



ATT-TELCO-IS-002-316-043

Common Systems: Fiber Distributing Frame Deployment Standards

Presented in this document are the deployment standards to implement a Fiber Distribution Frame in the AT&T LOCAL EXCHANGE companies Central Offices, CEVs, Huts, and Customer Premises.

To:	The primary audience for this document are AT&T LOCAL EXCHANGE companies personnel in the following disciplines, Switch Capacity Planner/Engineer, Transport Equipment Engineer (TEE), Facility Equipment Engineer (FEE), Digital Transport Engineer (DTE), Maintenance Engineer, Space Planner, Frame Planner, Long Range Technical Planners, Outside Plant and Fundamental Network Planning. This document is to be used internally within AT&T LOCAL EXCHANGE companies and their AT&T Authorized Vendors and has a limited distribution subject to the header/footer information..
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Table Of Contents

1.	Copyright Page	1
2.	Reasons for Reissue	1
3.	INTRODUCTION	1
4.	FDF Overview and Definition	2
4.1.	Definition	2
4.2.	Network Role	3
4.3.	Strategic Direction	3
4.3.1.	Approved AT&T Central Office Terminations	4
4.3.2.	Approved Terminations for the Customer Premises Locations	4
4.3.3.	Approved Term for Point of Presence IXC (POP) Long Distance Carrier Sites Only	5
4.4.	FDF Guidelines	5
4.4.1.	Central Office Cross connect Guidelines	6
4.4.2.	Central Office Patch Cord/Jumper Cross Connect Guidelines	6
4.4.3.	Central Office Cabling Cross Connect Guidelines	7
4.4.4.	Placement of Fiber Termination Panels (FTP) and Parking Lot Panels (PLP)	8
4.5.	FDF Applicability, Types and Use	9
4.5.1.	FDF Applicability	9
4.5.2.	FDF Types	9
4.5.3.	FDF Use	9
4.6.	FDF Panel Terminations & Placements	10
4.7.	Fiber Optic Cross-Connect Jumpers	11
4.8.	Fiber Optic Cross-Connect Patch Cords / Jumpers / Cables	12
5.	Fiber Protection System (Raceways)	12
5.1.	Intra-office Routing Diversity	12
5.2.	Fiber Raceway Topology	13
6.	Optical Patch Panels	13
6.1.	Older LUSCIE/LUSCIU Type Panels	13
6.2.	Miscellaneous Panels	14
6.3.	Generation III (NG3) Panels	17
6.4.	NG3 to NGF Compatibility Arrangements	18
6.4.1.	Bay Interconnection	19
6.4.2.	Panel Use	19
7.	Optical Terminations/Connectors	19
7.1.	Overview	19

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7.2.	Attenuators	20
7.3.	Care & Cautions	21
8.	DWDM, FTM, CWDM, WDM and Optical Splitter Deployments	22
9.	FDF System Management	22
10.	FDF Planning Guidelines	23
10.1.	Primary FDF	23
10.2.	Satellite FDF	23
10.3.	Fiber Protection System	24
10.4.	High Density (Generation III) FDF	24
10.4.1.	New High Density Standard	24
10.4.2.	Layout	26
10.4.3.	FDF Arrangements	27
10.5.	Raceway Downspout/Turndown Provisioning	27
10.6.	FDF Fiber Bridges	28
10.7.	NG3 Miscellaneous Bay	29
10.8.	Other Fiber Splice Arrangements	30
10.8.1.	Ancillary Splice Housings within the FDF	30
10.8.2.	Outside Plant Arrangements including FDF OSP Panel Tail and Stubs	30
10.9.	Special Fiber Bay Arrangements	30
10.10.	Contracts and Financials	31
10.11.	Building Blocks	31
11.	Frame Placement Strategy	32
12.	Records Assignments	35
12.1.	OSMINE Records Assignments	35
12.1.1.	Generation I & II Frame Types	35
12.1.2.	Embedded NGF Frames (AT&T Midwest only)	36
12.1.3.	Generation III (NG3) Frames	37
12.2.	Fiber Terminations on Panels	38
12.3.	TAB/db	39
12.4.	TIRKS	42
13.	References	42
14.	Contacts	46
	ACRONYMS	47
A.1.	DOCUMENT SPECIFIC ACRONYMS	47
A.2.	NETWORK ACRONYMS DICTIONARY	47

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2. Reasons for Reissue

This section will reflect the last three issues of updates for field consumption.

Issue 10, Migrated document from the Common Systems web site to APEX

Issue 9, All Sections: Change from SBC to AT&T

Issue 9, Section 4D: Updated to include policy changes for fiber distribution

Issue 9, Section 4E: Updated approved types of FDF

Issue 8, Section 1: Copyright Page has Project Lightspeed footnote added.

Issue 8, Section 4: Paragraph C added projects and programs from WaveMAN and GigaMAN with the 10 Gig option to Project Lightspeed.

Issue 8, Section 4: Paragraph D updated the ability to provision Breakout Bays for Network Equipment.

Issue 8, Section 4: Paragraph D added that it strongly recommended that new optical equipment be located either in close proximity to the FDF or the location of a satellite FDF on a going-forward basis.

Issue 8, Section 4: Paragraph 2E added that even with the introduction of Project Lightspeed, there is not a need for the Generation III FDFs, continue to use the Gen II LGX-style as standard.

3. INTRODUCTION

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<http://ebiz.SBC.com/commonsystems>

<http://apex.sbc.com>

This document has been updated to reflect Network Planning & Engineering (Common Systems Standards) for the following Incumbent Local Exchange Carriers, henceforth referred to as AT&T LOCAL EXCHANGE companies:

AT&T East (Connecticut)

AT&T West (California, Nevada)

AT&T Southwest (Missouri, Texas, Arkansas, Oklahoma, Kansas)

AT&T Midwest (Illinois, Wisconsin, Indiana, Ohio, and Michigan)

The FDF is considered as an integral part of the Central Office or outside plant hut/remote terminal that will support the interconnection needs for customers, carriers, other telecommunications providers, switches, transport equipment and cable facilities in the serving Wire Center (WC) area. When forecasting the ultimate floor space requirements for the frame footprint, considerations are made based upon the initial 20-year projection of use by the above listed elements. The frame is deployed in a logical layout to maximize the overall life of the frame and to permit the greatest utilization of frame equipment and termination assignments with the least amount of congestion and blockage.

Subsequent growth requirements of the FDF will be based upon Wire Center (WC) forecasting, technology additions and growth, and the need for increases in facility placement in direct support of the community growth that the WC supports. The incremental growth of frames will be addressed in this document. It must be specified that the building structure is planned to support this initial 20-year life-of-frame deployment with associated cable entrance facilities provided throughout the length of the frame in a direct route through the Wire Center. Shorter timelines could result in increased costs due to the need to redistribute equipment and facilities on the frame to smaller frame hardware increments.

It is understood that State Utility Commissions may require a reduced interval in the forecast planning from the standard projection timelines. When this occurs, the floorspace layout should reflect the maximum permissible sizing available. The Space Planner, working with the Detail Engineering Service Provider (DESP), where applicable, shall take into account the best solution based upon space availability, most efficient design and least cost application for the frame placement and design.

The FDF supports the technology and applications based upon their optical standard requirements. It is imperative that the FDF be forecasted with the appropriate space and strategic location allocated within the Wire Center. Every effort must be made to avoid blocking the logical growth layout of a FDF or the inappropriate placement of the frame within the WC, causing the potential need for expensive additional regeneration equipment.

4. FDF Overview and Definition

4.1. Definition

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A Fiber Distributing Frame (FDF) architecture serves as the primary interface between Outside Plant (OSP) fiber optic facilities entering a Central Office structure and the fiber optic equipment installed within that same location. When placed in a remote terminal or customer premises, it serves as the cross-connect point between outside plant facilities and the F2 facility or customer campus cabling. The FDF provides a centralized point for the organization and administration of the fiber optic facility and intra-building fiber equipment cables, provides a flexible platform for future fiber growth, and provides rearrangeable connections between any two terminations or appearances.

4.2. Network Role

FDF systems are suitable for use in both large and small offices, digital loop carriers, Controlled Environmental Vaults (CEVs), and customer premises. The systems are modular in design and serve as centralized termination, test access and cross-connection points and as distributing frames for all fiber network elements and circuits.

4.3. Strategic Direction

The FDF is planned to be the primary interface and cross-connect point for all fiber optic products, cabling and equipment in the telecommunications network. This frame will continue to be the primary cross-connect point with Intelligent Network Elements such as optical multiplexers, DWDM, WDM, CWDM, FTM, optical amplifiers and projects/programs such as GigaMAN, GigaMAN with the 10 Gig option (ex-DecaMAN), FibreMAN, WaveMAN and Project Lightspeed. The FDF is the direct cable cross-connect point for all AT&T Network Elements to one another. Optical Carrier systems that use primary and protect paths for signal transmission should have path diversity for cross-connects and cabling within the Central Office beyond the initial Network Equipment lineup for high capacity services of OC-192/10 Gigabit and higher speeds. Fiber cabling within a Network Element system using one or multiple contiguous bays within the same footprint may be cabled directly without termination on a FDF.

All products listed in this Infrastructure Deployment Guideline (IDG) are baseline funded at this time. This product line including skeleton bays, panels and tails/stubs is classified as Major Materials and should be charged to the appropriate Field Report Code, FRC, in accordance with the Accounting Handbook Telephone Plant. The cross-connect jumpers and patch cords will be classified as minor materials. FDF items may be a Field Reporting Code in one of the following groups: 257C, 357C, 377C or 477C for capital items. Check with your Equipment or Outside Plant Engineer funding Manager for the correct Account Classification Coding before ordering of FDF products.

Effective August 15, 2001, all regions must use the SingleMode SC-UPC connector as the standard on a going-forward basis per FLASH-2001-015, SBC Construction Support ST to SC Conversion in SBC-SWBT, dated June 2001. The ST-UPC connector is no longer rated as standard.

Effective Jan 1, 2003, the new SBC Fiber Optic Connector/Mode Policy was released, SBC-002-316-078, Issue 1, dated Jan 2003. This document coupled with SBC Fiber Optic Connector/Mode Policy Addendum by Approved Services, SBC-002-316-079; Issue 1, dated Jan 2003 covers the following:

On a going-forward basis, this policy reconfirms that the AT&T standard for fiber optic terminations is the SC-UPC, SingleMode interface for customers, CLECs, carriers and internal users, approved by John Monday, Vice President-Finance & Engineering Support (NP&E). This standard interface insures that network reliability is promoted through a standard network interface thereby reducing the overall costs in the network, with engineering and technical decisions becoming streamlined in a single process.

Due to the need to provide more near-term services with manufactured off-the-shelf components, AT&T is modifying the policy to permit exceptions on a case-by-case basis due to technical shortfalls of Network Elements for the use of

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the LC-UPC SingleMode instead of the SC-UPC connector on the faceplate for small form factor connectors in the Central Offices, CEV's and Huts only. In addition, limitations on the near-term deployment of video services for Fiber-to-the-Home will necessitate the use of SC-APC, SingleMode (angled) connectors using an analog signal. When the video is converted to an optical signal, the connector type will revert to the SC-UPC, SingleMode. The use of SC connectors with a MultiMode method of transmission is authorized for general use at both the Customer Premises and the Point of Presence (POP) only. SBC-002-316-079, SBC Fiber Connector/Mode Addendum by Application Services Approval for Use will provide the specific products and services that are approved for use under the auspices of this policy. The addendum document will be updated as new services are approved for introduction into the PDP/NTI development process. As other technology requirements become necessary and cost justified, AT&T may elect to introduce new connector/mode types on a case-by-case basis with both this document and the addendum covering these changes.

The standard demarcation point for AT&T LOCAL EXCHANGE companies facilities is the SC-UPC SingleMode termination with the alternative solution being the SC-UPC MultiMode termination at the POP and customer premises. AT&T has no obligation to construct new demarcation facilities or modify their "as is" facilities except through regulated retail product offerings as specified by State and Federal tariffs as a result of the Telecommunication Act's current obligations and their interpretations by the court and the commissions. The demarcation for Access Services (regulated retail product offerings) is defined in the Demarcation Policy for Access Services Terminated at Other Carrier's Point of Presence (POP) Locations only. This demarcation policy allows some flexibility for the termination of fiber optic facilities at Interexchange Carrier sites only; all other customer sites will receive the standard handoff connections specified by tariff.

The Generation II (LGX style i.e. SBFCM), the Next Generation (NGF) and Generation III FDF (NG3) products are approved by AT&T Communications and will support the use of multiple types of connectors and modes within the respective panels and clusters.

4.3.1. Approved AT&T Central Office Terminations

The standard arrangement will be the SC-UPC, SingleMode termination within the Central Office. There are exceptions based upon manufacturer small form factor needs and specific products needs that are covered in AT&T-TELCO-IS-002-316-079, AT&T Connector/Mode Policy Addendum by Application Services Approval for Use. This addendum will specify the current approved arrangements in accordance with this policy and will be updated as new services are introduced into the PDP/NTI process. For further information on connector Mode policy refer to ATT-TP-76412.

4.3.2. Approved Terminations for the Customer Premises Locations

The standard arrangement will be the SC-UPC, SingleMode or the SC-UPC MultiMode terminations (using a specific service offering) at the customer premises as specified by tariff. Specific products and service applications that are approved for use are covered in ATT-TELCO-IS-002-316-079, ATT Connector/Mode Policy Addendum by Application Services Approval for Use. This addendum will specify the current approved arrangements in accordance with this policy and will be updated as new services are introduced into the PDP/NTI process. For further information on connector Mode policy refer to ATT-TP-76412.

4.3.3. Approved Term for Point of Presence IXC (POP) Long Distance

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Carrier Sites Only

The standard arrangement will be the SC-UPC, SingleMode or the SC-UPC MultiMode terminations (using a specific service offering) at the IXC (POP) as specified by tariff. In addition, the IXC (POP) locations may be provisioned through a transition jumper using a LC-UPC, SingleMode, ST-UPC, SingleMode or FC-UPC, SingleMode at the IXC's request. Specific products and service applications that are approved for use are covered in ATT-TELCO-IS-002-316-079, ATT Connector/Mode Policy Addendum by Application Services Approval for Use. This addendum will specify the current approved arrangements in accordance with this policy and will be updated as new services are introduced into the PDP/NTI process. For further information on connector Mode policy refer to ATT-TP-76412.

