



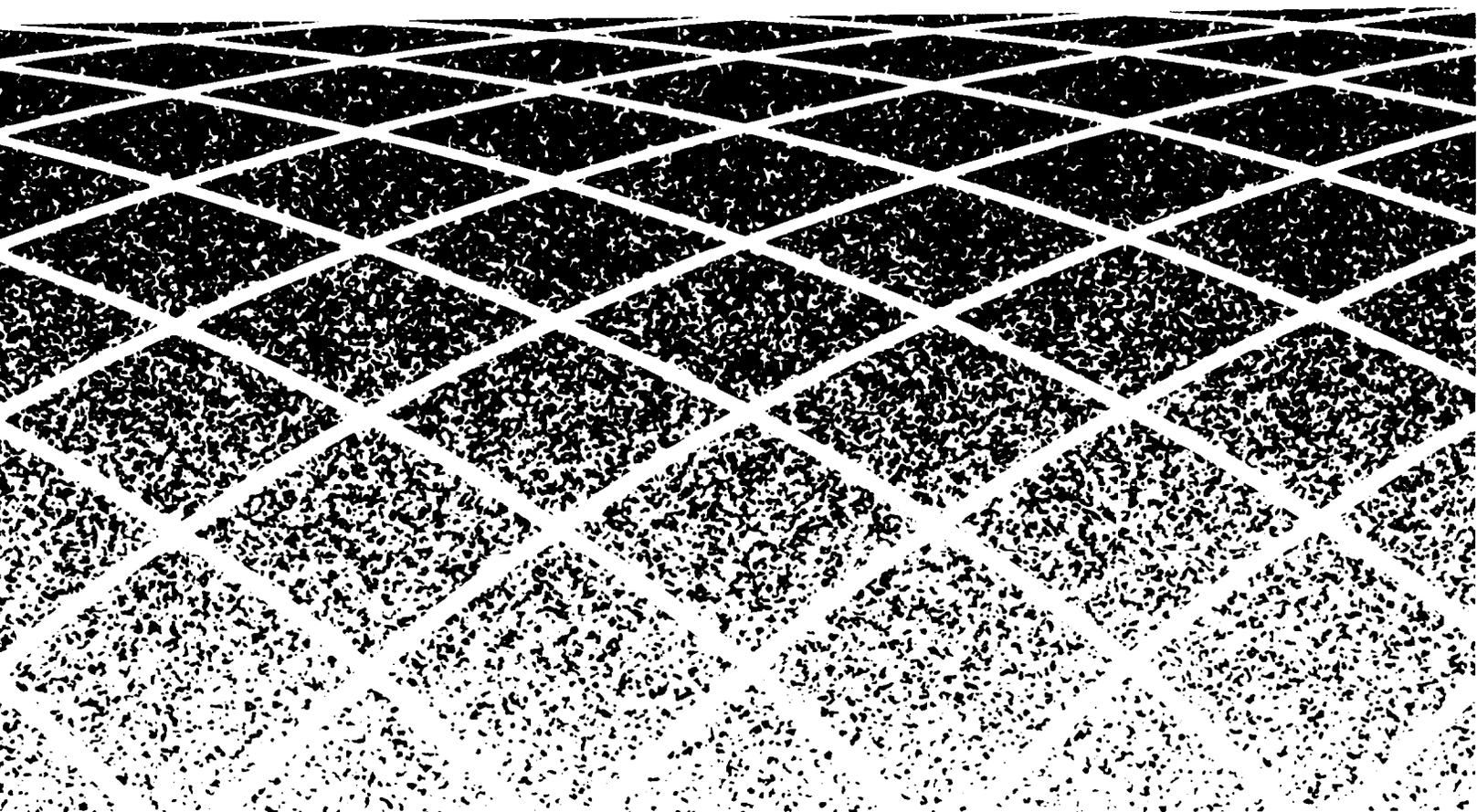
AT&T 363-206-157

Issue 1

December 1992

DDM-Plus ED-8C730-33 Wall Distant Terminal

Installation Manual



**Copyright © 1992 AT&T
All Rights Reserved
Printed in U.S.A.**

Notice

Every effort was made to ensure that the information in this document was complete and accurate at the time of printing. However, information is subject to change.

Mandatory Customer Information

Federal Communications Commission (FCC) Statement

NOTE: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart B of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residence is likely to cause interference in which case the user at their own expense will be required to take whatever measures may be required to correct the interference.

Security

In rare instances, unauthorized individuals make connections to the telecommunications network through the use of remote access features. In such event, applicable tariffs require that the customer pay all network charges for traffic. AT&T cannot be responsible for such charges and will not make any allowance or give any credit for charges that result from unauthorized access.

Trademarks

SLC, ST, and LGX are registered trademarks of AT&T.
UL is a registered trademark of Underwriters Laboratories Inc.
CSA is a trademark of Canadian Standards Association.

Warranty

AT&T provides a limited warranty to this product. For more information, consult your local Account Executive.

Documentation Ordering Information

The ordering number for this document is AT&T 363-206-154. To order this document call 1-800-432-6600 or 1-317-352-8557. RBOC/BOC customers should process document orders or standing order requests through their Company Documentation Coordinator. For more ordering information, refer to "How to Order Documents" in the section "About This Document."

Customer Assistance and Technical Support

The AT&T Regional Technical Assistance Center (RTAC) provides a technical assistance telephone number that is monitored 24 hours a day. For technical assistance, simply call 1-800-225-RTAC.

Documentation Support Telephone Number

AT&T provides a telephone number for you to report errors or to ask questions about the information in this document. The support telephone number is 1-800-334-0404 or (919) 727-6681.

Developed by the AT&T Document Development Organization

How Are We Doing?

Document Title: DDM-Plus ED-8C730-33 Wall Distant Terminal Installation Manual

Document No.: 363-206-157

Issue 1

Date: December 1992

AT&T welcomes your feedback on this document. Your comments can be of great value in helping us improve our documentation.

1. Please rate the effectiveness of this document in the following areas:

	Excellent	Good	Fair	Poor	Not Applicable
Ease of Use					////////////////////
Clarity					////////////////////
Completeness					////////////////////
Accuracy					////////////////////
Organization					////////////////////
Appearance					////////////////////
Examples					
Illustrations					
Overall Satisfaction					////////////////////

2. Please check the ways you feel we could improve this document:

- | | |
|--|---|
| <input type="checkbox"/> Improve the overview/introduction | <input type="checkbox"/> Make it more concise/brief |
| <input type="checkbox"/> Improve the table of contents | <input type="checkbox"/> Add more step-by-step procedures/tutorials |
| <input type="checkbox"/> Improve the organization | <input type="checkbox"/> Add more troubleshooting information |
| <input type="checkbox"/> Include more figures | <input type="checkbox"/> Make it less technical |
| <input type="checkbox"/> Add more examples | <input type="checkbox"/> Add more/better quick reference aids |
| <input type="checkbox"/> Add more detail | <input type="checkbox"/> Improve the index |

Please provide details for the suggested improvement. _____

3. What did you like most about this document?

4. Feel free to write any comments below or on an attached sheet.

If we may contact you concerning your comments, please complete the following:

Name: _____ Telephone Number: (____) _____

Company/Organization: _____ Date: _____

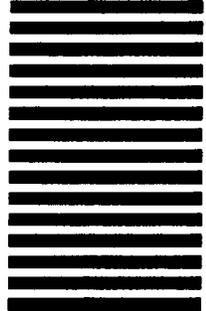
Address: _____

When you have completed this form, please fold, tape, and return to address on back or Fax to: 919-727-3043.

Do Not Cut—Fold Here And Tape



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1999 GREENSBORO, N.C.

POSTAGE WILL BE PAID BY ADDRESSEE

DOCUMENTATION SERVICES
2400 Reynolda Road
Winston-Salem, NC 27199-2029



How Are We Doing?

Document Title: DDM-Plus ED-8C730-33 Wall Distant Terminal Installation Manual

Document No.: 363-206-157

Issue 1

Date: December 1992

AT&T welcomes your feedback on this document. Your comments can be of great value in helping us improve our documentation.

1. Please rate the effectiveness of this document in the following areas:

	Excellent	Good	Fair	Poor	Not Applicable
Ease of Use					////////////////////
Clarity					////////////////////
Completeness					////////////////////
Accuracy					////////////////////
Organization					////////////////////
Appearance					////////////////////
Examples					
Illustrations					
Overall Satisfaction					////////////////////

2. Please check the ways you feel we could improve this document:

- | | |
|--|---|
| <input type="checkbox"/> Improve the overview/introduction | <input type="checkbox"/> Make it more concise/brief |
| <input type="checkbox"/> Improve the table of contents | <input type="checkbox"/> Add more step-by-step procedures/tutorials |
| <input type="checkbox"/> Improve the organization | <input type="checkbox"/> Add more troubleshooting information |
| <input type="checkbox"/> Include more figures | <input type="checkbox"/> Make it less technical |
| <input type="checkbox"/> Add more examples | <input type="checkbox"/> Add more/better quick reference aids |
| <input type="checkbox"/> Add more detail | <input type="checkbox"/> Improve the index |

Please provide details for the suggested improvement. _____

3. What did you like most about this document?

4. Feel free to write any comments below or on an attached sheet.

If we may contact you concerning your comments, please complete the following:

Name: _____ Telephone Number: (____) _____

Company/Organization: _____ Date: _____

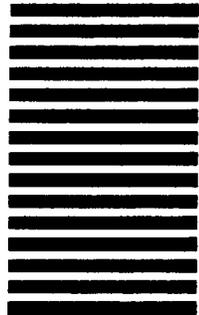
Address: _____

When you have completed this form, please fold, tape, and return to address on back or Fax to: 919-727-3043.

Do Not Cut—Fold Here And Tape



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 1999 GREENSBORO, N.C.

POSTAGE WILL BE PAID BY ADDRESSEE

DOCUMENTATION SERVICES
2400 Reynolda Road
Winston-Salem, NC 27199-2029



Contents

About This Document	xiii
■ Purpose	xiii
■ Intended Audiences	xiii
■ How to Use This Document	xiv
■ Safety Instructions	xv
Product Safety Labels	xv
■ Related Documentation	xxii
■ Related Training	xxiv
■ How to Order Documents	xxvi
■ How to Comment on This Document	xxvii

1	General Information	1-1
	■ DDM-Plus Description	1-1
	System Description	1-1
	Extension Shelf Description	1-2
	Wall Distant Terminal (DT) Description	1-2
	■ Equipment	1-3
	Miscellaneous Equipment	1-3
	Test Equipment	1-3
	■ Precautions	1-3
	General	1-3
	■ DDM-Plus Wall DT Installation Checklist	1-3
	Chapter 2, Equipment and Cable Installation	1-4
	Chapter 3, Powering and Verification	1-4
	Chapter 4, Circuit Pack Installation	1-5
	Chapter 5, Stand-Alone Installation Tests	1-5
	Chapter 6, End-to-End Installation Tests	1-5

Contents

2	Equipment and Cable Installation	2-1
	■ General	2-1
	Description	2-1
	■ Tools, Test Sets, and Accessories	2-2
	■ Inspection	2-3
	Procedure	2-3
	■ Equipment Installation	2-3
	Description	2-3
	Wall Mounting Requirements	2-4
	Wall DT Installation Procedure	2-4
	■ Ground Cable Installation	2-5
	Description	2-5
	Procedure	2-5
	■ Power Cable Installation	2-6
	Description	2-6
	Procedure	2-6
	■ Office Alarm Cable Installation	2-8
	Description	2-8
	Procedure	2-8
	■ Miscellaneous Discrete Cable Installation	2-9
	Description	2-9
	Procedure	2-10
	■ Parallel Telemetry Cable Installation	2-11
	Description	2-11
	Procedure	2-11
	■ DS1 Cable Installation	2-12
	Description	2-12
	Procedure	2-13
	■ Optical Fiber Cable Installation	2-14
	Description	2-14
	Fiber Cleaning Instructions	2-15
	Procedure	2-15
	■ Final Operations	2-16
	Procedure	2-16

Contents

3	Powering and Verification	3-1
	■ General	3-1
	Description	3-1
	Tools, Test Sets, and Accessories	3-1
	■ Verification	3-2
	Procedure	3-2
	■ Powering	3-2
	Procedure	3-2

4	Circuit Pack Installation	4-1
	■ General	4-1
	Description	4-1
	Tools, Test Sets, and Accessories	4-2
	■ Circuit Pack Option Settings	4-3
	Description	4-3
	25-Type OLIUs	4-3
	■ Circuit Pack Installation	4-5
	Procedure	4-6
	■ Final Operations	4-7
	Procedure	4-7

5	Stand-Alone Installation Tests	5-1
	■ General	5-1
	Description	5-1
	LED, Pushbutton, and Display Descriptions	5-2
	Tools, Test Sets, and Accessories	5-5
	■ LED Test	5-6
	Description	5-6
	Procedure	5-6
	■ Local Test	5-6
	Description	5-6

Contents

Procedure	5-7
■ Cross-Connect Test	5-9
Description	5-9
Procedure	5-10
■ Office Alarm and Automatic Protection Switching Test	5-14
Description	5-14
Procedure	5-15
■ Parallel Telemetry Test	5-17
Description	5-17
Procedure	5-18
■ DS1 Transmission Test	5-20
Description	5-20
Procedure	5-20
■ Final Operations	5-22
Procedure	5-22

6	End-to-End Installation Tests	6-1
■	General	6-1
	Description	6-1
	Tools, Test Sets, and Accessories	6-2
■	Fiber Verification and Automatic Protection Switching Test	6-3
	Description	6-3
	Procedure	6-3
■	End-to-End System Test	6-5
	Description	6-5
	Procedure	6-5
■	End-to-End DS1 Transmission Test	6-7
	Description	6-7
	Procedure	6-7
■	End-to-End Telemetry Test	6-9
	Description	6-9
	Procedure	6-10
■	Final Operations	6-11
	Procedure	6-11

Contents

7	Troubleshooting	7-1
	■ General	7-1
	Description	7-1
	For Normal Operation	7-1
	Diagnostic Codes for OLIUs	7-2
	Fiber Cleaning Instructions	7-3
	■ Technical Support	7-4
	Description	7-4
	■ COACH Description	7-4
	Description	7-4
	■ Required Product Changes	7-6
	Description	7-6

Figures

About This Document

1. Alert Symbol	xv
2. OLIU's Laser Danger Label	xviii
3. Shelf's Laser Danger Label	xix
4. ESD Warning Label	xix
5. Static Control Wrist Strap	xxi

1 General Information

1-1. DDM-Plus Extension Shelf with Circuit Packs	1-8
1-2. DDM-Plus Wall DT with Circuit Packs	1-9

2 Equipment and Cable Installation

2-1. Wall Mounting Position (Top View)	2-22
2-2. Wall DT Cable Connections (Side View)	2-23
2-3. Wall DT (Rear View)	2-24
2-4. DS1 Cable Shield Clamping (Rear View)	2-25
2-5. DS1 Cable Shield Clamping (Side View)	2-26
2-6. Wall DT Without Circuit Packs	2-27

4 Circuit Pack Installation

4-1. 25-Type OLIU Option Switches	4-11
4-2. Wall Distant Terminal with OLIUs	4-12

Figures

5	Stand-Alone Installation Tests	
	5-1. 25-Type OLIU Faceplate	5-23
	5-2. Installation Test Connections	5-24

6	End-to-End Installation Tests	
	6-1. Installation Test Connections	6-12

Tables

1	General Information	
	1-1. Miscellaneous Equipment	1-6
	1-2. Tools, Test Sets, and Accessories	1-7

2	Equipment and Cable Installation	
	2-1. Wall Distant Terminal Cable Assemblies	2-17
	2-2. Office Alarm Connections	2-18
	2-3. Miscellaneous Input Connections	2-19
	2-4. Parallel Telemetry Connections — Connector P1	2-20
	2-5. DS1 Connections	2-21

4	Circuit Pack Installation	
	4-1. DDM-Plus Circuit Pack Codes	4-8
	4-2. 25-Type DS1 Line Code Settings	4-8
	4-3. 25-Type DS1 Line Buildout Settings	4-9
	4-4. 25-Type DS1 LOS Settings	4-9
	4-5. 25-Type BER Threshold Settings	4-10
	4-6. 25-Type Output Power Settings	4-10

About This Document

Purpose

This manual provides installation instructions on the ED-8C730-33 DDM-Plus Wall Distant Terminal (DT) for end-users responsible for their own equipment installations. This manual is only intended for installation and tests performed prior to turnover to service turn-up personnel. This manual is not a service manual. Refer to AT&T 363-206-150, *DDM-Plus User/Service Manual*, for any activity involving circuit turn-up, normal maintenance, or trouble analysis.

Intended Audiences

This installation manual is for DDM-Plus customers who maintain their own installation organization to install their telecommunications equipment.

How to Use This Document

This installation manual only supports the ED-8C730-33,G1 Wall DT Shelf. Information on the other DDM-Plus housings, Cabinet Distant Terminal, and Extension Shelf, is contained in AT&T 363-206-150, *DDM-Plus User/Service Manual*.

This manual is divided into several chapters. The chapters are numbered in the order in which they are to be performed; however, each chapter was developed to stand alone.

DDM-Plus installation procedures are also available for the DDM-Plus Extension Shelf and traditional loop enclosure arrangements such as 51-, 80-, and 90-type cabinets, controlled environment vaults (CEVs), etc. These procedures are referenced in the following documents:

- AT&T 363-205-010 — **SLC**[®] *Series 5 Carrier System Applications and Planning Guide*
- AT&T 363-205-401 — **SLC**[®] *Series 5 Carrier System Remote Terminal Acceptance and Turnup (TOP)*
- AT&T 626-500-105 — *80-Type Cabinets Coding Scheme, Ordering Information, and Lettering Guidelines*
- AT&T 626-500-115 — *90-Type Cabinets Coding Scheme, Ordering Information, and Lettering Guidelines*

Safety Instructions

Product Safety Labels

Important safety instructions are in this chapter. In addition to the instructions on the following pages, there are other safety instructions you must follow. These instructions involve lasers, lightwave optical cable and connectors, and precautions when handling circuit packs to prevent damage from electrostatic discharge. This manual also contains admonishments in the form of **DANGERS**, **WARNINGS**, and **CAUTIONS** which must be followed at all times.

The symbol in Figure 1 appears throughout this manual to alert the user to the presence of important operating and maintenance (servicing) instructions for the DDM-Plus Wall DT.



