ATT-TELCO-IS-002-316-003

Frame Forecast M&P

Presented in this document are the methods and procedures to implement and manage the growth of Frames (MDF/IDF) in the Central Office and other Collocation Sites.

To:	ATT ILEC Space Planners, Frame Planners, Transport Equipment Engineers (TEE), Long Range Technical Planners. The secondary audience within the ATT Local Exchange Carriers are the Network Operations/Local Field Operations (LFO), Corporate Real Estate (CRE), Network Sales Support (NSS) and the Collocation Services organizations.
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1. REASONS FOR REISSUE

Issue 11, Entire document: Changed references from Avaya and Marconi to CommScope and Emerson Network Power.

Issue 11, Section 7: Update 7.1 & 7.2

Issue 10, Entire document: Update reference from SBC to ATT.

Issue 9, Section 2: Overview and Definitions brought up to 2004 standards.

Issue 9, Section 6: Clarify and define cable pairs and other terminations allowed on COSMIC frames.

Issue 9, Section 8: Add example of typical frame layout for both vertical and horizontal.

Issue 9, Section 12: New section covering the future of frames.

Issue 9, Section 13: Reference section updated in its entirety.

Issue 9, Section 14: Contact section updated in its entirety.

Issue 8, Section - All, renumbered sections to reflect removal of DSX and FDF references. DSX and FDF information is now contained in separate forecast M&P documents.

Issue 8, Section - 7.2, to reflect the new corporate policy regarding the deployment of Universal Modular Distributing Frames.

Issue 8, Section - 2.2, updates definitions of frame functionality - Main Distributing Frame and Intermediate Distributing Frame.

2. OVERVIEW AND DEFINITIONS

2.1. Overview

This document has been updated to reflect Network Planning & Engineering (Common Systems Standards) for the following Incumbent Local Exchange Carriers:

ATT-East (Connecticut)

ATT-West (California, Nevada)

ATT-Southwest (Missouri, Texas, Arkansas, Oklahoma, Kansas)

ATT-Midwest (Illinois, Wisconsin, Indiana, Ohio, Michigan)

[NOTE: For the purposes of this document, unless otherwise noted, all references to a distributing frame are in relation to copper terminations of DS0, VF, xDSL and T1 type circuits.]

The Distributing Frame supports the interconnection needs for customers, carriers, other telecommunications providers, switches, transport equipment, and cable facilities in the serving Wire Center (WC) area.

Generally, distributing frames fall into two functional categories: Main Distributing Frames (MDF) and Intermediate Distributing Frames (IDF). MDF's and IDF's are found in two physical configurations: conventional distributing frames and Universal Modular Distributing Frames (UMDF).

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 Main Distributing Frame should be deployed to maximize the overall life of the frame (and the WC structure), use the least amount of floor space and to permit the greatest utilization of frame equipment and block assignments with the least amount of jumper congestion and blockage. The Common Systems Frame and Space Planner will monitor activity, determine exhaust dates and size relief for conventional and Universal Modular frames.

Subsequent growth requirements of the frame will be based upon Wire Center forecasting, technology additions and growth, and the need for increases in facility placement in direct support of the community growth that the WC supports. Incremental growths of the 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 WC. The exhaust of the Main Distributing Frame or Protector frame will frequently trigger a building addition or new Wire Center. Shorter timelines could result in increased costs due to the need to redistribute equipment and facilities on the frame on 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.

There are four generic distributing frame types within a Wire Center: Main/Intermediate Distributing Frame (Copper), DSX-1, DSX-3 and Fiber Distribution Frame (FDF). These frames support the technology and applications based upon their electrical and optic standard requirements. It is imperative that each type of frame must 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 frame or the inappropriate placement of the frame within the WC, causing the potential need for expensive additional regeneration equipment.

2.2. Definitions

2.2.1. Main Distributing Frame (MDF)

As the name implies, the MDF is the primary, or main, distributing frame in the wire center. The MDF supports the interconnection needs for twisted pair connections between OE/LEN to Cable Pairs, or Derived Cable Pairs, to the outside plant. The MDF is an integral component of the wire center. Should the MDF exhaust, the wire center may be considered exhausted. The MDF is also referred to as the Subscriber Main Distributing Frame (SMDF). In wire centers in which there is only one distributing frame it is sometimes known as the CMDF or Combined Main Distributing Frame,

since it combines the functions of both the MDF and the IDF.

2.2.2. Intermediate Distributing Frame (IDF)

The MDF is the primary frame in the office, all others are secondary or Intermediate Distributing Frames. There may be more than one IDF in a wire center. IDF's are intended to help mitigate the premature exhaust of the MDF. The IDF is intended to provide a point of termination of Network Elements that would be considered as low utilization services, i.e. alarm monitoring devices, repeater bays, other telecommunications providers (CLEC's), transport equipment, POTS-Splitters and interframe tie cables.

In the past, these frames had been known by a number of different titles - TMDF, TPDF, SDDF, etc.

3. NETWORK ROLE

The Distributing Frame family provides the key interconnection for all copper provisioned services between the outside plant copper facilities and all cross-connected Network Elements. It also provides for a point of service and equipment protection from voltage and current fluctuations when equipped as the primary MDF. Both Narrowband (Voice & Data) and Broadband (T1/1.544 Mb/s and DSL technologies) that use copper facilities as the transmission medium may be terminated on this frame family.

4. STRATEGIC DIRECTION

The Distributing Frame Family will continue to be a pivotal part of the telecommunications infrastructure. On a going-forward basis, the use of the standard frame will be the double-sided 8'10" high Conventional Frame using the FrameMate software system. Low-density terminations will be placed on a second frame within the same office (including CLECs) when triggers are met. The Universal Modular Distributing Frame (such as the COSMIC family) requires an economic study of all reasonable alternatives and funded by an approved business case prepared by Fundamental Network Planning - SWITCH, and a One Time Approval through ATT Services Inc., Network Planning & Engineering - Common Systems for new applications and footprints, although existing location footprints may be expanded to meet service needs.

