

LattisLink 2800A 10BASE-T Workgroup Concentrator User's Guide



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従って、住宅地域、その隣接地域等で使用した場合、ラジオ、テレビ受信機等に障害を与えることがあります。

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Consequently, when this equipment is used in a residential area or in an adjacent area thereto, radio interference may be caused to equipment such as radios and TV receivers.

For more information regarding a specific product, refer to the appropriate product reference sheet.

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Consequently, when this equipment is used in a residential area or in an adjacent area thereto, radio interference may be caused to equipment such as radios and TV receivers.

Compliance with the applicable regulations is dependent upon the use of shielded cables. The user is responsible for procuring the appropriate cables. Read instructions for correct handling.

For more information regarding a specific product, refer to the appropriate product reference sheet.



NOTE: *The following short EMI statements are typically used in Reference sheets and other brief hardware publications. A larger governing document (for example, System 3000 I & M Guide) must contain the full EMI statements for the product.*

Electromagnetic Emissions

Meets requirements of:

FCC Part 15, Subparts A and B, Class A

EN 55 022 (CISPR 22:1985), Class A <and Class B>

General License VDE 0871, Class B (AmtsbIVfg No. 243/1991 and Vfg 46/1992)

VCCI Class 1 ITE

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Preface

This guide describes the physical installation of the LattisLink 2800A 10BASE-T Workgroup Concentrator. It also provides configuration rules and procedures for connection of Ethernet stations. Appendices provide descriptions of concentrator indicators and switches, technical specifications for the concentrator, connector pin assignments, and descriptions of the link integrity test and autopolarity detection and correction functions.

Intended Audience

This guide is intended for network installers or administrators who are responsible for configuring, installing, or maintaining a 10BASE-T network with LattisLink 2800A 10BASE-T Workgroup Concentrators. An understanding of 10BASE-T concepts and terminology will be helpful in using this manual.

How This Guide Is Organized

This guide contains the following chapters and appendices:

Chapter 1, “Overview,” describes the hardware features of the Model 2800A concentrator.

Chapter 2, “Installation,” provides instructions for physical installation of the Model 2800A.

Chapter 3, “Network Configurations and Cable Connections,” describes configurations and cable connections for single-concentrator and multiple-concentrator networks.

Appendix A lists the Model 2800A indicators and switches and describes their functions.

Appendix B provides the Model 2800A technical specifications.

Appendix C provides pin assignments for the Model 2800A connectors.

Appendix D describes the link integrity test function.

Appendix E describes autopolarity detection and correction.

Related Publications

For more information about LattisNet Ethernet networks, see the *LattisNet System 3000 Ethernet Connectivity Guide*, Part Number 893-211-B.

Chapter 1 Overview

The LattisLink 2800A 10BASE-T Workgroup Concentrator is a preconfigured, standards-based connectivity platform for small, low-density 10BASE-T Ethernet networking environments. The LattisLink 2800A is based on IEEE 802.3i 10BASE-T, which specifies the operation of Ethernet at 10 megabits per second (Mb/s) over unshielded twisted pair (UTP) wire.

Each Model 2800A concentrator (see Figure 1-1) offers 16 host ports with standard RJ-45 receptacles for UTP wire connections, and a dedicated attachment unit interface (AUI) interconnect port. You can use the AUI port to connect the Model 2800A to a coaxial cable backbone or to another concentrator using IEEE 802.3 MAUs or FOMAUs.



Figure 1-1. LattisLink 2800A 10BASE-T Workgroup Concentrator

The front panel includes LEDs that indicate concentrator, port, and network traffic conditions. There is also a convenient MDI-X/MDI switch that swaps the Port 1 transmit and receive pin assignments, allowing you to link multiple Model 2800As via 10BASE-T without using a special crossover cable.

The Model 2800A features an internal power supply, operating over the 50/60 Hz, 100/240 VAC universal input voltage range. You can install the Model 2800A in a rack, on a wall, or on a table.

Features

The Model 2800A has the following features:

- Sixteen IEEE 802.3i 10BASE-T-compatible ports for unshielded twisted pair connections
- Standard shielded RJ-45 modular female connectors

Overview

- Connections to shielded twisted pair cable using the Model 822 10BASE-T-to-Type 1 Adapter
- Per-port link integrity test function
- Per-port autopartitioning, which disconnects the port in the event of excessive consecutive collisions, an excessively long single collision, or jabber input
- Per-port automatic polarity detection and correction, which detects and automatically corrects for signal inversions on the UTP receive data wire-pair
- Data packet retiming (IEEE 802.3 repeater standard)
- AUI port to facilitate interconnection to other concentrators or coaxial segments via IEEE 802.3 MAUs or FOMAUs
- MDI-X/MDI switchable Port 1
- Small physical size
- Internal power supply (50/60 Hz, 100/240 VAC)
- Mounting versatility—in rack, on wall, on table

Chapter 2 Installation

Installation of the Model 2800A concentrator consists of preparing the installation site, unpacking equipment, and physically installing the concentrator(s).



NOTE: *Only qualified technicians should install and maintain this equipment.*

Site Preparation

Before you start installing the Model 2800A, make sure the installation site is ready. Check the following conditions:

- Adequate space and support

You need a space approximately 10" by 18" on a tabletop or shelf for table installation of the Model 2800A. Make sure the table or shelf you plan to use is level and will support at least 10 pounds.

In a standard 19-inch EIA equipment rack, allow one rack space for the Model 2800A.

For wall installation of the Model 2800A, you need a piece of half-inch plywood secured to the wall in the location where you plan to attach the Model 2800A. The recommended minimum size of the plywood is 6" by 20".

Make sure there is adequate space for cables and wiring hardware such as punch-down blocks.

For a wall-mounted concentrator, allow adequate space at the front and rear of the concentrator to perform network maintenance such as checking LEDs or changing cable connections.

- Temperature

Make sure the operating environment temperature is between 5° C and 40° C. Do not place the Model 2800A in direct sunlight or near warm air exhausts or heaters.

Installation

- Ventilation
For proper cooling of the Model 2800A, make sure there is adequate airflow around the concentrator. Air enters through both sides and flows out the back. Leave at least two inches of space on all sides of the Model 2800A for proper airflow and cooling.
- Humidity
Do not allow humidity in the area to be higher than 85% relative humidity, noncondensing.
- Lack of dust
Avoid installing the Model 2800A in extremely dusty locations.
- Electromagnetic “noise”
Avoid installing the Model 2800A within six feet of equipment such as photocopy machines, arc welders, or other equipment that creates electromagnetic “noise.”
- Wiring hardware
Have wiring hardware, such as punch-down blocks or patch panels, in place before you install the Model 2800A.
- Power source
Have a power outlet within six feet of the intended installation site.

