CONVENTIONAL DISTRIBUTING FRAMES

DESCRIPTION

CONTENTS PAGE

1. GENERAL

1.01 This section describes the various types of main distributing frames and combined distributing frames commonly used in larger multi-unit central office buildings.

1.02 This section is reissued to incorporate information on the 89-type connecting block and the 305-type connector.

1.03 Included in this section is information pertaining to combined distributing frames, low profile distributing frames, and B-type main distributing frames having both protective apparatus and interconnecting facilities on one frame.

1.04 The main distributing frame in a central office building is primarily an interface between outside plant cable pairs and central office equipment. A combined distributing frame is basically a main distributing frame which is used to interconnect trunks and miscellaneous equipment in addition to central office equipment.

1.05 Some of the basic type frames and terms used are:

- Conventional Frame
- Main Distributing Frame (MDF)
- Combined Distributing Frame (CDF)
- Protector Frame
- B-Type MDF
- A-Type MDF
- Low Profile Conventional Distributing Frame (LPCDF)
- Low Profile Double-Sided Protector Frame (LPDSPF)

1.06 ***Conventional Frame:*** A type of frame constructed of a steel framework employing vertical angles, channel transverse arms, top and base angles, rectangular tie bars, and angle guard rails. Conventional frames can be of various heights and lengths as necessary to serve the particular central office building where it is located. The term conventional frame is used as opposed to the modular type frames which are covered in separate sections.

1.07 ***Main Distributing Frame (MDF):*** Basically the MDF is that frame in a central office building where provision is made for a flexible association of outside plant cable pairs to central

office equipment. The cable pairs and the central office equipment are interconnected on the MDF by means of cross-connection jumpers. The outside plant cable pairs may terminate on protective apparatus mounted directly on the MDF, or they may terminate on protective apparatus mounted on a separate protector frame. Where a separate protector frame and MDF are used, office cabling (tie cables) connects the outside plant cable pairs from the protector frame to the MDF.

1.08 ***Combined Distributing Frame (CDF):*** A CDF is that frame in a central office building having provisions for trunk and miscellaneous interconnections in addition to outside plant to central office interconnections. A combined distributing frame can be a conventional B-type frame.

1.09 ***Protector Frame:*** A conventional protector frame is a double-sided frame on which is mounted protective apparatus or jacks and where outside plant cable pairs are terminated.

1.10 ***B-Type MDF:*** This is a single unit conventional frame that provides for all protective apparatus mounting, outside plant cable pair terminations, and cable pair to central office equipment interconnections on a single frame. No separate protector frame is used with a B-type MDF. (This type frame may be used as a CDF.)

1.11 ***A-Type MDF:*** Some early design frames are designated as A-type MDFs. A-type frames will not be separately described in this section as they are basically the same as B-type frames differing only in the following respect. On A-type frames, outside plant cable pairs are terminated on terminal strips on the horizontal side of the frame; central office equipment is terminated on fuse mountings or protectors mounted on the vertical side of the frame. On B-type frames, outside plant cable pairs are terminated on protectors, connectors, or jacks mounted on the vertical side of the frame; central office equipment is terminated on terminal strips ⧫or connecting blocks⧫ on the horizontal side.

1.12 ***Low Profile Conventional Distributing Frame (LPCDF):*** This is a conventional type distributing frame developed to meet the needs of buildings which comply with restrictions of the new equipment building standards. The low profile conventional frame is basically a floor mounted, earthquake resistant, cut-down version of the taller conventional frames.

1.13 ***Low Profile Double-Sided Protector Frame (LPDSPF):*** The LPDSPF is basically a floor mounted, earthquake resistant, cut-down version of the taller conventional double-sided protector frame and is designed to be used with the LPCDF.

2. DOUBLE-SIDED PROTECTOR FRAME AND DISTRIBUTING FRAME

2.01 This type of MDF arrangement has a double-sided protector frame and a separate (usually parallel) distributing frame (Fig. 1). The protector frame portion has protectors, connectors, or jacks mounted on verticals on both sides of the frame. The distributing frame portion has terminal blocks mounted on verticals on the side facing the protector frame and terminal blocks mounted on horizontals on the side away from the protector frame. The capacity per MDF vertical of this type frame for terminating outside plant is twice that of the B-type MDF described in Part 3.