5. FRAME FORECAST STRATEGY

The Long Range Technical Planner or Frame Planner will request a forecast of demand from the Network Planning & Engineering Wire Center Forecasting Organization for that geographic area for Main Distributing Frames. Transport Equipment Engineers (TEE) will request a forecast of demand for DSX-1, DSX-3 and 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
- Resident Engineers
- Maintenance Engineers
- Installation/Maintenance Organizations
- 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)
- Transport Equipment Engineers (TEE)
- Architecture Planning Engineers

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 ATT 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 such sources as Chambers of Commerce, state universities, banks, municipal and state governments. A common source is the ATT Economist who 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 including the changes in anticipated technology architectural shifts. It is anticipated that shifts will occur with regard to transmission delivery systems requiring additional frames such as DSX-1, DSX-3 and Fiber Distribution Frames (FDF) to support the higher bandwidth requirements and the conversion of existing services onto these new platforms.

Initial Forecast expectations are 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. Schedule 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, ATT-002-316-101, as follows:

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

- 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 equip-

ment necessary to meet service needs. These groups will translate the demand of equipment into the amount of frame lineup lengths necessary to meet those objectives and forecasts. A typical example:

The Wire Center needs a new frame suitable for 100,000 cable pairs; (the old frame is exhausted). The frame chosen by the Frame Planner is an 8'-10", Low Profile Double-sided conventional frame. This frame will accommodate 12 - 100 pr. high-density connector blocks per vertical. 100,000 terminations will require 84 verticals to support this deployment. The space required for this frame will be approximately 56 feet long by 16'-3" wide.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:

1. Less than optimum placement of connection blocks/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 frame structure.

2. Cable and 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.

Once the type of frame and amount of verticals/bays are determined, the Frame Planner/Transport Equipment Engineer will fill out and submit the Wire Center Equipment/Power Forecast Form to the Space Planner.

6. FRAME DEPLOYMENT STRATEGIES

6.1. Conventional MDF Only

This layout utilizes a single conventional frame for the termination of all ATT ILEC terminations including Special Circuits based upon a Frame Forecast. This system should not extend beyond 300 verticals in a Central Office. If the forecast period for the ILEC growth does not exceed the existing capacity on the conventional MDF, other services such as CLEC and Special Interconnection Arrangements for outside terminations other than ATT may be placed. If the existing Conventional Frame space is expected to be exhausted within the next 5-years and the frame has been compressed previously and cannot be grown beyond the current size, it is recommended that an Intermediate Distribution Frame (IDF) be deployed. The primary frame would be converted into a frame limited to key essential services such as the OE, Cable Pairs and Tie Pairs of the ILEC and place the IDF for termination of all other services, CLEC and/or Special Circuit applications.

In order to maximize the life of the conventional MDF; do not block the footprint growth layout of the frame with other equipment and bays. The blockage of a frame can be an immediate trigger of a Central Office growth or establish the

requirement for a new wire center. The frame is considered as an indigenous part of the wire center structure.

6.2. Universal Modular DF (MDF) and Conventional IDF

The Universal Modular DF is designed to be the MDF for the Central Office and is intended for terminations of ILEC OE/LEN, copper and derived (non-integrated SLC) Cable Pairs that have individual appearances on the frame, and Tie Pairs for the ATT services within that Central Office. The Universal Modular DF is usually accompanied by a Conventional IDF which will handle the other services such as Special Circuits, CLEC's and high overflows of low-density subscriber line carrier terminations. The Universal Modular DF's were originally designed for a 20-year lifecycle in the mid-1970's and have frequently achieved their planned growth expectations. These frames are very complex and costly from both an Expense and Capital Cost standpoint to grow beyond their current size. Terminations of Special Circuits, DSLAMs or CLEC interconnections were not designed nor planned for in both the ATT layout and the manufacturer specifications. The ready availability and capability of the adjacent conventional IDF coupled with its low growth costs makes it the preferred termination point for these additional services. It is recommended that the Conventional IDF be grown to accommodate the addition of future CLEC facilities as the least cost solution and the UMDF grown only for OE/CP/TP's for the ATT CO. However, in situations where there is no IDF present, these terminations by necessity will have to be placed on the Modular Frame.

6.3. Conventional MDF and Conventional IDF

The MDF supports the interconnection needs for twisted pair connections between OE/LEN to Cable Pairs, or Derived Cable Pairs, to the outside plant. The IDF provides a point of termination of Special Circuits, DSLAMs and CLEC interconnections, alarm monitoring devices, repeater bays, POTS-Splitters, interframe tie cables and generally low-utilization terminations. When excess frame capacity is available on the second conventional frame that will never be used, consider the removal of that portion for reuse on other Central Office frames that may be at or near exhaust.

6.4. Multi-Stage Frames (three or more frames)

This arrangement that uses a frame for OE/LEN, another for Special Circuits/DSLAMs, CLECs and another with Cable Pairs is highly undesirable from an operations and maintenance standpoint and should be mitigated whenever possible. Transitions to a dual MDF/IDF topology should be evaluated as service additions are forecasted.

6.5. Growth Requirements and New Frames

Options and considerations for frame additions and growth are as follows:

- Redistribute and condense older infrequently used services and terminations on the existing frame. Curtail the use of large blocks on the frame.

- Consider a limited Frame growth for the MDF whenever possible for ATT provided OE/CP/TP only.

- If the following conditions apply, add an Intermediate Distribution Frame (IDF) as a support frame for CLEC, Special Circuits and low-density applications such as Integrated Carrier Systems. (Based upon current projections, the use of High Capacity Broadband Applications such as Integrated LiteSpan systems are anticipated to become the new standard for terminations. Within a five-year horizon, the demand for Cross-Connect Frames may be reduced.)

  1. If the Primary frame cannot be grown beyond current size and it is forecasted to exhaust within 5-years resulting in the closure of the Central Office to further growth. If IDF space is not available, immediately notify Planning Organization.

  2. The C.O. is a Category I location and the frame is forecasted to exhaust within 5 years. If the C.O. is a Category II location, currently has Collocation and is forecasted to exhaust within 5 years.

  3. Provide an IDF frame for CLEC's and low density terminations to support their needs and requirements only (generally when 4 or more CLEC's are located in one CO) to extend the life of the other frames. Base this on a five-year exhaust of the MDF.

The corporate decision on a going-forward basis is to plan on using the Intermediate Distribution Frame (IDF) in lieu of building growths. The IDF will be a **conventional** DF that will be placed within SBC Central Offices. Do not use a modular or COSMIC frame for an IDF in any case. Continue to expand MDF frames where feasible as a best choice option. Tie Cables are required to be placed between these frames at the time of frame installation. UMDF placements subject to the requirements of PAN # 20011072.

