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DECconcentrator™ 500



ThinWire and Shielded Twisted-Pair Option Card Installation

Order Number: EK-DEFCN-CM-002

CAUTION

People installing the cabling system described in this manual should know local building codes, fire codes, and any other applicable codes or regulations. The manufacturers or their distributors and agents will not be responsible for damage due to improperly installed cabling, neglect, misuse, or improper connection of devices to the cabling system.

CAUTION

This equipment is in the 1st Class category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council For Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in commercial and/or industrial areas. Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused in radios and TV receivers, etc. Read the instructions for correct handling.

NOTICE – Class A Computing Device:

This equipment generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such radio frequency interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference; in which case, measures taken to correct the interference are at the user's expense.

DECconcentrator™ 500

ThinWire and Shielded Twisted-Pair Option Card Installation

January 1992

This manual describes how to install and check the DECconcentrator 500 ThinWire and Shielded Twisted-Pair option cards.

Supersession/Update Information: This is a revised manual.

digital

Order Number: EK-DEFCN-CM-002

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Safety

Warnings and cautions that appear in this manual are defined as follows:

WARNING 

Contains information to prevent personal injury.

VORSICHT

Enthält Informationen, die beachtet werden müssen, um den Benutzer vor Schaden zu bewahren.

DANGER

Signale les informations destinées à prévenir les accidents corporels.

AVISO

Contiene información para evitar daños personales.

CAUTION 

Contains information to prevent damage to equipment.

ACHTUNG

Enthält Informationen, die beachtet werden müssen, um die Geräte vor Schaden zu bewahren.

ATTENTION

Signale les informations destinées à prévenir la détérioration du matériel.

PRECAUCIÓN

Contiene información para evitar daños al equipo.

The warnings and cautions you must observe for the hardware described in this document are listed below in English, German, French, and Spanish. The pages on which these safety messages appear are also listed.

CAUTION 

Static electricity can damage modules and electronic components. Digital recommends that you use a grounded anti-static wrist strap (P/N 29-11762) and grounded work surface when you handle any modules or internal parts. Do not remove any option cards you may have from their anti-static bags until instructed to do so in the installation procedure. (Page 1-1)

ACHTUNG

Module und elektronische Komponenten können durch elektrostatische Entladungen beschädigt werden. Benutzen Sie immer eine antistatische Gelenkmanschette und eine geerdete Arbeitsunterlage, wenn Sie am offenenGerät arbeiten. Ein Antistatik-Kit ist in der BRD bei DECdirekt unterder Bestellnummer 29-26246 erhältlich. Entfernen Sie die antistatische Verpackunerst vonErweiterungskarten, wenn Sie in der Installationsanleitung entsprechende Anweisungen sehen.

ATTENTION

Les charges excessives d'électricité statique peuvent endommager les modules et les composants électroniques. Digital conseille l'utilisation d'un bracelet de masse et d'un plan de travail mis à la terre (Réf. 29-11762) lors de la manipulation des modules et des composants internes. Si vous possédez des cartes en option, ne les retirez pas de leur housse antistatique avant d'en avoir reçu l'instruction.

PRECAUCIÓN

La electricidad estática puede dañar los componentes electrónicos y los módulos. Digital recomienda que se utilicen cintas de pasadores y superficies de trabajo conectadas a tierra (P/N 29-11762) al trabajar con cualquier módulo o parte interna. No sacar de la bolsa ninguna placa de opciones adicional que pudiera tenerse hasta que se indique en el procedimiento de instalación.

WARNING 

To avoid bodily injury or damage to the equipment, do not connect the power cord or any other cable until you are instructed to do so in these procedures.

Do not apply power to the unit unless all covers are installed. (Page 2-1)

VORSICHT

Schließen Sie das Netzkabel oder andere Kabel erst an, wenn Sie dazu aufgefordert werden. Andernfalls besteht LEBENSGEFAHR! Überdies können die Geräte Schaden nehmen.

Schließen Sie das Gerät erst an das Stromnetz an, wenn alle Abdeckungen ordnungsgemäß angebracht worden sind.

DANGER

Afin d'éviter tout risque d'accident corporel ou matériel, NE BRANCHEZ AUCUN cordon d'alimentation ou autre câble sans en avoir reçu l'instruction explicite dans la procédure.

Ne reliez au secteur qu'après l'installation complète de tous les capots.

AVISO

Para evitar daños internos al equipo, NO conectar el cable de alimentación ni ningún otro hasta que se indique en estos procedimientos.

WARNING 

To avoid bodily injury, use care when connecting the concentrator power cord. Regulations in some countries may require an authorized person to connect the power.

Make sure you connect the power cord to a grounded wall outlet. (Page 2-1)

VORSICHT

Netzspannung ist lebensgefährlich. Beachten Sie dies, wenn Sie das Netzkabel anschließen. In einigen Ländern dürfen Elektrogeräte nur von entsprechend ausgebildetem Personal, beispielsweise Elektrikern, angeschlossen werden. Prüfen Sie, ob das in Ihrem Land zutrifft.

Schließen Sie das Netzkabel nur an eine geerdete Steckdose an.

DANGER

Afin d'éviter tout risque d'accident corporel, agissez avec la plus grande précaution lors du raccordement du cordon d'alimentation du concentrateur. Assurez-vous que la législation vous autorise bien à effectuer ce branchement.

Assurez-vous que la prise sur laquelle vous raccordez le cordon d'alimentation est effectivement reliée à la terre.

AVISO

Para evitar daños generales, es importante tener cuidado a la hora de conectar el cable de alimentación del concentrador. En algunos países existen estipulaciones para que la conexión la tenga que hacer una persona autorizada.

Hay que comprobar que se conecta el cable de alimentación a una toma conectada a tierra.

WARNING 

A safety earth ground wire has been incorporated into this product through the three-wire plug cap of the ac power cord. For continued protection against risk of electric shock, this product must be connected to a three-wire wall receptacle that has its grounding terminal reliably connected to the building's safety earth ground. (Page 2-2)

VORSICHT

Das Stromkabel in diesem Gerät ist mit einem Schutzleiter versehen. Um optimale Sicherheit zu gewährleisten, dürfen Sie es nur an eine ordnungsgemäß geerdete Schuko-Steckdose anschließen.

DANGER

Cet équipement est mis à la terre au moyen du fil de terre du cordon d'alimentation secteur. Afin d'assurer une protection efficace contre tout risque d'électrocution, cet équipement doit être raccordé à une prise secteur équipée d'un contact de mise à la terre effectivement relié à la terre secteur du bâtiment.

AVISO

El producto consta de un cable de tierra en el enchufe trifásico del cable de alimentación. Para evitar el riesgo continuado de descargas eléctricas, este producto debe conectarse en una toma de pared trifásica que tenga un terminal de tierra con una conexión fiable a la toma de tierra del edificio.

Preface

This manual explains how to install the DECconcentrator 500 ThinWire and Shielded Twisted-Pair option cards into the DECconcentrator 500 unit. The ThinWire and Shielded Twisted-Pair option cards provide links to the Fiber Distributed Data Interface (FDDI) using copper media.

Intended Audience

This manual is for:

- The hardware installer
- The system/network manager

The hardware installer and system/network manager should be familiar with ThinWire and shielded twisted-pair network technologies, the FDDI ANSI X3T9 standards, and safety procedures.

Structure of This Manual

This manual has two chapters and five appendixes as follows:

- | | |
|------------------|---|
| Chapter 1 | Provides an overview and physical description of the DECconcentrator 500 ThinWire and Shielded Twisted-Pair Port Cards. Describes how to install the ThinWire and the Shielded Twisted-Pair Port Cards into the DECconcentrator 500 unit. |
| Chapter 2 | Describes how to verify the installation of the ThinWire Port Card and the Shielded Twisted-Pair Port Card. Provides cabling information. |

- Appendix A** Contains the ThinWire cable evaluation procedure.
- Appendix B** Contains the shielded twisted-pair cable evaluation procedure.
- Appendix C** Contains the DECconcentrator 500 Identification List.
- Appendix D** Contains vendor information for purchasing cables and adapters.
- Appendix E** Lists related documents.

The post paid Reader's Comments form on the last page of this document requests your evaluation to assist us in preparing for future documentation.

Installing the Option Card

This chapter explains the following:

- Checking the shipment contents
- Identifying the option card
- Disconnecting the power and data cables
- Removing a blank panel or a previously installed option card
- Installing the option card

CAUTION

Static electricity can damage modules and electronic components. Digital recommends that you use an anti-static grounded wrist strap (P/N 29-11762) and a grounded work surface when you handle modules or internal parts. Do not remove any option cards from their antistatic bags until the installation procedure instructs you to do so.