4.4. FDF Guidelines

The full cross-connect architectural design of the FDF will be used in the AT&T LOCAL EXCHANGE companies. Fire-retardant ribbon fiber optic cables should be pre-terminated on one OSP shelf in a FDF bay and spliced to optical outside plant facilities in the cable vault, with the exception of locations where there is no cable vault and in the West region. In cases where there is no cable vault and in the West region, splicing may be performed in various methods:

- Outside the first manhole closest to the C.O.
- At the back side of the OSP panel in the FDF lineup in the provided splice tray.
- Inside the C.O. near the cable entrance facility in a wall mounted splice box.

Fiber optic interconnect cables from optical transmission and switching equipment are terminated on the rear of a Fiber Optic Termination shelf in an adjacent FDF bay. The FOT and OSP terminations will be connected via cross-connect fiber optic jumpers at the time a service request is initiated. Network Element terminations will be placed on the rear of FOT panels. OSP fiber terminations will be placed on the rear of OSP panels. In most applications, an alternating bay terminating arrangement is recommended. The alternating bay arrangement segregates Outside Plant (OSP) terminations and Fiber Optic Transmission (FOT) equipment terminations into alternate bays and ensures the most cost effective deployment arrangement. **The FDF shall always utilize the cross-connect methodology.** The interconnection of fiber termination equipment to another within the Central Office will be through the full cross-connect design of the Fiber Distributing Frame. (Example: An OC48 with a subtending OC3C will be cabled to the FDF and not directly between the two multiplexers). Under no circumstances will CO fiber equipment be directly terminated on the front access ports of the OSP panels.

When the equipment placement is located on another floor or a non-contiguous equipment area, a fiber optic tie cable terminated on Fiber Optic Termination (FOT) panels will be placed from the FDF to that remote area and terminated on a **satellite FDF** in its own bay. From this satellite location, Fiber Protection Systems will be placed in a logical layout to support the eligible area for each Network Element. The remote area will be supported through fiber patch-cords to the Network Element allowing for rapid fiber deployments at minimal dedicated long-term costs. Network Element to Network Element cross-connects will be made at the main FDF, not the satellite FDF. Under normal circumstances, the satellite FDF will use the cross-connect arrangement for terminations to this bay. **New optical equipment should be located either in close proximity to the FDF or the location of a satellite FDF.**

Fiber Protection Systems and fiber optic patch-cords will not traverse firewall partitions and floors. Fiber Protection Systems shall be provisioned between the 8'6" and 9'0" heights when ever possible, allowing for fiber patch-cord/fiber jumper placements via SBC Local Exchange Carrier or SBC LOCAL EXCHANGE companies Approved

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Vendor personnel for service requests, orders and/or equipment installations for the standard 7-foot height of FDF bays.

4.4.1. Central Office Cross connect Guidelines

The guidelines below are intended to address provisioning intervals and capital expense issues as well as to standardize consistent cross connect methods between Fiber Distributing Frames (FDF's) and Network Elements (NE's).

Prior to the placement of fiber optic cross connects, a determination of cross connect methodology must be made. There are several options to choose from and the correct one should be based on common engineering practices i.e. the number of terminations, distances, existing infrastructure economics etc.

A decision tree titled "Intraoffice Fiber Distribution Decision Tool", is available and should be considered a tool to be used in the decision process to determine the best way to provision fiber optic terminations between Fiber Distributing Frames (FDF's) and between FDF's and Network Elements. The Decision Tree Matrix can be found at the attached URL:

<http://ebiz.sbc.com/transdata/iof/13state.cfm>

The advantage in using this tool is to help choose the best method applicable for the distribution of central office fiber.

The guidelines provided in the decision tree will allow the local planners to meet the complexity, diversity and growth needs of the network by providing the following advantages:

- Lower Cost
- Shorter provisioning intervals
- Consistent routing methods throughout AT&T
- Decrease in damaged fiber
- Decrease in stranded inventory.

4.4.2. Central Office Patch Cord/Jumper Cross Connect Guidelines

The use of fiber patch cords to connect between FDF's and Network Elements (NE's) has historically been the method of choice. This method of cross connect requires the use of a fiber protection system as individual patch cords are placed at the FDF and NE. Refer to ATT-C-70001-E for more detail. This method may be preferred when there is a relatively low quantity of fiber terminations to be placed.

With advancements in fiber optic equipment, the newer equipment typically requires a higher density of fiber counts. The placement of the electronics requiring the fiber may be staggered over time, therefore, the management of these higher density fiber units is required. In addition the use of the decision tree matrix will aide in determining the appropriate fiber management method.

There are four acceptable methods of managing these fibers;

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- 1) Patch cords can be direct connected from FDF to NE if optic cards are in place.
- 2) Patch cords can be terminated at the FDF and then labeled and left hanging in the protective Glide Cable Management System (GCMS) or vertical fiber duct, if optic cards are not in place.
- 3) Patch cords can be terminated at the FDF and then terminated at a “**Parking Lot Panel**” (PLP) in or near the NE if fiber optic cards are not in place.
- 4) Patch cords can be terminated at the FDF and terminated at an intermediate Fiber Termination Panel (FTP) in or near the NE if the fiber optic cards are not in place.

Caution: For some applications the use of method number four (4), the use of an intermediate fiber termination panel is not recommended due to an increase of insertion loss as a result of additional termination points. The AT&T engineer shall verify that the technology being placed will not be adversely affected by the use of the FTP and its consequential insertion loss. An example of this would be FTTP application.

4.4.3. Central Office Cabling Cross Connect Guidelines

Historically the use of fiber cable has not been an option in cross connecting the FDF to the NE. However, with the advancements in fiber optic technology and higher fiber density the use of direct cabling from the FDF to the NE will provide greater benefits over the patch cord method for certain applications.

The use of fiber optic cabling regardless of deployment method between the FDF and NE will require the use of dedicated OFNR cable rack. In cases where space may be limited, the use of metallic conduit may be preferred over cable rack. In addition the use of the decision tree matrix will aid in determining the appropriate fiber management method.

There are **three** acceptable cross connect methods for the use of fiber optic cable between the FDF and NE:

- 1). The first option is to direct cable from the FDF to the NE. Caution should be used not to over engineer the placement of fiber cable as this could result in stranded inventory. Also, the estimated economic advantage over patch cords becomes apparent when more than 24 fiber terminations are required. The disadvantage in using fiber cable is its limited cable count quantities. When placing fiber cables direct from FDF to NE, 2mm break outs shall be required and as always, the specific technologies diversification requirements need to be considered.
- 2) The second option is similar to option 1 which utilizes direct cable from the FDF to the NE but incorporates the use of a “Parking Lot Panel” (PLP). The PLP is used to store fibers that have been forecasted without terminating them. The PLP will be placed in or near the NE bay that will ultimately utilize them. Again, caution should be used not to over engineer the placement of fiber cable as this could result in stranded inventory.
- 3). The Third option, the use of an intermediate Fiber Termination Panel (FTP) between the FDF and the NE. An FTP would be placed in or near the NE therefore creating a termination point for pre-provisioned fibers. This will allow a short jumper concept between the FDF and the NE as short interval demand requires. Again, caution should be used not to over engineer the placement of fiber cable as this could result in stranded inventory.

Note: It needs to be made clear, that intermediate FTP’s are intended to be associated with, and cabled to, a specific NE. Intermediate FTP’s are not intended to be used as, nor are to be considered, a termination point between multiple NE’s. In other words, intermediate FTP’s should never be confused with a satellite distributing frame.

Caution: For some applications the use of an intermediate fiber termination panel is not recommended due to an

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increase of insertion loss as a result of additional termination points. The AT&T engineer shall verify that the technology being placed will not be adversely affected by the use of the FTP and its consequential insertion loss. An example of this would be FTTP application.

4.4.4. Placement of Fiber Termination Panels (FTP) and Parking Lot Panels (PLP)

Fiber Termination Panels (FTP's) are used as an intermediate termination point between the FDF and the NE. They are used for the purposes of short interval provisioning by the use of short jumpering concept by means of cable placement between the FDF and the FTP.

FTP's should be placed in one of two conditions.

1. The Network Equipment has significant interconnection shortfalls either using unique connectorization or non-standard jumper assemblies.
2. Where new short interval provisioning has been implemented, port for port assignment panels will be placed in adjacent breakout bays to reduce the time interval.

FTP's may be placed in the same bay as the NE equipment or may be placed in a breakout bay arrangement within the NE lineup.

Parking Lot Panels (PLP's) are used as a storage facility for un-terminated fiber when there are no electronics available in the NE to accept fiber termination. PLP's are primarily used for FTTx applications where additional insertion loss can not be tolerated. PLP's may be placed in the same bay as the intended NE or in close proximity. PLP's should be considered temporary, therefore, once all fiber has been terminated the PLP may be removed and reused in another location.

Breakout bays adjacent to Network Equipment can be placed in one of two conditions.

3. The Network Equipment has significant interconnection shortfalls either using unique connectorization or non-standard jumper assemblies.
4. Where new short interval provisioning has been implemented, port for port assignment panels will be placed in adjacent breakout bays to reduce the time interval.

A Breakout bay is comprised of 72-port panels that permit the fiber cable to be placed between that bay and the FOT located at the FDF. These panels are assigned one-for-one dedicated to the counts as shown on both the FOT and the Network Equipment. These panels will be interconnected with fiber optic jumpers from the face of the panel to the Network Equipment adapter interface. The fiber optic medium between the FOT panel in the FDF and the Breakout Bay panel may be either fiber cable or jumpers, whichever is more economically feasible. The appearance of the service on the FOT will be cross-connected to the other equipment or outside plant panel point on the Fiber Distributing Frame.

It must be emphasized that Fiber Protection Systems and fiber optic patch-cords will not traverse firewall partitions and floors. Future Fiber Protection Systems shall be provisioned between the 8'6" and 9'0" heights allowing for fiber patchcord/fiber jumper placements via SBC Local Exchange Carrier or SBC LOCAL EXCHANGE companies Approved Vendor personnel for service requests, orders and/or equipment installations for the standard 7-foot height of FDF bays.

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4.5. FDF Applicability, Types and Use

4.5.1. FDF Applicability

AT&T Central Offices/Outside Plant are sized based on one of four categories with a fifth version trump card (Constrained Offices) used to preclude the growth of the building structure simply for the needs of the FDF. These categories have been defined by Network Operations with regard to strategic network support, customer base, internal security, collocation concentration and a series of other factors. The summary listing is as follows:

Critical Category I Central Offices:

Critical Category I locations represent the absolute largest and most critical strategic offices within AT&T having both tandem switching or facility hub equipment in a large metropolitan area.

Category I Central Offices:

Category I denotes strategic Central Offices that have tandem switching or facility hub in large metropolitan areas.

Category II Central Offices:

All End Central Offices that are not tandem switching or facility hubs in large metropolitan areas supporting business and/or mixed business/residential areas.

Category III Central Offices:

Small Central Offices and CDOs that are not tandem switching or facility hubs but support predominately residential areas.

Category IV Outside Plant (SLC Hut/CEV-Cust. Premises):

Geographic supported end handoff locations for residential/business customers, IXC Carriers and termination points for F1 to F2/F3 cable facilities. This site may support collocation.

4.5.2. FDF Types

The AT&T LOCAL EXCHANGE companies standard FDF is the Generation II (SBFCM – LGX Style) covered in PAN 19995259, FDF and Fiber Optic Apparatus dated June 1999 and 19995259.0001 FMT Panels for the Central Office dated June 2002. OSP and Special Services panels are covered in the following PANs:

SBC-PAN-2004-3397, SBC FMT/FL-1/FL-2 Fiber optic panels and tails, Issued April 2004

SBC-PAN-2004-3396, SBC Utility Combination Demarcation Multimedia Panel (Wall & Shelf Mount) Issued April 2004.

PAN 19995259-0001/0002/0003 Series covers the original FMT/FL-1/FL-2 panels and trays (replaced by SBC-PAN-2004-3397), Issued June 2002.

These arrangements shall be used in all AT&T subsidiaries and affiliates as the normal standard for use.

4.5.3. FDF Use

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Fiber Distributing Frames are designed to be placed into equipment lineups within a Central Office/Outside Plant and may be up to 20 bays in a single lineup. Parallel lineups with either tie panels or inter-lineup bridges may be used to connect parallel lineups. The types of FDFs are as follows:

The **Generation I** is a low density Fiber Distributing Frame using a bay arrangement. This FDF has 24 to 48 fiber optic ports per panel and up to 11 panels per 7-foot high bay. **This FDF layout has been grandfathered and shall be capped with existing panels.** All new bays and panels will use the Generation II FDF equipment outlined in PAN 19995259 for AT&T LOCAL EXCHANGE companies, FDF and Fiber Optic Apparatus dated June 1999. This type of FDF can be modified to a Generation II type, refer to applicable drawings and M&P's. This FDF will fit in a standard frame relay rack as a Network bay having a 23-inch interior and 26-inch exterior width and a 15-inch depth.

The **Generation II** (SBFCM LGX Style) is a medium density Fiber Distributing Frame using a bay arrangement. This is the AT&T LOCAL EXCHANGE companies **STANDARD FOR USE.** This FDF has 72 (96 standard in AT&T East with the option for 96 in AT&T Midwest) fiber optic ports per panel and up to 9 panels per 7-foot high bay. This FDF will fit in a standard frame relay rack as a Network bay having a 23-inch interior and 26-inch exterior width and a 15-inch depth. This type of FDF may be grown to the end of the current lineup in any category Central Office or Outside Plant Location. Changes to Generation III should be made upon commencement of a new lineup or at such time that the location becomes constrained.

The **Next Generation** (NGF) is a High Density Fiber Distribution Frame (HD-FDF) that utilizes an innovative frame consisting of high –density port panels, which can be mounted into twelve Fiber Termination Block (FTB) mounting positions that are equally divided between vertical columns on the left and right side of the frame. This is a multi-trough frame that has front and rear access. **This frame is only available for use in the AT&T Midwest region.** This FDF will not fit in a standard frame relay rack. It will be required to fit within a large bay configuration having a 36" x 36" width and depth with actual dimensions of 30" wide by 24" deep.

The **Generation III** FDF is a High Density Fiber Distributing Frame (HD-FDF) that utilizes a new frame arrangement consisting of high-density 72-port panels located within a multi-trough high-density bay arrangement. AT&T LOCAL EXCHANGE companies NP&E has approved the Generation III frame for general use within Category 1 and Category 2 Central Offices, as well as any constrained Offices in any Category and Category IV Outside Plant Sites. This FDF will not fit in a standard frame relay rack. It will be required to fit within a large bay configuration having a 36" x 36" width and depth with actual dimensions of 30" wide by 24" deep.