- Building Expansion to permit the growth of the MDF.

- Consider a new Wire Center due to Frame constriction or Blockage.

Any growth of terminations on a frame, either the vertical or the horizontal side may trigger a growth condition. It is crucial that the Forecast of Floor Space and Frame Space is clearly identified and forwarded to the appropriate Space and Frame Planners. In addition, the necessary coordination must be made with the cost causer to identify cost resolution.

7. DEPLOYMENT CONSIDERATIONS

7.1. Conventional Distributing Frames

The conventional frame is typically a single structure that is a double sided, manually operated interconnection device with horizontal wire carrying shelves backed by vertical uprights. **For new conventional frame installations, the frame shall be a low profile conventional frame (8'10" high) although existing conventional frames should continue to**

Forecasts and frame reviews must be performed on a **rolling** 5-year view. Each review should view forward 5 calendar years from the actual date of the review. Document the review.

be grown at their current structure arrangement (11'6" or 14' high). Reviewing the percent-of-fill on both sides of the frame is very important. Once a frame has reached the 80% fill on either side, an increased frequency of monitoring and forecast review is necessary. Add verticals for the placement of copper outside plant facilities in five-year increments based upon a 95% fill rate. The vertical side of the frame is the only side where cable facilities will be terminated. The horizontal portion of the frame is the termination point for network elements and is typically placed on terminal blocks. Minimum frame growth increments should not be less than 6 contiguous verticals of ironwork. All horizontal and vertical troughs and levels must match evenly and provide for a continuous jumper placement route on all levels.

Use all available space of an existing conventional frame, e.g. space above the 8-foot level on tall frames. When growth to a conventional frame is blocked in a linear layout, the frame is exhausted. When the wire center structure cannot be extended for the conventional frame growth requirements, then the entire wire center can be exhausted.

Switch replacements do not justify replacing the frame but should be considered as a soft trigger to evaluate the alternatives and costs at that time. Options such as Y-splicing and tandem blocking should be analyzed prior to requesting a frame replacement study. **Distributing frame equipment shall not be replaced, recabled, or relocated merely for convenience of access.** If the 20-year forecast exceeds the capacity of a 300 vertical 8'-10" frame, then install an 11'

6" frame at that location. Frame requirements beyond this length will require the evaluation through an economic study for the provisioning of a second frame, either conventional (DF) frame or a universal modular distributing frame.

When MDF exhaust capacity cannot support the termination requirements beyond the 20th year of the planning period, the MDF shall be configured at the highest density approved for use, just short of severe jumper congestion. The lack of available space and the status of a congested frame today may dictate a review prior to this period. This may require the replacement of existing connectors and protectors to high-density units on the verticals of the MDF through Frame Compression. Generally, the first point of exhaust on a MDF is the vertical side. The use of high-density, straight, 100 pair vertical connectors is the recommended strategy for optimum cable pair deployments on the vertical side of the conventional frame. The use of terminal blocks is rated standard when Subscriber Line Carrier/LiteSpan/UMC 1000 Carrier systems are deployed with a Central Office Terminal; these do not require Frame Protector Units. The placement of connecting blocks is important in order to provide for the most effective frame utilization and the resulting impact of jumper interconnection requirements which may also be a contributor to frame exhaust. Terminal blocks will be used for equipment and tie interconnections on the MDF. The use of 100/128 pair terminal blocks provide the best balanced solution between capital costs, densities of application, and the mitigation of higher long term maintenance costs. Starting on the same end as the growth of the vertical side, OE/LEN Switch terminations will be provided on the terminal blocks.

In the illustration below, when only one ATT Switch entity is to be installed but two may be forecast (including ATM remotes) the levels will be grown in 5 block increments on sequential even levels; e.g. B, D, F. Tie Blocks and Special Circuits will normally grow on the bottom and top level of the frame: e.g. A, H. The levels C, E, F, etc are reserved for a second switch LEN placement in an odd level sequence similar to the first switch layout. Alternative arrangements may be considered such that these alternatives promote product life, short jumpers, extended operational efficiency, and mitigate cost and jumper congestion in a planned layout.

When only one ATT Switch represents the ultimate Wire Center design, follow this layout (or an equivalent with the same features):

- Top and bottom levels used for tie cables to the IDF frames.

- "C" and "E" levels used to place competing technologies for spectrum separation if no other Switches are planned for the C.O.

