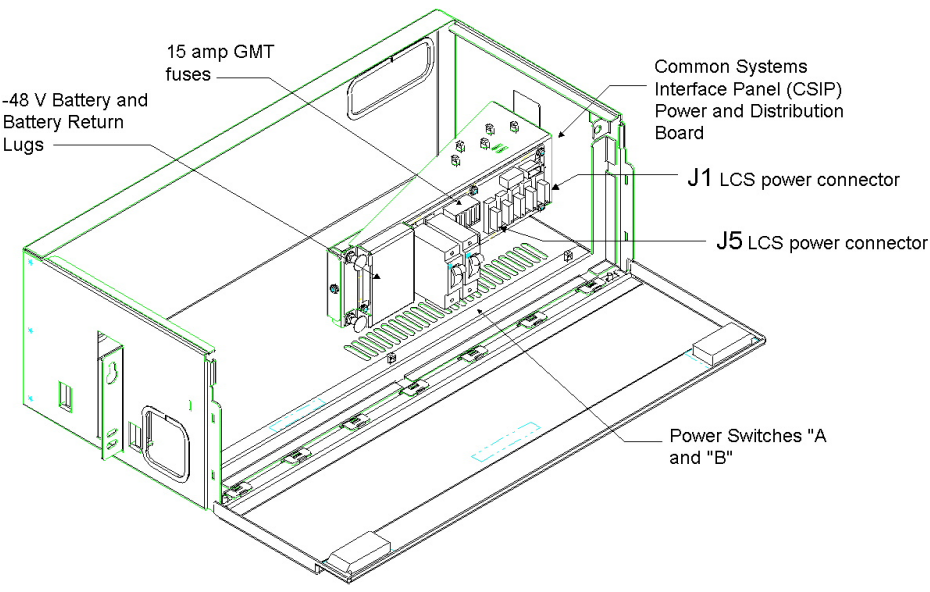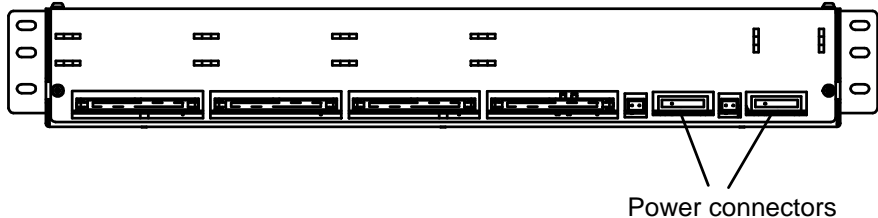
STEP	PROCEDURE
4	Unlatch and lower the Auxiliary CSIP front panel. The latches are located at the top of the panel. Slide both latches inward to release and lower the panel. **Figure 37: Auxiliary CSIP**
5	Pull the power cable from the cable port to the front of the CSIP.
6	WEAR AN ELECTROSTATIC DISCHARGE (ESD) STRAP AT ALL TIMES when making connections on the CSIP. The Grounding jack is located on the right side of the Line Card Shelf assembly, near the top of the side panel.
7	Connect the power cable to connector J5 on the CSIP.
8	Are there additional ADSL Link IDs in the same relay rack? ■ If YES, continue to Step 9. ■ If NO, skip to STEP 13.

Table 14: ADSL Link ID to Auxiliary CSIP Power Connection (continued)

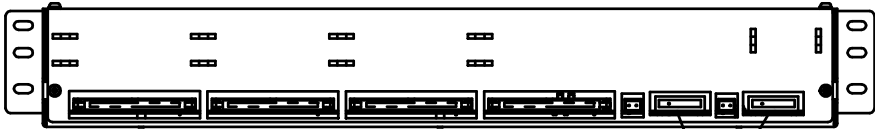| STEP	PROCEDURE
9	For an additional ADSL Link ID, connect a power cable to a power connector on the ADSL Link ID backplane. **NOTE:** Power connectors can be used for either input or output connections. Power connectors
10	Route the power cable up the relay rack to the ADSL Link ID above it.
11	Connect the power cable to the available power connector on the ADSL Link ID.
12	Are there additional ADSL Link IDs in the same relay rack? ■ If YES, repeat Steps 9 through 11. ■ If NO, continue to STEP 13.
13	Are there additional ADSL Link IDs in *another* relay rack? ■ If YES, repeat Steps 1 through 12 for each additional relay rack. ■ If NO, the ADSL Link ID Power Cabling Procedure is complete.

SECTION 3   ATM NETWORK CABLING

Chapter 8   DS3 MCS to ATM Network Cabling

Introduction   The interface between the ATM Network and the Speedlink system is made at the Master Control Shelf (MCS) trunk interface card. The Speedlink system supports two different ATM trunk interface cards:

- DS3T (45 Mbps)
- OC3T (155 Mbps)

This chapter provides detailed instructions on how to connect the ATM network trunk "transmit[1]" and "receive[2]" cables at the Master Control Shelf backplane for a Speedlink system using DS3T trunk cards.

Required Tools and Equipment   To begin this task you must have the following equipment and tools:

- WECO 728A equivalent coax cable
- Four - "75 ohm" BNC socket connectors
- Diagonal Cutters
- Coax Center Crimp Tool
  (For example: Trompeter TEI 010-0055)
- Coax Cable Stripping Tool
  (For example: Trompeter STI/STC-F w/tool crimp blade cassette)
- Coax Crimp Tool
  (For example: Trompeter CT3/CD3-2 BNC crimp tool and die)
- Step ladder (optional)

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[1] Transmit - data being sent to the ATM Network.
[2] Receive - data being received from the ATM Network.

DS3 Trunk Cable Connection at the MCS

DS3 "transmit[3]" and "receive[4]" trunk cables are connected to and run from the central office DS3 (DSX-3) cross connect panel across the horizontal cable racks to the Speedlink by the network service provider or a Speedlink Technician. These trunk cables are connected to the Speedlink at the front of the MCS backplane.

Follow these steps to connect DS3 trunk cables at the MCS backplane:

Table 15: DS3 Trunk Cable Connection at the MCS
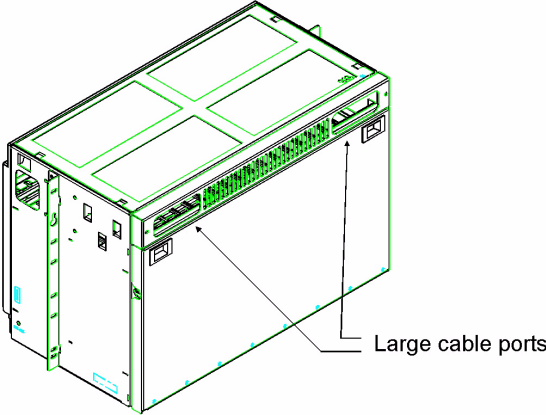
STEP	PROCEDURE
1	Terminate "75 ohm" BNC pin connectors on one end of the transmit and receive coax cables using a coax (WECO 728A) crimp tool.
2	Connect "transmit" and "receive" trunk cables to the DS3 (DSX-3) cross connect panel.
3	Route the trunk cables from the DS3 cross connect panel across the horizontal cable rack and down the relay rack rails to the Speedlink Master Control Shelf, following local procedures.
4	Push the "transmit" and "receive" trunk cables through one of the large cable ports at the back of the MCS. **IMPORTANT:** Be careful when handling coax cable. Kinks or sharp bends in the cable will cause signal distortion. Large cable ports Figure 38: Master Control Shelf Assembly—Back View

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3   Transmit - data being sent to the ATM Network.

4   Receive - data being received from the ATM Network.

Table 15: DS3 Trunk Cable Connection at the MCS (continued)
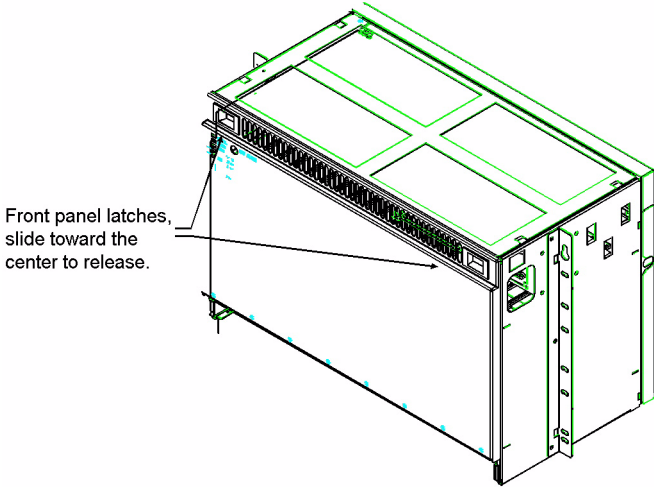
STEP	PROCEDURE
5	Go to the front of the Master Control Shelf. Is the MCS front panel in the closed position? ■ If YES, proceed to STEP 6. ■ If NO, skip to STEP 8.
6	Unlatch and lower the MCS front panel to access the front side of the backplane. The latches are located at the top of the front panel. Slide both latches inward to release and lower the panel. Front panel latches, slide toward the center to release. Figure 39: MCS Assembly—Front View
7	Remove the Master Control Shelf front panel during cabling procedures. Hold the panel on both sides and slide to the left about ¼ inch. Pull the panel towards you and release it from the holding clips. IMPORTANT: The front panels must be replaced and closed after all *Installation* (Volume 2) and *Acceptance Testing* (Volume 3) procedures are completed to ensure proper air flow through the Speedlink system.
8	Is the MCS top screen in position? ■ If YES, proceed to STEP 9. ■ If NO, skip to STEP 10.

Table 15: DS3 Trunk Cable Connection at the MCS (continued)
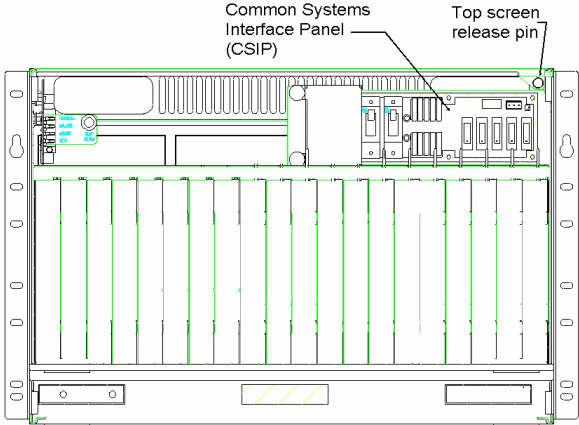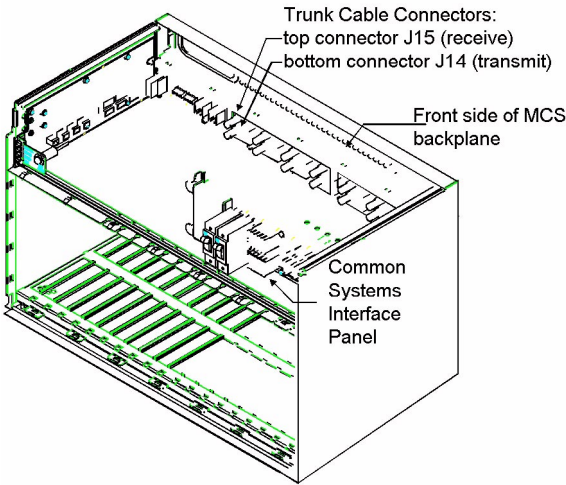
STEP	PROCEDURE
9	Remove the MCS top screen to allow room to run cabling and make backplane connections: release the top screen using the release pin located in the top right corner. Pull out on the release pin and slide the top screen out. Figure 40: Front View of the Master Control Shelf
10	Pull the trunk cables from the back of the Master Control Shelf through to the front and to the left of the CSIP.
11	Locate the "receive[a]" J15 (top) and "transmit[b]" J14 (bottom) BNC connectors mounted on the front of the MCS backplane. Figure 41: Front of the MCS Backplane (top screen is removed)

Table 15: DS3 Trunk Cable Connection at the MCS (continued)

STEP	PROCEDURE
12	Cut the transmit and receive coax cables to the correct length using diagonal cutters.
13	Strip and terminate "75 ohm" BNC socket connectors on the transmit and receive coax cables.
14	Connect the "receive" trunk cable to the "receive" top connector (J15). Push in on the coax connector and turn to the right to lock it into position.
15	Connect the "transmit" trunk cable to the "transmit" bottom connector (J14). Push in on the coax connector and turn to the right to lock it into position.
16	Verify continuity of "transmit" and "receive" coax cables following local procedures.
17	Slide the MCS top screen back into position and push in on the release pin to secure.
18	Replace the MCS front panel. Hold the panel on both sides so it is level with the bottom of the card cage. Insert the hinged portion of the panel between the tabs on the card cage and slide the panel straight in and then to the right about ¼ inch to lock in place.
19	Close the MCS front panel; slide both latches towards the center and release to lock in place.
20	The MCS to ATM network cabling procedure is complete. Continue to one of the following chapters, according to the line cards you will be using: ■ Chapter 9, "Line Card Shelf to MDF Cabling—ADSL Line Cards (Data Only)" on page 67. ■ Chapter 10, "Low Pass Filter Shelf Cabling—ADSL Line Cards (Data Plus Voice)" on page 89. ■ Chapter 11, "Line Card Shelf to MDF Cabling—SDSL and IDSL Line Cards (Data Only)" on page 133.

[a]   Receive - data being received from the ATM Network.

[b]   Transmit - data being sent to the ATM Network.

SECTION 3   ATM NETWORK CABLING

Chapter 9   OC3 MCS to ATM Network Cabling

Introduction   The interface between the ATM Network and the Speedlink system is made at the Master Control Shelf (MCS) trunk interface card. The Speedlink system supports two different ATM trunk interface cards:

- DS3T (45 Mbps)
- OC3T (155 Mbps)

This chapter provides detailed instructions on how to connect the ATM network trunk "transmit[1]" and "receive[2]" cables to a Speedlink system with OC3T trunk cards.

Required Tools and Equipment   To begin this task you must have the following equipment and tools:

- Single-mode duplex fiber optic cable(s) with SC duplex connectors (or SC duplex adapters) and 3/4 inch or longer connector housing shells
- Step ladder (optional)

OC3 Trunk Cable Connection at the MCS   OC3 "transmit" and "receive" trunk cables are connected to and run from the central office Optical Distribution Frame (ODF) across the horizontal cable racks to the Speedlink by the network service provider or a Speedlink Technician. These trunk cables are connected to the Speedlink at the faceplate of the OC3T trunk card[3].

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[1] Transmit - data being sent to the ATM Network.

[2] Receive - data being received from the ATM Network.

[3] A second OC3T card can be installed for redundant protection.

Follow these steps to route the fiber optic cables to the OC3T card location(s):

Table 16: OC3 Trunk Cable Connection at the MCS

STEP	PROCEDURE
1	Route the fiber optic cables from the Optical Distribution Frame (ODF) across the horizontal cable rack and down the relay rack rails to the Speedlink Master Control Shelf, following local procedures. **IMPORTANT:** Be careful when handling and routing fiber optic cable. Do not make any bends or coil the cable in less than a 2" diameter loop. The cable is fragile and kinks or sharp bends can cause signal distortion **IMPORTANT:** Follow all standard safety procedures when using fiber optic cable and equipment to prevent eye damage.
2	Push the "transmit" and "receive" trunk cables through one of the large cable ports at the back or on the side of the MCS. Large cable port Large cable ports Figure 42: Master Control Shelf Assembly—Back View
3	Go to the front of the Master Control Shelf. Is the MCS front panel in the closed position? ■ If YES, proceed to STEP 4. ■ If NO, skip to STEP 6.

Table 16: OC3 Trunk Cable Connection at the MCS (continued)
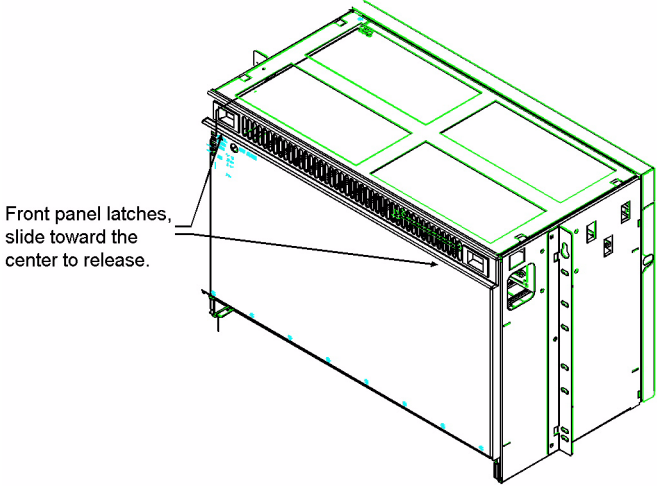
STEP	PROCEDURE
4	Unlatch and lower the MCS front panel to access the front side of the backplane. The latches are located at the top of the front panel. Slide both latches inward to release and lower the panel. Front panel latches, slide toward the center to release. Figure 43: MCS Assembly—Front View
5	Remove the Master Control Shelf front panel during cabling procedures. Hold the panel on both sides and slide to the left about ¼ inch. Pull the panel towards you and release it from the holding clips. **IMPORTANT:** The front panels must be replaced and closed after all *Installation* (Volume 2) and *Acceptance Testing* (Volume 3) procedures are completed to ensure proper air flow through the Speedlink system.
6	Is the MCS top screen in position? ■ If YES, proceed to STEP 7. ■ If NO, skip to STEP 8.

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                OC3 Trunk Cable Connection at the MCS

Table 16: OC3 Trunk Cable Connection at the MCS (continued)

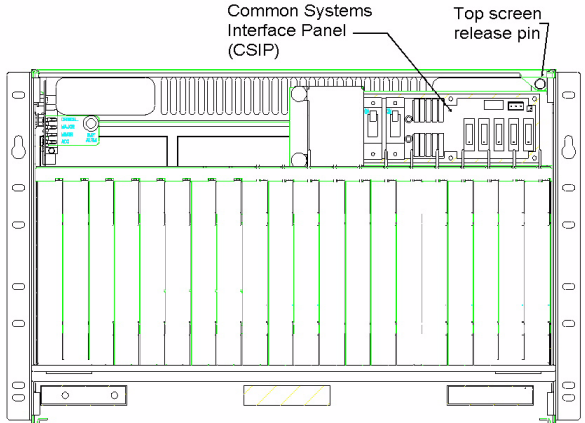| STEP	PROCEDURE
7	Remove the MCS top screen to allow room to run cabling: release the top screen using the release pin located in the top right corner. Pull out on the release pin and slide the top screen out. Figure 44: Front View of the Master Control Shelf
8	Pull the fiber optic cable from the back of the Master Control Shelf to the front.

Table 16: OC3 Trunk Cable Connection at the MCS (continued)
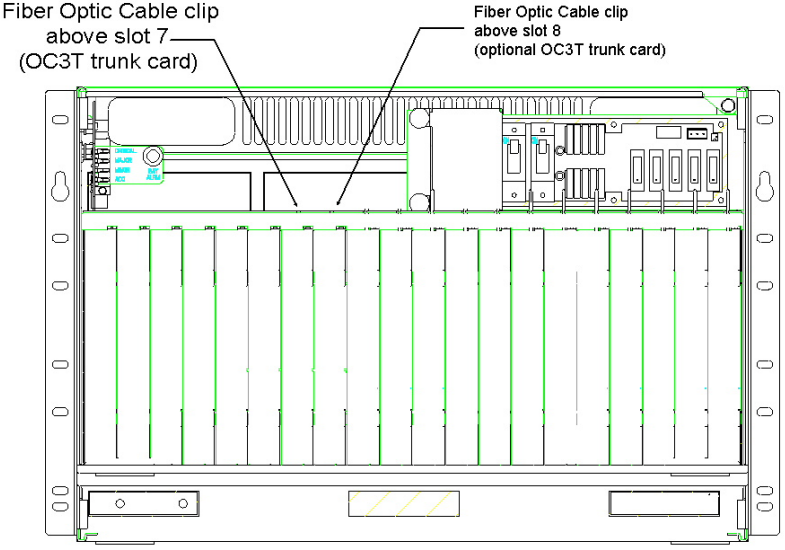
STEP	PROCEDURE
9	Route the cable through the clip above slot 7 at the top of the MCS cage and down to slot 7[a].
	The cable can be connected to the faceplate of the OC3T card after the card is installed. If the connectors have protective caps, leave them on until the card is installed. Volume 3—*Acceptance Testing* provides instructions for installing all Master Control Shelf cards.
10	Verify continuity of the "transmit" and "receive" fiber optic cables following local procedures.
11	Slide the MCS top screen back into position and push in on the release pin to secure.
12	Replace the MCS front panel. Hold the panel on both sides so it is level with the bottom of the card cage. Insert the hinged portion of the panel between the tabs on the card cage and slide the panel straight in and then to the right about ¼ inch to lock in place.
13	Close the MCS front panel; slide both latches towards the center and release to lock in place.

Table 16: OC3 Trunk Cable Connection at the MCS (continued)

STEP	PROCEDURE
14	The OC3 MCS to ATM Network Cabling procedure is complete. Continue to one of the following chapters, based on the type of line cards planned for the Speedlink Multiplexer: ■ Chapter 9, "Line Card Shelf to MDF Cabling—ADSL Line Cards (Data Only)" on page 67. ■ Chapter 10, "Low Pass Filter Shelf Cabling—ADSL Line Cards (Data Plus Voice)" on page 89. ■ Chapter 11, "Line Card Shelf to MDF Cabling—SDSL and IDSL Line Cards (Data Only)" on page 133.

ª   Follow the same cabling procedures for a second redundant OC3T card in slot 8.

SECTION 4   TELCO CABLING

Chapter 10   Line Card Shelf to MDF Cabling—ADSL Line Cards (Data Only)

Introduction   The Speedlink system can be configured three different ways based on the types of line cards installed and the needs of your network service provider. See Chapter 1, "Master Control Shelf Installation," page 1, for descriptions of each configuration.

If the Speedlink system is configured for <u>ADSL data service only,</u> the connection between the local exchange network and the Speedlink is made at the Line Card Shelf (LCS). Each Line Card Shelf is designed for connection to a maximum of 192 cable/pairs at the Main Distribution Frame (MDF).

Line card types can be mixed on a Line Card Shelf. LCS cabling is modular and connectorized; line card types can be re-cabled for a different application, if required. The service capacity is 48 lines per shelf with Dual line cards, 96 lines per shelf with Quad line cards, and 192 lines per shelf with Octal line cards. Release 3.0 supports Dual CAP ADSL, Quad ADSL (CAP and DMT), and Octal SDSL and IDSL line cards.

This chapter provides detailed instructions on how to connect 25 pair cable stubs to the LCS backplane for Dual and Quad CAP and DMT ADSL <u>data service only</u> configurations. For other cabling instructions:

- Octal SDSL and IDSL <u>data service only</u> configuration instructions, see Chapter 11, "Line Card Shelf to MDF Cabling—SDSL and IDSL Line Cards (Data Only)", beginning on page 133.

- Dual and Quad (CAP and DMT) ADSL <u>data plus voice</u> configuration instructions, see Chapter 10, "Low Pass Filter Shelf Cabling—ADSL Line Cards (Data Plus Voice)", beginning on page 89.

Required Tools and Equipment

To begin this task you must have the following equipment and tools:

- Four - 25 pair cable stub(s) with a 50 pin Amp Champ IDC male connector at one end and a vinyl rubber grommet (DLCC Part Number: 40-0015).

- Four - 50 pin Amp Champ IDC female connectors.

- 25 pair cable (24 AWG).

- A small flat-blade screwdriver.

Round cable to flat "laminated" cable stub(s) are shipped with the Speedlink system. Cable stub(s) are equipped with a 50 position female IDC connector on the flat end and a 50 position Amp Champ[1] male connector on the round cable end.

25 Pair Cable Stubs

Line Card Shelf (LCS) cabling is fully connectorized; 25 pair cable stub(s) are shipped with the Speedlink system. The flat ribbon end of the 25 pair cable stub is connected to the LCS backplane. The round end of the cable stub connects to the 25 pair cable which is connected to subscriber lines at the Main Distribution Frame (MDF).

LCS line cards are organized into groups of six channel slots, called "six packs." Each 25 pair cable stub connects up to 6 line cards. For example: a system ordered with one LCS and 24 ADSL line cards comes with four LCS to MDF cable stubs—one stub for each group of six line cards.

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[1] Cable stubs with 710 or MS2 connectors are available based on requirements of the network service provider.

LCS with Mixed Line Card Types

Release 3.0 supports 5 different line card types:

- CAP2 (Dual ADSL)
- CAP4 (Quad ADSL)
- DMT4 (Quad ADSL)
- SDSL8 (Octal SDSL)
- IDSL8 (Octal IDSL)

Line Card Shelf cabling must match the requirements of the line card layout.

CAP4 and DMT4 cards can be supported on the same Line Card Shelf with SDSL8 and IDSL8 line cards, when each card type is placed within its own six pack (i.e., all CAP4 cards in one six pack, all IDSL8 cards in one six pack, etc.). These cards all operate on an LCS backplane provisioned at 25 MHz.
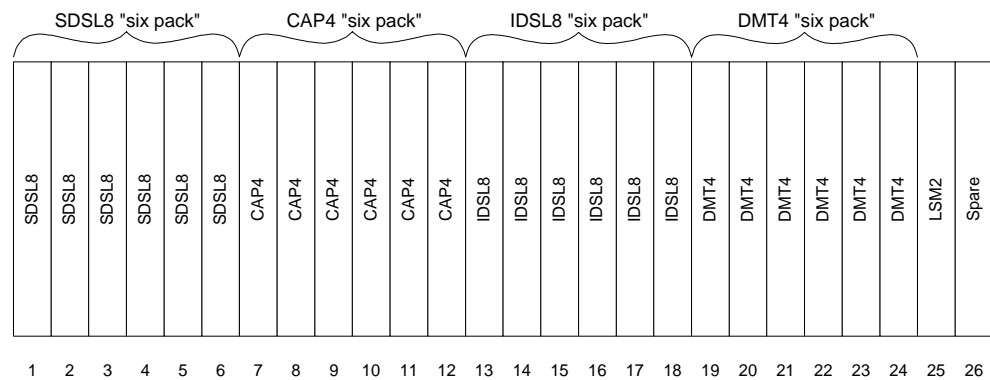
Figure 45: Line Card Shelf with SDSL8, CAP4, IDSL8, and DMT4 Line Cards

The portion of the LCS backplane supporting CAP2 cards must be provisioned at 12.5 MHz. CAP2 cards can be supported on the same Line Card Shelf with CAP4, DMT4, SDSL8, and IDSL8 cards, in one of the following configurations:

- all CAP2 cards in slots 1-12 (at 12.5 MHz), and 6-pack combinations of CAP4, DMT4, SDSL8, and IDSL8 cards in slots 13-24 (at 25 MHz), OR
- 6-pack combinations of CAP4, DMT4, SDSL8, and IDSL8 cards in slots 1-12 (at 25 MHz), and all CAP2 cards in slots 13-24 (at 12.5 MHz)

Figure 46: Line Card Shelf with CAP2, IDSL8, and DMT4 Line Cards

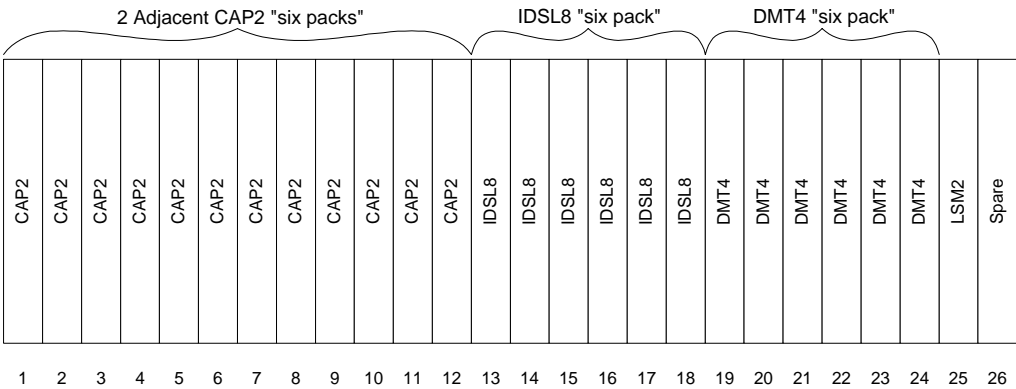| 25 Pair Stub Connection at the LCS	Follow these steps to connect 25 pair cable stubs to the LCS backplane:

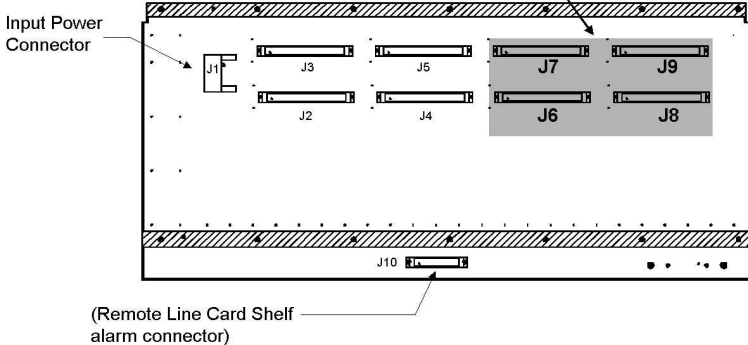**Table 17: 25 Pair Stub Connection at the LCS**

STEP	PROCEDURE
1	Is the Line Card Shelf back panel in the closed position? ■　If YES, proceed to STEP 2. ■　If NO, skip to STEP 4.
2	Unlatch and lower the <u>back</u> panel on the <u>first</u> LCS to access the LCS backplane. The latches are located at the top of the back panel. Slide both latches toward the center to release and lower the panel.
3	Remove the LCS back panel during cabling procedures. Hold the panel on both sides and slide it to the left about ¼ inch. Pull the panel towards you and release it from the holding clips. **IMPORTANT:**　The back panel must be replaced and closed after all Installation procedures are completed to keep cables securely in place.
4	Connect the first 25 pair cable stub[a] to connector J9—this connects to line card slots 1–6. Refer to the Dual ADSL Cable/Pair Assignment Tables on pages 76 and 77, and the Quad ADSL Cable/Pair Assignment Tables on pages 78 through 81. Figure 47: Back View of LCS Backplane

Table 17: 25 Pair Stub Connection at the LCS (continued)

STEP	PROCEDURE
5	Backplane connectors have latches on both sides. These latches snap down on the cable stub ribbon connector and lock in place. Figure 48: Ribbon Connectors (backplane and 25 pair cable stub) Figure 49: Connector Pins 1 through 25
6	The LCS assembly has 5 cable slots on both the left and right sides. Bring the 25 pair cable stub connected to the J9 connector through the top cable slot on the right side of the LCS assembly. Refer to the LCS to MDF Cabling Diagram in STEP 8 on page 73. Figure 50: Line Card Shelf Assembly—Back View, Panel Closed

Table 17: 25 Pair Stub Connection at the LCS (continued)

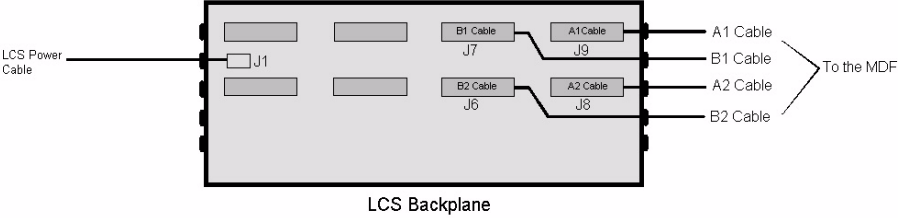| STEP	PROCEDURE
7	There is a rubber vinyl grommet pre-installed on the 25 pair cable stub. Position the grommet on the cable stub so it fits over the edge of the slot on the LCS assembly. Push the grommet into the slot as far as you can so it doesn't interfere with the back cover. The grommet helps hold the cable in position and also protects it from the metal edge.
8	Connect all of the necessary 25 pair cable stubs shipped with the Line Card Shelf assembly. Refer to the LCS to MDF Cabling Diagram below and the Dual ADSL Cable/Pair Assignment Tables on pages 76 and 77, and the Quad ADSL Cable/Pair Assignment Tables on pages 78 through 81: ■ Connect the second 25 pair cable stub[b] to connector J8—this connects to line card positions 7–12. Bring the 25 pair cable stub connected to the J8 connector through the third cable slot (from the top) on the right side of the LCS assembly. ■ Connect the third 25 pair cable stub to connector J7—this connects to line card positions 13–18. Bring the 25 pair cable stub connected to the J7 connector through the second cable slot (from the top) on the right side of the LCS assembly. ■ Connect the fourth 25 pair cable stub to connector J6—this connects to line card positions 19–24. Bring the 25 pair cable stub connected to the J6 connector through the fourth cable slot (from the top) on the right side of the LCS assembly. Position grommets on all cable stubs to fit over the edges of the slots on the LCS assembly. Push the grommets into the slots as far as you can so they don't interfere with the back cover. Figure 51: LCS to MDF Cabling Diagram

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               25 Pair Stub Connection at the LCS

Table 17: 25 Pair Stub Connection at the LCS (continued)

STEP	PROCEDURE
9	Replace the LCS back panel. Hold the panel on both sides so it is level with the bottom of the card cage. Insert the hinged portion of the panel between the tabs on the card cage and slide the panel straight in and then to the right about ¼ inch to lock in place.
10	Lift the LCS back panel up into position. Slide both latches towards the center and release to lock in place.
11	The Speedlink system is designed for a maximum of twelve Line Card Shelves. Repeat steps 1 through 10 for all Line Card Shelves supporting ADSL line cards.
12	Continue to the next procedure: 25 Pair Cable—MDF to LCS.