2.02 The outside plant cable pairs are terminated on protectors, connectors, or jacks which are mounted on verticals on both sides of the protector frame. Central office equipment is terminated on terminal blocks which are mounted on the horizontal side of the distributing frame. The protectors, connectors, or jacks on the protector frame are cabled to the terminal blocks mounted on the vertical side of the distributing frame. Each distributing frame vertical has the termination capacity of two protector frame verticals. Sections 201-206-101, 201-207-101, and 201-208-101 describe the various types of protectors, connectors, or jacks.

2.03 Where a double-sided frame is employed, all cross-connections are made on the distributing frame.

2.04 The double-sided protector frame and distributing frame can vary in height and equipment arrangement. Descriptions in 3.03 for the combined B-type MDF also apply; except reference shall be made to Fig. 1.

2.05 Each vertical of the protector frame is made of uprights spaced the proper distance apart and arranged for mounting protector hardware back to back. The protectors, connectors, or jacks

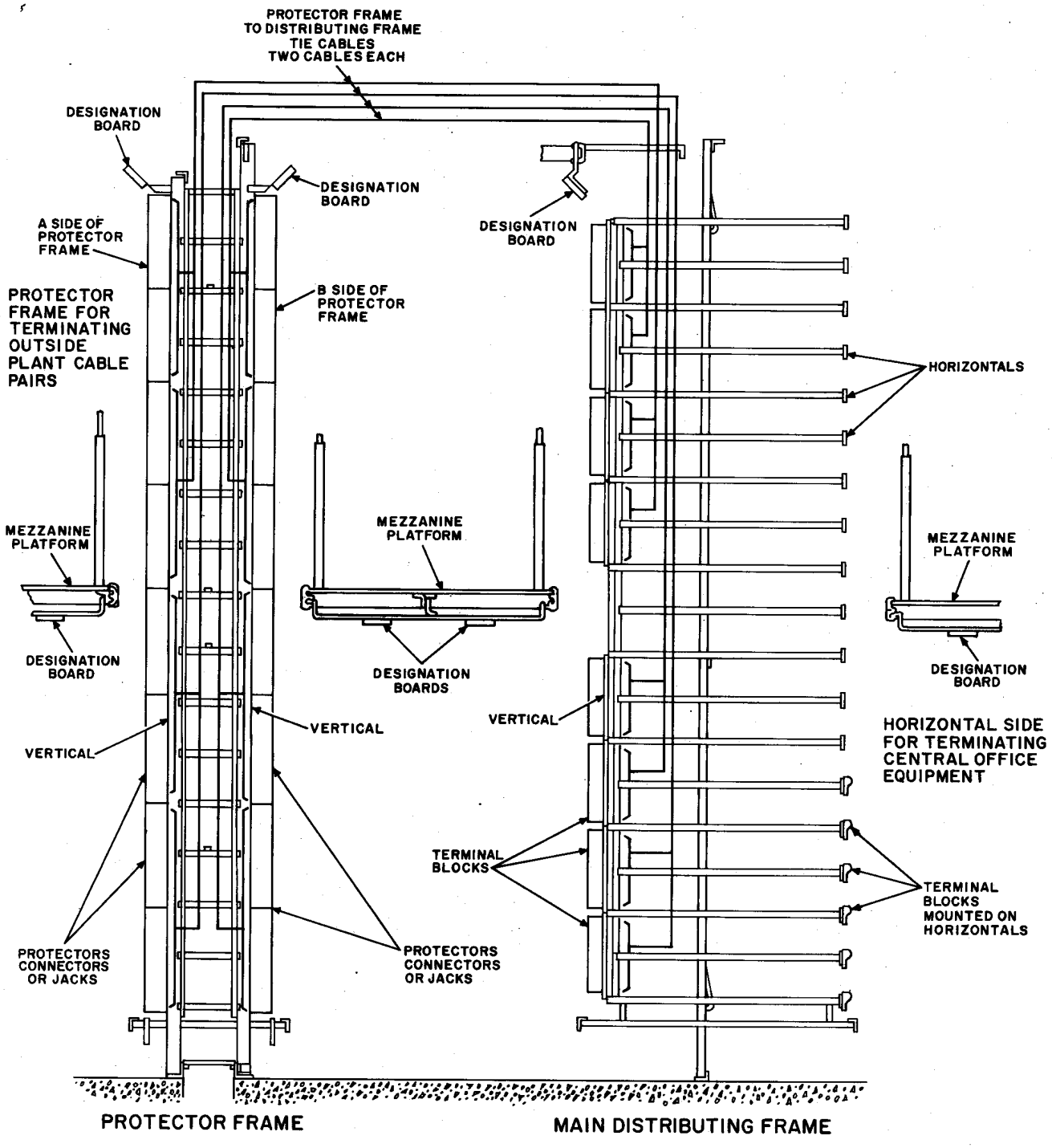

Fig. 1—Main Distributing Frame (MDF) With Double-Sided Protector Frame

are bolted to the vertical uprights. Verticals are generally spaced on 8-inch centers along the length of the frame. The capacity of a vertical depends on the height of the frame and the type of protector, connector, or jack provided (Table A). The number of verticals of a frame depends on the size of the central office building that the frame is intended to serve.

2.06 The vertical side of the distributing frame is arranged for mounting terminal blocks. These blocks are of varying capacity depending on the number of cable pairs terminated on the associated verticals on the protector frame. Verticals on the protector frame are cabled to and combined on verticals of the distributing frame (Fig. 1). A 16-inch space is left vacant in the middle of the vertical on the distributing frame at the level of the mezzanine platform where provided. If ladders are used, this vacant space is not required.

2.07 Terminal blocks mounted on the horizontal side of the distributing frame are for terminating central office equipment. Descriptions in 3.06 and 3.07 for the combined B-type MDF also apply; except reference shall be made to Fig. 1.

