MAIN FRAME PROTECTION

B-TYPE FRAMES

CONTENTS PAGE

1. GENERAL

1.01 This section covers the types of protective apparatus required on B-type main distributing frames. Reference to main frame as used in this section shall be considered as also applying to protector frames. These requirements apply to all conductors whether protected by fuses or by protective cable (fuse-type).

1.02 This section is reissued to change the color of 300-type connector caps specified for class TP protection and generally to revise the section. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 On B-type main distributing frames, outside cable conductors are terminated at protector mountings or at 444-type jacks on the vertical side of the frame. On separate protector frames, outside cable conductors are terminated at protector mountings or at jacks mounted on verticals on both sides of the frame from which cables are run to terminal strips on the vertical side of a main distributing frame. Cables from the central office equipment are terminated at terminal strips on the horizontal side of the main distributing frame. Protection is provided by protector blocks, heat coils, and circuit marking devices. The methods of testing, handling, and cleaning protection equipment are given in other plant series sections.

1.04 The latest standard device for terminating and applying protection to outside plant cable conductors is the 300-type connector. The term "connector" is applied to distinguish the new device from the term "protector", which in the past has been applied to cable termination mounting assemblies such as the C50, C52, etc. The 300-type connector supersedes a similar arrangement, coded the 121-type protector. All references in this section to the 300-type connector shall be considered to apply to the 121-type protector.

1.05 Some of the characteristics of the 300-type connector are as follows:

(a) In the working position, the assembled protector unit (Fig. 1) is inserted and turned in a clockwise direction so that the stripe on the cap is horizontal (Fig. 2).

(b) In the open circuit position, the protector unit is rotated 90 degrees counterclockwise from the working position. The stripe on the cap is vertical and the cap projects farther from the faceplate (Fig. 2). In this position, the central office equipment is disconnected from the outside plant conductor. Protective carbons (gap discharge blocks) are still effective.