Package Contents

When you unpack the equipment, check to see that you have the following items (see Figure 2-1):

- Model 2800A Concentrator
- Two rack-mounting brackets
- Two wall-mounting brackets
- Installation hardware:
 - Five #4-40 x 5/16" flat-head Phillips screws for attaching mounting brackets (one extra)

Required Tools and Materials

- Four #10-32 x 3/4" panhead Phillips screws and nylon washers for rack-mounting
- Power cord (North America only)
- Four rubber feet
- This user's guide
- Warranty card

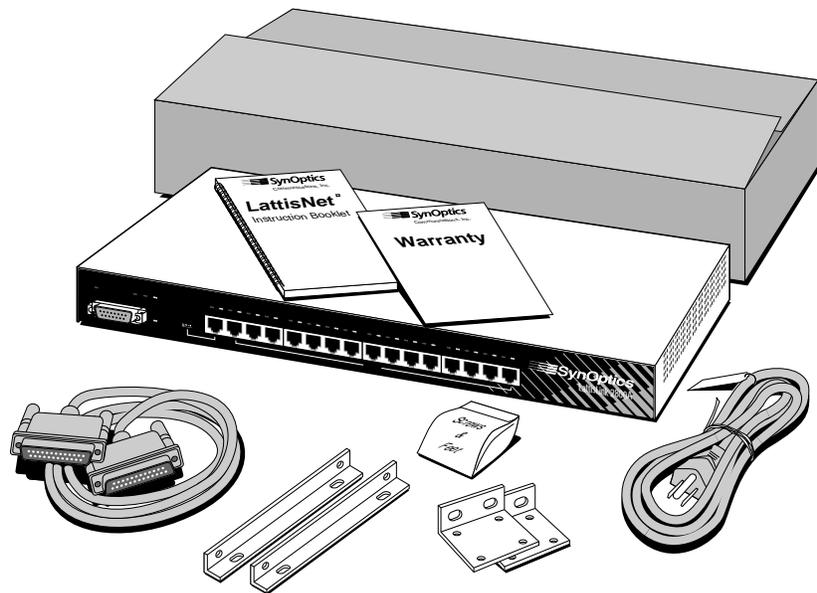


Figure 2-1. Unpacking the Model 2800A Concentrator

If any listed items are missing or damaged, contact the sales or customer service representative from whom you purchased your Model 2800A Concentrator.

Required Tools and Materials

To install the Model 2800A, you need the following tools and materials:

- #1 Phillips screwdriver for attaching mounting brackets

Installation

- #2 Phillips screwdriver for tightening rack mounting screws
- For wall installation:
 - Piece of plywood approximately 6" by 20" (minimum 1/2 inch thick)
 - Drill
 - Four #12 x 5/8" panhead Phillips sheet metal screws

Table or Shelf Installation

To install the Model 2800A on a table or shelf, follow these steps:

1. **Peel off the protective backing from the rubber feet and apply one at each marked location on the bottom of the Model 2800A (see Figure 2-2).**

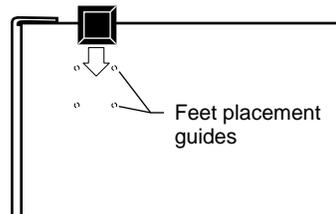


Figure 2-2. Attaching Feet

2. **Set the concentrator on a table or shelf so that it has at least two inches of space on all sides.**
3. **Connect the power cord, first to the power entry receptacle on the back of the concentrator (see Figure 2-3), and then to the wall.**

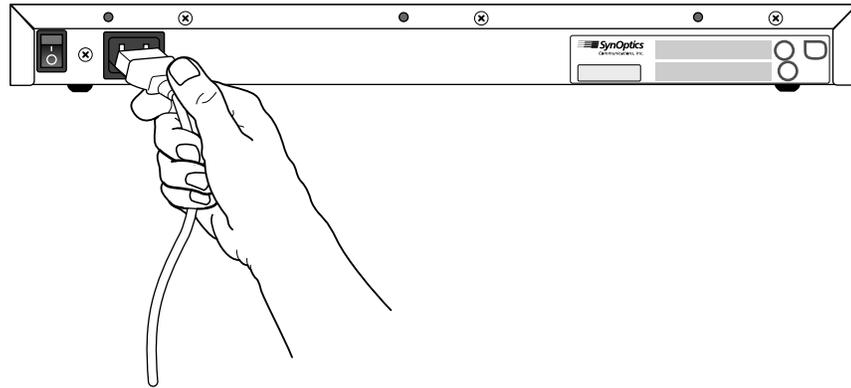


Figure 2-3. Connecting Power Cord

4. Turn on the power switch.
5. Check the Power LED on the front panel (see Figure 2-4). If it does not light, contact the customer support department of the organization from which you purchased your Model 2800A.

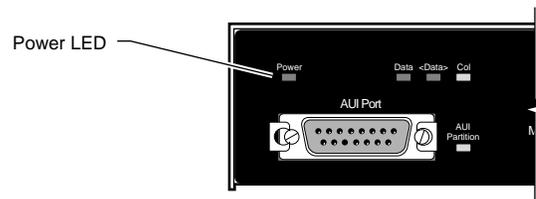


Figure 2-4. Power LED

At this point the concentrator is ready to have the network cables connected. See Chapter 3 for information on network configurations and connecting cables.

Rack Installation

To install the Model 2800A in an equipment rack, follow these steps:

1. Attach mounting brackets:

Installation

- a. On each side of the concentrator, use a #1 Phillips screwdriver to remove the screws at the front corner (see Figure 2-5).

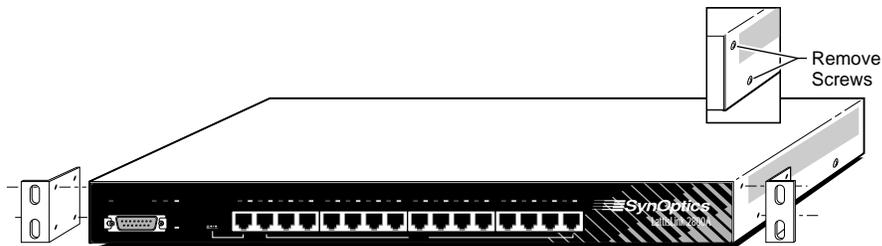


Figure 2-5. Attaching Brackets for Rack Installation

- b. Hold a mounting bracket against each side of the concentrator, as shown in Figure 2-5, and align the counter-sunk screw holes in the bracket with the bracket mounting holes in the concentrator.
 - c. Insert two #4-40 x 5/16" flat-head screws through each bracket and into the bracket mounting holes in the concentrator cabinet (see Figure 2-5). Using a #1 Phillips screwdriver, tighten the screws to secure each bracket.
- 2. Install the concentrator in the rack:**
- a. Hold the concentrator with the mounting holes in the brackets aligned with holes in the rack (see Figure 2-6).

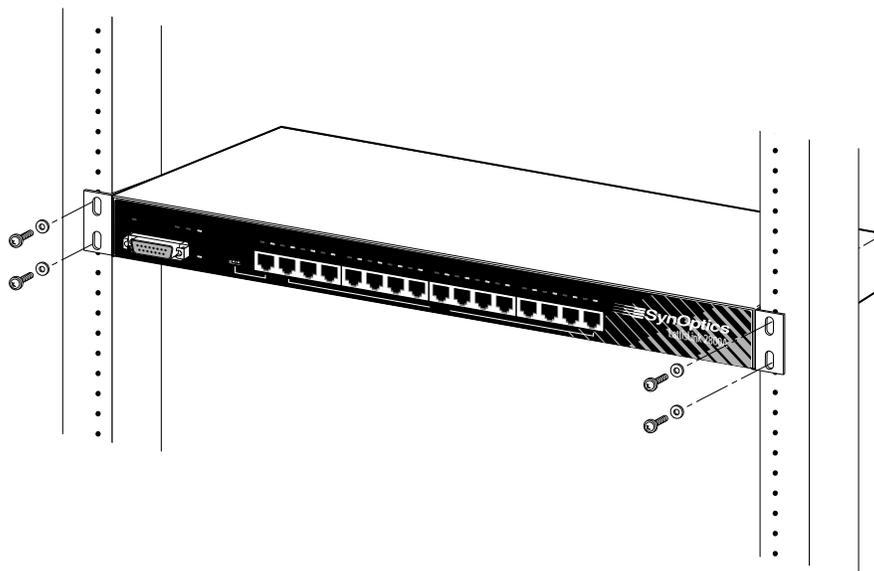


Figure 2-6. Installing Concentrator in Equipment Rack

- b. Insert two #10-32 x 3/4" screws with nylon washers through each bracket and into the rack. Using a # 2 Phillips screwdriver, tighten the screws to secure the concentrator to the rack.
3. **Connect the power cord, first to the power entry receptacle on the back of the concentrator (see Figure 2-7) and then to the power outlet.**