[a] LCS to MDF cable stubs are equipped with right angle connectors.

[b] See previous footnote.

25 Pair Cable— MDF to LCS

25 pair cables[2] are tied down and run from the central office Main Distribution Frame (MDF) across the horizontal cable racks to the Speedlink. This work may be done by the network service provider or the Speedlink technician. These 25 pair cable(s) are connected to the 25 pair cable stub(s) installed at the Line Card Shelf.

Follow these steps to connect 25 Pair Cables from the MDF to the LCS Cable Stubs:

Table 18: 25 Pair Cable—MDF to LCS

STEP	PROCEDURE
1	Route the 25 pair cable(s) from the MDF down from the horizontal cable rack and along the relay rack rails, following local procedures.
2	Verify continuity of each 25 pair MDF cable, following local procedures.
3	Terminate the 25 pair cable on an Amp Champ[a] female connector.
4	Connect the 25 pair cable, identified as the A1 cable, to the J9 LCS cable stub. Refer to the Dual ADSL Cable/Pair Assignment Tables on pages 76 and 77, and the Quad ADSL Cable/Pair Assignment Tables on pages 78 through 81.
5	Tighten the two screws on the Amp Champ connector to secure.
6	Repeat steps 2 through 5 for each 25 pair cable (refer to the Dual ADSL Cable/Pair Assignment Tables on pages 76 and 77, and the Quad ADSL Cable/Pair Assignment Tables on pages 78 through 81): ■ Connect the A2 cable to the J8 LCS cable stub. ■ Connect the B1 cable to the J7 LCS cable stub. ■ Connect the B2 cable to the J6 LCS cable stub.
7	The Speedlink system is designed for a maximum of twelve Line Card Shelves. Repeat the entire LCS to MDF cabling procedure for all LCSs.
8	Go to the next procedure: Verify Continuity of Cable Pairs on page 82.

[a] 710 or MS2 connectors may be used if the network service provider requested cable stubs with these connectors.

[2] The network service provider may choose to run 100 pair cables from the MDF to the Speedlink. These 100 pair cables require four - 25 pair Amp Champ IDC four connectors to connect to the 25 pair cable stubs.

Dual ADSL Cable/Pair Assignments

The following tables show the cable/pair assignments for one Line Card Shelf with <u>Dual ADSL line cards</u>, two subscriber lines (two pairs) per line card. LCS line cards are organized into groups of six channel slots. Each table represents cable/pair assignments for an LCS backplane connector (J9, J8, J7, J6), or a 6-slot line card group.

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	Ring
J9	1	1	A1	1	White	Blue
	1	2		2	White	Orange
	2	1		5	White	Slate
	2	2		6	Red	Blue
	3	1		9	Red	Brown
	3	2		10	Red	Slate
	4	1		13	Black	Green
	4	2		14	Black	Brown
	5	1		17	Yellow	Orange
	5	2		18	Yellow	Green
	6	1		21	Violet	Blue
▼	6	2	▼	22	Violet	Orange

Figure 52: Connector J9 Dual ADSL Cable/Pair Assignments

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	Ring
J8	7	1	A2	1	White	Blue
	7	2		2	White	Orange
	8	1		5	White	Slate
	8	2		6	Red	Blue
	9	1		9	Red	Brown
	9	2		10	Red	Slate
	10	1		13	Black	Green
	10	2		14	Black	Brown
	11	1		17	Yellow	Orange
	11	2		18	Yellow	Green
	12	1		21	Violet	Blue
▼	12	2	▼	22	Violet	Orange

Figure 53: Connector J8 Dual ADSL Cable/Pair Assignments

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	Ring
J7	13	1	B1	1	White	Blue
	13	2		2	White	Orange
	14	1		5	White	Slate
	14	2		6	Red	Blue
	15	1		9	Red	Brown
	15	2		10	Red	Slate
	16	1		13	Black	Green
	16	2		14	Black	Brown
	17	1		17	Yellow	Orange
	17	2		18	Yellow	Green
	18	1		21	Violet	Blue
▼	18	2	▼	22	Violet	Orange

Figure 54: Connector J7 Dual ADSL Cable/Pair Assignments

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	Ring
J6	19	1	B2	1	White	Blue
	19	2		2	White	Orange
	20	1		5	White	Slate
	20	2		6	Red	Blue
	21	1		9	Red	Brown
	21	2		10	Red	Slate
	22	1		13	Black	Green
	22	2		14	Black	Brown
	23	1		17	Yellow	Orange
	23	2		18	Yellow	Green
	24	1		21	Violet	Blue
▼	24	2	▼	22	Violet	Orange

Figure 55: Connector J6 Dual ADSL Cable/Pair Assignments

Quad ADSL Cable/Pair Assignments

The following tables show the cable/pair assignments for one Line Card Shelf with <u>Quad ADSL line cards,</u> four subscriber lines (four pairs) per line card. LCS line cards are organized into groups of six channel slots. Each table represents cable/pair assignments for an LCS backplane connector (J9, J8, J7, J6), or a 6-slot line card group.

Shading is used in the following tables to indicate cable pairs used for Quad ADSL only. Cable pairs used for <u>Dual ADSL</u> are <u>not shaded:</u>

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	**Ring**
J9	1	1	A1	1	White	Blue
	1	2		2	White	Orange
	1	3		3	White	Green
	1	4		4	White	Brown
	2	1		5	White	Slate
	2	2		6	Red	Blue
	2	3		7	Red	Orange
	2	4		8	Red	Green
	3	1		9	Red	Brown
	3	2		10	Red	Slate
	3	3		11	Black	Blue
	3	4		12	Black	Orange
	4	1		13	Black	Green
	4	2		14	Black	Brown
	4	3		15	Black	Slate
	4	4		16	Yellow	Blue
	5	1		17	Yellow	Orange
	5	2		18	Yellow	Green
	5	3		19	Yellow	Brown
	5	4		20	Yellow	Slate
	6	1		21	Violet	Blue
	6	2		22	Violet	Orange
	6	3		23	Violet	Green
▼	6	4	▼	24	Violet	Brown
-	-	-	-	25	Violet	Slate

Figure 56: Connector J9 Quad ADSL Cable/Pair Assignments

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	Ring
J8	7	1	A2	1	White	Blue
	7	2		2	White	Orange
	7	3		3	White	Green
	7	4		4	White	Brown
	8	1		5	White	Slate
	8	2		6	Red	Blue
	8	3		7	Red	Orange
	8	4		8	Red	Green
	9	1		9	Red	Brown
	9	2		10	Red	Slate
	9	3		11	Black	Blue
	9	4		12	Black	Orange
	10	1		13	Black	Green
	10	2		14	Black	Brown
	10	3		15	Black	Slate
	10	4		16	Yellow	Blue
	11	1		17	Yellow	Orange
	11	2		18	Yellow	Green
	11	3		19	Yellow	Brown
	11	4		20	Yellow	Slate
	12	1		21	Violet	Blue
	12	2		22	Violet	Orange
	12	3		23	Violet	Green
▼	12	4	▼	24	Violet	Brown
-	-	-	-	25	Violet	Slate

Figure 57: Connector J8 Quad ADSL Cable/Pair Assignments

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	**Ring**
J7	13	1	B1	1	White	Blue
	13	2		2	White	Orange
	13	3		3	White	Green
	13	4		4	White	Brown
	14	1		5	White	Slate
	14	2		6	Red	Blue
	14	3		7	Red	Orange
	14	4		8	Red	Green
	15	1		9	Red	Brown
	15	2		10	Red	Slate
	15	3		11	Black	Blue
	15	4		12	Black	Orange
	16	1		13	Black	Green
	16	2		14	Black	Brown
	16	3		15	Black	Slate
	16	4		16	Yellow	Blue
	17	1		17	Yellow	Orange
	17	2		18	Yellow	Green
	17	3		19	Yellow	Brown
	17	4		20	Yellow	Slate
	18	1		21	Violet	Blue
	18	2		22	Violet	Orange
	18	3		23	Violet	Green
▼	18	4	▼	24	Violet	Brown
-	-	-	-	25	Violet	Slate

Figure 58: Connector J7 Quad ADSL Cable/Pair Assignments

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	**Ring**
J6	19	1	B2	1	White	Blue
	19	2		2	White	Orange
	19	3		3	White	Green
	19	4		4	White	Brown
	20	1		5	White	Slate
	20	2		6	Red	Blue
	20	3		7	Red	Orange
	20	4		8	Red	Green
	21	1		9	Red	Brown
	21	2		10	Red	Slate
	21	3		11	Black	Blue
	21	4		12	Black	Orange
	22	1		13	Black	Green
	22	2		14	Black	Brown
	22	3		15	Black	Slate
	22	4		16	Yellow	Blue
	23	1		17	Yellow	Orange
	23	2		18	Yellow	Green
	23	3		19	Yellow	Brown
	23	4		20	Yellow	Slate
	24	1		21	Violet	Blue
	24	2		22	Violet	Orange
	24	3		23	Violet	Green
▼	24	4	▼	24	Violet	Brown
-	-	-	-	25	Violet	Slate

Figure 59: Connector J6 Quad ADSL Cable/Pair Assignments

Verify Continuity of Cable Pairs

All cable pairs terminated at the MDF should be tested for continuity. A Pair Analysis Module (PAM) card is available to complete this testing. It can be used to test Dual ADSL, Quad ADSL, and Octal SDSL/IDSL line card cable pairs.

Required Equipment and Tools

To begin this task you must have the following equipment and tools:

■ Electrostatic Discharge (ESD) Strap.

■ PAM card (DLCC Part Number: 60-0038-800) with eight AA Batteries.

■ Extra AA Batteries.

■ A second person to isolate tip and ring wires at the MDF.

PAM Card

The PAM card plugs into the LCS backplane just like a line card and is used to test continuity of cable pairs (tip/ring). The PAM card is powered by AA batteries or - 48V central office battery. The Speedlink does not have to be powered up to use the PAM card.
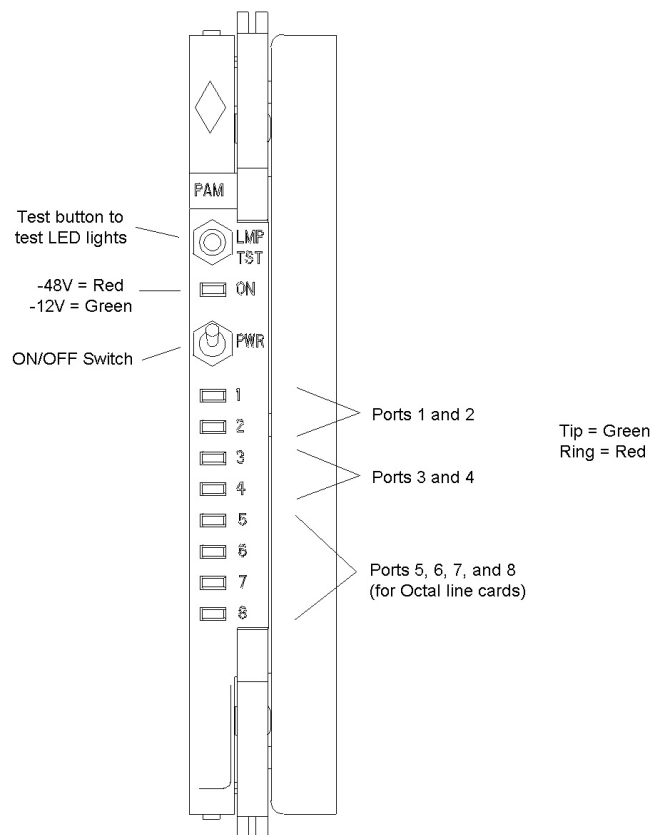
Figure 60: PAM Card Face

Verify Continuity of Cable Pairs   Follow these steps to verify continuity of all cable pairs terminated on the MDF:

Table 19: Verify Continuity of Cable Pairs
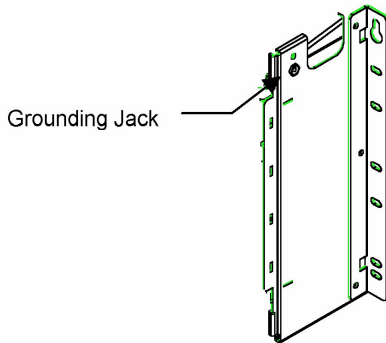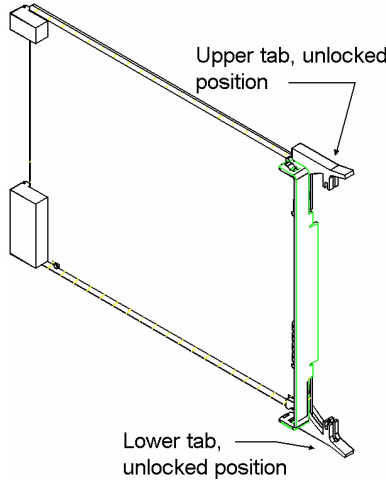
STEP	PROCEDURE
1	Unlatch and lower the front panel of the LCS to access the LCS card bay.
2	WEAR AN ELECTROSTATIC DISCHARGE (ESD) STRAP <u>AT ALL TIMES</u> during card installation to prevent possible damage to the cards. Plug the discharge strap wire into the grounding jack before handling cards. The grounding jack is located on the side of the Line Card Shelf assembly. Figure 61: Grounding Jack Location—Side View of LCS Assembly
3	Unlock the locking tabs on the PAM card by holding the tabs (located on the outside edge of the card) in their unlocked position. Figure 62: PAM Card with Locking Tabs in the Unlocked Position

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                  Verify Continuity of Cable Pairs

Table 19: Verify Continuity of Cable Pairs (continued)

STEP	PROCEDURE
4	The LCS card bay is designed with 26 card guides, bottom and top, to properly align cards into position on the backplane. The LCS holds a total of twenty-four line cards and one Line Card Shelf Multiplexer (LSM2) card, with one spare slot for future use.

Figure 63: Line Card Shelf Card Layout

Slide the PAM card into Line Card Slot #1 until it plugs into the backplane connector. Each card is "keyed" so it will only plug into its correct position on the backplane.

CAUTION: DO NOT force the card into position. If the card does not plug in easily, slide the card back out and verify you are placing it in the correct position and that the guides are aligned. Check for any obstructions or bent pins on the connectors that might prevent the card from sliding easily into place.

Table 19: Verify Continuity of Cable Pairs (continued)

STEP	PROCEDURE
5	Flip the locking tabs down until you hear an audible "click." The "click" indicates the card is locked into position.

Figure 64: PAM Card with Locking Tabs in the Locked Position

STEP	PROCEDURE
6	The PAM card is now connected to Line Card Slot 1, Port 1 and 2 if cabling was completed for Dual ADSL (2 subscriber lines per card); or Line Card Slot 1, Ports 1, 2, 3, and 4 if cabling was completed for Quad ADSL.

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	**Ring**
J9	1	1	A1	1	White	Blue
▼	1	2	▼	2	White	Orange

Figure 65: Dual ADSL Connector, Line Card Slot, Port, Cable and Pair

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	**Ring**
J9	1	1	A1	1	White	Blue
	1	2		2	White	Orange
	1	3		3	White	Green
▼	1	4	▼	4	White	Brown

Figure 66: Quad ADSL Connector, Line Card Slot, Port, Cable and Pair

Refer to the Tables on pages 76 and 77 for Dual ADSL Cable/Pair Assignments.

Refer to the Tables on pages 78 through 81 for Quad ADSL Cable/Pair Assignments.

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                               Verify Continuity of Cable Pairs

Table 19: Verify Continuity of Cable Pairs (continued)

STEP	PROCEDURE
7	Flip the PAM card power switch to the ON position. A <u>red</u> power LED light indicates the PAM card is operating off of -48V central office power. A <u>green</u> power LED light indicates the PAM card is operating off of -12V batter power. Depress the LED Test button to test the LED lights.
8	A second person is needed to locate and ground each cable/pair (tip and ring) at the MDF. Continuity is indicated by the LEDs on the front of the PAM card: ■ **Test OK -** The Tip or Ring LED lights as the tip or ring is grounded at the MDF: **Tip = Green** **Ring = Red** ■ **Open** - The Tip or Ring LED does not light when grounded at the MDF. ■ **Short** - The Tip or Ring LED lights before it is grounded at the MDF. ■ **Cross** - The Tip LED lights when the Ring is grounded at the MDF, and vice versa.
9	Complete continuity test on all pairs for Line Card Slot #1.
10	Unlock the PAM card by flipping up the locking tabs (located on the outside edge of the card) into their up or unlocked position. Slide the card out of Line Card Slot #1. Figure 67: PAM Card with Locking Tabs in the Unlocked Position

Table 19: Verify Continuity of Cable Pairs (continued)

STEP	PROCEDURE
11	Repeat Steps 3 through 10 for each Line Card Slot 2 through 24.
12	Close the LCS front panel after you have completed PAM testing. Lift the LCS front panel up, slide both latches toward the center and release to lock in place.
13	Are additional Line Card Shelves installed? ■ If YES, repeat Steps 1 through 12 for each Line Card Shelf. ■ If NO, the Line Card Shelf to MDF Cabling and Verify Continuity of Cable Pairs procedures are complete.

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                Verify Continuity of Cable Pairs

SECTION 4   TELCO CABLING

Chapter 11   Low Pass Filter Shelf Cabling—ADSL Line Cards (Data Plus Voice)

Introduction   The Speedlink system can be configured three different ways based on the types of line cards installed and the needs of your network service provider. See Chapter 1, "Master Control Shelf Installation," page 1, for descriptions of each configuration.

This chapter provides detailed cabling instructions for a Speedlink Multiplexer supporting data plus voice where the LCS and LPFS are co-located.

When the Speedlink system is configured for ADSL data plus voice service, the connection between the local exchange network and the Speedlink is made at the Low Pass Filter Shelf (LPFS). Data plus voice frequency signals are received from the customer at the Low Pass Filter Shelf (LPFS). The LPF card "splits" the low frequency voice signal from the high frequency ADSL data signal. The voice signal is sent onto the switch unimpeded; the data signal is received by the ADSL line card.

Release 3.0 supports the following LPF cards:

- LPF2 cards for CAP2 Dual ADSL line cards (48 cable/pairs per Low Pass Filter Shelf).

- LPF4 cards for CAP4 Quad ADSL line cards (96 cable/pairs per Low Pass Filter Shelf).

- LPF4D cards for DMT4 Quad ADSL line cards (96 cable/pairs per Low Pass Filter Shelf).

LPFS Backplane Connections	LPF cards are organized into groups of six channel slots. Each group of six cards requires three connections on the LPFS backplane. This chapter provides detailed instructions on how to make Connections One through Three:

- Connection One: (LPFS to LCS)

  <u>Data</u> signals are sent to and received from the ADSL line card. This connection is made at the LPFS backplane and LCS backplane. The LPFS to LCS Cabling procedure begins on page 91.

- Connection Two: (LPFS to MDF Subscriber)

  <u>Data plus voice</u> signals are received from and sent to the subscriber. This connection between the LPFS and the local exchange network is made at the Main Distribution Frame (MDF). The LPFS to MDF Subscriber Cabling procedure begins on page 105.

- Connection Three: (LPFS to MDF Switch)

  <u>Voice</u> signals are sent to and received from the voice switch. The connection between the LPFS and the switch is made at the MDF. The LPFS to MDF Switch Cabling procedure begins on page 110.

LPFS to LCS Cabling	This procedure provides detailed instructions on how to make Connection One— Low Pass Filter Shelf to Line Card Shelf.

Required Tools and Equipment	To begin this task you must have the following equipment and tools:

- Four - 25 pair cable(s) with flat "laminated" ends, 50 position female IDC connectors at both ends, and two vinyl rubber grommets (DLCC Part Numbers: 40-0011-001, 40-0011-002, 40-0012-001, and 40-0012-002)

25 pair LPFS to LCS cable(s) are shipped with the Speedlink system. The number of cable stubs shipped is based on the size of the Speedlink system ordered.

LPFS to LCS Cables	LPFS to LCS cabling is fully connectorized. One end of the 25 pair cable is connected to the LPFS backplane, the other end connects to its corresponding connector on the Line Card Shelf backplane.

Each 25 pair cable connects up to six LPF cards to six ADSL line cards. For example: A system ordered with one LCS, one LPFS, 24 ADSL line cards, and 24 LPF cards comes with a total of four LPFS to LCS cables—one cable for each group of six line cards.

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             LPFS to LCS— 25 Pair Cable Connection at the LPFS

| LPFS to LCS—25 Pair Cable Connection at the LPFS | Follow these steps to connect 25 pair cables to the LPFS backplane: |

<div align="center">

Table 20: LPFS to LCS—25 Pair Cable Connection at the LPFS

</div>
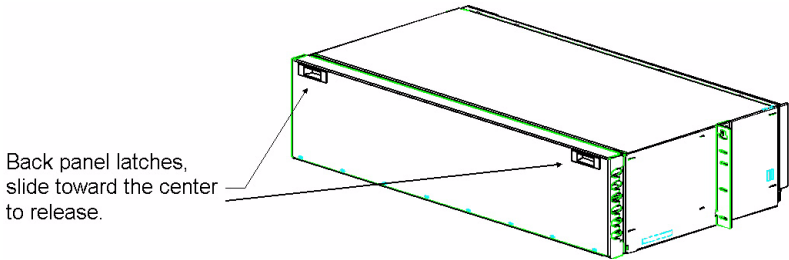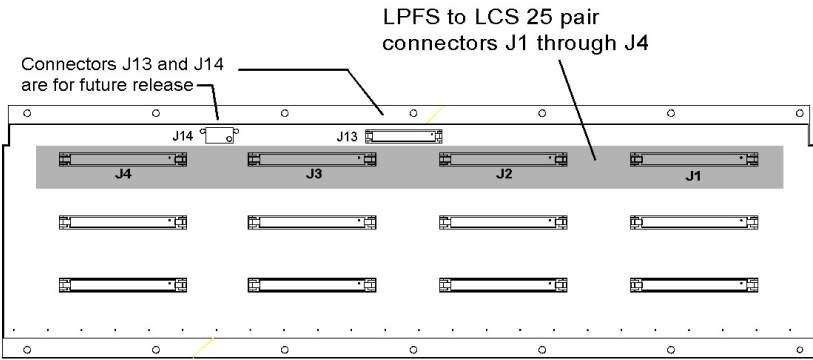
STEP	PROCEDURE
1	Unlatch and lower the <u>back</u> panel on the <u>first</u> LPFS to access the backplane. The latches are located at the top of the back panel. Slide both latches towards the center to release and lower the panel. Back panel latches, slide toward the center to release. Figure 68: LPFS Assembly—Back View
2	Remove the LPFS back panel during Installation procedures. Hold the panel on both sides and slide to the left about ¼ inch. Pull the panel towards you and release it from the holding clips.
3	Repeat steps 1 and 2 to lower and remove the <u>back</u> panel from the <u>first</u> Line Card Shelf.
4	Connect a <u>right angle</u> 25 pair cable[a] (DLCC P/N: 40-0011-001) to LPFS backplane connector J1, this connects to LPF card slots 1-6. Connectors J13 and J14 are for future release LPFS to LCS 25 pair connectors J1 through J4 J14 J13 J4 J3 J2 J1 Figure 69: Back View of LPFS Backplane

Table 20: LPFS to LCS—25 Pair Cable Connection at the LPFS (continued)

STEP	PROCEDURE
5	Backplane connectors have latches on both sides. These latches snap down on the cable connector and lock in place. Pair 1 is indicated by arrow Figure 70: Ribbon Connectors (Backplane and 25 Pair Cable)
6	The back of the LPFS assembly has 6 cable slots on the left and right sides. Bring the 25 pair cable connected to the J1 connector through the second cable slot (from the top) on the right side of the LPFS assembly. Refer to the LPFS Cabling Diagram on page 94. Cable slots on side of LPFS assembly. Figure 71: Low Pass Filter Shelf Assembly—Back View
7	There are two rubber vinyl grommets pre-installed on the LPFS cable. Position one of the grommets on the cable so it fits over the edge of the slot on the LPFS assembly. Push the grommet into the slot as far as you can so it doesn't interfere with the back cover. The grommet helps hold the cable in position and also protects it from the metal edge.

Table 20: LPFS to LCS—25 Pair Cable Connection at the LPFS (continued)

STEP	PROCEDURE
8	Repeat steps 4 through 7 for all the 25 pair LPFS to LCS cables shipped with the Low Pass Filter Shelf assembly. Refer to the LPFS Cabling Diagram below. ■ Connect a <u>right angle</u> 25 pair cable[b] (DLCC P/N: 40-0011-002) to connector <u>J2</u>, this connects to LPF card positions 7-12. Bring the 25 pair cable connected to the J2 connector through the <u>top</u> cable slot on the <u>right</u> side of the LPFS assembly. ■ Connect a <u>left angle</u> 25 pair cable (DLCC P/N: 40-0012-001) to connector <u>J3</u>, this connects to LPF card positions 13-18. Bring the 25 pair cable connected to the J3 connector through the <u>top</u> cable slot on the <u>left</u> side of the LPFS assembly. ■ Connect a <u>left angle</u> 25 pair cable (DLCC P/N: 40-0012-002) to connector <u>J4</u>, this connects to LPF card positions 19-24. Bring the 25 pair cable connected to the J4 connector through the <u>second</u> cable slot (from the top) on the <u>left</u> side of the LPFS assembly. Position grommets on all cables to fit over the edge of the slots on the LPFS assembly. Push the grommets into the slot as far as you can so they don't interfere with the back cover. Figure 72: LPFS Cabling Diagram
9	Continue to the next procedure: LPFS to LCS—25 Pair Cable Connection at the LCS on page 95.

[a] Use right angle LPFS to LCS cable connectors for LPFS J1 and J2 connectors. Use left angle LPFS to LCS cable connectors for LPFS J3 and J4 connectors.

[b] See previous footnote.

LPFS to LCS—25 Pair Cable Connection at the LCS

Follow these steps to connect 25 Pair cables from the LPFS backplane to the LCS backplane:

Table 21:   LPFS to LCS—25 Pair Cable Connection at the LCS
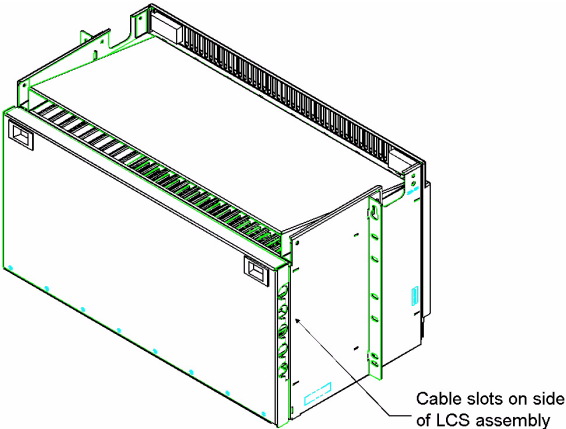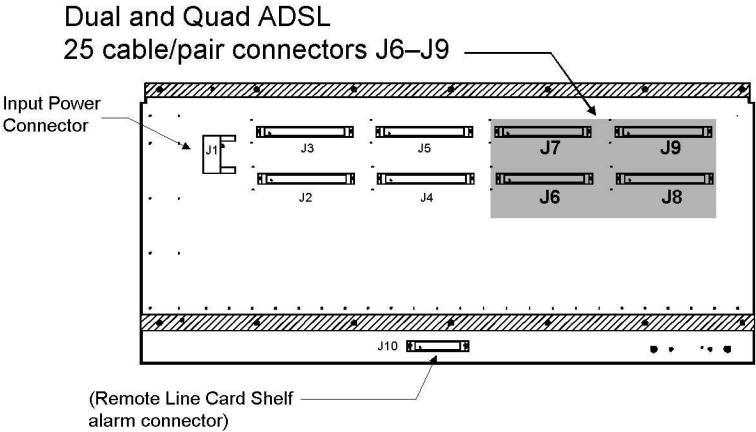
STEP	PROCEDURE
1	The LCS assembly has 5 cable slots on the left and right sides. Bring the LPFS <u>J1</u> connector cable through the <u>top</u> cable slot on the <u>right</u> side of the LCS assembly. Refer to the LPFS Cabling Diagram on page 97. Cable slots on side of LCS assembly Figure 73: Line Card Shelf Assembly—Back View, Panel Closed
2	Connect the LPFS <u>J1</u> connector cable to LCS connector <u>J9</u> (line card slots 1– 6). Refer to the Dual Cable/Pair Assignment Tables on pages 99 and 100 and the Quad Cable/Pair Assignment Tables on pages 101 - 104. Dual and Quad ADSL 25 cable/pair connectors J6–J9 Input Power Connector J1 J3 J5 J7 J9 J2 J4 J6 J8 J10 (Remote Line Card Shelf alarm connector) Figure 74: Back View of LCS Backplane

Table 21:   LPFS to LCS—25 Pair Cable Connection at the LCS (continued)
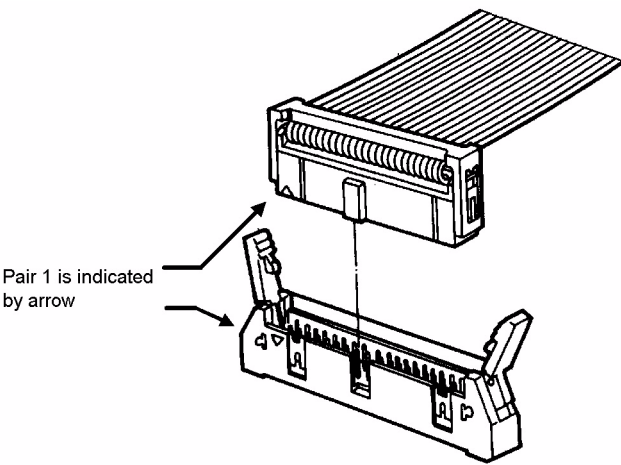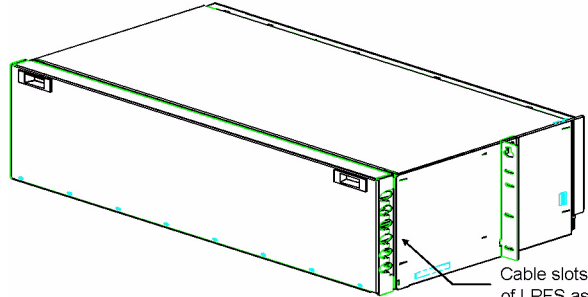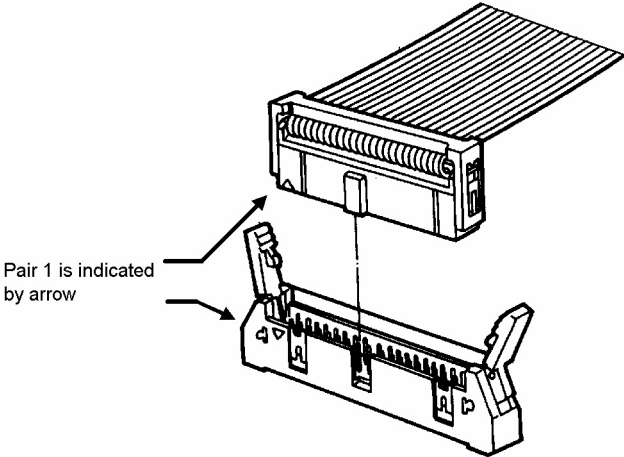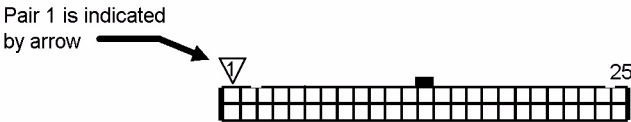
STEP	PROCEDURE
3	Backplane connectors have latches on both sides. These latches snap down on the cable ribbon connector and lock in place.