- All other levels will have LEN/OE blocks placed in 5 block zoned compliments

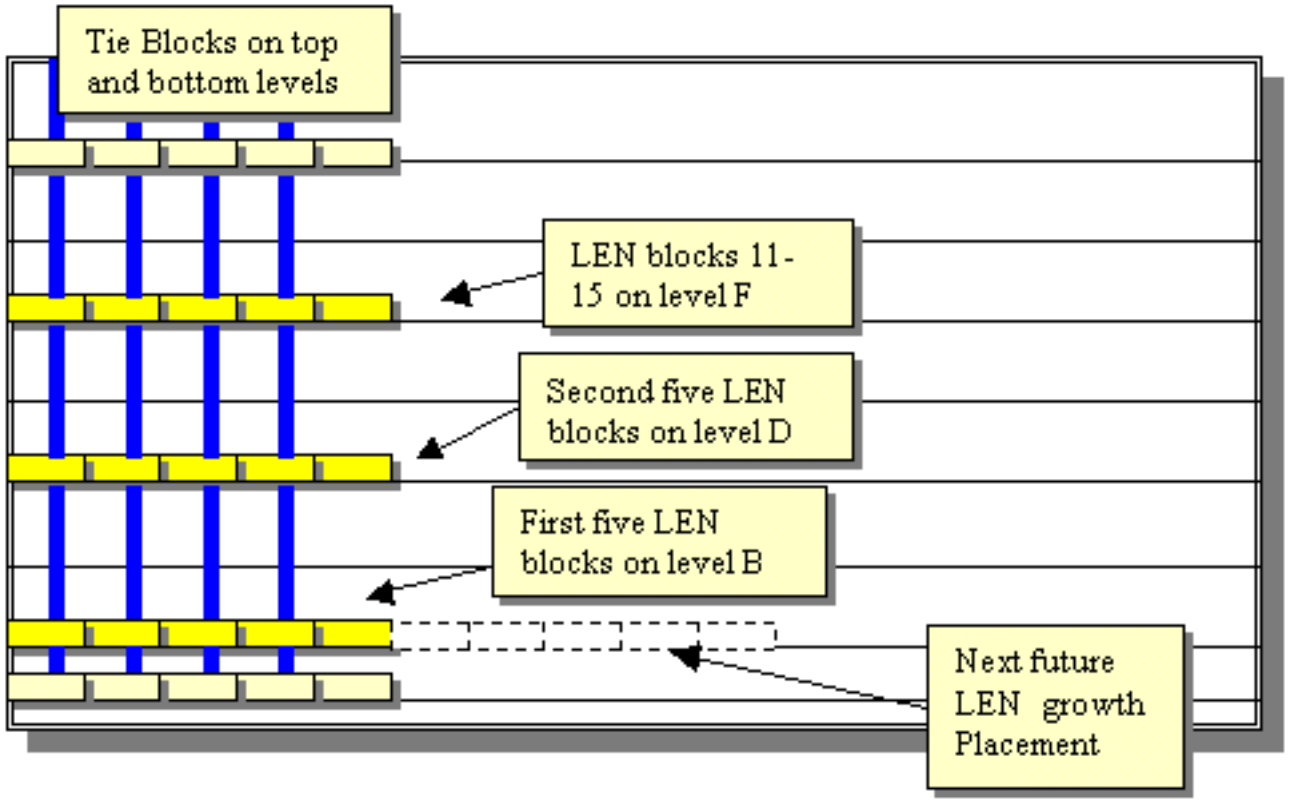


Illustration of the Horizontal Side of a MDF with only one SBC Switch entity. OE/LEN terminations are provided on the even B, D, F levels. The Blue lines represent the vertical cable terminations on the far side of the MDF.

7.2. Modular Frames

Modular distributing frames are configured so that facilities and equipment cables are terminated on the backside of alternating terminating fields. They are laid out and administered using preferential assignments to avoid jumper congestion. There are four basic types of modular frames used by ATT:

- ESS Modular Frames
- CommScope COSMIC I/IA/IIA© Types
- Emerson Network Power COS II
- Porta Frame

The Universal Modular Distributing Frame (such as the COSMIC family) requires an economic study of all reasonable alternatives and funded by an approved business case prepared by Fundamental Network Planning - SWITCH, and a One Time Approval through ATT Services Inc., Network Planning & Engineering - Common Systems for new applications and footprints, although existing location footprints may be expanded to meet service needs. Refer to PAN # 20011072 regarding restrictions to deploying UMDF's.

7.2.1. ESS Modular Frames

ESS Modular Frames are Manufacture Discontinued and will not be grown beyond their current size unless authorized by a One Time Approval through ATT Services Inc., Network Planning & Engineering - Common Systems. Replacement of an ESS Modular Frame requires an economic study of all reasonable alternatives by Fundamental Network Planning - Switch.

7.2.2. CommScope COSMIC I/IA/IIA

The most extensively deployed system is the Common Systems Main Interconnecting (COSMIC©) Type Distributing Frames made by CommScope. They retained the ESS DF operational advantages but avoided the disadvantages by greatly increasing the cross-connection capacity to include electromechanical switching equipment. The COSMIC©-Type DF's are designated as Type I/IA or Type IIA modular frames. The Type I/IA modular frame requires a separate protector frame. The Type IIA modular frame integrates protectors for facility cables terminated directly on the backside of the frame. This feature eliminates the additional cost for cabling and floor space associated with a separate Protector Frame for a new location but at a significant additional cost.

Add modular frame bays to the universal modular frame in five-year increments when it is projected to reach 80% capacity. Module Bays are added in 8-bay increments or an addition of no less than 25% of the existing bays, whichever is greater. The new cable pairs and line equipment will be spread over this new growth. This will minimize the quantity of lines or cable pairs that must be relocated in order to mitigate the use of tie pairs. Relocate (or add, if switch projections support this) the absolute minimum amount of lines or cables to this new frame section necessary to achieve parity between lines or cable pairs until the next growth job. (Growth to an existing frame and any relocation of line equipment or cable pairs is baseline funded). The Universal Modular Frame is intended to support universal cable access, line equipment indigenous to the Local Exchange Company Central Office, and the necessary tie pairs to connect to other frames and equipment. The use of a Tie Pair Distributing Frame (TPDF) is not recommended or supported. When a universal modular frame is installed, a conventional IDF must be established for transport equipment, and other low utilization equipment, on the horizontal side and the vertical area can be used for the protector frame functions. The Universal Modular Distributing Frame is designed to accommodate cable pairs, indigenous switch terminations and tie pairs only. Terminations of Special Circuit Equipment, low-density network element and CLEC terminations are not permitted on this frame family.

New Bays and Modules may be added in various configurations. The key is to deploy bays in 8-bay complements (4 cable pair and 4-line equipment). Therefore increments may be in 8, 16, 24, 32, etc. The lineup may be placed adjacent to an existing lineup, extending an existing lineup, or starting a new lineup in another area of the wire center.

[Note: Extending a line-up may have operational and long jumper impacts if the new numbering scheme does not fit the existing frame pattern. Starting a new lineup in another area of the wire center may be construed as a new frame and

approval requires an economic study of all reasonable alternatives and funded by an approved business case prepared by Fundamental Network Planning - Switch and a One Time Approval through ATT Services Inc., Network Planning & Engineering - Common Systems.]

FrameMate© is the operational support system for all Universal Modular Distributing Frames. This is a ATT Local Exchanges Carrier vehicle that provides for short-jumper assignments and mechanized input for SWITCH/FOMS©.

Replacement of an existing Conventional Frame by a Universal Modular Frame requires an economic study of all reasonable alternatives and funded by an approved business case prepared by Fundamental Network Planning - Switch and a One Time Approval through ATT Services Inc., Network Planning & Engineering - Common Systems.

7.2.3. COS II Frames

COS II Frames manufactured by Emerson Network Power are not standard within ATT. New Installations are not authorized or standard and growths of existing COSII Frames will necessitate a One Time Approval through ATT Services Inc., Network Planning & Engineering - Common Systems.