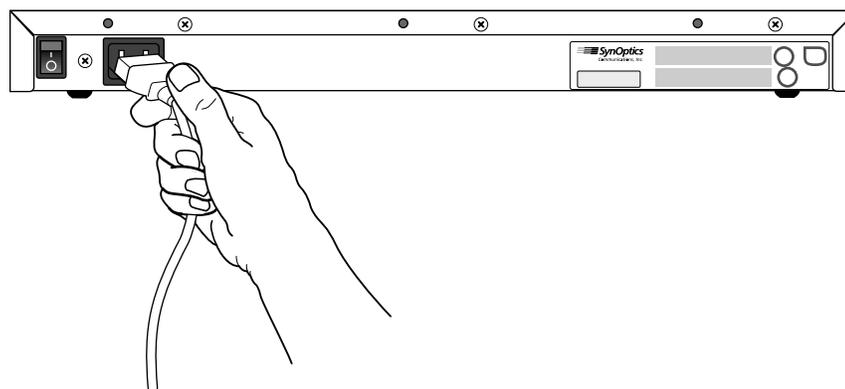


Figure 2-7. Connecting Power Cord

4. Turn on the power switch.
5. Check the Power LED on the front panel (see Figure 2-8). If it does not light, contact the customer support department of the organization from which you purchased your Model 2800A.

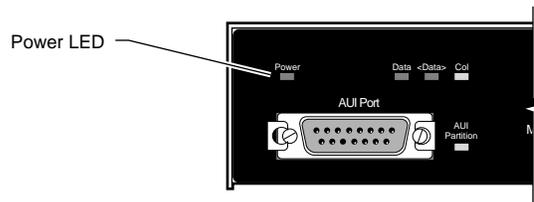


Figure 2-8. Power LED

At this point the concentrator is ready to have the network cables connected. See Chapter 3 for information on network configurations and connecting cables.

Wall Installation



SCREWS FOR WALL INSTALLATION: You must supply four #12 x 5/8” panhead Phillips sheet metal screws for wall mounting the Model 2800A.

In a wall installation, the Model 2800A must be mounted on a wooden surface. Make sure half-inch plywood is securely attached to the wall where you intend to install the Model 2800A.

To install the Model 2800A, follow these steps:

1. **Attach mounting brackets:**
 - a. Using a #1 Phillips screwdriver, remove the two bottom screws on each side (see Figure 2-9).

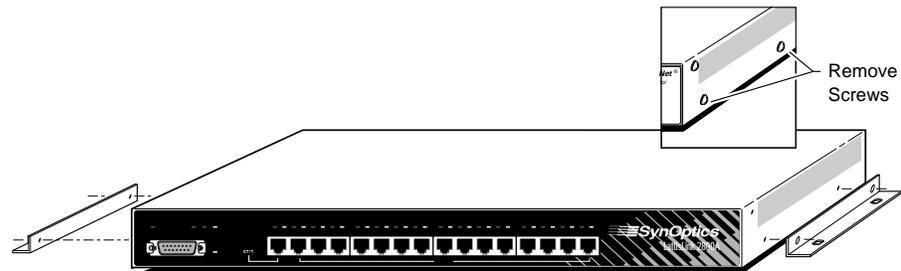


Figure 2-9. Attaching Brackets for Wall Mounting

- b. Hold a mounting bracket against each side of the concentrator where you removed the screws, as shown in Figure 2-9, and align the countersunk screw holes in the bracket with the bracket mounting holes in the concentrator.
 - c. Insert two #4-40 x 5/16" flat-head screws through each bracket and into the bracket mounting holes in the concentrator cabinet (see Figure 2-9). Using a #1 Phillips screwdriver, tighten the screws to secure each bracket.
- 2. Prepare the wall for installing the mounting screws:**
- d. Using Figure 2-10 as a guide, mark the mounting screw locations on the plywood where you plan to install the Model 2800A.
 - e. Drill pilot holes at the marked locations.

Installation

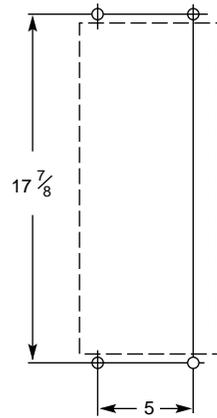


Figure 2-10. Template for Wall Mounting

- 3. Holding the concentrator against the wood, align the bracket holes with the pilot holes in the plywood (see Figure 2-11). Insert and tighten the sheet metal screws.**

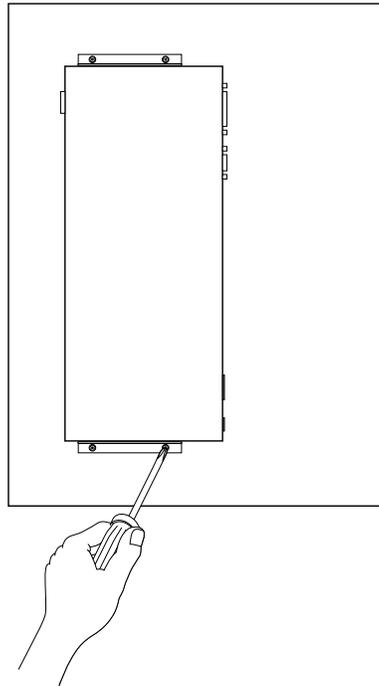


Figure 2-11. Securing Concentrator to the Wall

- 4. Connect the power cord, first to the power entry receptacle and then to the wall outlet (see Figure 2-12).**

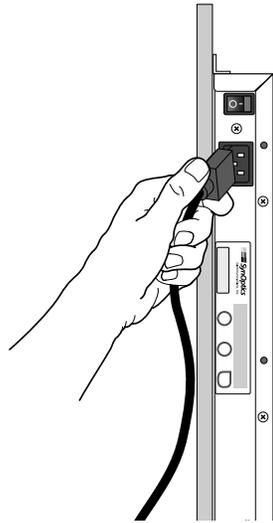


Figure 2-12. Connecting Power Cord

5. Turn on the power switch.
6. Check the Power LED on the front panel (see Figure 2-13). If it does not light, contact the customer support department of the organization from which you purchased your Model 2800A.

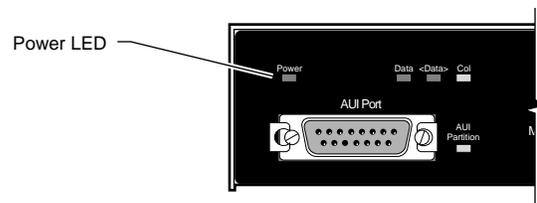


Figure 2-13. Power LED

At this point the concentrator is ready to have the network cables connected. See Chapter 3 for information on network configurations and connecting cables.

Chapter 3 Network Configurations and Cable Connections

This chapter provides the general requirements and recommendations for proper network configuration of the LattisLink 2800A 10BASE-T Workgroup Concentrator. It also tells how to connect network cables to the concentrator.

You can use the Model 2800A as a stand-alone concentrator supporting up to 16 users, or you can interconnect it to other concentrators to create a larger network. Follow the configuration guidelines listed under “Configuration Rules,” later in this chapter, to adhere to the IEEE 802.3i 10BASE-T specifications.

The installation procedures in this chapter assume that UTP horizontal distribution cables are already installed, providing connection from the work area wall outlet to the wiring closet punch-down blocks. Normal cabling system practices are assumed; your installation procedure may vary slightly, depending on your particular cabling system.

Single-Concentrator Network

Figure 3-1 shows a typical single-concentrator network configuration using the LattisLink 2800A 10BASE-T Workgroup Concentrator. In the work area, the Ethernet stations are attached to the UTP horizontal distribution cables through the AUI network interface card (NIC) and 10BASE-T transceiver. You can omit the 10BASE-T transceiver if the Ethernet station has an installed 10BASE-T network interface card.

