SBC-002-316-018
Distributing Frame Standards

Abstract
Presented in this document are the methods and procedures for the deployment of VF/DS0 Distributing Frames.

Audience: The primary audience for this document is SBC Local Exchange Carrier personnel in the following disciplines, Frame Planner, Long Range Technical Planners, Space Planner and Network Operation (LFO-IN) organizations. This document is to be used internally within **SBC-13STATE** and their Authorized Vendors and have a limited distribution subject to the header/footer information.

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1. Reasons for Reissue

This section is reserved for future issues.

2. Introduction

This document provides the general description and specifications for Conventional Distributing Frames utilized in SBC facilities.

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

NOTE: Unless otherwise noted, all references to a distributing frame are in relation to copper terminations of DS0 or VF type circuits.

2.1 Strategic Direction

The Distributing Frame Family will continue to be a pivotal part of the telecommunications infrastructure. On a going-forward basis, the standard frame for use will be the double-sided 8'10" high Conventional Frame for non-raised floor environments. For raised floor environments, the 7' high double-sided conventional frame is standard.

For specific deployment requirements of new frames and for growth additions to existing frames refer to *SBC-002-316-003 Frame Forecast M&P* and *SBC-002-216-025 IDG (Infrastructure Deployment Guidelines) – Switching, Tab 11 - Distributing Frames*.

3. Conventional Distributing Frames

Distributing frames are not covered in the Building Block / Transport Build process and therefore the cluster vendor program is not in force. The cluster vendor may or may not be an approved EF&I vendor for distributing frames. Check with your local quality management group to determine if the vendor is approved to perform frame work.

A One Time Approval (OTA) is required when considering the placement of a distributing frame not noted in this document or noted as requiring an OTA. For OTA procedures see SBC 002-200-992, OTA (One Time Approval) Purchase of Non-Approved Products. In an effort to minimize costs and standardize across **SBC-13STATE**, the placement of non-approved distributing frames is ***PROHIBITED.***

When a new Wire Center is deployed, the provisioning of an 8'10" high double-sided low profile frame (Engineering Drawing Number SBC-C-20006-E-00) will be deployed to meet the 5-year forecast in accordance with SBC-002-316-003, SBC Frame Forecast M&P.

Note: If the 20-year forecast exceeds the capacity of a 200 vertical 8'10" frame, then the installation of an 11' 6" frame at that location should be considered. Refer to Engineering Drawing Number SBC-C-20007-E-00.

If the new Wire Center is utilizing a raised floor environment, provision a 7' high double-sided low profile frame. Refer to Engineering Drawing Number SBC-C-20009-E-00. The frame will not be braced or supported from above and all cabling will utilize cableways beneath the raised floor. If the 20-year forecast exceeds the capacity of a 200 vertical 7' frame, deploy an 8'10" frame.

NOTE: The 8'10" frame must be supported from above and coordination with CRE

is essential.

3.1 General Descriptions

The conventional Distributing Frame is constructed of a series of vertical assemblies. These assemblies consist of a vertical center strut with a number of horizontal cross-arms. The vertical assemblies are joined together in a series to form the frame structure. On one side of the frame the cross-arms are joined horizontally to form horizontal shelves, and on the opposite side of the frame, the cross-arms are joined vertically to form vertical mounting structures. The DF may also be constructed with vertical or horizontal structures on both sides of the frame. All of these structures are considered double-sided DF's.

The DF may also be constructed as a single-sided frame with several possible configurations – horizontal shelves on the upper half of the frame and verticals on the lower half, or with just a vertical or horizontal assembly.

3.2 General Requirements

3.2.1 Structural Considerations

All new DF installations shall conform to NEBS (Network Equipment – Building Standards) requirements as described in TP76200MP.

The frame structure will be constructed in such a way as to allow the placement of terminal blocks and connectors directly to the frame. The use of adapters to allow for the mounting of frame products from a variety of manufacturers is also acceptable.

The DF shall be capable of accommodating interconnections of any equipment on it with any other equipment on it.

The frame components (materials, finish, enclosures, etc.) shall be such that performance, life and reliability requirements will be met when operating in the environment described in NEBS.

The termination capacity of the frame must be appropriate for its intended application. Furthermore, it must be possible to increase the termination capacity of the initial installation by providing additional hardware.

Considerations should be made to ensure that growth of the DF shall not interfere with the day to day work of the DF workforce nor interrupt customer service. Cables should be capable of entering the frame structure from either above or below. There should be sufficient space to accommodate the addition, removal or rearrangement of individual cables or equipment on the frame without disturbing adjacent equipment on the frame. There should be adequate cabling space to allow for dressing and securing cables neatly. Once the cable is properly secured and dressed, it should not interfere with normal frame operations.

Jumper routes or pathways through the horizontal shelves and vertical troughs must be of adequate size to accommodate anticipated equipment growth, taking into consideration the use of appropriate frame management strategies to ensure proper frame balance. Some of the factors to be taken into consideration when determining adequate routing capacity include, but are not limited to: total termination capacity, termination density, frame zoning, and mechanized or manual assignment procedures.

As a general rule of thumb for calculating jumper density, assume that the maximum density is 80 twisted pairs of 24 gauge unshielded jumper wire per square inch.

The frame structure should be capable of supporting the load normally expected to be placed upon it. This load includes fully loaded lateral and vertical cable racks. This also includes all cables, jumpers or equipment that would be placed on the frame structure.

To mitigate installer and attendant safety issues, there should be no sharp edges or corners on the structure. There should be no parts or components that might abrade, cut or damage the cables or jumpers that are placed on the frame during normal frame operations.

3.2.2 Electrical Considerations

The frame shall be electrically grounded and have its own ground wire connected to the central office ground. The frame ground must be isolated from the office switch ground.

AC electrical outlets installed as part of the frame structure must conform to all local electrical codes and to the National Electrical Code. The neutral wire shall never be used as the source of ground for the purpose of providing equipment grounding.