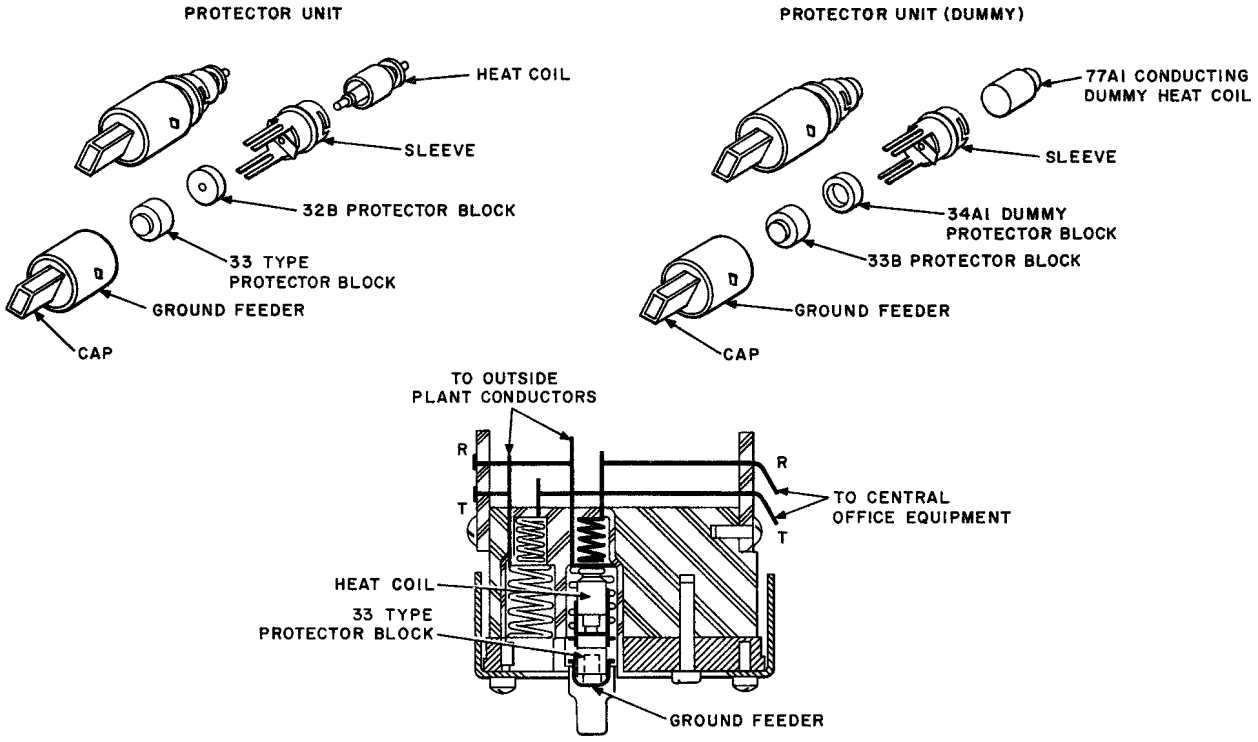

Fig. 1 — 300-Type Connector Assembly

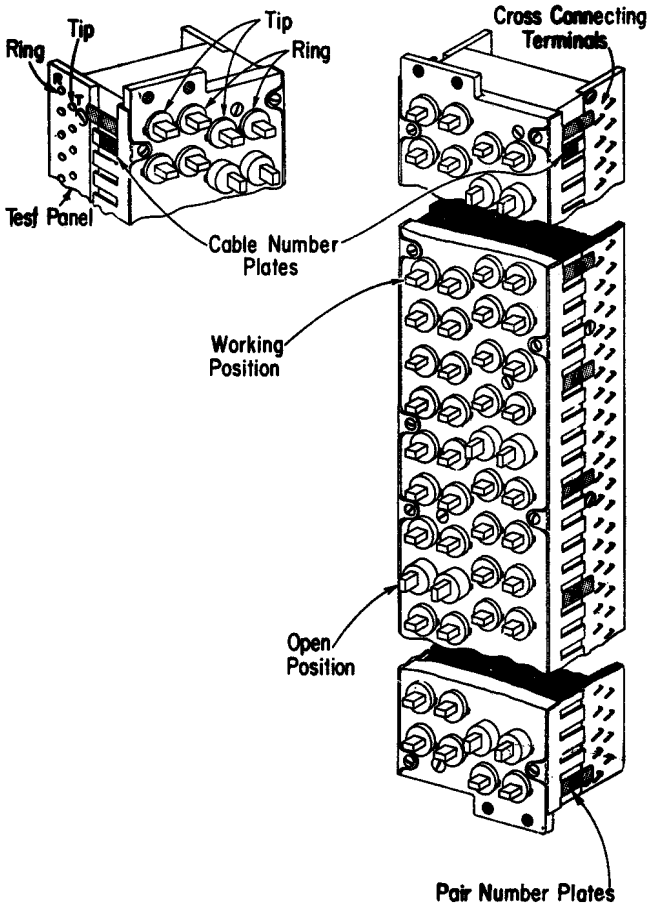

Fig. 2 — 300-Type Connector Mounting

(c) When the protector unit is removed, the central office equipment is disconnected from the outside plant conductor and no protection is provided.

Note: When the 121-type protector units are removed, the cable conductors may be automatically grounded. Therefore, before removing these protector units from circuits serving telegraph loops or other types of special circuits which have potential on the cable side, the associated equipment should be taken out of service. It may be necessary to remove connections to the cable pair to prevent equipment damage. Also for this reason, the modified B test clip with the M2EM cord is not recommended for use with the 121-type protector units.

(d) In either the working or the open position, the ground feeder of the protector unit (Fig. 1) rests against the inside surface of the grounded aluminum faceplate. This ground is fed through the ground feeder to the carbon insert of the No. 33B protector block.

(e) When heat coil operation is effected, the tip of the coil passes through the hole in the No. 32B carbon block or 34A1 porcelain

dummy block and makes contact with the grounded insert of the No. 33B protector block. (See Fig. 1.)

1.06 Some circuits, for engineering reasons, require straps to bypass the heat coil function between the cable and equipment terminals. For a detailed explanation of the approved procedures for placing straps, refer to Section 069-120-801.

A. Classes of Conductors

1.07 Conductors entering a central office are generally classified as either exposed or unexposed. In general, an unexposed conductor is one so located that it is unlikely that a foreign voltage in excess of 300 volts will accidentally contact it. An exposed conductor is one that does not meet this requirement.

1.08 Occasionally, in order to provide adequate protection, it is necessary to divide the unexposed class into two parts. (Refer to 1.10.)

B. Classification of Conductors

Class NP

1.09 Interoffice cable conductors which are entirely underground and have no outside terminals connected to them are classified as NP and require neither protective heat coils nor protective blocks. These circuits consist principally of interoffice trunks.

Class TP

1.10 Buried or underground interoffice cable conductors which are subject to lightning, low-frequency induction, or magnetic storm potentials are classified as TP. These circuits require protective blocks; protective heat coils are not required.

Class P

1.11 Class P conductors include all conductors other than NP or TP. Since there is the possibility of voltage from foreign sources, such as sneak currents and lightning being impressed on these circuits, full protection consisting of protective heat coils and protective blocks is required.

C. Types of Protector Mountings, Blocks, and Heat Coils

1.12 Figures 1 and 3 show the makeup of the usual types of B-type frame protector devices. Figure 4 shows various types of protector blocks and heat coils, including some of the older types still in use. Table A lists the present standard types of heat coils and protector blocks and also the corresponding older types.