Pair 1 is indicated
by arrow

Figure 75: Ribbon Connectors (Backplane and 25 Pair Cable)

Pair 1 is indicated
by arrow

25

Figure 76: Connector Pins 1 Through 25

STEP	PROCEDURE
4	There is a second rubber vinyl grommet pre-installed on the LPFS cable. Position the grommet on the cable so it fits over the edge of the slot on the LCS assembly. Push the grommet into the slot as far as you can so it doesn't interfere with the back cover.

Table 21:   LPFS to LCS—25 Pair Cable Connection at the LCS (continued)
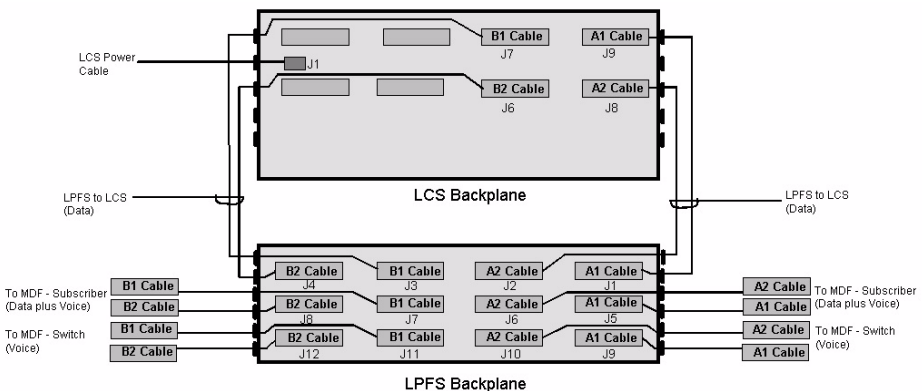
STEP	PROCEDURE
5	Repeat steps 1 through 4 for all 25 pair LPFS to LCS cables shipped with the Low Pass Filter Shelf assembly. Refer to the LPFS Cabling Diagram below, and the Dual Cable/Pair Assignment Tables on pages 99 and 100 and the Quad Cable/Pair Assignment Tables on pages 101 - 104:

Bring the LPFS <u>J2</u> connector cable through the <u>third</u> cable slot (from the top) on the <u>right</u> side of the LCS assembly.
Connect the LPFS <u>J2</u> connector cable to LCS connector <u>J8</u> (line card positions 7−12).
Bring the LPFS <u>J3</u> connector cable through the <u>top</u> cable slot on the <u>left</u> side of the LCS assembly.
Connect the LPFS <u>J3</u> connector cable to LCS connector <u>J7</u> (line card positions 13 − 18).
Bring the LPFS <u>J4</u> connector cable through the <u>third</u> cable slot (from the top) on the <u>left</u> side of the LCS assembly.
Connect the LPFS <u>J4</u> connector cable to LCS connector <u>J6</u> (line card positions 19 − 24).

Position grommets on all cables to fit over the edges of the slots on the LCS assembly. Push the grommets into the slots as far as you can so they don't interfere with the back cover.

Figure 77: LPFS Cabling Diagram

| 6 | Replace the LCS back panel. Hold the panel on both sides so it is level with the bottom of the card cage. Insert the hinged portion of the panel between the tabs on the card cage and slide the panel straight in and then to the right about ¼ inch to lock in place. |

Table 21:   LPFS to LCS—25 Pair Cable Connection at the LCS (continued)

STEP	PROCEDURE
7	Lift the LCS back panel up into position. Slide both latches towards the center and release to lock in place.
8	The LPFS to LCS cabling procedure is complete. Continue to the next procedure: Low Pass Filter to MDF Subscriber Cabling on page 105.

Dual LPF and Dual ADSL Line Card Cable/Pair Assignments

The following tables show the cable/pair assignments for Low Pass Filter Shelf to Line Card Shelf cabling. These tables are for Dual LPF2 cards, and CAP2 Dual ADSL line cards—two subscriber lines (two pairs) per card.

LPFS Connector #	LPF Card Slot	LPF Port	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
								Tip	Ring
J1	1	1	J9	1	1	A1	1	White	Blue
	1	2		1	2		2	White	Orange
	2	1		2	1		5	White	Slate
	2	2		2	2		6	Red	Blue
	3	1		3	1		9	Red	Brown
	3	2		3	2		10	Red	Slate
	4	1		4	1		13	Black	Green
	4	2		4	2		14	Black	Brown
	5	1		5	1		17	Yellow	Orange
	5	2		5	2		18	Yellow	Green
	6	1		6	1		21	Violet	Blue
▼	6	2	▼	6	2	▼	22	Violet	Orange

Figure 78: LPFS Connector J1 to LCS Connector J9
Dual ADSL Cable/Pair Assignments

LPFS Connector #	LPF Card Slot	LPF Port	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
								Tip	Ring
J2	7	1	J8	7	1	A2	1	White	Blue
	7	2		7	2		2	White	Orange
	8	1		8	1		5	White	Slate
	8	2		8	2		6	Red	Blue
	9	1		9	1		9	Red	Brown
	9	2		9	2		10	Red	Slate
	10	1		10	1		13	Black	Green
	10	2		10	2		14	Black	Brown
	11	1		11	1		17	Yellow	Orange
	11	2		11	2		18	Yellow	Green
	12	1		12	1		21	Violet	Blue
▼	12	2	▼	12	2	▼	22	Violet	Orange

Figure 79: LPFS Connector J2 to LCS Connector J8
Dual ADSL Cable/Pair Assignments

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                Dual LPF and Dual ADSL Line Card Cable/Pair Assignments

LPFS Connector #	LPF Card Slot	LPF Port	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
								Tip	Ring
J3	13	1	J7	13	1	B1	1	White	Blue
	13	2		13	2		2	White	Orange
	14	1		14	1		5	White	Slate
	14	2		14	2		6	Red	Blue
	15	1		15	1		9	Red	Brown
	15	2		15	2		10	Red	Slate
	16	1		16	1		13	Black	Green
	16	2		16	2		14	Black	Brown
	17	1		17	1		17	Yellow	Orange
	17	2		17	2		18	Yellow	Green
	18	1		18	1		21	Violet	Blue
▼	18	2	▼	18	2	▼	22	Violet	Orange

Figure 80: LPFS Connector J3 to LCS Connector J7
Dual ADSL Cable/Pair Assignments

LPFS Connector #	LPF Card Slot	LPF Port	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
								Tip	Ring
J4	19	1	J6	19	1	B2	1	White	Blue
	19	2		19	2		2	White	Orange
	20	1		20	1		5	White	Slate
	20	2		20	2		6	Red	Blue
	21	1		21	1		9	Red	Brown
	21	2		21	2		10	Red	Slate
	22	1		22	1		13	Black	Green
	22	2		22	2		14	Black	Brown
	23	1		23	1		17	Yellow	Orange
	23	2		23	2		18	Yellow	Green
	24	1		24	1		21	Violet	Blue
▼	24	2	▼	24	2	▼	22	Violet	Orange

Figure 81: LPFS Connector J4 to LCS Connector J6
Dual ADSL Cable/Pair Assignments

Quad LPF and Quad ADSL Line Card Cable/Pair Assignments

The following tables show the cable/pair assignments for Low Pass Filter Shelf to Line Card Shelf cabling. These tables are for Quad LPF4 or LPF4D cards, and Quad CAP4 or DMT4 ADSL line cards—four subscriber lines (four pairs) per card.

LPFS Connector #	LPF Card Slot	LPF Port	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
								Tip	Ring
J1	1	1	J9	1	1	A1	1	White	Blue
	1	2		1	2		2	White	Orange
	1	3		1	3		3	White	Green
	1	4		1	4		4	White	Brown
	2	1		2	1		5	White	Slate
	2	2		2	2		6	Red	Blue
	2	3		2	3		7	Red	Orange
	2	4		2	4		8	Red	Green
	3	1		3	1		9	Red	Brown
	3	2		3	2		10	Red	Slate
	3	3		3	3		11	Black	Blue
	3	4		3	4		12	Black	Orange
	4	1		4	1		13	Black	Green
	4	2		4	2		14	Black	Brown
	4	3		4	3		15	Black	Slate
	4	4		4	4		16	Yellow	Blue
	5	1		5	1		17	Yellow	Orange
	5	2		5	2		18	Yellow	Green
	5	3		5	3		19	Yellow	Brown
	5	4		5	4		20	Yellow	Slate
	6	1		6	1		21	Violet	Blue
	6	2		6	2		22	Violet	Orange
	6	3		6	3		23	Violet	Green
▼	6	4	▼	6	4	▼	24	Violet	Brown
-	-	-	-	-	-	-	25	Violet	Slate

Figure 82: LPFS Connector J1 to LCS Connector J9
Quad ADSL Cable/Pair Assignments

VOLUME 2   **INSTALLATION**
Section 4   **Telco Cabling**
         Quad LPF and Quad ADSL Line Card Cable/Pair Assignments

LPFS Connector #	LPF Card Slot	LPF Port	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
								Tip	Ring
J2	7	1	J8	7	1	A2	1	White	Blue
	7	2		7	2		2	White	Orange
	7	3		7	3		3	White	Green
	7	4		7	4		4	White	Brown
	8	1		8	1		5	White	Slate
	8	2		8	2		6	Red	Blue
	8	3		8	3		7	Red	Orange
	8	4		8	4		8	Red	Green
	9	1		9	1		9	Red	Brown
	9	2		9	2		10	Red	Slate
	9	3		9	3		11	Black	Blue
	9	4		9	4		12	Black	Orange
	10	1		10	1		13	Black	Green
	10	2		10	2		14	Black	Brown
	10	3		10	3		15	Black	Slate
	10	4		10	4		16	Yellow	Blue
	11	1		11	1		17	Yellow	Orange
	11	2		11	2		18	Yellow	Green
	11	3		11	3		19	Yellow	Brown
	11	4		11	4		20	Yellow	Slate
	12	1		12	1		21	Violet	Blue
	12	2		12	2		22	Violet	Orange
	12	3		12	3		23	Violet	Green
▼	12	4	▼	12	4	▼	24	Violet	Brown
-	-	-	-	-	-	-	25	Violet	Slate

Figure 83:   LPFS Connector J2 to LCS Connector J8
Quad ADSL Cable/Pair Assignments

LPFS Connector #	LPF Card Slot	LPF Port	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
								Tip	Ring
J3	13	1	J7	13	1	B1	1	White	Blue
	13	2		13	2		2	White	Orange
	13	3		13	3		3	White	Green
	13	4		13	4		4	White	Brown
	14	1		14	1		5	White	Slate
	14	2		14	2		6	Red	Blue
	14	3		14	3		7	Red	Orange
	14	4		14	4		8	Red	Green
	15	1		15	1		9	Red	Brown
	15	2		15	2		10	Red	Slate
	15	3		15	3		11	Black	Blue
	15	4		15	4		12	Black	Orange
	16	1		16	1		13	Black	Green
	16	2		16	2		14	Black	Brown
	16	3		16	3		15	Black	Slate
	16	4		16	4		16	Yellow	Blue
	17	1		17	1		17	Yellow	Orange
	17	2		17	2		18	Yellow	Green
	17	3		17	3		19	Yellow	Brown
	17	4		17	4		20	Yellow	Slate
	18	1		18	1		21	Violet	Blue
	18	2		18	2		22	Violet	Orange
	18	3		18	3		23	Violet	Green
▼	18	4	▼	18	4	▼	24	Violet	Brown
-	-	-	-	-	-	-	25	Violet	Slate

Figure 84: LPFS Connector J3 to LCS Connector J7
Quad ADSL Cable/Pair Assignments

LPFS Connector #	LPF Card Slot	LPF Port	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
								Tip	Ring
J4	19	1	J6	19	1	B2	1	White	Blue
	19	2		19	2		2	White	Orange
	19	3		19	3		3	White	Green
	19	4		19	4		4	White	Brown
	20	1		20	1		5	White	Slate
	20	2		20	2		6	Red	Blue
	20	3		20	3		7	Red	Orange
	20	4		20	4		8	Red	Green
	21	1		21	1		9	Red	Brown
	21	2		21	2		10	Red	Slate
	21	3		21	3		11	Black	Blue
	21	4		21	4		12	Black	Orange
	22	1		22	1		13	Black	Green
	22	2		22	2		14	Black	Brown
	22	3		22	3		15	Black	Slate
	22	4		22	4		16	Yellow	Blue
	23	1		23	1		17	Yellow	Orange
	23	2		23	2		18	Yellow	Green
	23	3		23	3		19	Yellow	Brown
	23	4		23	4		20	Yellow	Slate
	24	1		24	1		21	Violet	Blue
	24	2		24	2		22	Violet	Orange
	24	3		24	3		23	Violet	Green
▼	24	4	▼	24	4	▼	24	Violet	Brown
-	-	-	-	-	-	-	25	Violet	Slate

Figure 85: LPFS Connector J4 to LCS Connector J6
Quad ADSL Cable/Pair Assignments

LPFS to MDF Subscriber Cabling	LPF line cards are organized into groups of six channel slots. Each group of six line cards requires <u>three</u> connections on the LPFS backplane. This procedure provides detailed instructions on how to make Connection Two—Low Pass Filter Shelf to MDF Subscriber Cabling.

Required Tools and Equipment	To begin this task you must have the following equipment and tools:

- A small flat-blade screwdriver
- Four - 25 pair cable stub(s) with a 50 pin Amp Champ female connector at one end and a vinyl rubber grommet (DLCC Part Number: 40-0014 and 40-0015)
- Four - 50 pin Amp Champ IDC male connectors
- 25 pair cable (24 AWG)

Round cable to flat "laminated" LPFS to MDF Subscriber cable stub(s) are shipped with the Speedlink system. Cable stubs are equipped with a 50 position female ribbon connector on the flat end and a 50 position Amp Champ IDC[1] <u>female</u> connector on the round cable end.

LPFS to MDF Subscriber Cable Stubs	Low Pass Filter Shelf (LPFS) cabling is fully connectorized. The flat ribbon end of the 25 pair cable stub is connected to the LPFS backplane. The round end of the cable stub connects to the 25 pair cable which is connected to the subscriber lines at the MDF.

Each 25 pair cable stub connects up to six LPF cards. For example: A system ordered with one LCS, one LPFS, and 24 LPF cards comes with a total of four LPFS to MDF Subscriber cable stubs—one stub for each group of six line cards.

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[1] Cable stubs with 710 or MS2 connectors are available based on requirements of the network service provider.

LPFS to MDF Subscriber—25 Pair Stub Connection

Follow these steps to connect 25 pair cable stubs to the LPFS backplane:

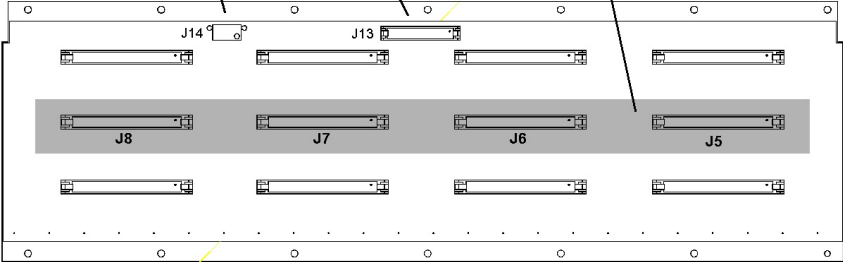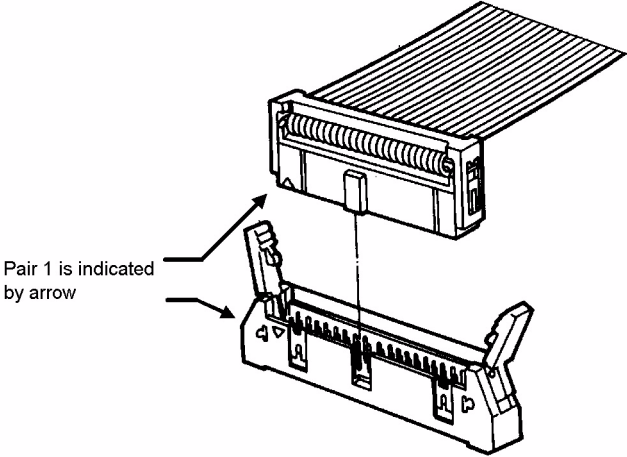**Table 22: LPFS to MDF Subscriber—25 Pair Stub Connection**

STEP	PROCEDURE
1	Connect a <u>right</u> angle 25 pair cable stub[a] (DLCC P/N: 40-0015) to connector <u>J5</u>, this connects to LPF line card slots 1-6. LPFS to MDF Subscriber 25 pair connectors J5 through J8 Connectors J13 and J14 are for future release J14 J13 J8 J7 J6 J5 Figure 86: Back View of LPFS Backplane
2	Backplane connectors have latches on both sides. These latches snap down on the cable stub connector and lock in place. Pair 1 is indicated by arrow Figure 87: Ribbon Connectors (Backplane and 25 Pair Cable Stub)

Table 22: LPFS to MDF Subscriber—25 Pair Stub Connection (continued)
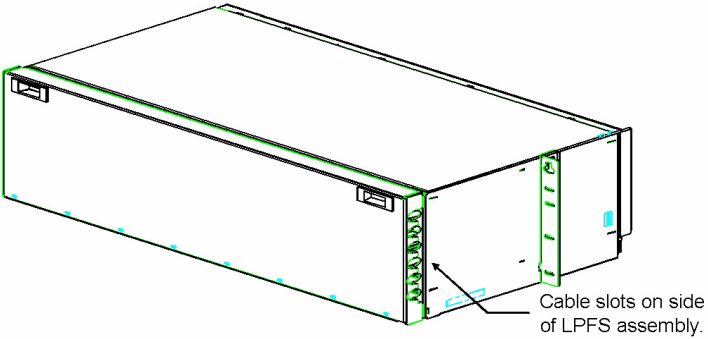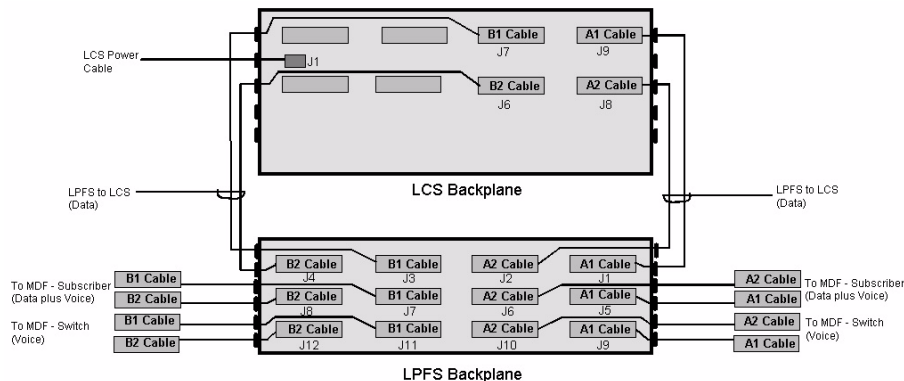
STEP	PROCEDURE
3	The back of the LPFS assembly has 6 cable slots on the left and right sides. Bring the 25 pair cable stub connected to the <u>J5</u> connector through the <u>fourth </u>cable slot (from the top) on the <u>right</u> side of the LPFS assembly. Refer to the LPFS Cabling Diagram on page 108. Cable slots on side of LPFS assembly. Figure 88: Low Pass Filter Shelf Assembly—Back View
4	There is a rubber vinyl grommet pre-installed on the 25 pair cable stub. Position the grommet on the cable stub so it fits over the edge of the slot on the LPFS assembly. Push the grommet into the slot as far as you can so it doesn't interfere with the back cover. The grommet helps hold the cable in position and also protects it from the metal edge.

Table 22: LPFS to MDF Subscriber—25 Pair Stub Connection (continued)

STEP	PROCEDURE
5	Repeat steps 1 through 4 for all the 25 pair LPFS to MDF Subscriber cable stubs shipped with the Low Pass Filter Shelf assembly. Refer to the LPFS Cabling Diagram below.

- Connect a right angle 25 pair cable stub[b] (DLCC P/N: 40-0015) to connector J6, this connects to LPF card positions 7-12. Bring the 25 pair cable stub connected to the J6 connector through the third cable slot (from the top) on the right side of the LPFS assembly.

- Connect a left angle 25 pair cable stub (DLCC P/N: 40-0014) to connector J7, this connects to LPF card positions 13-18. Bring the 25 pair cable stub connected to the J7 connector through the third cable slot (from the top) on the left side of the LPFS assembly.

- Connect a left angle 25 pair cable stub (DLCC P/N: 40-0014) to connector J8, this connects to LPF card positions 19-24. Bring the 25 pair cable stub connected to J8 connector through the fourth cable slot (from the top) on the left side of the LPFS assembly.

Position grommets on all cable stubs to fit over the edges of the slots on the LPFS assembly. Push the grommets into the slots as far as you can so they don't interfere with the back cover.

Figure 89: LPFS Cabling Diagram

STEP	PROCEDURE
6	Continue to the next procedure: LPFS to MDF Subscriber—25 Pair Cable Connection on page 109.

[a] Use right angle LPFS cable stubs for LPFS J5 and J6 connectors. Use left angle LPFS cable stubs for LPFS J7 and J8 connectors.

[b] See previous footnote.

Detailed Level Procedure

LPFS to MDF Subscriber—25 Pair Cable Connection

25 pair cables[2] are run from the central office Main Distribution Frame (MDF) across the horizontal cable racks to the Speedlink. This work may be done by the network service provider or the Speedlink technician. These 25 pair cables are connected to the LPFS to MDF Subscriber cable stub(s) installed at the Low Pass Filter Shelf.

Follow these steps to connect 25 Pair Cables to the LPFS Cable Stubs:

Table 23: LPFS to MDF Subscriber—25 Pair Cable Connection

STEP	PROCEDURE
1	Route the 25 pair cables (from the MDF) down from the horizontal cable rack, along the relay rack rails, following local procedures.
2	Verify continuity of each 25 pair MDF cable, following local procedures.
3	Terminate the 25 pair cable on an Amp Champ[a] IDC male connector.
4	Connect the 25 pair cable, identified as the <u>A1</u> cable, to the <u>J5</u> LPFS cable stub. Refer to Dual Cable/Pair Assignment Tables on pages 116 and 117 and Quad Cable/Pair Assignment Tables on pages 118 - 121.
5	Tighten the two screws on the Amp Champ connector to secure.
6	Repeat steps 2 through 5 for each 25 pair cable. Refer to the LPFS Cabling Diagram on page 108, and the Dual Cable/Pair Assignment Tables on pages 116 and 117 and Quad Cable/Pair Assignment Tables on pages 118 - 121. ■ Connect the <u>A2</u> cable to the <u>J6</u> LPFS to MDF Subscriber cable stub. ■ Connect the <u>B1</u> cable to the <u>J7</u> LPFS to MDF Subscriber cable stub. ■ Connect the <u>B2</u> cable to the <u>J8</u> LPFS to MDF Subscriber cable stub.
7	Continue to the next procedure: LPFS to MDF Switch Cabling on page 110.

[a] 710 or MS2 connectors may be used if the network service provider requested cable stubs with these connectors.

[2] The network service provider may choose to run 100 pair cables from the MDF to the Speedlink. These 100 cables require four - 25 pair Amp Champ IDC male connectors to connect to the 25 pair cable stubs.

LPFS to MDF Switch Cabling

LPF line cards are organized into groups of six channel slots. Each group of six line cards requires <u>three</u> connections on the LPFS backplane. This procedure provides detailed instructions on how to make Connection Three—Low Pass Filter Shelf to MDF Switch.

Required Tools and Equipment

To begin this task you must have the following equipment and tools:

- A small flat-blade screwdriver
- Four - 25 pair LPFS to MDF Switch cable stub(s) with 50 pin Amp Champ IDC male connectors at both ends and a vinyl rubber grommet (DLCC Part Numbers: 40-0014 and 40-0015)
- Four - 50 pin Amp Champ female connectors
- 25 pair cable (24 AWG).

Round cable to flat "laminated" LPFS to MDF Switch cable stub(s) are shipped with the Speedlink system. Cable stub(s) are equipped with a 50 position female IDC connector on the flat end and a 50 position Amp Champ IDC[3] <u>male</u> connector on the round cable end.

LPFS to MDF Switch Cable Stubs

Low Pass Filter Shelf (LPFS) cabling is fully connectorized. The flat ribbon end of the 25 pair cable stub is connected to the LPFS backplane. The round end of the cable stub connects to the 25 pair cable which is connected to the central office switch at the MDF.

Each 25 pair cable stub connects up to six LPF cards. For example: A system ordered with one LCS, one LPFS, and 24 LPF cards comes with a total of four LPFS to MDF Switch cable stubs—one stub for each group of six line cards.

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[3] Cable stubs with 710 or MS2 connectors are available based on requirements of the network service provider.

LPFS to MDF Switch—25 Pair Stub Connection

Follow these steps to connect 25 pair cable stubs to the LPFS backplane:

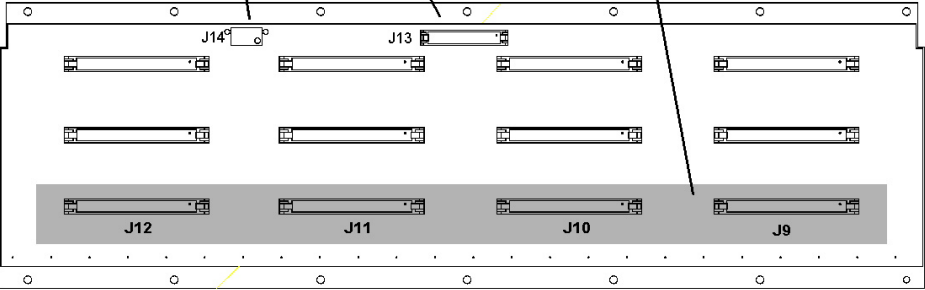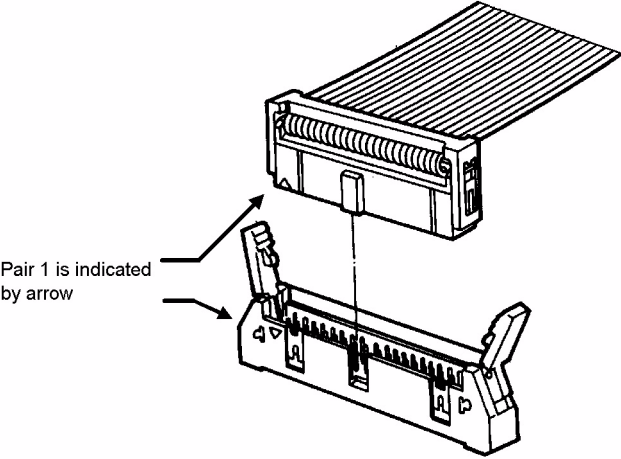**Table 24: LPFS to MDF Switch—25 Pair Stub Connection**

STEP	PROCEDURE
1	Connect a <u>right</u> angle 25 pair cable stub[a] (DLCC P/N: 40-0015) to connector <u>J9</u>, this connects to LPF line card slots 1-6.

Figure 90: Back View of LPFS Backplane

STEP	PROCEDURE
2	Backplane connectors have latches on both sides. These latches snap down on the cable stub connector and lock in place.

Figure 91: Ribbon Connectors (Backplane and 25 Pair Cable Stub)

Table 24: LPFS to MDF Switch—25 Pair Stub Connection (continued)
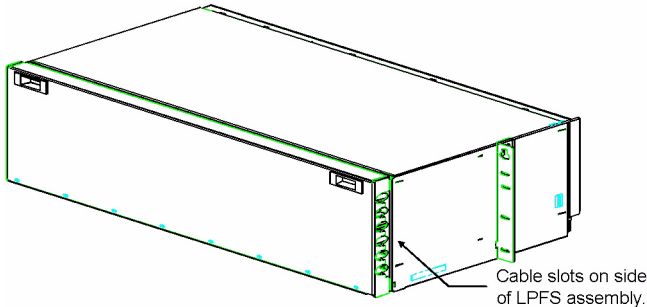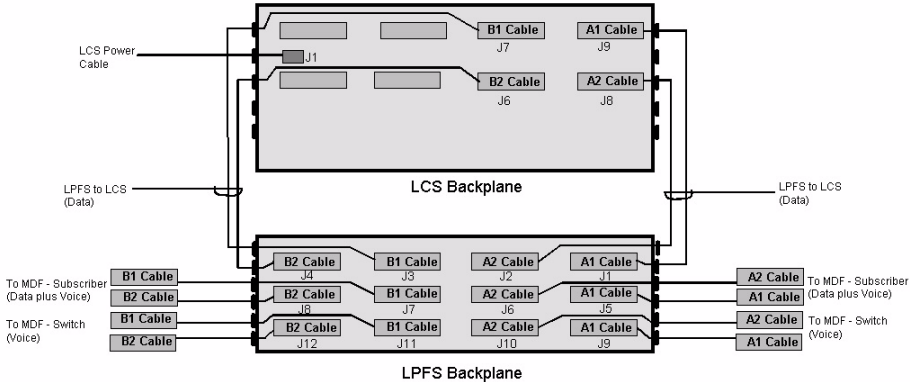
STEP	PROCEDURE
3	The back of the LPFS assembly has 6 cable slots on the left and right sides. Bring the 25 pair cable stub connected to the <u>J9</u> connector through the <u>sixth</u> cable slot (from the top) on the <u>right</u> side of the LPFS assembly. Refer to the LPFS Cabling Diagram on page 113. Cable slots on side of LPFS assembly. Figure 92: Low Pass Filter Shelf Assembly—Back View, Panel Closed
4	There is a rubber vinyl grommet pre-installed on the 25 pair cable stub. Position the grommet on the cable stub so it fits over the edge of the slot on the LPFS assembly. Push the grommet into the slot as far as you can so it doesn't interfere with the back cover. The grommet helps hold the cable in position and also protects it from the metal edge.

Table 24: LPFS to MDF Switch—25 Pair Stub Connection (continued)

STEP	PROCEDURE
5	Repeat steps 1 through 4 for all the 25 pair LPFS to MDF Switch cable stubs shipped with the Low Pass Filter Shelf assembly. Refer to the LPFS Cabling diagram below. ■ Connect a <u>right</u> angle 25 pair cable stub (DLCC P/N: 40-0015) through the <u>fifth</u> cable slot (from the top) on the <u>right</u> side of the LPFS assembly. ■ Connect a <u>left</u> angle 25 pair cable stub[b] (DLCC P/N: 40-0014) to connector <u>J11</u>, this connects to LPF card positions 13-18. Bring the 25 pair cable stub connected to the J11 connector through the <u>fifth</u> cable slot (from the top) on the <u>left</u> side of the LPFS assembly. ■ Connect a <u>left</u> angle 25 pair cable stub (DLCC P/N: 40-0014) to connector <u>J12,</u> this connects to LPF card positions 19-24. Bring the 25 pair cable stub connected to J12 connector through the <u>sixth</u> cable slot (from the top) on the <u>left</u> side of the LPFS assembly. Position grommets on all cable stubs to fit over the edges of the slots on the LPFS assembly. Push the grommets into the slots as far as you can so they don't interfere with the back cover. Figure 93: LPFS Cabling Diagram
6	Continue to the next procedure: LPFS to MDF Switch—25 Pair Cable Connection on page 114.

a Use right angle LPFS cable stubs for LPFS J9 and J10 connectors. Use left angle LPFS cable stubs for LPFS J11 and J12 connectors.

b See previous footnote.

| LPFS to MDF Switch—25 Pair Cable Connection | Twenty-five pair cables[4] are run from the central office Main Distribution Frame (MDF) across the horizontal cable racks to the Speedlink. This work may be done by the network service provider or the Speedlink technician. These 25 pair cables are connected to the LPFS to MDF Switch cable stub(s) installed at the Low Pass Filter Shelf. |

Follow these steps to connect 25 Pair Cables to the LPFS Cable Stubs:

Table 25: LPFS to MDF Switch—25 Pair Cable Connection

STEP	PROCEDURE
1	Route the 25 pair cables (from the MDF) down from the horizontal cable rack, along the relay rack rails, following local procedures.
2	Verify continuity of each 25 pair MDF cable, following local procedures.
3	Terminate the 25 pair cable on an Amp Champ[a] female connector.
4	Tighten the two screws on the Amp Champ connector to secure.
5	Connect the 25 pair cable, identified as the A1 cable, to the J9 LPFS to MDF Switch cable stub. Refer to the Dual Cable/Pair Assignment Tables on pages 116 and 117 and the Quad Cable/Pair Assignment Tables on pages 118 - 121.
6	Repeat steps 2 through 5 for each 25 pair cable. Refer to the LPFS Cabling Diagram on page 113, and the Dual Cable/Pair Assignment Tables on pages 116 and 117 and the Quad Cable/Pair Assignment Tables on pages 118 - 121. ■ Connect the <u>A2</u> cable to the <u>J10</u> LPFS to MDF Switch cable stub. ■ Connect the <u>B1</u> cable to the <u>J11</u> LPFS to MDF Switch cable stub. ■ Connect the <u>B2</u> cable to the <u>J12</u> LPFS to MDF Switch cable stub.
7	Replace the LCS back panel. Hold the panel on both sides so it is level with the bottom of the card cage. Insert the hinged portion of the panel between the tabs on the card cage and slide the panel straight in and then to the right about ¼ inch to lock in place.