If outside plant connectors are to be terminated on the frame structure, a ground bar must be provided across the top of the frame, and each vertical mounting bar shall be attached to it. All ground bar joints and connections should be made on a bare, bright, unpainted surface coated with an anti-oxidant compound. The connections should be made with machine screws in tapped holes or with self-tapping screws.

Aluminum conductors must not be used to provide grounding.

3.3 Test Procedures

All of the frame structures must be capable of sustaining the structural loads, both static and dynamic, that they are expected to encounter. These loads include the weight of lateral and transverse cable racks, and the cables they support. The weight of the apparatus mounted on the vertical and horizontal sides and their associated wiring and jumpers must also be included.

The following loads shall be applied to the frame under test:

- **Cable Rack Load** – This load simulates the load applied to the structure by lateral and transverse cable racks and cable. The lateral rack loading shall be simulated by the application of a force of 130 pounds per linear foot for each linear foot of frame being tested. The forces shall be applied at the attachment or contact points between the cable rack and the frame structure. Figure 1.
- **Apparatus Load** – Horizontal – Each horizontal mounting position that could be equipped with a terminal block, or any other frame mounted apparatus, shall have a 5 pound weight attached for each eight inch space. Figure 2.
- **Apparatus Load** – Vertical – For each 10 inches of vertical available for the mounting of equipment a 25 pound weight shall be applied at the mounting. Figure 3.
- **Jumper Wire Load** – This load is intended to simulate the load applied to the structure by the pile up of jumper wire in the various routes. Because jumper routes can vary widely in their capacity, it will be necessary to calculate the weight for each of the different routes. For the purposes of these calculations, it shall be assumed that the entire cross-section is filled with jumpers and that these jumpers weigh 1.2 pounds per linear foot per square inch. After the jumper weight has been calculated, these weights shall be applied to the framework in a distributed manner that approximates the actual conditions as closely as possible. Figure 4.

- **Inadvertent Human Load** – Each of the following loads is intended to simulate inadvertent contact with the frame by a person:
  - A horizontal load perpendicular to the frame, of 200 pounds magnitude, shall be applied to a horizontal rail at least five but no more than six feet above the floor and at the midpoint of the test section.
  - A similar horizontal load shall be applied to the vertical side on a vertical near the midpoint of the test section.

  These two loads shall not be applied simultaneously.
- A vertical 200 pound load shall be applied to the fourth shelf up from the floor at the midpoint of the test section.

Static Test – With the framework statically loaded with the various elements described above (multiplied by at least a safety factor of 2.0), no component shall exceed elastic limits, i.e., permanently deform either plastically or by buckling.

Dynamic Test – With the framework loaded with the various elements described above it shall be tested in accordance with SBC's TP76200MP (NEBS) and Telcordia's GR-63-CORE requirements.

Failure Criteria – A framework shall have met these requirements if, after testing:

- None of the joints have failed.
- There is no buckling of any frame structural member.
- There is no plastic deformation of any structural member.