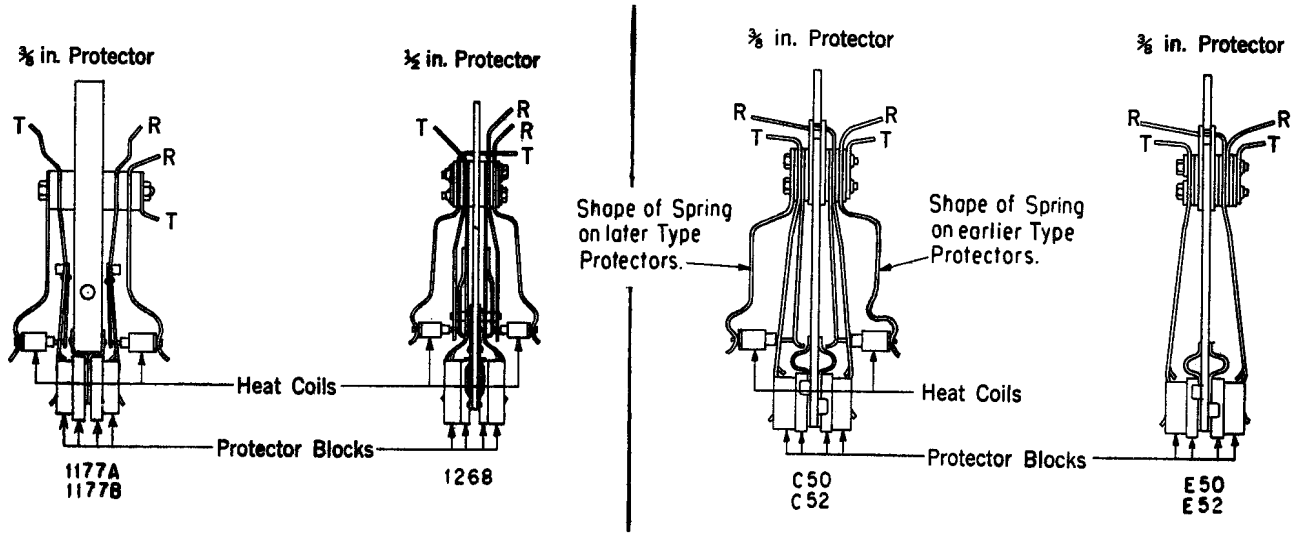

Fig. 3 — Protectors Other Than 300-Type

TABLE A

ITEM	STANDARD	OLDER TYPES
PROTECTOR BLOCKS		
3/8-in. Mounting:		
Ground Side	28	11*
Line Side	29†	12*
1/2-in. Mounting:		
Ground Side	26	1*
Line Side	27†	2*
300-Type Connector:		
Ground Side	33B	
Line Side	32B†	
DUMMY PROTECTOR BLOCKS		
3/8-in. Mounting	15	
1/2-in. Mounting	9	
300-Type Connector	34A1	
HEAT COILS		
Battery Feeders	75A	
All Other Lines	76A	41, 67, 73A
DUMMY HEAT COILS		
Metal:		
300-Type Connector	77A1	
3/8- or 1/2-in. Mounting	40	66, 68
Insulating:		
3/8- or 1/2-in. Mounting	72A**	70A**

*Use No. 9 protector micas with No. 11 and 12 protector blocks and No. 3 protector micas with No. 1 and 2 protector blocks.

†Use No. 29B, 30, or 33A protector blocks instead of No. 29, 27, and 33B protector blocks, respectively, where the MDF protector mountings are connected to drainage coil assemblies.

Note: Where mutual drainage reactors are used, install the No. 15 or 9 dummy protector blocks.

**The No. 70A and 72A dummy heat coils are insulating dummy coils used in the protectors of lines which are to be kept open as an indication that regular heat coils are not to be put in.

