JOB DRAWINGS

CABLING AND CABLE RACK PLAN DRAWINGS

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1. GENERAL

1.1 Scope of Section

1.11 This section describes the several kinds of job cabling and cable rack plan drawings most commonly encountered and explains the use thereof. The numbering plan applied to job drawings is covered in Section 1 of this handbook.

2. SINGLE LINE CABLE RACK DRAWINGS

2.1 Single Line cable rack conventions are used for all new areas.

2.2 The cabling and cable rack plans show all present cable runs and frames associated with the unit being installed. The cable runs are indicated by a single, broad line, whereas the frames are outlined with a more narrow line than is used to indicate the cable runs. Refer to Figure 4.

2.3 Double line cable rack drawing drafting practices are used where necessary to more clearly show complex fabrications and double level cable rack arrangements. See Figure 4 and 5.

2.4 Future cable runs associated with the unit being installed are indicated by using a single, thin line.

2.5 Future frames associated with the unit being installed are shown in the same way as equipped frames except that no frame assignment is given.

3. CLASSIFICATION AND TYPES OF CABLE RUNS

3.1 Regular cable runs are runs on which the cables for a particular circuit are carried on an individual cable rack, overall or part of the length of the run, in a predetermined arrangement.

3.2 Miscellaneous cable runs consist of a collection of groups of cables or individual cables which do not require a predetermined arrangement and which are carried on an interconnected system of cable racks to their terminating points.

3.3 Cable runs are said to be resting, hanging or side runs depending upon the position in which the cable rack straps are placed to which the cables are to be attached. Resting runs are used wherever practicable.

3.4 Due to cramped conditions being encountered under beams and girders, it is sometimes necessary to place cable racks in an inverted position and carry the cables on the flanges of the cable rack channels. Such runs are known as basket runs and are so designated on the cable plan drawing.

4. AUXILIARY FRAMING

4.1 A layout of auxiliary framing (bars or channels) is shown on the cabling and cable rack plan drawing. A long and short dash line indicates low type framing and a long dash line indicates high type framing. The bars or channels are shown in the actual location in which they are to be placed. Ceiling inserts are shown by a symbol and, in general, are shown only along the four sides of each room in which auxiliary framing is to be installed. Refer to Figures 1 and 4.

5. CROSS-SECTIONS AND VIEWS

5.1 Cross-sections, showing the arrangement of all regular runs of cables on cable racks, are taken at one point of the run and shown on the cabling and cable rack plan drawing. Refer to Figure 2. Where it is considered necessary to show changes in the arrangement of the cables, cross-sections are taken at other points in the run and shown on the drawing. All cross-sections for the same run are taken in the same direction where possible.

5.2 The cross-sections of regular runs generally show the ultimate height of the cables on the rack, the cross-section designation and title of the run, the width of the cable rack, code of cables, locating dimension of first cable (if other than standard 3/4") and the grouping and sequence of numbering of the cables. See Figure 2.

5.3 The letters associated with the symbol used to designate the run bears a similarity to the title of the run involved. A list of the cross-section letters commonly used in designating regular cable runs follows:

Title of Run	Cross-Section Letters
Inter to Answering Jack	AJ
Inter to Relay or Line Relay	LR
Main to Multiple (O.G.T.)	MM
Inter to Multiple "A" Board	AM
Inter to Multiple "B" Board	BM
Inter to Final	IF
Inter to Connectors	IC
Inter to Message Register	MR
Main to Inter	MI
Main to Multiple 3-Wire (1st Unit)	3W-11(1st Sect) 3W-12(2nd Sect) etc.
Main to Multiple 3-Wire (2nd Unit)	3W-21(1st Sect) 3W-22(2nd Sect) etc.
Main to Multiple 4-Wire (1st Unit)	4W-11(1st Sect) 4W-12(2nd Sect) etc.
Main to Multiple 4-Wire (2nd Unit)	4W-21(1st Sect) 4W-22(2nd Sect) etc.
Protector to Main	PM
Line Link to M.D.F.	LM
Line Link to L.D.F.	LL
Block Relay to L.D.F.	BR

5.31 Where more than one cross-section is required on a particular regular run (except "Main to Multiple 3 and 4 Wire") the letter designation is supplemented by numbers assigned consecutively from one up.

5.4 Miscellaneous cross-sections are not shown in detail. The necessary information is included in a table on the cabling and cable rack plan drawing. Refer to Figures 3 and 6. The tables are arranged to show the number of cables installed on the run on previous orders. On Figure 3, the dimensions shown in column "B" represent the ultimate pileup of cable, including power cables. The "Capacity" and "Number of Cables" columns represent the number of cables in terms of cables having less than 90 conductors.