NOTE

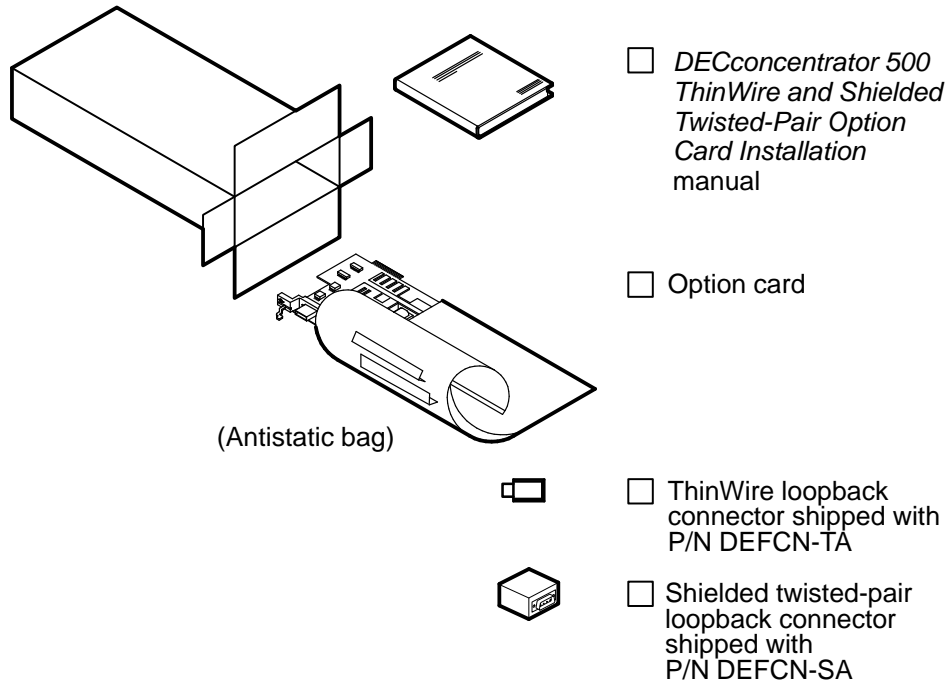
The only tool required for this installation is a Phillips-head screwdriver.

1.1 Checking the Shipment Contents

Refer to Figure 1-1 to check the contents of your shipment. Do not remove an option card from its antistatic bag until instructed to do so.

- In case of damage, contact your shipping agent and Digital sales representative.
- If parts are missing, contact your Digital sales representative.

Figure 1-1: Checking the Contents of Your Shipment

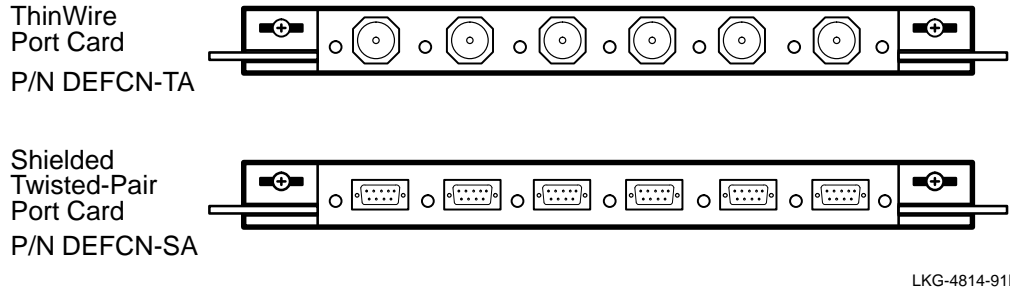


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1.2 Identifying the Option Cards

The copper-media option cards have six PHY (Physical Layer Protocol) M ports. Figure 1–2 shows the copper-media port cards.

Figure 1–2: Copper-Media Port Cards



1.3 Disconnecting the Power and Data Cables

NOTE

Adding an option card disrupts network traffic. Digital recommends that you add an option card when there will be little or no use of the network.

Remove the power and data cables from the DECconcentrator 500 unit as follows:

1. Disconnect the power cord from the power source.
2. Disconnect any cable from the unit that prevents access to the slot where the option card is to be installed. Note the cable orientation and port location for each cable you remove.

1.4 Removing a Blank Panel or a Previously Installed Option Card

To remove a blank panel or a previously installed option card, do the following:

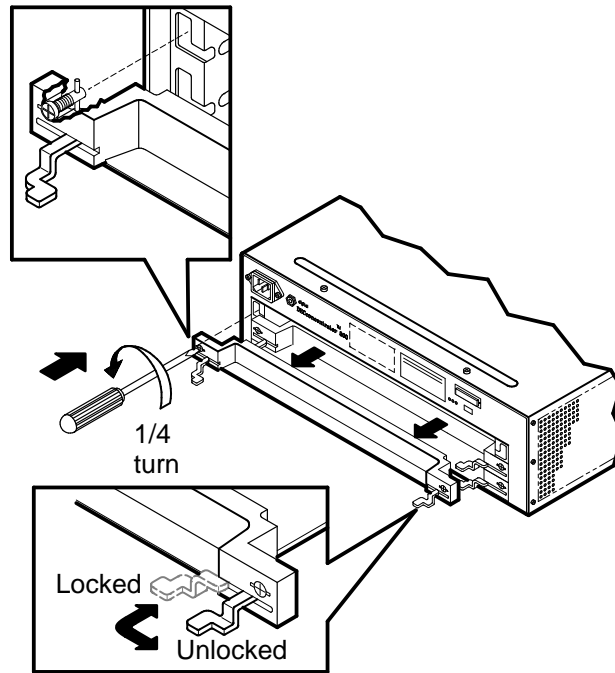
1. Place the antistatic wrist strap around your wrist and attach the other end of the strap to the concentrator chassis.

NOTE

If you are installing an option card in a desktop DECconcentrator, attach the antistatic wrist strap to your wrist and attach the other end of the strap to a grounded surface.

2. Use a Phillips-head screwdriver to push in and turn the two captive screws counterclockwise one-quarter turn.
3. Unlock the locking levers (see Figure 1–3). Remove the blank panel or option card.

Figure 1–3: Removing a Blank Panel or a Previously Installed Option Card



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1.5 Installing an Option Card

To install an option card, do the following:

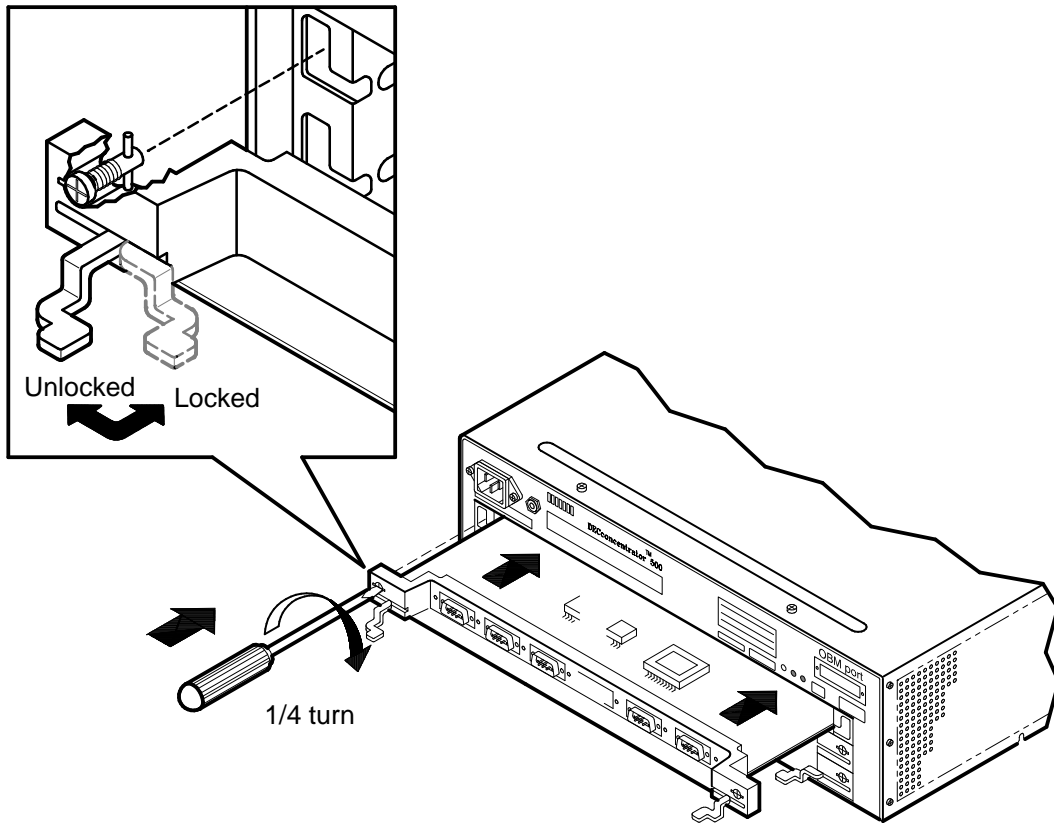
1. Place the antistatic wrist strap around your wrist and attach the other end of the strap to the concentrator chassis.