2.08 The 89-type connecting block was primarily designed and made available to provide a high density wiring option for the low height conventional distribution frames (listed in Table B) that require additional terminating capacity. The 89-type block is designed for use with DT-type irridated polyvinyl chloride (IPVC) jumper wire.

2.09 The 89-type connecting block is available in various terminal configurations which are: single wire wrap, bifurcated wire wrap, single quick clip, and single quick clip strapped on the rear of the block for bifurcation. All these blocks (19 codes) are eight-inches long for mounting on the vertical or horizontal side of the main frame on 8-inch centers. A fanning strip is included, which provides a surface for pair identification and/or other information, and isolates the terminals from wire tension induced during jumper running and manual jumper tracing operations.

2.10 The 756D wire insertion tool is used for connection on the 89-type blocks equipped with single quick clip terminals. In addition, a KS-21771 wire insertion tool with wire cut-off and wire removal facilities is available. The 724A wire removal tool can also be used for removing jumpers from the quick clip terminals. Standard wire wrap tools are used for connects on the 89-type blocks equipped with wire wrap terminals; the standard wire unwrap tools are used for disconnects.

2.11 All the 89-type blocks are mounted in a plastic housing which is designed to allow the connecting block to be rotated upward to 180-degrees, thus exposing the rear of the terminals for initial cable installation and servicing. The block locks in place in this open position by a

TABLE A

NUMBER OF OUTSIDE PLANT CABLE PAIRS TERMINATED PER VERTICAL ON VARIOUS FRAMES (CONVENTIONAL)

FRAME HEIGHT (FEET)	C-50 OR E-50 PROTECTOR	300-TYPE CONNECTOR	444-C TYPE JACK	301-TYPE CONNECTOR	302A2, B2 CONNECTOR (NOTE 2)	303-TYPE CONNECTOR	305-TYPE CONNECTOR (NOTE 1)
14½	400	400	800	800	800	800	1200
12½	300	300	600	600	600	600	1200
11½	300	300	600	600	600	600	1200

Note 1: A maximum of 1200 pairs per vertical may be terminated. Any number greater will cause congestion problems in the vertical bays.

Note 2: Double-sided protector frames only.

spring mechanism. When the block is rotated closed, it is held down in place with two captive screws. An optional designation cover (KS-21876) is available for those 89-type blocks which do not provide sufficient area on the block's surface for cable pair identification or other information. More complete coverage of the 89-type connecting block is in Section 201-220-301.