7.2.4. Porta Modular Frames

Porta Frames are not standard within ATT. New Installations are not authorized and growths of existing cross-connect portion of Porta Frames will necessitate a One Time Approval through ATT Services Inc., Network Planning & Engineering - Common Systems. Existing Porta Protector frames will be required to convert to 5-pin protector units effective immediately on a going-forward basis.

Due to the exceptionally high cost of Universal Modular Distribution Frames and their limited applicability with regard to spectrum interference, Enterprise Technology Support Staff does not recommend the deployment of a new UMDF frames at this time.

7.3. Protector Frames

When a universal modular distributing frame replaces a conventional frame, the vertical side of the conventional Main Distributing Frame will become the Wire Center Protector Frame. This conventional frame will continue to be the termination point for all cable facilities and protectors. The horizontal side of this frame will function as the IDF for the wire center. **Stand-alone Protector Frames are strongly discouraged due to excessive cost and inordinate space requirements. These should not be installed on new MDF deployments.**

The termination of T1 or HDSL services on the back of Protector Frames through hard wiring to the cable pairs shall be halted. This creates immediate frame congestion, blockage and loss of reuse through the subsequent breakage of pins and poor contacts of wire wraps resulting from using wire wrap tools not appropriate for the small gauge wire on the back of these frames. The use of High Twist Wire (Wing Wire) on the front of the existing Frames is rated standard.

Subscriber Line Carrier (SLC) or equivalent equipment such as LiteSpan or UMC 1000 that uses a Central Office Terminal (COT) in the Central Office do not need Protector Terminations. Further information may be obtained on the Common Systems Standard FLASH 00-004, Wiring of Derived Digital Pair Gain Pairs on

Distributing Frames, dated January 2000.

8. MECHANIZATION AND ZONING OF FRAMES

Universal Modular Distributing Frames (UMDF) will utilize the FrameMate© Mechanization tool managed and owned by ATT. Transitions will be scheduled from the PACE/MELD© system owned by Lucent Technologies as soon as possible. Zoning for UMDF frames is traditionally established in 8 Mod zones.

Conventional Frames will be transitioning to the new FrameMate© system that will provide increased mechanization and short jumper assignment and management. It is recommended that all conventional frames use a 10 vertical configuration for each zone.

Frames placed in lineups could be limited in size when bays of other technologies are placed innocently on the other end of the same lineup with the intention that the equipment/frame will not grow to a point to interfere with one another. When the frame is first placed, it's potential lineup growth space should be the last space used in the office for other ILEC/CLEC applications prior to a building exhaust. The impact and cost to place additional frames and lineups and tie back to the original constricted frame increases our first capital costs and embeds long term maintenance and software costs into the W.C. location making it more inefficient.

It is critical that our frame footprint utilizes the ultimate bay numbering plan even though we are incrementally growing the frame structure. Our physical layout of frames must be kept in alignment with established software programs that support these frames (e.g.: SWITCH, FOMS, FrameMate, ISIS for conventional MDF's) for optimum cable management and short jumper/cable routing. The software programs are an order of magnitude more expensive to change to compensate for inappropriate frame placements and less than optimum management.

9. MAIN FRAME FORECAST MODEL

Using the Infrastructure Deployment Guidelines (Switching), Tab 11, Distributing Frames (MDF/IDF), dated August 2001, forecasting for a frame expansion or a new frame shall be performed with both the Frame Planner and the Fundamental Network Planning organizations. It is recognized that each Central Office has different customer service needs, physical layouts and densities of certain types of services. Each site must take into account the balance between service and cost.

When a new Wire Center is deployed, the provisioning of an 8'10" high double-sided low profile frame will be deployed to meet the 10-year. (Note: If the 20-year forecast exceeds the capacity of a 300 vertical 8'10" frame, then consider the installation of an 11' 6" frame at that location.) This frame provides for the termination of protector units and cable facilities on the vertical side of the frame, with all other terminations on the horizontal side. Reserve and plan floor space for a 20-year forecast but only provision to the forecasted limit as specified by regulatory organizations.

In large Central Offices where there will be high POTS activity levels and low special circuit/transport volumes expected throughout the 20-year projection cycle, a new Universal Modular Distributing Frame may be considered, but requires an economic study of all reasonable alternatives and funded by an approved business case prepared by Fundamental Network Planning-Switch and a One Time Approval through ATT Services Inc., Network Planning & Engineering - Common Systems.

Small wire centers with an ultimate forecast line size of 50,000 will not be candidates for a Universal Modular Distributing Frame.

When a conventional Main Distributing Frame is planned for the new wire center, it is recommended that an Intermediate Distributing Frame be deployed as well. With the deployment of a Universal Modular Distributing Frame, a conventional IDF Frame must be deployed. The IDF will be used for termination of digital loop carrier (Pair Gain), transport equipment, miscellaneous interconnect facilities, other telecommunication providers (CLECs), and to mitigate access issues for non-ILEC personnel.

A traditional Main Distributing Frame (MDF) is modeled in the following exercise:

Based upon the Wire Center Forecasting Organization expectations, the Central Office sizing is determined in guideline categories of Small, Small-Medium, Medium and Large Wire Centers. The purpose of the study is to identify and support the ultimate size of the mature community telecommunications requirements for the WC. Coordination with the Detail Engineer Service Provider (DESP), where applicable, and with the Equipment manufacturer are essential to the proper footprint layout within the eligible Wire Center structure.

Small Wire Center	Small-Medium	Medium WC	Large Wire Center
5-10,000 lines	15-30,000 lines	30-60,000 lines	60-90,000 + lines
3,000 trunks	7,500 trunks	15,000 trunks	22,000 trunks
20-40,000 c/prs	60-120,000 c/prs	120-240,000 c/prs	240-360,000 c/prs
10 equiv. D4 Banks	30 equiv. D4 Banks	60 equiv. D4 Banks	80 equiv. D4 Banks
1,000 CLEC c/prs	5,000 CLEC c/prs	10,000 CLEC c/prs	25,000 CLEC c/prs

An 8'-10" high double-sided, low profile, frame would represent the traditional MDF used for a new Wire Center. This frame provides for the termination of protector units and cable facilities on one side with all other terminations on the other. This frame requires a 4-foot clearance on both sides of the frame with a frame depth of 4'3" from vertical to horizontal sides.