4.6. FDF Panel Terminations & Placements

Terminating capacity of a Generation II FDF shall be limited to 72 fiber connectors per shelf with a maximum of 9 shelves per bay (96-terms per panel are grandfathered in AT&T East). The top shelf (9) in each bay will be reserved for special applications such as test access, administrative access, and passive devices such as WDM and fiber splitter applications. All passive devices will conform to the AT&T LOCAL EXCHANGE companies standard for the vertical Miscellaneous panel (12-slot module shelves) only. The Miscellaneous panel will be the only version permitted on the Generation II and Generation III FDF. The FDF is limited to a seven-foot environment and can have up to 20-bays in a single lineup. The FDF should be ordered to include storage of excess jumper slack between bays. The Generation II FDF uses a high-density trough system that permits the routing of fiber optic cross-connect jumpers of varied lengths to fit into the system without the need to custom fit or splice connectors. Both upper and lower troughs shall be used.

IMPORTANT NOTE: Excess fiber slack should not exceed 6-feet in length. In addition, the minimum fiber jumper length is 10 feet for any cross-connect jumpers.

The terminating capacity of a Generation III FDF is currently 72 ports per panel or may use three panels placed together in a three-pack for a combined total of 216 terminations, with a maximum potential of 20 panels per bay.

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In extremely small Central Offices, the first FDF bay can be used in a combination mode with the FOT panels on the bottom and the OSP panels on the top. Any growth beyond the first bay will require the existing pattern be carried out through out the lineup. If in doubt as to the growth of the office, then care should be used to place the frames in the normal arrangement of OSP-FOT-OSP-FOT.... See Section 10D.3 of this document for more details.

The Generation III FDF will have a different physical placement requirement of the lineup. The lineup must be in a suitable place to accommodate both front and rear access providing for a full 36-inches between parallel lineups on both front and rear. If a new lineup is started using the Generation III bays after an embedded Generation II (standard bay) arrangement is already in service, strive to place the new lineup adjacent to the Generation II lineup, or within the closest proximity. A transition bay from the NGF to the NG3 will be required to migrate from these two Generation III systems.

Do not intermix standard bay (Generation II) with large bay (Generation III) FDFs in the same lineup unless the office is considered Constrained. Even in this instance, exceptional care must be exercised to provide for transition end guards and fiber raceways in excess of the normal standard to compensate for transition choke points between these two types of frames.

The need for proper management in an FOT alternating OSP bay arrangement cannot be overstated to provide for a consistent layout of terminations. At such point that "O-O-O" or "O-E-O" cross-connect machines are commonly deployed, the terminations for these products will need to be dispersed in separate panels across the FDF in each FOT bay in a similar manner that a COSMIC copper frame would expect to have OE Grids distributed. The use and maintenance of the TAB/db system for assignments will be a critical resource in the future to properly manage the FDF frame assignments.

FDF layouts in the Central Office and Outside Plant sites will vary in size based upon the needs of business and the complexity of the existing office topology. The new Generation III FDF has three major components:

- The FOT bay used for Network Equipment and CLEC terminations
- The OSP bay used for Outside Plant cabling terminations
- The Miscellaneous bay used for additional slack storage, phone, drawer, etc.

It is expected that the FOT and OSP bays will alternate in placement in the same lineup with the Generation III Miscellaneous bay being placed in the forecasted center of the overall frame lineup. It is not anticipated to have more than one Miscellaneous bay per FDF lineup and will not be deemed necessary for bay arrangements less than 5 bays.

Assignments will be provisioned and managed by the Equipment Engineer through the TAB/dB system. Performance monitoring will be managed by the subtending Network Elements connecting to the FDF fiber optic cross-connect jumpers.

With each frame, insure that the correct panel and fiber tail orientation is considered. In the first quarter of 2002, AT&T LOCAL EXCHANGE companies began provisioning new switchroom space in a raised floor environment. This dictates that the cable orientation, left verses right, and the feed direction, match the route of cabling. With the raised floor arrangement, all fiber optic cabling will be bottom fed to network equipment and the FDF. The fiber raceway feeds from the bottom of the respective bays.

4.7. Fiber Optic Cross-Connect Jumpers

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A fiber optic jumper is defined as cross-connect or connection located at the FDF used to link or connect the OSP termination to the FOT termination. A fiber optic patch-cord is defined as the link or connection between the Network Element and the rear of the FOT shelf located in the FDF.

Fiber optic cross-connect jumpers shall be ordered in the near correct lengths in order to properly place the connection from the two fiber panels (OSP-FOT), (FOT-FOT), or (OSP-OSP) on Generation I FDF systems. **DO NOT PERMIT EXCESS CABLING TO BE ORDERED OVER 6 LINEAR FEET FOR ANY JUMPER.** On Generation II and beyond FDF systems, the fiber jumpers should be provided in 5-foot increments and should not be less than 10-feet for any one-jumper cross-connect. Sufficient storage is available on 72-96 panel fiber systems. The Generation III FDF jumpers should be provided in 5-foot increments and should not be less than 10-feet for any one-jumper cross-connect. Fiber optic jumpers shall be ordered from a Procurement approved manufacturer. Fiber cross-connect jumpers used for cross-connects should be provided by the Local Field Operations (LFO)/Network Operations. Fiber optic patch-cords for network element terminations should be ordered by the local equipment engineers. The local Equipment Engineer may elect to provide fiber cabling to Network Elements in lieu of fiber patchcords. Fiber cabling is strongly recommended for high use fiber optic Network Elements such as OC 192, Dense Wavelength Division Multiplexers and other high-speed product lines that have a significant density of fiber optic connectivity.

4.8. Fiber Optic Cross-Connect Patch Cords / Jumpers / Cables

Standards for approved fiber optic jumpers / patch cords / cables are referenced in ATT-E-00136-E.

5. Fiber Protection System (Raceways)

5.1. Intra-office Routing Diversity

The Fiber Protection System is rated as standard and represents a separate and unique fiber optic protection system used only for fiber optic patch-cords/fiber jumpers between transmission and switch equipment and the FDF. **Do not place fiber cable within the Fiber Protection Systems.** All equipment which uses fiber optic connectivity will hub to the FDF for all intraoffice connections. This protection system will provide both separation from all other cable racks and will provide a protection of the fiber optic patch-cords/fiber jumpers from installation activity in a Central Office. The protection system will provide both the separation from all other cable racks and will provide a protection of the fiber optic patch-cords from installation activity in a Central Office.

The protection system will provide the routing capability for the SONET ring paths for both primary and protect connections from the transport/switch equipment to the FDF. The fiber pairs will be cross-connected at the FDF to either OSP Facilities or to other intra-office equipment.

Diverse routing capability from the NE to the FDF for the primary and protect paths shall be required for high capacity services such as OC-192 or higher speeds. Diverse routing may be accomplished in two ways:

Example 1: By placing working and protect fiber patch cords on opposite sides of the same physical raceway (Similar to timing leads.)

Example 2: By placing working and protect fiber patch-cords in completely separate physical raceways.

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It is not necessary to add multiple raceways down the same lineup simply to achieve route diversity, thus a maximum of only one raceway path per lineup will be allowed. Route diversity will be achieved via main aisles, not line-ups.

NOTE: Once an ILEC high speed Optical Carrier system such as an OC-192, 10GigE its equivalent or higher speed system has been placed in the Central Office, diverse routing for connections between the high speed Optical Carrier and the FDF need to be accomplished via example 2 listed above. The Fiber Protection System for Optical Carrier speeds less than OC-192 or 10 GigE, can be accomplished by example 1 or 2.

The use of direct cabling from a Network Element interconnect bay within the same footprint of the manufacturers equipment or cabling to a specific lineup (satellite arrangement) to the FDF will not require diverse routing.

The Protection System should be provided to within 2 inches of the Fiber Distributing Frame (FDF) and located to the adjacent vertical trough and at the same level horizontally as the transport/switching equipment termination point on the primary and protect routes. The work and protect patch cords will be routed differently through a parallel Fiber Protection System to the FDF. Fiber optic cable placements within the Central Office will adhere to merged practice standards as outlined in BSP 800-003-150MP and fiber raceways will adhere to SBC-002-316-053, Fiber Raceway Provisioning M&P The AT&T LOCAL EXCHANGE companies Standard Drawing is SBC-C-50001-E-00. **Fiber optic cables will not be placed in the raceway/duct work of the Fiber Protection System. Fiber Protection System and fiber optic patch cords will not traverse fire wall or ceiling penetrations. Fiber optic patch cords shall not be placed in metallic conduit and run between floors. The Tensil strength of fiber optic patch cords is such that it would not allow for such activity without potential damage to the patch cord itself.**

5.2. Fiber Raceway Topology

The FDF shall be the primary hub for the AT&T LOCAL EXCHANGE companies Central Office fiber optic facilities. The Fiber Protection System will be the primary tool for fiber optic cabling on each floor, but not between floors. The FDF will be treated as the common cable entrance and cross-connect point. When there is a need for Optical Carrier cabling to equipment on another floor, a tie cable will be terminated in a shelf on the FDF and will be directly terminated on a new satellite FDF bay on that other floor using an OSP shelf. The Fiber Protection System will be extended from the FDFs to the equipment involved. With the deployment of high capacity Optical Carrier systems such as OC-192/10 GigE and higher to the Fiber Distributing Frame, it is strongly recommended that any FDF that has the forecast to provision OC-192 and or 10GigE services within the next 5 years should have primary raceway routes from the optical multiplexers to the FDF provisioned or reinforced with 12" wide Fiber Protection System troughs. In addition, the Fiber Protection System over the FDF should have 12" wide horizontal troughs and 4" wide vertical troughs as a minimum throughout its length.

Do not permit parch cord buildup within the Fiber Protection System to exceed 2-inches in depth at any point. **The minimum trough size is 4-inches. The use of 2-inch FPS in a horizontal configuration for optical feeds is prohibited.**

6. Optical Patch Panels

6.1. Older LUSCIE/LUSCIU Type Panels

The optical patch panel (typically an interconnect panel) was intended to be used where a small number of fibers would be terminated. These panels, mounted in standard relay racks, are typically configured as an "interconnect" system in

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which only the Outside Plant fiber appears at a connector on the panel. A Fiber Optic Terminal “cables” to the OSP connection with an Optical Carrier patch-cord, run in a fiber protection system, from the FOT bay to the bay containing the optical patch panel. The interconnect panel is not specifically designed as a cross-connect point using fiber jumpers. It has limited devices for managing excess jumper slack or to prevent micro bending of the jumpers. Interconnect panels such as a stand-alone LUSCIE panel shall not be installed in the Central Office. Older interconnect panels should have the fiber cable rolled (transferred) to the FDF at the first opportunity and it is mandatory at such time that the first OC-192 or higher speed system is deployed in the Central Office.

6.2. Miscellaneous Panels

Single Mode fiber optic splitters may be used as a service termination panel and will be placed within the Central Office Fiber Distributing Frame or on the customer’s premises as the fiber optic demarcation point. These units may be used as the demarcation point for the regulated service, a handoff point for a Certified Local Exchange Company (CLEC) at a Point of Termination (POT). Where CLECs have a POTless termination, there will not be splitters placed on the fiber strands at either the FDF or the CLEC. For dark fiber circuit provisioning, SingleMode fiber splitters may be placed at the “A” and “Z” termination points of the circuit.

Optical splitters are SingleMode optical glass devices used to distribute fiber optic signals to multiple fiber optic output locations. Optical splitters produce output signals in varying combinations. The most common SingleMode splitters provide a 90/10 or a 50/50 percent split of the input signal intensity. The AT&T Local Exchange companies has specified enhanced performance characteristics on approved for use SingleMode units that are expected to operate successfully on services up to OC-192/10 GigE. Optical splitters and associated connector hardware are used to provide a near non-intrusive test/monitor location for optical signals. MultiMode splitters are not available or offered.

In addition, Wavelength Division Multiplexing (WDM) modules may be used within the same miscellaneous termination panel. This equipment is covered in more depth, ATT-TELCO-IS-002-316-026, SingleMode Passive WDM M&P, Issue 3, dated November 2001.

Warning: Fiber optic splitters do not currently fit into the old NGF design of the FDF used in AT&T Midwest. Another standard LGX type bay or new Generation III NG3 bay (preferred) will need to be ordered.

Traditionally these would be located at the FDF or a customer premises. The long term strategy for fiber test access will be to use an integrated test vehicle located at the FDF, which will provide for automated and remote testing and sectionalization of the entire optical path. The future system will mitigate the need for mass deployment of SingleMode fiber optic splitters. Multi-mode splitters are not approved or suitable in the AT&T Local Exchange Carrier network.

A maximum of three splitter devices is the recommended overall network design on any unidirectional transmission path between optical termination equipment even if it traverses multiple offices, two is standard. This will include a maximum of one in a Central Office location for each optical transmission path. If span loss design will not support two splitters, then one is required at the customer optical demarc. This will limit the optical signal loss introduced by these devices into the network while allowing appropriate non-intrusive access points for trouble isolation and testing. Span Design Engineering will be responsible for identifying the total loss budget for the span and determining if splitter devices would be applicable for the optical circuit design. The total loss budget will include the span loss plus the splitter loss. In the central office optical splitters generically terminate in vertical module Generation II or III type frames. The splitters are designed to fit the miscellaneous shelves located at the top shelf of the primary Fiber Distribution Frame within the CO or at a customer premises.

For optical facilities with transmission speeds of OC-48 or higher, the use of fiber optic terminators are required. These fiber optic terminators are to be placed on all unterminated ports of splitters that are in use with these transmission speeds in order to reduce the negative effects of optical signal reflectance. It is recommended to place these terminat-

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ors on all non-terminated ports of these splitters when they are not connected with a fiber jumper. In any case, any active signal, regardless of transmission speed or capacity, should have the end caps placed on all non-terminated access points in the circuit.

Recommended applications are as follows:

- OC-n/Fiber Distributed Data Interface (FDDI), Broadband Circuit Service (BCS) and ReliaNet service handoffs to customer owned equipment. The splitter will be used as a monitoring, testing and point of demarcation.
- Intra-office OC-n connectivity between Network Elements that have no SONET layer interoperability. An example would be an ATM OC-Nc interface that points into our optical network.
- Optical interface points at Inter-nodal Links (INL) for non-intrusive testing and monitoring at the ATM layer.
- Optical interface points at Network Elements/equipment located at both the Central Office and/or the customer premises that does not have organic test access at the optical level within the footprint of the products.
- Physical collocation handoffs in accordance with FCC and State Regulatory action.
- Demarcation points for SingleMode fiber optic handoffs, both loop and interoffice.
- Placement of optical splitters in the Central Office will be the Fiber Distribution Frame (FDF) except when the CLEC has requested a Point of Termination (POT) where it will be placed at the end of the fiber jumper handoff at the CLEC collocation area.
- All other applications would be considered as non-standard.