Figure 1. Alert Symbol

Admonishments

Admonishments in this document have the following definitions:

- **Danger** indicates the presence of a hazard that *will* cause death or severe personal injury if the hazard is not avoided.
- **Warning** indicates the presence of a hazard that can cause death or severe personal injury if the hazard is not avoided.
- **Caution** indicates the presence of a hazard that *will* or can cause minor personal injury or property damage if the hazard is not avoided. This includes equipment damage, loss of software, or service interruption.

Lightwave Safety

An AT&T lightwave digital transmission system and associated optical test sets use semiconductor laser transmitters. The lasers emit lightwaves, at or near infrared wavelengths, into lightguide cables. This light is at the red end of the visible spectrum. Although, at present, the transmitter power levels are below those known to cause injury to the eye (for example, from a direct inadvertent exposure to the end of an energized fiber), direct exposure at close distances should be avoided.



CAUTION:

Never view any unterminated optical connector with optical instruments other than indirect image-converting devices such as the FIND-R-SCOPE, since viewing optics tends to collimate the energy from an optical connector and, hence, increases the potential risk for injury.

Laser danger labels are attached to the left circuit board of the optical line interface unit (OLIU) (Figure 2).

— DANGER —
DISCONNECTED OPTICAL
CONNECTORS MAY EMIT
INVISIBLE OPTICAL
RADIATION
AVOID DIRECT EYE
EXPOSURE TO THE BEAM

Figure 2. OLIU's Laser Danger Label

Electrostatic Discharge (ESD) Considerations



CAUTION:

Industry experience has shown that all integrated circuit packs can be damaged by static electricity that builds up on work surfaces and personnel. The static charges are produced by various charging effects of movement and contact with other objects. Dry air allows greater static charges to accumulate. Higher potentials are measured in areas with low relative humidity, but potentials high enough to cause damage can occur anywhere.

The warning label (Figure 3) is attached on the inside surface of the side door.

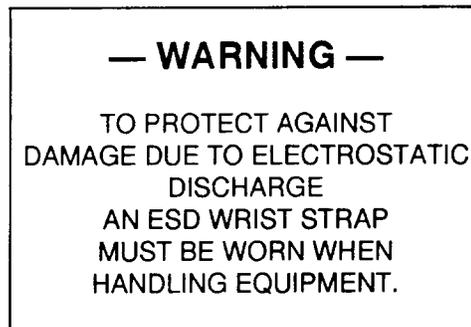


Figure 3. ESD Warning Label

The following list of precautions should be observed when handling circuit packs in order to prevent damage by electrostatic discharge.

- (a) Assume all circuit packs contain solid-state electronic components that can be damaged by electrostatic discharge (ESD).
- (b) When handling circuit packs (storing, inserting, removing, etc.) or when working on the backplane, always wear a grounded wrist strap or wear a heel strap and stand on a grounded, static-dissipating floor mat.
- (c) Handle all circuit packs by the faceplate or latch and by the top and bottom outermost edges. Never touch the components, conductors, or connector pins.
- (d) Observe warning labels on bags and cartons. Whenever possible, do not remove circuit packs from antistatic packaging until ready to insert them into slots.
- (e) If possible, open all circuit packs at a static-safe work position, using properly grounded wrist straps and static-dissipating table mats.
- (f) Always store and transport circuit packs in static-safe packaging. Shielding is not required unless specified.
- (g) Keep all static-generating materials such as food wrappers, plastics, and styrofoam containers away from all circuit packs. Upon removal from bay, immediately put circuit packs into static-safe packages.
- (h) Whenever possible, maintain relative humidity above 20 percent.

To reduce the possibility of ESD damage, assemblies are equipped with grounding jacks to enable personnel to ground themselves using wrist straps (see Figure 4) while handling circuit packs or working on an assembly(s). The jacks for connection of wrist straps are located at the lower right-hand corner of each assembly and are labeled. When grounding jacks are not provided, an alligator clip adapter enables connection to bay frame ground.

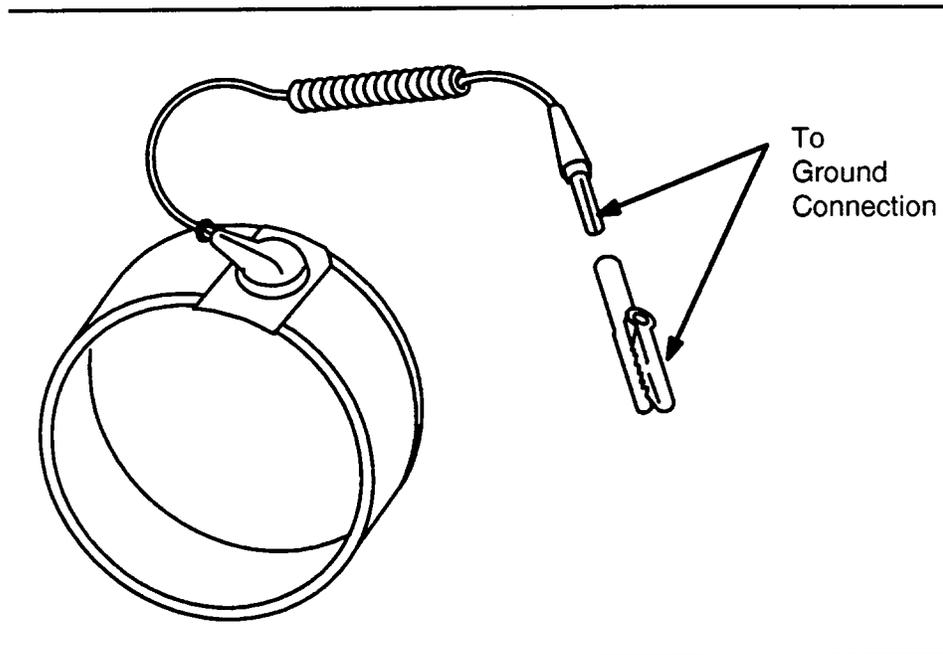


Figure 4. Static Control Wrist Strap

IMPORTANT SAFETY INSTRUCTIONS



CAUTION:

*Use only AT&T manufactured **UL*** Recognized and **CSA**** Certified Component circuit packs. Refer to DDM-Plus User/Service Manual 363-206-150 for a list of UL Recognized and CSA Certified Component circuit packs.*

ATTENTION: *N'utiliser que des cartes électroniques fabriquées par AT&T, homologuées par les UL et faites d'un composant certifié CSA. Voir le guide d'utilisation et d'entretien DDM-Plus 363-206-150 pour la liste des cartes électroniques reconnues par les UL et certifiées CSA.*



CAUTION:

Disconnect two (2) power supply connections when removing power from this system.

ATTENTION: *Déconnecter les deux (2) fils d'alimentation avant de procéder à la mise hors tension de ce système.*



CAUTION:

For continued protection against risk of fire, replace only with the same type and rating of fuse.

ATTENTION: *Pour ne pas compromettre la protection assurée contre le risque d'incendie, remplacer seulement par un fusible de mêmes type et caractéristiques nominales.*



WARNING:

Installation must include an independent frame ground drop to building ground. See AT&T Practice 363-206-156.

AVERTISSEMENT: *Le bâti du matériel doit comporter une mise à la terre indépendante par la prise de terre du bâtiment. Voir la publication AT&T 363-206-156.*

This device is suitable for wall mounting and also for desk top use.

Cet appareil peut être installé au mur ou sur un bureau.

For proper installation refer to AT&T installation manual 363-206-157.

Voir le guide AT&T 363-206-157 afin d'installer l'appareil adéquatement.

SAVE THESE INSTRUCTIONS

* Registered trademark of Underwriters Laboratories Inc.

** Trademark of Canadian Standards Association.

IMPORTANT INSTALLATION SAFETY INSTRUCTIONS

1. Read and understand all instructions.
2. Installation and maintenance procedures must be followed and performed by trained personnel only.
3. Never install telecommunications wiring during a lightning storm.
4. Never install telecommunications jacks in wet locations.
5. Never touch uninsulated telecommunications wires or terminals unless the telecommunications line has been disconnected at the DS1 interface.
6. Use caution when installing or modifying telecommunications lines.
7. Follow instructions in this installation manual for wall mount applications of the DDM-Plus Wall Distant Terminal.

SAVE THESE INSTRUCTIONS

Related Documentation

The following documents provide additional information pertinent to the DDM-Plus applications:

- AT&T 363-206-150 — *DDM-Plus User/Service Manual*
- AT&T 363-206-151 — *DDM-Plus Installation Manual*
- AT&T 363-206-152 — *DDM-Plus Quick Reference Guide*
- AT&T 363-206-153 — *Software Release Description*
- AT&T 363-206-156 — *DDM-Plus Equipment Engineering and Ordering Guide*
- AT&T 363-206-200 — *DDM-2000 Multiplexer Application, Planning, and Ordering Guide*
- AT&T 365-200-107 — *DS1 Extension Shelf Description, Installation, and Maintenance T1 Digital Line*
- AT&T 365-227-500 — *T1 Digital Line — Trouble-Locating Procedures*
- AT&T 365-800-002 — *T1 Digital Line — Acceptance and Maintenance Tasks — Digital Transmission Tasks*
- AT&T 855-350-104 — *T1, T1 Outstate, T1C and T1D - Fault-Locate System Engineering Design*
- AT&T 855-351-101 — *T1 Digital Line — Transmission and Outside Plant Design Procedures*
- AT&T 915-710-115 — **SLC**[®] *Series 5 Carrier System Applications Engineering*
- FPD 801-525-169 — *DDM-Plus Floor Plan Data Sheet*

The following drawings provide additional information about the DDM-Plus:

J98725DB	DDM-Plus Extension Shelf Assembly
ED-8C730-10	Typical Bay Arrangement
ED-8C730-20	Cabling Assemblies
ED-8C730-33	Shelf Assembly (Wall DT)
ED-8C730-32	Plug-In Group Ordering
SD-7C514-01	Application Schematic, Wall DT
SD-7C559-01	DDM-Plus Extension Shelf Application Schematic
T-7C514-30	DDM-Plus Wall DT Interconnect Circuit
T-7C559-31	DDM-Plus Extension Shelf Interconnect Circuit

Related drawings:

ED-8C501-50	Network Bay Frame
T-82046-30	Power Systems DC Distribution Circuit for Digital Transmission System

How to Order Documents

To order additional copies of this document and/or to request placement on the standing order list, send or call in an order as follows:

Customer	Mail Order	Telephone Order (Monday through Friday)
Commercial Customers*	AT&T Customer Information Center Attention: Order Entry Center 2855 N. Franklin Road P.O. Box 19901 Indianapolis, IN 46219	Within USA: 1-800-432-6600 7:30 a.m. to 6:30 p.m. EST FAX: 1-317-322-6484 From Canada: 1-800-255-1242 Australia and all European Countries: Toll: 1-317-322-6416 All Other Countries: Toll: 1-317-322-6646 Worldwide: FAX: 1-317-322-6699
RBOC/BOC	Process through your Company Documentation Coordinator	

* For commercial customers, a check, money order, purchase order number, or charge card number is required with all orders. Make checks payable to AT&T. AT&T entities should use Form IND 1-80.80 FA, available through the Customer Information Center.

One-time orders include a binder (if applicable) and the document contents for the current issue in effect at the time of order. Also, you may request placement on the standing order list for all later reissues of any document. The standing order list for each document provides automatic distribution for all reissues of the document. RBOC/BOC customers should process document orders or standing order request through their Company Documentation Coordinator.

How to Comment on This Document

Feedback forms are located immediately after the title page of this document. If the feedback forms are missing, please send your comments and suggestions to:

Documentation Services
2400 Reynolda Rd.
Winston Salem, N. C. 27106

You may also report errors or request changes to this document by calling the toll free number: **1-800-334-0404** and giving the nine-digit document number (**AT&T 363-206-157**).

General Information

1

Contents

DDM-Plus Description	1-1
■ General	1-1
■ System Description	1-1
■ Extension Shelf Description	1-2
■ Wall Distant Terminal (DT) Description	1-2
Equipment	1-3
■ Miscellaneous Equipment	1-3
■ Test Equipment	1-3
Precautions	1-3
DDM-Plus Wall DT Installation Checklist	1-3
■ General	1-3
■ Chapter 2, Equipment and Cable Installation	1-4
■ Chapter 3, Powering and Verification	1-4
■ Chapter 4, Circuit Pack Installation	1-5
■ Chapter 5, Stand-Alone Installation Tests	1-5
■ Chapter 6, End-to-End Installation Tests	1-5

General Information

1

DDM-Plus Description

General

Refer to AT&T 363-206-150, *DDM-Plus User/Service Manual*, for detailed descriptions on the different housings and plug-in units.

Refer to AT&T 363-206-151, *DDM-Plus Installation Manual*, if installing the J98725DB-1, L1 Extension Shelf.

System Description

The DDM-Plus consists of a housing (shelf), a number of optical line interface units (OLIUs) and/or T1 repeater circuit packs, and associated cables.

The 25A or 25F OLIU is used in conjunction with the housing to provide a basic optical transport system in which four DS1s are transported between two locations. The 25A OLIU spans up to 3.1 km for single-mode and 2.2 km for multimode fiber. The 25F OLIU spans up to 23 km for single-mode and 14.5 km for multimode fiber. At each end, the OLIU receives four DS1s from the equipment side; multiplexes them up to a DS2; converts the DS2 to an optical signal; transmits over fiber to the OLIU at the receive end, which converts the optical signal back to an electrical signal; demultiplexes the DS2 to four DS1s; and provides the DS1s to the equipment side. An unprotected system consists of a housing and an OLIU at one end connected to a housing and an OLIU at a remote end by a pair of optical fiber cables.

Extension Shelf Description

⇒ NOTE:

The following is not covered in this manual. This description is for reference purposes only.

The DDM-Plus J98725DB-1, L1 Extension Shelf is divided into seven groups of four DS1s each as shown in Figure 1-1. The group designations are labeled (A through G) above the circuit pack slots. Each of the 7 groups can accommodate two 25-type OLIUs or 4 T1 repeater circuit packs. The OLIUs and repeater circuit packs **CANNOT** be mixed in the same group. For mixed shelves, it is required that OLIUs grow from left to right and AEK-type repeaters grow from right to left. All connections, except the power cable and the optical fibers, are connected to the front side of the backplane, just under the circuit pack slots. The fuse card is located in the center of the shelf and contains the two 10-ampere feeder fuses. Located on the J98725DB-1, L1 shelf assembly below the fuse card is an electrostatic discharge (ESD) jack, alarm cutoff (ACO) light/button, and the Major (MJ) and Minor (MN) alarm light-emitting diodes (LEDs).

Wall Distant Terminal (DT) Description

The DDM-Plus Wall DT supports one group of four DS1s. The Wall DT can be used in an unprotected mode with one OLIU or in a protected mode with two OLIUs as shown in Figure 1-2. Unlike the Extension Shelf, the Wall DT **DOES NOT** support any T1 repeater circuit packs. The Wall DT can be mounted on a wall or can be placed on a table or a desk. If mounted on a wall, a specially designed mounting bracket allows the Wall DT to be swung out for easy installation and clear access. The front of the Wall DT housing has a left-hinged front door that opens to provide access to the circuit packs. A ground jack for connecting wrist straps is also provided on the front of the Wall DT. This ground jack is accessible with the door closed.

The Wall DT housing also has a hinged door on its right side (as viewed from the front) that opens to provide access to a fiber storage area, power connections, alarm connections, parallel telemetry connections, and fuses. These doors can be locked so that access to circuit packs, power connections, fusing, alarm connections, and fiber is only available to appropriate personnel. The front door must be closed before the side door can be locked.

The rear of the Wall DT housing provides access to all DS1 signals through four RJ48X grounded connectors. Power, alarm, parallel telemetry cables, and fibers enter the housing through access holes in the rear panel of the housing and are terminated inside the housing.

Equipment

Miscellaneous Equipment

Miscellaneous equipment is listed in Table 1-1.

⇒ NOTE:
Not all equipment is required for each installation.

Test Equipment

Tools, test sets, and accessories are listed in Table 1-2.

⇒ NOTE:
Not all tools are required for each installation.

Precautions

An antistatic wrist strap must be worn when handling circuit packs or connecting cables to the shelf.

Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments.

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser radiation exposure.

DDM-Plus Wall DT Installation Checklist

General

The following is a checklist to assist installers who are familiar with and who have already installed a DDM-Plus Wall DT. Every item on this checklist must be performed for the installation to be completed.

Chapter 2, Equipment and Cable Installation

- Inspect the DDM-Plus Wall DT for visible damage.
- Verify that the installation kit has shipped with the Wall DT.
- Verify that the Wall Mounting Requirements are met per FPD 801-525-169.
- Mount the Wall DT to the wall.



NOTE:

Use wall bracket as a template for mounting hole locations.

- Install the optical fiber conduit.
- Install the power cable and label at the battery distribution fuse board (BDFB) or equivalent fusing equipment.
- Verify that the proper size fuses (between 0.75 and 1.0 ampere) are available at the BDFB. Do not install them.
- Install the office alarm cable.
- Install the miscellaneous discrete input cable.
- Install the parallel telemetry cable. (Ground the ground return lead.)
- Install the DS1 cables and ground cable shields.
- Install the optical fiber jumpers from the DDM-Plus to the LGX[®] Fiber Optic Distributing System.
- Verify that cables are properly dressed and labeled.

Chapter 3, Powering and Verification

- Verify that the two 0.5-ampere Wall DT fuses are installed.
- Verify that the Wall DT is properly grounded.
- Install the proper size fuses (between 0.75 and 1.0 ampere) at the BDFB.
- Measure and verify that the proper voltage is observed between -48A and GRD A on the terminals on TB1.
- Measure and verify that the proper voltage is observed between -48B and GRD B on the termination TB1.



NOTE:

If the AT&T 1145A1 Power Supply is used there is only a connection made to -48A and GND A. There will not be any voltage between -48B and GND B.

Chapter 4, Circuit Pack Installation

- Option OLIUs in accordance with office records.
- Install OLIUs in shelf.

Chapter 5, Stand-Alone Installation Tests

- LED Test
- Local Test
- Cross-Connect Test
- Office Alarm and Automatic Protection Switching Test
- Parallel Telemetry Test (includes miscellaneous telemetry)
- DS1 Transmission Test (optional).

Chapter 6, End-to-End Installation Tests

This chapter requires that outside plant fiber be installed and that stand-alone testing be completed at each end as follows:

- Fiber Verification and Automatic Protection Switching Test
- End-to-End System Test
- End-to-End DS1 Transmission Test
- End-to-End Telemetry Test
- Final Operations.