5.5 Miscellaneous cross-sections are designated by a single letter (except "I", "O" and "P") followed by a single digit number.

5.51 On jobs engineered at Hawthorne, each main, end and overaisle run carrying miscellaneous cables are known as "paths" for the purpose of routing (in the cabling specification) the cables on dial system jobs. Each "path" is lettered alphabetically with letters "A" to "V," excluding "I," "O" and "P." These letters followed by a number are used to designate the miscellaneous cross-sections in the path. Refer to Figures 1 and 4. Miscellaneous cross-sections which are not shown in a regularly designated path (such as cable runs to cable holes, desks, or short spur rack between frames) are designated by the letters "X," "Y" and "Z". Refer to Figures 1 and 4.

5.6 Cross-sections of power cable runs are shown on the cabling and cable rack plan drawing where "talking" and "signaling" leads are to be separated on the cable rack. Power cable cross-sections, when consisting of power cables only, are designated by the letter "PW" supplemented by a numeral. Refer to Figure 3.

5.61 Combined switchboard and power cable cross-sections are assigned designations as explained in Paragraph 5.5 for miscellaneous switchboard cable runs, except that the designation are preceded by the letter "P".

5.62 The power cable cross-sections and the combined switchboard and power cable cross-sections are included in the miscellaneous section chart. The capacity specified for combined switchboard cable and power cable cross-sections represents the switchboard cable capacity only. The dimensions specified in column "B" of Figure 3 would represent the combined pile-up of power and switchboard cables if power cables had been included in any of the particular runs covered by the figure.

5.7 Views of the cabling arrangement at particular equipments are shown on cabling and cable plan drawings as follows:

5.71 For switchboards, where cables are carried on a miscellaneous basis and a definite arrangement is required in the switchboard, a view looking into the board is shown.

5.72 For cable holes, where the cabling around a cable hole is congested and it is impossible to show the necessary locating dimensions of the racks in the hole, an enlarged detached view is shown to indicate the relative location of the racks and the ultimate pile-up of cables on each rack.

5.73 For distributing frame cross-arms, typical views are shown indicating the arrangement of regular cables and groups of miscellaneous cables when the arrangement differes from the arrangement shown in the standard cabling plan drawing applicable. Refer to Figure 3 and 5.

5.74 For relay rack bays when the arrangement of formed cables cannot be readily determined from cross-sections and a definite arrangement is required on the vertical upright, a view of the location of the cables on the bracket and the sequence of numbering is shown.

5.8 Views covering cable rack fabrication are shown on cabling and cable rack plan drawings. Refer to Figures 3 and 5. The fabrication figures covered in the BSP which apply are shown in inverted brackets on these views. Formations covered by figures on standard H or ED drawings are indicated by showing the number of the drawing.

5.81 The radii required at all inside cable rack turns, also at outside turns where the radius exceeds 6", are indicated on the fabrication views adjacent to the convention used except in cases where a drawing is specified for method of fabricating the turn. Refer to Figure 3.

6. SYMBOLS USED

6.1 Symbols applied on a particular drawing are explained in the manufacturing notes.

7. MISCELLANEOUS EQUIPMENT UNITS

7.1 Where two or more pieces of miscellaneous equipment units are to be mounted in the same general area on walls or columns, cabling layout and dimensional information are provided.

Manager, Engineering Practices

ATTACHMENT
Figures 1,2,3,4,5 and 6 on Pages 5, 7, 8, 9, 11, and 13.

Reason for Reissue:
General Revision of Section 7 series cabling and cable rack plan drawing information transferred to Section 7B.

Replaces part of Section 7 dated 12-2-54.