Figure 1. Cable Rack Loading

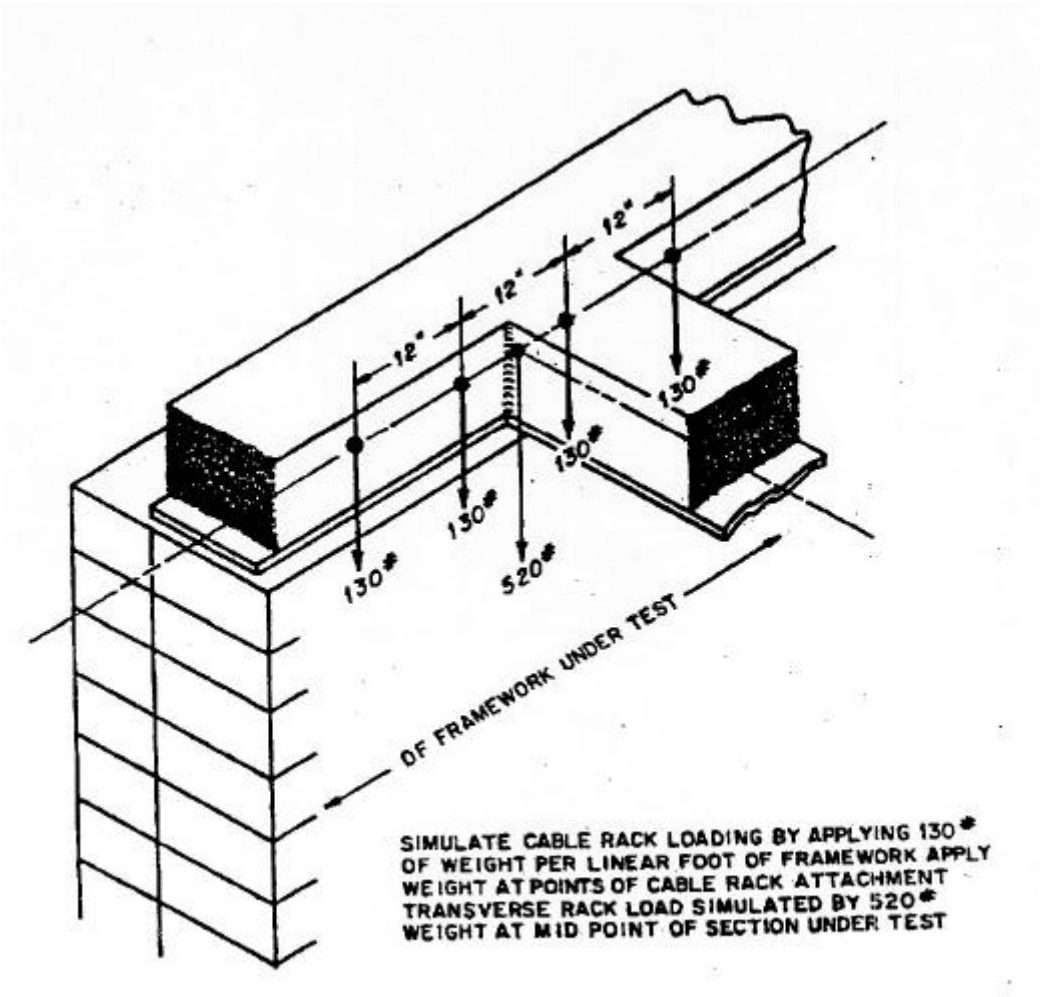


Figure 2. Apparatus Load – Horizontal

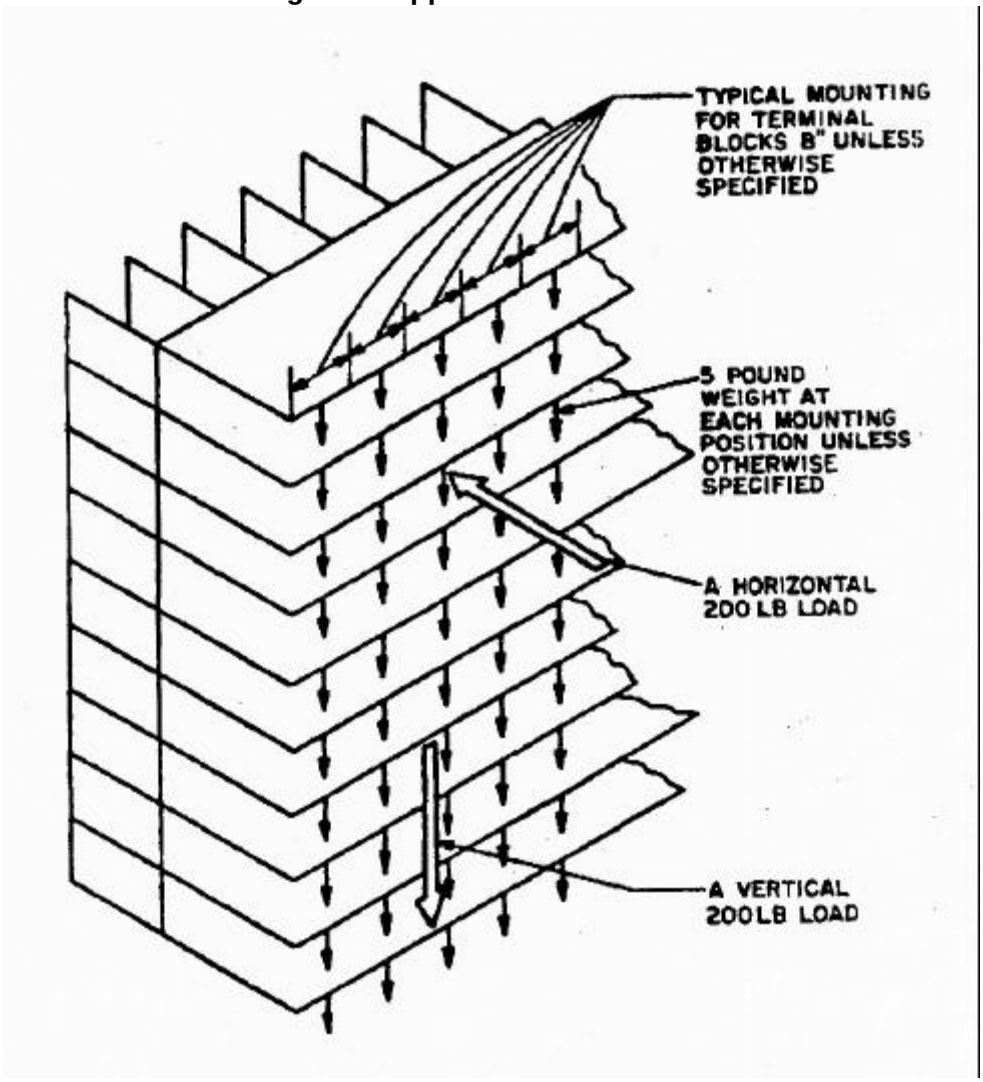


Figure 3. Apparatus Load – Vertical

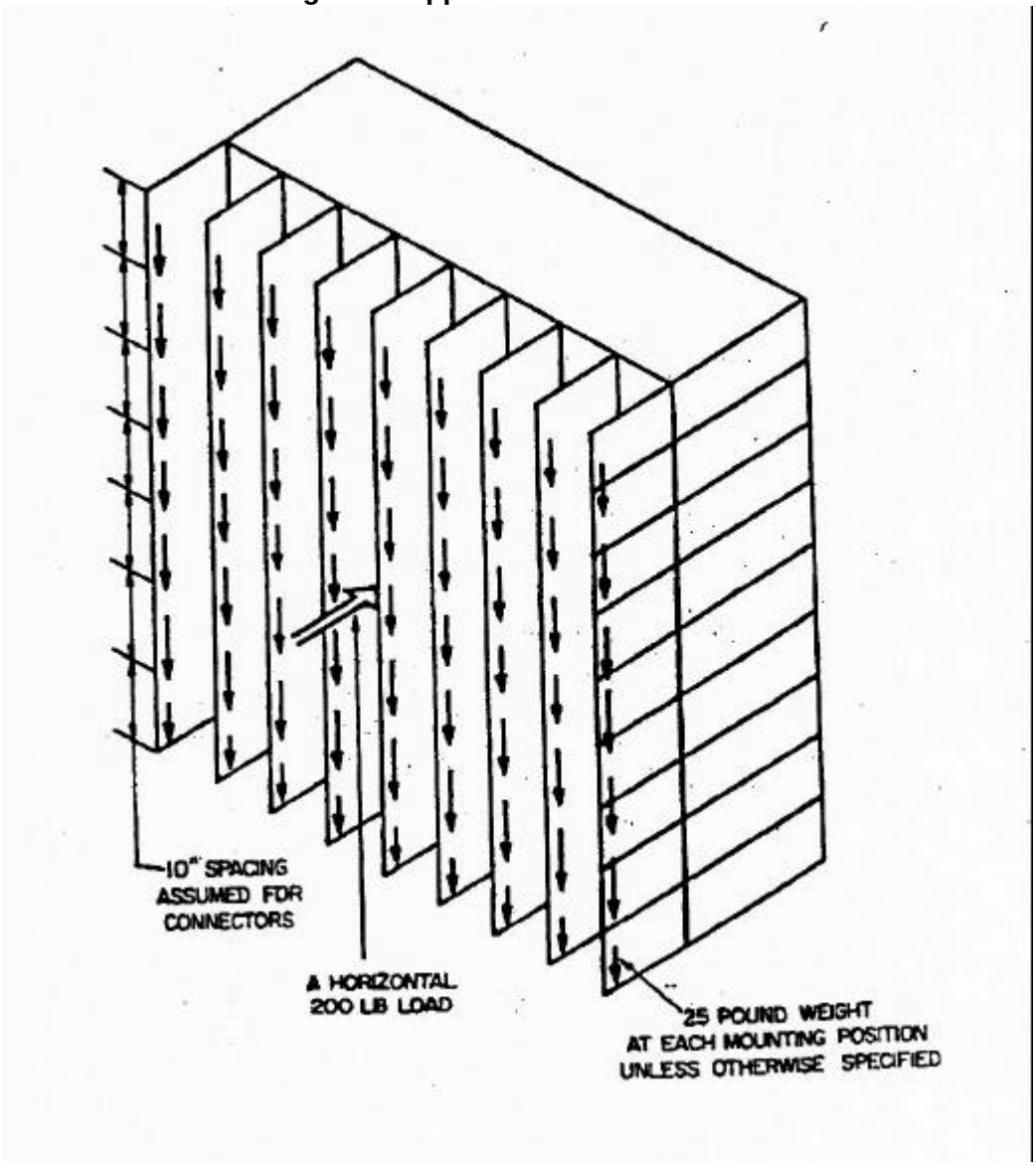
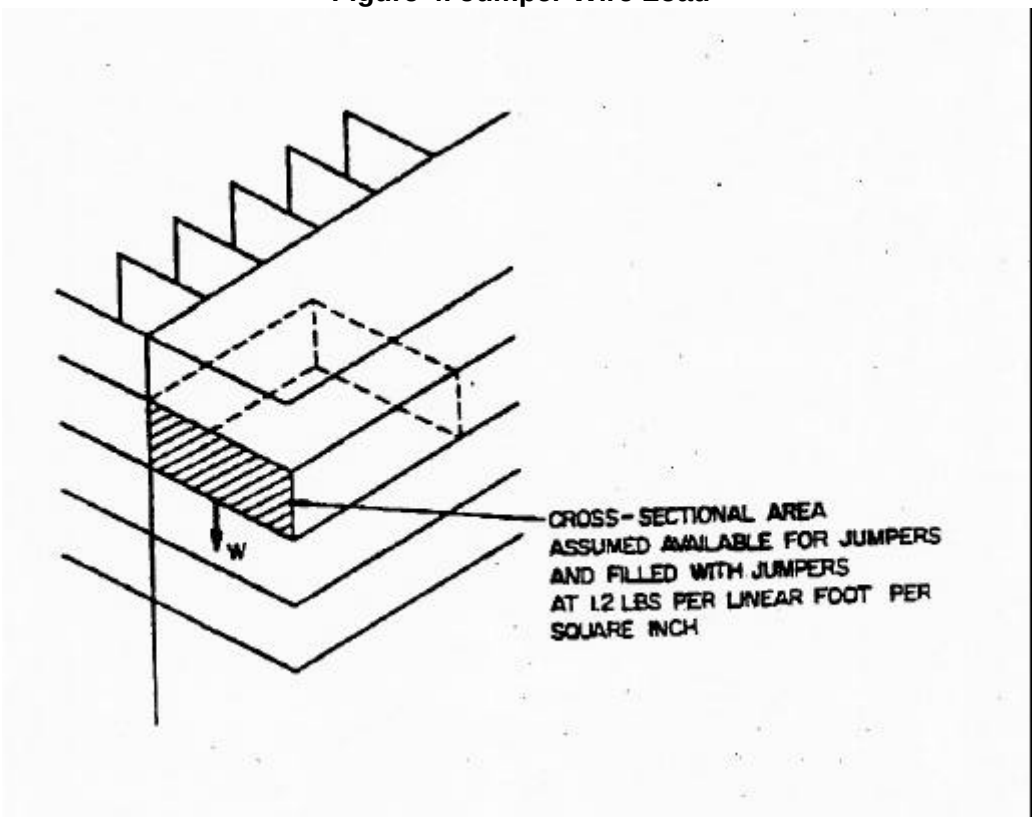


Figure 4. Jumper Wire Load



3.4 Dimensional Requirements

When planning a new conventional distributing frame or an addition to a conventional distributing frame refer to the SBC Distributing Frame Standards Drawings. These drawings are available on the SBC Standards Drawings WEB site http://woodduck/. The dimensions shown on these drawings are now considered to be the **SBC-13State** standard and must be adhered to.

The following is the list of SBC Distributing Frame Standards Drawings:

- SBC-E-20005-E-00 for the 8'10" frame - shelf "A" is 12" from the floor.
- SBC-E-20006-E-00 for the 8'10" frame – shelf "A" is 15" from the floor. Figure 5
- SBC-E-20007-E-00 for the 11'6" frame – shelf "A" is 15" from the floor. Figure 6
- SBC-E-20008-E-00 for the 14'5" frame – shelf "A" is 15" from the floor.
- SBC-E-20009-E-00 for the 7' frame – shelf "A" is 12" from floor. Figure 7
- SBC-E-20001-E-00 for the Network Bay Distributing Frame (NBDF). See Section 5.

Note: The first horizontal shelf on all new 8'10" and 11'6" frames will be 15 inches off of the floor. The first shelf on the 7' frame will be at 12 inches. Augments of existing frames will match the first shelf dimension of the existing frame.