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[4] The network service provider may choose to run 100 pair cables from the MDF to the Speedlink. These 100 cables require four - 25 pair Amp Champ IDC male connectors to connect to the 25 pair cable stubs.

Table 25: LPFS to MDF Switch—25 Pair Cable Connection (continued)

STEP	PROCEDURE
8	Lift the LCS back panel up into position. Slide both latches towards the center and release to lock in place.
9	Are there additional Line Card Shelves and Low Pass Filter Shelves installed? ■ If YES, repeat these procedures for each co-located LCS and LPFS: - LPFS to LCS Cabling beginning on page 91, - LPFS to MDF Subscriber Cabling beginning on page 105, and - LPFS to MDF Switch Cabling beginning on page 110. ■ If NO, continue to the next procedure: Verify Continuity of Cable Pairs on page 122.

[a] 710 or MS2 connectors may be used if the network service provider requested cable stubs with these connectors.

Dual LPF to MDF Cable/Pair Assignments

The following tables show the cable/pair assignments for Low Pass Filter Shelf to MDF Subscriber cabling. These tables are for Dual LPF2 cards—two subscriber lines (two pairs) per card.

LPFS MDF to Subscriber Connector #	LPFS MDF to C.O. Switch Connector #	LPF Card Slot	LPF Port	Cable	Pair	25 Pair Telco Cable Color Code	
						Tip	Ring
J5	J9	1	1	A1	1	White	Blue
		1	2		2	White	Orange
		2	1		5	White	Slate
		2	2		6	Red	Blue
		3	1		9	Red	Brown
		3	2		10	Red	Slate
		4	1		13	Black	Green
		4	2		14	Black	Brown
		5	1		17	Yellow	Orange
		5	2		18	Yellow	Green
		6	1		21	Violet	Blue
↓	↓	6	2	↓	22	Violet	Orange

Figure 94: LPFS Connector J5 and J9
Dual LPF Cable/Pair Assignments

LPFS MDF to Subscriber Connector #	LPFS MDF to C.O. Switch Connector #	LPF Card Slot	LPF Port	Cable	Pair	25 Pair Telco Cable Color Code	
						Tip	Ring
J6	J10	7	1	A2	1	White	Blue
		7	2		2	White	Orange
		8	1		5	White	Slate
		8	2		6	Red	Blue
		9	1		9	Red	Brown
		9	2		10	Red	Slate
		10	1		13	Black	Green
		10	2		14	Black	Brown
		11	1		17	Yellow	Orange
		11	2		18	Yellow	Green
		12	1		21	Violet	Blue
↓	↓	12	2	↓	22	Violet	Orange

Figure 95: LPFS Connector J6 and J10
Dual LPF Cable/Pair Assignments

LPFS MDF to Subscriber Connector #	LPFS MDF to C.O. Switch Connector #	LPF Card Slot	LPF Port	Cable	Pair	25 Pair Telco Cable Color Code	
						Tip	Ring
J7	J11	13	1	B1	1	White	Blue
		13	2		2	White	Orange
		14	1		5	White	Slate
		14	2		6	Red	Blue
		15	1		9	Red	Brown
		15	2		10	Red	Slate
		16	1		13	Black	Green
		16	2		14	Black	Brown
		17	1		17	Yellow	Orange
		17	2		18	Yellow	Green
		18	1		21	Violet	Blue
		18	2		22	Violet	Orange

Figure 96: LPFS Connector J7 and J11
Dual LPF Cable/Pair Assignments

LPFS MDF to Subscriber Connector #	LPFS MDF to C.O. Switch Connector #	LPF Card Slot	LPF Port	Cable	Pair	25 Pair Telco Cable Color Code	
						Tip	Ring
J8	J12	19	1	B2	1	White	Blue
		19	2		2	White	Orange
		20	1		5	White	Slate
		20	2		6	Red	Blue
		21	1		9	Red	Brown
		21	2		10	Red	Slate
		22	1		13	Black	Green
		22	2		14	Black	Brown
		23	1		17	Yellow	Orange
		23	2		18	Yellow	Green
		24	1		21	Violet	Blue
		24	2		22	Violet	Orange

Figure 97: LPFS Connector J8 and J12
Dual LPF Cable/Pair Assignments

Quad LPF to MDF Cable/Pair Assignments

The following tables show the cable/pair assignments for Low Pass Filter Shelf to MDF Subscriber cabling. These tables are for Quad LPF4 and LPF4D cards—four subscriber lines (four pairs) per card.

Shading is used in the following tables to indicate cable pairs used for Quad LPF cards. Cable pairs used for Dual LPF cards are not shaded.

LPFS MDF to Subscriber Connector #	LPFS MDF to C.O. Switch Connector #	LPF Card Slot	LPF Port	Cable	Pair	25 Pair Telco Cable Color Code	
						Tip	Ring
J5	J9	1	1	A1	1	White	Blue
		1	2		2	White	Orange
		1	3		3	White	Green
		1	4		4	White	Brown
		2	1		5	White	Slate
		2	2		6	Red	Blue
		2	3		7	Red	Orange
		2	4		8	Red	Green
		3	1		9	Red	Brown
		3	2		10	Red	Slate
		3	3		11	Black	Blue
		3	4		12	Black	Orange
		4	1		13	Black	Green
		4	2		14	Black	Brown
		4	3		15	Black	Slate
		4	4		16	Yellow	Blue
		5	1		17	Yellow	Orange
		5	2		18	Yellow	Green
		5	3		19	Yellow	Brown
		5	4		20	Yellow	Slate
		6	1		21	Violet	Blue
		6	2		22	Violet	Orange
		6	3		23	Violet	Green
↓	↓	6	4	↓	24	Violet	Brown
-		-	-	-	25	Violet	Slate

Figure 98: LPFS Connector J5 and J9
Quad LPF Cable/Pair Assignments

LPFS MDF to Subscriber Connector #	LPFS MDF to C.O. Switch Connector #	LPF Card Slot	LPF Port	Cable	Pair	25 Pair Telco Cable Color Code	
						Tip	Ring
J6	J10	7	1	A2	1	White	Blue
		7	2		2	White	Orange
		7	3		3	White	Green
		7	4		4	White	Brown
		8	1		5	White	Slate
		8	2		6	Red	Blue
		8	3		7	Red	Orange
		8	4		8	Red	Green
		3	1		9	Red	Brown
		9	2		10	Red	Slate
		9	3		11	Black	Blue
		9	4		12	Black	Orange
		10	1		13	Black	Green
		10	2		14	Black	Brown
		10	3		15	Black	Slate
		10	4		16	Yellow	Blue
		11	1		17	Yellow	Orange
		11	2		18	Yellow	Green
		11	3		19	Yellow	Brown
		11	4		20	Yellow	Slate
		12	1		21	Violet	Blue
		12	2		22	Violet	Orange
		12	3		23	Violet	Green
↓	↓	12	4	↓	24	Violet	Brown
-		-	-	-	25	Violet	Slate

Figure 99: LPFS Connector J6 and J10
Quad LPF Cable/Pair Assignments

VOLUME 2   **INSTALLATION**
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           Quad LPF to MDF Cable/Pair Assignments

LPFS MDF to Subscriber Connector #	LPFS MDF to C.O. Switch Connector #	LPF Card Slot	LPF Port	Cable	Pair	25 Pair Telco Cable Color Code	
						Tip	**Ring**
J7	J11	13	1	B1	1	White	Blue
		13	2		2	White	Orange
		13	3		3	White	Green
		13	4		4	White	Brown
		14	1		5	White	Slate
		14	2		6	Red	Blue
		14	3		7	Red	Orange
		14	4		8	Red	Green
		15	1		9	Red	Brown
		15	2		10	Red	Slate
		15	3		11	Black	Blue
		15	4		12	Black	Orange
		16	1		13	Black	Green
		16	2		14	Black	Brown
		16	3		15	Black	Slate
		16	4		16	Yellow	Blue
		17	1		17	Yellow	Orange
		17	2		18	Yellow	Green
		17	3		19	Yellow	Brown
		17	4		20	Yellow	Slate
		18	1		21	Violet	Blue
		18	2		22	Violet	Orange
		18	3		23	Violet	Green
↓	↓	18	4	↓	24	Violet	Brown
-		-	-	-	25	Violet	Slate

Figure 100: LPFS Connector J7 and J11
Quad LPF Cable/Pair Assignments

LPFS MDF to Subscriber Connector #	LPFS MDF to C.O. Switch Connector #	LPF Card Slot	LPF Port	Cable	Pair	25 Pair Telco Cable Color Code	
						Tip	Ring
J8	J12	19	1	B2	1	White	Blue
		19	2		2	White	Orange
		19	3		3	White	Green
		19	4		4	White	Brown
		20	1		5	White	Slate
		20	2		6	Red	Blue
		20	3		7	Red	Orange
		20	4		8	Red	Green
		21	1		9	Red	Brown
		21	2		10	Red	Slate
		21	3		11	Black	Blue
		21	4		12	Black	Orange
		22	1		13	Black	Green
		22	2		14	Black	Brown
		22	3		15	Black	Slate
		22	4		16	Yellow	Blue
		23	1		17	Yellow	Orange
		23	2		18	Yellow	Green
		23	3		19	Yellow	Brown
		23	4		20	Yellow	Slate
		24	1		21	Violet	Blue
		24	2		22	Violet	Orange
		24	3		23	Violet	Green
▼	▼	24	4	▼	24	Violet	Brown
-		-	-	-	25	Violet	Slate

Figure 101: LPFS Connector J8 and J12
Quad LPF Cable/Pair Assignments

Verify Continuity of Cable Pairs	Cable pairs from the LPFS and terminated at the MDF should be tested for continuity. Complimentary Analysis Module (CAM) and Pair Analysis Module (PAM) cards are available to complete this testing. These cards are used to test Dual ADSL and Quad ADSL line card cable pairs.

Required Equipment and Tools	To begin this task you must have the following equipment and tools:

- Electrostatic Discharge (ESD) Strap
- CAM card (DLCC Part Number: 60-0039-800)
- PAM card (DLCC Part Number: 60-0038-800) with eight AA Batteries
- Extra AA Batteries
- Tone Transmitter and Detector
- A second person to isolate tip and ring wires at the MDF

CAM Card	The CAM card plugs into the LPFS backplane just like an LPF card and provides the <u>pathway</u> to do the continuity testing from the LCS to the Main Distribution Frame (MDF) and from the Switch to the MDF.

PAM Card	The PAM card plugs into the LCS backplane just like a line card and is used to test continuity of Cable/Pair (tip/ring) from the LCS to the MDF. The PAM card is powered by AA batteries or -48V central office battery. The Speedlink does not have to be powered up to use the PAM card.
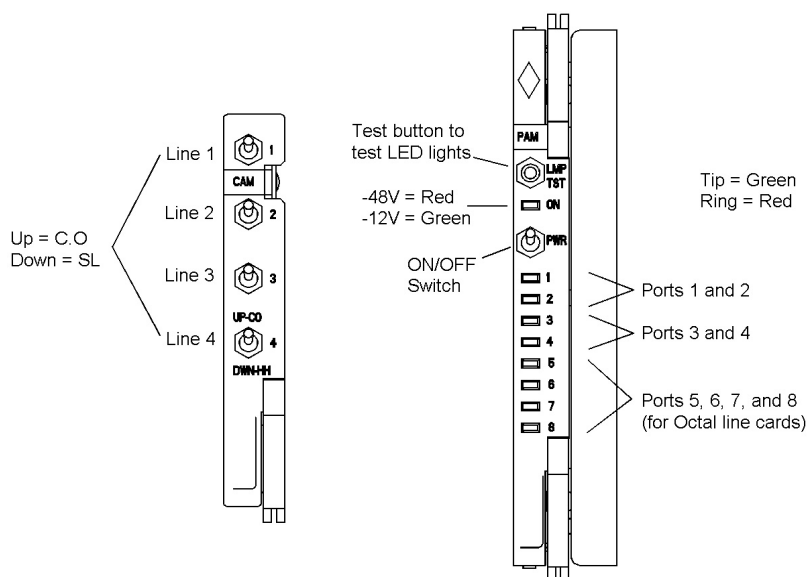
Figure 102: CAM and PAM Cards

Verify Continuity of Cable Pairs— LCS to MDF

Follow these steps to verify continuity of all cable pairs from the Line Card Shelf to the MDF.

Table 26: Verify Continuity of Cable Pairs—LCS to MDF
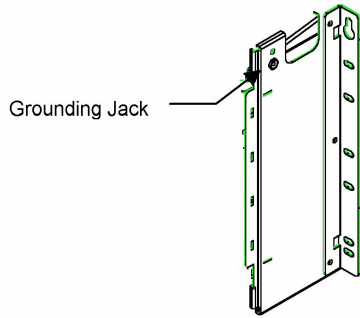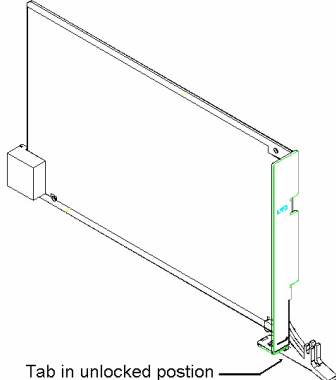
STEP	PROCEDURE
1	Unlatch and remove the LPFS front panel to access the card bay.
2	WEAR AN ELECTROSTATIC DISCHARGE (ESD) STRAP <u>AT ALL TIMES</u> during card installation to prevent possible damage to the cards. Plug the discharge strap wire into the grounding jack before handling cards. A grounding jack is located on the side of the <u>Line Card Shelf</u> assembly. Grounding Jack Figure 103: Grounding Jack Location—Side View of LCS Assembly
3	Unlock the locking tab on the CAM card by flipping the tab (located on the lower edge of the card) to the unlocked position. Tab in unlocked postion Figure 104: CAM Card with Locking Tab in the Unlocked Position

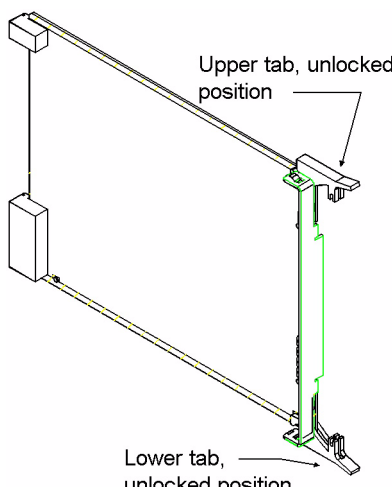**Table 26: Verify Continuity of Cable Pairs—LCS to MDF (continued)**
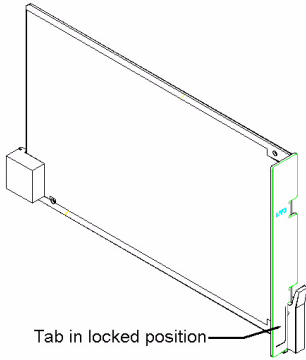
STEP	PROCEDURE
4	The LPFS card bay is designed with 24 card guides, bottom and top, to properly align cards into position on the backplane. The LPFS holds a total of twenty-four LPF cards. Figure 105: LPFS Card Positions 1 - 24 Slide the CAM card into LPF Card Slot #1 until it plugs into the backplane connector. **CAUTION:** DO NOT force the card into position. If the card does not plug in easily, slide the card back out and verify you are placing it in the correct position and that the guides are aligned. Check for any obstructions or bent pins on the connectors that might prevent the card from sliding easily into place.
5	Flip the locking tab into the locked position until you hear an audible "click." The "click" indicates the card is locked into position. Tab in locked position Figure 106: CAM Card with Locking Tab in Locked Position

Table 26: Verify Continuity of Cable Pairs—LCS to MDF (continued)

STEP	PROCEDURE
6	The CAM card is connected to Low Pass Filter Slot 1, Ports 1 and 2—if cabling was completed for Dual ADSL (2 subscriber lines per card). The CAM card is connected to Low Pass Filter Slot 1, Ports 1, 2, 3, and 4—if cabling was completed for Quad ADSL (4 subscriber lines per card). Flip Line 1, 2, 3, and 4 switches to the **DOWN** position to establish the <u>pathway</u> to test cable pair continuity from the LPFS—through the Line Card Shelf—to the MDF.
7	The PAM card must be placed in the same Line Card slot # as the CAM card to do the continuity testing. For example: The CAM card is in LPF slot #1, the PAM card needs to go in LCS slot #1. Unlatch and remove the LCS front panel to access the card bay.
8	Unlock the locking tabs on the PAM card by holding the tabs (located on the outside edge of the card) in their unlocked position. Figure 107: PAM Card with Locking Tab in the Unlocked Position

Table 26: Verify Continuity of Cable Pairs—LCS to MDF (continued)

STEP	PROCEDURE
9	The LCS card bay is designed with 26 card guides, bottom and top, to properly align cards into position on the backplane. The LCS holds a total of twenty-four line cards and one Line Card Shelf Multiplexer (LSM2) card, with one spare slot for future use.

Figure 108: Line Card Shelf Card Layout

Slide the PAM card into LCS Card Slot #1 until it plugs into the backplane connector.

CAUTION: DO NOT force the card into position. If the card does not plug in easily, slide the card back out and verify you are placing it in the correct position and that the guides are aligned. Check for any obstructions or bent pins on the connectors that might prevent the card from sliding easily into place.

Table 26: Verify Continuity of Cable Pairs—LCS to MDF (continued)
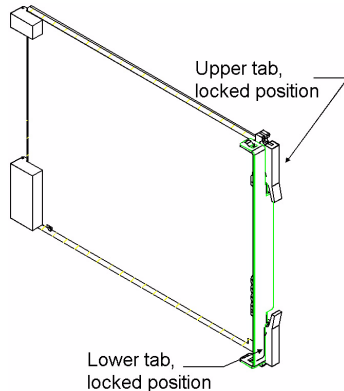
STEP	PROCEDURE
10	Flip the locking tabs down until you hear an audible "click." The "click" indicates the card is locked into position.

Figure 109: PAM Card with Locking Tab in Locked Position

| 11 | The PAM card is connected to Line Card Slot 1, Ports 1 and 2—if cabling was completed for Dual ADSL (2 subscriber lines per card). |

The PAM card is connected to Line Card Slot 1, Ports 1, 2, 3, and 4—if cabling was completed for Quad ADSL (4 subscriber lines per card):

LPFS Connector #	LPF Card Slot	LPF Port	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
								Tip	Ring
J1	1	1	J9	1	1	A1	1	White	Blue
▼	1	2	▼	1	2	▼	2	White	Orange

Figure 110: Dual ADSL Connectors, Card Slots, Ports, Cable and Pair

LPFS Connector #	LPF Card Slot	LPF Port	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
								Tip	Ring
J1	1	1	J9	1	1	A1	1	White	Blue
	1	2		1	2		2	White	Orange
	1	3		1	3		3	White	Green
▼	1	4	▼	1	4	▼	4	White	Brown

Figure 111: Quad ADSL Connectors, Card Slots, Ports, Cable and Pair

Dual ADSL Cable/Pair Assignment Tables are provided on pages 99 and 100.

Quad ADSL Cable/Pair Assignment Tables are provided on pages 101 through 104.

Table 26: Verify Continuity of Cable Pairs—LCS to MDF (continued)

STEP	PROCEDURE
12	Flip the PAM card power switch to the ON position. A <u>red</u> power LED light indicates the PAM card is operating off of -48V central office power. A <u>green</u> power LED light indicates the PAM card is operating off of -12V battery power. Depress the LED Test button to test the LED lights.
13	A second person is needed to locate and ground each cable/pair (tip/ring) at the MDF. Continuity for each line is indicated by the LEDs on the front of the PAM card: ■ **Test OK** - The Tip or Ring LED lights as the tip or ring is grounded at the MDF: **Tip = Green Ring = Red** ■ **Open** - the Tip or Ring LED does not light when grounded at the MDF. ■ **Short** - the Tip or Ring LED lights before it is grounded at the MDF. ■ **Cross** - The Tip LED lights when the Ring is grounded at the MDF and vice versa.
14	Complete continuity testing on Line Card Slot #1 cable pairs.
15	Unlock the CAM card by flipping up the locking tab in the unlocked position. Slide the CAM card out of LPF Card Slot #1.
16	Unlock the PAM card by flipping up the locking tabs in the unlocked position. Slide the PAM card out of Line Card Slot #1.
17	Repeat Steps 3 through 16 for each LPF Card and Line Card slot.
18	Replace and close LCS and LPFS front panels after completing continuity testing.
19	Are additional Line Card and Low Pass Filter Shelves installed? ■ If YES, continue repeating Steps 1 through 18 for each Line Card Shelf. ■ If NO, continue to the next procedure: Verify Continuity of Cable Pairs—Switch to MDF on page 129.

Verify Continuity of Cable Pairs— Switch to MDF

The CAM card can also provide the pathway to do continuity testing from the Switch to the Main Distribution Frame (MDF), the <u>PAM card is not used</u> for this procedure. The CAM card plugs into the LPFS backplane just like an LPF card and provides the <u>pathway</u> to do the continuity testing from the Switch to the MDF.

Follow these steps to verify continuity of all cable pairs from the Switch to the MDF.

Table 27: Verify Continuity of Cable Pairs—Switch to MDF
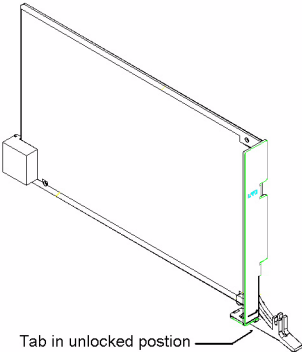
STEP	PROCEDURE
1	Unlock the locking tab on the CAM card by flipping the tab (located on the lower edge of the card) to the unlocked position. Tab in unlocked postion Figure 112: CAM Card with Locking Tab in the Unlocked Position

Table 27: Verify Continuity of Cable Pairs—Switch to MDF (continued)
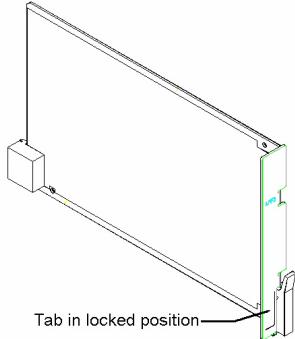
STEP	PROCEDURE
2	The LPFS card bay is designed with 24 card guides, bottom and top, to properly align cards into position on the backplane. The LPFS holds a total of twenty-four LPF cards. Figure 113: LPFS Card Positions 1 - 24 Slide the CAM card into LPF Card Slot #1 until it plugs into the backplane connector. **CAUTION:** DO NOT force the card into position. If the card does not plug in easily, slide the card back out and verify you are placing it in the correct position and that the guides are aligned. Check for any obstructions or bent pins on the connectors that might prevent the card from sliding easily into place.
3	Flip the locking tab into the locked position until you hear an audible "click." The "click" indicates the card is locked into position. Tab in locked position Figure 114: CAM Card with Locking Tab in Locked Position

Table 27: Verify Continuity of Cable Pairs—Switch to MDF (continued)

STEP	PROCEDURE
4	The CAM card is connected to Low Pass Filter Slot 1, Ports 1 and 2—if cabling was completed for Dual ADSL (2 subscriber lines per card). The CAM card is connected to Low Pass Filter Slot 2, Ports 1, 2, 3, and 4—if cabling was completed for Quad ADSL (4 subscriber lines per card). (see table below) Flip Line 1, 2, 3, and 4 switches in the **UP** position to establish the <u>pathway</u> to test cable pair continuity from the Switch—through the LPFS—to the MDF. Dual ADSL Cable/Pair Assignment Tables are provided on pages 116 and 117. Quad ADSL Cable/Pair Assignment Tables are provided on pages 118 through 121.
5	Use a Tone Transmitter and Detector to insert tone on each cable pair per local procedures. A second person is needed at the MDF to receive tone.
6	Unlock the locking tab on the CAM card and slide the CAM card out of LPF Slot #1.
7	Repeat Steps 1 through 6 for each LPF Slot 2 through 24.

Figure 115 table:

LPFS MDF to C.O. Switch Connector #	LPF Card Slot	LPF Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	Ring
J9	1	1	A1	1	White	Blue
▼	1	2	▼	2	White	Orange

Figure 115: Dual ADSL Connectors, Card Slots, Ports, Cable and Pair

Figure 116 table:

LPFS MDF to C.O. Switch Connector #	LPF Card Slot	LPF Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	Ring
J9	1	1	A1	1	White	Blue
	1	2		2	White	Orange
	1	3		3	White	Green
▼	1	4	▼	4	White	Brown

Figure 116: Quad ADSL Connectors, Card Slots, Ports, Cable and Pair

Table 27: Verify Continuity of Cable Pairs—Switch to MDF (continued)

STEP	PROCEDURE
8	Replace and close LPFS front panels after completing continuity testing.
9	Are additional Low Pass Filters Shelves installed? ■ If YES, repeat Steps 1 through 8 for each Low Pass Filter Shelf. ■ If NO, the Verify Continuity of Cable Pairs—Switch to MDF procedure is complete.

SECTION 4   TELCO CABLING

Chapter 12   Line Card Shelf to MDF Cabling—SDSL and IDSL Line Cards (Data Only)

Introduction   This procedure provides detailed instructions on how to complete Line Card Shelf to MDF cabling for Octal SDSL and IDSL Line Cards.

SDSL and IDSL support <u>data service only</u>. The connection between the local exchange network and the Speedlink is made at the Line Card Shelf (LCS). Each Line Card Shelf is designed for connection to a maximum of 192 cable/pairs at the Main Distribution Frame (MDF).

Line card types can be mixed on a Line Card Shelf. LCS cabling is modular and connectorized; line card types can be re-cabled for a different application, if required. The service capacity is 48 lines per shelf with Dual line cards, 96 lines per shelf with Quad line cards, and 192 lines per shelf with Octal line cards. Release 3.0 supports Dual CAP ADSL, Quad ADSL (CAP and DMT), and Octal SDSL and IDSL line cards.

This chapter provides detailed instructions on how to connect 25 pair cable stubs to the LCS backplane for an Octal SDSL or IDSL <u>data service only</u> configuration. For other cabling instructions:

- Dual and Quad (CAP and DMT) ADSL <u>data service only</u> configuration instructions, see Chapter 9, "Line Card Shelf to MDF Cabling—ADSL Line Cards (Data Only)", beginning on page 67.

- Dual and Quad (CAP and DMT) ADSL <u>data plus voice</u> configuration instructions, see Chapter 10, "Low Pass Filter Shelf Cabling—ADSL Line Cards (Data Plus Voice)", beginning on page 89.

Required Tools and Equipment

To begin this task you must have the following equipment and tools:

- Eight - 25 pair cable stub(s) with a 50 pin Amp Champ IDC male connector at one end and a vinyl rubber grommet (DLCC Part Number: 40-0015)
- Eight - 50 pin Amp Champ IDC female connectors
- 25 pair cable (24 AWG).
- A small flat-blade screwdriver.

Round cable to flat "laminated" cable stub(s) are shipped with the Speedlink system. Cable stub(s) are equipped with a 50 position female IDC connector on the flat end and a 50 position Amp Champ[1] male connector on the round cable end.

25 Pair Cable Stubs

Line Card Shelf (LCS) cabling is fully connectorized; 25 pair cable stub(s) are shipped with the Speedlink system. The flat ribbon end of the 25 pair cable stub is connected to the LCS backplane. The round end of the cable stub connects to the 25 pair cable which is connected to subscriber lines at the Main Distribution Frame (MDF).

LCS line cards are organized into groups of six channel slots, called "six packs." On an LCS with octal line cards, each 25 pair cable stub connects to a maximum of 4 ports on a maximum of 6 line cards. For example: a Speedlink system with one LCS and 24 Octal SDSL or IDSL line cards requires eight LCS to MDF cable stubs—one cable stub for ports 1-4 and one cable stub for ports 5-8, for each group of six line cards.

LCS with Mixed Line Card Types

Release 3.0 supports 5 different line card types:

- CAP2 (Dual ADSL)
- CAP4 (Quad ADSL)
- DMT4 (Quad ADSL)
- SDSL8 (Octal SDSL)
- IDSL8 (Octal IDSL)

Line Card Shelf cabling must match the requirements of the line card layout.

CAP4 and DMT4 cards can be supported on the same Line Card Shelf with SDSL8 and IDSL8 line cards, when each card type is placed within its own six pack (i.e., all CAP4 cards in one six pack, all IDSL8 cards in one six pack, etc.). These cards all operate on an LCS backplane provisioned at 25 MHz.