NOTE

If you are installing an option card in a desktop concentrator, attach the antistatic wrist strap to your wrist and attach the other end of the strap to a grounded surface.

2. Carefully remove the option card from its antistatic bag. Make sure that the locking levers on the option card are in the outward (unlocked) position and the locking screw is in the vertical position.
3. Slide the option card into the appropriate slot. Make sure that the sides of the option card are seated in the guides of the DECconcentrator 500. Push firmly into place.
4. Lock the locking levers on the option card in place by pushing the locking levers inward (see Figure 1-4).
5. Turn the two captive screws clockwise one-quarter turn.
6. Remove the antistatic wrist strap from the concentrator and your wrist.

Figure 1-4: Installing Option Cards



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Verifying the Installation

This chapter contains the procedures to connect the power and data cables. It also explains how to verify the operation of the DECconcentrator 500 unit and the ports.

2.1 Applying Power

WARNING 

To avoid bodily injury or damage to the equipment, do not connect the power cord or any other cable until you are instructed to do so in these procedures.

Do not apply power to the unit unless all covers are installed.

WARNING 

To avoid bodily injury, use care when connecting the concentrator power cord. Regulations in some countries may require an authorized person to connect the power.

Make sure you connect the power cord to a grounded wall outlet.

WARNING

A safety earth ground wire has been incorporated into this product through the three-wire plug cap of the ac power cord. For continued protection against risk of electric shock, this product must be connected to a three-wire wall receptacle that has its grounding terminal reliably connected to the building's safety earth ground.

To verify the DECconcentrator 500 option card installation, plug the power cord into the concentrator first and then into the wall outlet. This applies power to the concentrator and starts the self-test. Refer to the self-test section in the *DECconcentrator 500 Installation* manual.

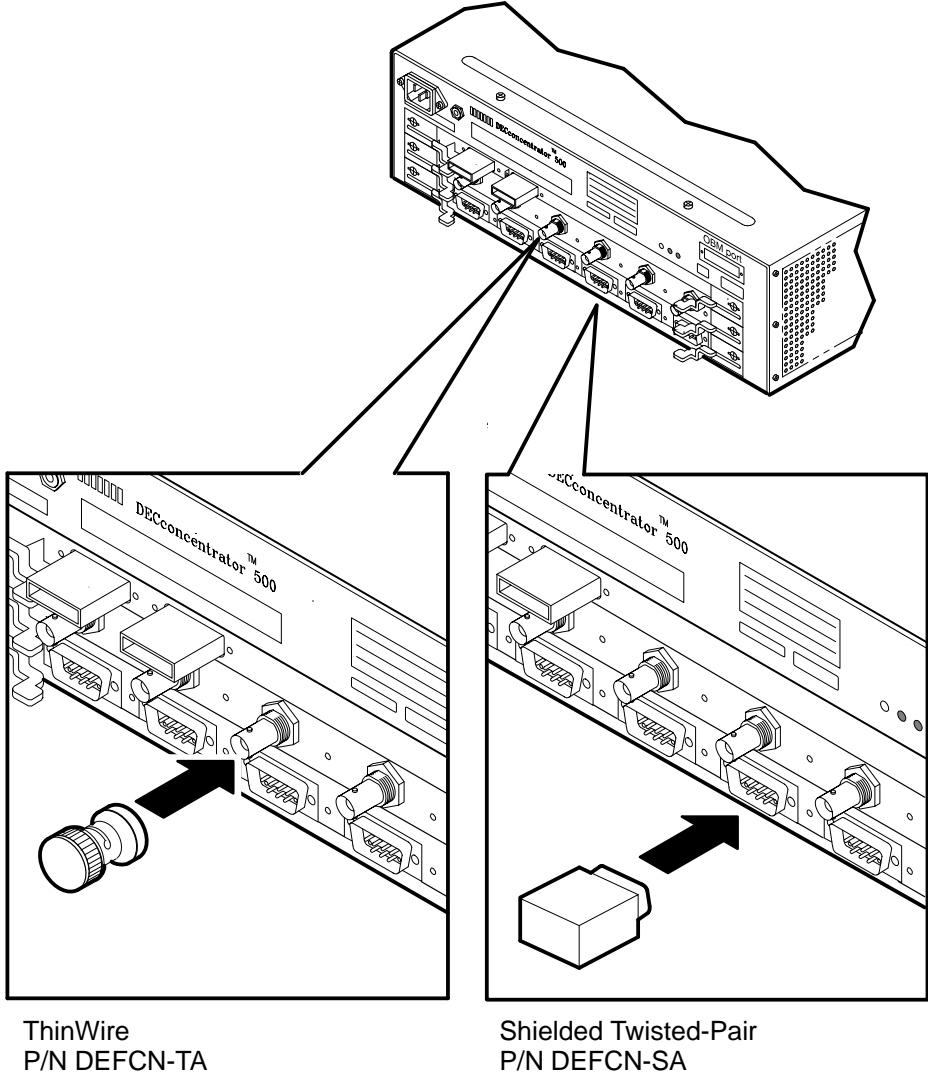
After the self-test is complete, the port LEDs blink green. If the LEDs are not blinking green, refer to the problem-solving section in the *DECconcentrator 500 Installation* manual.

2.2 Loopback Testing

The loopback test determines whether the DECconcentrator 500 option card is faulty. This test can also determine whether there's a problem with the cable or the device at the end of the cable. The port LED should be blinking green before you start the loopback test. Steps 1 through 3 describe the procedures to perform the loopback test.

1. Connect the loopback connector to the port to be tested. Use the appropriate loopback connector for the port you are testing (see Figure 2-1).

Figure 2-1: Loopback Connectors

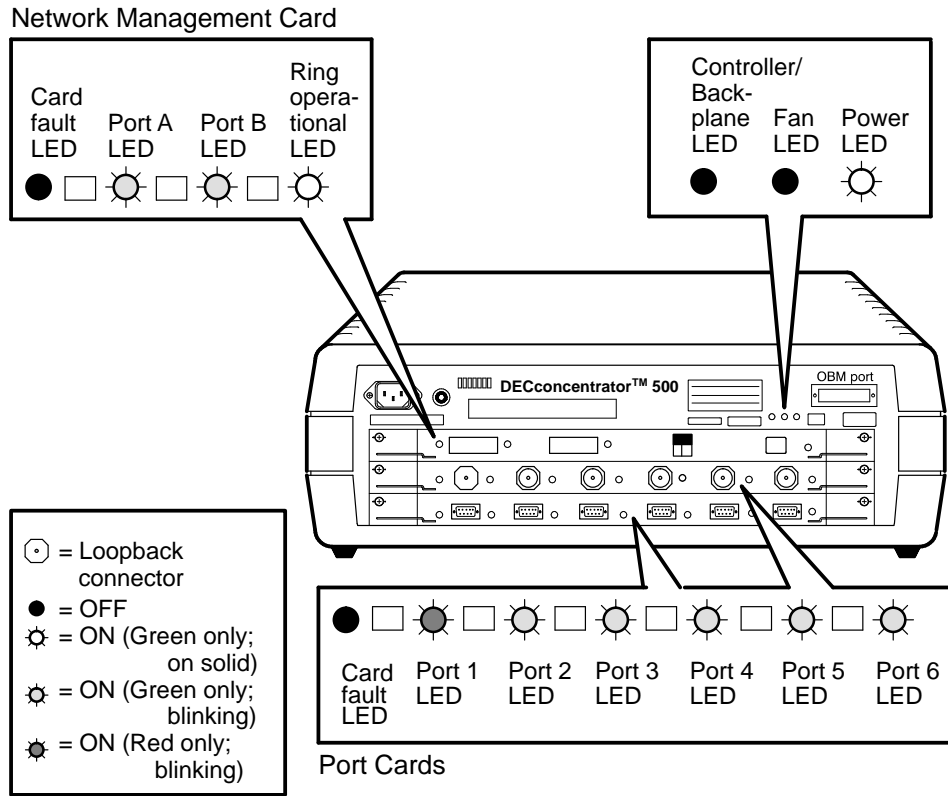


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After loopback connection, the port LED blinks red. This indicates successful completion of the loopback test.

Figure 2–2 shows loopback connection to port 1 of the ThinWire option card. If the LEDs do not match Figure 2–2, refer to the problem-solving section in the *DECconcentrator 500 Installation* manual.