Table 1-1. Miscellaneous Equipment

<u>Item</u>	<u>Equipment Code or Commercial Code</u>	<u>Comcode</u>
DDM-Plus Extension Shelf	J98725DB-1, L1	—
Heat Baffle Assembly	J98725DB-1, L2	—
DDM-Plus Cable Assemblies	ED-8C730-20	—
DDM-Plus Wall DT	ED-8C730-33, G1	
AT&T Fiber Protection System*	NE-09800-50	

* The AT&T Fiber Protection System is a completely enclosed PVC duct work that encloses/protects optical fiber cables routed in central office and controlled environment vault (CEV) frames and cableways.

Table 1-2. Tools, Test Sets, and Accessories

<u>Description</u>	<u>Commercial or Comcode</u>	<u>See Note</u>
Multimeter		1,4
Screwdriver with appropriate head(s)		1
Electrostatic discharge (ESD) wrist strap	900486994	1
Wire-wrap gun		1,5
Optical fiber cables with ST® connectors on each end, 4 ft. (min. of 2)	105357735	2,6
Optical fiber cables with biconic connectors on each end, 5 ft. (min. of 2)	104149216	2,6
Microduster air (clean) (12 cans/case)	900709361	
Microduster nozzle assembly	900709338	
Absorbond cleaner (300 wipes/pkg.)	900709379	
DS1 Transmission Test Set with DS1 cables		3,7

Notes:

1. Required for all installations.
2. Required if performing the Chapter 5, "Stand-Alone Installation Tests".
3. Required if performing the optional DS1 transmission tests contained in Chapter 5, "Stand-Alone Installation Tests", or Chapter 6, "End-to-End Installation Tests".
4. The multimeter must be capable of measuring DC voltage in the 40- to 60-volt range.
5. The wire-wrap gun must be able to accommodate 26-gauge wire.
6. The optical fiber cables can be single or multimode fiber and the recommended length is 3 feet. Select either the optical fiber cables with ST connectors or biconic connectors depending on the connectors used at the LGX® panel. The optical fiber cables with ST connectors can be used to loop the OLIUs directly on themselves.
7. The DS1 test set must include a transmitter and a receiver capable of sending/receiving a framed quasi-random bit pattern.

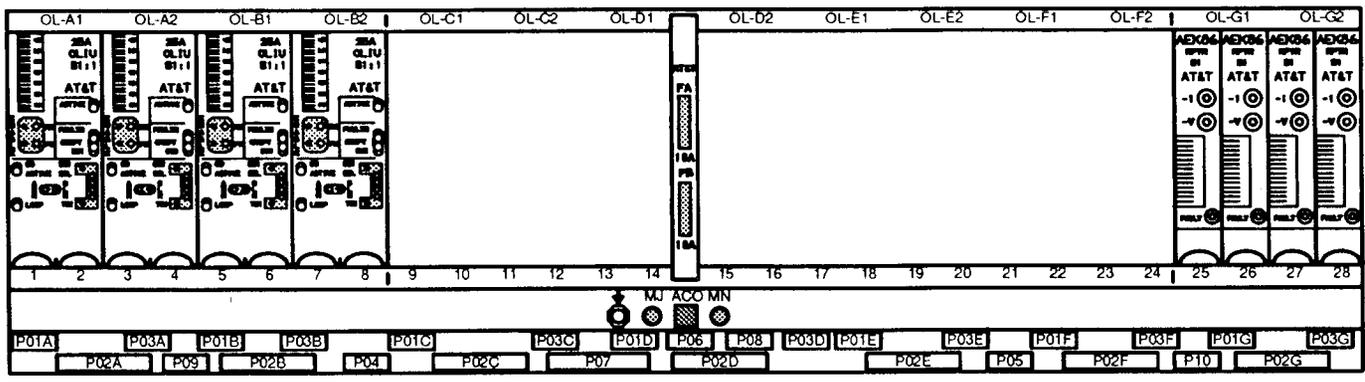


Figure 1-1. DDM-Plus Extension Shelf with Circuit Packs

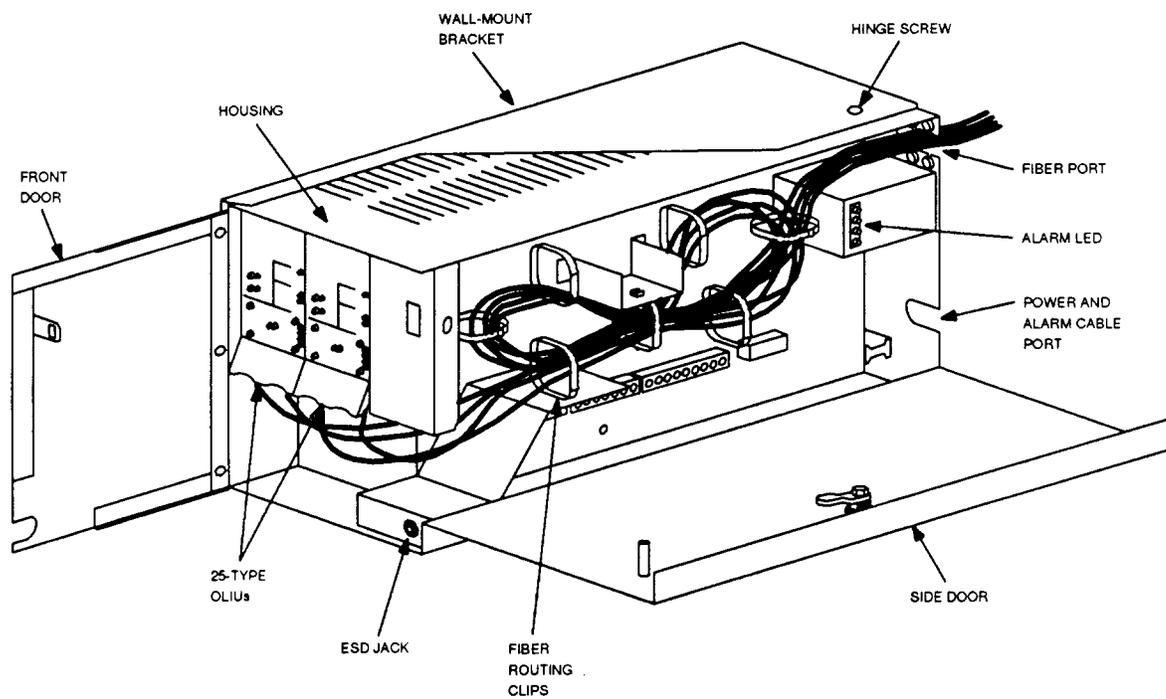


Figure 1-2. DDM-Plus Wall DT with Circuit Packs

Equipment and Cable Installation

2

Contents

General	2-1
■ Description	2-1
Tools, Test Sets, and Accessories	2-2
Inspection	2-3
■ Procedure	2-3
Equipment Installation	2-3
■ Description	2-3
■ Wall Mounting Requirements	2-4
■ Wall DT Installation Procedure	2-4
Ground Cable Installation	2-5
■ Description	2-5
■ Procedure	2-5
Power Cable Installation	2-6
■ Description	2-6
■ Procedure	2-6
Office Alarm Cable Installation	2-8
■ Description	2-8
■ Procedure	2-8
Miscellaneous Discrete Cable Installation	2-9
■ Description	2-9
■ Procedure	2-9
Parallel Telemetry Cable Installation	2-10
■ Description	2-10

Contents

■ Procedure	2-11
DS1 Cable Installation	2-12
■ Description	2-12
■ Procedure	2-12
Optical Fiber Cable Installation	2-14
■ Description	2-14
■ Fiber Cleaning Instructions	2-15
■ Procedure	2-15
Final Operations	2-16
■ Procedure	2-16

Equipment and Cable Installation

2

General

Description

This chapter covers the installation of the ED-8C730-33, G1, Wall Distant Terminal (DT), cables, and grounding.

⇒ NOTE:

This installation manual contains the latest cable information at the time of issue. For up-to-date cable and connection information, refer to the following:

- FPD 801-525-169 DDM-Plus Floor Plan Data Sheets
- ED-8C730-20 DDM-Plus Cable Assemblies
- SD-7C514-01 Wall DT Application Schematic
- T-7C514-30 Wall DT Interconnect Circuit

⇒ NOTE:

Circuit packs must not be installed at any time during this section.

⇒ NOTE:

Cable assembly options are listed in Table 2-1.

⇒ **NOTE:**
Miscellaneous equipment is listed in Chapter 1, "General Information", of this manual.

⇒ **NOTE:**
In the tables listing cable connection information wire color codes are provided. In AT&T color codes, the first color is the wire color and the second color is the tracer color. A color code of BL-W is a blue wire with a white stripe.

⇒ **NOTE:**
Use cable tie-wraps in the Wall DT as instructed. The tie-wraps have a onetime use.

Tools, Test Sets, and Accessories

The following tools are required:

<u>Qty.</u>	<u>Description</u>
	Screwdriver(s) (Note 1)
1	Wire-wrap gun (Note 2)

⇒ **NOTE 1:**
A screwdriver is required, with the appropriate head(s) for mounting the Wall DT, and connecting the cables to the terminal blocks (TB 1 and TB 2).

⇒ **NOTE 2:**
A wire-wrap gun is required to make connections on the DS1, alarm, telemetry and fault locate cables. The wire-wrap gun must be able to accommodate 26-gauge wire.

Inspection

Procedure

1. Inspect the outside of the Wall DT for visible damage.
2. Open the side cover, swing open the front cover, and inspect for visible damage on the inside of the Wall DT.
3. Verify that the following material has shipped with the Wall DT.

<u>Qty.</u>	<u>Description</u>
4	Mounting screws
4	Spare fuses (2 additional fuses ship installed)
12	Tyrap 4 inches long
4	Rubber feet
2	Keys (for locking Wall DT)

4. Verify that AT&T 363-206-157, *DDM-Plus Wall DT Installation Manual*, is shipped with the Wall DT.

Equipment Installation

Description

This procedure describes the requirements and method for mounting the Wall DT to a wall.

⇒ NOTE:

If the Wall DT is going to be placed on a flat surface instead of wall-mounted, then the wall-mount bracket must be removed. -Four rubber feet must be attached to the bottom of the housing at the locations marked with an "o". Access to the front, the right side, and the rear of the unit must be provided.

Wall Mounting Requirements

1. The Wall DT is 6-3/4 inches high, by 6-1/2 inches wide, by 15-1/2 inches deep, and weighs 16 pounds.
2. The Wall DT must be mounted to a wall that can sufficiently support 74 pounds.
3. The wall must be able to accommodate the provided wood screws for attachment of the Wall DT bracket.
4. The Wall DT must be mounted in such a way to allow access to the front, the right side, and rear of the unit.



NOTE:

Typically, this unit will be mounted so that its left side, as viewed from the front, is flat against a wall.

5. The Wall DT should be mounted at a suitable height, such as the bottom of the unit being placed at 4 feet, for easy installation and maintenance.

Wall DT Installation Procedure

1. Determine that a suitable mounting location has been found meeting the "Wall Mounting Requirements".
2. Prior to mounting, position the Wall DT housing and its bracket against the wall and swing out the housing to ensure that the minimum clearance is met as shown in Figure 2-1.
3. Remove the Wall DT housing from its bracket by removing the two shoulder screws at the hinge point (one on top and one on the bottom).
4. Place the bracket against the wall and mark the location of the mounting holes.
5. Install the wood screws, provided with the unit, into the wall leaving sufficient space between the screwhead and wall to mount the bracket.
6. Place the bracket over the wood screws and secure the bracket to the wall.
7. Attach the Wall DT housing to the bracket and install the two shoulder screws at the hinge point (one on top and one on the bottom).
8. Swing out the housing to ensure that the minimum clearance is met.
9. Verify that the Wall DT is secured to prevent accidental movement of the unit.
10. Verify there is sufficient access to the front, to the right side, and to the rear of the unit.

11. Install the required fiber conduit for the optical fiber cables to be routed from the Wall DT to the LGX[®] Fiber Optic Distributing System.
12. Install additional conduit or provide a cable rack or tie bar for the routing and securing of all the nonfiber cables from the Wall DT to their respective locations.



NOTE:

Optical fiber cables and nonfiber cables cannot share the same conduit.



NOTE:

The alarm, power, and ground cables must be secured to the wire tie bases inside the Wall DT using tie-wraps.

Ground Cable Installation

Description

This procedure describes how to ground the Wall DT. Correct grounding is necessary for proper operation of the Wall DT.

Procedure

1. Obtain a 14-gauge wire to serve as the ground wire.
2. Connect this wire to the FR GND terminal on TB 1 as shown in Figure 2-2. Connection is made by inserting bare wire under the terminal screw and tightening.
3. Route the ground wire from the right side of the Wall DT as viewed from the front (Figure 2-3) through the appropriate cable cutout located in the rear of the Wall DT (Figure 2-4) to the reference ground point.



NOTE:

Leave some slack in the cable in the Wall DT. DO NOT secure cable to the wire tie bases at this time.



NOTE:

The ground wire should be kept as short as possible and connected to the closest known ground reference point.

Power Cable Installation

Description

This procedure describes how to attach the power cable to the Wall DT and to the battery distribution fuse board (BDFB).

Procedure

1. Obtain two pairs of twisted pair wire, between 14 and 18 gauge, to serve as the Wall DT power cables.



NOTE:

There is no manufactured cable group offered for the Wall DT power connections.



NOTE:

The actual gauge size used should be calculated by the power engineer per T-82046-30 and FPD 801-525-169.

2. Label the wires, at each end, -48A and GND A in one twisted pair, and -48B and GND B in the other twisted pair.
3. Connect these four wires to the appropriate terminals on TB1 on the Wall DT, labeled -48A, GND A, -48B, GND B as shown in Figure 2-2. Connection is made by inserting bare wire under the terminal screw and tightening. Ensure that terminal screw is loose before inserting wire.
4. Route the power cable from the right side of the Wall DT as viewed from the front (Figure 2-3) through the appropriate cable cutout located in the rear of the Wall DT (Figure 2-4) to the battery distribution fuse board (BDFB) or equivalent.



NOTE:

If the Wall DT is going to be powered by a portable power supply or equivalent, make connections per instructions provided with the power supply (such as the power supply described in AT&T 363-206-156, *DDM-Plus Equipment Engineering and Ordering Guide*).

5. Secure the ground and power cables to the left wire tie base using the tie-wrap provided.



NOTE:

Leave slack in the cable in the Wall DT for strain relief. Do not tiwrap the cables to strain relief bracket (Figure 2-2) at this time.

6. Place the cable in a protective conduit or tie the cable to a stationary object such as a wall or cable rack.

 **NOTE:**

The cable should be routed in a protective conduit or dressed in such a manner as to not be easily moved or become a hazard.

7. At the BDFB or equivalent, cut the power cable to the desired length.

 **WARNING:**

At the BDFB or equivalent, verify that the breakers are OFF or that the fuses are not installed.

 **NOTE:**

The DDM-Plus Wall DT is powered by -48 V DC.

8. At the BDFB or equivalent make connections per the cable labels, -48A, GND A, -48B, and GND B.
9. Each feeder at the BDFB should be fused according to engineering records based upon power cable length and gauge.

 **NOTE:**

In the absence of engineering records, fuse between 0.75 and 1.0 amp.

10. Leave the fuses out or breakers off until Chapter 3, "Powering and Verification", of this installation manual.

Office Alarm Cable Installation

Description

Office alarms is the common method used in a central office for maintenance personnel to quickly isolate a failure to the correct system. Perform this procedure if connection to the central office alarm system is required.

⇒ NOTE:

The office alarm closures are designed for a maximum open circuit voltage of 60 volts, a transient voltage of up to 135 volts for a maximum of 1 ms, and a maximum steady-state current of 1 amp.

Procedure

1. Obtain an office alarm cable (Group 32 or 33) listed in Table 2-1.
2. Connect the five wires on the exposed wire end of the cable to the appropriate terminals on TB2 on the Wall DT (Figure 2-2) making connections as shown in Table 2-2. Connection is made by inserting bare wire under the terminal screw and tightening. Ensure that terminal screw is loose before inserting wire.

⇒ NOTE:

Although the cable is loose at both ends, wire per the color codes shown in Table 2-2. If this cable is connected in a standard fashion, it will allow for easier troubleshooting later.

3. Route the office alarm cable from the right side of the Wall DT as viewed from the front (Figure 2-3) through the appropriate cable cutout located in the rear of the Wall DT (Figure 2-4) to the office alarm equipment.

⇒ NOTE:

Leave some slack in the cable in the Wall DT for strain relief. Do not wire the cables to the strain relief bracket (Figure 2-2) at this time.

⇒ NOTE:

Do not secure cable to a wire tie base in the Wall DT at this time.

4. Place the cable in a protective conduit or tie the cable to a stationary object such as a wall or cable rack.

⇒ NOTE:

The cable should be routed in a protective conduit or dressed in such a manner as to not be easily moved or become a hazard.

5. At the office alarm equipment, cut the office alarm cable to the desired length.
6. Connect this end of the office alarm cable to the alarm panel making connections as shown in Table 2-2.

⇒ NOTE:

Wire-wrap this end if desired.

7. Inspect the office alarm panel and add contact protection network (if required).
8. Label all designations on the alarm panel.

Miscellaneous Discrete Cable Installation

Description

Miscellaneous discrettes is the common method used to report an alarm condition on equipment external to the Wall DT, located at a remote site, to the DDM-Plus equipment (Wall DT or Extension Shelf) in a central office. Perform this procedure if a miscellaneous discrete input is required.

⇒ NOTE:

A miscellaneous discrete input is entered into the DDM-Plus by providing a closure between the two miscellaneous discrete terminals on TB2 on the Wall DT.

Procedure

1. Obtain a miscellaneous discrete input cable (Group 34 or 35) listed in Table 2-1.
2. Connect the three wires on the exposed wire end of the cable to the appropriate terminals on TB2 on the Wall DT (Figure 2-2) making connections as shown in Table 2-3. Connection is made by inserting bare wire under the terminal screw and tightening. Ensure that terminal screw is loose before inserting wire.

3. Route the miscellaneous discrete input cable from the right side of the Wall DT as viewed from the front (Figure 2-3) through the appropriate cable cutout located in the rear of the Wall DT (Figure 2-4) to the external equipment which will be providing the input.
4. Secure the office alarm and miscellaneous discrete cables to the right wire tie-base using the tie-wrap provided.



NOTE:

Leave some slack in the cable in the Wall DT for strain relief. Do not wire tie cables to the strain relief bracket (Figure 2-2) at this time.

5. Place the cable in a protective conduit or tie the cable to a stationary object such as a wall or cable rack.



NOTE:

The cable should be routed in a protective conduit or dressed in such a manner as to not be easily moved or become a hazard.