DESIGNATIONS

2.12 Designation boards are furnished for both sides of the protector frame and the vertical side of the distributing frame. The designation boards are mounted at the top of the frame; when a mezzanine platform is provided, a duplicate set of designation boards are located under the mezzanine platform (Fig. 1). The number of the vertical and the numbers of the cables appearing in that vertical are stamped on the designation boards as described in 3.08 for the combined B-type MDF and shown in Fig. 2 with the exception that a letter A or B is added to the vertical numbers on the protector frame. The letter A is added to the protector frame vertical numbers on the side away from the distributing frame, and the letter B is added to the protector frame vertical numbers on the side near the distributing frame. For example, vertical 39-A would be on the far side associated with the 39th vertical on the frame. On some installations, several protector frame verticals may be omitted at selected intervals to provide aisle space. Where these verticals are omitted, the associated vertical numbers are also omitted.

2.13 Vertical numbers and cable numbers are also stamped on the vertical metal framework on the horizontal side of the frame as described in 3.09.

2.14 Cable and pair designations on the protectors, connectors, jacks, and terminal strips are covered in the 636 division of Bell System Practices.

MAINTENANCE EQUIPMENT

2.15 Jack boxes for test lines and plugging up lines are placed at regular intervals along the vertical side of the frame.

2.16 Test lines and plugging up lines from test desks require protection but no cross-connection facilities. The first vertical of an MDF, where growth is from left to right, is ordinarily not furnished with jumper rings and is not used for terminating outside plant. Because of this and in order to provide a definite and uniform location for the plugging up and test line protectors, the first vertical of a frame is reserved, irrespective of direction of growth, for these lines.

3. B-TYPE MAIN DISTRIBUTING FRAME

3.01 The B-type MDF (Fig. 3) is a single frame which has protector, connector, or jack mountings on one side (vertical) of the frame and terminal blocks on the other side (horizontal) of the frame. Outside plant cable pairs are terminated on the protectors, connectors, or jacks; central office equipment is terminated on the terminal blocks. Detailed descriptions of the various type protectors, connectors, and jacks used on MDFs are found in Sections 201-206-101, 201-207-101, and 201-208-101.

3.02 Cross-connections are made between the outside plant on the vertical side and the central office equipment on the horizontal side.

3.03 Various vintage B-type frames have an assortment of equipment arrangements and vary in height (Table A). Most of the 14-1/2 foot frames were originally designed with a mezzanine platform shown in Fig. 3. The cables were split with some pairs appearing on a vertical above the mezzanine platform and some pairs appearing on the vertical below the mezzanine platform. In some installations, rolling ladders are installed instead of mezzanine platforms to provide access to the upper levels of the frame. Due to rearrangements and the introduction of newer types of protector mountings, jacks, or connectors, cable pairs may be terminated as above or may be terminated on adjacent consecutive verticals—all above or all below the mezzanine platform. In some instances, cables may be split with some pairs appearing in one location and some pairs in another location. Local cabling records must be consulted in order to determine the exact location of cable pairs.

3.04 The vertical uprights of the frame are generally spaced on 8-inch centers, and the protectors, connectors, or jacks are bolted directly to the uprights. The cable pair terminating capacity of a vertical depends on the height of the frame and the type of terminating apparatus installed. Table A lists the number of cable pairs that can