The following pages provide examples of some of the frame configurations and their appropriate dimensions. The dimensions shown on these drawings are considered to be standard for **SBC-13State**. Some dimensions are shown as a range, such as, 19 ¼" to 20". This means that this dimension on the frame must fall between the stated range. These ranges are provided to allow for differences between the frame manufacturers.

Figure 5. SBC-E-20006-E-00 8'10" Double-Sided Frame with 15" First Shelf

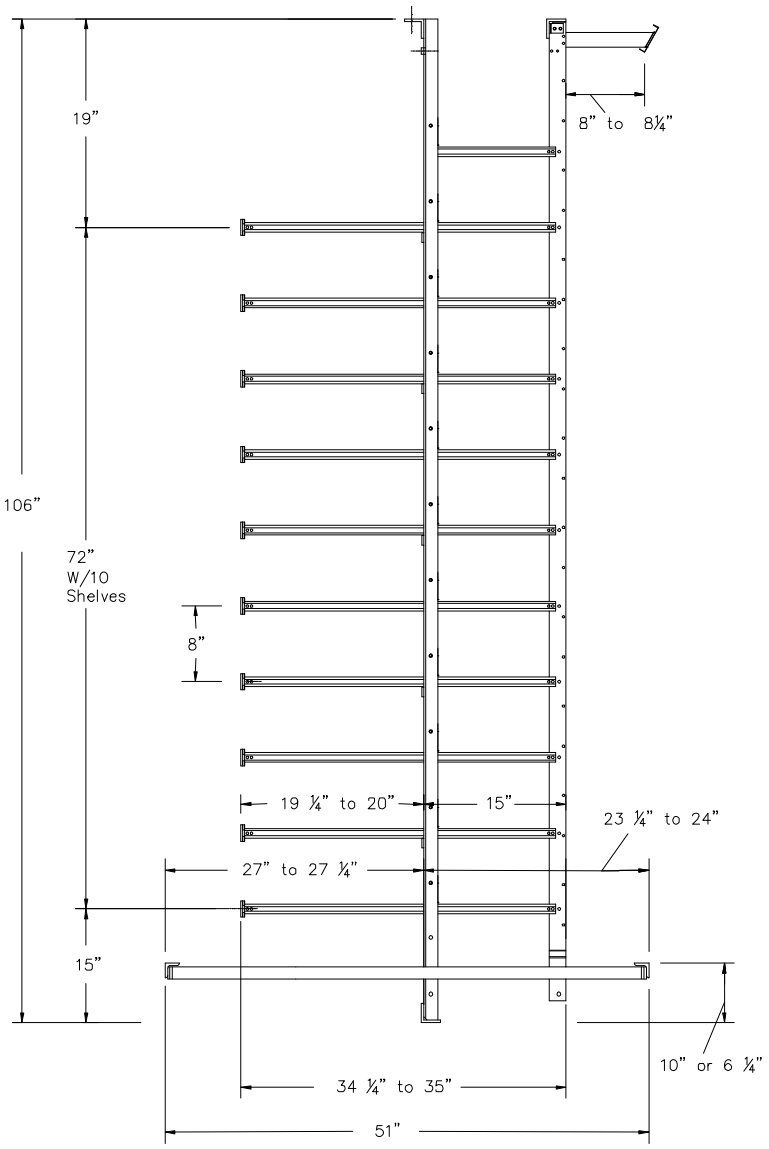


Figure 6. SBC-E-20007-E-00 11'6" Double Sided Frame

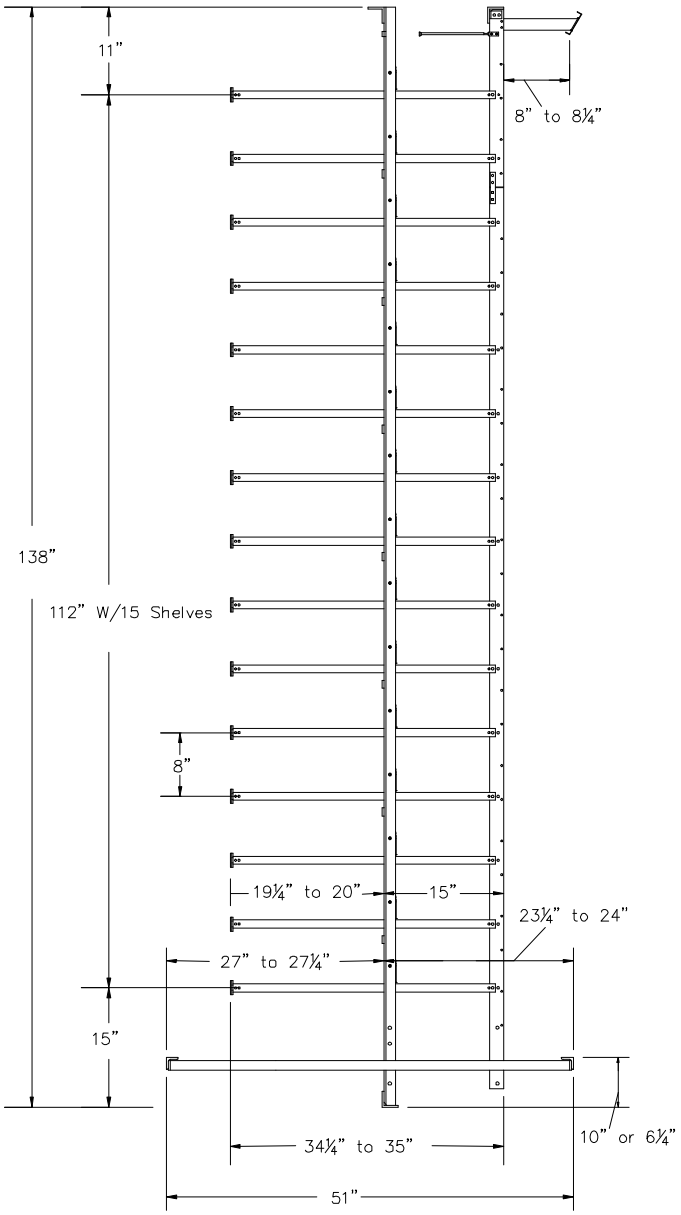
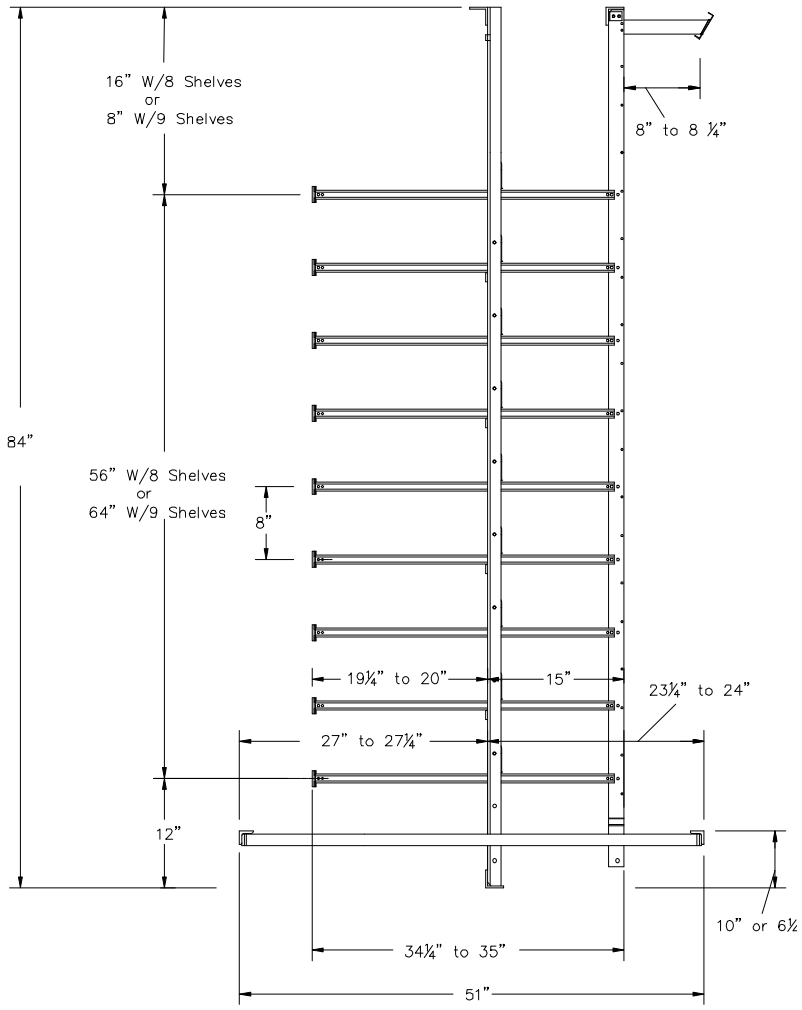
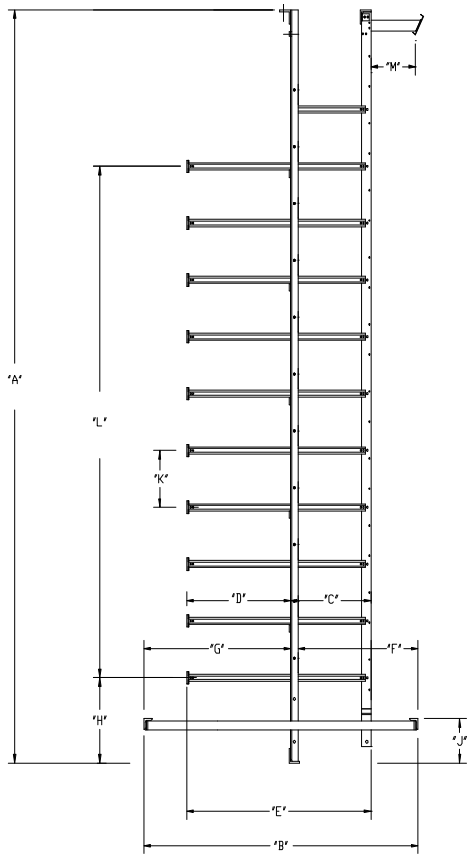


Figure 7. SBC-E-20009-E-00 7' Double Sided Frame



To help in identifying the most appropriate frame for the purposes of augmenting an existing frame, use Figures 8 and 9. Figure 8 represents a drawing of a distributing frame with the vertical & horizontal sides. Use this drawing and the checklist in Figure 9 during an office visit to note the dimensions of