6. At the equipment providing the miscellaneous discrete, cut the miscellaneous discrete input cable to the desired length.
7. Connect this cable to the equipment providing the discrete.



NOTE:

Wire-wrap this end if desired.



NOTE:

If the miscellaneous discrete cable is being connected to equipment which provides a ground, then the return lead (R) is connected to ground and the input lead (MD) is open from the (R) lead until the alarm condition exists.

8. At the external equipment, clearly label that this cable is providing the *DDM-Plus Miscellaneous Input*.

Parallel Telemetry Cable Installation

Description

Parallel telemetry is a set of individual alarm and status outputs which can be reported to a maintenance center through a telemetry system. Connection of parallel telemetry requires a parallel telemetry system at the Wall DT location. Perform this procedure if connection to a parallel telemetry system is required.

⇒ NOTE:

The parallel telemetry outputs are designed for a maximum open circuit voltage of 60 volts, a transient voltage of up to 135 volts for a maximum of 1 ms, and a maximum steady-state current of 35 mA.

Procedure

1. Obtain a parallel telemetry cable (Group 36 or 37) listed in Table 2-1.
2. Connect the parallel telemetry cable to P1 located on the side of the Wall DT (Figure 2-2).

⇒ NOTE:

Secure the cable connector down using the slide lock.

3. Route the telemetry cable from the right side of the Wall DT as viewed from the front (Figure 2-3) through the appropriate cable cutout located in the rear of the Wall DT (Figure 2-4), to the telemetry panel.

⇒ NOTE:

Leave some slack in the cable in the Wall DT for strain relief. Do not wire tie cables to the strain relief bracket (Figure 2-2) at this time.

4. Place the cable in a protective conduit or tie the cable to a stationary object such as a wall or cable rack.

⇒ NOTE:

The cable should be routed in a protective conduit or dressed in such a manner as to not be easily moved or become a hazard.

5. At the telemetry panel, cut the telemetry cable to the desired length.
6. Connect this end of the telemetry cable to the telemetry panel making connections as shown in Table 2-4.

⇒ NOTE:

Wire-wrap this end if desired.

7. Label all designations at the telemetry panel.

DS1 Cable Installation

Description

This procedure describes how to connect DS1 transmission cables to the Wall DT cables, route and connect the cables to the DSX-1 or T1 equipment.

⇒ NOTE:

This procedure describes how to install one DS1 cable which will accommodate one DS1. Repeat this procedure as necessary to install the desired number (1 to 4) of DS1 cables. Install DS1 cable number 4 first.

⇒ NOTE:

Use caution when swinging open the housing with cables attached.

⇒ NOTE:

The DS1 cables are restricted to a maximum length of 450 feet.

Procedure

1. Obtain a DS1 cable (Group 28 or 29) as listed in Table 2-1.
2. Connect the DS1 cable to the desired RJ48X connector (labeled 1, 2, 3, or 4) located on the rear of the Wall DT (Figure 2-4).
3. Route the DS1 cable to the DSX-1 or T1 equipment.
4. Place the cable in a protective conduit or tie the cable to a stationary object such as a wall or cable rack.

⇒ NOTE:

The cable should be routed in a protective conduit or dressed in such a manner as to not be easily moved or become a hazard.

5. At the DSX-1 cut the DS1 cable to the desired length.
6. Connect this end of the DS1 cable to the DSX-1 making connections as shown in Table 2-5.

⇒ NOTE:

Wire-wrap this end if desired.

7. Label all connections at the DSX-1.
8. Repeat this procedure for every DS1 cable to be installed.

Optical Fiber Cable Installation

Description

This procedure describes how to clean the optical fiber cables, connect the optical fiber cables to the Wall DT, and route the cables out of the Wall DT to the optical cross-connect (*LGX* Fiber Optic Distributing System). This procedure does not cover routing the optical fiber cable between Wall DT locations.



WARNING:

Open optical connectors may emit invisible radiation. Do not view beam with optical instruments. Avoid direct exposure to beam.



NOTE:

The optical fiber cable is fragile and must be protected. The fibers should be placed in a protective fiber conduit, like the AT&T Fiber Protection System, when running the cable from the DDM-Plus to the cable rack. The fibers should be placed in the cable rack in a fiber conduit with nothing on top of them. DO NOT use cable ties with the optical fiber cables.



NOTE:

Determine the mode of fiber (single-mode or multimode) that is connected between the *LGX* panels at each end. The fiber from the DDM-Plus optical line interface unit (OLIU) transmitter to the *LGX* panel must be single-mode or the same mode that exists between the *LGX* panels. The fiber from the DDM-Plus OLIU receiver to the *LGX* panel must be multimode or the same mode that exists between the *LGX* panels.



NOTE:

The optical fiber cables require *ST*[®] type connectors for connection to the DDM-Plus OLIUs. The optical fiber cables must be connected to the DDM-Plus OLIUs before the OLIUs are installed.



NOTE:

Prior to connecting the optical fiber cables clean them per the fiber cleaning instructions.

Fiber Cleaning Instructions



WARNING:

Open optical connectors may emit invisible radiation. Do not view beam with optical instruments. Avoid direct exposure to beam.



NOTE:

Always clean *ST* connectors and couplings before doing initial connections or reconnections per the following instructions.

1. Clean the end and sides of the connector tips with a lint-free, optical quality tissue dampened with isopropyl alcohol.
2. Carefully wipe the connector end again with a clean dry lint-free, optical quality tissue.
3. Blow any lint or dust from the connector using a canned air duster 3 inches from the face of the connector.

Procedure

1. Verify that the fiber conduit has been installed per the "Equipment Installation" procedure.
2. Connect the optical fiber cables to the *LGX* panel.



NOTE:

Cables should not be energized, leave protective covers on cables at the Wall DT end.

3. Route the optical fiber cables from the *LGX* panel into the DDM-Plus Wall DT through the fiber access slot in the rear of the Wall DT as shown in Figure 2-4. Place one fiber in each fiber strain relief clip.
4. At each end, label the optical fiber cables indicating OLIU (A1 or A2) and direction (IN or OUT).
5. Place excess fiber in the fiber holders as shown in Figure 2-6.
6. Place the optical fiber cables between the Wall DT and *LGX* panel.

Final Operations

Procedure

1. Dress all cables (ground, power, alarm, miscellaneous discrete and parallel telemetry) to the strain relief bracket (Figure 2-2) as they leave the Wall DT housing, using the wire tie provided.
2. Dress all cables (DS1, power, alarm, miscellaneous discrete, and parallel telemetry) to the area provided on the mounting bracket (Figure 2-5), making sure that the housing can move into both of its positions without pinching or pulling the cables.
3. Verify that all cables are properly labeled.
4. Verify that designations where cables were connected (wire-wrapped) are properly labeled.
5. Verify that the Wall DT can be swung open and closed without disturbing the cables.
6. Verify that all the cables are properly dressed.

Table 2-1. Wall Distant Terminal Cable Assemblies (Notes)

Description	ED-8C730-20, Group	Cable Length (Ft.)	Cable Type	Wall DT Connections
DS1 Cable	28	as required	1205002C	1,2,3, or 4
	29	40		
Parallel Telemetry	36	as required	816AS	P1
	37	75		
Office Alarms	32	as required	816AS	TB2
	33	150		
Miscellaneous	34	as required	812AS	TB2
Discrete Input	35	150		
Power Cable*	—	—	14 - 18 gauge	TB1
Frame Ground†	—	—	14 gauge	TB1

Notes:

1. Cable lengths listed as required are specified by the customer.
 2. The DS1 cables are restricted to a maximum length of 450 feet.
 3. Each DS1 cable (Groups 28 and 29) accommodates one DS1. The Wall DT can support four DS1s.
 4. The 812AS, 816AS and 1205002C type cables are 26 gauge.
 5. The shields of the office alarm cable and the miscellaneous discrete input cable are to be connected to the FR GND (frame ground) on TB2.
 6. The use of other than the cables referenced could cause cross talk problems or may result in violation of the FCC Part 15 Emission Requirements and possibly interface with other electronic equipment.
- * There is no cable group for power connections. The maximum and minimum gauge that can be connected to the Wall DT terminal block is 14 and 18 gauge, respectively. Cable size is determined per engineering rules specified per T-82040-30 and FPD 801-525-169.
- † There is no cable group for the frame ground connection. Use 14-gauge wire.

Table 2-2. Office Alarm Connections (Notes)

Name	Desig.	Wall DT Terminal	Color Code
Major Alarm Major Alarm Return	MJ MJR	TB2 - MJ TB2 - MJR	BL-W W-BL
Minor Alarm Minor Alarm Return	MN MNR	TB2 - MN TB2 - MNR	O-W W-O
Cable Shield	—	TB2 - FR GND (left)	BK

Notes:

1. The office alarms are visual alarms and cannot be ACO'd (alarm cut-off'd) from the Wall DT housing.
2. The office alarm cable is 26 gauge (816AS type cable).
3. Connect the exposed wire end, which is 6 inches long, to the Wall DT terminals on TB2 as described above. Use the left FR GND on TB2. Connect the other end to the office alarm system.
4. Use the right side cable tie base and tie wrap to secure cable and provide strain relief.
5. This cable may also have a green/brown pair inside which is not used.

Table 2-3. Miscellaneous Input Connections (Notes)

Name	Desig.	Wall DT Terminal	Color Code
Miscellaneous Input Return	MD R	TB2 - MISC B (right) TB2 - MISC A (left)	BL-W W-BL
Cable Shield	—	TB2 - FR GND (right)	BK

Notes:

1. The miscellaneous discrete interface cable is 26 gauge (812AS type cable).
2. Connect the exposed wire end, which is 6 inches long, to the Wall DT terminals on TB 2 as described above. Use the right FR GND on TB2. Connect the other end to the miscellaneous input.
3. A miscellaneous input is activated by grounding MISC B or by a closure between the two MISC DISC leads on the miscellaneous discrete interface cable.
4. Use the right side cable tie base and tie wrap to secure cable and provide strain relief.

Table 2-4. Parallel Telemetry Connections — Connector P1 (Notes)

Name	Desig.	Term	Code
Major Alarm	MJ	4	G-W
Minor Alarm	MN	13	W-BL
Near End Activity	NE	12	W-O
Far End Activity	FE	3	BR-W
Ground Return	R	5	O-W
System ID	SYSID	2	W-BR
Miscellaneous Output	MD	6	BL-W
No Connection	—	1	—
No Connection	—	7	—
No Connection	—	8	—
No Connection	—	9	—
No Connection	—	10	—
No Connection	—	11	—
No Connection	—	14	—
No Connection	—	15	—

Notes:

1. The parallel telemetry cable is 26 gauge (816AS type cable).
2. The ground return lead (terminal 5 in connector P1) must be wired to ground.
3. When an alarm condition exists, a voltage potential of approximately 48 volts exists between -48 V and the alarm lead.

Table 2-5. DS1 Connections (Notes)

DS1 Direction	Designation	Loose End Color	Connector End Terminal
OUT	T	W-BL	2
	R	BL	1
IN	T1	W-O	5
	R1	O	4

Notes:

1. The DS1 cable is 26 gauge (1205002C).
2. The Wall DT supports four DS1s. The cable for DS1-1 connects to jack 1, DS1-2 connects to jack 2, DS1-2 connects to jack 3, and DS1-4 connects to jack 4.
3. Wire-wrap the DS1 OUT wires to the DSX-1 OUT or T1 equipment.
4. Wire-wrap the DS1 IN wires to the DSX-1 IN or T1 equipment.

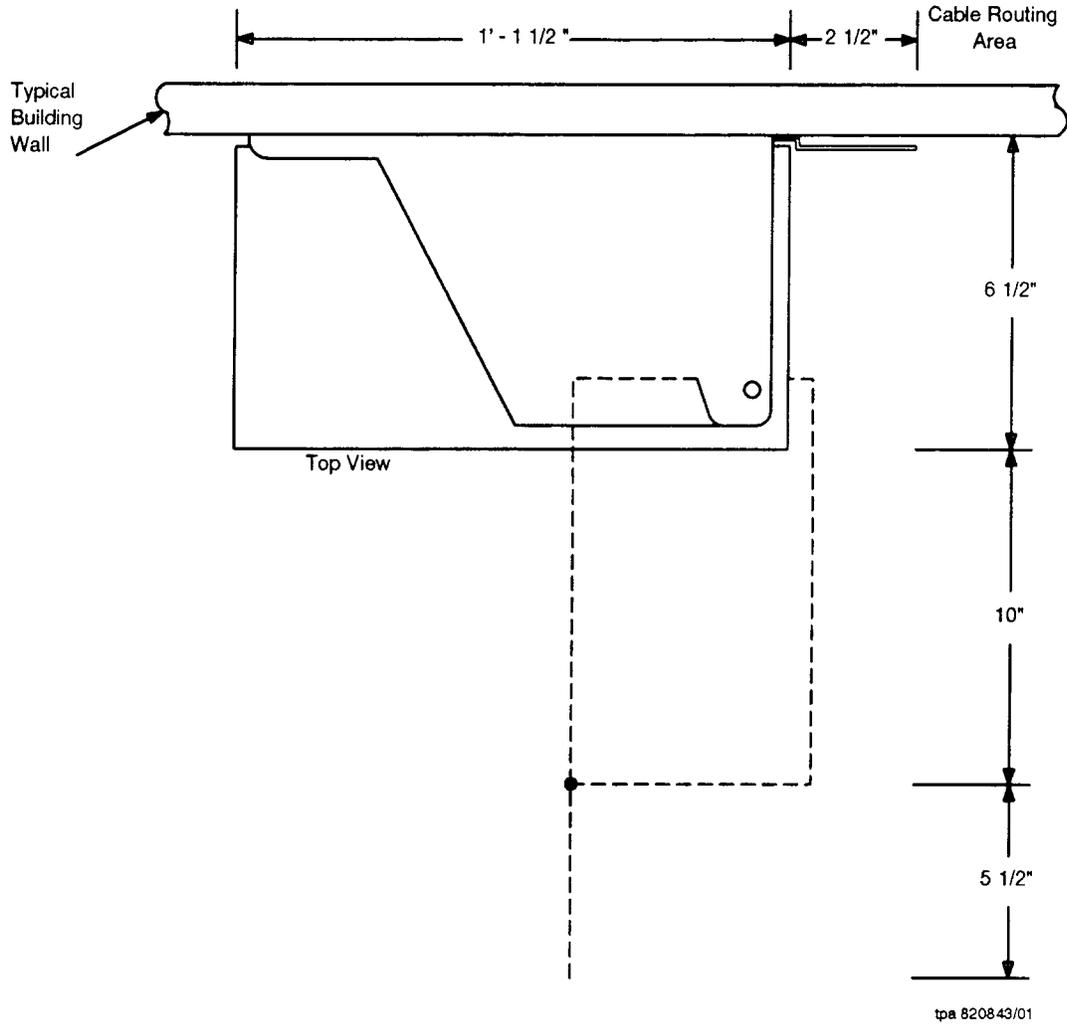


Figure 2-1. Wall Mounting Position (Top View)

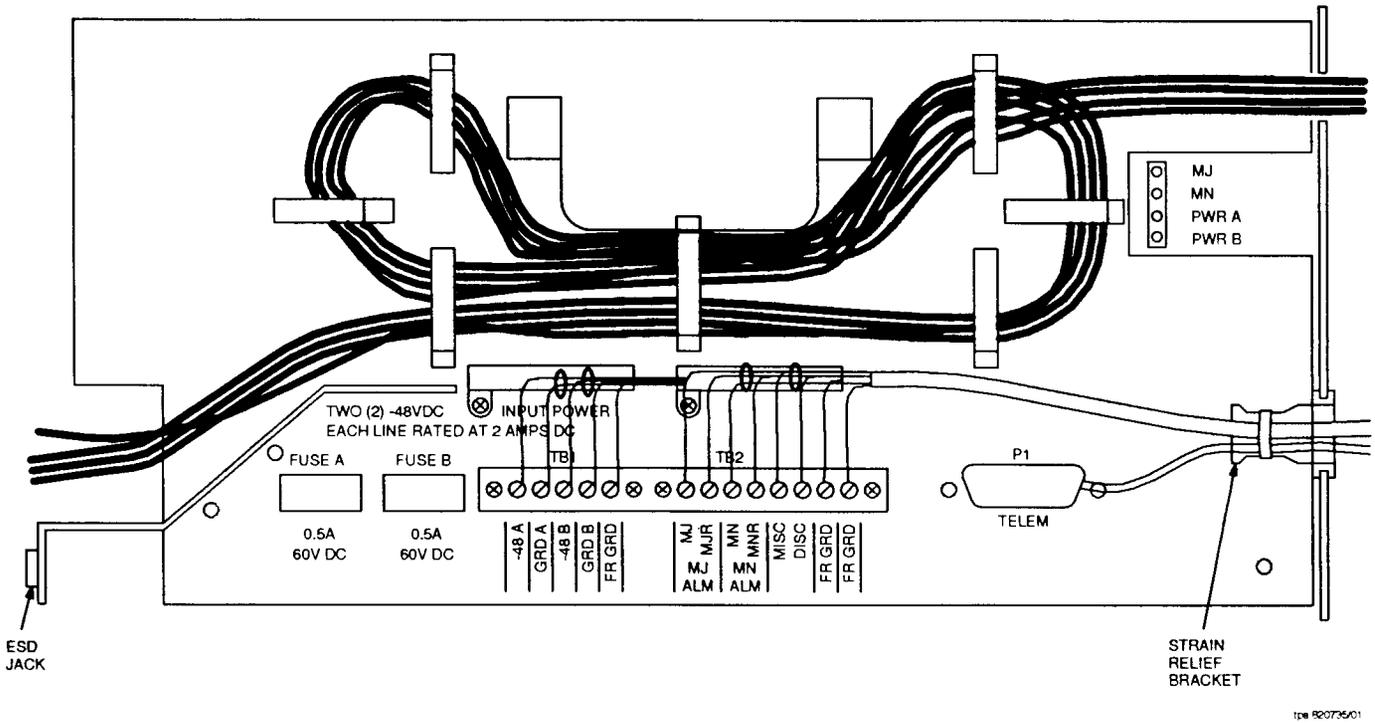


Figure 2-2. Wall Cable Connections (Side View)