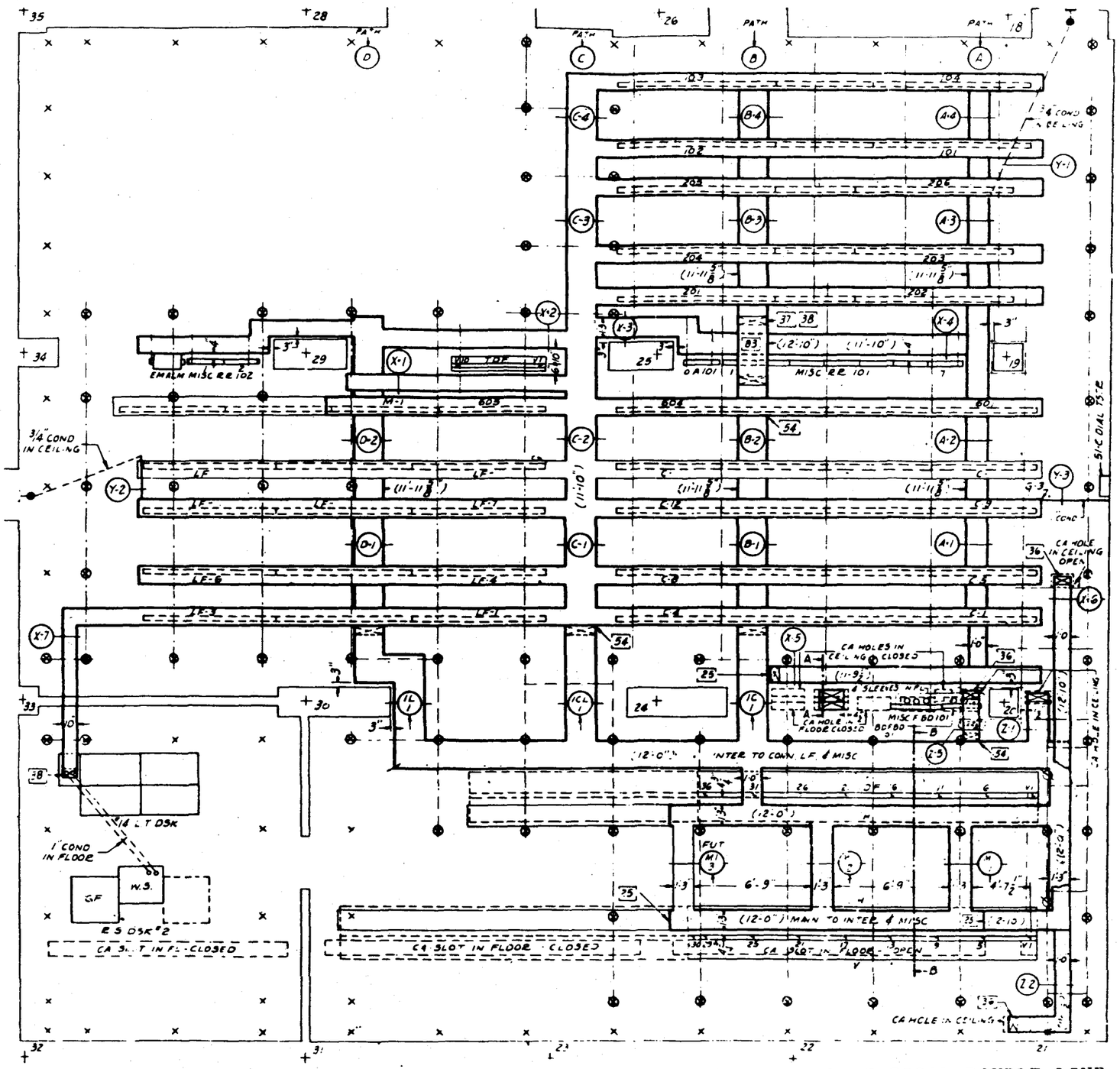
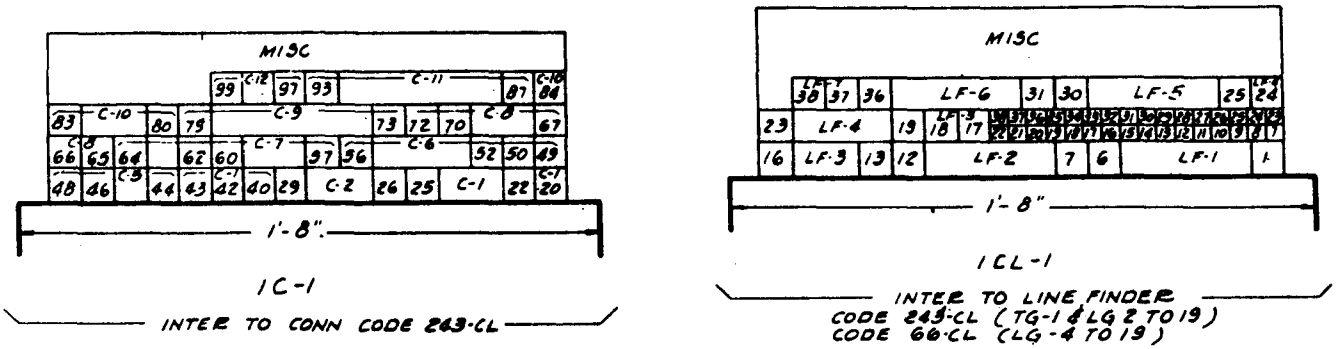
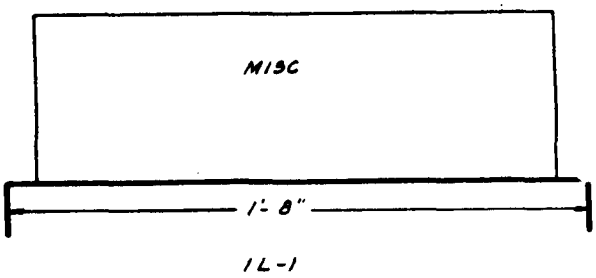
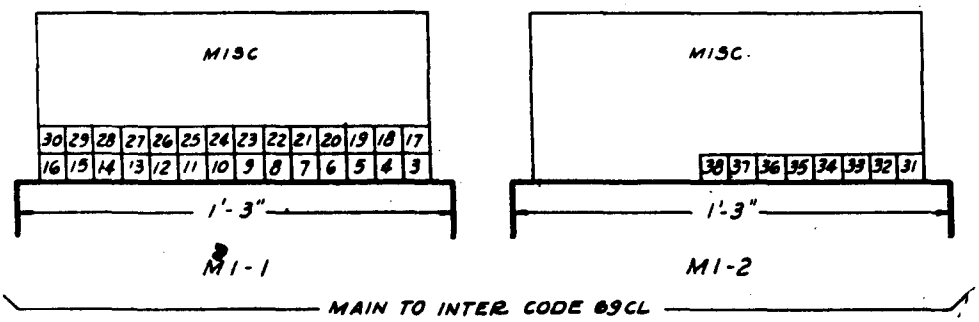