Based upon these assumptions, the following frame sizes would be anticipated to be required in support of this Wire Center:

Frame Sizing

Small Wire Center	Small-Medium	Medium WC	Large Wire Center
8'-10" high	8'-10" high	8'-10" high	8'-10" high
27 feet long	80 feet long	160 feet long	240 feet long
12 feet 3-in. deep	12 feet 3-in. deep	12 feet 3-in. deep	12 feet 3-in. deep
331 square feet	**980 square feet**	**1,960 square feet**	**2,940 square feet**

Determine the number of verticals from the Forecast and submit the information using the forms and processes covered in the Wire Center Planning Method & Procedures, SBC-002-316-101, to the Space Planner.

Frame Layout Example – Vertical Side

Zone 1 – Vertical side, each zone is 10 verticals, zone 2 would be verticals 11 – 20 etc.									
							PG4 1-100	PG4 901-1000	
Cable 1 1-100		Cable 3 401-500		Cable 6 1-100			PG4 101-200	PG4 1001-1100	
Cable 1 101-200		Cable 4 1-100		Cable 6 101-200			PG4 201-300	PG4 1101-1200	
Cable 1 201-300		Cable 4 101-200		Cable 6 201-300			PG4 301-400	PG4 1201-1300	
Cable 2 1-100		Cable 4 201-300		Cable 6 301-400			PG4 401-500	PG4 1301-1400	
Cable 3 1-100		Cable 4 301-400		Cable 6 401-500			PG4 501-600		
Cable 3 101-200		Cable 4 401-500					PG4 601-700		
Cable 3 201-300		Cable 4 501-600					PG4 701-800		
Cable 3 301-400		Cable 4 601-700					PG4 801-900		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Frame Layout Example – Horizontal Side

Zone 1 – Horizontal side, each zone is 10 verticals, zone 2 would be verticals 11 – 20 etc.

									CO Tele. terminations	K
RR108.05	RR108.05	SM045	SM045	M00 Res	PGTC	SM045	SM046	SM045	M00	J
TBCU P9-P16	TBCU P1-P8	LTP1	LTP2	Pnl 0		LTP2 MMSU	LTP2 MMSU	LTP2 STLMS	ANNC	
										H
										G
	SM045 LTP003 AIU 03				SM045 LTP003 AIU 01					F
LP16-19	LP00-03	LP04-07	LP08-11	LP12-15	LP00-03	LP04-07	LP08-11	LP12-15	LP16-19	E
	SM045 LTP003 AIU 02					SM045 LTP003 AIU 00				D
LP16-19	LP00-03	LP04-07	LP08-11	LP12-15	LP16-19	LP00-03	LP04-07	LP08-11	LP12-15	C
					Tie Cable TC01					
3401-3500	3301-3400	3201-3300	3101-3200	3001-3100	2901-3000	2801-2900	2701-2800	2601-2700	2501-2600	B
					Tie Cable TC01					
901-1000	801-900	701-800	601-700	501-600	401-500	301-400	201-300	101-200	1-100	A
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	

10. IDF INFRASTRUCTURE FIRST DEPLOYMENT

The expected standard for first deployment of new Intermediate Distributing Frames (IDF) will be made using the decision matrix shown earlier in this document. The new IDF will normally be initially installed using a one-year growth projection and will be reviewed within 6-months. If the service requirement has grown at that time, authorize the IDF to be grown to a full five-year deployment size. The expected one year IDF will be a 6-vertical double sided (horizontal on equipment side), 8'-10" high conventional frame. A three to five year projection forecast is expected to be the 18 vertical arrangement, three times the layout equipment. This frame type may be purchased from CommScope, Corning Cable Systems, or Emerson Network Power, each of these manufacturers will provide the standard ATT product.

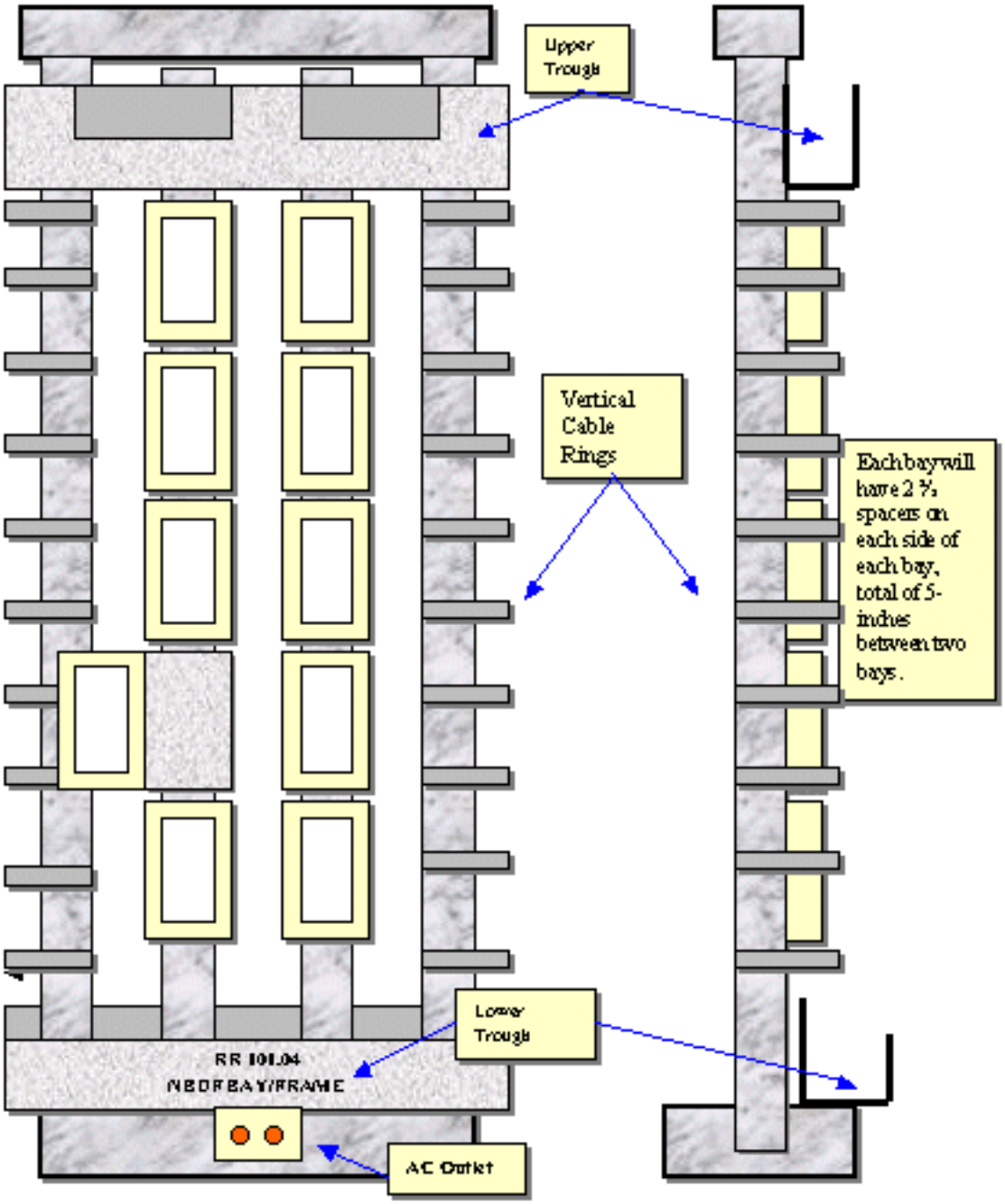
With this installation, all tie cables and cable racks must be placed between the two frames prior to turn-up. Each manufacturer will be able to perform the full EF&I functions or use authorized Installation contractors as specified by