the specific frame. Table A is a cross-reference to the notations on Figure 8. The checklist can be used to aid the Frame Planner and the equipment vendor to properly match the additional verticals with the existing frame.

Figure 8. Areas of concern when adding verticals to existing conventional frames



The areas of concern, when planning an addition to an existing distributing frame are listed in the following table.

Table A. Reference Key for Figure 8.

NOTATION	DESCRIPTION
A	OVERALL FRAME HEIGHT
B	DEPTH OF GUARD RAIL
C	SHELF DEPTH - VERTICAL SIDE
D	SHELF DEPTH - HORIZONTAL SIDE
E	OVERALL SHELF DEPTH
F	DEPTH OF GUARD RAIL - VERTICAL SIDE
G	DEPTH OF GUARD RAIL - HORIZONTAL SIDE
H	SHELF “A” HEIGHT FROM FLOOR
J	GUARD RAIL HEIGHT FROM FLOOR
K	DISTANCE BETWEEN HORIZONTAL SHELVES
L	OVERALL HEIGHT OF SHELVES AND NUMBER OF SHELVES
M	DISTANCE BETWEEN VERTICAL & DESIGNATION BOARD

Figure 9. Checklist for Conventional Distributing Frame Additions

DISTRIBUTING FRAME CHECKLIST

(ADDITIONS)
Refer to Figure 8 for diagram & Table A of SBC-002-316-018 for dimension notations