FIG. 1 TYPICAL DOUBLE LINE CABLING AND CABLE RACK PLAN DRAWING







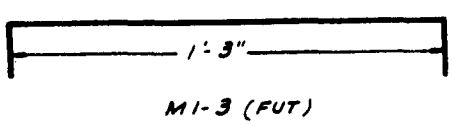
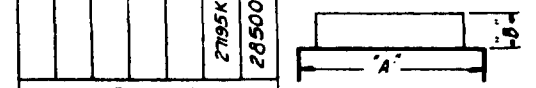


FIG. 2 TYPICAL DOUBLE LINE CABLING AND CABLE RACK PLAN DRAWING (CROSS-SECTIONS ASSOCIATED WITH FIG. 1)

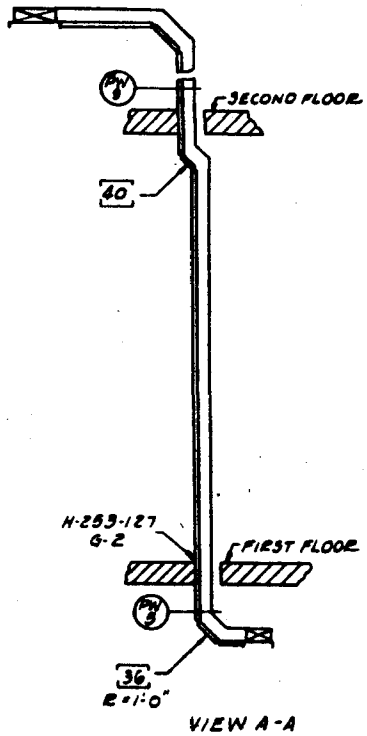
MANUFACTURING NOTES

1. CROSS SECTIONS SHOWN THUS —⊙— ARE REGULAR CROSS SECTIONS. ARROW INDICATES DIRECTION IN WHICH CROSS SECTION IS TAKEN. CROSS SECTIONS SHOWN THUS —⊙— ARE MISCELLANEOUS CROSS SECTIONS AND ARE SHOWN IN THE MISCELLANEOUS SECTION CHART.
2. DIMENSIONS SHOWN IN PARENTHESIS ( ) INDICATE VERTICAL HEIGHT OF CABLE RACK FROM FLOOR LINE TO CABLE LINE OF CABLE RK
3. DIMENSIONS LOCATING VERTICAL TURNS AND OFFSETS ARE SHOWN TO END OF HORIZONTAL SECTION OF RACK.
4. DIMENSIONS SHOWN TO SIDES OF CABLE RUNS ARE LOCATING DIMENSIONS OF CABLE RACK.
5. DIMENSIONS SHOWN IN BRACKETS [ ] REFER TO CABLE RACK FABRICATION FIG'S LISTED IN BSPAA614-007.
6. — — — — INDICATES HIGH TYPE AUXILIARY FRAMING BOTTOM OF REGULAR BARS IS 11'-8" ABOVE FLOOR.
7. — · — · — · INDICATES LOW TYPE AUXILIARY FRAMING BOTTOM OF REGULAR BARS IS 11'-6" ABOVE FLOOR.
8. X DENOTES CEILING INSERTS.
9. ⊠ DENOTES HANGER ROD FOR SUPPORTING AUXILIARY FRAMING FROM CEILING INSERT.
10. ⊗ DENOTES HANGER ROD FOR SUPPORTING AUXILIARY FRAMING FROM EXPANSION SHIELD.
11. CONDUITS SHALL BE JUNCTIONED AT CAKES IN ACCORDANCE WITH ED-90977-70 GROUPS AS SPECIFIED.