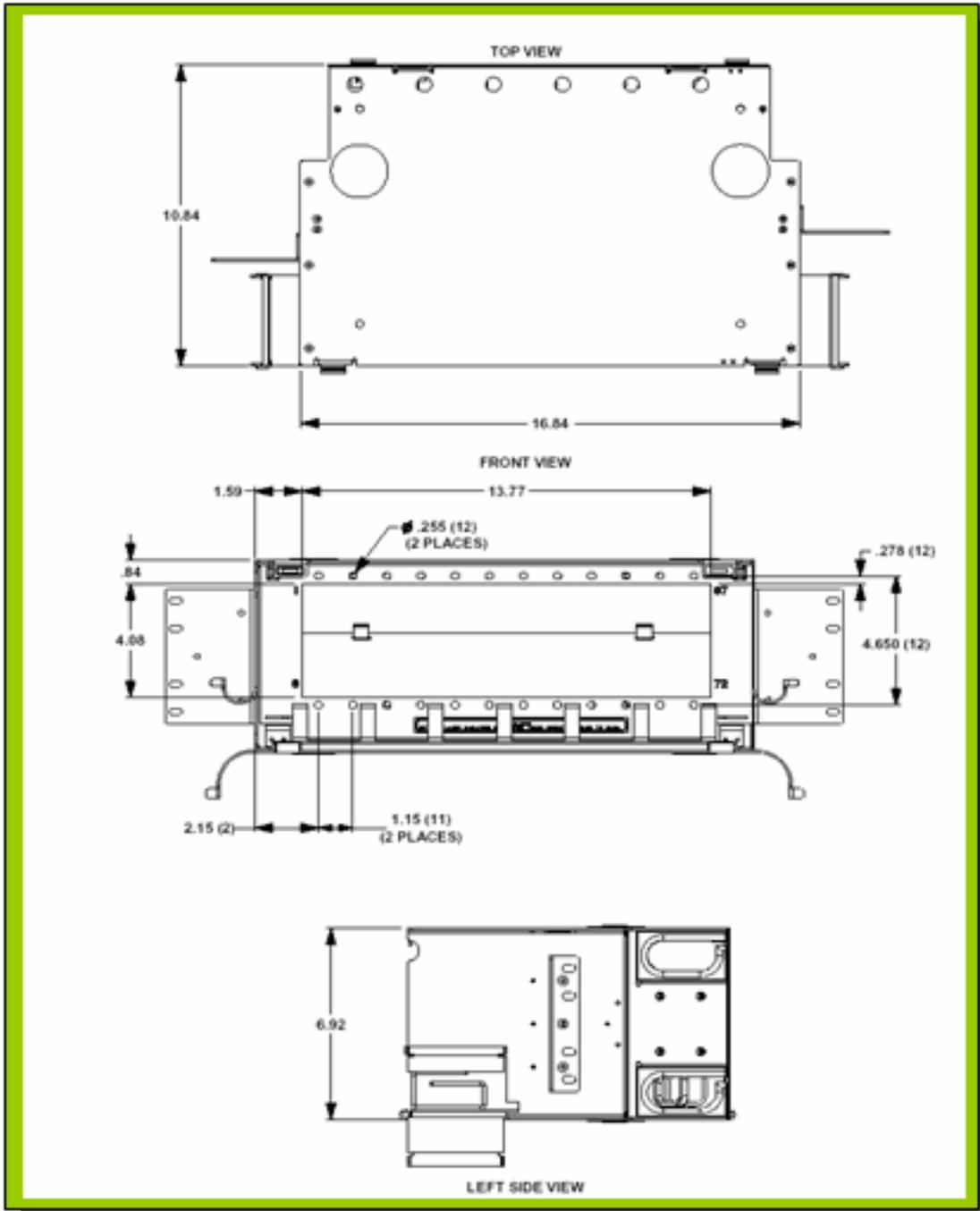
Refer to Infrastructure Deployment Guidelines, Transport, Tab 4, Fiber Distributing Frames, dated June 2004 and ATT-TELCO-IS-002-316-011, SingleMode Fiber Optic Splitter M&P, dated May 2004.

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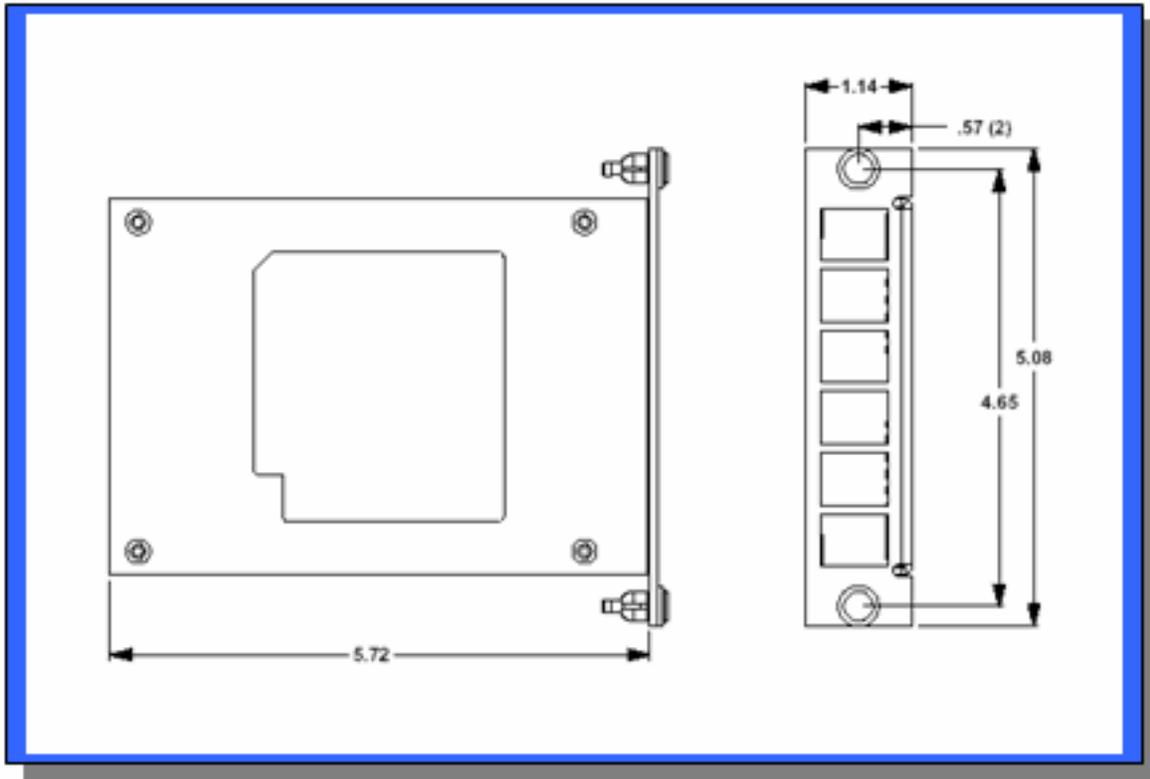
Drawing of the standard Miscellaneous panel approved for use in AT&T.

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Drawing of the Miscellaneous Module Plug-In Design.

6.3. Generation III (NG3) Panels

The Next Generation III (NG3) panels manufactured by ADC Telecommunications meet the requirements of AT&T and Telcordia GR-449-CORE, Issue 2, date Jan 2003 for the new Generation III type of Fiber Distributing Frames. This new panel uses a high capacity arrangement in half the space that a standard Generation II type of panel uses. This panel is front mounted and can be installed in the Generation III Large frame bay.

Special fiber arrangements using the NG3 panels for Network Equipment are covered in SBC-PAN-2003-3148 issued in Jan 2003. This includes outside plant arrangements or in a new NG3 bay (large footprint) for Central Office use, but not in an existing Generation II bay.

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Illustration of the Generation III panels in the closed configuration

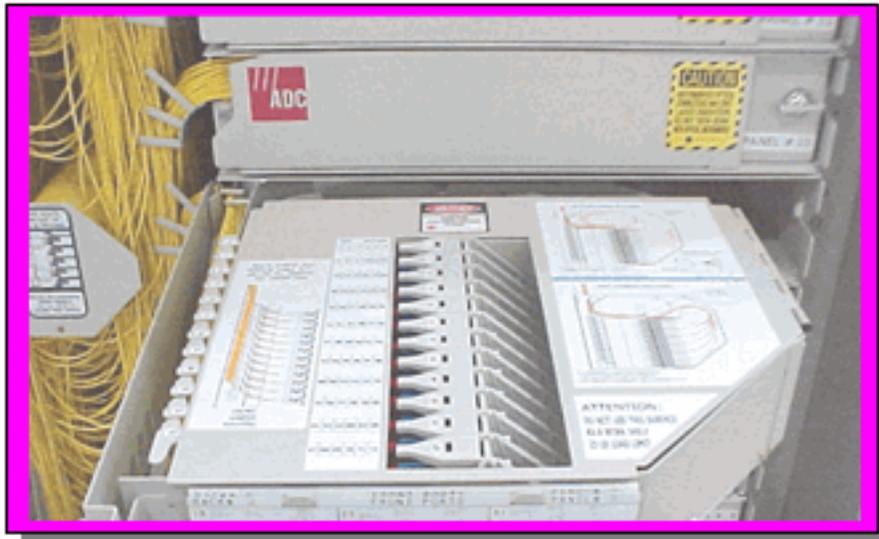


Illustration of the NG3 panel in the open configuration fully loaded.

6.4. NG3 to NGF Compatibility Arrangements

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6.4.1. Bay Interconnection

Existing lineups of the older NGF type of FDFs located in AT&T Midwest will be required to order a transition part to convert the end of the bay to mate with the new NG3 Generation III style FDF. Once converted, do not convert back to the NGF, each conversion part adds 6-inches to the lineup length.

6.4.2. Panel Use

The cluster panels used on the NGF FDF will not work on the new NG3 Generation III FDF. If you have an old supply of FOT or OSP cluster panels for the NGF, the Outside Plant or Equipment Engineer will need to return these panels when the new NG3 style frame is deployed. The NG3 panels are backward compatible to the Generation II LGX style of FDF but will not work with on the NGF. .The bottom line: ADC Telecommunications Generation III panels will only fit into their respective Generation III Fiber Distributing Frames. Do not intermix these panels and bays.

7. Optical Terminations/Connectors

7.1. Overview

The use of fusion splices is rated as standard. **Mechanical splices will only be permitted on an exception basis for the immediate service restoration of damaged facilities. Mechanical splices will not remain in place for any longer than 30 days before conversion to a fusion splice.** Biconic splices shall not be used for new fiber optic services. Biconic connectors may not meet the technical specifications necessary for optical transmission of OC-48 and higher services. Existing optical signals and spare fiber terminations with Biconic termination connectors must be replaced at the first opportunity or activity associated with that facility or there is forecasted deployment of OC-192/10 GigE or higher speed services within that location within the next five years.

The standard termination in the Central Office for all AT&T Regions is the **SingleMode SC-UPC connector**. Effective August 1, 2001, the standard termination for AT&T Southwest was changed to the SingleMode SC-UPC connector on a going-forward basis, refer to FLASH-2001-015, dated Jun 2001. The embedded base of ST-UPC connectors will still be supported for the foreseeable future but all new panels will have the SC-UPC connectors. These connector uses will be handled as standard within the respective Local Exchange Companies for all fiber optic provisioned services (Asynchronous, OC3, OC3C, OC12, OC48, OC192, OC-192C, WDM, DWDM, CWDM, FTM, 1 Gigabit, 10 Gigabit and any other fiber optic speeds not listed). Effective October, 3rd, 2005, **Biconic** Termination Connectors were manufacture discontinued and should not be used for any high speed services (OC-48 low-power). Future cabling should be reterminated with the standard connector in the existing LUSCIE panel or transition the cable to an FDF panel.

If a manufacturer's Network Equipment platform requires a special miniature form factor connector; AT&T LOCAL EXCHANGE companies has approved the use of the SingleMode LC-UPC connector for Network Element backplane connections only, not the FDF.

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If a manufacturer's Network Equipment platform requires an angled connector; AT&T LOCAL EXCHANGE companies has approved the use of the SingleMode SC-APC (Angled Polished Connector) connector as specified in SBC-E-00136-E, Fiber Patch Cords, Fiber Cable and Fiber Attenuators/Buildouts.

All other connections for the fiber connectivity of the circuits and facilities will be with the SC-UPC connector/mode in the Central Office unless modified by the AT&T Fiber Optic Connector/Mode Policy.

7.2. Attenuators

Attenuators are placed at the Fiber Distributing Frame (FDF) panel supporting the Network Element. FOT and OSP panels in the FDF normally are ordered with a 0-dB (or no) attenuation. Attenuators are not to be placed at any place in the network except the Fiber Distributing Frame; this includes both bulkhead and inline attenuators, unless they are placed within the system equipment footprint connecting one piece of equipment with another in the same bay. Do not place attenuators at the faceplate of any network equipment; use a termination panel for this purpose! The connector may be changed in the FDF and replaced with the proper attenuator in the connector socket to pad the signal in 5-dB increments. Inline attenuators are rated as standard for use and will be placed to pad the signal and shall only be placed between the FOT panel and the fiber jumper. Never place an attenuator between two fiber optic jumpers in the Fiber Protection System (yellow raceway) or the FDF troughs, but in the FOT panel itself. Attenuators should not be placed on the Network Element equipment side of the fiber optic patch-cord except under unusual circumstances where the fiber connections are secured from incidental hazards and potential service outages. Bulkhead attenuators may be used for up to (low power-not multiplexed) OC-48 (2.5 Mbps) speed services, but not for services at (high power) OC-48 or higher speeds and power levels per SBC-NOT-000-000-473, SBC Optical In-Line Attenuator Standard, Issue 1, dated June 2002. The Inline attenuators are recommended on a going-forward basis for any attenuated fiber signal. Bulkhead attenuators are not recommended to be used on a going-forward basis due to their less-than-optimum performance criteria.

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Service Type	Not Multiplexed	Multiplexed with WDM, DWDM, CWDM, etc
OC-1	In-Line Optional*	In-Line Required**
OC-3	In-Line Optional	In-Line Required
OC-3C	In-Line Optional	In-Line Required
OC-12	In-Line Optional	In-Line Required
OC-48 (Low Power)	In-Line Optional	In-Line Required
OC-48 (High Power)	In-Line Required	In-Line Required
OC-192/192c	In-Line Required	In-Line Required
OC-768	In-Line Required	In-Line Required
1 Gigabit	In-Line Required	In-Line Required
10 Gigabit	In-Line Required	In-Line Required
Encapsulated subrate	In-Line Required	In-Line Required
Optical Media Converter	In-Line Required	In-Line Required
LAN circuit (T1, T3)		

* Inline attenuators will be the long-term best value with higher capacity services.