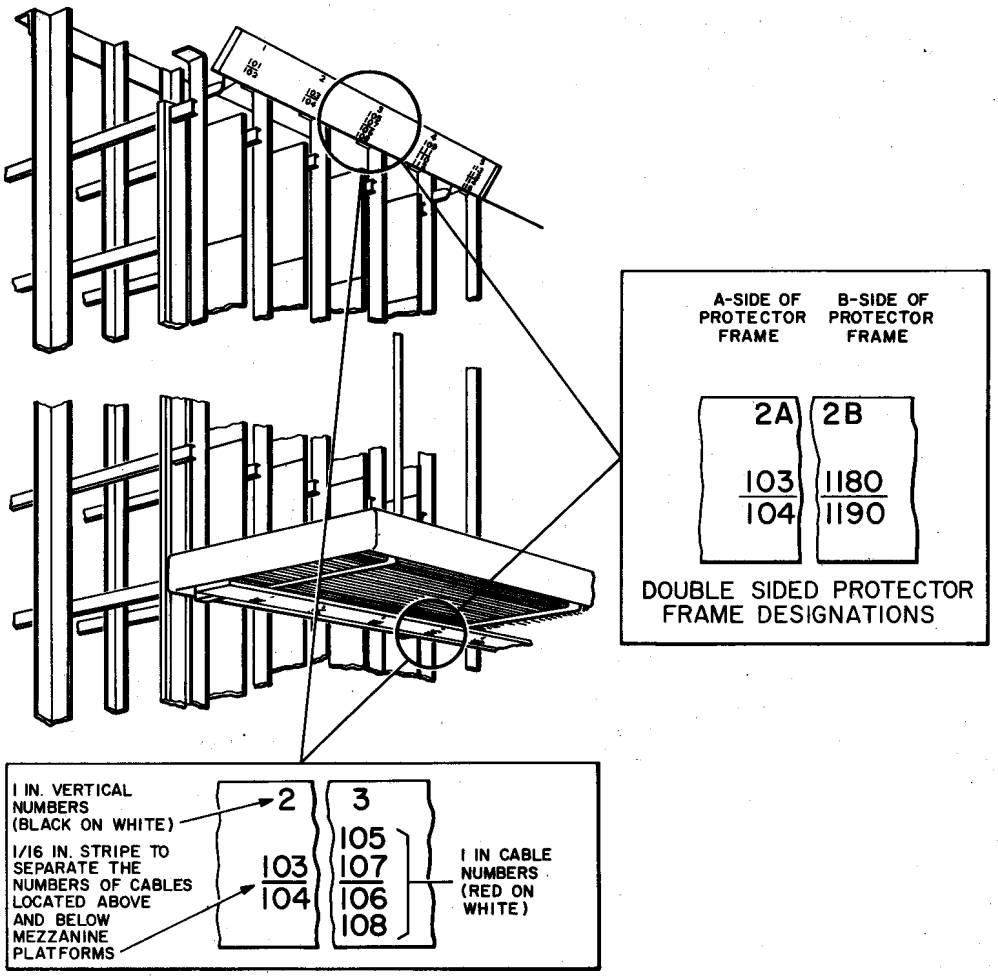

Fig. 2—Typical Designations on Vertical Side of MDF With Mezzanine

be terminated on verticals of various height frames using various type protectors, connectors, or jacks.

3.05 The length of a frame and the number of verticals provided vary with the size of the central office building that the frame is designed to serve.

3.06 Terminal blocks mounted on the horizontal side of the MDF may be of assorted sizes, shapes, and capacities. Basically the various type terminal blocks all serve the same purpose. The terminal blocks provide a means for terminating and cross-connecting the central office equipment appearing on the frame. Plant records must be consulted to determine both the location and the method of terminating of central office equipment on the frame.

3.07 The number of horizontals and the spacing of the horizontals on the MDF vary according to each particular installation; Fig. 3 shows a typical B-type MDF.

DESIGNATIONS

3.08 Verticals on the B-type frame are numbered consecutively from one up, starting at either end of the frame depending on direction of growth (left to right or right to left). Designation boards (Fig. 2 and 3) are provided for the top of the frame; when the frame is equipped with a mezzanine platform, duplicate boards are located under the