ORDER NUMBERS 27195K	ORDER NUMBERS 28500	SECT	A DIMENSIONS	B DIMENSIONS	CAP
	11	Z-5	1'-0"	6"	189
	8 2	Z-2	1'-0"	6"	189
	21	Z-1	1'-3"	6"	243
	4	Y-3	1"	COND	
	7	Y-2	3/4"	COND	
	2	Y-1	3/4"	COND	
	33	X-7	10"	6"	153
		X-6	1'-0"	6"	189
	31	X-5	1'-0"	6"	189
	30	X-4	1'-3"	6"	243
	8 18	X-3	1'-3"	6"	243
	27	X-2	1'-0"	6"	189
		X-1	1'-0"	6"	189
	28	IL-1			
	8 37	ICL-1			
	14	IC-1	SEE	DET.	SEC.
		MI-3			FUT
	4	MI-2			
	34	MI-1			
	35	D-2	1'-8"	6"	333
	35	D-1	1'-8"	6"	333
	17	C-4	1'-8"	6"	333
	23	C-3	1'-8"	6"	333
	8 96	C-2	1'-8"	6"	333
	8 70	C-1	1'-8"	6"	333
	19	B-4	1'-8"	6"	333
	23	B-3	1'-8"	6"	333
	73	B-2	1'-8"	6"	333
	79	B-1	1'-8"	6"	333
	14	A-4	1'-3"	6"	243
	22	A-3	1'-3"	6"	243
	100	A-2	1'-3"	6"	243
	97	A-1	1'-3"	6"	243

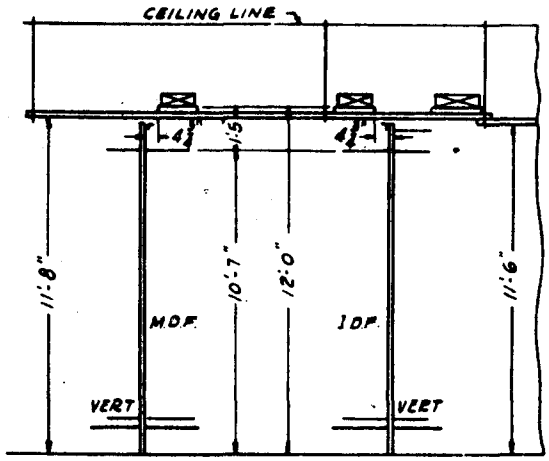


MISCELLANEOUS SECTION CHART



VIEW A-A

POWER CABLE RACK BETWEEN BASEMENT & 2ND FLOOR



VIEW B-B

FIG. 3 TYPICAL DOUBLE LINE CABLING AND CABLE RACK PLAN DRAWING (CHARTS, MANUFACTURING NOTES AND VIEWS ASSOCIATED WITH FIGURE 1)