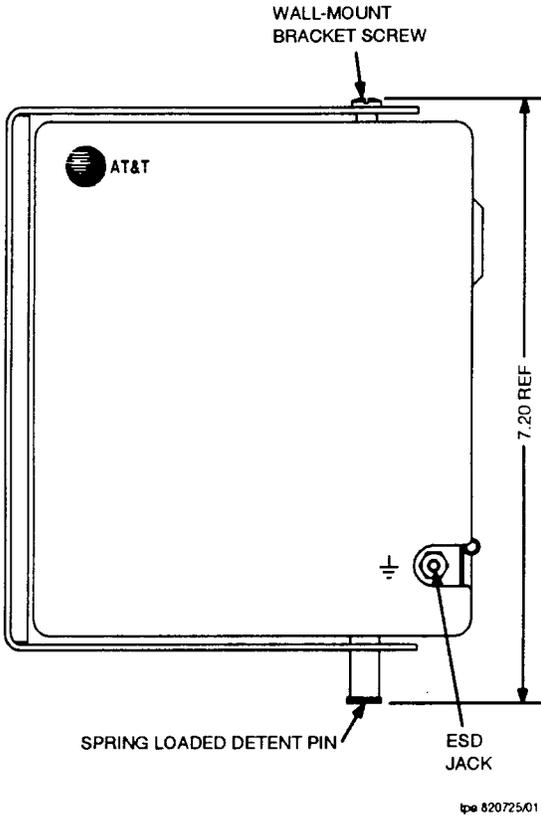
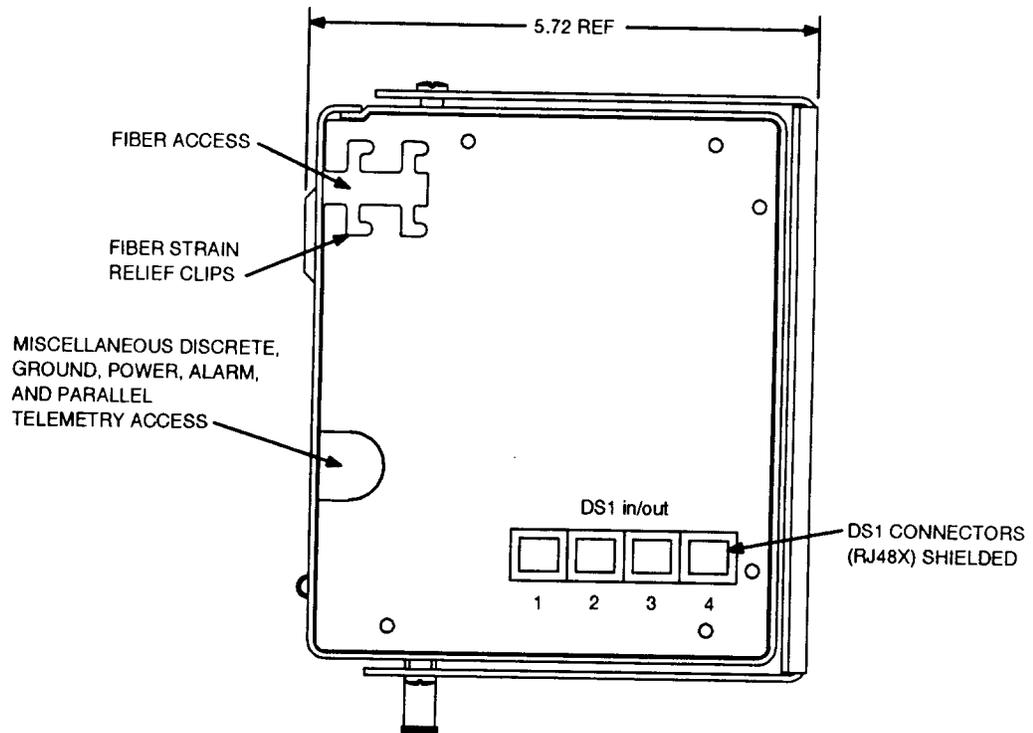
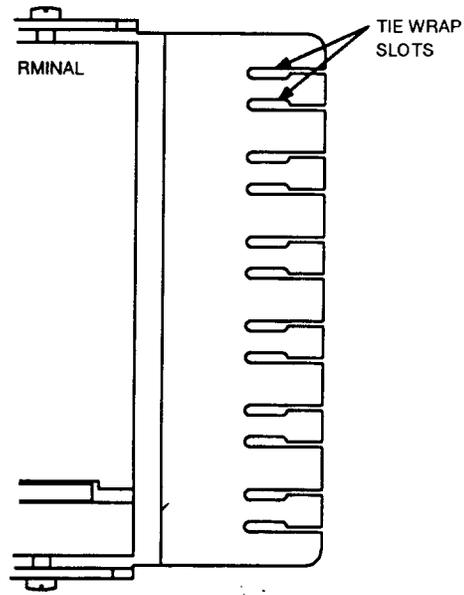


Figure 2-3. Wall DT (Front View)



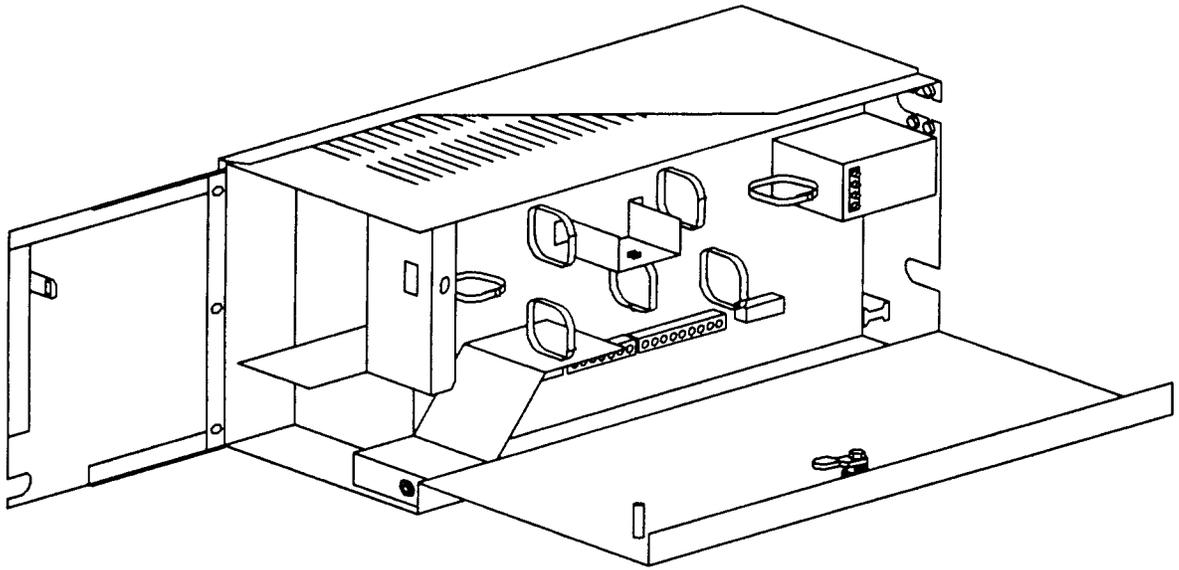
tpa 820724/01

Figure 2-4. Wall DT (Rear View)



tpc 620726/01

Figure 2-5. DS1 Cable Shield Clamping (Rear View)



pa 620611/01

Figure 2-6. Wall DT Without Circuit Packs

Powering and Verification

3

Contents

General	3-1
■ Description	3-1
■ Tools, Test Sets, and Accessories	3-1
Verification	3-2
■ Procedure	3-2
Powering	3-2
■ Procedure	3-2

Powering and Verification

3

General

Description

This chapter verifies that the Wall Distant Terminal (DT) is properly fused and is being supplied with the proper power.

Tools, Test Sets, and Accessories

The following are required:

<u>Qty.</u>	<u>Description</u>	<u>Usage</u>
1	Multimeter	The voltmeter must be capable of measuring DC voltage in the 40- to 60-volt range.
1	Wrist Strap	A wrist strap grounded into an ESD jack must be worn when connecting cables to the backplane.

Verification

Procedure

1. Verify that two 0.5 amp fuses are installed in the DDM-Plus fuse holders (one for each feeder).



NOTE:

Do not remove fuses from the Wall DT.

2. Verify that the power cable connections are properly labeled at the Wall DT and the power source.
3. Verify that the Wall DT power supply is fused between 0.75 and 1.0 amp at the battery distribution fuse board (BDFB) or equivalent.
4. Using the ohmmeter, verify that the FRM GND on TB 1 is connected to office ground.

Powering

Procedure

1. Verify that the power cable is properly connected to the -48A, GND A, -48B, and GND B terminals on TB 1.
2. If fuses are being used, install fuses specified per the line engineering requirements in the customer's BDFB or equivalent.
3. If breakers are being used, verify that they are rated per the line engineering requirements.
4. If breakers are being used, put the breakers in the ON position.
5. Using a voltmeter, measure the voltage between -48A and GND A on the terminals on TB 1.

Requirement: The voltage MUST be between -40.0 and -60.0 V DC.

6. Using a voltmeter, measure the voltage between -48B and GND B on the terminals on TB 1.

Requirement: The voltage MUST be between -40.0 and -60.0 V DC.

⇒ NOTE:

If circuit packs are not going to be installed immediately, remove power from the shelf by removing BDFB fuses or placing breakers in the OFF position.

⇒ NOTE:

If the AT&T 1145A1 Power Supply is used there is only a connection made to -48A and GND A. There will not be any voltage between -48B and GND B.

Circuit Pack Installation

4

Contents

General	4-1
■ Description	4-1
■ Tools, Test Sets, and Accessories	4-2
Circuit Pack Option Settings	4-3
■ Description	4-3
■ 25-Type OLIUs	4-3
Circuit Pack Installation	4-5
■ General	4-5
■ Procedure	4-6
Final Operations	4-7
■ Procedure	4-7

Circuit Pack Installation

4

General

Description

This chapter provides instructions for circuit pack option setting and installation into the ED-8C730-33, G1 Wall Distant Terminal (DT).

This chapter is only to be performed AFTER the shelf has been powered. Perform Chapter 3, "Powering and Verification", if this has not been done.

The DDM-Plus Wall DT supports the 25A and 25F optical line interface units (OLIUs). These are the only circuit packs which are *UL* Recognized and *CSA* Certified for use with the Wall DT. Detailed information on the function of each of the OLIU circuit packs is contained in AT&T 363-206-150, *DDM-Plus User/Service Manual*.

The product codes for the DDM-Plus circuit packs are located in Table 4-1.

⇒ NOTE:

If office alarms are connected (terminals on TB2), it is advisable to disconnect them while performing testing to prevent spurious alarms from being reported. Reconnect the office alarms after completion of all testing.

Tools, Test Sets, and Accessories

The following is required:

<u>Qty.</u>	<u>Description</u>	<u>Note</u>
1	Wrist strap	Use the ESD jack provided on the front of the DDM-Plus Wall DT.



CAUTION:

To protect against damage due to electrostatic discharge, an ESD wrist strap must be worn when handling equipment.

Circuit Pack Option Settings

Description

This procedure provides instructions for setting the circuit pack option settings. After the circuit packs have been optioned, they may be placed in the Wall DT but NOT FULLY INSTALLED.

⇒ NOTE:

Rules on equipping circuit pack positions in the Wall DT are contained in the "Circuit Pack Installation" procedure in this chapter.

25-Type OLIUs

1. The *ST*[®] connectors on the OLIU should ALWAYS be either connected to fiber, or covered by the protective covers that shipped on them.
2. The 25-type OLIU has option switches for setting the following:
 - DS1 line code
 - DS1 line buildout
 - DS1 loss of signal (LOS) indication
 - Bit error ratio (BER) threshold
 - OLIU output power.

⇒ NOTE:

If protection OLIUs are used, both OLIUs in the same group MUST be optioned identically.

⇒ NOTE:

Refer to Figure 4-1 for location of option switches and Tables 4-2, 4-3, 4-4, 4-5, and 4-6 for option switch settings.

⇒ NOTE:

Set the 25-type OLIU option switches per customer engineering records or requirements.



NOTE:

In the absence of engineering records, set the 25-type OLIU option settings for the following:

<u>Option</u>	<u>Recommended Setting</u>
DS1 Line Code	AMI
DS1 Line Buildout	Cable Length
LOS Indication	No Alarm
BER Threshold	10^{-4}
OLIU Output Power	Low

3. Set the DS1 line code for AMI or B8ZS for each DS1. This is done by positioning section 1 on switches S6, S7, S8, and S9, for DS1-1, DS1-2, DS1-3, and DS1-4, respectively. Refer to Table 4-2.
4. Set the DS1 line buildout for the distance to the DSX-1 or T1 equipment for each DS1. This is done by positioning sections 2, 3, and 4 on switches S6, S7, S8, and S9, for DS1-1, DS1-2, DS1-3, and DS1-4, respectively. Refer to Table 4-3.
5. Set the DS1 loss of signal alarm for Minor Alarm or No Alarm for each DS1. This is done by positioning S10-1, S10-2, S10-3, and S10-4 for DS1-1, DS1-2, DS1-3, and DS1-4, respectively. Refer to Table 4-4.
6. Set the desired OLIU bit error rate threshold for OLIU protection switching. This is done by rotating the S12 dial to position the desired number at the hash mark. Refer to Table 4-5.
7. Set the OLIU output power for high or low power. This is done by positioning S13, which is located on the lower circuit board. Refer to Table 4-6.
8. Verify S11 is set to the ON position. Refer to Figure 4-1.
9. Place, but do not fully install, the OLIUs into the shelf.

Circuit Pack Installation

General

Figure 4-2 shows a Wall DT equipped with two OLIUs.

 **WARNING:**
Invisible laser radiation when open. Avoid direct exposure to beam.

 **NOTE:**
Unterminated optical connectors may emit laser radiation. Do not view beam with optical instruments.

 **NOTE:**
Each 25-type OLIU consists of two printed circuit boards (PCBs). An OLIU must be installed in the leftmost or rightmost position. It CANNOT be installed straddling the middle of the Wall DT.

 **NOTE:**
The DDM-Plus Wall DT supports one group of four DS1s. One OLIU can be installed (in the left or right position) if protection is not desired.

 **NOTE:**
An OLIU must be connected by optical fiber cables to an OLIU of the same type (25A or 25F) at the far end. However, both OLIUs in the same group at each end can be of different types.

 **NOTE:**
Observe all precautions when handling fiber optic cables. When fiber cables are not connected to equipment, the protective fiber covers should be in place.

Procedure

1. Verify that the optical fiber cables have been placed in a protective tube or channel.
2. Verify that the optical fiber cables are properly labeled indicating OLIU (position) and direction (IN or OUT).
3. Clean the optical fiber cables.



NOTE:

The fiber can be cleaned with optical quality lint-free tissue or with a compressed air duster. For detailed cleaning instructions refer to Chapter 7, *Troubleshooting*.

4. Connect the optical fiber cables to the OLIUs.



CAUTION:

Do not bend the optical fiber cables sharply. Exceeding the bending radius of optical fiber cables may cause permanent damage.



NOTE:

The optical fiber cables must be connected to the OLIUs before the OLIUs can be fully seated in the shelf.



NOTE:

The left *ST* connector on the OLIU is the receiver (IN). The right *ST* connector on the OLIU is the transmitter (OUT).

5. Route the optical fiber cables in the fiber tray and out the fiber access slot in the rear of the Wall DT.

6. Fully insert all the OLIUs into the Wall DT.

⇒ **NOTE:**
Installing circuit packs requires some force.

⇒ **NOTE:**
Verify that the OLIU is fully seated in the Wall DT before closing the latch.

⇒ **NOTE:**
When installing the circuit packs, be careful to insert them straight to avoid damaging the LEDs.

7. If one OLIU in a group has its DS1 LED(s) illuminated steadily, verify that the options of both OLIUs in the same group agree.

⇒ **NOTE:**
Ignore other circuit pack LED indications at this time.

Final Operations

Procedure

1. Verify that all circuit packs are installed.
2. Verify that the optical fiber cables are connected.
3. Leave the office alarm cables disconnected at this time.

Table 4-1. DDM-Plus Circuit Pack Codes (Note)

<u>Product Code</u>	<u>Description</u>
25A OLIU	780-nm, 3.1 km span range on SM fiber; 2.2 km span range on MM fiber
25F OLIU	1300-nm, 23 km span range on SM fiber; 14.5 km span range on MM fiber

Note:

For ordering information refer to AT&T 363-206-156, *DDM-Plus Equipment Engineering and Ordering Guide*.

Table 4-2. 25-Type OLIU DS1 Line Code Settings

<u>Switch 6 (DS1-1), Switch 7 (DS1-2), Switch 8 (DS1-3) & Switch 9 (DS1-4)</u>	
<u>Line Code</u>	<u>Section 1</u>
AMI	ON
B8ZS	OFF

Table 4-3. 25-Type OLIU DS1 Line Buildout Settings

**Switch 6 (DS1-1), Switch 7 (DS1-2),
Switch 8 (DS1-3) & Switch 9 (DS1-4)**

**For 26 Gauge
Cable**

<u>Length (ft)</u>	<u>Section 2</u>	<u>Section 3</u>	<u>Section 4</u>
0 to 90	OFF	OFF	OFF
>90 to 180	OFF	OFF	ON
>180 to 270	OFF	ON	OFF
>270 to 360	OFF	ON	ON
>360 to 450	ON	OFF	OFF

Table 4-4. 25-Type OLIU DS1 LOS Settings

Switch 10

<u>DS1 LOS Alarm</u>	<u>Section 1 (DS1-1)</u>	<u>Section 2 (DS1-2)</u>	<u>Section 3 (DS1-3)</u>	<u>Section 4 (DS1-4)</u>
Minor	ON	ON	ON	ON
No Alarm	OFF	OFF	OFF	OFF

Table 4-5. 25-Type BER Threshold Settings

Switch 12	
Switch Position	BER Threshold
1	Invalid setting
2	Invalid setting
3	Invalid setting
4	10^{-4}
5	10^{-5}
6	10^{-6}
7	10^{-7}
8	10^{-8}
9	10^{-9}
0	10^{-10}

Table 4-6. 25-Type Output Power Settings

Switch 13 (on Right-Hand PCB)	
Output Power (Note)	Selection
-3.3 to -7.4 dBm	HIGH (right position)
-7.4 to -9.6 dBm	LOW (left position)

Note:

As shown on the circuit pack figure, the output power switch is located on the lower PCB, when the faceplate latch is on the right. The low power position is with the switch to the left.

25-Type OLIU Option Notes:

1. The 25-type OLIU has option switches which must be properly set. Refer to the option switch settings on Tables 4-2 through 4-6.
2. All switches should be set per the customer's engineering records.