In the wiring closet, the UTP horizontal distribution cabling is connected to a punch-down block, and the connection through patch cables is made to a 10BASE-T port on the Model 2800A concentrator.

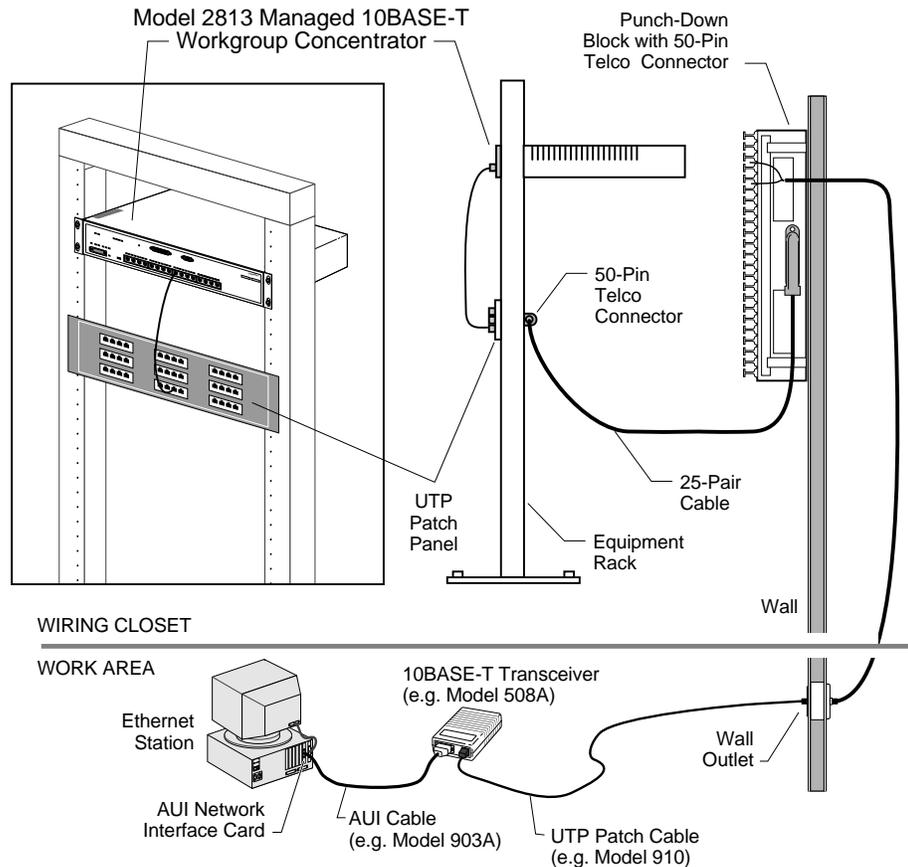


Figure 3-1. Typical Single-Concentrator Network Configuration

Ethernet Station Connections

For a single-concentrator network, the only cable connections are those between the Ethernet stations and the concentrator. Ethernet station connections are standard for all network configurations, irrespective of the number of concentrators used, and are typically made in two locations: in the work area and in the wiring closet.

Cable Connections in the Work Area

The Ethernet station can have one of two types of network interface card installed:

- An AUI network interface card
- A 10BASE-T network interface card

If you are connecting an Ethernet station with an **AUI network interface card**, you must use an external 10BASE-T transceiver, such as the SynOptics Model 508A or Model 928. To connect the station to the premises cabling, follow these steps:

1. **Attach an AUI cable (e.g. Model 903A) from the interface card to the AUI port of an external 10BASE-T transceiver (e.g. Model 508A), as shown in Figure 3-2, or attach a SynOptics Model 928 Integrated Transceiver directly to the interface card (see Figure 3-3).**

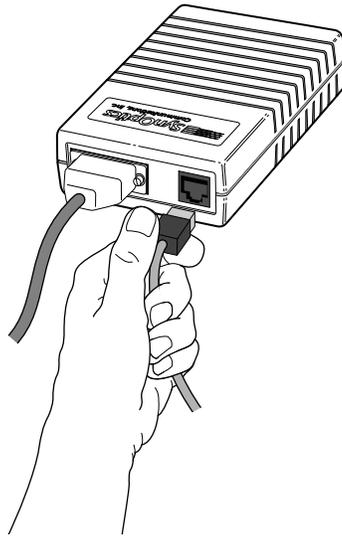


Figure 3-2. Connecting a Model 508A 10BASE-T Transceiver

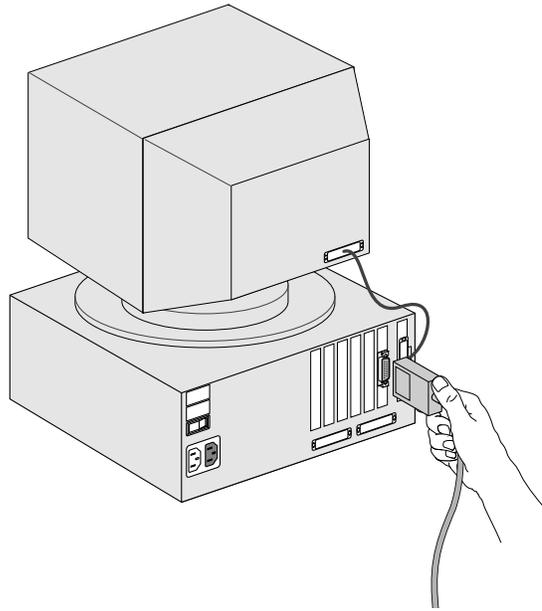


Figure 3-3. Connecting a Model 928 Integrated 10BASE-T Transceiver

2. **Connect a UTP patch cable (e.g. Model 910) from the RJ-45 port of the 10BASE-T transceiver to the RJ-45 connector of the wall outlet, or attach the captive cable on the Model 928 to the wall outlet (see Figures 3-2 and 3-3).**

If a **10BASE-T network interface card** is installed in the Ethernet station, you do not need the external 10BASE-T transceiver and AUI cable. To connect an Ethernet station with a 10BASE-T network interface card, follow these steps:

1. **Connect one end of a UTP patch cable (e.g. Model 910) to the RJ-45 port of the 10BASE-T interface card (see Figure 3-4).**
2. **Connect the other end to the RJ-45 connector of the wall outlet (see Figure 3-4).**

Repeat steps 1 and 2 for each type of station until all Ethernet stations are connected to the UTP horizontal distribution cabling through the RJ-45 connectors of wall outlets.

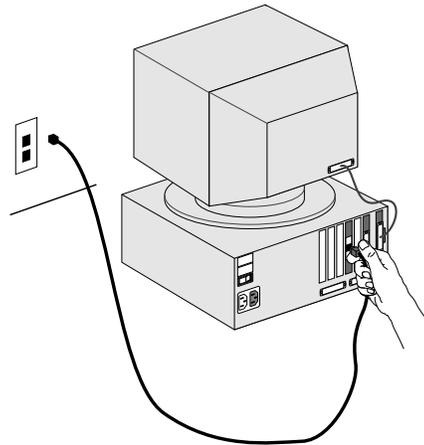


Figure 3-4. Connecting a 10BASE-T Interface Card



CONNECTING STP CABLE: To connect Ethernet stations to IBM Type 1 STP cable, use the Model 822 10BASE-T-to-Type 1 Adapter. See the Model 822 10BASE-T-to-Type 1 Adapter Reference Sheet for installation details.