the local Transport Equipment Engineer and Frame Planner. Equipment (CLEC and ILEC) terminations on a going-forward basis will be placed on the horizontal side of the IDF Frame. Tie Cable terminations will be placed on the vertical side of the IDF. On a going-forward basis after the IDF is in service, new terminations of equipment (both ILEC and CLEC) can be terminated on the equipment block assignment locations. The MDF will remain as the single termination point for cable pairs and ATT indigenous OE/LENs with other terminations including such items as CLEC, UNEs, SLC, D4, Burglar Alarms, Pronto on the new IDF on a going-forward basis. The following Building Blocks and ATT Common Systems Drawings will apply:

ATT-C-20000-E-00	ATT Engineering Drawings for Conventional Distributing Frames	Issue 1, 4th Qtr, 2001
ATT-C-20001-E-00	ATT Engineering Drawings for the Network Bay Distributing Frame (NBDF)	Issue 1, 4th Qtr, 2001
Building Block 0740	ATT Building Block for Main Distributing Frames	Pending

On an exception basis where the Central Office is out of space or as an application for Unbundled Network Elements (UNE), the Network Bay Distributing Frame (NBDF) may be used. A single sided frame mounted within an interconnecting series of standard unequal flange bays, each having two vertical bars mounting eight terminal blocks on each bar. There are horizontal troughs between the two vertical bars and between the adjoining NBDF bays. The UNE arrangement is not an IDF, it is classified as a Collocation Frame that will be in addition to a IDF and is covered in ATT-002-316-001, Unbundled Network Elements Equipment Installation for the Central Office, Issue 2, Dec 2000.

A pictorial illustration on the next page shows five connector blocks, but in fact there should be eight. The standard termination arrangement will have the left bar on each NBDF bay as the termination point for shielded and non-shielded tie cables to the primary Main Distributing Frame. These cables will be normally terminated on the horizontal side of the MDF to permit the maximum footprint on the vertical side for cable pair terminations. The right bar on each NBDF bay is intended for equipment/CLEC terminations. In instances where there is a minimal requirement for tie pair connectivity between the NBDF and the MDF, the top half (4-blocks) of the vertical left tie bar of each NBDF bay may be used for equipment/CLEC terminations with the bottom half being used for the tie cable terminations.



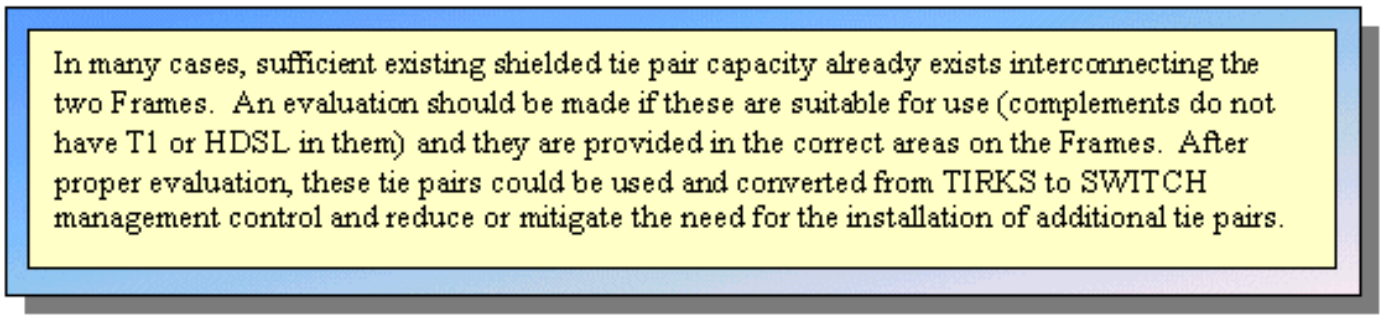
Pictorial View of the Single Sided DSX/xDSL/ADSL NBDF Bay/Frame
Front View **Side View**

This illustration shows how a DS0 Collocation Bay/Frame is arranged. The equipment will fit within a standard bay footprint and may be placed in an existing Cageless Collocation Lineup.

11. TIE PAIR PLACEMENTS ON MULTIPLE FRAMES

When multiple Frames are used within the same Central Office tie pairs will be required in sufficient quantities to support the types of services placed there. It is recommended that all tie cables be shielded. Ground the IDF properly and terminate the tie pair ground leads to the IDF ground.

When using COSMIC or Modular Frames interconnected to a conventional frame, a factor of 1.3 needs to be applied to insure that xDSL services are properly distributed throughout the Modular Frame. This will permit the successful introduction of this service on a Modular frame without having the need to use IntraMod Tie Pairs where other Spectrum Interference issues are presented with other Special Circuits. **DO NOT USE IntraMod Tie Pairs for xDSL services, including HPFL (Line Sharing).** The use of a combination Shielded and Non-Shielded COSMIC to MDF arrangement will dictate a slightly higher tie pair count over the all-shielded layout as shown below.