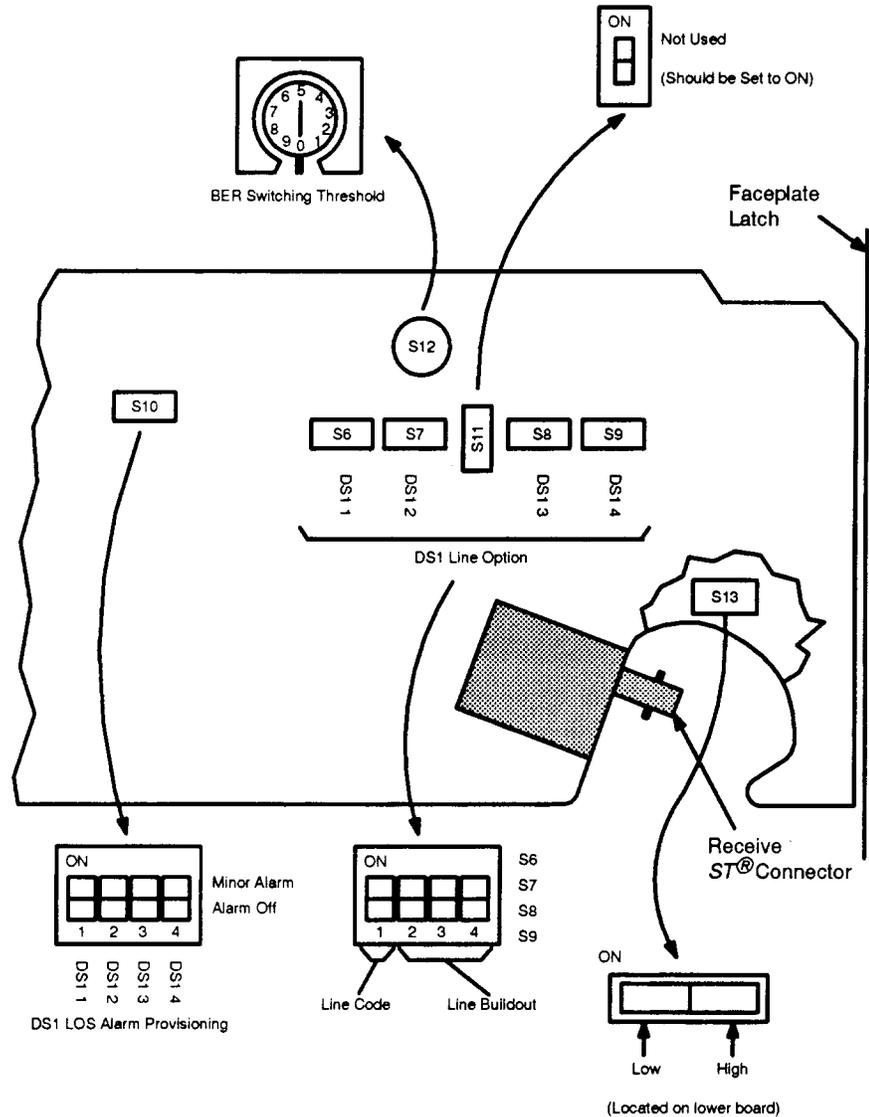
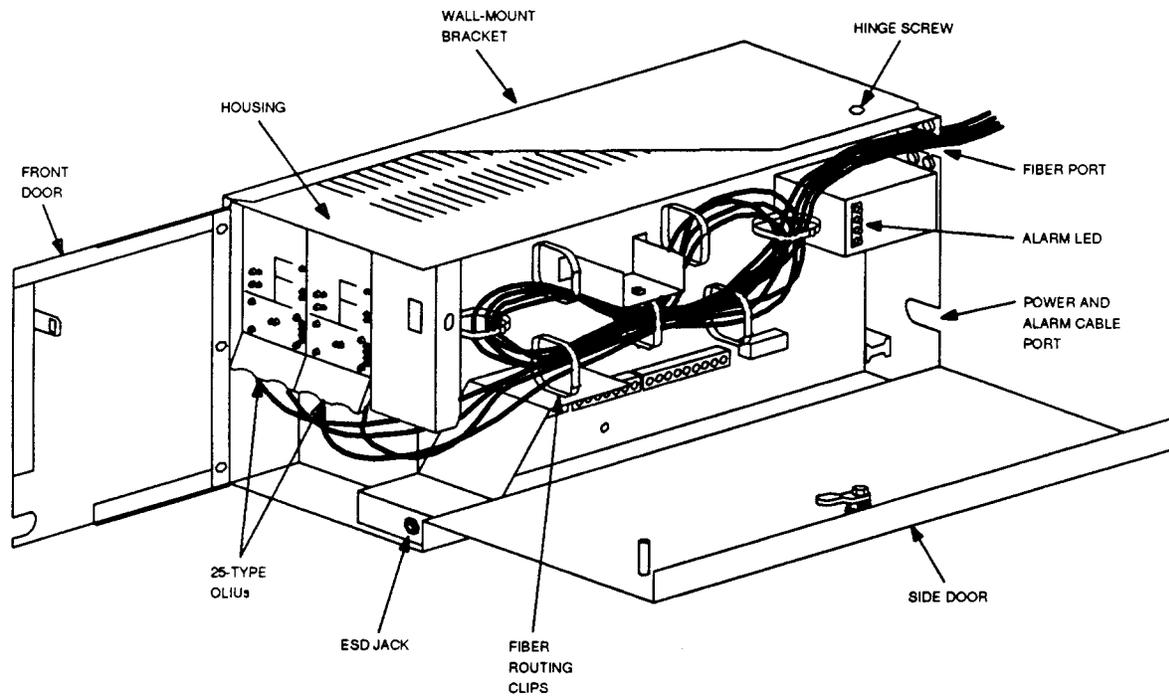


Figure 4-1. 25-Type OLIU Option Switches



tpa 820878/01

Figure 4-2. Wall Distant Terminal with OLIUs

Stand-Alone Installation Tests

5

Contents

General	5-1
■ Description	5-1
■ LED, Pushbutton, and Display Descriptions	5-2
■ Tools, Test Sets, and Accessories	5-5
LED Test	5-6
■ Description	5-6
■ Procedure	5-6
Local Test	5-6
■ Description	5-6
■ Procedure	5-7
Cross-Connect Test	5-9
■ Description	5-9
■ Procedure	5-10
Office Alarm and Automatic Protection	
Switching Test	5-14
■ Description	5-14
■ Procedure	5-15
Parallel Telemetry Test	5-17
■ Description	5-17
■ Procedure	5-18
DS1 Transmission Test	5-20
■ Description	5-20
■ Procedure	5-20

Contents

Final Operations	5-22
■ Procedure	5-22

Stand-Alone Installation Tests

5

General

Description

This chapter provides instructions on the stand-alone installation tests that should be performed at each end with a Wall Distant Terminal (DT).

The stand-alone installation tests examine the Wall DT optical line interface units (OLIUs), local optical fiber cables, wiring to the equipment DSX-1, office alarms, parallel telemetry, and automatic protection switching.

The following installation tests are run only in an out-of-service mode of operation. Interruption of service will result if these tests are run on an operating in-service system.

If problems are encountered refer to Chapter 7, "Troubleshooting For detailed troubleshooting, refer to AT&T 363-206-150, *DDM-Plus User/Service Manual*.

⇒ **NOTE:**
Observe all precautions when handling fiber.

⇒ **NOTE:**
Prior to beginning the following installation tests, disconnect the office alarm cables from the Wall DT (terminals on TB2), if this has not already been done, to prevent alarming in the office during tests.

LED, Pushbutton, and Display Descriptions

⇒ NOTE:
The DDM-Plus alarms and LEDs have a delay of one second. This delay is not user-settable.

⇒ NOTE:
For detailed LED descriptions, refer to AT&T 363-206-150, *DDM-Plus User/Service Manual*.

The following LEDs are located on the DDM-Plus Wall DT:

<u>LED</u>	<u>Description</u>
MJ (Major)	Indicates a service-affecting failure
MN (Minor)	Indicates a non-service-affecting failure
PWR A	Indicates the Wall DT is receiving proper power on the A Feed
PWR B	Indicates the Wall DT is receiving proper power on the B Feed

⇒ NOTE:
If the Wall DT is powered by the AT&T 1145A1 power supply it will receive power on the A feed only. The PWR A LED will be lit and the PWR B LED will not.

The following LEDs are located on the 25-type OLIUs as shown in Figure 5-1:

<u>LED</u>	<u>Description</u>
ACTIVE	Indicates the pack is selected to carry service. One OLIU from each pair (if equipped for protection) should have its ACTIVE LED lighted.
CP/OPT FAULT	When blinking, it indicates an optical line failure; when continuously lighted, it indicates a circuit pack failure.
DS1 FAULT	When blinking, it indicates a loss of signal from the equipment DSX-1; when continuously lighted, it indicates inconsistent option settings between the OLIU pair or indicates a DS1 failure in turnup tests.
NE (Near End)	Indicates an alarm condition at the near end. Near end faults are displayed when the NE/Enable pushbutton is pressed.
FE (Far End)	Indicates an alarm condition at the far end. Far end faults are displayed when the FE/Enable pushbutton is pressed.
ABN (Abnormal)	Indicates a user-initiated abnormal condition (for example, a turnup test in progress, a loopback, or a protection switch lockout).
1→4 Indicators	Used with auto turnup tests to indicate the test in progress or a specific DS1 failure; also used to test or loopback a specific DS1.

The following pushbuttons are located on the 25-type OLIUs as shown in Figure 5-1:

<u>Pushbutton</u>	<u>Description</u>
ENABLE (NE)	Must be pressed in conjunction with GO ACTIVE, LOOP, or TST to initiate function at the Near End and prevent accidental operation.
ENABLE (FE)	Must be pressed in conjunction with GO ACTIVE, LOOP, or TST to initiate function at the Far End and prevent accidental operation.
GO ACTIVE	Must be pressed in conjunction with ENABLE (NE or FE). If pressed on the active pack, it performs a protection switch lockout; if pressed on the standby pack, it performs a protection switch.
DS1 SEL	Used to show and update in-service DS1 ports, or select an individual DS1 to test or perform a loopback.
LOOP	Must be pressed in conjunction with ENABLE (NE or FE); used to perform a loopback on a selected DS1.
TST	Must be pressed in conjunction with ENABLE (NE or FE); used to perform a transmission test on a selected DS1. if no DS1 is selected, it is used to initiate the auto turnup tests.
CLR	Used to stop the auto turnup or DS1 tests, remove loopback, or remove lock.

Tools, Test Sets, and Accessories

The following are required:

<u>Qty.</u>	<u>Description</u>	<u>Usage</u>
1	Wrist strap	A wrist strap must be worn when handling circuit packs. Use the ESD jack provided on the front of the Wall DT.
2	Single mode optical fiber cables	These cables are required for looping back the OLIUs at the <i>LGX</i> [®] panel. The cables must be single-mode fiber and must have the same connector as the <i>LGX</i> panel. If the OLIUs are going to be looped back directly on themselves, then fibers with <i>ST</i> [®] connectors on each end are required. If multimode fiber is used, the OLIU will not be harmed, but it may not operate properly because of a detector overload. The recommended cable length is 2 feet.
4	DSX-1 loopback cables	These cables are required to perform the Cross-Connect Test which verifies cabling to the equipment DSX-1.
1	DS1 Transmission Test Set	The DS1 Test Set is only required if additional DS1 transmission tests on the OLIUs are desired.

LED Test

Description

This test procedure verifies proper operation of all the LEDs on the 25-type OLIU. Operation of all LEDs is necessary to assist in trouble isolation.

⇒ NOTE:

If there are any LED failures, determine if the problem is with the OLIU or Wall DT and replace the faulty unit.

Procedure

1. Simultaneously press and hold the NE/ENABLE and FE/ENABLE buttons on the OLIU.
2. Verify that all LEDs on the OLIU under test remain illuminated while the NE/ENABLE and FE/ENABLE buttons are pressed.
3. Repeat this procedure on each OLIU.

Local Test

Description

This test procedure verifies proper operation of the circuit pack positions, the OLIUs, and the cabling from the OLIUs to the LGX panel.



WARNING:

Invisible laser radiation when open. Avoid direct exposure to beam.



NOTE:

Unterminated optical connectors may emit laser radiation. DO NOT view beam with optical instruments.



NOTE:

After completing this procedure, replace any failed units. If any OLIUs are replaced, repeat this procedure until it passes without failures.

⇒ **NOTE:**
If protection OLIUs are not equipped, then ignore any reference to them.

⇒ **NOTE:**
Refer to Figure 5-2 for test connections.

Procedure

1. Loopback the OLIUs on themselves by placing fiber loopbacks at the LGX panel.
2. Verify that the ACTIVE LED is illuminated on one OLIU and extinguished on the other OLIU.
3. Verify that no other LEDs are illuminated on the OLIU pair.
4. Perform the following on the ACTIVE pack.

⇒ **NOTE:**
This test will also work if initiated on the standby pack, but the LED on and off descriptions will be slightly different.

5. Initiate automatic turnup Test 1 by pressing and holding the NE/ENABLE button (on the ACTIVE pack) and then pressing the TST button once until the first DS1 LED is illuminated.
6. After 10 seconds, the test will begin and the ABN LED on both OLIUs will illuminate.

⇒ **NOTE:**
If there are no failures, the DS1 SELECT LEDs will cycle on and off.

⇒ **NOTE:**
If there are any failures, the NE and CP/OPT LEDs on the pack under test will illuminate and the DS1 LED(s) of the failed DS1(s) will illuminate. If the test fails, press CLR on the OLIU and isolate the problem.

7. If no failure is displayed after 10 seconds of testing, press CLR on the OLIU to end the test.



NOTE:

The OLIU is considered to have passed the test.



NOTE:

All LEDs on the pack under test will blink on and off twice.

8. After the LEDs on the OLIU under test have blinked twice, verify that the same OLIU remains ACTIVE.
9. Verify that no other LEDs are illuminated on the OLIU pair.
10. Perform a manual protection switch by holding the NE/ENABLE button and pressing GO ACTIVE on the standby pack.
11. Verify that the other OLIU becomes ACTIVE.
12. Verify that the ABN LED is illuminated on both OLIUs. (The ABN LED is illuminated because a protection switch lockout condition exists.)
13. Remove the protection switch lockout by pressing CLR on one of the OLIUs.
14. Verify that the ABN LEDs extinguish and that no alarm LEDs are illuminated on the OLIU pair.
15. Repeat this procedure on the OLIU which is now active.
16. After completion of the Local Test, leave the OLIU loopbacks in-place at the LGX panel in preparation for the next test.

Cross-Connect Test

Description

This test procedure verifies proper wiring of the cabling from the DDM-Plus Wall DT to the equipment DSX-1.

⇒ NOTE:

After completing this procedure, replace any failed OLIUs and isolate and correct any incorrect wiring. If any OLIUs are replaced or cabling is corrected, repeat this test until it passes without failures.

⇒ NOTE:

If protection OLIUs are not equipped, then ignore any reference to them.

⇒ NOTE:

This procedure is performed on two DS1s on an OLIU at a time. Testing only two DS1s at a time instead of four is a better test of channel turnover wiring errors.

⇒ NOTE:

Refer to Figure 5-2 for test connections.

Procedure

1. Verify that both OLIUs are looped on themselves at the *LGX* panel.
2. Verify that the ACTIVE LED is illuminated on one OLIU and extinguished on the other OLIU.
3. Verify that no other LEDs are illuminated on the OLIU pair.
4. Place a loopback at the equipment DSX-1 on DS1s 1 and 3 associated with this pair.

⇒ NOTE:
Leave DS1s 2 and 4 open.

5. Perform the following on the ACTIVE pack.

⇒ NOTE:
This test will fail if initiated on the standby pack.

6. Initiate automatic turnup Test 2 by pressing and holding the NE/ENABLE button (on the ACTIVE pack) and then pressing the TST button twice until the first two DS1 LEDs are illuminated.
7. After 10 seconds, the test will begin and the ABN LED on both OLIUs will illuminate.

⇒ NOTE:
If there are no failures, the DS1 SELECT LEDs will cycle on and off.

⇒ NOTE:
If there are any failures, the NE and CP/OPT LEDs on the pack under test will illuminate and the DS1 LED(s) of the failed DS1(s) will illuminate.

8. Verify that the NE and CP/OPT LEDs and DS1 LEDs 2 and 4 are illuminated.

⇒ NOTE:
DS1s 2 and 4 failed because they were not looped-back. This also indicates that DS1s 1 and 3 passed.

9. Press CLR on the OLIU to end this test.
10. Place a loopback at the equipment DSX-1 on DS1s 2 and 4.

11. Remove the loopback from DS1s 1 and 3.
12. Perform a DS1 port equipage update on each OLIU by pressing and holding the NE/ENABLE button and then pressing the DS1 SELECT button.



NOTE:

Within 10 seconds this will stop the OLIU from alarming for a DS1 input which was removed.



NOTE:

DS1 LEDs 2 and 4 will illuminate when the NE/ENABLE and DS1 SELECT buttons on S1:2 OLIUs are pressed because they are in-service (looped-back) ports. On S1:3 or later OLIUs, only the NE/ENABLE button must be pressed to determine in-service ports.

13. Verify that the ACTIVE LED is illuminated on the same OLIU and extinguished on the other OLIU.
14. Verify that no other LEDs are illuminated on the OLIU pair.
15. Initiate automatic turnup Test 2 by pressing and holding the NE/ENABLE button (on the ACTIVE pack) and then pressing the TST button twice until the first two DS1 LEDs are illuminated.
16. After 10 seconds, the test will begin and the ABN LED on both OLIUs will illuminate.
17. After the test begins, verify that the NE and CP/OPT LEDs and DS1 LEDs 1 and 3 are illuminated.



NOTE:

DS1s 1 and 3 failed because they were not looped-back. This also indicates that DS1s 2 and 4 passed.

18. Press CLR on the OLIU to end this test.
19. Place a loopback at the equipment DSX-1 on DS1s 1 and 3.



NOTE:

All four DS1s should be looped back.

20. Initiate automatic turnup Test 2 by pressing and holding the NE/ENABLE button (on the ACTIVE pack) and then pressing the TST button twice until the first two DS1 LEDs are illuminated.

21. After 10 seconds, the test will begin and the ABN LED on both OLIUs will illuminate.

⇒ NOTE:

If there are no failures, the DS1 SELECT LEDs will cycle on and off.

⇒ NOTE:

If there are any failures, the NE and CP/OPT LEDs on the pack under test will illuminate and the DS1 LED(s) of the failed DS1(s) will illuminate. If the test fails, press CLR on the OLIU and isolate the problem.