Figure 2–2: Port LED Status During Loopback Testing



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2. Remove the loopback connector. The port LED blinks green again.

2.3 Cableplant

Ensure that the cableplant has been evaluated. Check the cableplant log book entry for the cableplant evaluation. The cables must be installed according to the installation guidelines specified by the vendors of each cable type. Refer to Appendix D for recommended cable types.

2.3.1 Cabling Specifications

ThinWire and Shielded Twisted-Pair Option Cards operate over copper links of a maximum length of 100 meters.

Verify that each cableplant meets the following critical parameters:

- The link has a maximum of two patch cables: a crossconnect cable and a non-spliced, behind-the-wall cable.
- The cable must be continuous, without any taps or junctions.

2.3.2 ThinWire Cableplant

The ThinWire Option Card uses a bidirectional scheme that sends and receives data over a single ThinWire coaxial cable. The loss of the cable and the number of junctions in the cable are critical for proper operation at 100 meters. You must perform the ThinWire evaluation procedure in Appendix A for cable lengths greater than 70 meters.

Refer to Appendix A for the ThinWire cable evaluation procedure.

NOTE

ThinWire cableplant total loss at 62.5 MHz must be less than 11.5 dB.

- The ThinWire/10base2 50-ohm coaxial cable must meet or exceed the IEEE 802.3 standard cable specification. Digital recommends using ThinWire cable (see Appendix A for the ThinWire cable evaluation procedure).

Figure 2–3 and Figure 2–4 show configurations using ThinWire cabling. The configurations conform to the EIA/TIA-568 building wiring standard. The standard states that the horizontal is limited to a maximum of 90 meters, including a maximum of 3 meters in the work area, and a maximum of 6 meters for cross-connecting.

Figure 2–3: ThinWire Standard Configuration

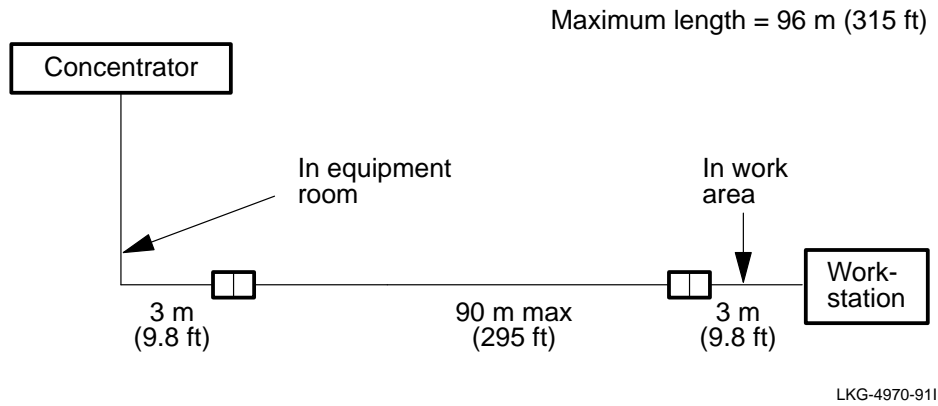
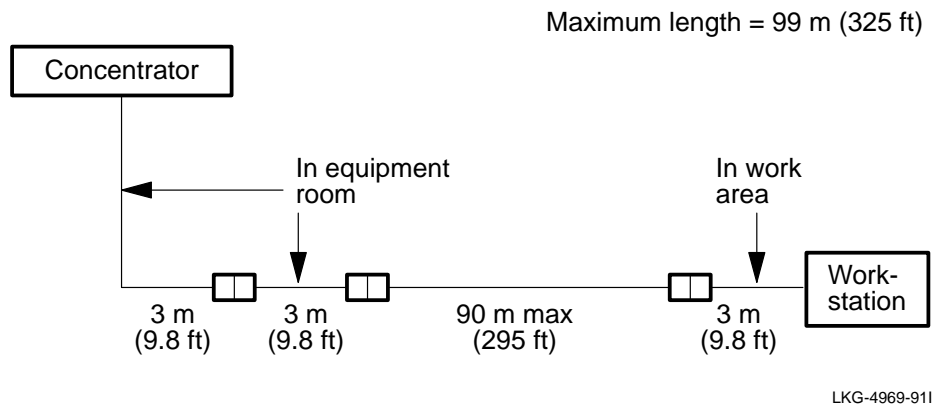


Figure 2–4: ThinWire Cross-Connect Configuration



2.3.3 Shielded Twisted-Pair Cable Evaluation

Shielded twisted-pair cable must be installed and verified to conform to the IEEE 802.5 token ring network installation guidelines.

Refer to Appendix B for the shielded twisted-pair cable evaluation procedure.

NOTE

Shielded twisted-pair cableplant total loss at 62.5 MHz must be less than 12dB.

The shielded twisted-pair cable must meet or exceed the requirements of the IEEE 802.5 token ring networks (refer to Appendix D for recommended cable types).

Figure 2–5 and Figure 2–6 show configurations using shielded twisted-pair cabling. The configurations conform to the EIA/TIA-568 building wiring standard. The standard states that the horizontal is limited to a maximum of 90 meters, including a maximum of 3 meters in the work area, and a maximum of 6 meters for cross-connecting. For additional cabling information, refer to the *Network Wiring and Applications Guide*.

Figure 2–5: Shielded Twisted-Pair Standard Configuration

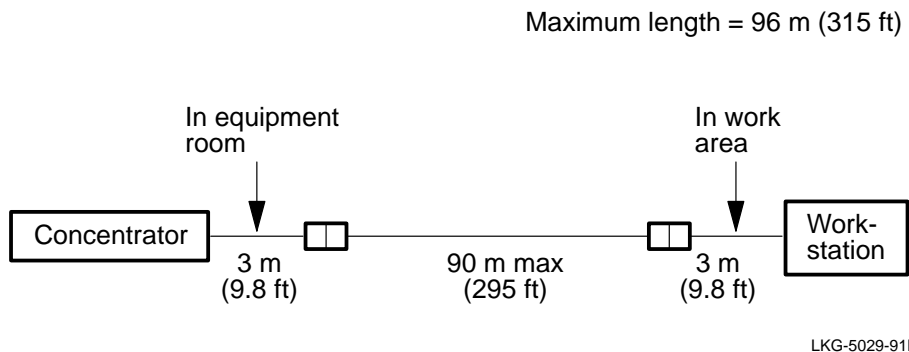
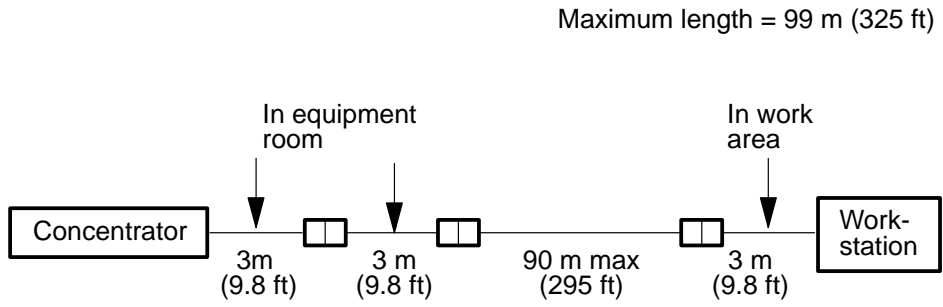


Figure 2-6: Shielded Twisted-Pair Cross-Connect Configuration

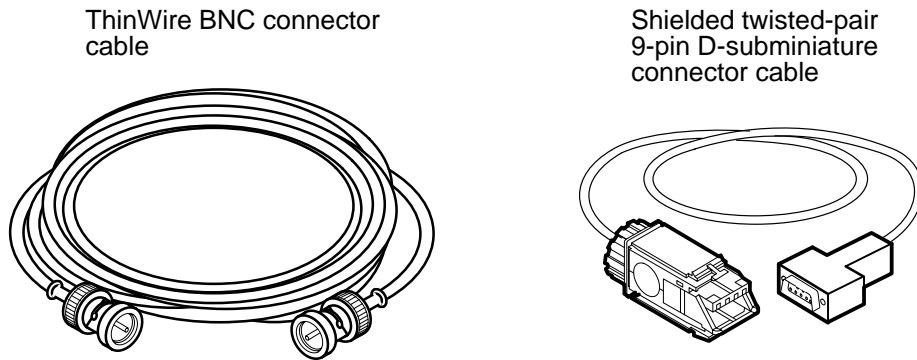


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2.4 Connecting Data Cables

Figure 2-7 shows the two types of data cables for the copper option cards.