Typical Tie Pair Placement for IDF placements

Forecasted Deployment of IDF Sizing		Number of Shielded Tie Pairs used on a Single Frame Arrangement	Number of Shielded Tie Pairs - Multiple Frame Arrangement (Conv IDF to Conv MDF)	Number of All Shielded Tie Pairs - Multiple Frame Arrangement (Conv IDF to COSMIC-MDF (*)	Network Bay Distributing Frame (NBDF) to Conv MDF
1-year 6-verticals low tie pair layout		0	1200	1600	1200
1-year 6-verticals std layout		0	2400	3200	2400
5-year 18-verticals low tie pair layout		0	3600	4700	3600
5-year 18-verticals std layout		0	7200	9400	7200

(*) COSMIC Frame Model assumes 2 Modular Lineups in one COSMIC Frame Configuration.

A "Rule of Thumb" on Tie Pair provisioning should be based upon actual forecasts and measured usage on frames. Periodic reviews on a rolling 5-year basis are necessary to insure an adequate supply of tie pairs between frames. Terminations are based on 100 pair connecting blocks shown below:

Frame Type Interconnections	Number of IDF Terminations	Ratio of Tie Pairs per IDF terminations needed
Conventional - Conventional	< 10,000 pairs (100 blocks)	20%
Conventional - Conventional	10,001 - 100,000 pairs	10%
COSMIC (COSMIC is a frame manufactured by CommScope. This name used here is generic for any COSMIC/ESS/Modular (non-conventional frame) manufactured by Porta, Corning Cable Systems, CommScope or Emerson Network Power. Porta is no longer standard. Emerson Network Power is not standard. CommScope has a Restricted Approval for embedded systems only.) - Conventional	< 10,000 pairs (100 blocks)	26%
COSMIC - Conventional	10,001 - 100,000 pairs	13%

NOTE:
Terminations to any Universal Modular Distributing Frame (UMDF), COSMIC/ESS/Modular Frame requires the termination ratio to be increased by 1.3 for the proper pair spread over multiple lineups for the short jumper plan deployment. A minimum presence of 1 connecting block must be placed on each modular frame lineup in the middle. DSL jumper lengths should not exceed 10 MODs on each lineup.

12. Frames of the Future

The Mechanized (a.k.a. Automated) Frame which would replace the manual work of placing and testing cross-connects has been the desired solution for several decades. Recognizing that the technology might finally be coming of age, ATT Technical staff working with Procurement began the search for these potential solutions in 1998. The Cross Functional Sourcing Team (CFST) for Common Systems in NP&E along with participation from the OSP-CFST, began the investigation. Through the years, the manufacturers generally have resisted any standards and tried to provide the customer with proprietary hardware and software that is not interchangeable.

It was determined that a new standard for the industry was urgently needed. ATT co-sponsored and ultimately helped obtain consensus in the completion of Telcordia Technologies GR-2525-CORE, Generic Requirements and Design Considerations for Mechanized Distributing Frames, Issue 1, dated March 2004. With this in hand as the core basis, ATT pursued its fifth RFI with this industry.

The Technical staff has always seen the potential for this type of product. Now, with the introduction of the new technologies along with Telcordia standards, the combined CFST finally sees the potential of this technology coming to fruition. The committee voted unanimously to recommend that, at such time that the leading manufacturers have finished developing and enhancing their products and have successfully tested their product at Telcordia, ATT will issue a Request for Quote (RFQ) for both inside and outside plant use. The timetable is solely dependent upon the manufacturers since the current products are “not ready for prime time”. Once a viable system has been identified, tested and validated, the replacement of frames with this new system will be covered further in this document.

13. References

For further information or electronic copies of this document and related information, visit either of the internal ATT Local Exchange Carrier Web (internal) sites:

http://home.ATT.com/commonsystems/ or http://apex.ATT.com

Document	Description	Issue
ATT-TELCO-002-316-002	Collocation Provisioning Guidelines	Current Issue
ATT-TELCO-IS-002-316-001	UNE Deployment in the Central Office	Current Issue
ATT-TELCO-IS-002-316-004	Tie Pair Management on MDF/IDF Frames	Current Issue
ATT-TELCO-IS-002-316-006	Line Sharing Deployment M&P	Current Issue
ATT-TELCO-002-316-008	CLEC Cable Placement	Current Issue
ATT-TELCO-002-316-009	ADSL for the Central Office M&P	Current Issue
ATT-TELCO-002-216-025, Infrastructure Deployment Guidelines (IDG), Switching, Tab 11	Distributing Frames	Current Issue
ATT-TP-76200	Network Equipment - Building Systems	Current Issue
ATT-TP-76300	Installation Guide within the Central Office	Current Issue
ATT-TP-76400	Detail Engineer Requirements for the C.O.	Current Issue
ATT-TELCO-002-316-101	Wire Center Planning M&P, Space Planning for the C.O.	Current Issue
ATT-TELCO-IS-812-000-012	Frame Standards	Current Issue
ATT-TELCO-002-618-001	FrameMate User Manual	Current Issue
Att-TELCO-002-217-125	13 State Markings and Identification Standards	Current Issue
PAN20011072	Avaya Modular Frames Restricted Approval for Use Applied	Current Issue
PAN 20001017	96-port POTS-SPLITTER Approval for Use	Current Issue
PAN 2000737	128-port POTS-SPLITTER Approval for Use	Current Issue
PAN 20001000	Main Distributing Frames Approval for Use	Current Issue
ATT-TELCO-PAN-COMMON SYSTEMS 2007-0002	Frame Blocks Approval for Use	Current Issue
PAN 19985018	Tight Twist Wire for 1.544 Mb/s/T1 Approval for Use	Current Issue
ATT-C-20000-E-00	ATT Drawings, Engineering & Wiring	Current Issue

ATT-C-20000-W-00	for MDF Frames	
ATT-C-20001-E-00 ATT-C-20001-W-00	ATT Drawings, Engineering & Wiring for a Single Sided Bay Frame	Current Issue
ATT-FLASH 00-030R2	ATT Equipment Deviation for over-sized Equipment	Current Issue
ATT-FLASH-000-000-035	ATT Use of IDF Provisioning	Current Issue

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