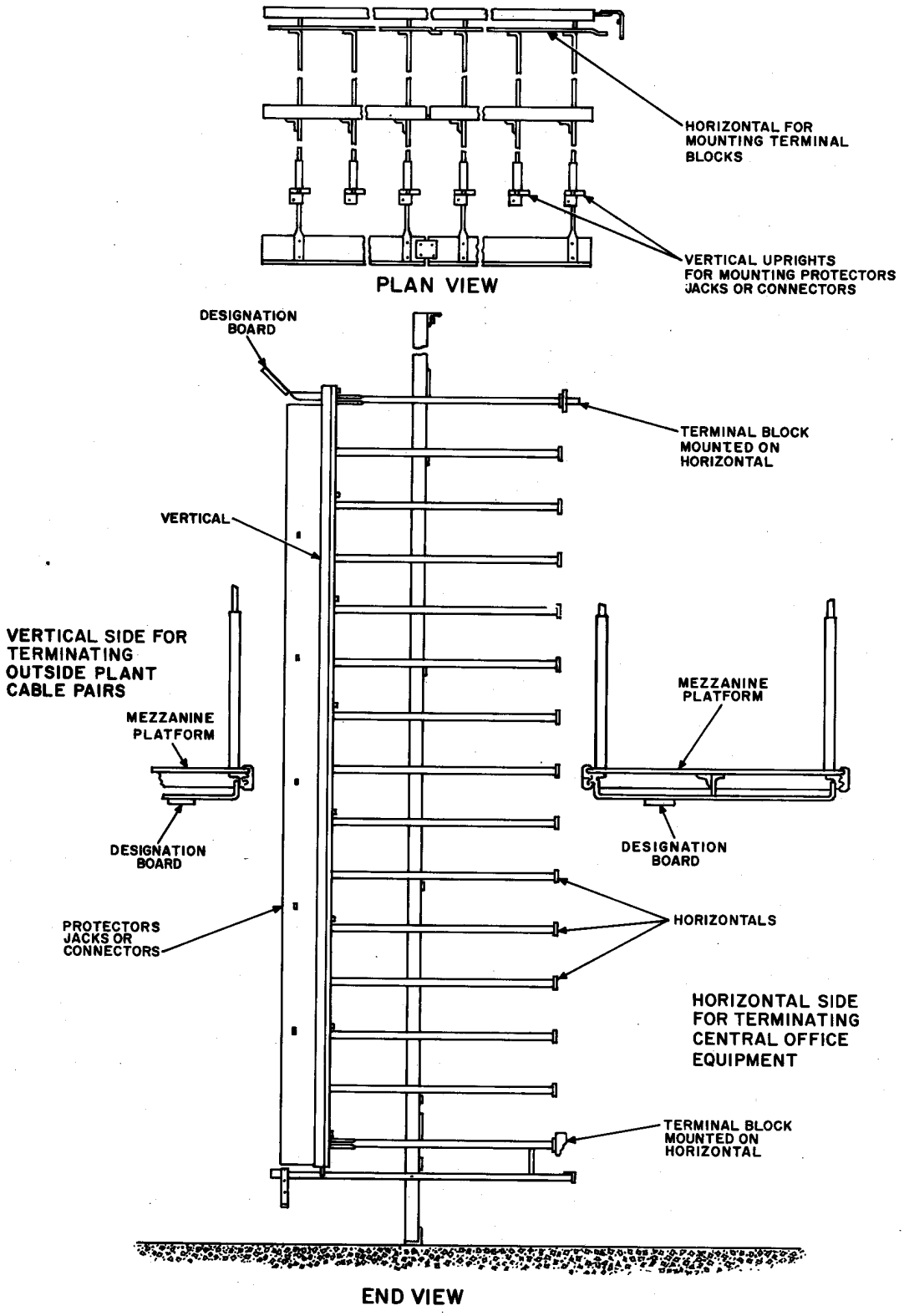

Fig. 3—B-Type Main Distributing Frame (MDF)

mezzanine platform. On the designation boards, the vertical number and the numbers of the cables appearing in the vertical are stamped directly above or immediately in front of each vertical. Where more than one cable appears in a vertical and a mezzanine platform is provided, a horizontal dividing line separates the numbers of the cables appearing in the upper and lower half of the vertical.

3.09 On the horizontal side of the frame, the vertical number and the cable numbers are stamped on the vertical metal framework. These designations are stamped between the fifth and sixth and ninth and tenth horizontal shelves. The designations are readily visible from the horizontal side of the frame and are provided as a convenience when running cross-connections. Starting with the bottom shelf, the horizontal shelves are lettered A, B, C, etc.

3.10 Cable and pair designations on the protectors, connectors, jacks, or teminal strips are covered in the 636 division of Bell System Practices.

4. LOW PROFILE FRAMES

A. Low Profile Conventional Distributing Frame (LPCDF)

4.01 The LPCDF (Fig. 4 and 5) is similar to other conventional frames; in that, the frame comprises a horizontal side for terminating line equipment, trunk circuits, etc, and a vertical side for terminating outside plant cable pairs. The LPCDF is 8-feet high, 4-feet 3-inches wide at the guard rails, and has an 8-inch center to center spacing between both the vertical members and the horizontal shelves. The frame contains 10 horizontal shelves. Each is approximately 20-inches deep.

4.02 Outside plant cable pairs may be terminated directly on connectors mounted on the vertical members of the LPCDF or on connectors mounted on the companion low profile double-sided protector frame (LPDSPF). In installations where the protector frame is used, the outside plant pairs are tie-cabled to terminal blocks mounted on the vertical side of the LPCDF.