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[1] Cable stubs with 710 or MS2 connectors are available based on requirements of the network service provider.
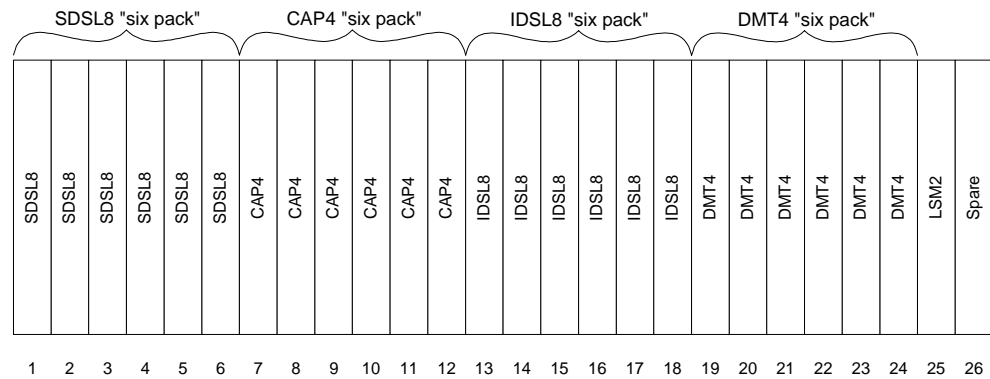
Figure 117: Line Card Shelf with SDSL8, CAP4, IDSL8, and DMT4 Line Cards

The portion of the LCS backplane supporting CAP2 cards must be provisioned at 12.5 MHz. CAP2 cards can be supported on the same Line Card Shelf with CAP4, DMT4, SDSL8, and IDSL8 cards, in one of the following configurations:

- all CAP2 cards in slots 1-12 (at 12.5 MHz), and 6-pack combinations of CAP4, DMT4, SDSL8, and IDSL8 cards in slots 13-24 (at 25 MHz), OR

- 6-pack combinations of CAP4, DMT4, SDSL8, and IDSL8 cards in slots 1-12 (at 25 MHz), and all CAP2 cards in slots 13-24 (at 12.5 MHz)
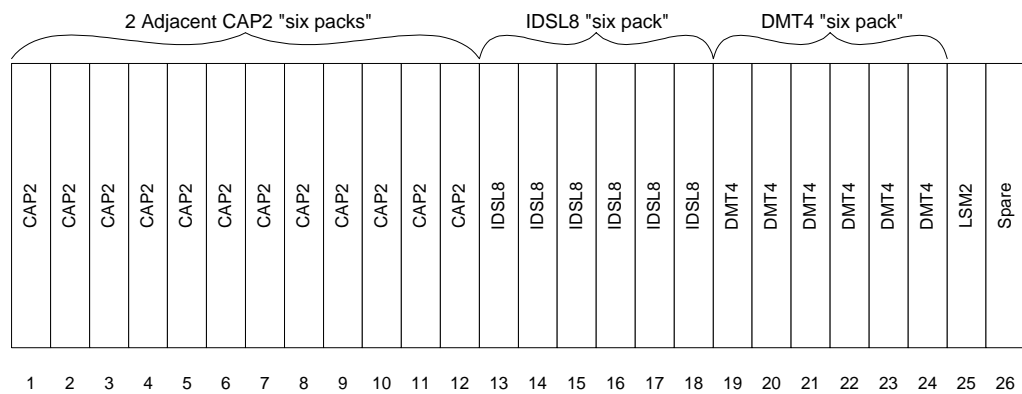
Figure 118: Line Card Shelf with CAP2, IDSL8, and DMT4 Line Cards

**25 Pair Stub
Connection at
the LCS**

Follow these steps to connect 25 pair cable stubs to the LCS backplane for Octal
SDSL/IDSL Line Cards:

Table 28: 25 Pair Stub Connection at the LCS

STEP	PROCEDURE
1	Is the Line Card Shelf back panel in the closed position? ■ If YES, proceed to STEP 2. ■ If NO, skip to STEP 4.
2	Unlatch and lower the <u>back</u> panel on the <u>first</u> LCS to access the LCS backplane. The latches are located at the top of the back panel. Slide both latches toward the center to release and lower the panel.
3	Remove the LCS back panel during cabling procedures. Hold the panel on both sides and slide it to the left about ¼ inch. Pull the panel towards you and release it from the holding clips. **IMPORTANT:** The back panel must be replaced and closed after all Installation procedures are completed to keep cables securely in place.
4	Connect the first 25 pair cable stub[a] to connector J9—this connects to line card slots 1-6, line card ports 1 through 4. Refer to the Octal SDSL/IDSL Cable/Pair Assignment Tables on pages 142 through 149. Octal SDSL/IDSL (ports 5 through 8) 25 cable/pair connectors J2–J5. Octal SDSL/IDSL (ports 1 through 4) 25 cable/pair connectors J6–J9. Input Power Connector J1 J3 J5 J7 J9 J2 J4 J6 J8 J10 (Remote Line Card Shelf alarm connector) Figure 119: Back View of LCS Backplane
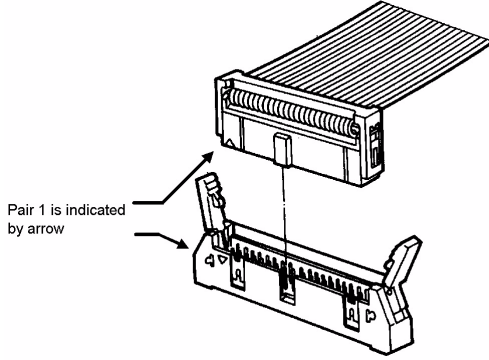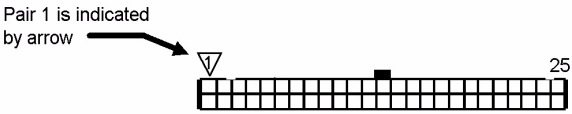
Chapter 12   Line Card Shelf to MDF Cabling—SDSL and IDSL Line Cards (Data Only)
Release 3.0   10/28/98
25 Pair Stub Connection at the LCS

Table 28: 25 Pair Stub Connection at the LCS (continued)

STEP	PROCEDURE
5	Backplane connectors have latches on both sides. These latches snap down on the cable stub ribbon connector and lock in place. Pair 1 is indicated by arrow Figure 120: Ribbon Connectors (Backplane and 25 Pair Cable Stub Pair 1 is indicated by arrow 25 Figure 121: Connector Pins 1 through 25

Table 28: 25 Pair Stub Connection at the LCS (continued)
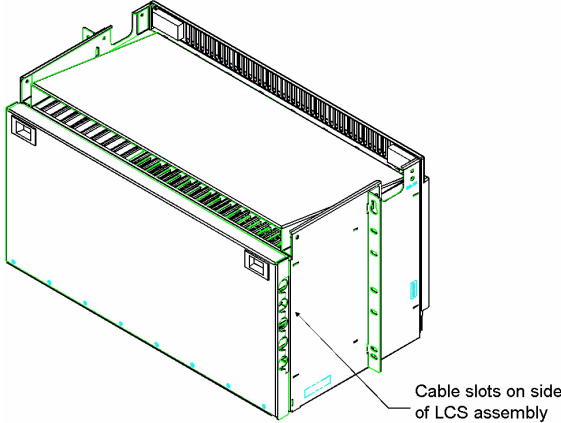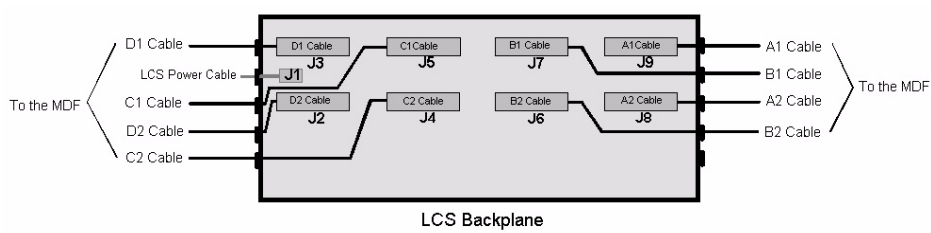
STEP	PROCEDURE
6	The LCS assembly has 5 cable slots on both the left and right sides. Bring the 25 pair cable stub connected to the <u>J9</u> connector through the <u>top</u> cable slot on the <u>right</u> side of the LCS assembly. Refer to the Octal SDSL/IDSL Line Card—LCS to MDF Cabling Diagram on page 140. Cable slots on side of LCS assembly Figure 122: Line Card Shelf Assembly—Back View, Panel Closed
7	There is a rubber vinyl grommet pre-installed on the 25 pair cable stub. Position the grommet on the cable stub so it fits over the edge of the slot on the LCS assembly. Push the grommet into the slot as far as you can so it doesn't interfere with the back cover. The grommet helps hold the cable in position and also protects it from the metal edge.

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25 Pair Stub Connection at the LCS

Table 28: 25 Pair Stub Connection at the LCS (continued)

STEP	PROCEDURE
8	Repeat steps 4 through 6 for all the 25 pair cable stubs shipped with the Line Card Shelf assembly. Refer to the Octal SDSL/IDSL—LCS to MDF Cabling Diagram on page 140 and the Cable/Pair Assignment Tables on pages 142 through 149:

- Connect the <u>second 25 pair cable stub</u>[b] to connector <u>J5</u>—this connects to line card slots <u>1–6</u>, line card ports <u>5 through 8</u>. Bring the 25 pair cable stub connected to the J5 connector through the <u>third</u> cable slot (from the top) on the <u>left</u> side of the LCS assembly.

- Connect the <u>third 25 pair cable stub</u> to connector <u>J8</u>—this connects to line card slots <u>7–12</u>, line card ports <u>1 through 4</u>. Bring the 25 pair cable stub connected to the J8 connector through the <u>third</u> cable slot (from the top) on the <u>right</u> side of the LCS assembly.

- Connect the <u>fourth 25 pair cable stub</u> to connector <u>J4</u>—this connects to line card slots <u>7–12</u>, line card ports <u>5 through 8</u>. Bring the 25 pair cable stub connected to the J4 connector through the <u>fifth</u> cable slot (from the top) on the <u>left</u> side of the LCS assembly.

- Connect the <u>fifth 25 pair cable stub</u> to connector <u>J7</u>—this connects to line card slots <u>13–18</u>, line card ports <u>1 through 4</u>. Bring the 25 pair cable stub connected to the J7 connector through the <u>second</u> cable slot (from the top) on the <u>right</u> side of the LCS assembly.

- Connect the <u>sixth 25 pair cable stub</u> to connector <u>J3</u>—this connects to line card slots <u>13–18</u>, line card ports <u>5 through 8</u>. Bring the 25 pair cable stub connected to the J3 connector through the <u>first</u> cable slot (from the top) on the <u>left</u> side of the LCS assembly.

- Connect the <u>seventh 25 pair cable stub</u> to connector <u>J6</u>—this connects to line card slots <u>19–24</u>, line card ports <u>1 through 4</u>. Bring the 25 pair cable stub connected to the J6 connector through the <u>fourth</u> cable slot (from the top) on the <u>right</u> side of the LCS assembly.

- Connect the <u>eighth 25 pair cable stub</u> to connector <u>J2</u>— this connects to line card slots <u>19–24</u>, line card ports <u>5 through 8</u>. Bring the 25 pair cable stub connected to the J2 connector through the <u>fourth</u> cable slot (from the top) on the <u>left</u> side of the LCS assembly.

Table 28: 25 Pair Stub Connection at the LCS (continued)

STEP	PROCEDURE
9	Position grommets on all cable stubs to fit over the edges of the slots on the LCS assembly. Push the grommets into the slots as far as you can so they don't interfere with the back cover. Figure 123: Octal SDSL/IDSL—LCS to MDF Cabling Diagram
10	Replace the LCS back panel. Hold the panel on both sides so it is level with the bottom of the card cage. Insert the hinged portion of the panel between the tabs on the card cage and slide the panel straight in and then to the right about ¼ inch to lock in place.
11	Lift the LCS back panel up into position. Slide both latches towards the center and release to lock in place.
12	The Speedlink system is designed for a maximum of twelve Line Card Shelves. Repeat steps 1 through 11 for all LCSs supporting Octal SDSL/IDSL line cards.
13	Continue to the next procedure: Octal SDSL/IDSL—25 Pair Cable MDF to LCS.

ᵃ LCS to MDF cable stubs are equipped with right and left angle connectors.

ᵇ See previous footnote.

25 Pair Cable MDF to LCS

25 pair cables[2] are tied down and run from the central office Main Distribution Frame (MDF) across the horizontal cable racks to the Speedlink. This work may be done by the network service provider or the Speedlink technician. These 25 pair cable(s) are connected to the 25 pair cable stub(s) installed at the Line Card Shelf.

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[2] The network service provider may choose to run 100 pair cables from the MDF to the Speedlink. These 100 pair cables require four - 25 pair Amp Champ IDC male connectors to connect to the 25 pair cable stubs.

Follow these steps to connect 25 Pair Cables from the MDF to the LCS Cable Stubs.

Table 29: 25 Pair Cable MDF to LCS

STEP	PROCEDURE
1	Route the 25 pair cable(s) from the MDF down from the horizontal cable rack and along the relay rack rails, following local procedures.
2	Verify continuity of each 25 pair MDF cable, following local procedures.
3	Terminate the 25 pair cable on an Amp Champ[a] IDC female connector.
4	Connect the 25 pair cable, identified as the A1 cable, to the J9 LCS cable stub. Refer to the Cable/Pair Assignment Tables on pages 142 through 149.
5	Tighten the two screws on the male Amp Champ connector to secure.
6	Repeat steps 2 through 5 for each 25 pair cable (refer to the Cable/Pair Assignment Tables on pages 142 through 149): ■ Connect the <u>C1</u> cable to the <u>J5</u> LCS cable stub. ■ Connect the <u>A2</u> cable to the <u>J8</u> LCS cable stub. ■ Connect the <u>C2</u> cable to the <u>J4</u> LCS cable stub. ■ Connect the <u>B1</u> cable to the <u>J7</u> LCS cable stub. ■ Connect the <u>D1</u> cable to the <u>J3</u> LCS cable stub. ■ Connect the <u>B2</u> cable to the <u>J6</u> LCS cable stub. ■ Connect the <u>D2</u> cable to the <u>J2</u> LCS cable stub.
7	The Speedlink system is designed for a maximum of twelve Line Card Shelves. Repeat the entire LCS to MDF cabling procedure for all LCSs engineered for Octal SDSL/IDSL line cards.
8	Continue to the next procedure: Verify Continuity of Cable Pairs on page 150.

[a] 710, or MS2 connectors may be used if the network service provider requested cable stubs with these connectors.

Octal SDSL/IDSL Cable/Pair Assignments

The following tables show the cable/pair assignments for one Line Card Shelf with <u>Octal SDSL or IDSL line cards</u>, eight subscriber lines per line card. LCS line cards are organized into groups of six channel slots. Each table represents cable/pair assignments for one LCS backplane connector (J2 - J9), or a 6-slot line card group:

- Figure 114 and 115   Connectors J9 and J5 (line card slots 1 through 6)
- Figure 116 and 117   Connectors J8 and J4 (line card slots 7 through 12)
- Figure 118 and 119   Connectors J7 and J3 (line card slots 13 through 18)
- Figure 120 and 121   Connectors J6 and J2 (line card slots 19 through 24).

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	**Ring**
J9	1	1	A1	1	White	Blue
	1	2		2	White	Orange
	1	3		3	White	Green
	1	4		4	White	Brown
	2	1		5	White	Slate
	2	2		6	Red	Blue
	2	3		7	Red	Orange
	2	4		8	Red	Green
	3	1		9	Red	Brown
	3	2		10	Red	Slate
	3	3		11	Black	Blue
	3	4		12	Black	Orange
	4	1		13	Black	Green
	4	2		14	Black	Brown
	4	3		15	Black	Slate
	4	4		16	Yellow	Blue
	5	1		17	Yellow	Orange
	5	2		18	Yellow	Green
	5	3		19	Yellow	Brown
	5	4		20	Yellow	Slate
	6	1		21	Violet	Blue
	6	2		22	Violet	Orange
	6	3		23	Violet	Green
	6	4		24	Violet	Brown
-	-	-	-	25	Violet	Slate

Figure 124: Connector J9, Line Card Slots 1-6, Ports 1-4
Octal SDSL/IDSL Cable/Pair Assignments

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	Ring
J5	1	5	C1	1	White	Blue
	1	6		2	White	Orange
	1	7		3	White	Green
	1	8		4	White	Brown
	2	5		5	White	Slate
	2	6		6	Red	Blue
	2	7		7	Red	Orange
	2	8		8	Red	Green
	3	5		9	Red	Brown
	3	6		10	Red	Slate
	3	7		11	Black	Blue
	3	8		12	Black	Orange
	4	5		13	Black	Green
	4	6		14	Black	Brown
	4	7		15	Black	Slate
	4	8		16	Yellow	Blue
	5	5		17	Yellow	Orange
	5	6		18	Yellow	Green
	5	7		19	Yellow	Brown
	5	8		20	Yellow	Slate
	6	5		21	Violet	Blue
	6	6		22	Violet	Orange
	6	7		23	Violet	Green
▼	6	8	▼	24	Violet	Brown
-	-	-	-	25	Violet	Slate

Figure 125: Connector J5, Line Card Slots 1-6, Ports 5-8
Octal SDSL/IDSL Cable/Pair Assignments

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Section 4   **Telco Cabling**
                 Octal SDSL/IDSL Cable/Pair Assignments

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	Ring
J8	7	1	A2	1	White	Blue
	7	2		2	White	Orange
	7	3		3	White	Green
	7	4		4	White	Brown
	8	1		5	White	Slate
	8	2		6	Red	Blue
	8	3		7	Red	Orange
	8	4		8	Red	Green
	9	1		9	Red	Brown
	9	2		10	Red	Slate
	9	3		11	Black	Blue
	9	4		12	Black	Orange
	10	1		13	Black	Green
	10	2		14	Black	Brown
	10	3		15	Black	Slate
	10	4		16	Yellow	Blue
	11	1		17	Yellow	Orange
	11	2		18	Yellow	Green
	11	3		19	Yellow	Brown
	11	4		20	Yellow	Slate
	12	1		21	Violet	Blue
	12	2		22	Violet	Orange
	12	3		23	Violet	Green
▼	12	4	▼	24	Violet	Brown
-	-	-	-	25	Violet	Slate

Figure 126: Connector J8, Line Card Slots 7-12, Ports 1-4
Octal SDSL/IDSL Cable/Pair Assignments

Diamond Lane Communications Corporation Proprietary Data

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	**Ring**
J4	7	5	C2	1	White	Blue
	7	6		2	White	Orange
	7	7		3	White	Green
	7	8		4	White	Brown
	8	5		5	White	Slate
	8	6		6	Red	Blue
	8	7		7	Red	Orange
	8	8		8	Red	Green
	9	5		9	Red	Brown
	9	6		10	Red	Slate
	9	7		11	Black	Blue
	9	8		12	Black	Orange
	10	5		13	Black	Green
	10	6		14	Black	Brown
	10	7		15	Black	Slate
	10	8		16	Yellow	Blue
	11	5		17	Yellow	Orange
	11	6		18	Yellow	Green
	11	7		19	Yellow	Brown
	11	8		20	Yellow	Slate
	12	5		21	Violet	Blue
	12	6		22	Violet	Orange
	12	7		23	Violet	Green
▼	12	8	▼	24	Violet	Brown
-	-	-	-	25	Violet	Slate

Figure 127: Connector J4, Line Card Slots 7-12, Ports 5-8
Octal SDSL/IDSL Cable/Pair Assignments

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Section 4   **Telco Cabling**
                Octal SDSL/IDSL Cable/Pair Assignments

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	**Ring**
J7	13	1	B1	1	White	Blue
│	13	2	│	2	White	Orange
	13	3		3	White	Green
	13	4		4	White	Brown
	14	1		5	White	Slate
	14	2		6	Red	Blue
	14	3		7	Red	Orange
	14	4		8	Red	Green
	15	1		9	Red	Brown
	15	2		10	Red	Slate
	15	3		11	Black	Blue
	15	4		12	Black	Orange
	16	1		13	Black	Green
	16	2		14	Black	Brown
	16	3		15	Black	Slate
	16	4		16	Yellow	Blue
	17	1		17	Yellow	Orange
	17	2		18	Yellow	Green
	17	3		19	Yellow	Brown
	17	4		20	Yellow	Slate
	18	1		21	Violet	Blue
	18	2		22	Violet	Orange
	18	3		23	Violet	Green
▼	18	4	▼	24	Violet	Brown
-	-	-	-	25	Violet	Slate

Figure 128: Connector J7, Line Card Slots 13-18, Ports 1-4
Octal SDSL/IDSL Cable/Pair Assignments

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	**Ring**
J3	13	5	D1	1	White	Blue
	13	6		2	White	Orange
	13	7		3	White	Green
	13	8		4	White	Brown
	14	5		5	White	Slate
	14	6		6	Red	Blue
	14	7		7	Red	Orange
	14	8		8	Red	Green
	15	5		9	Red	Brown
	15	6		10	Red	Slate
	15	7		11	Black	Blue
	15	8		12	Black	Orange
	16	5		13	Black	Green
	16	6		14	Black	Brown
	16	7		15	Black	Slate
	16	8		16	Yellow	Blue
	17	5		17	Yellow	Orange
	17	6		18	Yellow	Green
	17	7		19	Yellow	Brown
	17	8		20	Yellow	Slate
	18	5		21	Violet	Blue
	18	6		22	Violet	Orange
	18	7		23	Violet	Green
▼	18	8	▼	24	Violet	Brown
-	-	-	-	25	Violet	Slate

Figure 129: Connector J3, Line Card Slots 13-18, Ports 5-8
Octal SDSL/IDSL Cable/Pair Assignments

VOLUME 2   **INSTALLATION**
Section 4   **Telco Cabling**
        Octal SDSL/IDSL Cable/Pair Assignments

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	**Ring**
J6	19	1	B2	1	White	Blue
	19	2		2	White	Orange
	19	3		3	White	Green
	19	4		4	White	Brown
	20	1		5	White	Slate
	20	2		6	Red	Blue
	20	3		7	Red	Orange
	20	4		8	Red	Green
	21	1		9	Red	Brown
	21	2		10	Red	Slate
	21	3		11	Black	Blue
	21	4		12	Black	Orange
	22	1		13	Black	Green
	22	2		14	Black	Brown
	22	3		15	Black	Slate
	22	4		16	Yellow	Blue
	23	1		17	Yellow	Orange
	23	2		18	Yellow	Green
	23	3		19	Yellow	Brown
	23	4		20	Yellow	Slate
	24	1		21	Violet	Blue
	24	2		22	Violet	Orange
	24	3		23	Violet	Green
▼	24	4	▼	24	Violet	Brown
-	-	-	-	25	Violet	Slate

Figure 130: Connector J6, Line Card Slots 19-24, Ports 1-4
Octal SDSL/IDSL Cable/Pair Assignments

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	Ring
J2	19	5	D2	1	White	Blue
	19	6		2	White	Orange
	19	7		3	White	Green
	19	8		4	White	Brown
	20	5		5	White	Slate
	20	6		6	Red	Blue
	20	7		7	Red	Orange
	20	8		8	Red	Green
	21	5		9	Red	Brown
	21	6		10	Red	Slate
	21	7		11	Black	Blue
	21	8		12	Black	Orange
	22	5		13	Black	Green
	22	6		14	Black	Brown
	22	7		15	Black	Slate
	22	8		16	Yellow	Blue
	23	5		17	Yellow	Orange
	23	6		18	Yellow	Green
	23	7		19	Yellow	Brown
	23	8		20	Yellow	Slate
	24	5		21	Violet	Blue
	24	6		22	Violet	Orange
	24	7		23	Violet	Green
▼	24	8	▼	24	Violet	Brown
-	-	-	-	25	Violet	Slate

Figure 131: Connector J2, Line Card Slots 19-24, Ports 5-8
Octal SDSL/IDSL Cable/Pair Assignments

Verify Continuity of Cable Pairs

All cable pairs terminated at the MDF should be tested for continuity. A Pair Analysis Module (PAM) Card is available to complete this testing. It can be used to test Dual ADSL, Quad ADSL, and Octal SDSL/IDSL line card cable pairs.

Required Equipment and Tools

To begin this task you must have the following equipment and tools:

- PAM card (DLCC Part Number: 60-0038-800) with eight AA Batteries.
- Extra AA Batteries.
- A second person to isolate tip and ring wires at the MDF.

PAM Card

The PAM Card plugs into the LCS backplane just like a line card and is used to test continuity of cable/pairs (tip/ring). The PAM Card is powered by AA batteries or -48V central office battery. The Speedlink does not have to be powered up to use the PAM Card.
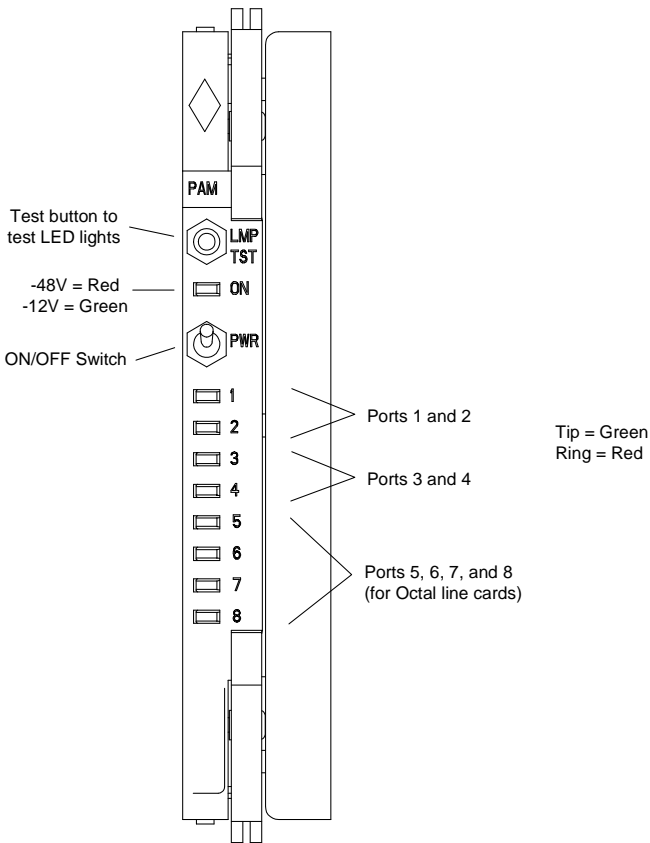
Figure 132: PAM Card Face

Verify Continuity of Cable Pairs   Follow these steps to verify continuity of all cable pairs terminated on the MDF.

Table 30: Verify Continuity of Cable Pairs
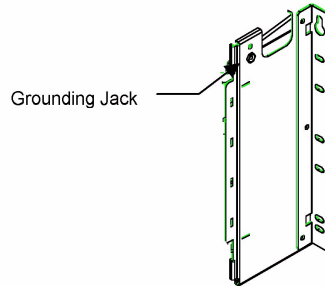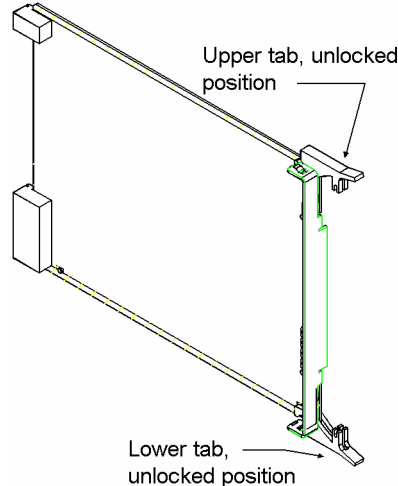
STEP	PROCEDURE
1	Unlatch and lower the front panel, to access the LCS card bay.
2	WEAR AN ELECTROSTATIC DISCHARGE (ESD) STRAP <u>AT ALL TIMES</u> during card installation to prevent possible damage to the cards. Plug the discharge strap wire into the grounding jack before handling cards. The grounding jack is located on the side of the Line Card Shelf assembly. Grounding Jack Figure 133: Grounding Jack Location—Side View of LCS Assembly
3	Unlock the locking tabs on the PAM Card by holding the tabs (located on the outside edge of the card) in their unlocked position. Upper tab, unlocked position Lower tab, unlocked position Figure 134: PAM Card with Locking Tabs in the Unlocked Position

Table 30: Verify Continuity of Cable Pairs (continued)
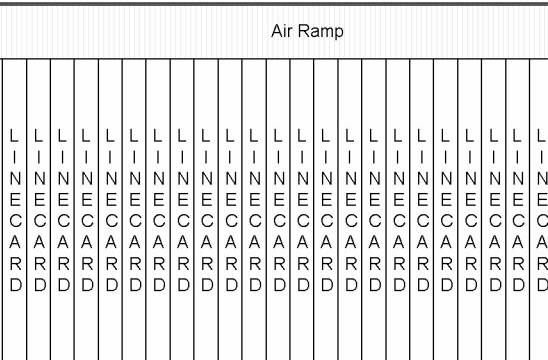
STEP	PROCEDURE
4	The LCS card bay is designed with 26 card guides, bottom and top, to properly align cards into position on the backplane. The LCS holds a total of twenty-four line cards and one Line Card Multiplex (LSM2) card, with one spare slot for future use.

Figure 135: Line Card Positions 1-26

Slide the PAM Card into Line Card Slot #1 until it plugs into the backplane connector. Each card is "keyed" so it will only plug into its correct position on the backplane.

CAUTION: DO NOT force the card into position. If the card does not plug in easily, slide the card back out and verify you are placing it in the correct position and that the guides are aligned. Check for any obstructions or bent pins on the connectors that might prevent the card from sliding easily into place.

Table 30: Verify Continuity of Cable Pairs (continued)
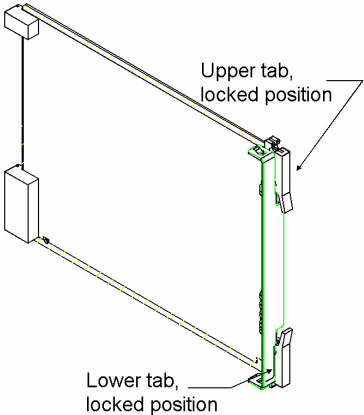
STEP	PROCEDURE
5	Flip the locking tabs down until you hear an audible "click." The "click" indicates the card is locked into position.

Figure 136: PAM Card with Locking Tabs in Locked Position

STEP	PROCEDURE
6	The PAM Card is now connected to Line Card Slot 1, Ports 1 - 8 (eight subscriber lines per card):

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
					Tip	Ring
J9	1	1	A1	1	White	Blue
↓	1	2	↓	2	White	Orange
	1	3		3	White	Green
↓	1	4	↓	4	White	Brown

Connector #	Line Card Slot	Line Card Port	Cable	Pair	25 Pair Telco Cable Color Code	
J5	1	5	C1	1	White	Blue
↓	1	6	↓	2	White	Orange
	1	7		3	White	Green
↓	1	8	↓	4	White	Brown

Figure 137: Octal SDSL/IDSL Connector, Line Card Slot, Port, Cable and Pair

STEP	PROCEDURE
7	Flip the PAM Card power switch to the ON position. A <u>red</u> power LED light indicates the PAM Card is operating off of -48V central office power. A <u>green</u> power LED light indicates the PAM Card is operating off of -12V battery power. Depress the LED Test button to test the LED lights.

Table 30: Verify Continuity of Cable Pairs (continued)
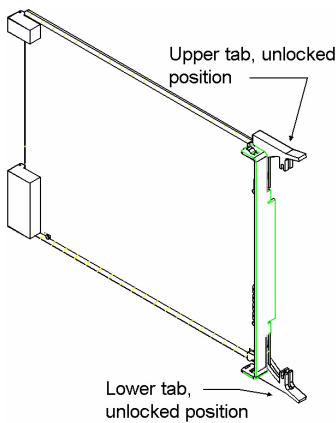
STEP	PROCEDURE
8	A second person is needed to locate and ground each cable/pair (tip and ring) at the MDF. Continuity is indicated by the LEDs on the front of the PAM Card: ■ **Test OK -** The Tip or Ring LED lights as the tip or ring is grounded at the MDF: **Tip = Green Ring = Red** ■ **Open** - The Tip or Ring LED does not light when grounded at the MDF. ■ **Short** - The Tip or Ring LED lights before it is grounded at the MDF. ■ **Cross** - The Tip LED lights when the Ring is grounded at the MDF and vice versa.
9	Complete PAM testing on all pairs for Line Card Slot #1.
10	Unlock the PAM Card by flipping up the locking tabs (located on the outside edge of the card) in their up or unlocked position. Slide the card out of Line Card Slot #1. Figure 138: PAM Card with Locking Tabs in the Unlocked Position
11	Repeat Steps 3 through 10 for each Line Card Slot 2 through 24.
12	Close the LCS front panel after you have completed PAM testing. Lift the LCS front panel up, slide both latches toward the center and release to lock in place.

Table 30: Verify Continuity of Cable Pairs (continued)

STEP	PROCEDURE
13	Are additional Line Card Shelves installed? ■ If YES, repeat Steps 1 through 12 for each Line Card Shelf. ■ If NO, the Line Card Shelf to MDF Cabling and Verify Continuity of Cable Pairs procedures are complete.

VOLUME 2   **INSTALLATION**
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                          Verify Continuity of Cable Pairs

SECTION 4   TELCO CABLING

Chapter 13   ADSL Link ID Cabling—ADSL Line Cards (Data Only)

Introduction   The Speedlink system can be configured three different ways based on the types of line cards installed and the needs of your network service provider. See Chapter 1, "Master Control Shelf Installation," page 1, for descriptions of each configuration.

This chapter provides detailed instructions on how to connect 25 pair cable stubs from the ADSL Link ID to the LCS backplane for Dual and Quad (CAP and DMT) ADSL data service only configurations. For other cabling instructions:

- Dual and Quad (CAP and DMT) ADSL data service only configuration instructions, see Chapter 9, "Line Card Shelf to MDF Cabling—ADSL Line Cards (Data Only)", beginning on page 67.

- Dual and Quad (CAP and DMT) ADSL data plus voice configuration instructions, see Chapter 10, "Low Pass Filter Shelf Cabling—ADSL Line Cards (Data Plus Voice)", beginning on page 89.

- Octal SDSL and IDSL data service only configuration instructions, see Chapter 11, "Line Card Shelf to MDF Cabling—SDSL and IDSL Line Cards (Data Only)", beginning on page 133.

Required Tools   To begin this task you must have the following equipment and tools:
and Equipment
- Four - 32 inch, 25 pair cables with flat "laminated" ends, 50 position female IDC connectors at both ends, and a vinyl rubber grommet, for each ADSL Link ID (DLCC Part Numbers: 40-0016-002)

- Four zip ties (optional)

- Wire Cutters (optional)

25 Pair Cable Stubs

ADSL Link ID to LCS cabling is fully connectorized. One end of the 25 pair cable is connected to the ADSL Link ID backplane, the other end connects to its corresponding connector on the Line Card Shelf backplane.

Each 25 pair cable connects one ADSL Link ID connector to six ADSL line cards on the LCS. For example: A system ordered with one LCS, one ADSL Link ID, and 24 ADSL line cards comes with a total of four ADSL Link ID to LCS cables—one cable for each group of six line cards.

Mixed Line Card Types

Each connector slot on the ADSL Link ID backplane operates with an LCS six-pack containing one of three different line card types[1]:

- CAP2 (Dual ADSL)
- CAP4 (Quad ADSL)
- DMT4 (Quad ADSL)

Cabling from the ADSL Link ID to the LCS is the same for all three line card types.

---

[1] The ADSL Link ID does not operate with Octal (SDSL8 or IDSL8) line cards.