22. If no failure is displayed after 10 seconds of testing, press CLR on the OLIU to end the test.

⇒ NOTE:

The equipment DSX-1 cabling is considered to have passed the test.

⇒ NOTE:

All LEDs on the pack under test will blink on and off twice.

23. After the LEDs on the OLIU under test have blinked twice, verify that the same OLIU remains ACTIVE.
24. Verify that no other LEDs are illuminated on the OLIU pair.
25. Perform a manual protection switch by holding the NE/ENABLE button and pressing GO ACTIVE on the standby pack.
26. Verify that the other OLIU becomes ACTIVE.
27. Verify that the ABN LED is illuminated on both OLIUs. (The ABN LED is illuminated because a protection switch lockout condition exists.)
28. Remove the protection switch lockout by pressing CLR on one of the OLIUs.
29. Verify that the ABN LEDs extinguish and that no alarm LEDs are illuminated on the OLIU pair.
30. Repeat this procedure on the OLIU which is now active.

⇒ NOTE:

This procedure can be repeated on the second OLIU in a Wall DT with all four DS1s looped back, since all equipment DSX-1 cabling has been tested.

31. After completion of the Cross-Connect Test, leave the OLIU loopbacks in-place at the *LGX* panel in preparation for the next test.
32. Remove all loopbacks at the DSX-1.
33. Perform a DS1 port equipage update on each OLIU by pressing and holding the NE/ENABLE button and then pressing the DS1 SELECT button.



NOTE:

Within 10 seconds this will stop the OLIU from alarming for a DS1 input which was removed.

Office Alarm and Automatic Protection Switching Test

Description

This test procedure verifies proper operation/wiring of the major and minor office alarms and automatic protection switching.

The DDM-Plus Wall DT has a major visual and minor visual office alarm.

⇒ NOTE:

The office alarm output provides a closure between the alarm and alarm return leads when an alarm condition exists.

⇒ NOTE:

It is a requirement that alarms on the DDM-Plus do not affect and are not affected by other equipment via office alarm connections. During this test, examine the alarm state of other equipment connected to the same office alarms as the DDM-Plus Wall DT after creating or clearing every alarm.

⇒ NOTE:

Prior to and after completing this test, verify that the DDM-Plus is clear of all alarms. If alarms do not clear refer to Chapter 7, "Troubleshooting".

⇒ NOTE:

Testing the Minor telemetry point requires two OLIUs installed.

Procedure

1. Verify that both OLIUs are looped on themselves at the *LGX* panel.

⇒ NOTE:

If OLIUs are looped directly on themselves instead of at the *LGX* panel, then automatic protection switching cannot be tested. Also, office alarms will be tested by installing OLIUs without optical fiber cables attached.

2. Verify that the ACTIVE LED is illuminated on one OLIU and extinguished on the other OLIU.
3. Verify that no other LEDs are illuminated on the OLIU pair.
4. Verify that no alarms are present on the shelf.
5. Connect the office alarm cable (if it has been disconnected) to the appropriate terminals on TB2.
6. Remove the loopback from the ACTIVE OLIU at the *LGX* panel.
7. Verify that the ACTIVE LED on the other OLIU illuminates.

⇒ NOTE:

This indicates that an automatic protection switch has occurred.

8. On the OLIU with the removed loopback, verify that the NE LED illuminates and the CP/OPT LED blinks.
9. Verify that the Minor (MN) office alarm is generated.

⇒ NOTE:

This can be observed as a closure between MN and MNR.

10. Remove the loopback at the *LGX* panel, from the other OLIU (which is now active) in this OLIU pair.
11. Verify that the ACTIVE LED on this OLIU remains illuminated.
12. On both OLIUs verify that the NE LED illuminates and the CP/OPT LED blinks.
13. Verify that the Major (MJ) office alarm is generated.



NOTE:

This can be observed as a closure between MJ and MJR.



NOTE:

When the major alarm is activated the minor alarm should extinguish.

14. Restore both loopbacks on the OLIUs at the *LGX* panel.
15. Verify that all alarms extinguish.
16. Verify that the ACTIVE LED is illuminated on one OLIU and extinguished on the other OLIU.
17. Verify that no other LEDs are illuminated on the OLIU pair.
18. If the office alarms are connected to an audible alarm system, then disconnect the office alarm cable from the DDM-Plus Wall DT.



NOTE:

This is done to prevent alarming in the office during other tests.

19. Leave the OLIU loopbacks in place at the *LGX* panel in preparation for the next test.

Parallel Telemetry Test

Description

This test verifies proper operation/wiring of the miscellaneous discrete input and the parallel telemetry output.

⇒ NOTE:

Operation of the parallel telemetry requires that the ground return lead on the parallel telemetry cable has been grounded.

⇒ NOTE:

A miscellaneous discrete alarm condition is generated by providing a closure between the two corresponding miscellaneous input leads (MISC DISC on TB2) or by providing a ground on MISC DISC B.

⇒ NOTE:

A parallel telemetry alarm condition is observed by a low voltage state on the corresponding alarm lead.

⇒ NOTE:

A parallel telemetry alarm condition can be measured with a voltmeter by measuring the voltage between the -48 V battery input and the alarm lead. With no alarm, there is an open circuit and 0 V will be measured. With an alarm condition, the alarm lead is at a low voltage state and approximately 48 V will be measured.

⇒ NOTE:

Prior to and after completing this test, verify that the DDM-Plus is clear of all alarms. If alarms do not clear, refer to Chapter 7, "Troubleshooting".

⇒ NOTE:

Testing the Minor telemetry point requires two OLIUs installed in the same group.

Procedure

1. Verify that both OLIUs are looped on themselves at the *LGX* panel.



NOTE:

If OLIUs are looped directly on themselves instead of at the *LGX* panel, then automatic protection switching cannot be tested. Also, office alarms will be tested by installing OLIUs without optical fiber cables attached.

2. Verify that the ACTIVE LED is illuminated on one OLIU and extinguished on the other OLIU.
3. Verify that no other LEDs are illuminated on the OLIU pair.
4. Remove the loopback from the ACTIVE OLIU at the *LGX* panel.
5. Verify that the ACTIVE LED on the other OLIU illuminates.



NOTE:

This indicates that an automatic protection switch has occurred.

6. On the OLIU with the removed loopback, verify that the NE LED illuminates and the CP/OPT LED blinks.
7. Verify that the Wall DT MN, NE, and SYS ID parallel telemetry points are set.
8. Remove the loopback at the *LGX* panel from the other OLIU (which is now active) in this OLIU pair.
9. Verify that the ACTIVE LED on this OLIU remains illuminated.
10. On both OLIUs verify that the NE LED illuminates and the CP/OPT LED blinks.
11. Verify that the Wall DT MJ, NE, and SYS ID parallel telemetry points are set.
12. Restore both loopbacks on the OLIUs at the *LGX* panel.
13. Verify that all alarms extinguish.
14. Verify that the ACTIVE LED is illuminated on one OLIU and extinguished on the other OLIU.

15. Verify that no other LEDs are illuminated on the OLIU pair.
16. Set the miscellaneous telemetry input point in by placing a closure between the two MISC DISC terminals on TB2.
17. Verify that the miscellaneous telemetry output point (MD) is set in the parallel telemetry.
18. Remove the closure between the two miscellaneous input leads and verify that the low voltage state is removed on the miscellaneous output lead.

DS1 Transmission Test

Description

This test procedure is an optional test to verify valid transmission, using a transmission test set, to and from the equipment DSX-1. This test is not required since equipment DSX-1 cabling was tested in the Cross-Connect Test.

Procedure

1. Configure a DS1 Transmission Test Set Transmitter for the following:
 - PRBS Pattern
 - DS1 Frame
 - BIT Errors Inject (Error Free)
2. Configure a DS1 Transmission Test Set Receiver for the following:
 - PRBS Pattern
 - DS1 Frame
 - BIT Errors Measurement (Total)

⇒ NOTE:
Refer to Figure 5-2 for test connections.

3. Verify that both OLIUs are looped on themselves at the *LGX* panel.
4. Verify that the ACTIVE LED is illuminated on one OLIU and extinguished on the other OLIU.
5. Verify that no other LEDs are illuminated on the OLIU pair.

⇒ NOTE:
If there are ALARM LEDs illuminated, determine if the problem is with the Wall DT or the circuit pack and replace the faulty unit.

6. Connect the DS1 Test Set Transmitter to the DS1 IN jack at the equipment DSX-1.
7. Connect the DS1 Test Set Receiver to the corresponding DS1 OUT jack at the equipment DSX-1.
8. Verify that error-free transmission is being received on the DS1 Test Set receiver.

9. If a signal is not detected on the DS1 Test Set Receiver [that is, loss of signal (LOS) is observed], isolate and correct the problem. Verify that:
 - The test set cables are connected to the correct cross-connect position.
 - DS1 cables are present and connected to both the DDM-Plus and the DSX-1.
 - The OLIUs are looped back.
10. If a signal with errors is observed, isolate and correct the problem. Most problems can be cleared by the following:
 - Loss of Frame: Verify that both the test set transmitter and receiver are set for a framed format.
 - All 1's: This indicates AIS is being detected. The problem could be that the test cables are connected to the wrong terminals at the DSX-1.
11. If error-free transmission is observed, repeat for the next DS1 position.

⇒ NOTE:
Perform this on each DS1 position with DSX-1 cabling.

⇒ NOTE:
If a valid DS1 signal is applied on the equipment side to the DDM-Plus then removed, the DS1 FAULT LED and the corresponding DS1 SELECT LED on the OLIU will blink.

⇒ NOTE:
After removing a DS1 input, perform a DS1 port equipage update on each OLIU by pressing and holding the NE/ENABLE button and then pressing the DS1 SELECT button.

Final Operations

Procedure

1. Remove all test signals and loopbacks at the DSX-1.
2. Perform a DS1 port equipage update on each OLIU by pressing and holding the NE/ENABLE button and then pressing the DS1 SELECT button.
3. Remove all loopbacks from the OLIUs at the LGX panel.
4. Set the OLIU output power on each OLIU for its required setting (high or low power).
5. Connect the optical fiber cables to their normal condition.

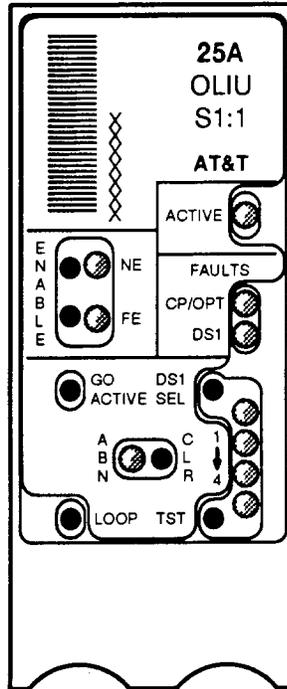


Figure 5-1. 25-Type OLIU Faceplate

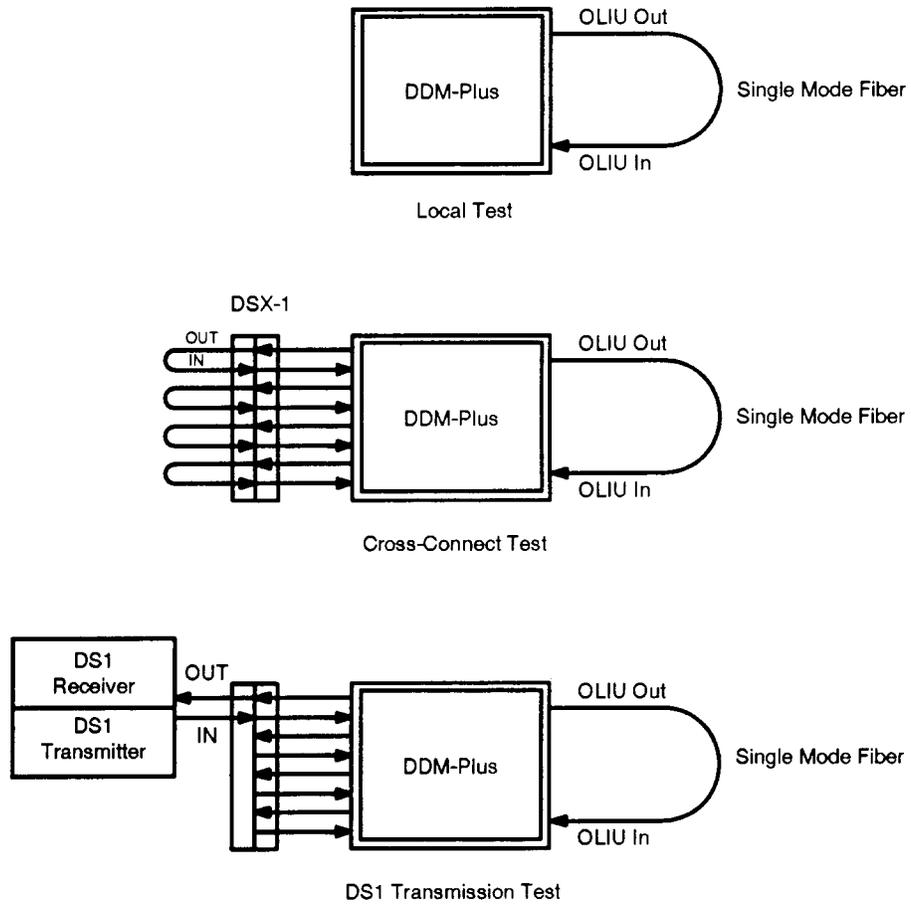


Figure 5-2. Installation Test Connections

End-to-End Installation Tests

6

Contents

General	6-1
■ Description	6-1
■ Tools, Test Sets, and Accessories	6-2
Fiber Verification and Automatic Protection	
Switching Test	6-3
■ Description	6-3
■ Procedure	6-3
End-to-End System Test	6-5
■ Description	6-5
■ Procedure	6-5
End-to-End DS1 Transmission Test	6-7
■ Description	6-7
■ Procedure	6-7
End-to-End Telemetry Test	6-9
■ Description	6-9
■ Procedure	6-10
Final Operations	6-11
■ Procedure	6-11

End-to-End Installation Tests

6

General

Description

This chapter provides instructions to verify optical fiber connections, to test automatic protection switching, to test miscellaneous parallel telemetry, and to verify end-to-end transmission.

This chapter should ONLY be performed after each end has been tested. If both ends are Wall Distant Terminals (DTs), then Chapter 5, "Stand-Alone Installation Tests", MUST have been previously completed at each end.

If one end is an Extension Shelf, then installation tests from AT&T 363-206-151, *DDM-Plus Installation Manual*, MUST have been previously completed.

This chapter requires personnel at both ends of the system.

The following installation tests are run only in an out-of-service mode of operation. Interruption of service will result if these tests are run on an operating in-service system.

If problems are encountered, refer to Chapter 7, "Troubleshooting". For detailed troubleshooting, refer to AT&T 363-206-150, *DDM-Plus User/Service Manual*.

Descriptions of LEDs and pushbuttons are located in Chapter 5, "Stand-Alone Installation Tests".

⇒ NOTE:

Prior to beginning the following installation tests, disconnect the office alarm cables from the Wall DT (terminals on TB 2), if this has not already been done, to prevent alarming in the office during tests.

Tools, Test Sets, and Accessories

The following are required:



<u>Qty.</u>	<u>Description</u>	<u>Usage</u>
1	Wrist strap	A wrist strap must be worn when handling circuit packs. Use the ESD jack provided on the front of the Wall DT.
2	DSX-1 cables	These cables and the DS1 test set are required to perform end-to-end DS1 transmission tests.
1	DS1 Transmission Test Set	These cables and the DS1 test set are required to perform end-to-end DS1 transmission tests.

Fiber Verification and Automatic Protection Switching Test

Description

This test procedure verifies that the optical fiber cables are properly connected and tests automatic protection switching.



WARNING:

Invisible laser radiation when open. Avoid direct exposure to beam.



NOTE:

Unterminated optical connectors may emit laser radiation. DO NOT view beam with optical instruments.



NOTE:

This procedure requires personnel at both the central office (CO) and remote terminal (RT) ends of the DDM-Plus system.



NOTE:

Observe all precautions when handling fiber.



NOTE:

If protection optical line interface units (OLIUs) are not equipped, then automatic protection switching is unavailable and cannot be tested. However, this procedure should still be performed to verify the optical fiber cable connections.

Procedure

1. On each OLIU, verify that the output power option switch has been set per office records.



NOTE:

The low power position is with the switch to the left.

2. At each end, verify that all the transmission cables are set-up for normal end-to-end operation and that OLIUs are installed.

3. At each end, verify that the ACTIVE LED is illuminated on one OLIU and extinguished on the other OLIU.
4. At each end, verify that no alarms are present on the shelf.
5. At the CO, disconnect the transmit fiber from the ACTIVE OLIU at the LGX[®] panel.
6. Verify that the ACTIVE LEDs on the end-to-end pair under test extinguish and that the ACTIVE LEDs on the other end-to-end pair illuminate.

 **NOTE:**

This indicates that an automatic protection switch occurred.

7. At the CO, verify that the proper OLIU (the one with the disconnected transmit fiber) illuminates its FE LED and blinks its CP/OPT LED.
8. At the RT, verify that the proper OLIU (the OLIU in the same position) illuminates its NE LED and blinks its CP/OPT LED.

 **NOTE:**

This verifies that the transmit fiber, which has been disconnected, was connected properly to the correct OLIU at the far end.

9. At the CO, reconnect the optical fiber cable at the LGX panel.
10. At the CO, verify that the FE and CP/OPT LEDs extinguish.
11. At the RT, verify that the NE and CP/OPT LEDs extinguish.
12. Verify that the ACTIVE LEDs are illuminated on the end-to-end pair which did not have the fiber removed.
13. At each end, verify that no alarms are present on the shelf.
14. Repeat this procedure on the other OLIU end-to-end pair (that is, the pair which is now active.)
15. Repeat this procedure at the RT end.

 **NOTE:**

This will verify that the transmit fibers in the other direction are connected properly.

End-to-End System Test

Description

This test procedure verifies valid transmission over the optical fiber cables between the DDM-Plus shelves.

Typically, the entire shelf will pass or fail this test indicating that the transmission path is good or bad. If a problem is isolated to the path, determine and correct the path problem and repeat the system test.

If the optical fiber path is trouble-free, but a problem still exists, isolate and correct the pack/shelf/cable problem. Repeat any of the installation tests as necessary.

⇒ NOTE:

This test is initiated at one end of the system and does not need to be repeated at the other end of the system.