** Where Inline attenuators are required, the use of Bulkhead attenuators are not permitted in this application.

7.3. Care & Cautions

1. First and foremost, it is extremely critical that all technicians working on fiber optic technology take proper precautions with regard to laser transmissions that will be concentrated and directed toward the working employee. **Do not expose eyes to this optical transmission and insure that all end caps and/or terminators are properly placed on FDF ports.**
2. Measure the power level of the combined signal (understand that the power level of each channel is additive to the combined signal.) Most fiber optic transmissions operate in the negative (-) dB range, but with newer fiber optic technologies, especially with long reach transmitters, the potential exists to have a positive (+) dB power level.
3. Expect the actual measured power level loss to be 3-dB when traversing each combined path. Insure that your calculations account for this in your optical loss budget.
4. Based upon recent Telcordia Technologies findings, cleaning the ends of the fiber connections is the normal expected process before service is placed on the fiber connections. Burnishing represents the more in-depth follow-up process of making the fiber end shiny or lustrous, especially after rubbing or used to smooth the surface or turning an edge (most AT&T employees do not have this capability.) Burnishing is different than the Wet or Dry cleaning process. With the advent of new higher power services, this method must be modified per the following table:

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When to Clean/Burnish Fiber Optic Terminations

Power Level	Clean/Burnish	Impact
< + 15 dB*	Yes / Yes	Cleaning will have no effect on the fiber termination
+ 15 to + 29 dB	Yes / Exception Basis	Cleaning is okay, burnish thorough evaluation must be made to insure there are no working alternatives and the end must be cleaned in order for the service to work adequately
+ 30 dB or greater	Exception Basis / No	Clean on an exception basis. No burnishing. This high power level will cause the burnished end to seriously degrade and fail

5. Refer to ATT-TP-76461, Fiber optic Connector Cleaning, Issue 3, dated May, 2004 covers this material in depth.

* Single fiber optic transmissions are typically in the -10 to -20 dB power level range. With the advent of combined wavelength technologies such as WDM, CWDM and DWDM, the combined power level may rise to the positive power level readings, since power levels are additive when optical signals are combined.

8. DWDM, FTM, CWDM, WDM and Optical Splitter Deployments

Dense Wave Division Multiplexing (DWDM), Wavelength Division Multiplexing (WDM), Optical Frequency Division Multiplexing (FDM), Coarse Wave Division Multiplexing (CWDM), optical amplifiers and optical splitters will be terminated at the primary Fiber Distributing Frame in either dedicated Fiber Optic Terminal panels or Miscellaneous panels. Insure that these panels are placed at the top of OSP and FOT bays in the top (ninth) slot for Generation II or the top two (19th and 20th) slots for Generation III FDFs. Manufacturers that do not manufacture vertical modules that will fit the miscellaneous style panels will not be permitted to terminate within the FDF structure.

All fiber optic cabling between one Network Element and another or to OSP fiber cable will be cross connected through the FDF Frame. Only fiber cabling within the same Network Element footprint space may be direct cabled.

Example: Fiber connectivity between bays within a Tellabs 5500 DCS. If the DCS in this example requires fiber interconnectivity outside the DCS, all cabling would be through the FDF. Refer to Infrastructure Deployment Guidelines (Transport) Tabs 4, 12 and 13 for further details.

The DWDM system standardized by AT&T dictates the use of a special MTP/MPO cable to an adjacent ADC fiber interconnect bay. Both of these bays will be a part of the manufacturers Network Equipment. The interconnection bay will convert the MTP/MPO cable to standard SC-UPC connectors and will then be cabled to the FDF for termination. Any circuits or facilities will be cross-connected at the FDF only, not at the interconnect bay.

9. FDF System Management

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The Fiber Administration System (FAS) development has been supplanted by AT&T LOCAL EXCHANGE companies internal development effort as a part of TAB/db. This effort will work to accomplish the following tasks, see Section 12 for more details:

1. Capacity Management Tool
2. Project Management Tool
3. Transport Build Efficiency Routing Process
4. Integrates the Wire Center Forecast (WCF)
5. Determination of Connector and Cable Termination Types

The orientation is to provide support to the Transport Equipment Engineer (NP&E) groups for the provisioning of bays and panels. The TAB/db inventory system is being enhanced to cover the dedication of cable assignments on FDF panels. TAB/db will not provide circuit level assignment reference points or jumper cross-connect routes.

10. FDF Planning Guidelines

10.1. Primary FDF

1. A new Central Office/OSP location has been constructed.
2. New fiber cable is to be placed in the Central Office.
3. When Central Office rearrangements or other type activities occur that will affect floor space.
4. Older technology or Manufacture Discontinued FOT equipment must be upgraded, such as the migration off older fiber interconnection arrangements (such as a LUSCIU and/or LUSCIE panel).
5. Cable activity causes rearrangements, cable throws, or services that require fiber connectors to be changed and upgraded.
6. Collocation fiber optic requests initiated in support of the Certified Local Exchange Carrier's service requirements.

10.2. Satellite FDF

Consideration for the addition of a Satellite FDF shall be when:

1. A new floor, different from the floor where the primary FDF is located within the Central Office.
2. The new location for fiber optic relay rack terminations is separated by a firewall, floor or ceiling away from the primary FDF.

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3. Use fiber cabling between the Satellite FDF and the Primary FDF instead of fiber jumpers.

10.3. Fiber Protection System

Consideration for transition to larger 12-inch wide fiber protection raceway troughs:

1. A new Central Office/OSP location is deployed.
2. An OC-192/GigaMAN with 10 Gigabit option (!0 Gigabet) or larger is forecast for deployment within 5 years.
3. The office does not have diverse routing for the raceway.
4. Deployment of fiber based technologies occurs in areas within the Central Office separate from the exiting fiber based technologies thus creating the need for fiber links between the areas.
5. Do not use the Fiber Protection System and fiber jumpers through firewalls or floors. Use fiber cable.

10.4. High Density (Generation III) FDF

10.4.1. New High Density Standard

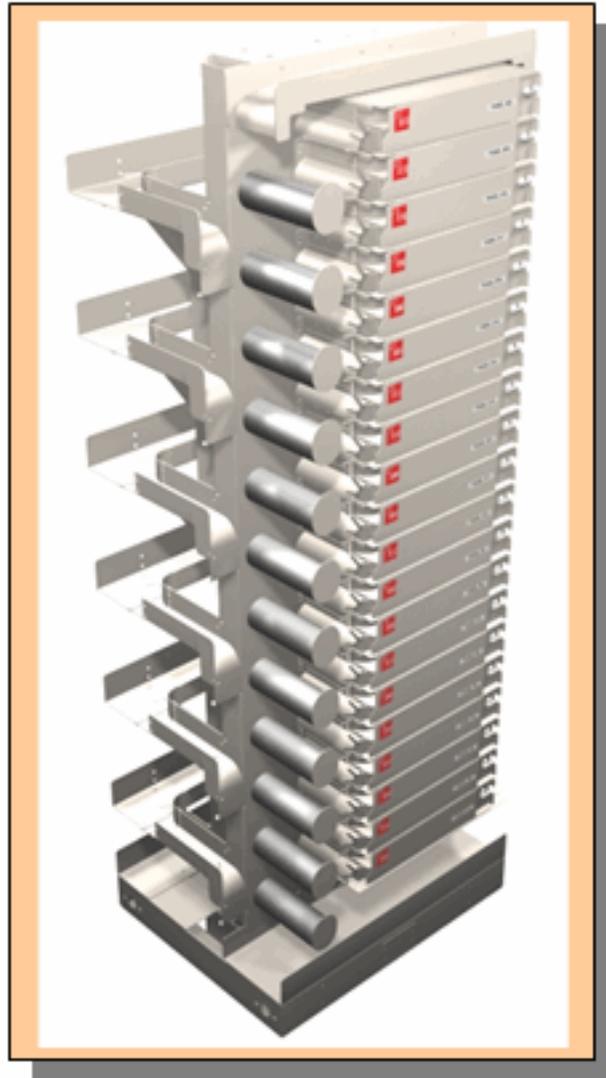
The picture below displays the front face of the new Generation III NG3 bay loaded with twenty empty 72-port panels. From the six rear troughs, optic cross-connect jumpers are run through the front to rear trough to reach the slack storage mounted in each bay. All jumper feeds will made on the left side as seen from the front.

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Up to twenty panels may be placed in each NG3 bay doubling the capacity over the Generation II (LGX) style FDFs currently in use.

The top two panel sections (slots 19 and 20) may be displaced providing for the placement of tie panels or miscellaneous panels for passive multiplexing in accordance with the Miscellaneous shelf standards.

Each shelf opens to the left to a full 90° degrees in order to permit ready access and provide for the maximum passive optical protection for our personnel.

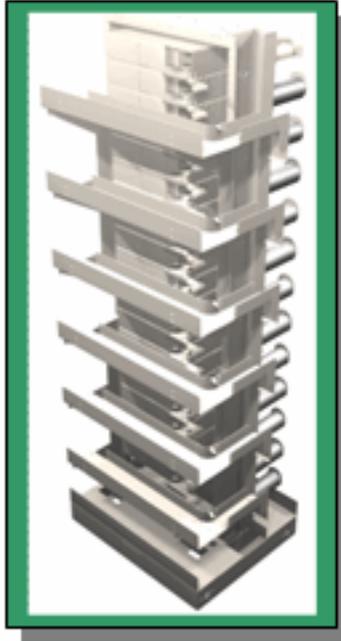
The picture below displays the rear of the new Generation III NG3 FDF for use by AT&T As can be seen in this arrangement, the bay provides for six rear troughs that interconnect with adjacent bays in the common lineup. These troughs will mate with the embedded NGF bays (with an adapter piece) that are used in AT&T Midwest region.

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Each panel is rear fed by fiber cables and/or jumpers to provide either OSP cabling or Network Equipment. The top panel must have at least 10-inches of space at the front of the bay since the panel opens forward and above the panel.

10.4.2. Layout

Generation III bays have the physical dimensions of 84-inches high x 24-inches deep x 30-inches across, each bay having their own built-in spacers within this space. This dictates that the bay must fit within the large bay arrangement for Space Planning purposes. The FDF needs to be placed in a logical location within the site to provide simplified and least cost access from cable vaults and Network Equipment locations. Locations for consideration would be space between columns in a Central Office or in locations near BDFB placements (since they dictate the same space and aisle considerations).

The Generation III FDF lineup can have as many as twenty bays. This footprint may have up to four parallel lineups of twenty bays each. The lineups may either be connected via tie panels or fiber bridges (preferred) to facilitate cross-connect interoperability.

The physical placement of the lineup must accommodate both front and rear access providing of a full 36-inches between parallel lineups on both front and rear. If a new lineup is started using the Generation III bays after an embedded Generation II (standard bay) arrangement is already in service, strive to place the new lineup adjacent to the Generation II lineup, or within the closest proximity. A transition bay from the Generation II FDF to the NG3 FDF will be required to migrate these two systems if the new NG3 FDF is placed directly adjacent to the existing Generation II FDF.

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It is not recommended to intermix standard bay (Generation II) with large bay (Generation III) FDFs in the same lineup unless the office is considered Constrained. Even in this instance, exceptional care must be exercised to provide for transition end guards and fiber raceways in excess of the normal standard to compensate for transition choke points between these two types of frames.

The long-term outlook with the deployment of BPON FTTH/FTTB will transition the FDF into the new standard cross-connect frame of the future supplanting the functionality of the existing copper main frames. The need for proper management in an FOT alternating OSP bay arrangement cannot be overstated to provide for a consistent layout of terminations. At such point that "O-O-O" or "O-E-O" cross-connect machines are commonly deployed, the terminations for these products will need to be dispersed in separate panels across the FDF in each FOT bay in a similar manner that a COSMIC copper frame would expect to have OE grids distributed. The use and maintenance of the TAB/db system for assignments will be a critical resource in the future to properly manage the FDF frame assignments.

10.4.3. FDF Arrangements

FDF layouts in the Central Office and Outside Plant sites will vary in size based upon the needs of business and the complexity of the existing office topology. The new Generation III FDF has three major components:

- The FOT bay used for Network Equipment and CLEC terminations
- The OSP bay used for Outside Plant cabling terminations
- The Miscellaneous bay used for additional slack storage, phone, drawer, etc.

It is expected that the FOT and OSP bays will alternate in placement in the same lineup with the Miscellaneous bay being placed in the forecasted center of the overall frame lineup. It is not anticipated to have more than one Miscellaneous bay per FDF lineup and will not be deemed necessary for bay arrangements of less than 5 bays.

10.5. Raceway Downspout/Turndown Provisioning

Turndowns used on the existing fiber optic raceways (FiberGuide) will use snap-on "Express Exit Unit" 2"x2" waterfall parts shown below (do not use the old generation cut-in downspouts) for Generation II style frames:

ADC Manufacturer Part Number	AT&T PID - Generation II Type FDF	Supporting Drawing Documents
FGS-MEXP-A/B/F	301041026	ATT-C-500001-E-00

Turndowns used on the existing or new fiber optic raceways (FiberGuide) will use snap-on "Express Exit Unit" 4" x 6" waterfall parts for Generation III style frames. Do not use the 2" x2" type of the Generation II FDF systems (shown above) or the old generation cut-in downspouts due to congestion.

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ADC Manufacturer Part Number	AT&T PID - Generation III Type FDF	Supporting Drawing Documents
FGS-MEXP-E-A/B/F	301071379	ATT-C-500001-E-00

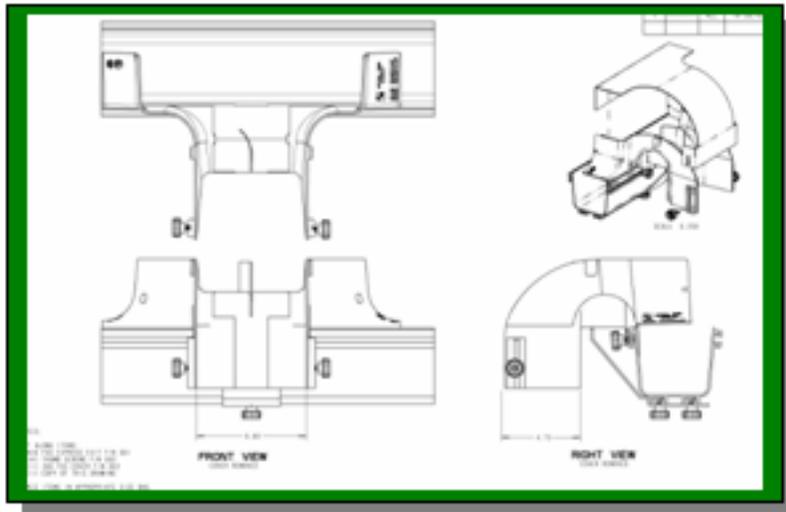


Illustration of Express Exit

10.6. FDF Fiber Bridges

FDF fiber bridges are simply adjustable cross-aisle trough systems that connect to the top level of a Generation II horizontal trough or a Generation III system that connects from the top horizontal pathway of the NG3 frame system. This product has been approved under ATT-TELCO-PAN-COMMONSYSTEMS-2006-0014, FDF Fiber Optic Cross-Aisle Bridge, Current Issue. The placement of bridges should be made at regular intervals, normally at every fifth bay in the lineup when multiple parallel bay lineups are used. Do not place bridges at the end of FDF lineups.