25 Pair Stub Connection at the ADSL Link ID

Follow these steps to connect 25 pair cable stubs to the ADSL Link ID backplane:

Table 31: 25 Pair Stub Connection at the ADSL Link ID
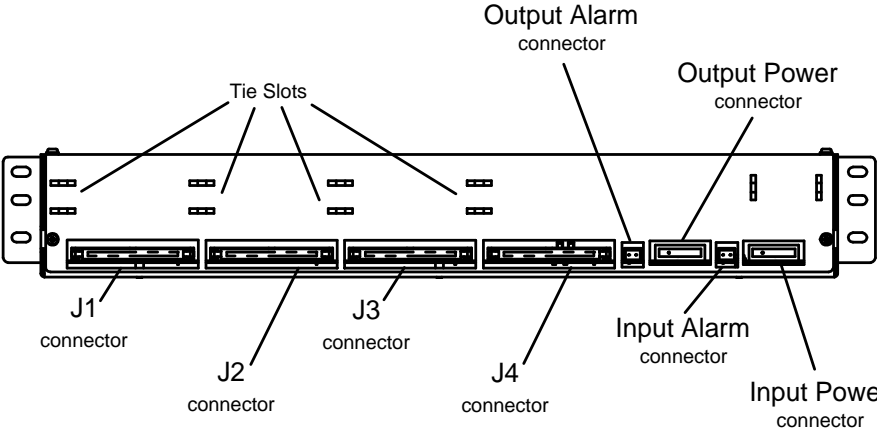
STEP	PROCEDURE
1	Connect the first 25 pair cable stub[a] to connector J1. **NOTE:** Be sure the cable is positioned so the small "key" on the top middle of each flat connector end is facing up, to match the key slot on the top of the ADSL Link ID connectors. Figure 139: Back View of ADSL Link ID Backplane

Table 31: 25 Pair Stub Connection at the ADSL Link ID (continued)

STEP	PROCEDURE
2	Backplane connectors have latches on both sides. These latches snap down on the cable stub ribbon connector and lock in place. Pair 1 is indicated by arrow **Figure 140: Ribbon Connectors (backplane and 25 pair cable stub)** Pair 1 is indicated by arrow 25 **Figure 141: Connector Pins 1 through 25**
3	The ADSL Link ID backplane has 4 pairs of tie slots to help hold the cables in position. Bring the 25 pair cable stub connected to the <u>J1</u> connector to the <u>first</u> pair of ties slots on the <u>left</u> side of the backplane.
4	Secure the cable by fastening a zip tie through on or both tie slots and around the cable. Trim the tie as necessary.
5	Repeat Steps 1 through 4 for all 25 pair cable stubs required: ■ Connect the <u>second</u> 25 pair cable stub to connector J2. Bring the cable to the <u>second</u> pair of ties slots on the <u>left</u> side of the backplane, and secure it with a zip tie. ■ Connect the <u>third</u> 25 pair cable stub to connector J3. Bring the cable to the <u>third</u> pair of ties slots on the <u>left</u> side of the backplane, and secure it with a zip tie. ■ Connect the <u>fourth</u> 25 pair cable stub to connector J4. Bring the cable to the <u>fourth</u> pair of ties slots on the <u>left</u> side of the backplane, and secure it with a zip tie.

Table 31: 25 Pair Stub Connection at the ADSL Link ID (continued)

STEP	PROCEDURE
6	Continue to the next procedure: 25 Pair Cable—ADSL Link ID to LCS.

[a] ADSL Link ID to LCS cable stubs are equipped with left angle connectors.

| 25 Pair Cable—
ADSL Link ID to
LCS | Follow these steps to connect 25 Pair cables from the ADSL Link ID backplane to the LCS backplane: |

Table 32:   25 Pair Cable—ADSL Link ID to LCS
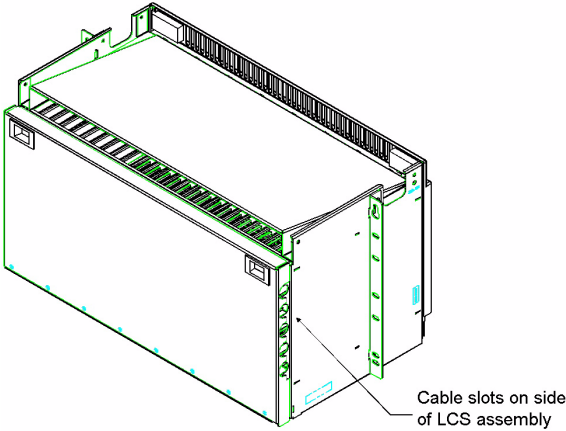
STEP	PROCEDURE
1	Is the Line Card Shelf back panel in the closed position? ■ If YES, proceed to STEP 2. ■ If NO, skip to STEP 4.
2	Unlatch and lower the back panel on the LCS to access the LCS backplane. The latches are located at the top of the back panel. Slide both latches toward the center to release and lower the panel.
3	Remove the LCS back panel during cabling procedures. Hold the panel on both sides and slide it to the left about ¼ inch. Pull the panel towards you and release it from the holding clips. **IMPORTANT:** The back panel must be replaced and closed after all Installation procedures are completed to keep cables securely in place.
4	The LCS assembly has 5 cable slots on the left and right sides. Bring the ADSL Link ID J1 connector cable through the <u>third</u> cable slot (from the top) on the <u>left</u> side of the LCS assembly. Refer to the LCS Cabling Diagram on page 163. Cable slots on side of LCS assembly Figure 142: Line Card Shelf Assembly—Back View, Panel Closed

Table 32:   25 Pair Cable—ADSL Link ID to LCS (continued)

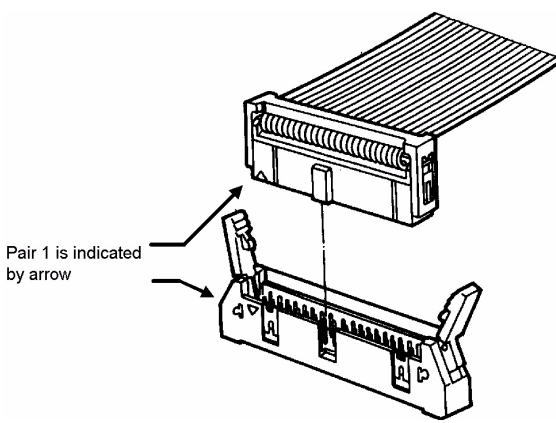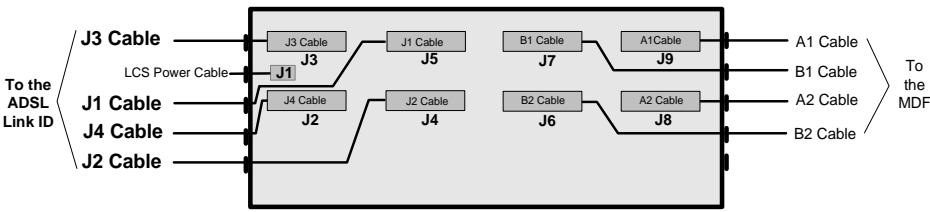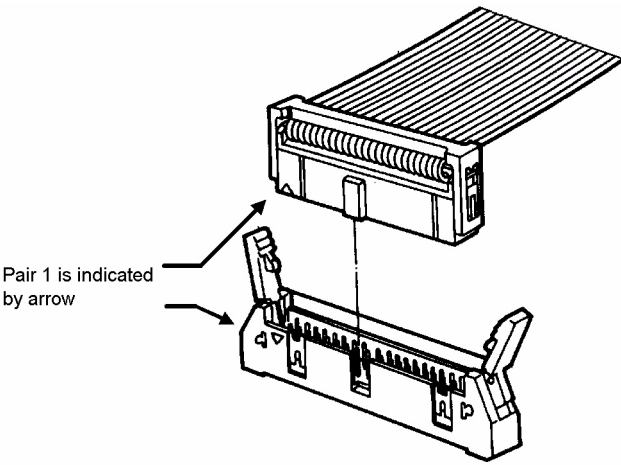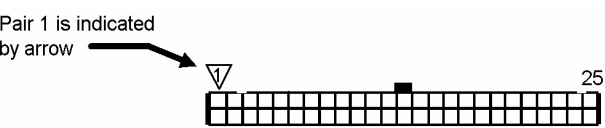| STEP	PROCEDURE
5	Connect the ADSL Link ID J1 connector cable to LCS connector J5 (line card slots 1– 6). Refer to the Dual Cable/Pair Assignment Tables on pages 166 and 167 and the Quad Cable/Pair Assignment Tables on pages 168-171. **NOTE:** Be sure the cable is positioned so the small "key" on the top middle of each flat connector end is facing up, to match the key slot on the top of the LCS connectors. Figure 143: Back View of LCS Backplane
6	Backplane connectors have latches on both sides. These latches snap down on the cable ribbon connector and lock in place. Figure 144: Ribbon Connectors (Backplane and 25 Pair Cable) Figure 145: Connector Pins 1 Through 25

Table 32:   25 Pair Cable—ADSL Link ID to LCS (continued)

STEP	PROCEDURE
7	There is a rubber vinyl grommet pre-installed on the ADSL Link ID cable. Position the grommet on the cable so it fits over the edge of the slot on the LCS assembly. Push the grommet into the slot as far as you can so it doesn't interfere with the back cover. The grommet helps hold the cable in position and also protects it from the metal edge.
8	Repeat steps 1 through 7 for all 25 pair ADSL Link ID to LCS cables. Refer to the LCS Cabling Diagram on page 163, and the Dual Cable/Pair Assignment Tables on pages 166 and 167 and the Quad Cable/Pair Assignment Tables on pages 168-171: ■ Bring the ADSL Link ID <u>J2</u> connector cable through the <u>fifth</u> cable slot (from the top) on the <u>left</u> side of the LCS assembly. ■ Connect the ADSL Link ID <u>J2</u> connector cable to LCS connector <u>J4</u> (line card positions 7−12). ■ Bring the ADSL Link ID <u>J3</u> connector cable through the <u>top</u> cable slot on the <u>left</u> side of the LCS assembly. ■ Connect the ADSL Link ID <u>J3</u> connector cable to LCS connector <u>J3</u> (line card positions 13 − 18). ■ Bring the ADSL Link ID <u>J4</u> connector cable through the <u>fourth</u> cable slot (from the top) on the <u>left</u> side of the LCS assembly. ■ Connect the ADSL Link ID <u>J4</u> connector cable to LCS connector <u>J2</u> (line card positions 19 − 24). Position grommets on all cables to fit over the edges of the slots on the LCS assembly. Push the grommets into the slots as far as you can so they don't interfere with the back cover.
9	Replace the LCS back panel. Hold the panel on both sides so it is level with the bottom of the card cage. Insert the hinged portion of the panel between the tabs on the card cage and slide the panel straight in and then to the right about ¼ inch to lock in place.
10	Lift the LCS back panel up into position. Slide both latches towards the center and release to lock in place.
11	Repeat all the steps in the previous procedure and in this procedure for additional ADSL Link IDs and LCSs.

Table 32:   25 Pair Cable—ADSL Link ID to LCS (continued)

STEP	PROCEDURE
12	The ADSL Link ID Cabling procedure is complete.

Dual ADSL Link ID and LCS Cable/Pair Assignments

The following tables show the cable/pair assignments for the ADSL Link ID to Line Card Shelf cabling. These tables are for CAP2 Dual ADSL line cards—two subscriber lines (two pairs) per card.

ADSL Link ID Connector #	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair
J1	J5	1	1	J1	1
		1	2		2
		2	1		5
		2	2		6
		3	1		9
		3	2		10
		4	1		13
		4	2		14
		5	1		17
		5	2		18
		6	1		21
↓	↓	6	2	↓	22

Figure 146: ADSL Link ID Connector J1 to LCS Connector J5
Dual ADSL Cable/Pair Assignments

ADSL Link ID Connector #	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair
J2	J4	7	1	J2	1
		7	2		2
		8	1		5
		8	2		6
		9	1		9
		9	2		10
		10	1		13
		10	2		14
		11	1		17
		11	2		18
		12	1		21
↓	↓	12	2	↓	22

Figure 147: ADSL Link ID Connector J2 to LCS Connector J4
Dual ADSL Cable/Pair Assignments

ADSL Link ID Connector #	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair
J3	J3	13	1	J3	1
		13	2		2
		14	1		5
		14	2		6
		15	1		9
		15	2		10
		16	1		13
		16	2		14
		17	1		17
		17	2		18
		18	1		21
▼	▼	18	2	▼	22

Figure 148: ADSL Link ID Connector J3 to LCS Connector J3
Dual ADSL Cable/Pair Assignments

ADSL Link ID Connector #	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair
J4	J2	19	1	J4	1
		19	2		2
		20	1		5
		20	2		6
		21	1		9
		21	2		10
		22	1		13
		22	2		14
		23	1		17
		23	2		18
		24	1		21
▼	▼	24	2	▼	22

Figure 149: ADSL Link ID Connector J4 to LCS Connector J2
Dual ADSL Cable/Pair Assignments

Quad ADSL Link ID and LCS Cable/Pair Assignments

The following tables show the cable/pair assignments for the ADSL Link ID to Line Card Shelf cabling. These tables are for CAP4 and DMT4 Quad ADSL line cards—four subscriber lines (four pairs) per card.

ADSL Link ID Connector #	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair
J1	J5	1	1	J1	1
		1	2		2
		1	3		3
		1	4		4
		2	1		5
		2	2		6
		2	3		7
		2	4		8
		3	1		9
		3	2		10
		3	3		11
		3	4		12
		4	1		13
		4	2		14
		4	3		15
		4	4		16
		5	1		17
		5	2		18
		5	3		19
		5	4		20
		6	1		21
		6	2		22
		6	3		23
▼	▼	6	4	▼	24
-	-	-	-	-	25

Figure 150: ADSL Link ID Connector J1 to LCS Connector J5
Quad ADSL Cable/Pair Assignments

ADSL Link ID Connector #	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair
J2	J4	7	1	J2	1
		7	2		2
		7	3		3
		7	4		4
		8	1		5
		8	2		6
		8	3		7
		8	4		8
		9	1		9
		9	2		10
		9	3		11
		9	4		12
		10	1		13
		10	2		14
		10	3		15
		10	4		16
		11	1		17
		11	2		18
		11	3		19
		11	4		20
		12	1		21
		12	2		22
		12	3		23
▼	▼	12	4	▼	24
-	-	-	-	-	25

Figure 151: ADSL Link ID Connector J2 to LCS Connector J4
Quad ADSL Cable/Pair Assignments

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           Quad ADSL Link ID and LCS Cable/Pair Assignments

ADSL Link ID Connector #	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair
J3	J3	13	1	J3	1
		13	2		2
		13	3		3
		13	4		4
		14	1		5
		14	2		6
		14	3		7
		14	4		8
		15	1		9
		15	2		10
		15	3		11
		15	4		12
		16	1		13
		16	2		14
		16	3		15
		16	4		16
		17	1		17
		17	2		18
		17	3		19
		17	4		20
		18	1		21
		18	2		22
		18	3		23
▼	▼	18	4	▼	24
-	-	-	-	-	25

Figure 152: ADSL Link ID Connector J3 to LCS Connector J3
Quad ADSL Cable/Pair Assignments

ADSL Link ID Connector #	LCS Connector #	Line Card Slot	Line Card Port	Cable	Pair
J4	J2	19	1	J4	1
		19	2		2
		19	3		3
		19	4		4
		20	1		5
		20	2		6
		20	3		7
		20	4		8
		21	1		9
		21	2		10
		21	3		11
		21	4		12
		22	1		13
		22	2		14
		22	3		15
		22	4		16
		23	1		17
		23	2		18
		23	3		19
		23	4		20
		24	1		21
		24	2		22
		24	3		23
▼	▼	24	4	▼	24
-	-	-	-	-	25

Figure 153: ADSL Link ID Connector J4 to LCS Connector J2
Quad ADSL Cable/Pair Assignments

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                      Quad ADSL Link ID and LCS Cable/Pair Assignments

SECTION 5   ALARM BOARD CONNECTIONS

Chapter 14   Alarm Board Connections

Introduction   Speedlink visual, audible, fuse and remote input alarm connections are made at the Master Control Shelf (MCS) Common Systems Interface Panel (CSIP) Alarm Board[1]. The Alarm Board is located inside the MCS above the card bays. The drawing below illustrates CSIP Alarm Broad connections. This chapter provides detailed instructions on how to make Speedlink alarm connections.
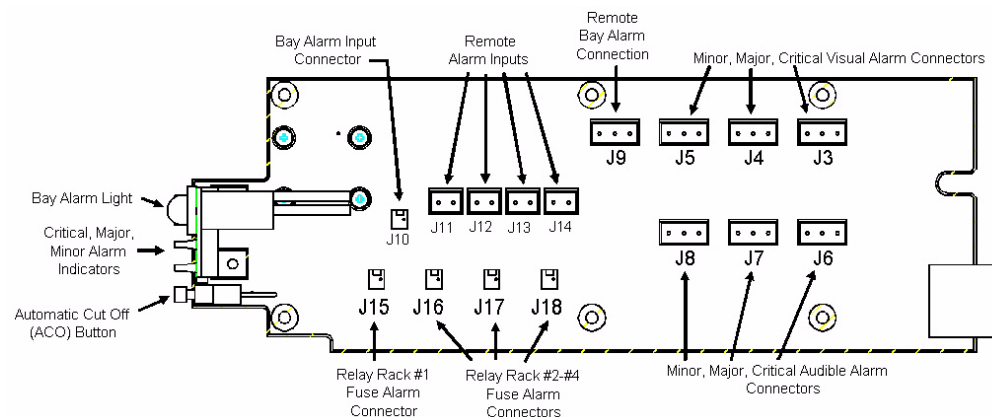

Figure 154: Board Connectors—Front View

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[1]   The CSIP Alarm Board will be referred to as the Alarm Board throughout this procedure.

Required Tools and Equipment	■ To begin this task you must have the following equipment and tools:
	■ Small flat-blade screwdriver (for 5mm plugs)
	■ Flats or wire cutters
	■ Electrostatic Discharge (ESD) Strap (DLCC Part Number: 85-0012)
	■ four − 2 position vertical (180°) 5mm pluggable terminal blocks (DLCC Part Number: 84-0043-002[2])
	■ seven − 3 position vertical (180°) 5mm pluggable terminal blocks (DLCC Part Number: #84-0043-003[2])
	■ one − 84 inch fuse alarm wire with 2 position IDC socket connectors (DLCC Part Number: 40-0005-002)
	■ one − 110 inch fuse alarm wire with 2 position IDC socket connectors (DLCC Part Number: 40-0005-003)
	■ one − 136 inch fuse alarm wire with 2 position IDC socket connectors (DLCC Part Number: 40-0005-004)
	■ 22 AWG wire
	■ one - 48 inch alarm cable for each ADSL Link ID to CSIP connection (DLCC Part Number: 40-0018-001)
	■ one - 36 inch alarm cable for each ADSL Link ID to ADSL Link ID connection (DLCC Part Number: 40-0018-002)

Visual, Audible and Bay Alarm wires are connected and run from the central office alarm terminal block across the horizontal cable racks to the Speedlink by the network service provider or by a Speedlink technician.

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[2] 2 and 3 position vertical 5mm pluggable terminal blocks are also included in the MCS/ACSIP Installation Kit (DLCC Part Number 50-0060).

Visual Alarm Connections

Follow these steps to complete critical, major and minor Visual Alarm connections at connectors J3 through J5:

Table 33: Visual Alarm Connections

STEP	PROCEDURE
1	Connect Visual, Audible and Bay alarm wires to the central office terminal block as required following local procedures.
2	Route the wires from the central office terminal block across the horizontal cable rack, and down the relay rack rails to the Speedlink Master Control Shelf following local procedures.
3	Push the wires through one of the large cable ports at the back of the Master Control Shelf.
4	WEAR AN ELECTROSTATIC DISCHARGE STRAP (ESD) STRAP AT ALL TIMES when making connections on the Alarm Board. The Grounding jack is located on the side of the Master Control Shelf assembly. Grounding Jack Figure 155: Grounding Jack Location—Side View of MCS Assembly
5	Unlatch and lower the MCS front panel to access the Alarm Board. Latches are located at the top of the front panel. Slide both latches inward to release and lower the panel.

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                         Visual Alarm Connections

Table 33: Visual Alarm Connections (continued)
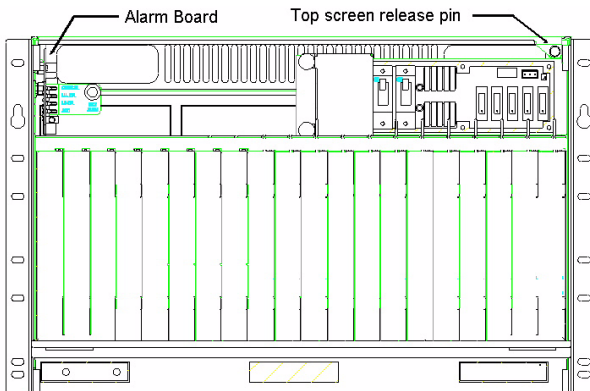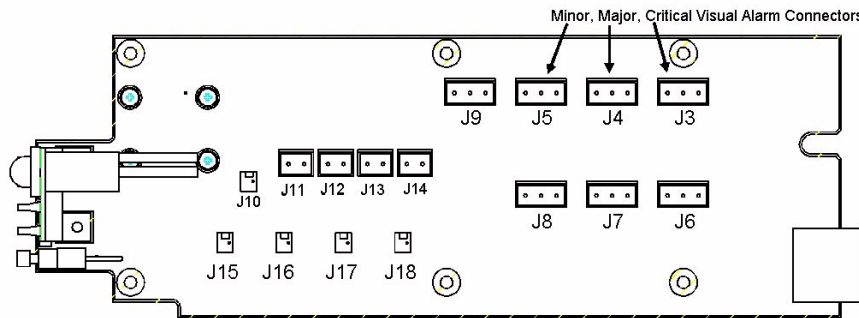
STEP	PROCEDURE
6	Remove the MCS top screen to allow room to make connections at the Alarm Board. Release the top screen using the release pin located in the top right corner. Pull the release pin and slide out the top screen. Figure 156: Master Control Shelf—Front View
7	Pull the alarm wires from the back of the Master Control Shelf through to the front and over to the Alarm Board, see drawing in STEP 6.
8	Visual Alarm connectors are identified as J3 (Critical), J4 (Major), and J5 (Minor). Figure 157: Alarm Board—Visual Alarm Connectors
9	Are Terminal Blocks plugged into J3, J4, and J5 connectors? ■ If YES, continue to STEP 10. ■ If NO, plug in 3 position vertical (180º) 5mm pluggable terminal blocks into connectors J3, J4, and J5.

Table 33: Visual Alarm Connections (continued)

STEP	PROCEDURE
10	Visual alarm connections are made with three position pluggable terminal blocks. Positions on each terminal block are identified as: ■ Position 1 (left) − Normally Open (NO) ■ Position 2 (center) − Common (COM) ■ Position 3 (right) − Normally Closed (NC) Complete Visual Alarm wiring based on requirements of the network service provider for Normally Open, Common, and Normally Closed relay contacts.
11	Using wire cutters, strip back insulation on 22 AWG wire by ¼ inch.
12	Insert wire into position one, two or three of terminal block J3, as required, see STEP 10.
13	Tighten the screw on the terminal block until a good connection is made, <u>do not</u> exceed 4.5 inch pounds torque.
14	Repeat Steps 11 through 13 for all positions on Visual Alarm terminal block J3 as required.
15	Repeat Steps 11 through 13 for Visual Alarm terminal blocks J4 and J5.
16	Dress, tie and label wiring following local procedures after all Visual Alarm wire connections (J3, J4, J5) are completed.
17	Continue to the next procedure: Audible Alarm Connections.

Audible Alarm Connections

Follow these steps to complete critical, major and minor Audible Alarm connections at connectors J6 through J8:
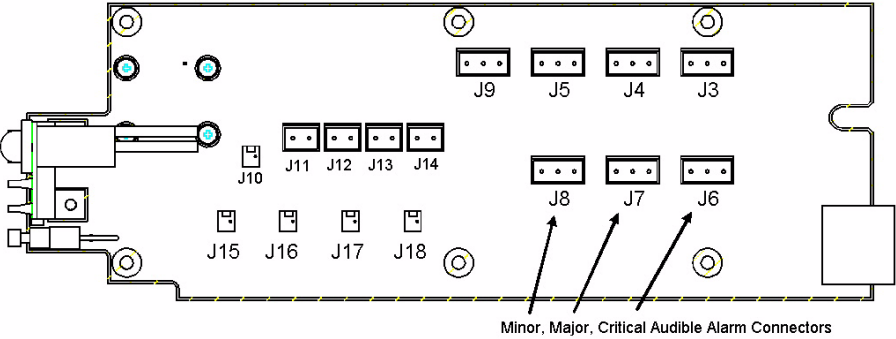
Table 34: Audible Alarm Connections

STEP	PROCEDURE
1	WEAR AN ELECTROSTATIC DISCHARGE STRAP (ESD) STRAP AT ALL TIMES when making connections on the Alarm Board. The grounding jack is located on the side of the Master Control Shelf assembly. See Visual Alarm Connections STEP 4 on page 175 for location of grounding jack.
2	Audible Alarm connectors are identified as J6 (Critical), J7 (Major), and J8 (Minor). Figure 158: Alarm Board—Audible Alarm Connectors
3	Are Terminal Blocks plugged into J6, J7, and J8 connectors? ■ If YES, continue to STEP 4. ■ If NO, plug in 3 position vertical (180º) 5mm pluggable terminal blocks into connectors J6, J7, and J8.
4	Audible Alarm connections are made with three position pluggable terminal blocks. Positions on each terminal block are identified as: ■ Position 1 (left) – Normally Open (NO) ■ Position 2 (center) – Common (COM) ■ Position 3 (right) – Normally Closed (NC) Complete Audible Alarm wiring based on requirements of the network service provider for Normally Open, Common, and Normally Closed relay contacts.

Table 34: Audible Alarm Connections (continued)

STEP	PROCEDURE
5	Using wire cutters, strip back insulation on 22 AWG wire by ¼ inch.
6	Insert wire into position one, two or three of terminal block J6, as required, see STEP 4.
7	Tighten the screw on the terminal block until a good connection is made, <u>do not</u> exceed 4.5 inch pounds torque.
8	Repeat Steps 5 through 7 for all positions on Audible Alarm terminal block J6 as required.
9	Repeat Steps 5 through 7 for Audible Alarm terminal blocks J7 and J8.
10	Dress, tie and label wiring following local procedures after all Audible Alarm wire connections (J6, J7, J8) are completed.
11	Continue to the next procedure: Remote Bay Alarm Connection.

Remote Bay Alarm Connection

Follow these steps to complete the Remote Bay Alarm connection at connector J9:
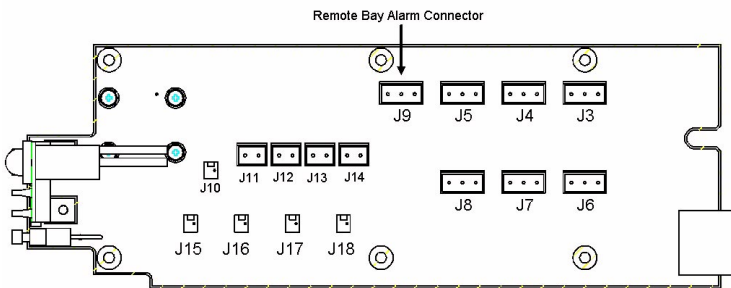
Table 35:   Remote Bay Alarm Connection

STEP	PROCEDURE
1	WEAR AN ELECTROSTATIC DISCHARGE STRAP (ESD) STRAP AT ALL TIMES when making connections on the Alarm Board. The grounding jack is located on the side of the Master Control Shelf assembly. See Visual Alarm Connections STEP 4 on page 175 for location of grounding jack.
2	Remote Bay Alarm connector is identified as J9. Figure 159: Alarm Board—Remote Bay Alarm Connector
3	Is a Terminal Block plugged into the J9 connector? ■ If YES, continue to STEP 4. ■ If NO, plug in a 3 position vertical (180º) 5mm pluggable terminal block into connector J9.
4	The Remote Bay Alarm connection is made with a three position pluggable terminal block. Positions on each terminal block are identified as: ■ Position 1 (left) – Normally Open (NO) ■ Position 2 (center) – Common (COM) ■ Position 3 (right) – Normally Closed (NC) Complete Remote Bay Alarm wiring based on requirements of the network service provider for Normally Open, Common, and Normally Closed relay contacts.
5	Using wire cutters strip back insulation on 22 AWG wire ¼ inch.

Table 35:   Remote Bay Alarm Connection (continued)

STEP	PROCEDURE
6	Insert wire into position one, two or three of terminal block J9, as required, see STEP 4.
7	Tighten the screw on the terminal block until a good connection is made, <u>do not</u> exceed 4.5 inch pounds torque.
8	Repeat Steps 5 through 7 for all positions on Remote Bay Alarm terminal block J9 as required.
9	Dress, tie and label wiring following local procedures after the Bay Alarm wire connection is completed.
10	Does the Speedlink system have more than three Line Card Shelves? ■ If YES, skip to the next procedure: Relay Rack Fuse Alarm Connections on page 182. ■ If NO, continue to STEP 11.
11	Does the Speedlink system require user defined Remote Alarm Inputs? ■ If YES, skip to the Remote Alarm Input Connections procedure on page 186. ■ If NO, continue to STEP 12.
12	Slide the MCS top screen back into position and push in on the release pin to secure.
13	Close the MCS front panel, slide both latches toward the center and release to lock in place.
14	The Alarm Board Connections procedure is complete.

Relay Rack Fuse Alarm Connections

Relay Rack Fuse Alarm connections are provided for a Speedlink system, with up to four relay racks:

J15 = Relay Rack #1

J16 = Relay Rack #2
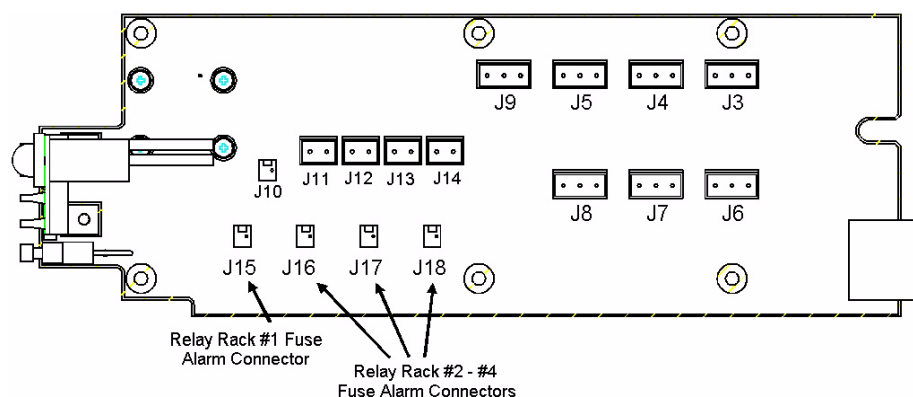
J17 = Relay Rack #3

J18 = Relay Rack #4

Figure 160: Alarm Board—Relay Rack Fuse Alarm Connectors

The Master Control Shelf (MCS) is shipped with the Relay Rack #1 Fuse Alarm pre-wired. There is no additional wiring required for the Relay Rack Fuse Alarm if you are installing a Speedlink system made up of an MCS and up to three Line Card Shelves (LCS). The following instructions apply only if you are installing a Speedlink system with more than three Line Card Shelves.

Required Tools and Equipment

The connector wires with IDC socket connectors and 22 AWG wire required to make Relay Rack #2, #3, and #4 Fuse Alarm connections are shipped with the Auxiliary Common Systems Interface Panel (CSIP) units. Auxiliary CSIPs are required to distribute power to an additional rack of Line Card Shelves and to provide the fuse alarm connection to the Master Control Shelf (MCS) Alarm Board.