Cable Connections in the Wiring Closet

To connect each Ethernet station to a Model 2800A 10BASE-T host port, follow these steps:

- 1. Verify that the total UTP segment length (including building wires and all patch cables used on any run between the station and the concentrator) does not exceed 100 meters.**
- 2. Make sure the MDI-X/MDI Switch on the Model 2800A is set to MDI-X (see Figure 3-5).**

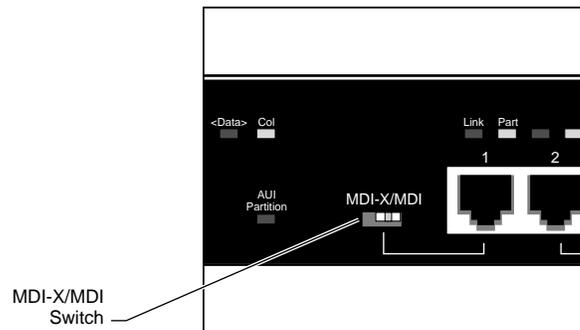


Figure 3-5. MDI-X/MDI Switch Set to MDI-X

The MDI-X/MDI Switch swaps the pin assignments of the transmit and receive data wire-pairs for Port 1. MDI-X configuration is used when the remote end of the wire is connected to a network station or to an MDI port on another concentrator. Ports 2 through 16 are internally configured as MDI-X ports. See Appendix A for a more complete description of the MDI-X/MDI Switch operation.

- 3. Connect a 25-pair UTP cable from the punch-down block to a UTP patch panel (see Figure 3-6).**

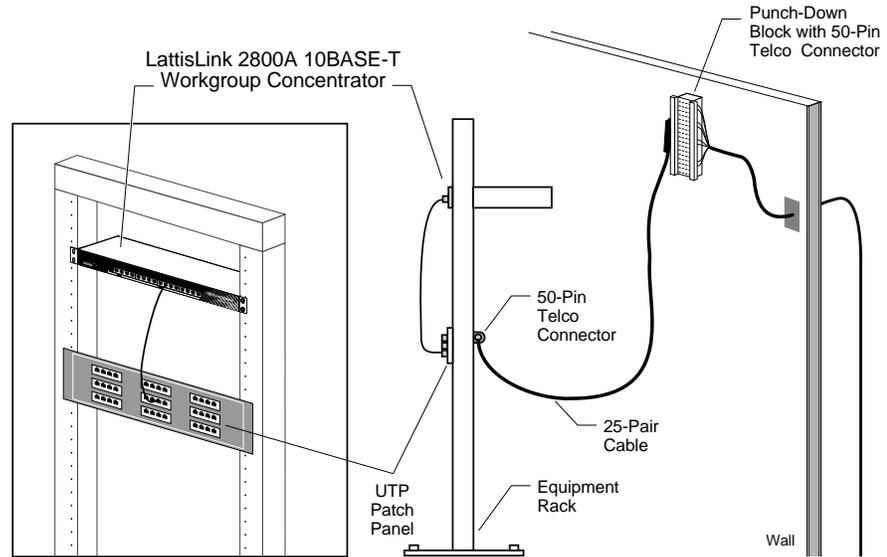


Figure 3-6. Connecting 25-Pair Cable

4. Connect one end of a UTP patch cable (e.g. Model 910) to the UTP patch panel (see Figure 3-6). Connect the other end to a 10BASE-T port on the Model 2800A (see Figure 3-7).

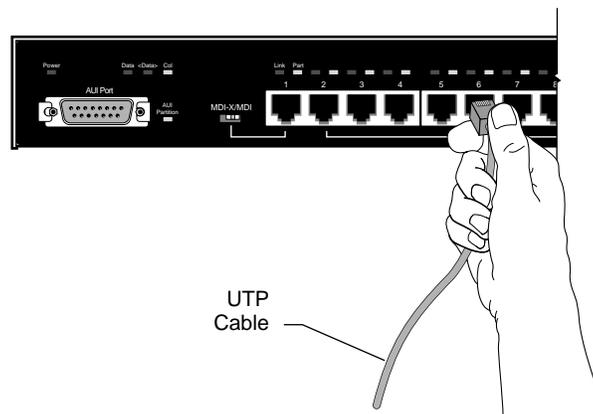


Figure 3-7. Model 2800A 10BASE-T Port Connection

5. Verify that the port's Link LED is ON.

The Model 2800A 10BASE-T Workgroup Concentrator supports the 10BASE-T specified Link Integrity Test Function. See Appendix D for a complete description of this feature.

Repeat steps 1 through 5 until all Ethernet stations are connected to Model 2800A 10BASE-T ports (see Figure 3-8).

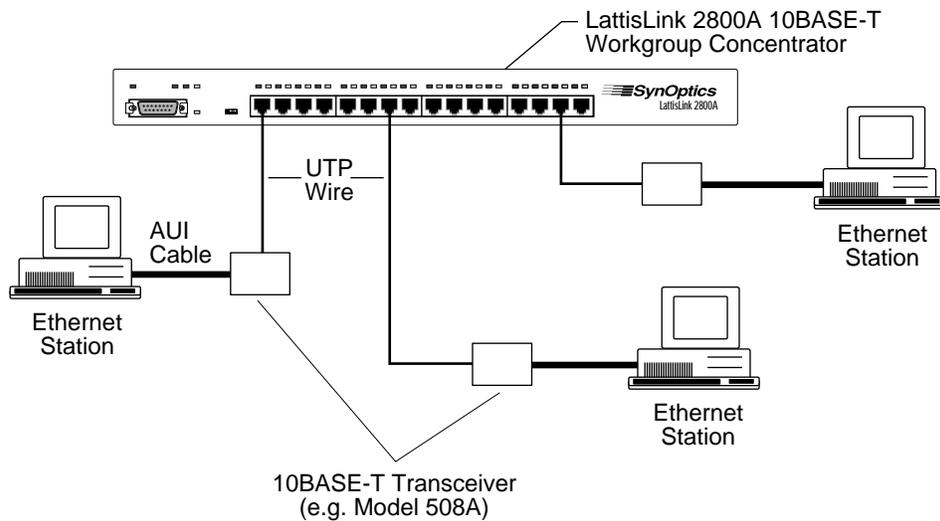


Figure 3-8. Model 2800A Single-Concentrator Network

See Appendix C for the pin assignments of the RJ-45 connector on the Model 2800A.

The Model 2800A supports automatic polarity detection and correction, which detects and automatically corrects for signal inversions on the UTP receive data wire-pair. If any receive data wire-pair was mistakenly reversed in the punch-down block during cable installation, the Model 2800A internally corrects for the miswiring, and the data path operates correctly. For more information about this feature, see Appendix E.

Multiple-Concentrator Network

The Model 2800A provides network connections for up to 16 users. To create larger networks, Model 2800A concentrators can be interconnected through a backbone interconnection, or through the MDI-X/MDI ports. Backbone connections are made through the AUI interconnect port.

For more information about ways of interconnecting concentrators, see the *LattisNet System 3000 Ethernet Configuration Guide*.

Configuration Rules

When you install a network with more than one concentrator, you must follow these configuration rules:

- Make sure all UTP segments are no longer than 100 meters.
- Disable the SQE Test function on a transceiver connected to the AUI port of the Model 2800A.
- You can have a maximum of four concentrators (repeaters) in the data path between any two Ethernet stations. (The Model 2800A counts as one repeater.) To extend the network further, use a bridge or router.
- To use Port 1 as an interconnect port to an MDI-X port on another concentrator, you must configure it as an MDI port, using the MDI-X/MDI switch.

Interconnecting Concentrators Using the AUI Port

You can connect the AUI port on the Model 2800A to any medium-specific IEEE 802.3 MAU. For example, you can use an IEEE 802.3 fiber optic medium attachment unit (FOMAU) to connect the Model 2800A to a fiber optic port on another concentrator. You can also connect the AUI port to a coaxial backbone through an IEEE 802.3 MAU.