CONVENTIONAL FRAMES

Overall Frame Height (A) _____ Overall Shelf Depth (E)_____
Shelf Depth – Vertical side (C) _____ Shelf Depth – Horizontal side (D) _____
Depth of Guard Rail – Vert. side (F) _____ Depth of Guard Rail – Horiz. side (G) ____
Depth of Guard Rail (B) _____ Guard Rail Height From Floor (J) _____
Shelf "A" Height From Floor (H) _____
Distance Between Horizontal Shelves (K)_____
Overall Height of Shelves & Number of Shelves (L)_____
Distance Between Vertical & Designation Board (M)_____
Distance Between Verticals_____
Manufacturer of Existing Frame _____
Part Number of Existing Frame (if known)_____

ADDITIONAL INFORMATION

Will lighting & AC need to be extended? _____
Will cable racking need to be extended? _____
Are verticals to be configured for protectors or blocks? _____

NOTES:

4. Universal Modular Distributing Frame (UMDF)

There are several types of UMDF's deployed within the **SBC 13-STATE** network. The Avaya COSMIC I/II type frames are the most common modular frames.

The COSMIC line of frames are the only modular frames currently approved for use within the network. The use of COSMIC frames is restricted to augments of existing COSMIC line-ups. Deployment of new COSMIC frames is prohibited.

Due to the exceptionally high cost of Universal Modular Distributing Frames and their limited applicability with regard to spectrum interference, Enterprise Technology Support Staff requires the application of an OTA (One Time Approval) prior to placement of any new COSMIC frames. Refer to PAN 20011072, Restriction of Approval for Use of Avaya COSMIC Modular Frames, for detailed information.

5. Network Bay Distributing Frame (NBDF)

The Network Bay Distributing Frame is a new type of distributing frame that will house connector blocks in a 23-inch network bay. This bay may be placed in an equipment lineup and be utilized in a manner similar to DSX bays but to be used for DS0 or Voice Frequency (VF) cross connects.

This frame configuration provides several applications in low utilization sites.

For example:

- CLEC to CLEC cross connections
- CLEC to ILEC tie cables
- CEV, remote switching huts, customer premise applications
- Transport Network Element cross connects where only a COSMIC frame is deployed

A Product Approval Notice (PAN) is expected in early 2003. Prior to the issuance of the PAN(s) the NBDF may be obtained with a One Time Approval (OTA) from SBC Services Inc, Network Planning & Engineering – Common Systems.

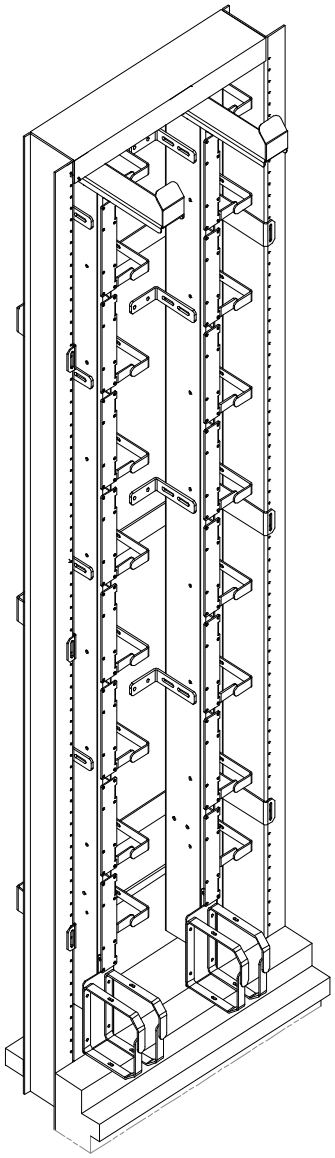
The NBDF is made up of a 23-inch network bay with a distributing frame kit assembled inside the bay. The network bays are standard and available from various approved manufacturers. Figure 10.

The distributing frame hardware mounts in the network bay. The hardware is arranged to provide 2 verticals arranged for terminal blocks or protector connectors. The protector arrangement shall be considered non-standard. Refer to Engineering Drawing Number SBC-C-20001-E-00 for detailed equipment drawings.

NOTE: The protector arrangement is NOT intended for deployment in central offices.

Each vertical will accommodate eight (8) Corning 139 type blocks with jumper management to the right of the vertical. Jumper troughs are placed at the top and bottom of the hardware. These troughs facilitate jumper placement between verticals and multiple bays. A maximum of 10 bays may be placed in a lineup. Comply with floor space guidelines as referenced in SBC-002-316-101, SBC Wire Center Planning M&P.

Figure 10. Example NBDF: Shown with 2 verticals in a 23" Network bay.



6. Miscellaneous Items

Miscellaneous items include the equipment and services required to facilitate the everyday activities of the distributing frame.

6.1 FrameMate and FrameMate II

FrameMate and FrameMate II are software applications developed to assist in the management of Modular and Conventional distributing frames respectively.

FrameMate II (FMII) for Conventional Frames will provide a mechanized method of managing the inventory and frame space assignment processes for conventional frames, much in the same manner that FrameMate currently manages Universal Modular Distributing Frames, such as COSMIC. FMII will also provide a mechanized method for updating conventional frame information in the SWITCH/FOMS database. FMII will replace inventory functionality currently provided by ACORN in SBC Midwest, and 140 drawings utilized in SBC West, SBC Southwest, and SBC Southern New England Telephone.

FrameMate II is undergoing limited release to the Frame Planners.

6.2 Ladders, Work Platforms & Stools

Ladders are required for reaching the upper levels of the conventional distributing frame. The most common ladder is the rolling track ladder. This ladder is used on all distributing frames over 9' that are not equipped with mezzanines. Additions to distributing frames would not normally require additional ladders.

When a new frame is placed, ladders are required. If an 8'10" conventional is initially placed, use the "A" frame rolling ladder. Two ladders for each side of the frame should be sufficient depending on the number of verticals. Use increments of 50 verticals as a benchmark for adding additional ladders. The most commonly used "A" frame rolling ladder is the KS5239 L2 ladder manufactured by Putnam Rolling Ladder Co. www.putnamrollingladder.com/

Non mezzanine conventional frames higher than 9'0" require the utilization of rolling ladders attached to a ladder track. On initial frame placements provide a minimum of 2 ladders per side. Use an increment of 50 verticals for additional ladders. The rolling ladder for the 11'6" frame is manufactured by Putnam Rolling Ladder Co. and is available from Putnam as number 204GS.