- one − 84 inch fuse alarm wire with 2 position IDC socket connectors (DLCC Part Number: 40-0005-002) for Relay Rack #2

- one − 110 inch fuse alarm wire with 2 position IDC socket connectors (DLCC Part Number: 40-0005-003) for Relay Rack #3

- one − 136 inch fuse alarm wire with 2 position IDC socket connectors (DLCC Part Number: 40-0005-004) for Relay Rack #4

Relay Rack #2 through #4 Fuse Alarm Connections

Follow these instructions to complete Relay Rack #2 through #4 Fuse Alarm connections at the MCS Alarm Board:

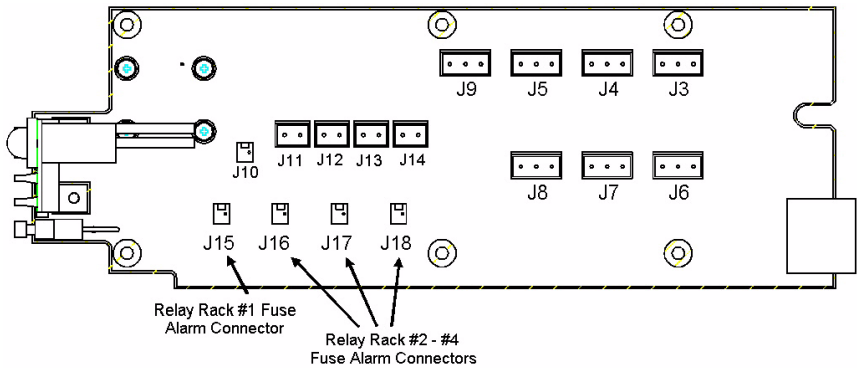**Table 36: Relay Rack #2 through #4 Fuse Alarm Connections**

STEP	PROCEDURE
1	WEAR AN ELECTROSTATIC DISCHARGE STRAP (ESD) STRAP AT ALL TIMES when making connections on the Alarm Board and CSIP. The grounding jack is located on the side of the Master Control Shelf assembly. See Visual Alarm Connections STEP 4 on page 175 for location of grounding jack.
2	Terminate the <u>84 inch wire</u> with IDC connectors on the J16 Relay Rack #2 Fuse Alarm pin connector. Figure 161: Alarm Board—Relay Rack Fuse Alarm Connectors
3	Are there additional relay racks that require fuse alarm connections? ■ If YES, continue to STEP 4. ■ If NO, skip to STEP 5.
4	Repeat Step 2 for each Relay Rack Fuse Alarm required: ■ Relay Rack #3—terminate the <u>110 inch wire</u> with IDC connectors on the J17 Relay Rack #3 Fuse Alarm pin connector. ■ Relay Rack #4—terminate the <u>136 inch wire</u> with IDC connectors on the J18 Relay Rack #4 Fuse Alarm pin connector.
5	Dress, tie and label wiring following local procedures after all Relay Rack Fuse Alarm connections (J16, J17, J18) are completed.
6	Route the Fuse Alarm wire(s) through the large cable port at the back of the MCS.

Table 36: Relay Rack #2 through #4 Fuse Alarm Connections (continued)

STEP	PROCEDURE
7	Go to the back of the Master Control Shelf and pull Fuse Alarm wire(s) through the cable port.
8	Route the alarm wire(s) from the back of the MCS assembly along the relay rack rails up to the horizontal cable rack for connection to the Auxiliary CSIP(s).
9	Continue to the next procedure: Fuse Alarm Connections at the Auxiliary CSIP.

Fuse Alarm Connections at the Auxiliary CSIP

Follow these instructions to complete Relay Rack #2 through #4 Fuse Alarm connections at the Auxiliary CSIP(s):

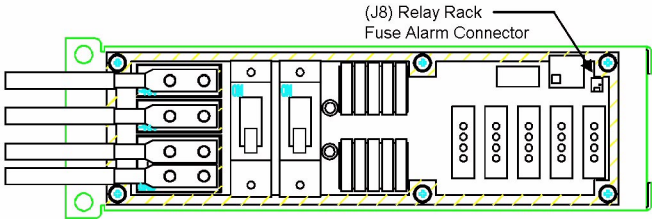**Table 37: Fuse Alarm Connections at the Auxiliary CSIP**

STEP	PROCEDURE
1	Bring the <u>84 inch</u> Fuse Alarm wire (connected to the MCS Alarm Board J16 connector) down from the horizontal cable rack along the relay rack rails to the Relay Rack #2 Auxiliary CSIP.
2	Route the wire through the cable opening at the back of the Auxiliary CSIP assembly.
3	Unlatch and lower the Auxiliary CSIP front panel.
4	Bring the wire to the front of the CSIP board and terminate it on the Fuse Alarm connector (J8). Figure 162: CSIP—Relay Rack Fuse Alarm Connection
5	Lift the Auxiliary CSIP front panel up into position. Slide both latches towards the center and release to lock in place.

Table 37: Fuse Alarm Connections at the Auxiliary CSIP (continued)

STEP	PROCEDURE
6	Are there additional relay racks that require fuse alarm connections? ■ If YES, continue to STEP 7. ■ If NO, skip to STEP 8.
7	Repeat Steps 1 through 5 for each additional Relay Rack Fuse Alarm. ■ Relay Rack #3—terminate the <u>110 inch</u> Fuse Alarm wire (connected to the J17 connector) on the Auxiliary CSIP Alarm connector (J8). ■ Relay Rack #4—terminate the <u>136 inch</u> Fuse Alarm wire (connected to the J18 connector) on the Auxiliary CSIP Alarm connector (J8).
8	Does the Speedlink system require user defined Remote Alarm Inputs? ■ If YES, skip to the next procedure: Remote Alarm Input Connections on page 186. ■ If NO, continue to STEP 9.
9	Slide the MCS top screen back into position and push in on the release pin to secure.
10	Close the MCS front panel, slide both latches towards the center and release to lock in place.
11	The Alarm Board Connections procedure is complete.

Remote Alarm Input Connections

The Alarm Board has four connections for Remote Alarm Inputs. These alarm connections are defined by the user via DiamondView and can be used for any type of remote alarm; for example, environmental alarms or ADSL Link ID alarm connections (see the nest section, "Alarm Connection for the ADSL Link ID," on page 188.

Follow these steps to complete Remote Alarm Input connections at connectors J11 through J14:
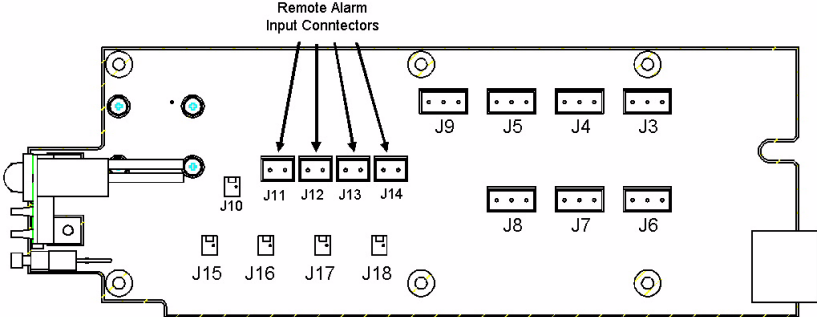
Table 38: Remote Alarm Input Connections

STEP	PROCEDURE
1	Route the Remote Alarm Input wires from the central office termination point, across the horizontal cable racks, and down the relay rack rails to the Speedlink Master Control Shelf, following local procedures.
2	Push the alarm wires through one of the large cable ports at the back of the Master Control Shelf.
3	Go to the front of the Master Control Shelf and pull the alarm wires from the back of the MCS to the front and over to the Alarm Board.
4	WEAR AN ELECTROSTATIC DISCHARGE STRAP (ESD) STRAP AT ALL TIMES when making connections on the Alarm Board. The grounding jack is located on the side of the Master Control Shelf assembly. See Visual Alarm Connections STEP 4 on page 175 for location of grounding jack.
5	Remote Alarm Input connectors are identified as J11, J12, J13 and J14. Figure 163: Alarm Board—Remote Alarm Input Connectors

Table 38: Remote Alarm Input Connections (continued)

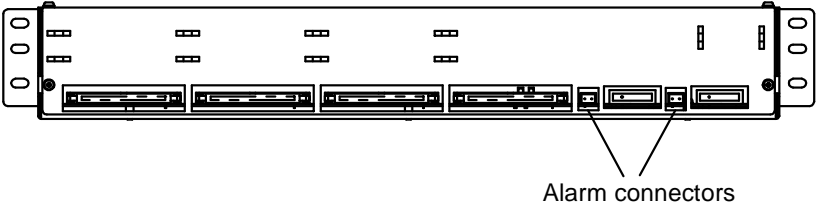| STEP	PROCEDURE
6	Are Terminal Blocks plugged into J11, J12, J13 and J14 connectors? ■ If YES, continue to STEP 7. ■ If NO, plug in 2 position vertical (180º) 5mm pluggable terminal blocks into connectors J11, J12, J13 and J14 as required.
7	Remote Alarm Input connections are made with two position pluggable terminal blocks.
8	Using wire cutters, strip back insulation on 22 AWG wire by ¼ inch.
9	Insert wire into position one or two of terminal block J11 as required.
10	Tighten the screw on the terminal block until a good connection is made, <u>do not</u> exceed 4.5 inch pounds torque.
11	Are there additional Remote Alarm Input connections required? ■ If YES, continue to STEP 12. ■ If NO, skip to STEP 13.
12	Repeat Steps 8 through 10 for all Remote Alarm Input connections required using terminal blocks J12, J13, and J14.
13	Dress, tie and label wiring following local procedures after all required Remote Alarm Input connections are completed.
14	Slide the MCS top screen back into position and push in on the release pin to secure.
15	Close the MCS front panel, slide both latches toward the center and release to lock in place.
16	The Alarm Board Connection procedure is complete.

Alarm Connection for the ADSL Link ID

A relay rack can support up to three ADSL Link IDs. An ADSL Link ID alarm connection is made using one of the Remote Alarm Input Connectors on the MCS Alarm Board[3]. The alarm connection is supplied to multiple ADSL Link IDs in a "daisy chain" arrangement:

- the alarm cable for the *second* ADSL Link ID connects to an alarm connector on the *first* ADSL Link ID

- the alarm cable for the *third* ADSL Link ID connects to an alarm connector on the *second* ADSL Link ID

NOTE: Be sure the ADSL Link ID power connection(s) are made before continuing with the alarm connections. The MCS alarm board will register an alarm condition until the ADSL Link ID is powered up.

Follow these steps to install alarm cables to the ADSL Link ID:

Table 39: Alarm Connection for the ADSL Link ID

STEP	PROCEDURE
1	Connect the alarm cable to an alarm connector on the (first) ADSL Link ID backplane. Alarm connectors Figure 164: ADSL Link ID Backplane Alarm Connectors

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[3] The Auxiliary CSIP does not provide alarm connections for co-located ADSL Link IDs. All ADSL Link ID alarm connections must be made at a Remote Alarm Input connector on the MCS Alarm Board.

Table 39: Alarm Connection for the ADSL Link ID (continued)
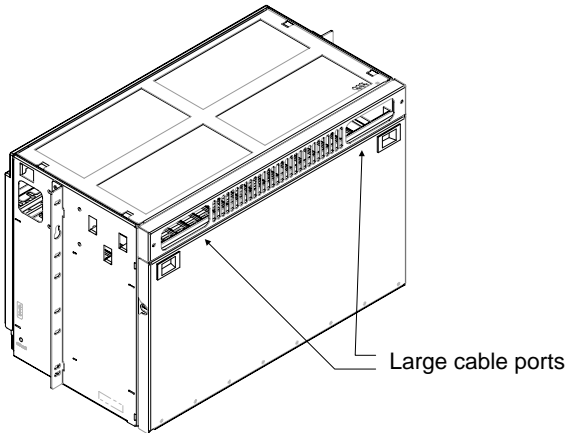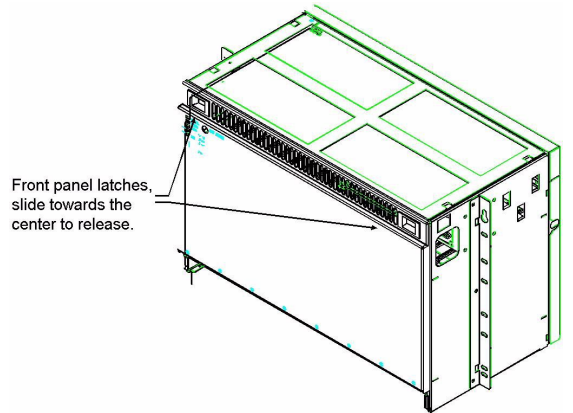
STEP	PROCEDURE
2	To connect the alarm cable to the MCS Alarm Board, route the alarm cable up the relay rack and push it through one of the large cable ports at the back of the MCS. Large cable ports Figure 165: MCS Cable Ports
3	Go to the front of the MCS.
4	Unlatch and lower the MCS front panel to access the Alarm Board. The latches are located at the top of the panel. Slide both latches inward to release and lower the panel. Front panel latches, slide towards the center to release. Figure 166: MCS Front Panel Release Latches
5	Pull the alarm cable from the cable port to the Alarm Board, located on the left inside panel of the MCS.

Table 39: Alarm Connection for the ADSL Link ID (continued)
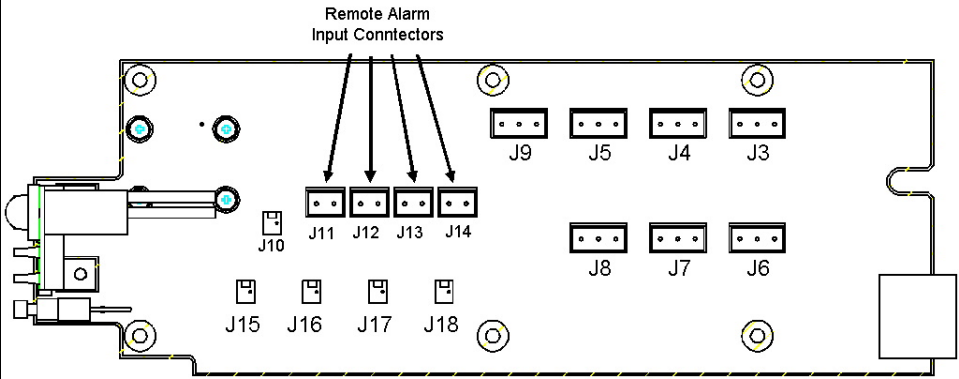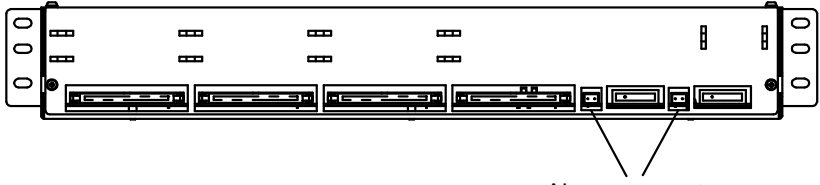
STEP	PROCEDURE
6	WEAR AN ELECTROSTATIC DISCHARGE (ESD) STRAP AT ALL TIMES when making connections on the Alarm Board. The Grounding jack is located on the side of the MCS. Grounding Jack Figure 167: Grounding Jack Location—Side View of MCS Assembly
7	Connect the alarm cable to an available Remote Alarm Input connector (J11, J12, J13, or J14) on the Alarm Board. **NOTE:** The alarm connection must be enabled in DiamondView or DiamondCraft. Refer to: - Volume 6—*DiamondView*, Chapter 2—"The DiamondView Reference Manual," the section titled, "Alarms," or - Volume 7—*DiamondCraft*, Chapter 2—"The DiamondCraft Reference Manual," the section titled, "Multiplexer," to enable remote alarm connections. Remote Alarm Input Conntectors J9 J5 J4 J3 J11 J12 J13 J14 J10 J8 J7 J6 J15 J16 J17 J18 Figure 168: Alarm Board—Remote Alarm Input Connectors

Table 39: Alarm Connection for the ADSL Link ID (continued)

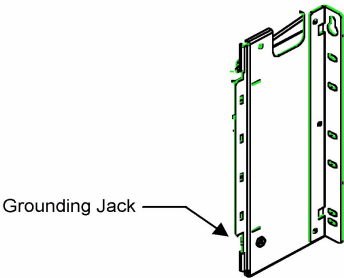| STEP	PROCEDURE
8	Lift the MCS front panel back into position. Slide the latches toward the center and release to lock in place. Skip to STEP 11.
9	Are you connecting an alarm cable to a second or third ADSL Link ID? ■ If YES, continue to STEP 10. ■ If NO, skip to STEP 12.
10	Connect the alarm cable to the next ADSL Link ID. Route the alarm cable up the relay rack to the ADSL Link ID above it and connect it to the available alarm connector on the backplane. Alarm connectors Figure 169: ADSL Link ID Backplane Alarm Connectors
11	Repeat STEP 10 for each ADSL Link ID.
12	The Alarm Connection for the ADSL Link ID procedure is complete.

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Section 5   **Alarm Board Connections**
                   Alarm Connection for the ADSL Link ID

SECTION 6   REMOTE LOW PASS FILTER

Chapter 15   Remote Low Pass Filter (RLPF)

Introduction   The Speedlink Remote Low Pass Filter (RLPF) is an external passive low pass filter "splitter" device. There are two types of Remote Low Pass Filters available with the Speedlink system—a Standalone RLPF for installation along side an existing Network Interface, and a Retrofit RLPF in a standard Network Interface Device (NID) housing for installations where there is no exiting NID.
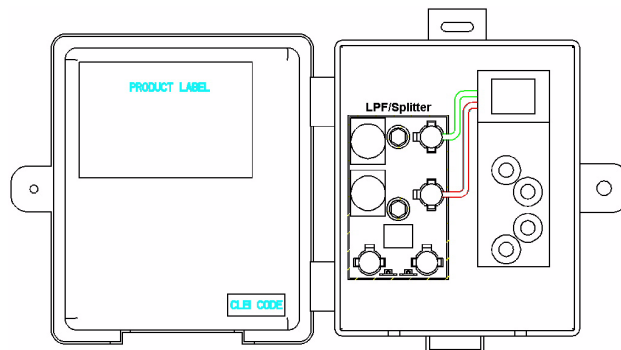
Figure 170: Standalone Remote Low Pass Filter (RLPF)
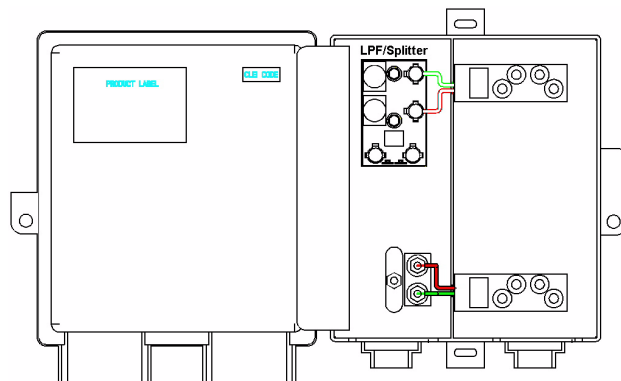
Figure 171: Retrofit Remote Low Pass Filter (RPLF)

Required Equipment and Tools

You must have the following equipment and tools to install the Remote Low Pass Filter:

- Standalone or Retrofit Remote Low Pass Filter (DLCC Part Number: 30-0004 or 30-0006)

- Straight blade screwdriver

- Standard telco Allen wrench (used to open the telco side of the Network Interface)

- Appropriate screws for mounting the RPLF housing; i.e. wood screws, molley bolts or other.

- Category 3 wire (required for installation of the standalone RLPF)

Standalone RLPF Installation

The drawing below shows the wiring required to install a Standalone RLPF:

Figure 172: Wiring Required for a Standalone RLPF Installation
next to an Existing Network Interface

Retrofit RLPF Installation   The drawing below shows the wiring required to install a Retrofit RLPF:

Figure 173: Wiring Required for a Retrofit RLPF Installation

SECTION 7 APPENDICES

Appendix A   Power to the Speedlink in a Non-Central Office Environment
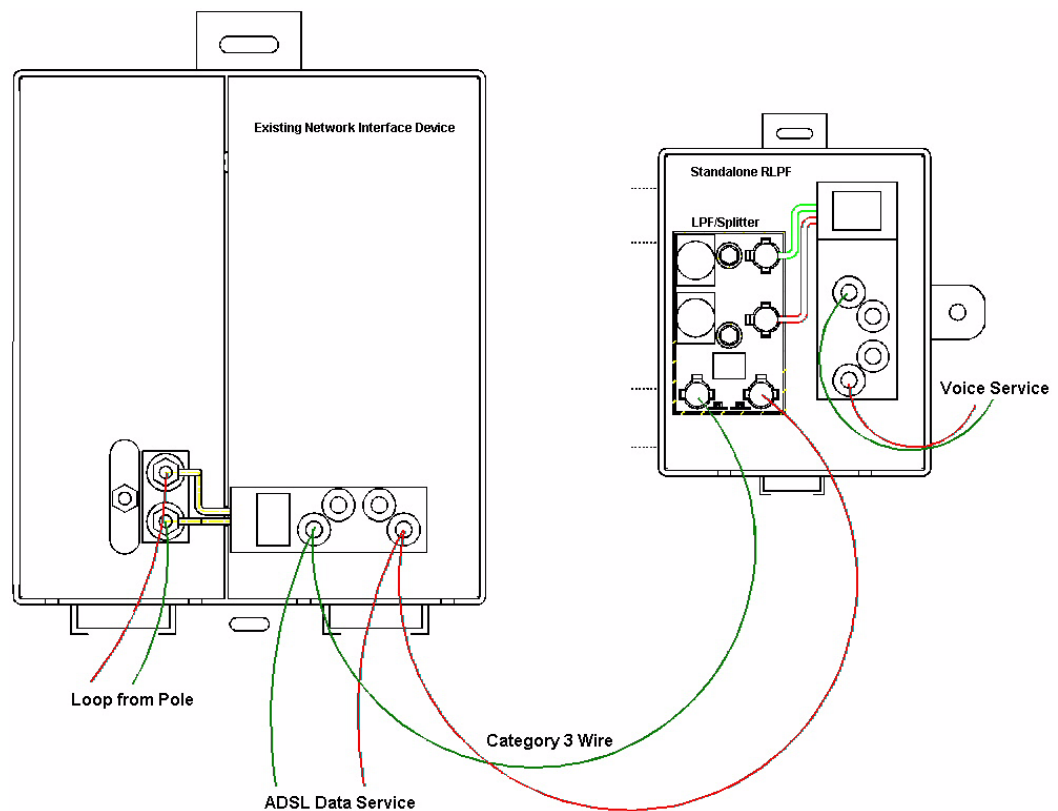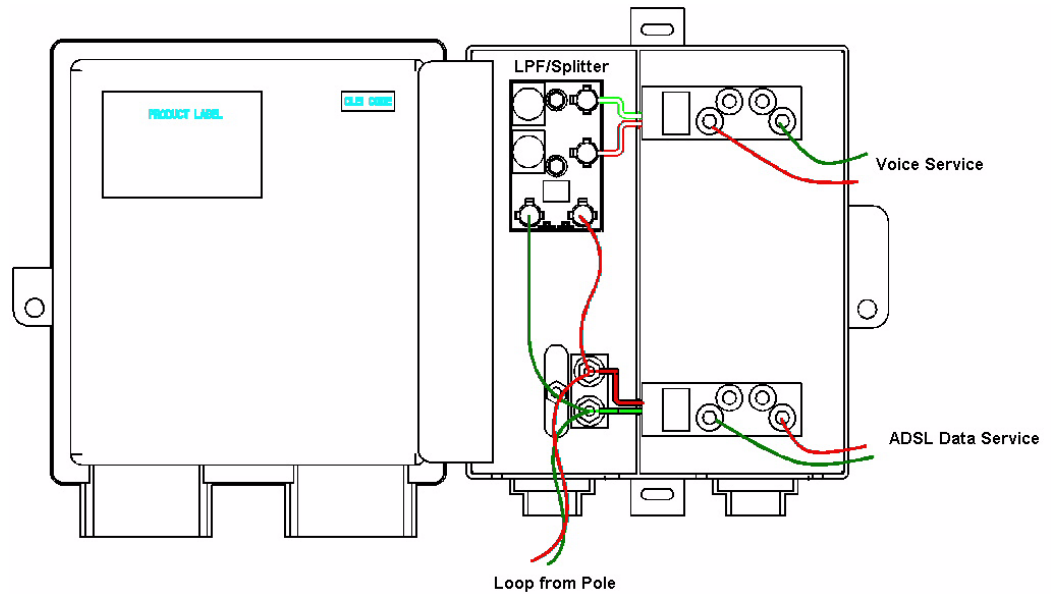
Introduction   This section provides instructions on how to supply power to the Speedlink system in a non-Central Office environment.

IMPORTANT: Be sure that the first two procedures in Chapter 6 have been completed *before* continuing with this section. The two procedures are "LCS Power Cable(s) Installation at the CSIP" and "Power Cable Installation at the LCS Backplane." See Chapter 6—"Central Office Power to the Speedlink system," beginning on page 31.

The Speedlink system is powered by −48 Volts DC. Power is connected to the Speedlink at the Master Control Shelf Common Systems Interface Panel (CSIP) Power and Distribution Board. The CSIP Power and Distribution Board will be referred to as the CSIP throughout this procedure.

NOTE: The following procedures describe the set-up of the Speedlink system for lab tests or demonstrations only. A Speedlink system installed according to these procedures will not meet the requirements and specifications necessary for commercial use of any kind.

This Appendix is divided into the following sub-sections:

- Required Equipment and Tools
- Grounding the MCS Common Systems Interface Panel (CSIP) and the Power Supply
- Power Supply Connection at the CSIP
- Return (BLACK) Cable Connection at the CSIP
- Power (RED) Cable Connection at the CSIP

- Verify Continuity and Polarity
- Verify Voltage

Required Equipment and Tools

To begin this task you must have the following equipment and tools:

- Electrostatic Discharge (ESD) strap (DLCC Part Number: 85-0012)
- One standard 23-inch, 7-foot telco relay rack
- One -48 Volts power supply, properly grounded
- One 8 AWG[1] Black ("positive" or " + ") return cable
- One 8 AWG Red ("negative" or " - ") power cable
- One 6 AWG ground wire (for rack to earth ground)
- One 8 AWG ground wire (for return [BLACK] cable to earth ground)
- Two 2-hole copper barrel lugs per cable (DLCC Part Number: 85-0009-002)[2]
- Two lug nuts per cable[3]
- Crimping Tool
- Diagonal Cutters
- Torque Wrench (rating: 18 to 20 pounds) with 3/8-inch nut socket
- Volt OHM Meter (VOM)
- Step Ladder (optional

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[1] 8 AWG or better wire is required for a fully loaded Speedlink system, refer to local electrical code for requirements.

[2] Two hole copper barrel lugs are included in the MCS/ACSIP Installation Kit (DLCC Part Number: 50-0060).

[3] Lug nuts are also included in the MCS/ACSIP Installation Kit (DLCC Part Number: 50-0060).

Grounding the MCS CSIP and the Power Supply

Follow these steps to properly ground the MCS CSIP and the power supply:

Table 40: Grounding the MCS CSIP and the Power Supply
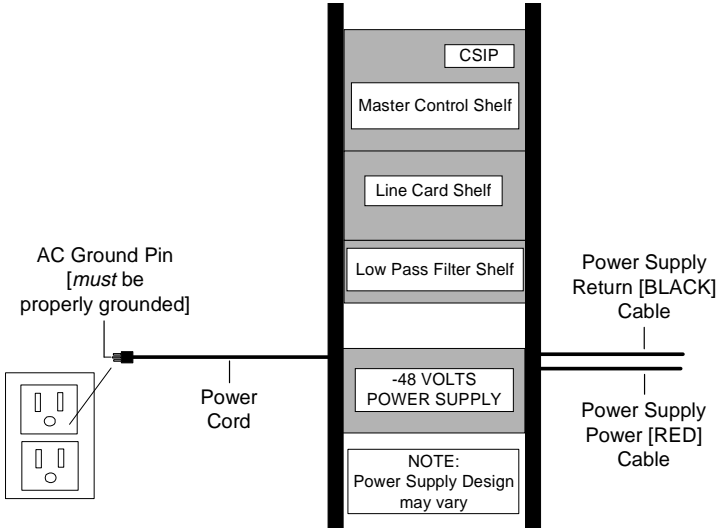
STEP	PROCEDURE
1	For maximum efficiency and safety install all Speedlink system components and the power supply into a standard 23-inch, 7-foot telco relay rack. **IMPORTANT:** Do not plug in the power supply at this point. Figure 174: Non-Central Office Rack Mount Setup (Front View)

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Grounding the MCS CSIP and the Power Supply

Table 40: Grounding the MCS CSIP and the Power Supply (continued)
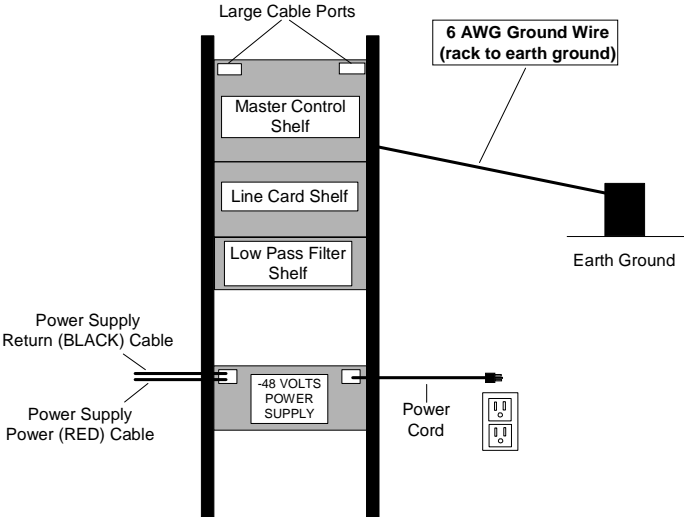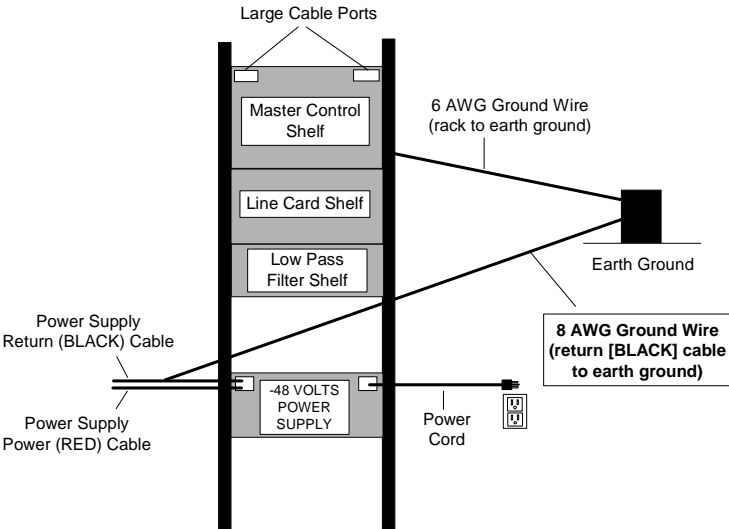
STEP	PROCEDURE
2	Run the 6 AWG ground wire from the rack to a known good earth ground, following local procedures. Large Cable Ports **6 AWG Ground Wire (rack to earth ground)** Master Control Shelf Line Card Shelf Low Pass Filter Shelf Earth Ground Power Supply Return (BLACK) Cable -48 VOLTS POWER SUPPLY Power Supply Power (RED) Cable Power Cord Figure 175: Rack to Earth Ground (Back View)
3	Run the 8 AWG ground wire from the return (BLACK) cable to a known good earth ground, following local procedures **IMPORTANT:** Do NOT run the 8 AWG ground wire from the return cable to the rack, this does not provide an earth ground. Large Cable Ports Master Control Shelf 6 AWG Ground Wire (rack to earth ground) Line Card Shelf Low Pass Filter Shelf Earth Ground Power Supply Return (BLACK) Cable **8 AWG Ground Wire (return [BLACK] cable to earth ground)** -48 VOLTS POWER SUPPLY Power Supply Power (RED) Cable Power Cord Figure 176: Return Cable to Earth Ground (Back View)

Table 40: Grounding the MCS CSIP and the Power Supply (continued)

STEP	PROCEDURE
4	Confirm that grounding procedures meet local requirements. Consult your local electrical code for instructions.
5	Continue to the next procedure: Power Supply Connection at the CSIP.