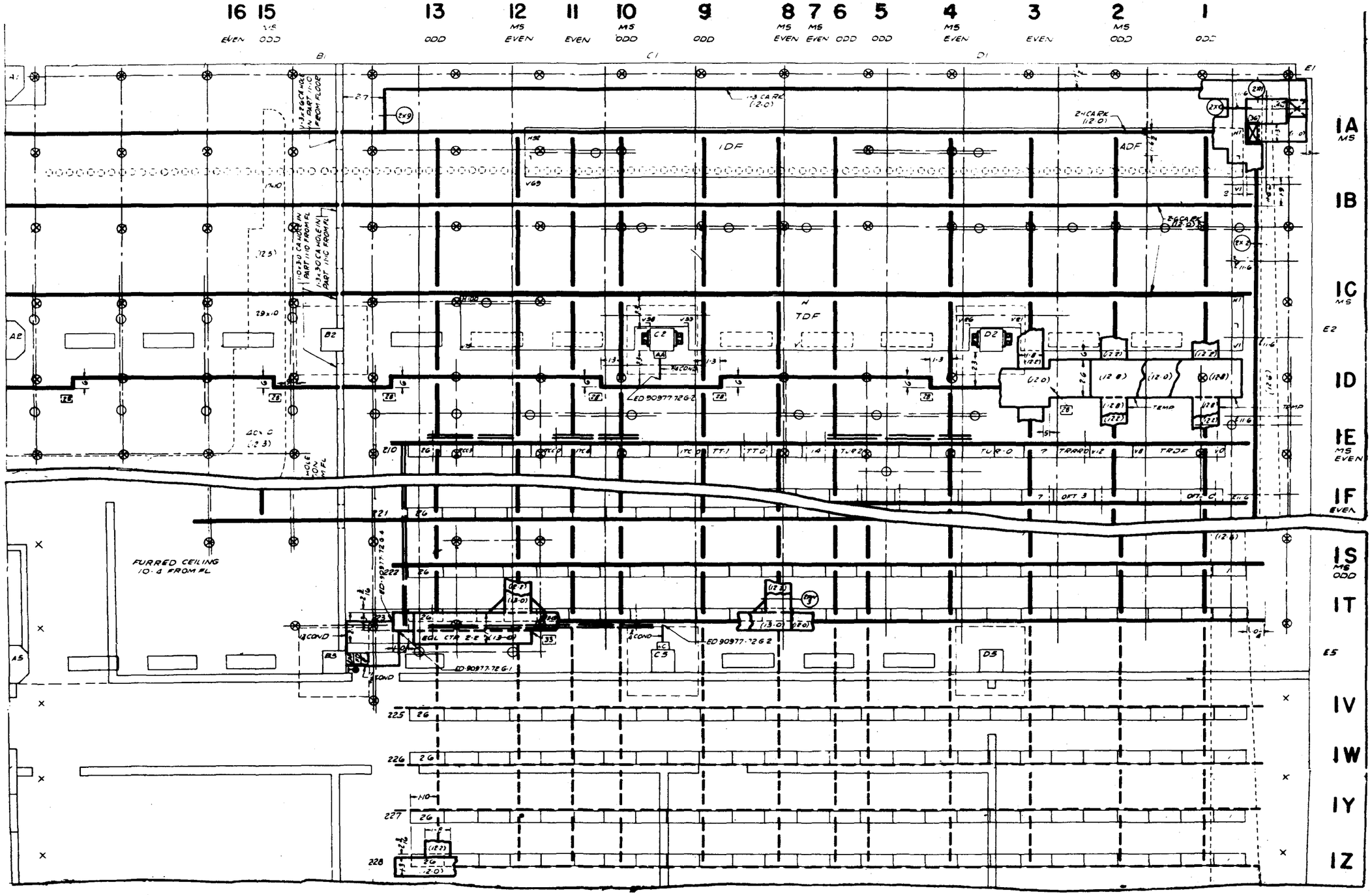
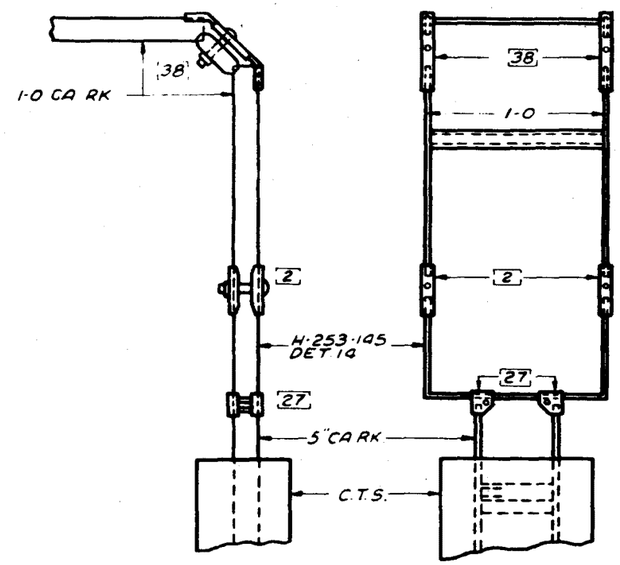
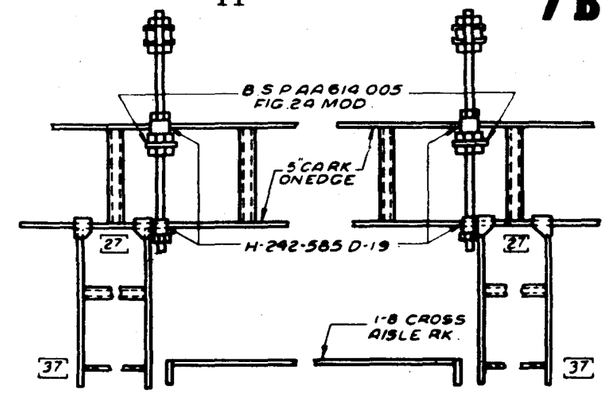
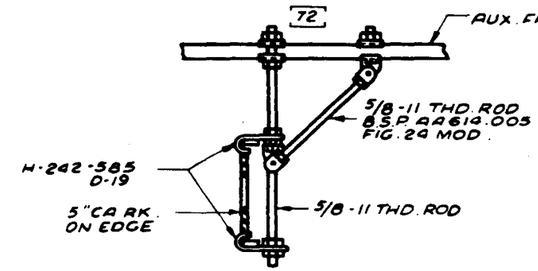
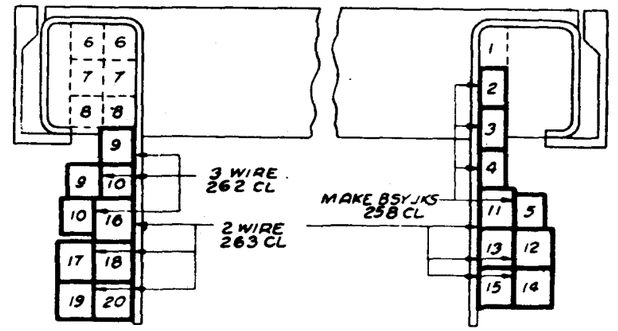