Additions to the 14'5" conventional distributing frame may or may not require adding ladders. If additional ladders are required, they are available from Putnam as number 208GS.

The use of ladders is not necessary for Modular Distributing Frames. However, the rolling work platform, the KS-21415-L1, without wire reel, and the KS21415-L2, with wire reel, are useful tools. The work platform ladder is also useful for the 8'10" conventional distributing frame.

Also available is a general-purpose rolling stool, ideal for low horizontal work, manufactured by Whiteside Mfg. Co. Inc. Ordering info can be found in PAN 19995208.

Ladder hardware & accessories are available from Putnam Ladder (212-226-5147).

Refer to TP76400MP (Detail Engineering Standards) Section 8 for detail engineering requirements.

6.3 AC Trolley Duct

The AC Trolley Duct that supplied AC for a soldering iron connection on a ladder is no longer required for new distributing frame placements or frame additions. Because all new terminations on the distributing frame are of the wire wrap type, soldering irons are not required. When adding verticals, do not extend this duct.

6.4 Lighting

The initial conventional frame placement and additions require sufficient lighting to satisfy the requirements listed in TP76400MP Sections 6, 8 and 13.

6.5 Communications Panels

There are several approved communications systems available for use in the central office. It is recommended that the system currently being used in the central office be expanded to support any new frame growths or placements. As new equipment is tested and approved it will be announced by way of the PAN (Product Approval Notice) process.

6.6 Testing Panels

Test panels for checking the 5 pin protectors are required on all new frame installations.

The approved protector unit tester is the wall-mounted panel, model 5712B, PID 701-091-753. It accurately measures the carbon type or solid state protector units for breakdown voltage. It also tests for tip & ring continuity and heat coil resistance. The 5712B is a direct replacement for the Lucent KS20100 L5 unit. The 5712B is available from CMC.

6.7 Wire Reels

Wire reels are required for all new frame installations. Depending on the utilization of the frame as an MDF or IDF, the number of reels needed for each frame vary. Provide 1 reel for POTS jumper wire, 1 reel for ADSL jumper wire, 1 reel for high-cap jumper wire and 1 reel for 4-wire jumper wire. Reels are available in plastic, KS 21955 L1, PID 401-977-335 and metal KS 8047 L2, PID 400218160.

7. Study Work in Progress

7.1 Mechanized Distributing Frame

A Request For Information (RFI) was issued by SBC Services, Enterprise Technology Support, Common Systems Standards for a mechanized / automated distributing frame. The RFI was reviewed at the March 2002 Common Systems CFST Frame and Fiber subcommittee meeting. At the present time, the Mechanized Distributing Frame technology is not at the desired maturation nor is the cost per line attractive enough for SBC to consider deployment.

Due to recent inquiries by the FCC and several states PUC's, the Common Systems CFST Frame and Fiber subcommittee will be conducting further detailed studies to validate the merit of these frames.

7.2 Raised Floor Initiative – DISTRIBUTING FRAMES

Currently Enterprise Technology Support is evaluating the utilization of raised floors in the Central Office. All transport type equipment will be placed on raised floors and cabled to the distributing frame from below.

Cabling between the distributing frame and the network elements will be managed by a cable rack system below the raised floor.

Placing a distributing frame on a raised floor creates unique challenges and opportunities. Because the frame cannot be supported from a cable rack infrastructure, the frame must be braced and designed to spread the weight over a larger area. Consequently, the floor supports must be designed to support the distributing frame. Because the frame must be free standing, the 7' double sided Conventional Frame is rated standard.

Further study is ongoing to determine if placing a distributing frame on a raised floor is operationally advantageous.

8. Financials

Distributing Frames are considered major material items. All frame blocks and terminals are minor material items; however, SBC takes the responsibility of defining the specific type and manufacturers of the blocks, to be deployed on the frames.

Frame materials are a Capital expense and are handled under baseline funding. The appropriate FRC's (Field Reporting Codes) will depend on the predominant use of the frame. Commonly used FRC's include 377C for Switching, 357C for Transport and 257C for OSP. Typically, a Central Office MDF is coded 377C with an ESS Switch terminated on it.

9. References

The following documents can be accessed from the Common Systems WEB site. The address is http://ebiz.sbc.com/commonsystems/

SBC-002-316-001, *SBC UNE Equipment Installation M&P*

SBC-002-316-002, *SBC Collocation Provisioning Guidelines*

SBC-002-316-003, *SBC Frame Deployment M&P*

SBC-002-316-016, *SBC Product Specifications for Connecting Blocks*

SBC-002-316-038, *SBC Frame Adapter Product Description*

SBC-002-316-101, *SBC Wire Center Planning*

SBC-UG-000-000013, *FrameMate II User's Guide*

PAN 19995207, SBC *Central Office Cart*

PAN 19995208, SBC *High Rise Seat from Whiteside MFG. Co. Inc.*

PAN 19995316, SBC *C.O. Connector & Terminal Blocks*

PAN 20001000, *SBC MDF/UMDF Approved Distributing Frames*

PAN 20001127, *SBC Nortel Companion Wireless Communication Systems*

PAN 20011072*, SBC Restriction of Approval for Use of AVAYA COSMIC Modular Distributing Frames*

TP76200MP, *SBC NEBS Requirements*

TP76300MP, *SBC Installation Requirements*

TP76400MP, *SBC Detailed Engineering Requirements*

The following documents can be accessed from the Vendor Documents section of the APEx Documents WEB site. The address is http://apex.sbc.com/

GR-63-CORE, *Network Equipment - Building Systems (NEBS): Physical Protection*

TR EOP-000162, *Conventional Distributing Frame Framework*

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