Power Supply Connection at the CSIP

Power is supplied to the Speedlink system at the CSIP, located inside the MCS assembly, as follows:

■ -48A terminal on the CSIP connects to the negative (" - ") terminal on the power supply with the RED cable

■ -48VA RTN terminal on the CSIP connects to the positive (" + ") terminal on the power supply with the BLACK cable
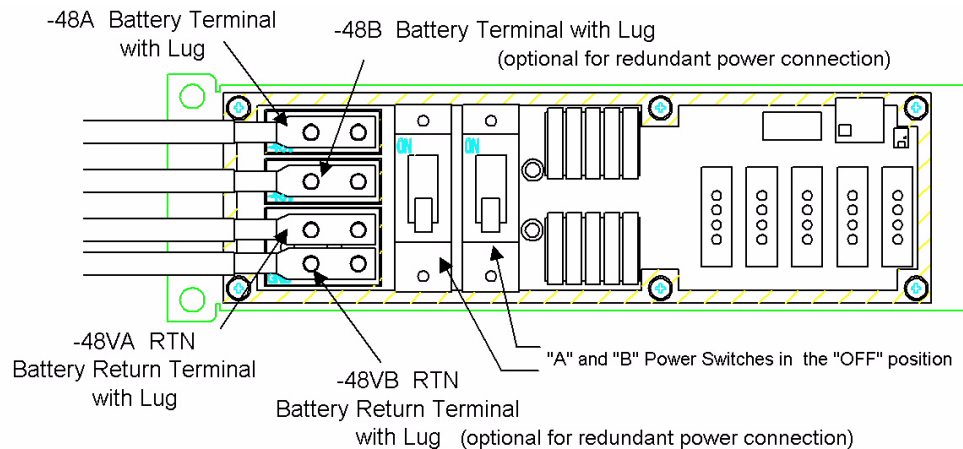

Figure 177: CSIP Power Return Battery Terminals

The Speedlink system will operate with a single power connection and a single return connection to the power supply. The -48B terminal and -48VB RTN terminal on the CSIP are for *optional* redundant power and return connections.

IMPORTANT: If you are using both the -48A terminal and the -48B terminal for redundant power connections, you must also use both the -48VA RTN terminal and the -48VB RTN terminal for redundant return terminal connections in order to have a properly balanced system.

Make sure that the power supply is unplugged. Do not connect power and return cables to the power supply before beginning the following procedure.

Return (BLACK) Cable Connection at the CSIP

Return (BLACK) cables are connected to the Speedlink system at the CSIP. The following steps provide instructions for installing one return cable; a second redundant cable can be installed in the same way.

Follow these steps to connect the return cable to the CSIP:

Table 41: Return (BLACK) Cable Connection at the CSIP

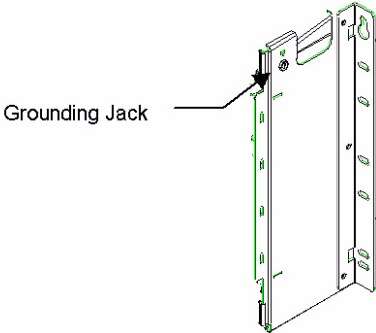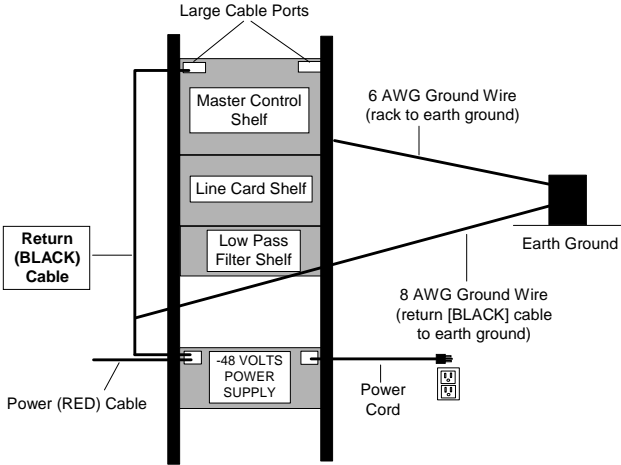| STEP	PROCEDURE
1	WEAR AN ELECTROSTATIC DISCHARGE (ESD) STRAP AT ALL TIMES when making connections on the CSIP. The Grounding jack is located on the side of the MCS assembly. Grounding Jack Figure 178: MCS Grounding Jack
2	Route the return cable from the positive (" + ") terminal on the power supply to the MCS CSIP. Figure 179: Return Cable to CSIP (Back View)

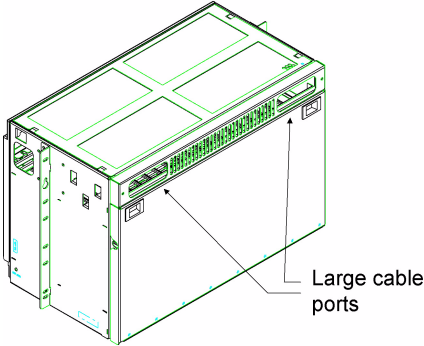**Table 41: Return (BLACK) Cable Connection at the CSIP (continued)**
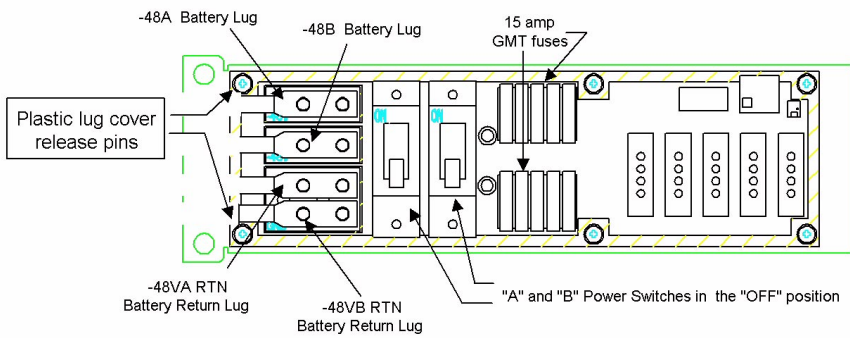
STEP	PROCEDURE
3	Push the return cable through one of the large cable ports at the back of the CSIP. Figure 180: MCS Cable Ports (Back View)
4	Go to the front of the MCS cabinet. Pull the return cable from the back of the assembly through the port to the front of the CSIP.
5	Cut the return cable to the correct length using diagonal cutters.
6	Using a crimping tool, attach the 2-hole barrel lug to the return cable.
7	**IMPORTANT:** Check to make sure that the power switches are set in the "OFF" or "Down" position. Verify that all fuses are removed from the fuse holders. See the diagram in the following step for an illustration of power switch and fuse locations.

Table 41: Return (BLACK) Cable Connection at the CSIP (continued)

STEP	PROCEDURE
8	Remove the protective plastic cover over the battery and battery return terminals on the CSIP. Pull on the two release pins (located on the left side, top and bottom) and remove. **IMPORTANT:** Do not lose this cover, place it where you can find it again. Figure 181: CSIP Lug Cover and Release Pins
9	Place the return cable lug on the battery return terminal labeled "-48VA RTN." If you are using a second redundant return cable, repeat Steps 2 through 9 for the redundant cable, and place the redundant cable lug on the battery return terminal labeled "-48VB RTN." **IMPORTANT:** Tighten lug nuts to 18-20 inch pounds torque.
10	Continue to the next procedure: Power (RED) Cable Connection at the CSIP.

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Power (RED) Cable Connection at the CSIP

**Power (RED)
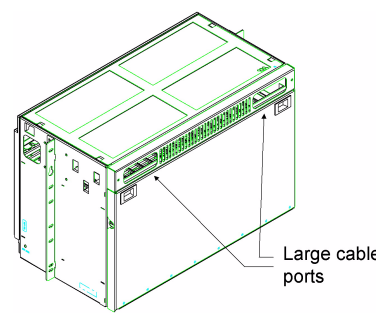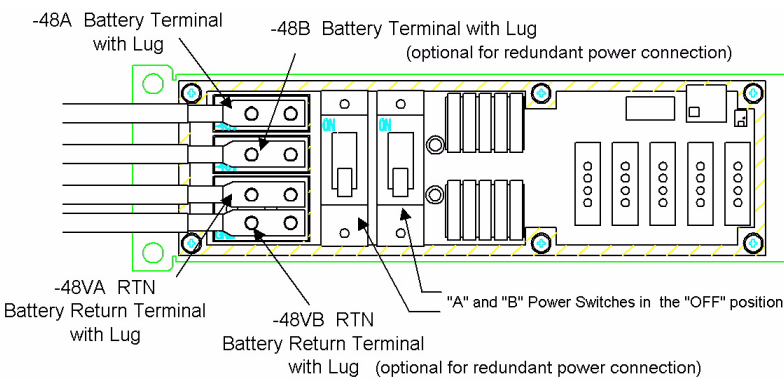Cable
Connection at
the CSIP**

Power (RED) cables are connected to the Speedlink system at the CSIP. The following steps provide instructions for installing one power cable; a second redundant cable can be installed in the same way.

Follow these steps to connect the power cable to the CSIP:

Table 42: Power (RED) Cable Connection at the CSIP

STEP	PROCEDURE
1	WEAR AN ELECTROSTATIC DISCHARGE (ESD) STRAP AT ALL TIMES when making connections on the CSIP. The Grounding jack is located on the side of the MCS assembly. Grounding Jack Figure 182: MCS Grounding Jack
2	Route the power cable from the negative (" − ") terminal on the power supply to the MCS CSIP. Large Cable Ports Master Control Shelf 6 AWG Ground Wire (rack to earth ground) Power (RED) Cable Line Card Shelf Low Pass Filter Shelf Earth Ground Return (BLACK) Cable 8 AWG Ground Wire (return [BLACK] cable to earth ground) -48 VOLTS POWER SUPPLY Power Cord Figure 183: Power Cable to CSIP (Back View)

Detailed Level Procedure

Appendix A   Power to the Speedlink in a Non-Central Office Environment
Release 3.0   10/28/98
Power (RED) Cable Connection at the CSIP

Table 42: Power (RED) Cable Connection at the CSIP (continued)

STEP	PROCEDURE
3	Push the power cable through one of the large cable ports at the back of the CSIP. Figure 184: MCS Cable Ports
4	Go to the front of the MCS cabinet. Pull the power cable from the back of the assembly through the port to the front of the CSIP.
5	Cut the power cable to the correct length using diagonal cutters.
6	Using a crimping tool, attach the 2-hole barrel lug to the power cable.
7	Place the power cable lug on the battery terminal labeled "-48A." If you are using a second redundant power cable, repeat Steps 2 through 7 for the redundant cable, and place the redundant cable lug on the battery terminal labeled "-48B." **IMPORTANT:** Tighten lug nuts to 18-20 inch pounds torque. Figure 185: CSIP Power and Return Terminals
8	Replace the protective plastic lug cover. Push in on the two release pins to secure.

Table 42: Power (RED) Cable Connection at the CSIP (continued)

STEP	PROCEDURE
9	Continue to the next procedure: Connect Power and Return Cables to the Power Supply.

Connect Power and Return Cables to the Power Supply

Follow these steps to connect the power and return cables to the power supply:

Table 43: Connect Power and Return Cables to the Power Supply

STEP	PROCEDURE
1	Check to make sure CSIP power switches are still in the "OFF" or "Down" position. Verify that fuses are not installed in the fuse holders.
2	Connect the *return* cable (first) to the power supply according to power supply specifications.
3	Connect the *power* cable (second) to the power supply according to power supply specifications.
4	Plug in the power supply.
5	Continue to the next procedure: Verify Continuity and Polarity.

Verify Continuity and Polarity

Follow these steps to verify continuity and polarity of cables:

Table 44: Verify Continuity and Polarity

STEP	PROCEDURE
1	Use a Volt OHM Meter (VOM) to verify continuity of cables from the CSIP to the power supply.
2	Use a VOM to confirm polarity between the power supply and the CSIP.
3	Continue to the next procedure: Verify Voltage.

Verify Voltage   Follow these steps to verify voltage at the CSIP:

Table 45: Verify Voltage

STEP	PROCEDURE
1	Use a VOM to measure the voltage present at the "-48A" and "-48VA RTN" terminals on the CSIP. If you are also using the "-48B" and "-48VB RTN" terminals, measure the voltage present on the "-48B" and "-48VB RTN" terminals.
2	Is the voltage between -42.75 and -56 Volts DC? ■ If YES, continue to STEP 3. ■ If NO, re-verify continuity of the power and return cables from the CSIP to the power supply.
3	The "Supplying Power to the Speedlink system in a Non-Central Office Environment" procedure is complete. Continue to Chapter 7—"DS3 MCS to ATM Network Cabling" on page 55, or Chapter 8—"OC3 MCS to ATM Network Cabling" on page 61.

IMPORTANT: Leave power switches in the "OFF" or "Down" position. Volume 3— *Acceptance Testing*, Chapter 6—"Speedlink Test and Turn-up" provides instructions for "powering up" the Speedlink system.

VOLUME 2   **INSTALLATION**
Appendix A   **Power to the Speedlink in a Non-Central Office Environment**
                     Verify Voltage

SECTION 7 APPENDICES

Appendix B   Speedlink Component Part Numbers

Part Numbers
Table

Table 46: Speedlink Component Part Numbers

PART NAME	PART NUMBER
SPEEDLINK MULTIPLEXER ASSEMBLIES	
Master Control Shelf Kit (includes Fan Tray)	50-0010
Line Card Shelf Kit (includes Fan Tray)	50-0020
Low Pass Filter Kit	50-0030
ADSL Link ID Kit	50-0106
Auxiliary CSIP Assembly Kit	50-0040
Fan Tray (included in MCS and LCS Kits)	30-0005
CABLE ASSEMBLIES	
LCS Power Cable	40-0002-004
Cable Assembly - female	40-0014
Cable Assembly - male	40-0015
Cable Assembly R LCS-LPFS	40-0011-001
Cable Assembly R LCS-LPFS	40-0011-002
Cable Assembly L LCS-LPFS	40-0012-001
Cable Assembly L LCS-LPFS	40-0012-002
3 Meter Duplex Fiber Optic Cable	70-0003-030
ADSL Link ID Telco Signal cable	40-0016-002
ADSL Link ID Power cable	40-0002-002
ADSL Link ID to CSIP Alarm cable - 48 inches	40-0018-001
ADSL Link ID to LCS Alarm cable - 36 inches	40-0018-002
INSTALLATION KITS	
MCS/ACSIP Installation Kit	50-0060
LCS/LPFS Installation Kit	50-0070

Table 46: Speedlink Component Part Numbers (continued)

PART NAME	PART NUMBER
MASTER CONTROL SHELF CARDS	
Master Control Processor card	60-0008-800
Master Line Card Adapter card	60-0010-800
Network Management Processor card	60-0009-800
DS3T Trunk Interface card	60-0007-800
OC3T Trunk Interface card	60-0027-801
LINE CARD SHELF CARDS	
Line Card Shelf Multiplexer (LSM2) card	60-0037-801
CAP2 card (Dual ADSL)	60-0005-801
CAP4 card (Quad ADSL)	60-0080-801
DMT4 card (Quad ADSL)	60-0066-801
SDSL8 card (Octal SDSL)	60-0044-801
IDSL8 card (Octal IDSL)	60-0054-801
LOW PASS FILTER SHELF CARDS	
LPF2 card (for CAP2 LCS cards)	60-0016-801
LPF4 card (for CAP4 LCS cards)	60-0016-802
LPF4D card (for DMT4 LCS cards)	60-0016-803
TEST CARDS	
Complimentary Analysis Module (CAM) card	60-0039-800
Pair Analysis Module (PAM) card	60-0038-800
ALARM BOARDS PARTS	
2 position vertical (180°) 5mm pluggable terminal blocks	84-0043-002
3 position vertical (180°) 5mm pluggable terminal blocks	84-0043-003
84 inch fuse alarm relay rack wire	40-0005-002
110 inch fuse alarm relay rack wire	40-0005-003
136 inch fuse alarm relay rack wire	40-0005-004
2 position IDC socket connector	84-0080-002
MISCELLANEOUS ITEMS	
Speedlink System Software	50-0002
DiamondView Software	50-0003
DiamondCraft Software	50-0004
Standalone Remote Low Pass Filter NID	30-0004
Retrofit Remote Low Pass Filter NID	30-0006
Thread Forming Screws (total of 4)	61-0065
2 hole copper barrel lugs (total of 4)	85-0009-002
15 amp GMT fuses	73-0002-015
Electrostatic Discharge Strap	85-0012

Diamond Lane Communications
Glossary and Acronyms

Asymmetric Digital Subscriber Line (ADSL)

Asymmetrical data signals for Internet access that share twisted pairs with POTS and that use modern signal modulation techniques to accomplish the data communications task.

Alarm

A signal used to indicate that an abnormality, a fault, or a failure has been detected. Alarms may be distinguished by type and by the severity of the event that caused the alarm.

Alarm Indication Signal (AIS)

A downstream signal in a digital network that replaces the normal traffic signal when a maintenance alarm indication has been activated (indicating an upstream failure detection − error or alarm on the network). It is used in the OSI network management model.

ATM Adaptation Layer (AAL)

ATM Adaptation Layer is located above ATM and converts non-ATM bit streams into ATM cells. The AAL protocol supports higher-layer service requirements.

Asynchronous Transfer Mode (ATM)

A multiplexed information transfer and switching process (cell-switched technology) in which data is organized into fixed length (53 octet) cells and transmitted according to each application's requirement. ATM is generally deployed in enterprise networks, which often connect LANs over wide areas that require large amounts of data to be transported over great distances.

Auxiliary Common Systems Interface Panel (CSIP)

Each Auxiliary CSIP connects and distributes central office power to up to four Line Card Shelves (LCS). Auxiliary CSIPs are required for Speedlink Systems with over five Line Card Shelves.

Bit Error Rate (BER)

A measurement of transmission quality expressed as a ratio (ratio of error bits to the total number of bits transmitted − erroneous bits per million). The BER indicates how many bits are incorrectly transmitted in a given bit stream. The BER depends on the type and length of transmission.

CAP2

Carrierless Amplitude and Phase (CAP) ADSL line card, 2 ports per line card.

CAP4

Carrierless Amplitude and Phase (CAP) ADSL line card, 4 ports per line card.

CBR (Constant Bit Rate)

Data that are transmitted at a constant rate on an ATM network.

CELL

In general, fast packet-switching technologies—such as ATM (Asynchronous Transfer Mode). The ATM Cell has a 5-byte header and contains 48 bytes of payload.

Central Office (CO)

The Local Exchange switch that terminates individual local telephone subscriber lines for switching and connection to the public network (locally and long distance).

Common Management Information Protocol (CMIP)

An OSI network management/service interface protocol created and standardized by ISO. Based on the basic data storage concept in which management information is collected and stored for subsequent retrieval by a management application. Provides for the transmission of event notifications and the transmission of operations directed toward managed objects.

Common Systems Interface Panel (CSIP) Power and Distribution Board

The CSIP Power and Distribution Board is located in the Master Control Shelf (MCS). Central office power is terminated at the CSIP and is distributed to the Master Control Shelf and up to four Line Card Shelves.

Common Systems Interface Panel (CSIP) Alarm Board

All Speedlink alarm connections are made at the CSIP Alarm Board; central office visual, audible, remote Bay Alarm and remote input alarms. The Alarm Board has LEDs to display Speedlink alarm status.

Constant Bit Rate (CBR)

Applications or services in a digital network that are to be the same bandwidth for the duration of the call.

CPE (Customer Premise Equipment)

Refers to telephone and related equipment located on the customer's premises (office or home).

Customer Network Management (CNM)

A feature of ATM, Frame Relay and SMDS which allows customers to directly view and manage their public data service (communications networks) in the same way they view and manage their local area networks.

Digital Loop Carrier (DLC)

Network transmission equipment used to provide a pair gain function. DLC equipment is deployed in situations in which the cost of the equipment is more than offset by the savings in copper distribution accomplished by eliminating need for as many copper pairs. Digital loop carrier systems consist of two parts—a Central Office Terminal (COT) and a Remote Terminal. The COT provides the multiplexing/demultiplexing function of individual voice signals to the composite multiplexed signal at the interface between the switching equipment and the DLC. The Remote Terminal provides the multiplexing/demultiplexing function at the interface between the individual subscriber pairs and the DLC equipment.

DiamondCraft™

DiamondCraft is the Speedlink's stand-alone craft interface application. It communicates directly with a Speedlink through a serial port connection using Point-to Point Protocol (PPP).

DiamondView™

DiamondView is the Speedlink's Element Management System (EMS). It is a HP Open View® application and operates on a UNIX workstation.

DS1 (Digital Signal Level One)

1.544 Mb/s digital signal.

DS3 (Digital Signal Level Three)

44.736 Mb/s digital signal − equivalent of 28 T-1 channels (also referred to as T-3).

DS3T

The DS3 trunk card provides the interface between ATM backbone facility and the Speedlink. It multiplexes and de-multiplexes up to 12 broadband ATM cell streams from the MLA cards and sends this "payload" out over the ATM network. The Speedlink has two DS3T cards in a 1:1 protection group.

DSLAM (Digital Subscriber Line Access Multiplexer)

An ATM access mux/concentrator that grooms traffic from multiple low rate lines into a high rate trunk (DS1, DS3, OC3, OC12).

Egress

Outgoing direction to a network or network device, as opposed to the ingress (or entrance).

Element Management Systems (EMS)

Software used to manage and monitor components of a telecommunication system at the lower levels of the Telecommunications Management Network.

Graphical User Interface (GUI)

A generic name for the computer interface that substitutes graphics for characters. The GUI permits users to directly manipulate graphical objects displayed on the monitor.

HDSL (High bit rate Digital Subscriber Line)

HDSL provides a DS1 on two copper wire pairs (without the loop engineering and repeaters required for a standard T1 system).

HEC (Header Error Control)

An 8-bit field (the last byte) of the ATM-cell header, whose purpose is to allow a receiver to detect, and possibly correct, transmission errors in the cell header. It is used for checking integrity only.

IEEE (Institute of Electrical and Electronics Engineers)

An international engineering organization that defines standards related to networking and other areas.

IETF (Internet Engineering Task Force)

One of two technical engineering bodies of the Internet Architecture Board. The IETF is responsible for solving short-term engineering needs and standards of the Internet.

Ingress

Incoming direction to a network or network device, as opposed to the egress (or exit).

IP (Internet Protocol)

A component of the TCP/IP protocol suite. IP operates at the Layer 3 of the OSI Reference model.

ISO (International Standards Organization)

The International Standards Organization is an international organization founded in 1946 to facilitate the development of international data communication standards.

ITU (International Telecommunications Union)

An organization established by the United Nations. The ITU sets telecommunications standards and allocates frequencies to various uses worldwide.

LAN (Local Area Network)

A privately owned and administered network for data communications, usually within a building or campus environment, used to connect computers and peripheral devices. Communication is typically accomplished by broadcasting on a connectionless basis over a shared medium.

Line Card

A line card serves as the interface between a line and a communications device.

Line Card Shelf (LCS)

The Speedlink System is made up of one Master Control Shelf and up to twelve Line Card Shelves. Each LCS has 24 mounting slots for line cards, a Line Card Shelf Multiplexer (LSM or LSM2) card, and an optional LSM or LSM2 card for Remote Line Card Shelf protection group application.

Line Card Shelf Multiplexer (LSM or LSM2) card

The LSM or LSM2 card communicates with the Master Line Card Adapter (MLA) card over multi-mode optical cable at OC-3 rates. The LSM or LSM2 multiplexes and demultiplexes ATM cell streams for up to 24 line cards in a Line Card Shelf.

Low Pass Filter Shelf (LPFS)

Data plus voice frequency signals are received from the customer at the Low Pass Filter Shelf. the LPF card "splits" the low frequency voice signal from the high frequency ADSL signal. The voice signal is sent onto the voice switch unimpeded; while data signal is received by the CAP2 line card.

LOF (Loss of Frame)

A condition that can occur in digital transmissions when the receiving equipment loses frame alignment data (used to determine channel assignments and channel boundaries).

LPF2

Low Pass Filter card, 2 ports per card.

LPF4

Low Pass Filter card, 4 ports per card.

Master Control Shelf (MCS)

The MCS contains the central control and communication functions for the Speedlink System and serves as the ATM network interface.

Master Control Processor (MCP) card

The MCP card is the central control and communications for the Speedlink, it stores program and provisioning database information. The Speedlink has two MCP cards in a 1:1 protection group.

Master Line Card Adapter (MLA) card

Each MLA card provides the broadband interface to one Line Card Shelf at OC-3 rates over optical fiber. There are up to twelve MLA cards in a Master Control Shelf providing the broadband interface for up to twelve Line Card Shelves and up to 288 line cards.

Management Information Base (MIB)

The MIB contains all the provisioning information for the Speedlink Multiplexer. (The MIB contains data available to a network management program. The network manager queries the MIB.)

Multiplexer

Equipment that aggregates two or more channels onto a single transmission channel.

NEBS (Network Equipment Building System)

NEBS is the Network Equipment Building System specification authored by Bellcore. NEBS compliance is required by many carrier customers; the Speedlink System shipping today is already NEBS-compliant.

NIC (Network Interface Card)

An electronic circuitry board that usually fits into an expansion slot of a PC whose purpose is to connect to a Local Area Network. A NIC is designed to comply with both a specific LAN Medium Access Control procedure (CSMA/CD for Ethernet) and a specific physical medium (e.g. twisted pair wire, coax, or multi-mode fiber). Associated with the NIC is a unique address called the MAC address. It works with the network software and computer operating system to transmit and receive messages on the network.

NID (Network Interface Device)

The Diamond Lane NID ADSL Splitter divides the ADSL and POTS signals and works in conjunction with the router at the subscriber end. The splitter installs on the outside of a home or building, and is enclosed in a weatherproof wall mount enclosure. It features primary lighting and AC power fault protection, and is a passive device, requiring no power or management from the central office or subscriber.

Network Management Processor (NMP) card

The NMP card controls the Speedlink's network management interfaces and provides the protocol support for communication for DiamondView and DiamondCraft.

OC-1 (Optical Carrier Level-1)

A SONET line rate of 51.840 Mb/s. Direct electrical-to-optical mapping of the STS signal with frame synchronous scrambling.

OC-3 (Optical Carrier Level-3)

A SONET line rate of 155.520 Mb/s. 3 x OC-1. Direct electrical-to-optical mapping of the STS signal with frame synchronous scrambling.

OC-12

Sonet channel of 622.08 Mbps.

OSI (Open System Interconnection Reference Model)

An internationally accepted set of standards for communication between various systems manufactured by different vendors. The OSI Reference Model is a seven-layer model developed by the ISO (International Standardization Organization) to describe how to connect any combination of devices to communicate.

PCI (Peripheral Component Interconnect)

Bus of an Intel PC. PCI transfers data between the PC's main microprocessor and peripherals at up to 132Mbps.

PCR (Peak Cell Rate)

PDR (Protocol Data Unit)

In data communication protocols, a unit of data created by a given protocol layer at one place and logically transferred to the same layer at another place called a peer. This is the OSI terminology for "packet".

PLCP (Physical Layer Convergence Protocol)

The part of the physical layer that adapts the transmission facility to handle DQDB functions as defined in IEEE 802.6-1990.

POP (Point-of-Presence)

The physical place within a LATA (the long distance carrier's local office) where the IEC provides services to the LEC, and perhaps directly to end-users.

POTS (Plain Old Telephone Service)

A term used to describe analog, voice-only basic telephone service. All POTS lines work on loop start signaling.

PPP (Point-to-Point Protocol)

A layer 2 protocol (relative to the OSI reference model) that allows a computer to use TCP/IP with a standard telephone line and a high-speed modem.

PVC (Permanent Virtual Circuit)

A permanent association between two DTEs established by configuration (established administratively via a service order process). A PVC uses a fixed logical channel to maintain a connection between the DTEs. After a PVC is defined, it requires no setup operation before data is sent and no disconnect operation after. The concept of a PVC is included in Networks supporting X.25, Frame Relay and ATM.

QoS (Quality of Service)

In ATM networks, a set of parameters for describing a transmission. These parameters include values such as allowable cell loss. The parameters apply to virtual channel connections and virtual path connections.

Remote Line Card Shelf (RLCS)

A RLCS allows customers served off of long loops — beyond 18,000 ft from the central office — access to xDSL service. The RLCS is located remotely from the central office in an outside cabinet and connected to the central office Master Control Shelf via fiber optic extensions.

Remote Low Pass Filter (RLPF)

The RLPF is a remote passive low pass filter "splitter" device. It splits the high frequency ADSL data signal from the voice signal at the customer end just like the Low Pass Filter card in the central office. There are two types of RLPF – a retrofit RLPF available a standard Network Interface Device housing and a standalone RLPF.

RFC (Request for Comments)

In the Internet community, a series of documents that contain protocol and model descriptions, experimental results, and reviews. All Internet standard protocols are written up as RFCs.

SDSL (Symmetric Digital Subscriber Line)

Also referred to as Single-Line Digital Subscriber Line, SDSL supports symmetrical T1/E1 transmissions. It uses a single copper-pair wire and has a maximum operating range of 10,000 feet. It is capable of accommodating applications that require identical downstream and upstream speeds, such as video conferencing.

Serial Port

A hardware input/output port in which only one pin is available for data transmission in a given direction – bits are transmitted in sequence (one bit at a time). The wiring for a port is associated with a particular physical interface (i.e., RS-232). A serial port is most commonly used for a modem or a mouse.

Service Provider

A service provider is an organization or individual that provides telephone access to a network or to another service, such as the Internet.

SNMP (Simple Network Management Protocol)

The network management protocol used within TCP/IP-based internets. Defines the protocol for managers (clients) to communicate with agents (servers). The agent interfaces directly with the networking layers on the monitored network device to obtain the network management information. An agent is installed on every network device that will be managed or monitored. A client is a application program that is installed at the network operations center. It communicates with the SNMP agents to collect information in the form of MIB variables. SNMP is a request/reply protocol that uses the operations of Set or Get on data items in a agents MIB.

SNR (Signal-to-Noise Ratio)

In a transmission, SNR is the ratio between the signal and noise levels at a given point, usually at the receiving end of the transmission. The SNR value is generally expressed

in decibels (dB). The SNR can be used to determine how long a cable segment can before the signal loss is unacceptably high. The SNR also helps determine whether a particular type of cable is appropriate for the intended use.

SOHO (Small Office – Home Office)

SONET (Synchronous Optical NETwork)

SONET is a high-speed, fiber-optic system, which provides an interface and mechanism for optical transmission of digital information. At the interface, signals are converted from electrical to optical form (and back to electrical form at the destination). SONET is an ANSI standard. Transmission rates range from 51.84Mbps to 13.22Gbps.

Speedlink Multiplexer

The Speedlink Multiplexer is classified as a Digital Subscriber Line Access Multiplexer (DSLAM). The Speedlink Multiplexer uses Digital Subscriber Line (xDSL) and Asynchronous Transfer Mode (ATM) technologies to deliver high speed data rates over the exiting copper network.

SVC (Switched Virtual Circuit)

A virtual connection set up on demand via a signaling protocol connection that is established for a communications session that is terminated after the session is over. This is in contrast to a permanent virtual circuit (PVC), which is a connection that is always established.

T1

DS1 rate electrical signal (two pair). T1 is suited for voice, data and image transmissions. T1 has a bandwidth of 1.544 megabits per second (Mbps), which comes from two dozen 64 kilobit per second (Kbps) channels, together with one 8Kbps framing channel.

TCP/IP (Transmission Control Protocol / Internet Protocol)

TCP/IP is a suite of several networking protocols developed for use on the Internet.

Telnet

Telnet is the terminal-remote host protocol developed for ARPAnet in 1974. On the Internet, it is a service program that allows you to connect to other computers at another site permitting you to interact with applications as if by a local terminal.

Trap

A method used to isolate an abnormal condition or operation.

TMN (Telecommunications Management Network)

A concept where all Operation and Maintenance Centers are linked together to form a network.

UBR (Unspecified Bit Rate)

In ATM networks, a UBR connection transmits at variable rates.

UNI (User-to-Network Interface)

In ATM networks, one of three levels of interface.   A UNI specification which defines Layer 1 and Layer 2 protocols required for CPE and carrier equipment to interoperate. UNI specifications provide physical media and line rate implementation options.

VBR (Variable Bit Rate)

In ATM networks, a VBR connection transmits in bursts, at variable speeds.

VDSL (Very-high-speed Digital Subscriber Line)

VDSL provides DSL service at a data rate in excess of 10Mbps (up to 52Mbps). VDSL has a maximum operating range from 1,000 feet to 4,500 feet on 24-gauge wire.

VPI (Virtual Path Identifier)

An identifier (value) in an ATM cell that identifies the data of one Virtual Path connection from the data of another connection.

Diamond Lane Communications Corporation Proprietary Data

WAN (Wide Area Network)

A WAN is a network of computers and related communications equipment whose elements may be in dispersed sites with distances great enough to require common carrier provided communication lines.

xDSL (all forms of Digital Subscriber Lines)

The "x" represents the various types of digital subscriber lines: ADSL, RADSL, SDSL, HDSL, or VDSL.

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