For safety sake, insure that rolling ladders are restricted from the area where the fiber bridges are in place. The purchase of rolling 6-foot floor ladders will be warranted in this case. **In addition, do not place string aisle lighting or other racking materials within 6-inches of the bridge components in order to provide the proper clearances for materials and adequate human factors access for technicians.**

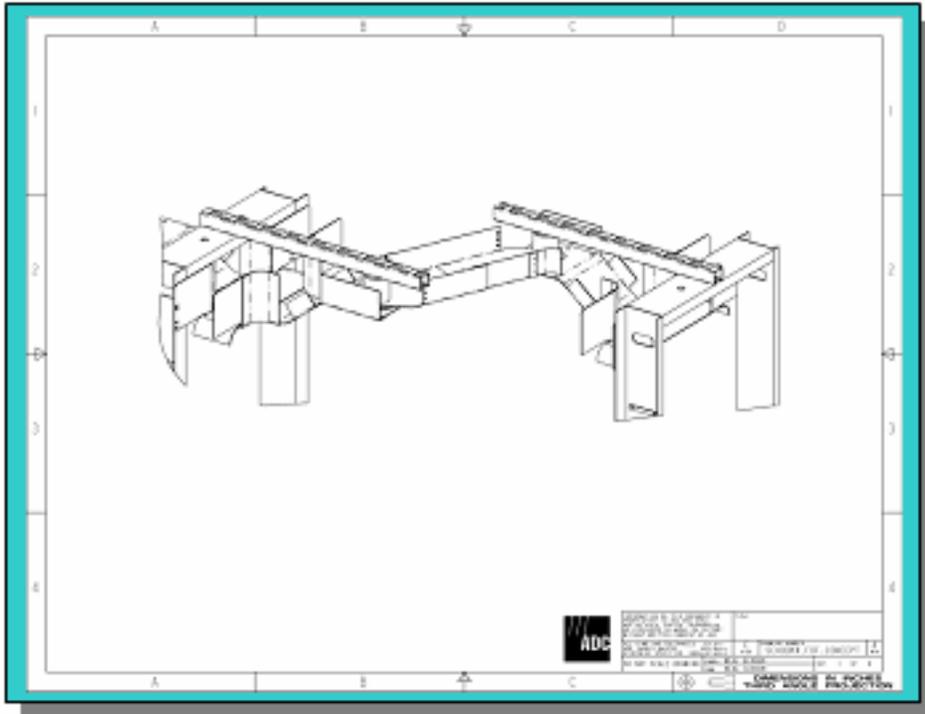
Fiber bridges can be used between multiple parallel lineups through the same bay. Recognize that the utilization of the top slots will be restricted for rapid egress of fiber jumpers and will require the displacement of the top three panels (18 through 20) in the Generation III (NG3 style) FDF bay where the bridge is located and will typically be placed in a Miscellaneous bay. The top two panels will be displaced on the Generation II (LGX style) FDF bay.

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Illustrative drawing of a fiber optic bridge placed across an aisle between two parallel FDF lineups.

10.7. NG3 Miscellaneous Bay

The NG3 Miscellaneous bay is expected to perform several functions:

- Phone communication
- Working tabletop drawer
- Fiber jumper storage for significant over-runs
- Fiber bridge interface to adjacent lineups
- Available top half for miscellaneous WDM optical splitters and tie panels (if used)

It is expected that the FOT and OSP bays will alternate in placement in the same lineup with the Miscellaneous bay being placed in the forecasted center of the overall frame lineup. It is not anticipated to have more than one Miscellaneous bay per FDF and will not be deemed necessary for bay arrangements of less than 5 bays.

Do not place the Miscellaneous bay at the end of a lineup.

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10.8. Other Fiber Splice Arrangements

10.8.1. Ancillary Splice Housings within the FDF

A stand-alone ancillary fiber termination or splice housing may be placed in the Generation II or Generation III FDF, yet it is not recommended. The best choice will be to use an OSP panel that has tails/stubs pre-provisioned in a "three-on-a-stick format". This arrangement provides a 216-strand tail for termination at the cable head or vault and slits within the cable to three 72-strand cables that connect to three OSP panels placed together within the same FDF bay.

10.8.2. Outside Plant Arrangements including FDF OSP Panel Tail and Stubs

Fiber optic cables that terminate on FDF OSP panels must be approved by the NP&E Common Systems group prior to use. The current standard only permits the use of cabling provided by ADC Telecommunications which are manufactured specifically for these panels. The Generation III panels will only accommodate the specific manufacturer's products and cannot be substituted by another manufacturer. Generation II OSP panels have approved panels with tails and tails/stubs that may be ordered independently from the same manufacturer to properly terminate on the panel. (See reference Section for PANs). Depending upon the needs or regulatory environment, these tails/stubs using indoor/outdoor cable may be terminated either at the cable vault or the first manhole away from the Central Office.

OSP terminations and panels that terminate within relay racks are covered by this document. Fiber optic cables and splice housings that do not terminate within these bays will be covered in other Outside Plant documents that discuss splice housings. For outside arrangements, a series of PANs have been issued that provide for front slide shelf access for both jumper and cabling in tight, constricted areas. Refer to the following PANs for further information:

PAN 19995259 Frame (FDF) and Fiber Apparatus, Issued June 1999
PAN 19995259.001 FMT Panels Approval For Use, Issued June 2002
PAN 19995259.002 OSP Panels w/ Tails/Stubs Approval for Use, June 2002
PAN 20021012 Fiber Management Tray for OSP, June 2002
SBC-PAN-2003-3148 Special Fiber Bay Approval for Use, Issued Jan 2003
SBC-PAN-2003-3146 Fiber optic Bridges for the FDF, Issued June 2003

10.9. Special Fiber Bay Arrangements

Due to the unique requirements for some Network Equipment fiber placements and the need to use especially tight fiber management arrangements within the same footprint of this equipment, AT&T has developed new panels and bays to support these arrangements. It should be noted that these PANs provide panels and ancillary apparatus that will not be used in the Central Office FDF. Refer to the following PANs for further information:

PAN 20021030 Fiber Breakout Bay PAN for the Nortel OPTera Connect DX Platform, Issued Apr 2002

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SBC-PAN-2003-3148 Special Fiber Bay Approval for Use, Issued Jan 2003

In addition, fiber jumpers may be placed within the trough systems developed for Ethernet Distributing Frames (EDF) covered in the following PAN:

SBC-PAN-2003-3161 Optical and Electrical Ethernet Products, Issued Mar 20

10.10. Contracts and Financials

Per AT&T Product Approval Notices (PANs) listed in the reference section of this document and the approval of the Common Systems-Cross Functional Sourcing Team (CS-CFST), ADC Telecommunications is the standard manufacturer for Fiber Distributing Frames. The ADC product (Generation II and III), Frames, fiber panels and their associated tails and Fiber Protection Systems are rated standard. Any substitution of product from established standards will require a One-Time Approval through the appropriate AT&T Services NP&E corporate engineering staff. All products listed in the referenced PANs are baseline funded at this time and are referenced in Section 13 of this document.

10.11. Building Blocks

AT&T Building Blocks have been established for the installation of Fiber Distributing Frames in the Central Office. These can be found internally and externally within <http://woodduck> (transport build). The Generation II FDF is standard for use. As discussed earlier in this document, the Generation III FDF is also approved for use, reference transport building blocks D13-D16 for this application.

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D01	FDF/OSP Combination Bay w/o Panels
D02	FDF Bay w/Panels (w/o Tails) - Troughs & IMP (Field Assembled)
D03	FDF/OSP Bay w/ Panels w/ Tails (Field-Assembled)
D04	OSP Panel w/o Fiber Tail
D04X	OSP Panel w/o Fiber Tail (X-series)
D05	OSP Panel w/ Fiber Tail
D05X	OSP Panel w/ Fiber Tail (X-Series)
D06	FOT Panel
D06X	FOT Panel (X-series)
D07	WDM Panel
D07X	WDM Panel (X-series)
D08	OSP or FOT Bay e/w 8 Panels (Preassembled)
D11	FMDF Terminal Block
D11X	FMDF Terminal Block (X-series)
D12	12, 24, 48 or 72 Position FDM/FMT Panel
D12X	12, 24, 48 or 72 Position FDM/FMT Panel (X-Series)
D13	NG3 HD-FDF bay w/o Panels
D13X	NG3 Panel
D14	NG3 Panel
D14X	NG3 Panel (X-Series)
D15	NG3 Panel w/ Fiber Tail
D16	NG3 Panel w/ Fiber Tail (2 panel set = 144 pos)
D17	OSP Panel w/ Fiber Tail (3 panel set = 216 pos)
D17X	OSP Panel w/ Fiber Tail (3 panel set = 216 pos) (X-series)

11. Frame Placement Strategy

The Equipment Engineer (TEE/FEE/DTE) will request a forecast of demand for FDF frames. In addition to the Forecasting Organization documentation, input can be received based upon strategic business Initiatives, customer demands and sales, marketing organizations, collocation demands, and from internal work forces such as:

Local Field Operations/Network Operations
Outside Plant Engineers

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Maintenance Engineers
Trunking and Inter Office Equipment Engineers
Digital Transmission Engineers (title will transition to Transport Equipment Engr)
Facility Equipment Engineers (title will transition to Transport Equipment Engr)
Architecture Planning Engineers
Fundamental Planners

The NP&E Forecasting Organization will determine the growth requirements; service needs and expected growth expectations through the following detailed forecast analysis:

Wire Center Area Forecast (WCAF)
Outside Plant (Feeder) Forecast (OSPF)
High Capacity Forecasting (HICAPF)
Wire Center (Switch) Forecasting
Seasonal Factors/Functional Pricing Forecasting
Volume Forecast Consensus

The AT&T LOCAL EXCHANGE companies Forecasting Organization will develop and maintain Wire Center construction data obtained from the F. W. Dodge database, DODGE DATALINE. Downloads are done monthly, or more frequently when needed. This data is supplemented locally from available sources, such as county construction permits and construction analysis vendors, i.e. American Metro Study. Business facts come from the INFOMARK system, which provides business location information including Standardized Industrial Classifications (SIC) codes that allow the development of customer profiles. In addition, locally available sources of economic data are obtained from Chambers of Commerce, state universities, banks, municipal and state governments. A common source is the AT&T Economist which publishes monthly analysis of U.S. and state economic conditions and quarterly forecasts of key variables such as employment, housing starts, interest rates, and business indices.

The trending includes a market analysis with the changes in anticipated technology architectural shifts. It is anticipated that shifts will occur with regard to transmission delivery systems requiring frames such as DSX-1, DSX-3 and Fiber Distributing Frames (FDF) to support the higher bandwidth requirements and the conversion of existing services onto these new platforms.

Initial forecast expectations were based on the number of service specific baseline products at the time of the request. Forecasts can be initiated or updated by three triggers:

1. Scheduled Trigger. A forecaster may develop a schedule that allows for forecast updates to be spread throughout a year for a more effective mix for annual and semi-annual updates.
2. Deviations. If a forecast deviates by 15% of the actuals the forecast should be updated. If the aggregate for the market area deviates from the expected mean by more than 10%, WC forecasts should be revised.
3. A Specific Request. If a Planner requests an update to the forecast, it should be performed on a real time basis; if the size or level of activity warrants, the forecast should be updated six months later in keeping with the Forecast Process Procedures.

The minimum and required forecast intervals to be used are covered in the Wire Center Planning Method & Procedures, SBC-002-316-101 as follows:

- A minimum of every 3 years is mandatory. (Calendar Year, CY+1, CY+2)

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- It is recommended to perform a 5-year frame forecast.
- A 10-year forecast needs to be performed for building exhaust situations.

Based upon the data received, the appropriate engineer/planner will evaluate the amount of service load and equipment necessary to meet service needs. These groups will translate the demand of equipment into the amount of bays or frame lineup lengths necessary to meet those objectives and forecasts. Three typical examples:

1. The Wire Center forecasts the placement of five OC-192 Network Element systems within the next six months. The TEE determines that the primary FDF has sufficient bays for the NE and OSP terminations, but the NE relay racks will be placed on another floor. Evaluate the route of egress from the NE to the primary FDF. Provision fiber raceways on both floors in a 12" wide capacity using diverse routing. Also, plan on the use of a Satellite FDF on the other floor.

2. The Equipment Engineer (TEE) has received a forecast for 700 fiber rings (to twelve Central Offices using a new 144 fiber cable to each location) and 400 Network Elements in Optical Carrier primary and protect in OC48 and OC192. Based upon the existing Fiber Distributing Frame layout topology and using the 72 port per panel arrangements, the following is calculated:

The outside plant cable will be terminated in 144 fibers per cable using two 72 port panels. Cabling will go to twelve other Central Offices, 144 fibers to each location. Therefore we will need 24 panels for OSP. The 400 Network Elements will require 800 fiber leads that can be placed in 12 FOT 72 port panels. The OSP and FOT panels are in alternating bays, 8 panels per bay.

Check to see if there is existing capacity within the existing bays for these additional panels. For this exercise, assume the existing FDF is exhausted.

Result: Need 3 bays of OSP and 2 bays of FOT. Since the bays are alternating, we will require the largest number for both FOT and OSP bays. The request will show a need for 3 OSP + 3 FOT panels for a total of 6 FDF bays.

3. The Equipment Engineer has received notification that several DWDM systems and BPON FTTH/FTTB will be deployed in the existing Central Office within the next 12 months. The site currently has 5 bays of Generation II (LGX) panels with the remaining capacity of 8 vacant OSP slots and one vacant FOT slot for panels. The forecasted demand will require 720 FOT terminations and 1440 OSP terminations.

Plan: Cap the existing Generation II (LGX) frame (no new bays). Fill up the remaining slots in the LGX frame for OSP and FOT panels. This will leave you with a need to terminate 12 OSP panels and 9 FOT panels in the new lineup.

First choice, use fiber optic bridges between Generation II and III lineups. If the distance between the two is significant, use tie panels, expect 10 for first deployment. With bridges, tie panels will not be needed.