Figure 2-7: Types of Data Cables

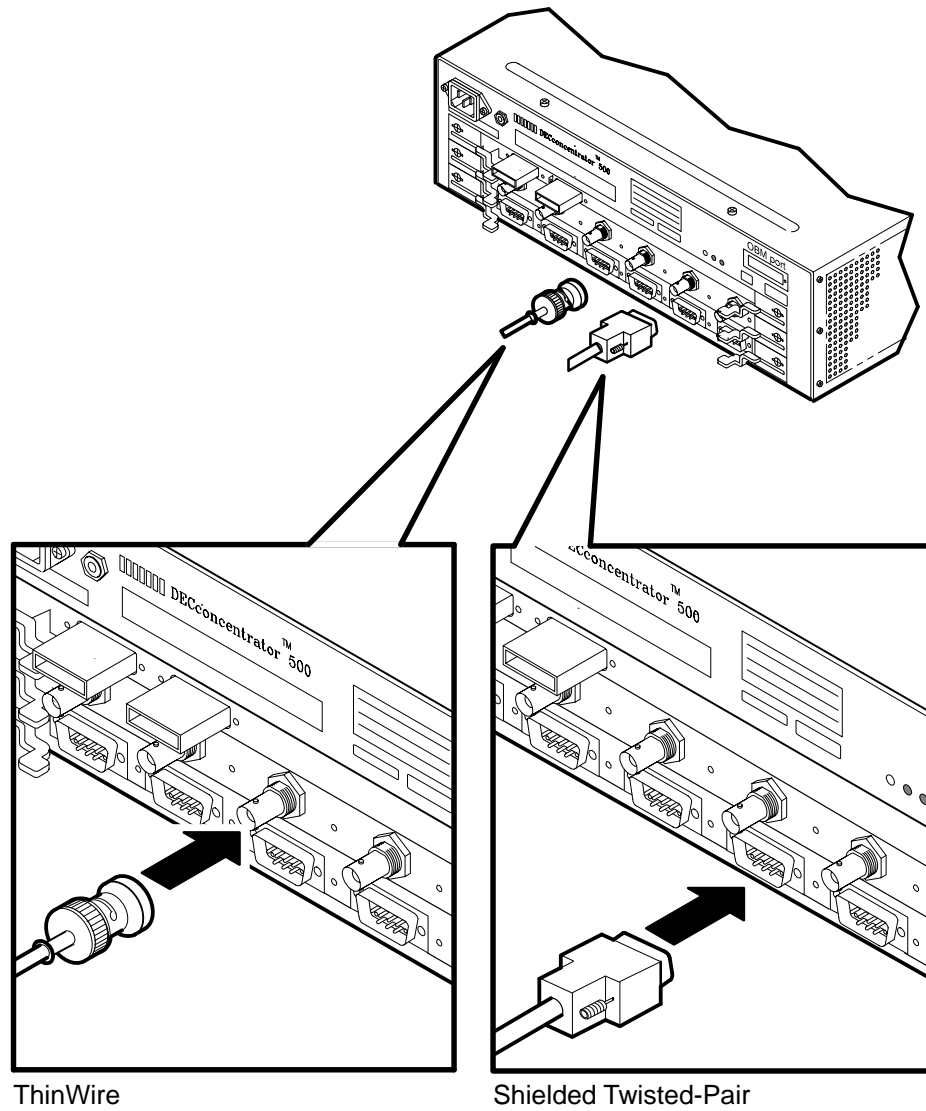


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Steps 1 through 3 describe how to connect the data cables.

1. Connect the data cable to the appropriate port (see Figure 2–8).

Figure 2–8: Connecting Data Cables

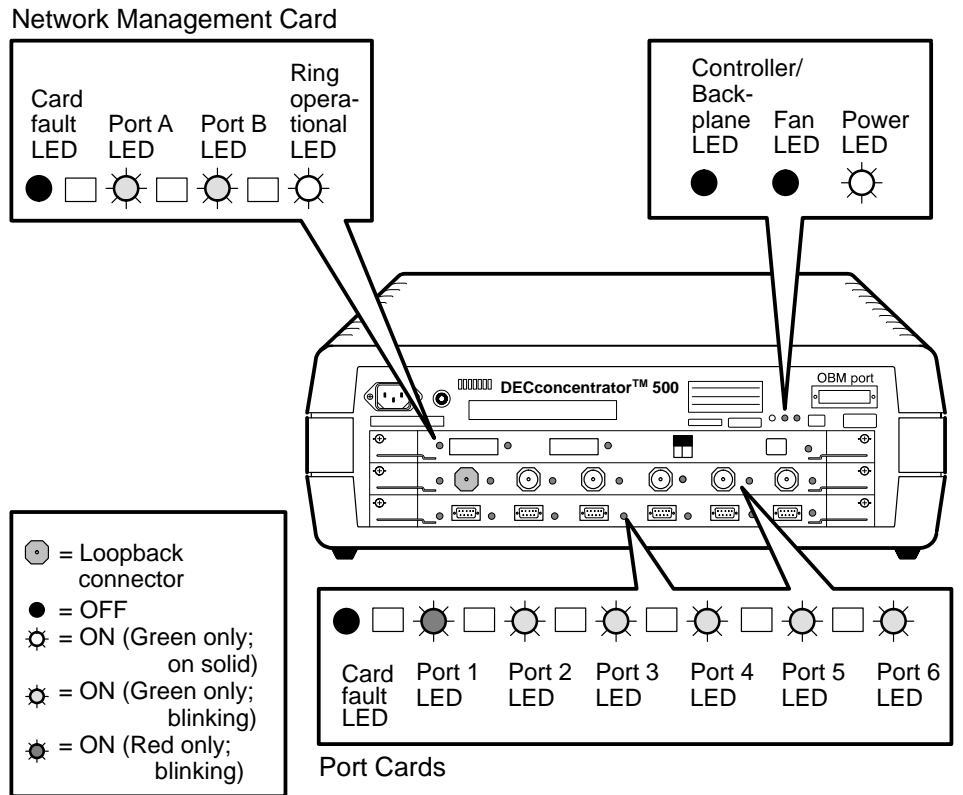


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2. Observe the LEDs after you connect the data cables (see Figure 2–9).

If the LEDs for the copper-media ports do not indicate proper DECconcentrator 500 operation, refer to the problem-solving section of the *DECconcentrator 500 Installation* manual.

Figure 2–9: LEDs – Fully Configured DECconcentrator 500



NOTE

Figure 2–9 assumes that all ports are connected to active stations.

3. For each cable connected to the concentrator, add the cable identification number to the DECconcentrator 500 Identification List in Appendix C.

ThinWire Cable Evaluation Procedure

This appendix contains the procedures to verify that the installed ThinWire cable-plant discussed in Chapter 2 works in the FDDI network.

The cable configuration is verified with a time domain reflectometer (TDR). The TDR detects discontinuities in the cable and measures the distance to the discontinuity. A discontinuity can be caused by a break, poor connection, incorrect termination, or an improperly installed cable.

There are several Time Domain Reflectometers (TDR) available that can be used to make the measurements. The following procedure uses the Tektronix Model 1503 TDR (Digital P/N FC-10079-AC).

NOTE

Digital part numbers are for use by Digital Service representatives. Customers should order Tektronix equipment from Tektronix or its representatives.

A.1 Test Procedure

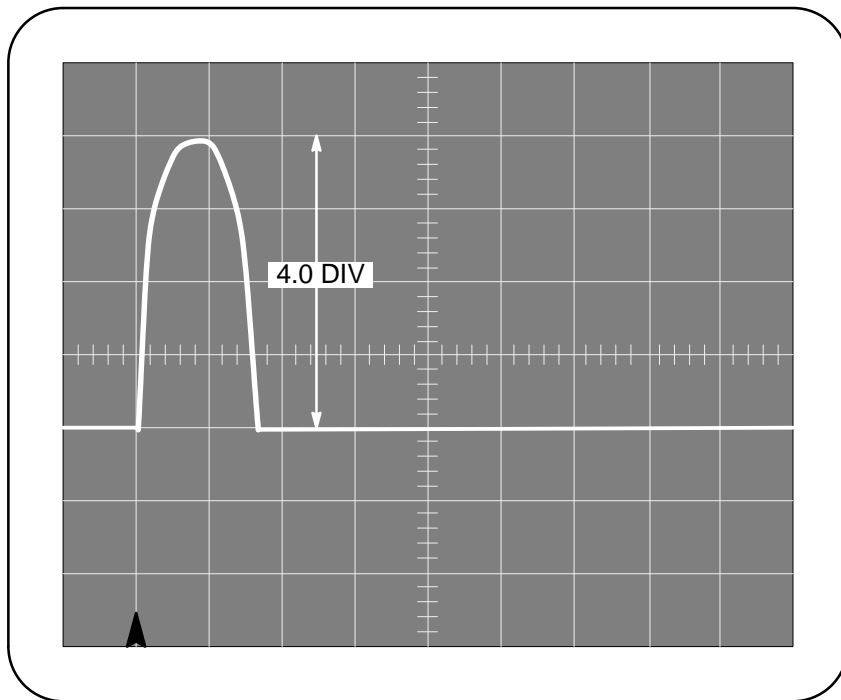
Perform the test procedure by doing the following:

1. Turn on the power to the TDR.
2. Connect the 50-ohm terminator to the BNC input on the TDR.
3. Set the TDR to 50-ohm termination.
4. Set the IMPLS WIDTH to 10 ns (SHORT PULSE).