FIG. 4 TYPICAL SINGLE LINE CABLING AND CABLE RACK PLAN DRAWING

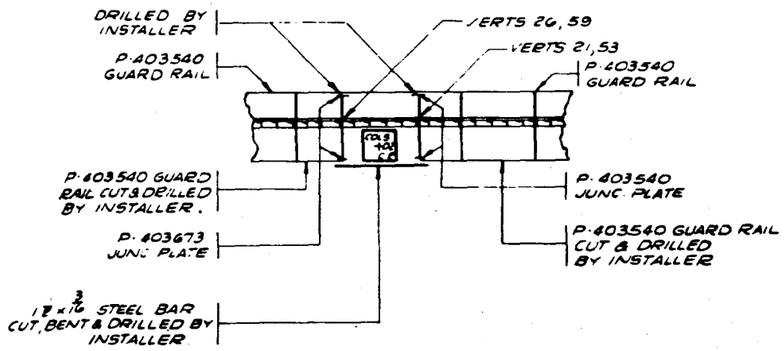




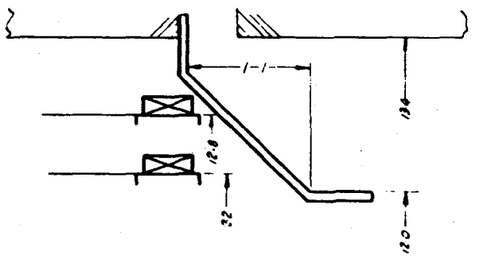




VIEW SHOWING CA ARRANGEMENT AT TMB-0



TYPICAL METHOD OF JUNCTIONING GUARD RAIL OF TDF AT COLUMNS



VIEW A-A

FIG. 5 TYPICAL VIEW ASSOCIATED WITH SINGLE LINE CABLING

MANUFACTURING NOTES

1. THE HEAVY PATH LINE AS SHOWN REPRESENTS THE CENTER LINE OF THE CABLE RACK DIMENSIONS SHOWN TO THIS LINE ARE LOCATING DIMENSIONS TO CENTER LINE OF CABLE RACK.

2. HEAVILY OUTLINED PATH LINES ARE PRESENT CABLE RACKS, DOTTED PATH LINES REPRESENT FUTURE CABLE RACKS.

3 ALL OVER FRAME CABLE RACKS ARE 1-3 WIDE & 12-0 FROM FLOOR & ALL CROSS AISLE CABLE BACKS ARE 1-8 WIDE & 12-2 FROM FLOOR UNLESS OTHERWISE SPECIFIED. CENTER LINE OF OVER FRAME CABLE RACKS SHALL BE LOCATED 9 11/16 IN FRONT OF REAR GUARD RAIL UNLESS OTHERWISE SPECIFIED.

4. ☐ REFERS TO CABLE RACK FABRICATION FIGURES SHOWN IN B.S.P.AA614 007

5 CABLE BACK FABRICATIONS NOT NUMBERED SHALL BE INSTALLED PER B S.P. AA614 007 AS FOLLOWS:
FIG 25 CLOSING END OF CABLE BACK.
FIG. 26 90° TURN IN SAME PLANE.
FIG 27 "T" INTERSECTION.
FIG 34 CORNER BRACKET AT TURN OR INTERSECTION

6 ALL CROSS AISLE CABLE RACKS SHALL BE CUT AND JUNCTIONED PER B.S.P. AA614 007 FIG 34, THEY SHALL NOT BE RUN CONTINUOUSLY

7. ALL 1-3 OVER FRAME CABLE RACKS SHALL EXTEND 1-0¼ PAST THE LAST BAY IN EACH LINEUP TO PROVIDE A PLACE TO SUPPORT CONDUIT FOR SWITCHES IN ACCORDANCE WITH FRAME & AISLE LTG DRAWINGS.