Connecting the AUI port to a Fiber Backbone

Connecting an IEEE 802.3 10BASE-FL transceiver to the AUI port on the Model 2800A allows you to connect the Model 2800A to a fiber backbone. Figure 3-9 shows a typical network with two Model 2800A concentrators connected to a fiber backbone. An AUI patch cable connects each Model

2800A to a SynOptics Model 504A Transceiver that has the SQE test disabled. (The Model 504A Transceivers could also be connected directly to the AUI ports on the concentrators.) A fiber cable is connected between the two transceivers.

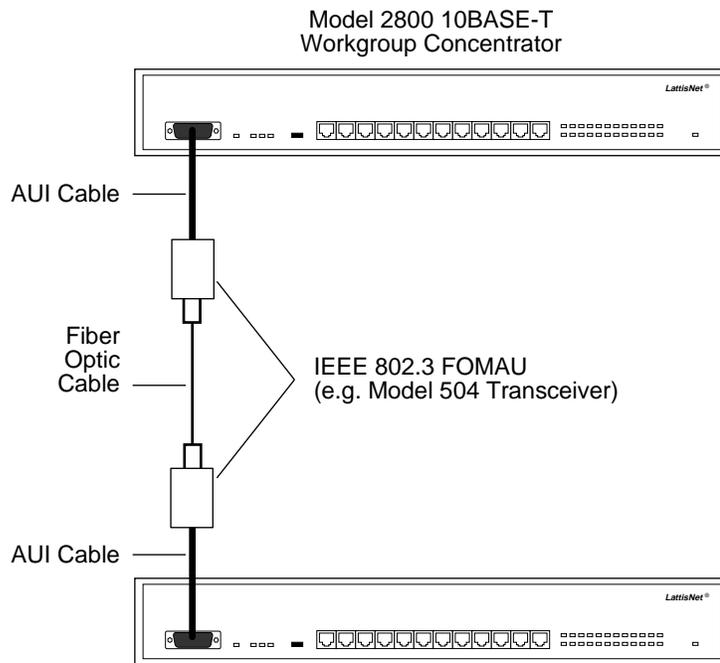


Figure 3-9. Interconnecting Model 2800As Using an IEEE 802.3 10BASE-FL Transceiver

To use an IEEE 802.3 10BASE-FL transceiver to interconnect the Model 2800A and other concentrators, follow these steps:

- 1. Disable the SQE (Signal Quality Error) test on an IEEE 802.3 10BASE-FL transceiver (for example, a Model 504A Transceiver).**



***SQE TEST:** IEEE 802.3 rules require you to disable the SQE (Signal Quality Error) Test function on the IEEE 802.3 10BASE-FL transceiver connected to the AUI Port of the Model 2800A.*

2. **Connect an AUI cable between the AUI port on the Model 2800A and the AUI port on the transceiver, or attach the 10BASE-FL transceiver directly to the AUI port on the Model 2800A.**
3. **Connect a fiber optic cable between the transceiver and another optical port (for example, a port on a Model 3304 Host Module in a Model 3000 Concentrator) at the next higher level in the network hierarchy.**

Repeat steps 1 through 3 for each Model 2800A that is to be interconnected through an IEEE 802.3 transceiver.

Connecting the AUI Port to Coaxial Backbone

You can use the AUI port to connect a Model 2800A to a coaxial backbone through an IEEE 802.3 MAU. Figure 3-10 shows two Model 2800As connected to a coaxial backbone through IEEE 802.3 MAUs. An AUI cable is connected between the AUI port on each Model 2800A and the MAU. The SQE test is disabled on each MAU connected to the AUI port on a Model 2800A.



SQE TEST: IEEE 802.3 rules require you to disable the SQE (Signal Quality Error) Test function on an IEEE 802.3 MAU connected to the AUI Port of the Model 2800A.

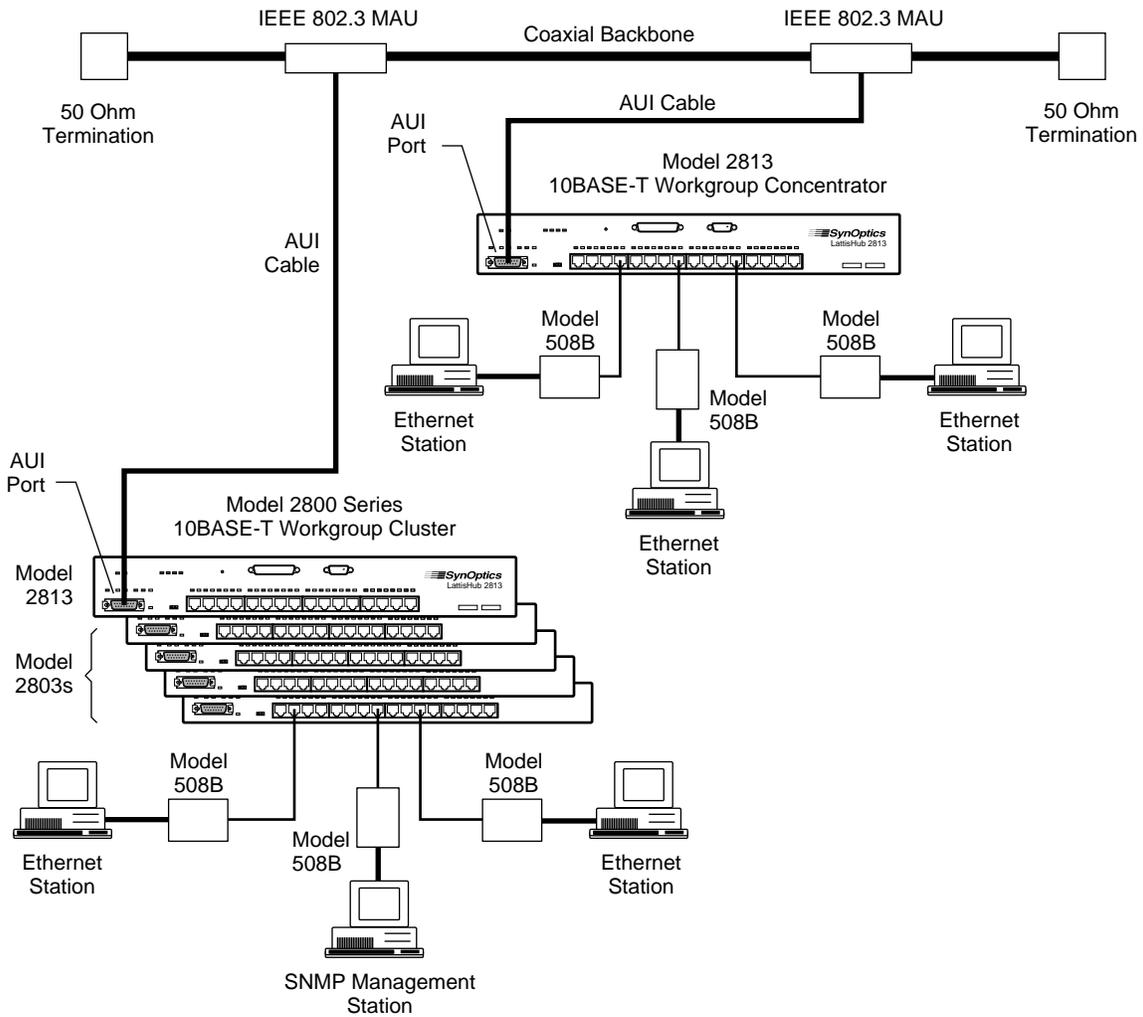


Figure 3-10. Interconnecting Model 2800As Using Coaxial Backbone

To connect a Model 2800A to a coaxial backbone, follow these steps:

- 1. Disable the SQE (Signal Quality Error) test on the MAU.**
- 2. Connect the IEEE 802.3 MAU to the coaxial backbone.**
- 3. Connect an AUI cable between the IEEE 802.3 MAU and the AUI port on the Model 2800A.**

Repeat steps 1 through 3 for each Model 2800A Concentrator that is to be connected to the coaxial backbone.