5. Set the the RET LOSS/SENSITIVITY controls to 0-dB.
6. Set the METERS/DIV control to 2.5.
7. Set the DISTANCE control to 0.
8. Adjust the 0-dB SET control to four divisions.
9. Adjust the ZERO REF SET so that the leading edge of the test pulse is on the first vertical line from the left edge of the screen. The arrow in the bottom left corner of the graticule shown in Figure A-1 indicates the reference line.

The display shows a pulse on the left half of the screen. Because there is no cable connected to the TDR and therefore no discontinuities (the terminator is a 50-ohm load), the pulse is followed by a horizontal line.

Figure A-1: TDR Test Pulse Display – Ideal Termination (Output Pulse Only)



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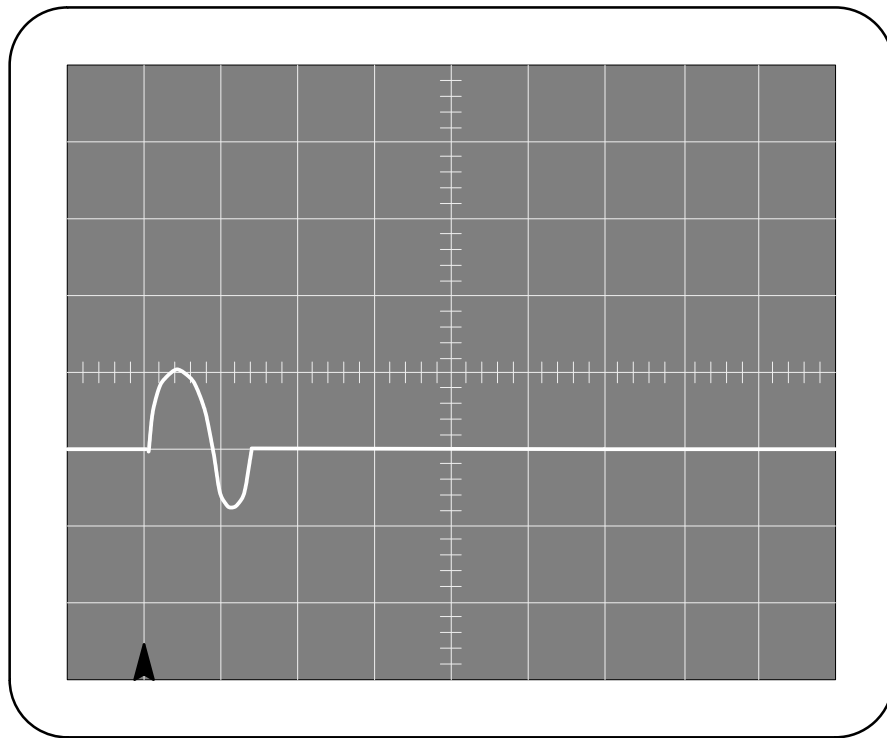
NOTE

If the TDR is not calibrated for ThinWire cable, refer to Section A.2. Refer to the cable manufacturer's specifications for the dielectric of the cable. A typical value is 0.77.

10. Connect the cable to the BNC input on the TDR.
11. Adjust the DISTANCE dial until the return pulse is located on the reference line. See Figure A-2.

The reading on the DISTANCE dial gives the length from the cable connector to the discontinuity.

Figure A-2: TDR Test Pulse Display – Typical Reflection Signature (Output Pulse and Reflection)



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For cables longer than 70 meters or when you encounter an operational problem, make and document a TDR measurement for distance, return loss, and discontinuity reflections for each end of the cable. The following list shows the maximum values allowed.

- Measured distance: 100 m
- Return loss: 11 dB
- Discontinuity reflections: -28 dB
- Number of discontinuities: 4

Measure the return loss and discontinuity reflections by adjusting the RET LOSS/SENSITIVITY control on the TDR until the amplitude of the return pulse matches the amplitude of the input pulse (four divisions). The RET LOSS/SENSITIVITY control setting is the return loss or discontinuity reflection value.

A.1.1 Evaluating the TDR Test

Remember the following points when evaluating a TDR test:

- To measure the relative amplitude of the reflection produced by any discontinuity on the coaxial cable under test, compare the return pulse generated by the discontinuity with the input (transmitted) pulse from the TDR. Conventionally, the relative difference is expressed in decibels (dB).
- Typical dB values for the discontinuities are:
 - For most untapped cable, -30 dB or more down
 - For connectors, -28 dB or more down
 - For short circuit, -4 dB or less down
 - For open circuit, -4 dB or less down

A.2 Calibrating for Cable Dielectric

1. Measure a length of cable electrically equivalent to the installed cableplant.
2. Set the FEET(METERS)/DIV and multiplier selectors so the pulse and the return pulse both appear on the screen.
3. Select the TEST PULSE to display two distinct pulse waveforms.

The first pulse is the test pulse; the second pulse is the reflection caused by the open end of the cable. The length of the cable is measured from the leading edge of the first pulse to the leading edge of the second pulse.
4. Adjust the DISTANCE CAL controls as close as possible to the actual length of the cable.
5. Use the ZERO REF CHECK and set the ZERO REF SET control to position the leading edge of the test pulse to the center line of the screen.
6. Set the DISTANCE control to the number equal to the length of the cable. The pulse from the end of the cable should be near the center line of the screen.
7. Adjust the DISTANCE CAL to position the end pulse as close to the center as possible.
8. Set the DISTANCE control to 0.
9. Use the ZERO REF CHECK and reset the leading edge of the test pulse to the center of the screen.
10. Repeat steps 6 through 9 until the end pulse is as close to the center line as possible.

The number selected with the DISTANCE CAL control is the cable dielectric factor.

Shielded Twisted-Pair Cable Evaluation Procedure

This appendix contains the procedures to verify that the installed shielded twisted-pair (STP) cableplant discussed in Chapter 2 works in the FDDI network.

The procedure checks:

- The length and loss characteristics with a Time Domain Reflectometer (TDR)
- The continuity of the wire and the shield
- Short circuits between the pairs of twisted wire in the cable and shorts to the shield

The following equipment and reference are recommended for use in the test procedure:

NOTE

Digital part numbers are for use by Digital Service Representatives. Customers should order Tektronix equipment from Tektronix or its representatives.

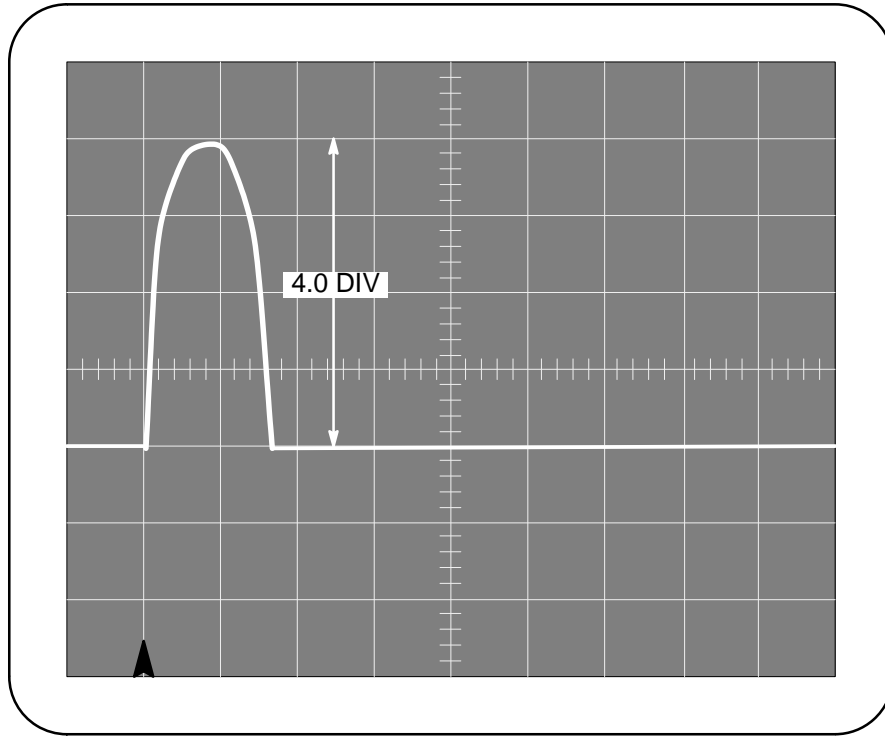
- Tektronix Model 1503 TDR (Digital P/N FC-10079-AC)
- Tektronix 015-0600-00 Token Ring Interface (Digital P/N 29-29364-01)
- Unmodified IBM 802.5 connector (Digital P/N 12-30269-01)
- *802.3/Ethernet Adapter for IBM Shielded Twisted-Pair Installation Guide* (P/N EK-STPIG-IN).