Place 4 bays of Generation III FDF, 2 OSP and 1 FOT bay and one MISC bay. Reserve space for additional bays per the Space Planning Guidelines. Load FOT and OSP panels from the bottom up of each bay. Load tie panels (if needed) in all bays from the top down.

When incremental growth forecasts are the only option due to regulatory limitations, great care should be exercised to keep the frame from prematurely exhausting. The forecast intervals need to be compressed to compensate for frames with less capacity than normal, which could be exhausted due to small surges in growth. Due diligence is necessary in the planning, use and mechanization, to preclude a premature exhaust. Some typical items are listed below:

Less than optimum placement of FOT/OSP panels that will cause long jumpers or convoluted cable routing. This may prematurely trigger the need for a new frame at a substantially increased cost over the ability to expand the existing

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frame structure.

Fiber jumper routing blockage can develop between old and new adjoining frame areas unless great attention to detail is exercised in cable management by performing cable rearrangements and disconnect orders on a regular basis, within one week of the date of the Service Order.

Note: It is absolutely critical that the Equipment Engineer (TEE/FEE/DTE) and the Outside Plant Engineer maintain documented records on initial and growth FDF decisions. The documentation needs to include the reasons for the placement/growth, the date/time group and the backup documentation from the Forecast Organization (or Fundamental Planners). This information will support the reasons as evidence in Regulatory inquiries. Insure that the documentation will stand on its own merit and it is written in a non-technical format.

12. Records Assignments

12.1. OSMINE Records Assignments

Per Telcordia Technologies GR-449-CORE, Generic Requirements for Fiber Distributing Frames, R3-66 [243] Issue 2, dated Apr 2003, the FDF and the panel/blocks will be OSMINE compliant with Telcordia Technologies document BR 751-100-790, Issue 6, Nov 1992, Table B, Format T. Each manufacturer shall file documentation with Telcordia Technologies and meet COMMON LANGUAGE Distributing Frame Cross-Connect Point Codes.

This requirement refers to adding FRAME DATA (bay, panel/block/tray, row, and port) on the network elements terminating on the Distributing frame. The Distributing frame itself is not inventoried in TIRKS but the Network Equipment and cable assignments that terminate to the FDF are loaded. The Frame data appears on the inventoried equipment (Network Equipment such as add-drop multiplexers) that indicates where the equipment is cabled.

The OSMINE (Operations Systems Modifications for Integration of Network Elements) process is applicable to Network Elements under software control, and as such, FDF does not come under the OSMINE scope. However, as the requirement R3-66 correctly describes, you will need to acquire the FDF Cross-Connect Point Codes.

12.1.1. Generation I & II Frame Types

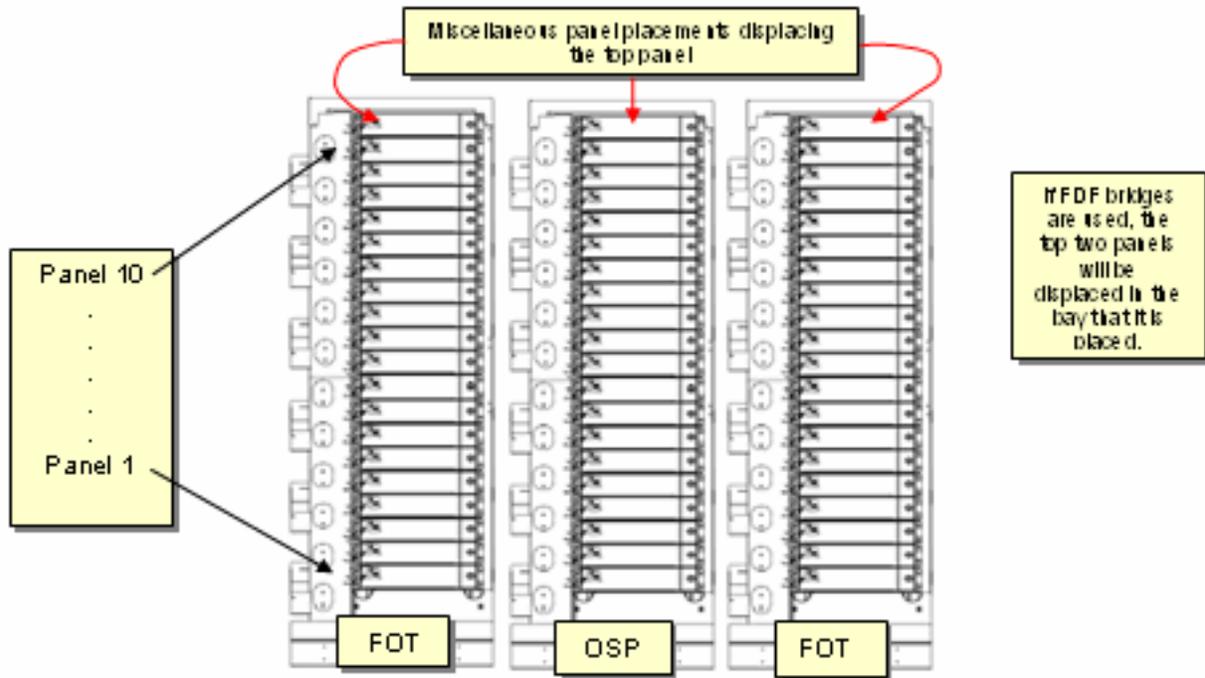
Frames that use horizontal panels will use a sequential whole numerical count from the bottom of each bay beginning with the number 1. In addition, OSMINE port counting within each horizontal panel will count in numerical sequential count (Standard Telco Provisioning) beginning with the top left connector as seen from the front. The sequential count will be additive downward to the bottom of the row followed in sequence at the top of the next row until the end of the panel. The bays will alternate with equipment terminations called the Fiber Optic Terminal (FOT) with Outside Plant (OSP) with the top panel space being left for the placement of a Miscellaneous panel or tie panels. See illustration on next page:

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12.1.2. Embedded NGF Frames (AT&T Midwest only)

The NGF uses clusters of connectors along two parallel vertical uprights in the bays that are numbered in a sequential whole numerical count beginning with the bottom left, then bottom right, then next above the bottom left, and so on. Numerical sequential numbered count begins with the top left connector as seen from the front. The sequential count will be additive on the same horizontal row to the end, returning to the next row starting directly below the first port on the panel. The count will continue across each row until the end of the panel and then move to the next level on the left side. The bays will alternate with equipment terminations called Fiber Optic Terminal (FOT) with Outside Plant (OSP). The use of a Miscellaneous panel will require the use of a Generation II or a Generation III (NG3) bay, the horizontal panel will not work within the NGF frame arrangement. A transition component will be required between the NGF and the NG3 when there is a change in the bay types in the same lineup.

When capping an existing NGF frame and transitioning to the Generation III (NG3) Frame, the existing NGF bay will have the clusters placed to finish all the NGF bays but will use the layout assignments starting with the very next cluster. The top two cluster blocks may be used for tie panels in any NGF bay. New bays (NG3) will use the new NG3 panels in lieu of the cluster blocks. See illustration on next page.

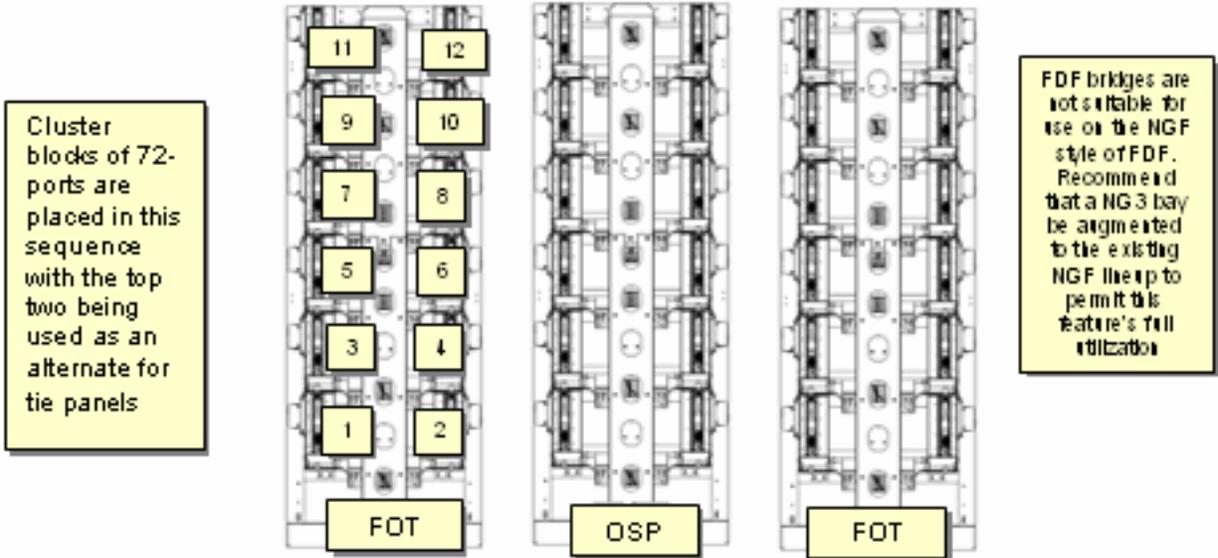
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Miscellaneous panels will not fit in the NGF frame due to the central feed for fiber jumpers. The placement of another frame (Generation III NG3 Frame is preferred).



12.1.3. Generation III (NG3) Frames

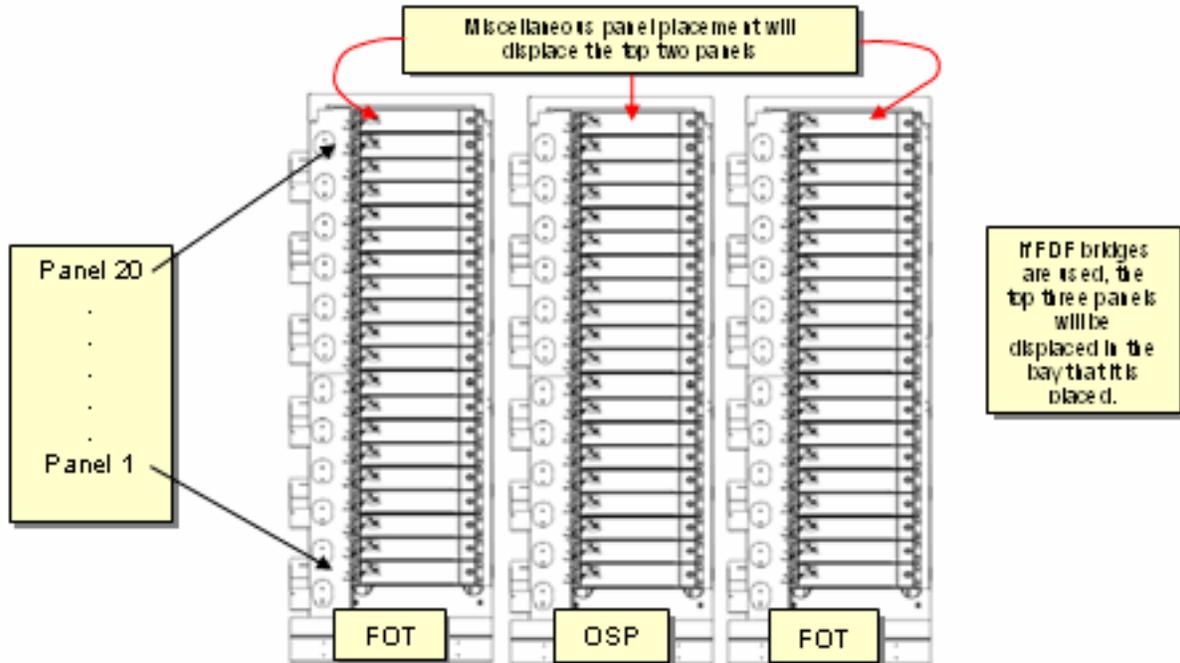
Frames that use horizontal panels will use a sequential whole numerical count from the bottom of each bay beginning with the number 1. In addition, OSMINE port counting within each horizontal panel will count in numerical sequential count (Standard Telco Provisioning) beginning with the top left connector as seen from the front. The sequential count will be additive downward to the bottom of the row followed in sequence at the top of the next row until the end of the panel. The bays will alternate with equipment called Fiber Optic Terminal (FOT) with Outside Plant (OSP) with the top panel space being left for the placement of a Miscellaneous panel or tie panel. See illustration.

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12.2. Fiber Terminations on Panels

Fiber Distributing Frames will have fiber strands terminated within the assigned panels in a sequential count starting with the first, or lowest strand number and increasing sequentially based upon the panel design. Typically panels are provided in 72-port grouping or clusters for the termination of fiber optic strands.

Rules for assignments of fiber strands follow the transmit and addresses. This follows the standard convention of assignments for Circuit Provisioning Centers (CPC). When fiber paths are provided in pairs, the first strand will represent the transmit signal from the first address that is transmitting. The second strand represents the receive signal route to the second termination address that is receiving this signal. The first strand will be identified using the nomenclature (TX) with the second being identified as the (RX). This convention may be reversed on certain equipment terminations with specific AT&T Equipment Drawings noting this as an exception to standard policy.