Interconnecting Concentrators Using the MDI Port 1

You can interconnect Model 2800A Concentrators by connecting an MDI Port 1 on one Model 2800A to any MDI-X 10BASE-T port on another concentrator. Figure 3-11 shows such a configuration, in which two Model 2800As are connected to a third Model 2800A. Ports 1 on the two lower concentrators are set to MDI, and a UTP patch cable is used to connect each of these ports to an MDI-X port on the higher Model 2800A concentrator.



MDI-X/MDI SETTINGS: Interconnections through the MDI-X/MDI ports must always be from MDI to MDI-X. Ports 2 through 16 are internally configured as MDI-X ports, and the switchable Port 1 is factory-set to be an MDI-X port. If you interconnect two Model 2800As through Port 1 on both concentrators, you must change one port (but only one) to the MDI setting.

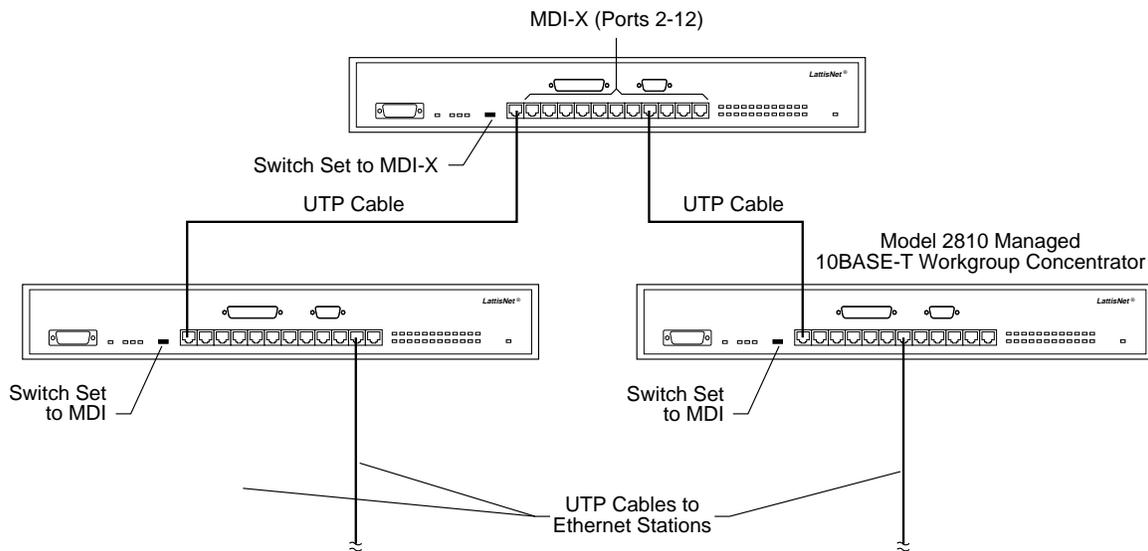


Figure 3-11. Interconnecting Concentrators via the MDI Port

To use the MDI Port 1 for interconnecting concentrators, follow these steps:

1. Use a small flat-blade screwdriver to set the MDI-X/MDI switch on a Model 2800A to the MDI position (see Figure 3-12). This sets Port 1 as an MDI port.

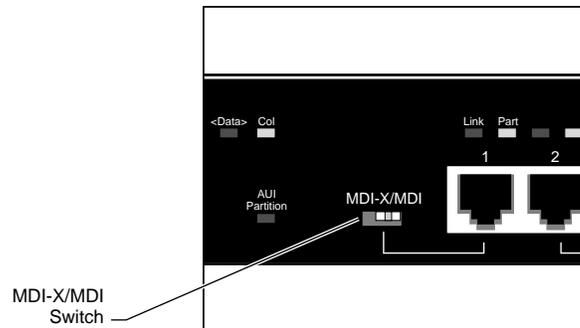


Figure 3-12. MDI-X/MDI Switch Set to MDI

2. Connect the MDI Port 1 of the Model 2800A to any MDI-X 10BASE-T port on a concentrator at the next higher level in the network hierarchy.

Repeat steps 1 and 2 for each Model 2800A Concentrator that is to be interconnected through an MDI Port 1 to another concentrator.

Appendix A Indicators and Switches

This appendix describes the indicator LEDs and the MDI-X/MDI switch on the LattisLink 2800A 10BASE-T Workgroup Concentrator.

Indicators

Figure A-1 shows the locations of LEDs on the Model 2800A. The table describes their meanings.

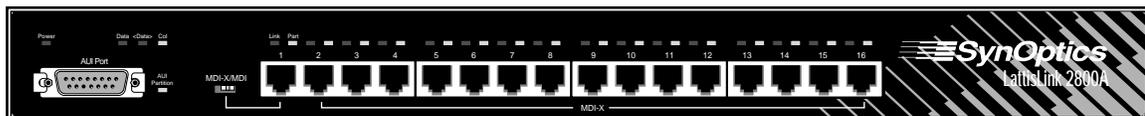


Figure A-1. Model 2800A LEDs

Table A-1. Model 2800A Workgroup Concentrator LEDs

Type	Label	Color	Meaning
Power LED	Power	green	DC power is accurately delivered to the concentrator's internal circuitry.
Concentrator LEDs	Data	green	Lights while data is present in the concentrator.
	<Data>	green	Lights for 34 ms after each data transmission. This allows the eye to perceive very short transmissions.
	Col	yellow	Lights for 140 ms indicating a collision in the concentrator.
AUI port LED	AUI Part	yellow	Lights to indicate that the AUI port has been autopartitioned because of an excessive number of consecutive collisions, an excessively long single collision signal, or jabber input.

Table A-1. Model 2800A Workgroup Concentrator LEDs (continued)

Type	Label	Color	Meaning
10BASE-T port LEDs (16 pairs)	Link	green	The port is connected to another powered 10BASE-T port whose signaling meets the requirements for an IEEE 802.3i 10BASE-T device.
	Part	yellow	The port has been autopartitioned because of an excessive number of consecutive collisions or an excessively long single collision signal.

MDI-X/MDI Switch

The LattisLink 2800A 10BASE-T Workgroup Concentrator allows you to configure Port 1 as an MDI or MDI-X port. The abbreviation MDI stands for Media Dependent Interface, and is specified by the IEEE 802.3i 10BASE-T Standard to be the electrical and mechanical interface to the UTP wire. An MDI port transmits out to the UTP wire on pins 1 and 2 (pair 2 of the 4-pair cable), and receives from the UTP wire on RJ-45 pins 3 and 6 (pair 3 of the 4-pair UTP cable).

For two 10BASE-T devices to communicate, the transmitter of each device must connect to the receiver of the other device. The reversal of the transmit and receive assignments is called a crossover function. Every 10BASE-T link segment requires a crossover function, and it can be implemented in one of two ways:

- Externally, with a crossover UTP cable that reverses the transmit and receive wire-pairs at the RJ-45 connector on one end of the UTP cable (see Figure A-2)

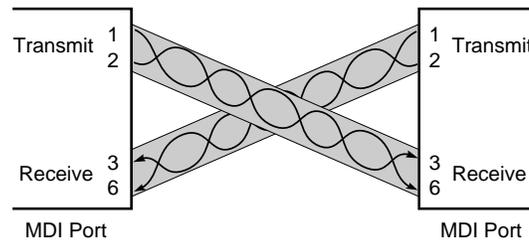


Figure A-2. External Crossover Function

- Internally, designed as part of the circuitry in the 10BASE-T device (see Figure A-3)

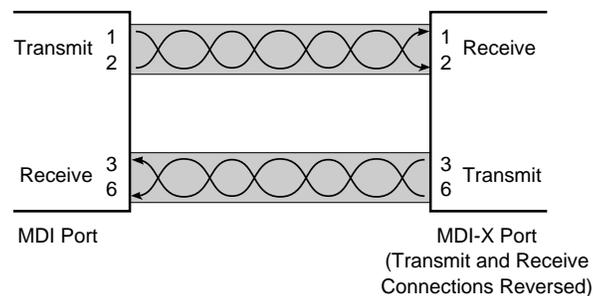


Figure A-3. Internal Crossover Function

Implementing the crossover function externally has several disadvantages. You may have to special-order or make your own crossover UTP cable, since this is a nonstandard cable. Having a mixture of straight-through and crossover cables in a network increases the probability of mistaken identification of patch cables. In general, it is more convenient to have the crossover function implemented internally.