B.1 Test Set-Up

1. Turn on the power to the TDR.
2. Connect the Token Ring Interface (TRI) to the BNC input on the TDR.
3. Set the PHANTOM VOLTAGE switch on the TRI to the OFF position. This switch is not used for FDDI installations.
4. Set the LOAD switch to the 150-ohm position.
5. Set the PAIR selection switch to REC.
6. Set the TDR to 125-ohm termination.
7. Set the IMPLS WIDTH switch on the TDR to 10 ns (SHORT PULSE).
8. Set the NOISE FILTER switch to ON.
9. Set the RET LOSS/SENSITIVITY controls to 0-dB.
10. Set the METERS/DIV control to 2.5.
11. Set the DISTANCE control to 0.
12. Adjust the 0-dB SET control for four divisions.
13. Adjust the ZERO REF SET control so that the leading edge of the test pulse is on the first vertical line from the left of the screen. The arrow in the bottom left corner of the graticule shown in Figure B-1 indicates the reference line.

The display shows a pulse on the left half of the screen. Because there is no cable connected to the TDR and therefore no discontinuities (the terminator is a 150-ohm load), the pulse is followed by a horizontal line. A small amount of ripple on the trace is normal.

Figure B-1: TDR Pulse Display – Ideal Termination



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NOTE

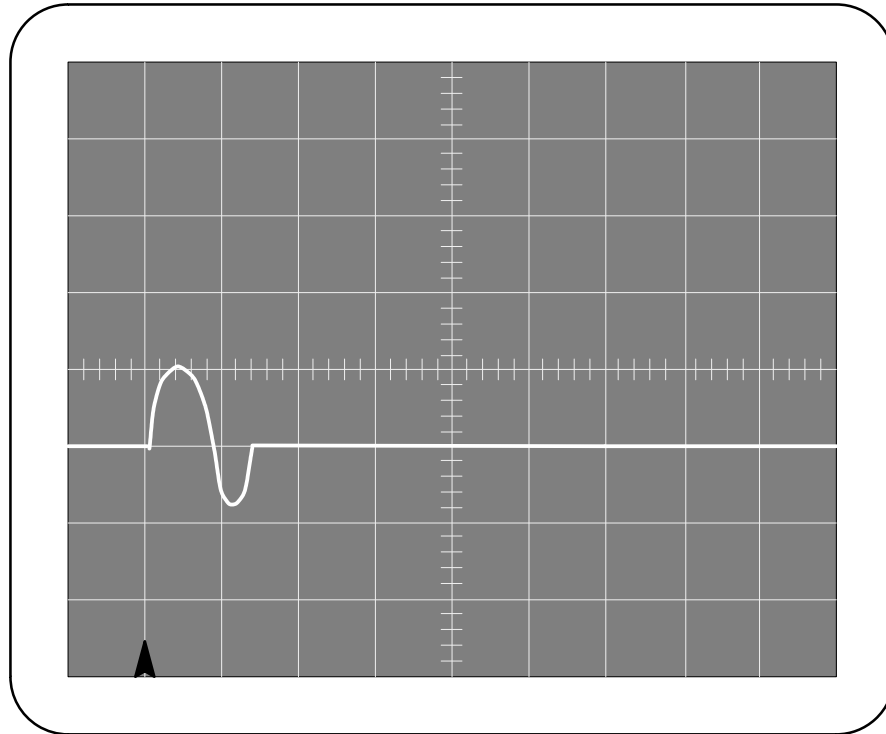
If the TDR is not calibrated for STP cable, refer to Section B.4. Refer to the cable manufacturer's specifications for the dielectric of the cable. A typical value is 0.77.

B.2 Testing for Length and Loss

1. Connect an unmodified IBM 802.5 connector at the far end of the cable. This connector is used to prevent the data pairs from wrapping back through the connector.
2. Set the LOAD switch on the TRI to the OPEN position.
3. Adjust the DISTANCE dial on the TDR until the return pulse appears on the screen. See Figure B-2.

The reading on the DISTANCE dial is the length from the cable connector to the discontinuity.

Figure B-2: TDR Test Pulse Display – Typical Reflection Signature (Output Pulse and Reflection)



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-
4. Toggle the PAIR switch on the TRI between the REC and XMIT settings.

There should be very little change in the distance reading. If there is a major change, a problem exists on the adjacent pair of shielded twisted-pair in the cable (short, open). The maximum values allowed are as follows:

- Measured distance: 100 m
- Return loss: 14 dB
- Discontinuity reflections: -20 dB

Measure the return loss and discontinuity reflections by adjusting the RET LOSS/SENSITIVITY control on the TDR until the amplitude of the return pulse matches the amplitude of the input pulse (four divisions). The RET LOSS/SENSITIVITY control setting is the return loss or discontinuity reflection value.

B.2.1 Evaluating the TDR Test

Remember the following points when evaluating a TDR test:

- Increased accuracy is obtained when a measurement is made at both ends of the cable.
- To measure the relative amplitude of the reflection produced by any discontinuity on the cable under test, compare the return pulse generated by the discontinuity with the input (transmitted) pulse from the TDR. Conventionally, the relative difference is expressed in decibels (dB).
- Typical dB values for the discontinuities are:
 - For most untapped cable, –30 dB or more down
 - For connectors, –25 dB or more down
 - For short circuit, –8.5 dB or less down
 - For open circuit, –8.5 dB or less down

B.3 Testing for Continuity and Short Circuit

Refer to Chapter 2 of the *802.3/Ethernet Adapter for IBM Shielded Twisted-Pair Installation Guide* for a description of continuity and short circuit tests.

B.4 Calibrating for Cable Dielectric

1. Measure the length of a cable electrically equivalent to the installed cable-plant.
2. Connect one end of the cable to the IBM 802.5 connector.
3. Connect the other end of the cable to the TRI.
4. Set the FEET(METERS)/DIV and multiplier switches so the pulse and the return pulse both appear on the screen.
5. Select the TEST PULSE to display 2 distinct pulse waveforms.

The first pulse is the test pulse; the second pulse is the reflection caused by the open end of the cable. The length of the cable is measured from the leading edge of the first pulse to the leading edge of the second pulse.

6. Adjust the DISTANCE CAL controls as close as possible to the actual length of the cable.
7. Use the ZERO REF CHECK and set the ZERO REF CHECK control to position the leading edge of the test pulse to the center line of the screen.
8. Set the DISTANCE control to the number equal to the length of the cable. The pulse from the end of the cable should be near the center line of the screen.
9. Adjust the DISTANCE CAL to position the end pulse as close as possible to the center.
10. Set the DISTANCE control to 0.
11. Use the ZERO REF CHECK and reset the leading edge of the test pulse to the center of the screen.
12. Repeat steps 8 through 11 until the end pulse is as close as possible to the center line.

The number selected with the DISTANCE CAL control is the cable dielectric factor.

DECconcentrator 500 Identification List

Use the DECconcentrator 500 Identification List to record the following information:

- DECconcentrator 500 model number
- DECconcentrator 500 serial number
- Network Management Card
 - cable ID number
 - hardware address
 - ports used
 - switch 1 setting
 - switch 2 setting
- Port Card
 - ports used
 - cable ID number

Fill in the DECconcentrator 500 Identification List (see Figure C-1) and give a copy to the system/network manager.