8. SPECIAL CABLE RACK FABRICATIONS ARE INDICATED BY H - DRAWING, ED- DRAWING OR VIEW NUMBER LISTED ADJACENT TO THE CABLE RACK CONVENTION.

9 DIMENSIONS LOCATING VERTICAL TURNS AND OFFSETS ARE SHOWN TO THE END OF THE HORIZONTAL SECTION OF RACK

10. MISCELLANEOUS CABLE RACKS AT RIGHT ANGLES TO ROWS OF FRAMES HAVE BEEN DESIGNATED WITH "PATH" NUMBERS. OVER FRAME CABLE RACKS WITH "PATH" LETTERS

11 ◯ IDENTIFIES MISCELLANEOUS CROSS SECTIONS SHOWN IN THE MISCELLANEOUS SECTION CHART.

12. NO SWITCHBOARD CABLE SHALL BE INSTALLED ON PORTION OF RACK DESIGNATED EQUALIZING CENTER. ALL POWER CABLE CONNECTIONS AT THESE CENTERS SHALL BE ACCESSIBLE FOR INSPECTION AT ALL TIME

13 ( ) DIMENSIONS SHOWN WITHIN PARENTHESES INDICATE VERTICAL HEIGHT OF CABLE RACK FROM FLOOR LINE TO CABLE LINE OF CABLE RACK. OR VERTICAL HEIGHT OF VENT DUCT FROM FLOOR LINE TO UNDERSIDE OF VENT DUCT.

14 SYMBOLS INDICATE EQUIPMENT AS FOLLOWS:

- ▷| VIBRATING SIGNAL HORN
- [E] STATION BOXES.
- [FD] FIRE DETECTION RELAY CASING
- [LC] LAMP CABINET
- [FAR] CODE SIGNAL SENDING DEVICE (WITH REMOTE CONTROL)
- ●— EXIT PILOT LAMP
- [AA] AUDIBLE SIGNAL ALM. MTG
- × CEILING INSERT
- Ø INDICATES EXPANSION SHIELD
- ○ HANGER ROD.
- ⊗ HANGER ROD FOR SUPPORTING AUX. FRAMING FROM CEILING INSERT
- —⊙— HANGER RODS SUPPORTING LOW TYPE AUXILIARY FRAMING(CHANNEL).
- ▬▬ FRAME SUPPORT PER B.S.P. AA 614.005 FIG. 5A
- ——— LOW TYPE AUXILIARY FRAMING. BOTTOM OF REGULAR CHANNELS IS 11-8 ABOVE FLOOR PLACE SUPPLEMENTARY CHANNELS ABOVE REGULAR CHANNELS UNLESS OTHERWISE INDICATED
- — — — HIGH TYPE AUXILIARY FRAMING BOTTOM OF PRIMARY CHANNELS 12-9 ABOVE FLOOR UNLESS OTHERWISE SPECIFIED
- ═══ POWER WIRE SUPPORT PER B.S.P. AA614007 FIG. 56

15. CABLE RACK AT THIS POINT SHALL BE RELOCATED BY INSTALLER IF REQUIRED, SO AS TO ALLOW FOR CABLING OF BAYS 2151 TO 2157 AT THE REAR WITHOUT INTERFERENCE FROM VENT DUCT.

ORDER NUMBERS 73877H	ORDER NUMBERS 67164H	PREVIOUSLY INSTALLED ORDERS	SECTION	CAPACITY	ULT. CA. PILEUP
	369		1G-2		
	322		1G-1		
6	333		1F-4	560	8½
9	200		1F-3		
17	232		1F-2	320	5
17	337		1F-1		
6	319		1E-4	560	8½
9	99		1E-3	320	5
	328		1E-2		
	354		1E-1		
6	325		1D-4	560	8½
9	94		1D-3		
	138		1D-2		
	261		1D-1		
6	115		1C-5	320	5
	358		1C-4	560	8½
9	72		1C-3		
	63		1C-2		
	134		1C-1		
	159		1B-5		
6	288		1B-4		
9	71		1B-3		
	73		1B-2		
	133		1B-1		
	256		1A-5	320	5
6	381		1A-4	560	8½
9	150		1A-3		
2	124		1A-2		
2	87		1A-1	320	5

MISCELLANEOUS SECTION TABLE

FIG. 6 TYPICAL SINGLE LINE CABLING AND CABLE RACK PLAN DRAWINGS (CHARTS, MANUFACTURING NOTES AND VIEWS ASSOCIATED WITH FIG. 4)