4.03 ▶Low profile frames are divided into three groups per ED-97754-70 (Table B). The following groups reflect the frame height and the type connectors and connecting blocks which are used with each group:

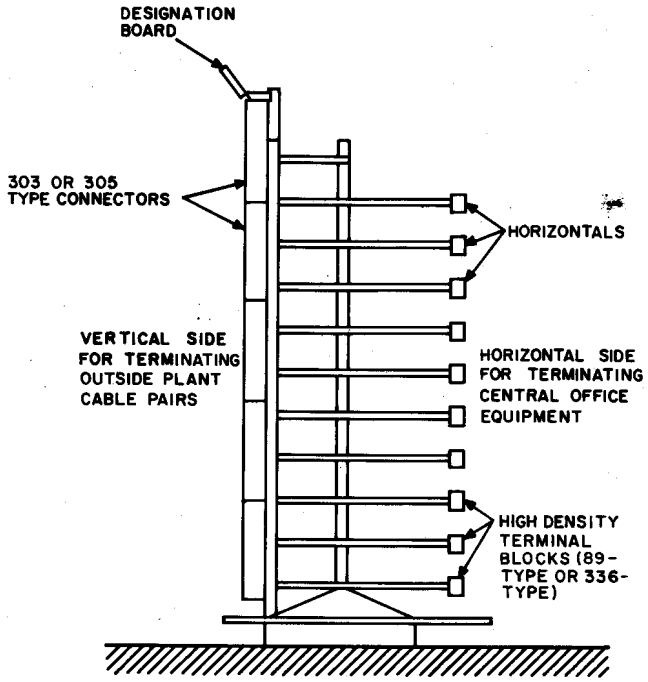

Fig. 4—Low Profile Conventional Distributing Frame With 303 ▶or 305 Connectors (Group 1 or Group 2)◀

- GROUP 1 LPCDF is 8-feet high and will accommodate four 303-type or eight 305-type connectors on each vertical. High density 89-type or 336-type terminal blocks are mounted on the horizontal side.

- GROUP 2 LPCDF is identical to Group 1, except that the vertical members are 9-feet high, and each will accommodate five 303-type connectors or ten 305-type connectors. High density 89-type or 336-type terminal blocks are mounted on the horizontal side.

- GROUP 3 LPCDF is 8-feet high and will accommodate five 336-type or ten 89-type high density connecting blocks each vertical. 336-type or 89-type terminal blocks mount on the horizontal side (see Fig. 5). Group 3 comprises the use of the LPCDF in conjunction with the LPDSPF which will accommodate five 302-type connectors per vertical on each side.◀