Procedure

1. At each end, verify that all the transmission cables are set-up for normal end-to-end operation and that OLIUs are installed.
2. At each end, verify that the ACTIVE LED is illuminated on one OLIU and extinguished on the other OLIU.
3. At each end, verify that no other LEDs are illuminated on the OLIU pair.
4. Perform the following on the ACTIVE pack.

⇒ NOTE:

This test will also work if initiated on the standby pack, but the LED on and off descriptions will be slightly different.

5. At the CO, initiate automatic turnup Test 3 by pressing and holding the NE/ENABLE button (on the ACTIVE OLIU) and then pressing the TST button three times until the first three DS1 LEDs are illuminated.
6. After 10 seconds, the test will begin and the ABN LED on all four OLIUs will be illuminated.

⇒ NOTE:

If there are no failures, the DS1 SELECT LEDs on the end-to-end pair will cycle on and off.

⇒ NOTE:

If there are any failures, the NE and CP/OPT LEDs on the pack under test will illuminate and the DS1 LED(s) of the failed DS1(s) will illuminate. If the test fails, press CLR and isolate the problem.

7. If no failure is displayed after 10 seconds of testing, press CLR on the OLIU to end the test.

⇒ NOTE:

The optical fiber cables are considered to have passed the test.

⇒ NOTE:

All LEDs on the pack under test will blink on and off twice.

8. After the LEDs on the OLIU under test have blinked twice, verify that the same OLIU remains ACTIVE.
9. Verify that no other LEDs are illuminated on the OLIU pair.
10. At the CO, perform a manual protection switch by holding the NE/ENABLE button and then pressing GO ACTIVE on the standby pack.
11. Verify that the other end-to-end pair becomes ACTIVE and that the pair that was active becomes standby.
12. Verify that the ABN LED is illuminated on all four OLIUs (because a protection switch lockout condition exists.)
13. Remove the protection switch lockout by pressing CLR on one of the OLIUs.
14. Verify that the ABN LEDs extinguish and that no alarm LEDs are illuminated on the OLIU pair.
15. Repeat this procedure on the other OLIU end-to-end pair in this group which is now active.

End-to-End DS1 Transmission Test

Description

This procedure is an optional test to verify valid transmission, using a transmission test set, over the optical fiber cables between the DDM-Plus shelves.

⇒ NOTE:

This procedure is performed in the CO.

Procedure

1. Configure a DS1 Transmission Test Set Transmitter for the following:
 - PRBS Pattern
 - DS1 Frame
 - BIT Errors Inject (Error Free)
2. Configure a DS1 Transmission Test Set Receiver for the following:
 - PRBS Pattern
 - DS1 Frame
 - BIT Errors Measurement (Total)

⇒ NOTE:

Refer to Figure 6-1 for test connections.

3. At each end, verify that all the transmission cables are set-up for normal end-to-end operation and that OLIUs are installed.
4. At each end, verify that the ACTIVE LED is illuminated on one OLIU and extinguished on the other OLIU.
5. At each end, verify that no other LEDs are illuminated on the OLIU pair.
6. At the CO, connect the DS1 Test Set Transmitter to the DS1 IN jack at the equipment DSX-1.
7. At the CO, connect the DS1 Test Set Receiver to the corresponding DS1 OUT jack at the equipment DSX-1.
8. At the RT, place a loopback cable between the corresponding IN and OUT jacks at the equipment DSX-1.

⇒ NOTE:

An internal loopback can be placed at the RT instead. At the CO, press DS1 SELECT (until the desired DS1 is selected); press and hold FE/ENABLE; then press LOOP.

9. Verify that there are no FAULT LEDs illuminated on the circuit packs for the DSX-1 position under test.

⇒ NOTE:

If there are FAULT LEDs illuminated, determine if the problem is with the Wall DT or the circuit pack and replace the faulty unit.

10. Verify that error-free transmission is being received on the DS1 Test Set Receiver.
11. If a signal is not detected on the DS1 Test Set Receiver [that is, loss of signal (LOS) is observed] isolate and correct the problem. Verify that:
 - The test set cables are connected to the correct cross-connect position.
 - DS1 cables are present and connected to both the DDM-Plus and DSX-1.
12. If a signal with errors is observed, isolate and correct the problem. Most problems can be cleared by the following:
 - Loss of Frame: Verify that both the test set transmitter and receiver are set for a framed format.
 - All 1's: This indicates AIS is being detected. The problem could be that the test cables are connected to the wrong terminals at the DSX-1 at the CO, or loopback cables are not in-place at the RT.
 - High BER: This may be caused by a DS1 line code mismatch between the end-to-end OLIU pairs.
13. If error-free transmission is observed, repeat for the next DS1 position.

⇒ **NOTE:**
On OLIUs, if a valid DS1 signal is applied on the equipment side to the DDM-Plus then removed, the DS1 FAULT LED and the corresponding DS1 SELECT LED on the OLIU will blink.

⇒ **NOTE:**
On OLIUs, after removing a DS1 input, perform a DS1 port equipage update on the OLIU by pressing and holding the NE/ENABLE button and then pressing the DS1 SELECT button.

End-to-End Telemetry Test

Description

This test procedure verifies proper end-to-end operation/wiring of the miscellaneous parallel telemetry and tests the far end telemetry point.

⇒ **NOTE:**
Operation of the parallel telemetry requires that the ground return lead on the parallel telemetry cable has been grounded.

⇒ **NOTE:**
A miscellaneous discrete alarm condition is generated by providing a closure between the two miscellaneous input leads (MISC DISC on TB 2).

⇒ **NOTE:**
A parallel telemetry alarm condition is observed by a low voltage state on the corresponding alarm lead.

⇒ **NOTE:**
A parallel telemetry alarm condition can be measured with a voltmeter by measuring the voltage between the -48 V battery input and the alarm lead. With no alarm, there is an open circuit and 0 V will be measured. With an alarm condition, the alarm lead is at a low voltage state and approximately 48 V will be measured.

⇒ **NOTE:**
Prior to and after completing this test, verify that the DDM-Plus is clear of all alarms. If alarms do not clear, refer to Chapter 7, "Troubleshooting".

Procedure

1. At each end, verify that all the transmission cables are set-up for normal end-to-end operation and that OLIUs are installed.
2. At each end, verify that the ACTIVE LED is illuminated on one OLIU and extinguished on the other OLIU.
3. At each end, verify that no other LEDs are illuminated on the OLIU pair.
4. At the RT, set the miscellaneous telemetry input point by placing a closure between the two input leads (MISC DISC on TB2).
5. At the CO, verify that the corresponding miscellaneous telemetry output point is set by observing a low voltage state on the miscellaneous output lead.



NOTE:

If the CO is also a Wall DT, this is the MD lead in the parallel telemetry cable.



NOTE:

If the CO is an Extension Shelf, the output lead is RMTRO() in the parallel telemetry cable. The letter in the () indicates the OLIU Optical Extension ID.

6. Remove the closure between the two miscellaneous input leads and verify that the low voltage state is removed on the corresponding miscellaneous output lead.
7. At each end, verify that no alarms are present on the shelf.
8. At the CO, disconnect the transmit optical fiber cable from the ACTIVE OLIU at the LGX panel.
9. At both ends, verify that the ACTIVE LED on the other OLIU illuminates.



NOTE:

This indicates that an automatic protection switch has occurred.

10. At the CO, on the OLIU with the removed transmit fiber, verify that the FE LED illuminates and the CP/OPT LED blinks.
11. At the CO, verify that the shelf FE parallel telemetry point is set.



NOTE:

The shelf MN and Optical Extension ID parallel telemetry points will also be set.

12. At the CO, reconnect the transmit optical fiber cable.
13. Verify that all alarms extinguish.
14. Verify that the ACTIVE LED is illuminated on one OLIU and extinguished on the other OLIU.
15. Verify that no other LEDs are illuminated on the OLIU pair.

Final Operations

Procedure

1. Remove all test signals and loopbacks at the DSX-1.
2. Perform a DS1 port equipage update on each OLIU by pressing and holding the NE/ENABLE button and then pressing the DS1 SELECT button.
3. At both ends of the system, connect the office alarm cable if it has been disconnected, that is, connector P06 for the Extension Shelf or TB2 terminals for the Wall DT.
4. Verify that all the cables are properly dressed.
5. Verify that designations where cables were wire-wrapped are properly labeled.
6. Verify that one OLIU is ACTIVE in each OLIU pair.
7. Verify there are no FAULT LEDs lighted on any circuit packs. If there are FAULT LEDs lighted, determine if the problem is with the shelf or the circuit pack and replace the faulty unit.
8. Notify the customer that the installation has been completed.

⇒ **NOTE:**
For the OLIUs, the DS1 loopbacks at the RT can be internal or external (cables).

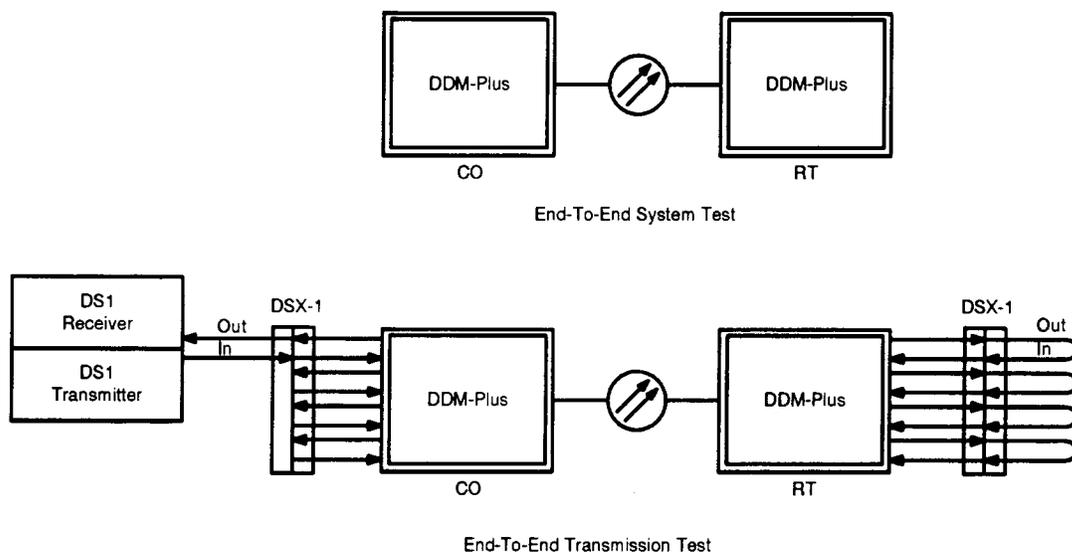


Figure 6-1. Installation Test Connections

Contents

General	7-1
■ Description	7-1
■ For Normal Operation	7-1
■ Diagnostic Codes for OLIUs	7-2
■ Fiber Cleaning Instructions	7-3
Technical Support	7-4
■ Description	7-4
COACH Description	7-5
■ Description	7-5
General	7-5
Diagnostic Dictionary	7-5
News and Bulletins	7-5
Compatibility Data	7-5
Ordering Guides	7-5
COACH User's Guide	7-6
Required Product Changes	7-6
■ Description	7-6

General

Description

This chapter covers some basic installation troubleshooting techniques and how to obtain technical support.

This chapter is intended for troubleshooting out-of-service systems only and should not be performed on in-service equipment. For detailed troubleshooting, refer to AT&T 363-206-150, *DDM-Plus User/Service Manual*.

⇒ NOTE:

For a description of the LEDs, refer to Chapter 5, "Stand-Alone Installation Tests".

For Normal Operation

1. Verify that the DSX-1 equipment cables are properly connected.
2. Verify that the associated equipment is operating properly and providing the DDM-Plus with valid DS1 signals.
3. Verify that there are no FAULT LEDs lighted on any circuit packs.
4. If the ABN LED is lighted on any circuit packs, press CLR.
5. Verify that one optical line interface unit (OLIU) is ACTIVE.

Diagnostic Codes for OLIUs

If the DDM-Plus is not operating as described in "For Normal Operation", use the following to isolate and correct the problem.

- A steady CP/OPT FAULT LED on both OLIUs in the pair may indicate inconsistent option settings. Check the options on all four OLIUs (two at each end) associated with the OLIU group in alarm.
- If the option settings are consistent between all four OLIUs in the same group, then a steady CP/OPT FAULT LED indicates a circuit pack failure. Replace the failed circuit pack.
- A blinking CP/OPT FAULT LED indicates a loss of signal on the optical fiber. Check the condition of the fiber and the OLIU circuit pack at the far end.



NOTE:

Dirty optical fiber cables can cause high BER or loss of signal. Whenever optical fiber cables are removed they should be cleaned before replacement. Refer to the fiber cleaning instructions in this chapter.

- A steady DS1 FAULT LED indicates a specific DS1 failure during turnup tests. Also, a steady DS1 FAULT LED may indicate that option switches on OLIUs in the same group are set differently. Isolate the failure to a circuit pack or cable and replace the faulty component.
- A blinking DS1 FAULT LED indicates a loss of DS1 from the adjacent equipment. The corresponding LED of the failed DS1 should also light. Determine if the problem is caused by the adjacent equipment or the cable in between. Isolate the problem and correct.
- Exactly one OLIU in each pair should be ACTIVE. If this is not the case, press CLR on both of the OLIUs. If this does not clear the problem, try reseating one (or both) of the OLIUs.

Fiber Cleaning Instructions



WARNING:

Open optical connectors may emit invisible laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam.



NOTE:

Always clean all *ST*[®] connectors and couplings before doing initial connections or reconnections per the following instructions.



NOTE:

Disconnect and clean only one set of connectors at a time when cleaning internal OLIU connectors.

On the OLIU, disconnect one of the *ST* connectors.

1. Clean the end and sides of the connector tips with a lint-free, optical quality tissue dampened with isopropyl alcohol.
2. Carefully wipe the connector end again with a clean dry lint-free, optical quality tissue.
3. Blow any lint or dust from the connector using a canned air duster 3 inches from the face of the connector.
4. Blow any lint or dust from inside the coupling using a canned air duster 3 inches from the coupling.
5. Install the *ST* connectors onto the coupling by aligning the mark on the rim of the connector body with the slot in the coupling. Push the connector onto the coupling with a clockwise twist-locking motion.

Technical Support

Description

AT&T is committed to providing total product coverage 24 hours a day by troubleshooting installation or service problems over the phone and if necessary on-site.

Regional Training Assistance Center (RTAC) organizations are established to provide the customer with a single point of contact supporting all of the AT&T transmission and switching products. Each RTAC supports a specific territory and they are located in the following areas:

Cockeysville, MD
Atlanta, GA
Rolling Meadows, IL
Ballwin, MO
Denver, CO
Pleasanton, CA

For RTAC support, dial 1-800-225-7822 which will direct the call to the RTAC center supporting your location.

— NOTICE —
FOR FIELD SUPPORT
DIAL 1-800-225-7822.

The RTACs are supported by a centralized Technical Support Organization (TSO) for transmission products. The TSO maintains a close relationship with Bell Laboratories and other AT&T organizations to expedite resolutions and maintain contact with the development community. This association provides continuous accessibility to every phase of the product life cycle and assures a prompt resolution to all inquiries.

COACH Description

Description

General

The DDM-Plus is fully supported by customized on-line aid for customer help (COACH).

COACH is a system of on-line support tools which provide product news and bulletins, diagnostic services, compatibility information, and on-line documents.

The COACH tools reside on a dedicated time-share computer accessible over toll-free lines and are available 24 hours a day, 7 days a week.

The following COACH tools are available.

Diagnostic Dictionary

Contains previously encountered problems and their solutions.

News and Bulletins

Immediately after a user logs into COACH, the news and bulletins tool displays bulletins containing urgent information related to the product. Users are informed about the presence of news items, which are less urgent, and can be read at their leisure.

Compatibility Data

This tool lists solutions to hardware/firmware configuration problems in the form of product changes which are available.

Ordering Guides

This tool contains the current issue of AT&T 363-206-156, *DDM-Plus Equipment Engineering and Ordering Guide*.

COACH User's Guide

This is an on-line version of how to use COACH.

For information on obtaining a COACH login contact:

COACH Software Development
Department NB0031200
AT&T
1600 Osgood St.
North Andover, MA. 01845

or complete the COACH USER form located in the back of this manual and
FAX it to 508-960-1772.

Required Product Changes

Description

During the life of a product, changes in the field may be required to correct an existing or potential problem.

Product changes are issued in the form of Product Change Notifications (PCNs).

The customer is notified about PCNs through the Design Change Management System (DCMS) which is an on-line tool similar to COACH.

For more information regarding DCMS contact:

Terry Davis (314) 891-4213 or
Bob Gniadek (314) 891-3660

*** INFORMATION NEEDED TO ADD COACH USER ***

NAME : _____
 LAST FIRST MI TELEPHONE TITLE
ROOM : _____ FLOOR : _____
STREET : _____ COMPANY : _____
CITY : _____
STATE : _____ ZIP : _____ COUNTRY : _____
FAX : _____

PRODUCTS

(Place a check mark beside each product wanted.)

- | | |
|---|--|
| <input type="checkbox"/> CUSTOMER NETWORK CONTROLLER | <input type="checkbox"/> DACS I & SRDC |
| <input type="checkbox"/> COACH SOFTWARE SYSTEM | <input type="checkbox"/> USEC/ASSET/BCM |
| <input type="checkbox"/> CUSTOMER SERVICE UNIT | <input type="checkbox"/> FT-2000 |
| <input type="checkbox"/> D4 | <input type="checkbox"/> FT SERIES G |
| <input type="checkbox"/> D5 | <input type="checkbox"/> DEMO |
| <input type="checkbox"/> DACS II | <input type="checkbox"/> INTEGRATED ACCESS XCONN SYSTEM |
| <input type="checkbox"/> DACS III-2000 | <input type="checkbox"/> ISSUE MGMT TRACKING SYSTEM |
| <input type="checkbox"/> DACS IV-2000 | <input type="checkbox"/> MPCS - LOT TRACKING |
| <input type="checkbox"/> DACS IV-2000-NSD | <input type="checkbox"/> NTT Module A |
| <input type="checkbox"/> DACS CONTROLLER | <input type="checkbox"/> PRIVATE NETWORKS |
| <input type="checkbox"/> <i>DACScan</i> [™] 2000 NTWK CONTROLLER | <input type="checkbox"/> <i>SLC</i> [®] Carrier Systems |
| <input type="checkbox"/> DDM-2000 | <input type="checkbox"/> DDM-1000 |
| <input type="checkbox"/> DDM-Plus | |

Please send completed form to:

AT&T
COACH Software Development
Department NB0031200
1600 Osgood St.
North Andover, MA 01845
FAX: 508-960-1772