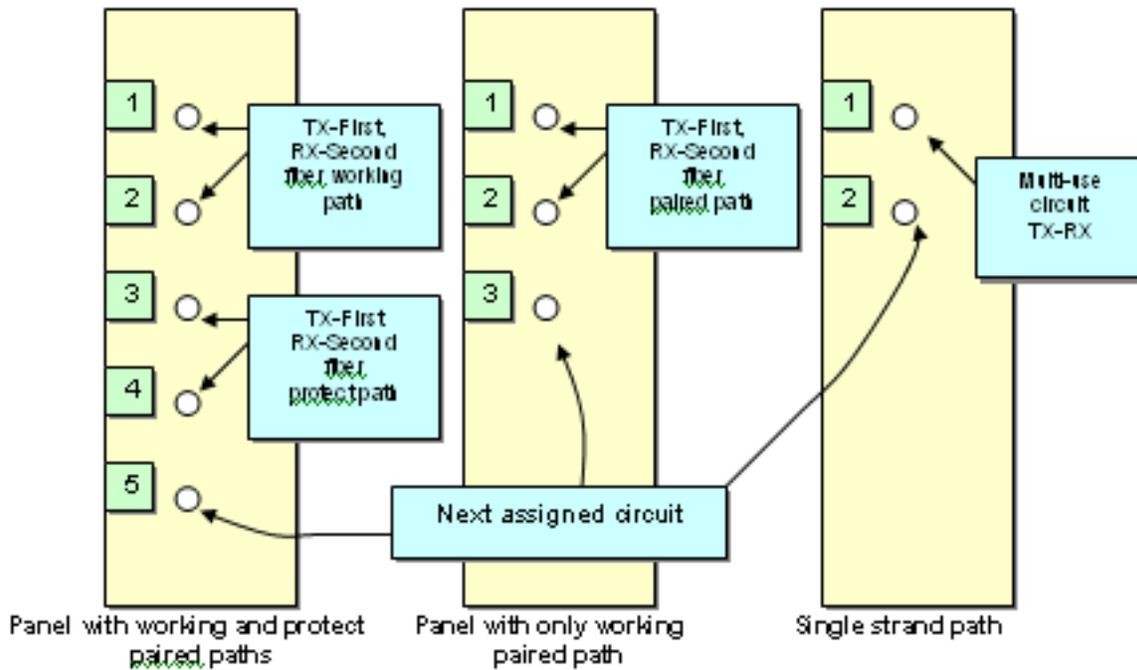
The working path will be identified as the first pair of strands. The second pair using the same sequence of TX and RX will be the protect path. When both working and protect paths are terminated on the same FOT panel, they would be installed in the sequence shown in the first box below. The second box demonstrates the placement of only the working or protect path by itself. The third box demonstrates the use of a multi-use fiber optic strand that provides both the transmit and the receive signals on the same strand. In this case, the strand will be identified using the nomenclature of TX-RX. Typically this type of signal is used in a working configuration only without a protect path. The next circuit will be assigned on the very next fiber optic strand without skips. For instance, a fully protected circuit with paired paths (the normal arrangement) would use port/strands 1-4 on the panel. The next port/strand would be assigned to the next circuit.

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12.3. TAB/db

The Tabular Database (TAB/db) is the inventory management tool for all FDF, panel and port assignments by type for AT&T Central Offices. The orientation is to provide support to the Equipment Engineer (NP&E) groups for provisioning of bays and panels. The TAB/db inventory system is being enhanced to cover the dedication of cable assignments on FDF panels. TAB/db will not provide circuit level assignment reference points or jumper cross-connect routes. TAB/db offers numerous training sessions on the use of the system, refer to the AT&T LOCAL EXCHANGE companies web site: <http://woodduck> , TAB/db, Training information and schedule.

The Equipment Engineer may begin in 2 ways after creating spec to work in:

- Locate panel which requires connector type changes (if list of panels is available)
- Query the system for fiber assignments and check each panel returned by the query for updates.

Tab/dB steps

1. Create a Record Only spec by using A7x if internal to AT&T or V7x if a vendor performs (where x = the next available number from 0-9).
2. Once the assignment chart is located select the 1st line to be changed.
3. Click in the "Connector Type" field to activate the drop-down menu and select the appropriate connector type (repeat for front and rear if both are required). **THIS IS A REQUIREMENT FOR BOTH FRONT AND REAR FOR ANGLED CONNECTORS.**

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4. Once the changes are complete click "Save".
5. Once the changes are saved select "Copy Special" from the Edit menu.
6. Select the next position that needs to be changed and select "Remove" from the Status menu.
7. Select the number of assignments to remove by using the shift key for contiguous positions and the control key for noncontiguous positions. **(Note: be sure they are all assigned to the same network element.)**
8. Then click "OK " to remove them.
9. Select "Paste Multiple" from the Edit menu.
10. Select the number of assignments to paste by using the shift key for contiguous positions and the control key for non-contiguous positions. **(Note: be sure they are all assigned to the same network element.)**
11. Then click "OK" to paste them with the new connector type.

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TAB/db uses a series of drop-down menus to properly populate the port assignments.

Line	Panel	Fiber Lead ID	Catalog Name	Location	Unit Name	BFD Tral	BFD Tral	Front Connector Type	Rear Connector Type
1	9	1	TK	FOM 100LF	RR-0414, Rack, OP (Cont)	PASB 10		SC-UPC	SC-UPC
2	9	2	TK	FOM 100LF	RR-0414, Rack, OP (Cont)	PASB 10		BICORIC	SC-UPC
3	9	3	TK	FOM 100LF	RR-0414, Rack, OP (Cont)	PASB 10		FC-UPC	SC-UPC
4	9	4	TK	FOM 100LF	RR-0414, Rack, OP (Cont)	PASB 10		LC-UPC	SC-UPC
5	9	5	TK	FOM 100LF	RR-0414, Rack, OP (Cont)	PASB 10		MTP-MM	SC-UPC
6	9	6	TK	FOM 100LF	RR-0414, Rack, OP (Cont)	PASB 10		MU-UPC	SC-UPC
7	9	7	TK	FOM 100LF	RR-0414, Rack, OP (Cont)	PASB 10		SC-APC	SC-UPC
8	9	8	TK	FOM 100LF	RR-0414, Rack, OP (Cont)	PASB 10		ST-UPC	SC-UPC
9	9	9	TK	FOM 100LF	RR-0414, Rack, OP (Cont)	PASB 10		LINKER/AN	SC-UPC
10	9	10	TK	FOM 100LF	RR-0414, Rack, OP (Cont)	PASB 10		SC-UPC	SC-UPC
11			TK					SC-UPC	SC-UPC
12			TK					SC-UPC	SC-UPC
13			TK					SC-UPC	SC-UPC
14			TK					SC-UPC	SC-UPC
15			TK					SC-UPC	SC-UPC

Illustration of a TAB/db screen used for FDF/panel and connector inputs.

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12.4. TIRKS

TIRKS assignments will be made based upon the serving location or the network equipment chosen for the network feed through the use of Cross-Connect Point Codes. The assignments are made through the use of CLLI®, CLFI® and CLEI® codes established by Telcordia Technologies Inc. The connector or mode type is not inventoried in TIRKS.

13. References

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Document	Description	Issue & Date
ATT-002-210-215	One Time Approval-Purchase of Non-Approved Products	Current Issue
ATT-TELCO-002-216-078	ATT-Demarcation Policy for Access Services	Current Issue
ATT-TELCO-002-216-266	ATT-Turn-up and Test for FTTH	Current Issue
ATT-TELCO-IS-002-316-011	ATT-SingleMode Fiber optic Splitters	Current Issue
ATT-TELCO-IS-002-316-026	ATT-SingleMode Passive Wave Division Multiplexer (WDM) for the FDF M&P	Current Issue
ATT-TELCO-IS-002-316-043	ATT-FDF Frame Deployment M&P Replaces AM-915-890-953 effective Dec 2001 and AM IL 95-07-017 effective Dec 2001	Current Issue
ATT-TELCO-IS--002-316-053	ATT-Fiber Raceway Deployment M&P	Current Issue
ATT-TELCO-IS-002-316-066	ATT-Breakout Bay Deployment in Support of the NORTEL OPTera Connect DX System	Current Issue
ATT-TELCO-IS-002-316-072	ATT-BPON FTTH Common Systems Provisioning	Current Issue
ATT-TELCO-IS-002-316-076	ATT-Telco Ethernet Architecture Standards	Current Issue
ATT-TELCO-IS-002-316-077	ATT-Common Systems Standards (Internal Document)	Current Issue
ATT-TELCO-IS-002-316-078	ATT-Fiber Connector/Mode Policy	Current Issue
ATT-TELCO-IS-002-316-079	ATT-Fiber Connector/Mode Policy Addendum by Applied Services Approved for Use	Current Issue
ATT-TELCO-IS-002-316-087	ATT-Intraoffice Routing Diversity Standards	Current Issue
ATT-TELCO-002-203-001 Section 13	ATT-Infrastructure Deployment Guidelines, Transport, Wavelength Division Multiplexing (WDM)	Current Issue
ATT-TELCO-002-203-001 Section 12	ATT-Infrastructure Deployment Guidelines, Transport, Fiber Optic Splitters	Current Issue
ATT-TELCO-002-203-001 Section 4	ATT-Infrastructure Deployment Guidelines, Transport, Fiber Distributing Frames (FDF)	Current Issue
ATT-E-00136-E	ATT Fiber Patch cords, Cable and Attenuators	Current Issue
ATT-E-01140-E-01	ATT Fiber Distributing Frame Drawings	Current Issue
ATT-C-50001-E-00	ATT Fiber Raceway Drawings	Current Issue
ATT-E-01110-E	ATT Equipment Drawing for the Nortel OPTera Connect DX	Current Issue
ATT-E-01110-W	ATTInterconnection Drawing for the Nortel OP-	Current Issue

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	Tera Connect DX	
ATT-E-00136-E	ATTFiber Cable Standards	Current Issue
ATT-TP-76200	ATT-Network Equipment – Building Systems (NEBS)	Current Issue
ATT-TP-76300	ATT-Installation Guide within the Central Office	Current Issue
ATT-TP-76400	ATT-Detail Engineer Requirements for the C.O.	Current Issue
ATT-TP-76412	ATT-Ethernet Standards for the Telco	Current Issue
ATT-TP-76450	ATT-Common Systems Standards for the AT&T Communications Network	Current Issue
ATT-TP-76450-001	ATT-Common Systems Checklist	Current Issue
ATT-TP-76450-002	ATT-Process Evaluation and Exception Request (PEER)	Current Issue
ATT-TP-76461	ATT-Fiber optic Connector Cleaning	Current Issue
F2.1731.01.053	ATT-TRI-BPON FTTH System and Architectural Overview	Current Issue
ATT-TELCO-PAN-COMMON-SYSTEMS-2006-0014	FDF Fiber Optic Cross-Aisle Bride	Current Issue
ATT-PAN-2004-3397	ATT FL1/FMT OSP Panels	Current Issue
ATT-PAN-2004-3196	ATT-Combination Utility Demarcation Panel	Current Issue
ATT-PAN-2004-3381	ATT-Fiber optic Splitters, Assoc Housings & Terminators	Current Issue
ATT-PAN-2003-3162	ATT-Fiber Raceways (FiberGuide)	Current Issue
ATT-PAN-2003-3161	ATT-Optical and Electrical Ethernet Products	Current Issue
ATT-PAN-2003-3160	ATT-Passive Optic Protection for the FDF	Current Issue
ATT-PAN-2003-3149	ATT-Fiber Raceway (FiberGuide) Approval for Use	Current Issue
ATT-PAN-2003-3148	ATT-Special Fiber Bay for Network Equipment	Current Issue
ATT-PAN-2004-3146	ATT-Fiber Optic Bridge between FDF Lineups	Current Issue
ATT-PAN-2003-3139	ATT-Destandardization of NGF FDF & Removal of PAN 20011120	Current Issue
ATT-PAN-2003-3138	ATT-Generation III FDF Approval for Use	Current Issue
ATT-PAN-2003-3137	ATT-Angled SC-APC Connectors and Panels	Current Issue

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ATT-PAN-2002-3001	ATT-Standard for Fiber Jumpers & Attenuators	Current Issue
ATT-PAN-2002-1012	ATT FMT/FL2 Fiber Management Tray	Current Issue
PAN 20021030	ATT-Fiber Breakout Bay Product Approval Notice for the Nortel OPTera Connect DX Platform	Current Issue
PAN 20011120	ATT-AIT Restricted Approval for AIT only with Sunset Clause for FMDf	Current Issue
PAN 20021012	ATT-Fiber Management Tray (FMT) for Outside Plant	Current Issue
PAN 19995259.0003	ATT-Tails-Stubs for use on OSP Panels	Current Issue
PAN 19995259.0002	ATT-FDF OSP Panels with Tails/Stubs Standards	Current Issue
PAN 19995259.0001	ATT-FMT Panels for Central Office Use	Current Issue
PAN 19995259	ATT-Frames (FDF) and Fiber Optic Apparatus	Current Issue
PAN 19985043	ATT-Fiber Protection Systems (Raceways & Fiber Duct Work)	Current Issue
BSP 800-003-150MP	ATT-Cable & Wire Installation for Cable Racks and (Fiber) Raceways	Issue 1, Sep 1998
ATT-NOTICE-000-000-606	ATT-Fiber optic Connector/Mode Standards	Issue 2, Jan 2003
ATT-NOT-000-000-516	ATT-Protective Cover for Existing Vertical Cable Guides	Issue 1, Aug 2002
ATT-NOT-000-000-473	ATT-Optical In-Line Attenuators for the FDF	Issue 1, June 2002
ATT-NOT-000-000-346	ATT-FMDf Restricted Use Approval with Sunset Clause Announcement	Dec-01
FLASH-2001-015	ATT-Construction Support SC-ST Conv. in SWBT	Jun-01
FLASH OSP-4/23/2002	ATT-Cleaner, Fiber Optic Connector Universal	Apr-02
SO.520.99.043	TRI-Recommendation to Replace Biconic Connectors	Issue 1, Mar 1999
GR-449-CORE	Telcordia-Fiber Distributing Frames (FDF)	Issue 2, Jul 2003
ADC Drawing #1284210	ADC-12 Port Multimedia Panel	Current Issue
ADC Drawing #1290301	ADC-24 Port Multimedia Panel	Current Issue
ADC Drawing #1228576	ADC-Cable Manager, Vertical Cable Drawings	Current Issue
ADCP-90-295	ADC-NG3 HD-FDF System Rack Installation Manual: Raised Floor/Concrete Floor	Current Issue

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ADCP-90-296	ADC-NG3 HD-FDF Patch Cord & Routing Guide	Current Issue
ADCP-90-297	ADC-NG3 HD-FDF 72-Position Hinged Termination Panel User Manual (Generation III)	Current Issue
ADCP-90-298	ADC-NG3 HD-FDF User Manual (Generation III)	Current Issue
ADCP-90-299	ADC-NG3 HD-FDF System Rack Installation Manual for Raised Floor and Concrete Floors	Current Issue
ADCP-92-009	ADC-Glide Installation Manual (Generation III)	Current Issue
ADCP-92-016	ADC-Glide User Manual	Current Issue
ADCP-90-198	ADC-7-Inch FDF Application Guide & User Manual	Current Issue
ADCP-90-325	ADC-Fiber Distributing Panel User Manual	Current Issue
ADCP-90-329	ADC-Fiber Breakout Bay Cable Routing Guide	Current Issue
ADCP-93-097	ADC-X-Aisle Trough System Planning & Installation Guide	Current Issue
ADCP-95-007	ADC-FDF Interbay Cross-Connect Wiring Procedures	Current Issue
ADC/Splitter & WDM Products	ADC-WDM Product Description	Current Issue
ADC/AOFR	ADC-1310/1533/1557 Wavelength Division Mux/Demux	Current Issue

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Acronyms

A.1. DOCUMENT SPECIFIC ACRONYMS

N/A

A.2. NETWORK ACRONYMS DICTIONARY

[Refer to ATT-000-000-020, Network Acronyms Dictionary.](#)

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