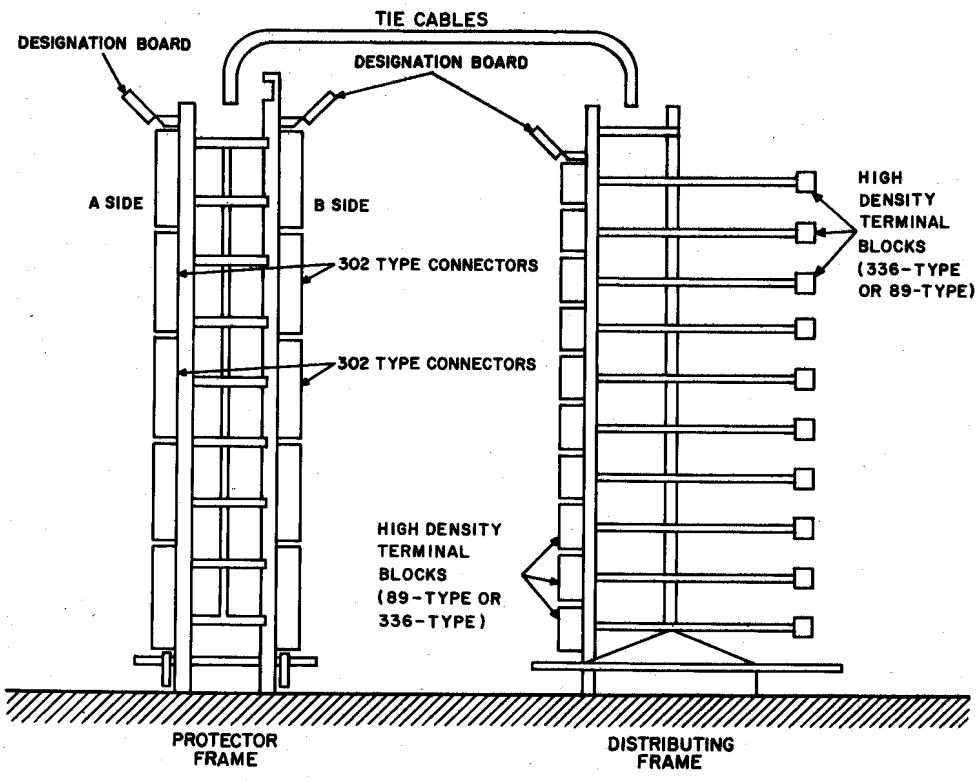

Fig. 5—Low Profile Conventional Distributing and Double-Sided Protector Frames

TABLE B

▶OUTSIDE PLANT TERMINATION CAPACITY FOR LPCDF◀

GROUP NO. PER ED-97754-70	FRAME SYSTEM	TYPE CONNECTOR	PAIRS PER VERTICAL	PAIRS PER FOOT OF FRAME LENGTH
GROUP 1	LPCDF ONLY (8 FT.)	303	400	600
		305	800	1200
GROUP 2	LPCDF ONLY (9 FT. VERTICAL)	303	500	750
		305	1000	1500
GROUP 3	LPCDF WITH LPDSPF	302	500 (Each side of LPDSPF)	1500

4.04 The LPCDF can accommodate four 303-type or ▶eight 305-type connectors on the vertical side of the Group 1 of ED-97754-70. Five 303-type connectors or ten 305-type connectors can be mounted on the Group 2 of ED-97754-70 which has taller verticals (only) extending into the 8-9 foot space. This additional space is normally◀ allocated to cross-aisle cabling (the tie-cabling between the LPDSPF and the LPCDF). ▶This additional space, with the taller verticals,◀ is available when outside plant cables enter the distributing frame vertical bays from below and are terminated directly on connectors that are mounted on the LPCDF verticals.

4.05 The LPCDF structural configuration (Fig. 4) differs basically from existing conventional frames as follows:

(a) A gusseted floor mounting plate has been added to eliminate ceiling bracing.

(b) On the vertical side of the frame, the vertical members have been connected with a vertical bar to the floor mounting plate for stiffening purposes.

4.06 The frame is compatible with new and existing apparatus and will be supplied in module lengths of six verticals.

B. Low Profile Double-Sided Protector Frame (LPDSPF)

4.07 The low profile double-sided protector frame (Fig. 5) is basically a cut-down version of the taller conventional double-sided frames. The new LPDSPF is 8-feet high by 2-feet 5-inches wide at the guard rails with verticals spaced on 8-inch centers. Each frame vertical will accommodate five 302-type connectors which are tie-cabled to ▶high◀ density terminal blocks◀ on the LPCDF ▶vertical.◀ The protector frame will also be supplied in modules of six verticals each.

4.08 The use of the LPCDF equipped with jacks and connectors (listed in Table A) reduces the termination capacity of the frame relative to the taller conventional frames. The use of the LPDSPF in conjunction with high density connecting blocks such as the 89-series compensates for the decrease in termination capacity.

C. Frame System Capacity

4.09 The ultimate capacity of the LPCDF is dependent on:

- Whether the LPCDF is used alone ▶either as Group 1 or Group 2 (see 4.03)◀ or in conjunction with the LPDSPF (Table B)
- Using 303-type ▶or 305-type◀ connectors on the LPCDF alone or 302-type connectors on the LPDSPF (Table B)
- The type of distribution frame wire used (Table C)
- Nature of the assignment procedures. The total jumper shelf capacities listed in Table C are based on random assignment.

DESIGNATIONS

4.11 Designations for the LPCDF and LPDSPF are essentially the same as conventional frames without the mezzanine. Refer to 3.08 and 3.09 for detailed designation information.

TABLE C

◗SHELF CAPACITY FOR LPCDF◖

TYPE DISTRIBUTING FRAME WIRE	SHELF CAPACITY (SEE NOTE)	
	PEAK JUMPER PILEUP (PAIRS)	TOTAL RANDOMLY ASSIGNED JUMPERS (PAIRS)
U22P (MD)	4,000	8,000
DT22P (IPVC)	6,500	13,000

Note: Care must be taken to install jumpers with adequate slack so that jumpers can be dressed along the shelves and jumper pileup can grow uniformly over the entire depth of the frame for these capacities to be achieved. The 89-type connecting block and the 305-type connector are designed for use with the DT-type wire.