If the crossover function is implemented internally, that port is designated an MDI-X port (X for crossover function). Internal crossover functions allow the use of standard straight-through UTP cable to connect MDI ports to MDI-X ports. 10BASE-T transceivers are implemented as MDI ports, and 10BASE-T repeaters (e.g. the Model 2800A) have MDI-X ports.

Indicators and Switches

The Model 2800A configures Ports 2 through 16 as MDI-X ports, while Port 1 can be configured as either MDI or MDI-X through the MDI-X/MDI switch on the front panel (see Figure A-4).

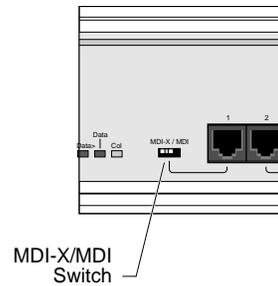


Figure A-4. MDI-X/MDI switch

This feature is very convenient when you interconnect the Model 2800A to 10BASE-T ports on other concentrators. It allows you to use a straight-through UTP cable between Port 1 (configured as an MDI port) and any of the inter-connected concentrator's MDI-X 10BASE-T ports. Without the MDIX/MDI switch, a crossover cable would be required to interconnect the concentrators directly through UTP wire.

Appendix B Technical Specifications

Network Protocol

10 Mb/s Manchester encoded (IEEE 802.3 CSMA/CD)

Standards Support

IEEE 802.3i Type 10BASE-T

Electrical Specifications

Input Power:	14 watts
Thermal Rating:	47.6 BTU/hr maximum
AC Line Frequency:	50–60 Hz
Input Voltage:	100–240 VAC
Volt Amperes Rating:	1.0A at 100 VAC 0.5A at 240 VAC
Fuses:	Internal
Fuse Rating:	2A at 240 VAC

Physical Specifications

Weight:	6.7 lb (3.0 kg)
Dimensions:	(W) 17.3 in x (D) 7.2 in x (H) 1.6 in (W) 43.9 cm x (D) 18.2 cm x (H) 4.0 cm
Rack Space:	1 rack-mount space

Environmental Specifications

Operating Temperature:	5° C to 40° C
Storage Temperature:	-25° C to 70° C
Operating Humidity:	85% max. relative humidity, noncondensing
Storage Humidity:	95% max. relative humidity, noncondensing
Operating Altitude:	10,000 ft (3,000m) maximum

Technical Specifications

Electromagnetic Emissions

Meets requirements of:

FCC Part 15, subparts A and B, Class A

EN 55 022 (CISPR 22:1985), Class B

General License VDE 0871, Class B (AmtsblVfg No. 243/1991
and Vfg 46/1992)

VCCI Class 1 ITE

Safety Agency Approvals

UL-listed, CSA-certified, TUV-licensed

Appendix C Pin Assignments

Table C-1 shows the pin assignments for the female DB-15 connector on the AUI port. Figure C-1 shows the pin locations.

Table C-1. AUI Connector Pin Assignments

Pin #	Signal	Pin #	Signal
1	GND	9	CI-B
2	CI-A	10	DO-B
3	DO-A	11	GND
4	GND	12	DI-B
5	DI-A	13	+12V
6	GND	14	GND
7	(NC)	15	GND
8	(NC)		



NOTE: Do not connect the AUI port on a Model 2800A directly to the AUI port on an Ethernet station.

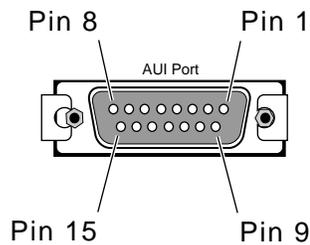


Figure C-1. DB-15 Connector Pin Locations

Pin Assignments

Table C-2 shows the RJ-45 pin assignments for the 10BASE-T ports on the Model 2800A. Figure C-2 shows the pin locations.

Table C-2. RJ-45 Pin Assignments for 10BASE-T Ports

Pin #	MDI Signal (Function)	MDI-X Signal (Function)
1	TD + (Transmit to UTP wire)	RD + (Receive from UTP wire)
2	TD - (Transmit to UTP wire)	RD - (Receive from UTP wire)
3	RD + (Receive from UTP wire)	TD + (Transmit to UTP wire)
4	Not used by 10BASE-T	Not used by 10BASE-T
5	Not used by 10BASE-T	Not used by 10BASE-T
6	RD - (Receive from UTP wire)	TD - (Transmit to UTP wire)
7	Not used by 10BASE-T	Not used by 10BASE-T
8	Not used by 10BASE-T	Not used by 10BASE-T

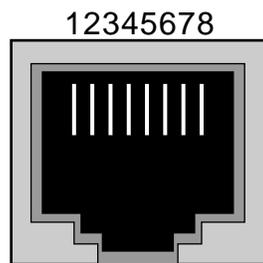


Figure C-2. RJ-45 Connector Pin Locations

Appendix D Link Integrity Test Function

The Model 2800A 10BASE-T Workgroup Concentrator supports the IEEE 802.3i 10BASE-T Link Integrity Test Function on all its 10BASE-T ports. This function monitors the UTP receive data wire-pair and determines the integrity of the UTP link segment. The 10BASE-T transceiver located at the other end of the link segment also monitors its UTP receive data wire-pair for link integrity. Thus both data wire-pairs of the UTP link segment are tested for link integrity.

At all times the Model 2800A transmits either data or an idle signal, which is called TP_IDL (twisted-pair idle signal). TP_IDL is transmitted in the absence of data, and consists of a repetitive sequence of 100-nanosecond pulses occurring every 16 milliseconds. The 100-nanosecond pulses are called Link Test Pulses (LTPs).

All Model 2800A ports monitor their receive wire-pair for data and LTP activity. If neither data nor LTPs are detected within 100 milliseconds, the port's **Link** LED goes OFF to indicate no link status. While there is no link integrity, the Model 2800A port does not send data to the UTP wire, and the port receiver does not forward data from the UTP wire to the concentrator backplane until link integrity is restored.

Link Integrity Test Function

Appendix E Autopolarity Detection and Correction

All Model 2800A 10BASE-T ports support the automatic polarity detection and correction function, which detects and automatically corrects for UTP receive data wire-pair signal inversions. If any receive data wire-pair is mistakenly reversed in the punch-down block during cable installation, the Model 2800A port internally corrects for the miswiring and the data path operates correctly.

The Model 2800A ports monitor the polarity of the receive data wire-pair only upon power-up of the concentrator or while the Model 2800A port has no link status (**Link Status LED OFF**).

While a port is being monitored, two conditions may occur:

- If the port receives one normal data packet (no inversion), wire polarity is considered good and the monitoring for that port stops until either power-up or no link status occurs.
- If the port receives either two consecutive inverted data packets or six consecutive inverted link test pulses, the automatic polarity correction function is enabled to internally correct for the receive data wire-pair inversion. Monitoring stops until either power-up or no link status occurs.

Since the algorithm monitors both data packets and link test pulses, the automatic polarity correction is enabled even if no data is present on the link segment. There is no indication on the Model 2800A that the wires are reversed, since no user intervention is required to correct this wiring error.

Autopolarity Detection and Correction