Figure C-1: DECconcentrator 500 Identification List

<input type="checkbox"/>	DECconcentrator 500 Model Number	_____
<input type="checkbox"/>	DECconcentrator 500 Serial Number	_____
<input type="checkbox"/>	Network Management Card: Hardware address	_____
<input type="checkbox"/>	Network Management Card: switch 1 setting	_____
<input type="checkbox"/>	Network Management Card: switch 2 setting	_____
<input type="checkbox"/>	Network Management Card: ports used	_____
	Port A cable ID number	_____
	Port B cable ID number	_____
<input type="checkbox"/>	First Port Card: ports used	_____
	Port 1 cable ID number	_____
	Port 2 cable ID number	_____
	Port 3 cable ID number	_____
	Port 4 cable ID number	_____
	Port 5 cable ID number	_____
	Port 6 cable ID number	_____
<input type="checkbox"/>	Second Port Card: ports used	_____
	Port 1 cable ID number	_____
	Port 2 cable ID number	_____
	Port 3 cable ID number	_____
	Port 4 cable ID number	_____
	Port 5 cable ID number	_____
	Port 6 cable ID number	_____
<input type="checkbox"/>	Third Port Card: ports used	_____
	Port 1 cable ID number	_____
	Port 2 cable ID number	_____
	Port 3 cable ID number	_____
	Port 4 cable ID number	_____
	Port 5 cable ID number	_____
	Port 6 cable ID number	_____

Vendors and Part Numbers

This appendix contains part descriptions, part numbers, and vendor names and addresses.

D.1 Shielded Twisted-Pair Patch Cables and Cable Types

Table D–1 lists the part number and vendor for patch cables. Table D–2 lists the part numbers and vendor for cable types. Refer to the *Anixter Brothers Catalog* for IBM Corporation cabling information.

Table D–1: Shielded Twisted-Pair Patch Cables

FDDI Option Cable	Digital Part Number	Anixter Brothers Part Number
DEFCN-SA (3 m approx)	BN20G-03	140082

Table D–2: Shielded Twisted-Pair Cable Types

Cable Types	Anixter Brothers Part Number	IBM Corp. Part Number
Type 1 (non-plenum)	317-036-2202-IBM	4716748
Type 1 (plenum)	325-023-2202-IBM	4716749
Type 2 (non-plenum)	318-037-2206-IBM	4716739
Type 2 (plenum)	315-023-2602-IBM	4716738
Type 6 (patch cable)	325-014-2206-IBM	4716743

D.2 ThinWire Patch Cables and Cable Types

Table D–3 lists the part numbers and vendor for patch cables. Table D–4 lists the part numbers and vendors for cable types. For additional information, refer to the *DECconnect Wiring Components and Applications Catalog*.

Table D–3: ThinWire Patch Cables

Patch Cable	Digital Part Number
0.6 m	BC16K-02
3.05 m	BC16K-10

Table D–4: ThinWire Cable Types

Cable types	Digital Part Number	Belden Part Number
303 m spool (plenum)	H8244-A	89907
303 m spool (non-plenum)	H8243-A	9907

D.3 ThinWire and Shielded Twisted-Pair Loopback Connectors

Table D–5 lists the part numbers for loopback connectors.

Table D–5: Loopback Connectors

Loopback Connector	Digital Part Number
ThinWire BNC loopback	H8614
Shielded Twisted-Pair D-subminiature loopback	H8616

D.4 Vendor Information

The following charts provide vendor addresses and telephone numbers.

IBM Direct System Products Department
One Colver Road
Dafton, NJ 08810

Belden Wire and Cable
P.O Box 1980
Richmond, IN 47375 (317)983-5200

Anixter Brothers
4711 Golf Road
Skokie, IL 60076 (708) 677-2600

Boston Office (617) 682-8870

Related Documents

The following documents contain additional information. Refer to the back of this manual for ordering information.

- *DECconcentrator 500 Problem Solving* (Order No. EK-DEFCN-PS)

This manual describes isolating DECconcentrator 500 faults to the field-replaceable unit (FRU) and removing and replacing each FRU. This is a field problem-solving manual.

- *DECbridge 500/600 Installation and Upgrade* (Order No. EK-DEFEB-IN)

This manual describes the installation and upgrade procedures for the DECbridge 500/600 series.

- *DECbridge 500/600 Problem Solving* (Order No. EK-DEFEB-PS)

This manual describes isolating DECbridge 500/600 faults to the field-replaceable unit (FRU) and removing and replacing each FRU. This is a field problem-solving manual.

- *DECconnect System Fiber Optic Planning and Configuration* (Order No. EK-DECSY-FP)

This manual describes the planning requirements, product information, and guidelines for configuring DECconnect System Fiber Optic Networks that use the DECconnect System fiber optic products.

- *DECconnect System Fiber Optic Installation* (Order No. EK-DECSY-FI)
This manual describes how to install a DECconnect System fiber optic cable plant.
- *DECelms Installation* (Order No. AA-PAK1A-TE)
This manual describes how to install and verify DECelms (DEC Extended LAN Management Software) on a VMS system.
- *DECelms Reference* (Order No. AA-PBWBA-TE)
This is a reference manual to the DECelms (DEC Extended LAN Management Software) commands.
- *DECelms Use* (Order No. AA-PAK2A-TE)
This manual describes how to use DECelms (DEC Extended LAN Management Software) to configure, manage, and monitor the LAN Bridge 100, LAN Bridge 150, LAN Bridge 200, DECbridge 500, and DECconcentrator 500 units.
- *DECmcc Installation* (Order No. AA-PD58-BTE)
This manual describes how to plan for and install DECmcc.
- *DECmcc Bridge Access Module Use* (Order No. AA-PD1BC-TE)
This manual describes the DECmcc bridge entity model, entity management, and the directives necessary to perform typical management operations.
- *DECmcc Concentrator Access Module Use* (Order No. AA-PH31A-TE)
This manual describes the DECconcentrator 500 entity model, entity management, and the directives necessary to perform typical management operations.
- *Fiber Distributed Data Interface Network Configuration Guidelines* (Order No. EK-DFDDI-CG)
This manual describes the guidelines for connecting devices to an FDDI network. It also includes network configuration examples.

- *Fiber Distributed Data Interface System Level Description*
(Order No. EK-DFSLD-SD)

This manual describes the FDDI system, how it works, and the role of the individual components.

Additional Networking Documentation

Refer to the Network Management Software documentation specific to your network product. Also refer to the following documents for additional information.

- *Networks and Communications Product Documentation*
(Order No. EK-NACPD-RE)

This manual lists the title and order number for each publication associated with Digital Equipment Corporation's Networks and Communications products.

- *Networks Buyer's Guide*

This guide describes Digital's networking products. Contact your local sales office to receive a copy.

Glossary

American National Standards Institute (ANSI)

An organization that compiles and publishes computer industry standards.

ANSI

See American National Standards Institute.

attenuation

Magnitude of optical power loss usually expressed in units of decibels (dB).

concentrator

An FDDI node that provides additional attachment points for stations that are not part of the dual ring, or for other concentrators in a tree structure. A concentrator has two Physical Layer entities and may have one or more Data Link layer entities. The concentrator is the focal point of Digital's dual ring of trees.

Fiber Distributed Data Interface (FDDI)

A set of ANSI/ISO standards that define a high-bandwidth (100-Mb/s) general-purpose local area network connection between computers and peripheral equipment in a timed-token passing, dual ring of trees configuration.

ANSI Media Interface Connector (MIC)

A category of connectors that meet the ANSI PMD standard and are used to connect single attachment stations, dual attachment stations, and concentrators to an FDDI network. Type A and B connectors are used to connect a concentrator to the dual ring. Type M and S connectors are used to connect concentrators and single attachment stations.

FDDI network

A network that meets the ANSI X3T9 standard. A counter rotating timed-token dual ring network operating at a bandwidth of 100 Mb/s.

fiber

Dielectric that guides light; waveguide.

fiber optic cable

A transmission medium designed to transport signals in the form of pulses of light.

fiber optics

A technology whereby signals are transmitted over an optical waveguide medium through the use of light-generating transmitters and light-detecting receivers.

LASER

Light Amplification by Stimulated Emission of Radiation. Predominantly used for transmission over single-mode cable systems.

Network Management Card

An option card for the concentrator that provides for the connection to the dual ring and the hardware/firmware to allow remote management. A Network Management Card has two ports and two switches.

optical receiver

An optoelectronic circuit that converts an incoming optical signal to an electronic logical signal.

optical transmitter

An optoelectronic circuit that converts an outgoing electronic logical signal to an optical signal.

Port Card

An option card for the concentrator that provides for the connection of stations to the concentrator. The Port Card conforms to the ANSI X3T9 standard.

Physical Layer Protocol

FDDI station that defines symbols, line skates, clocking requirements, and encoding of data for transmission.

PHY

See Physical Layer Protocol.

receive

The act of a station accepting a frame, token, or control sequence from the ring.

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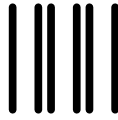
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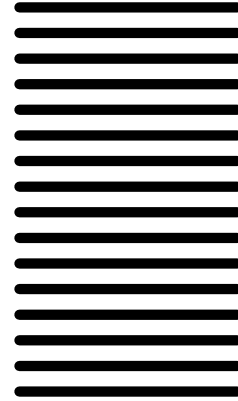
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