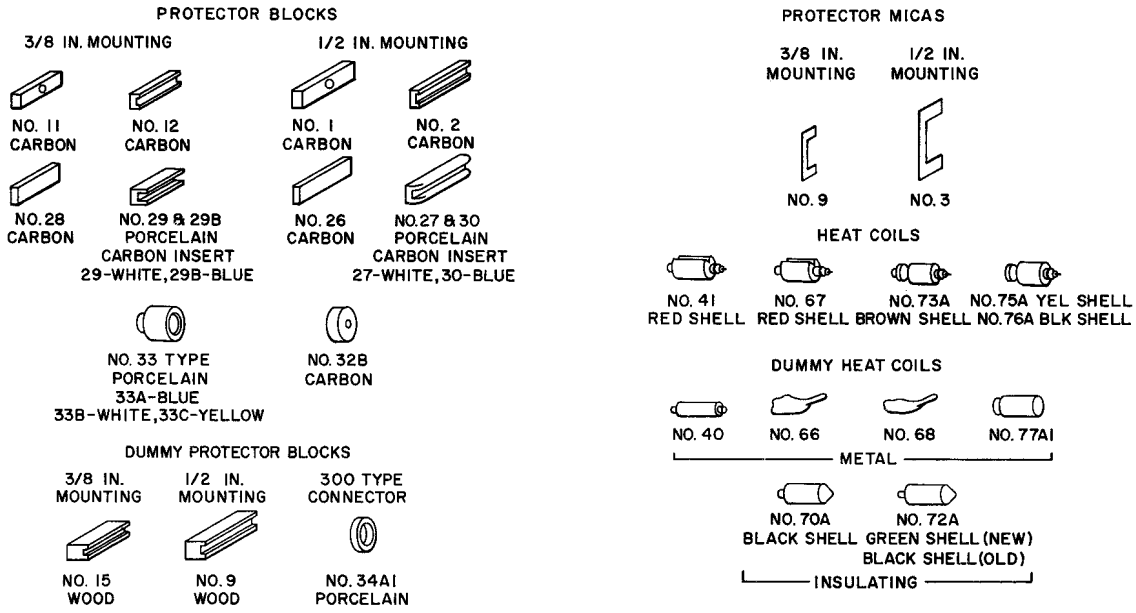

Fig. 4 — Types of Protector Blocks and Heat Coils

D. Battery Feeders

1.13 Protector mountings connected to class P conductors used as battery suppiy feeders and the return conductors of metallic feeders shall be equipped with gap discharge protector blocks and No. 75A heat coils.

1.14 Where battery feeder conductors are used in parallel and protector mountings are provided, each conductor shall be protected with gap discharge protector blocks and a No. 75A heat coil.

Note: Methods of strapping protectors, 444-type jacks, and 300-type connectors, where conductors are used in parallel for battery · feeders, are given in Section 069-120-803.

E. Test Trunks

1.15 Test trunks from the test desk to the main frame within an office, plugging-up lines in dial offices terminating at the main frame, and service observing lines which are arranged for connection to customer lines by plugging in at the main frame protectors shall be protected by using heat coils and dummy protector blocks.

2. 300-TYPE CONNECTORS

Note: Piece-part numbers for the colored caps and designation plates specified in the following paragraphs for use on the 300-type connector are given in Section 032-306-801.

A. Spare Conductors

2.01 A conductor is considered spare if it is connected to the protector but not to other office equipment.

2.02 Protector units associated with spare conductors shall be in the open position; the white line on the cap will be vertical, and the cap will protrude farther from the faceplate. The black capped assemblies serve as a designation of class P conductors. In the open position, the protective carbons (No. 32B protector blocks) are effective. The protector units are equipped as listed in Table B.

Note: To further identify these lines, tags or other indicating devices may be used.

TABLE B

300-TYPE CONNECTORS			
ITEM	CLASS P	CLASS NP	CLASS TP
Spare Conductors	Protector Blocks, Black 76A Heat Coils, Black Caps	Dummy Protector Blocks, Metal Dummy Heat Coils, Gray Caps, Gray Designation Plates	Protector Blocks, Metal Dummy Heat Coils, Gray Caps, Gray Designation Plates
Working Conductors	Customer Lines: Protector Blocks, Black 76A Heat Coils, Black Caps	Dummy Protector Blocks, Metal Dummy Heat Coils, Gray Caps, Gray Designation Plates	Protector Blocks, Metal Dummy Heat Coils, Black Caps, Gray Designation Plates
	Battery Feeders: Protector Blocks, Yellow 75A Heat Coils, Yellow Caps, Yellow Designation Plates		
	Special Lines: Protector Blocks, Heat Coils*, Red Caps, Red Designation Plates. (See Note 1.)	Special Lines: Dummy Protector Blocks. Metal Dummy Heat Coils, Red Caps, Red Designation Plates. (See Note 1.)	Special Lines: Protector Blocks, Metal Dummy Heat Coils, Red Caps, Red Designation Plates. (See Note 1.)
	Denied Lines: Protector Blocks, No Heat Coils, Green Caps, Green Designation Plates. (See Note 2.)		

*The heat coils will be specified locally.

Notes:

1. Procedures for the protection of special lines against service interruptions are covered in Section 069-120-801.
2. To avoid restoring service to a customer line with a protector unit containing a green cap, do not use heat coils in the protector unit.

B. Working Conductors

2.03 Working conductors shall be provided with protector units equipped as listed in Table B.

2.04 The following four types of Class P circuits requiring protection shall have protector blocks equipped as listed in Table B.

(a) Customer lines.

(b) Battery feeders.

(c) Special lines (telegraph loops, radio broadcast lines, police and fire alarms, etc).

(d) Denied lines — The protector units shall be in the open position. The white line on the cap will be vertical and the cap will protrude farther from the faceplate.

Note: To further identify these lines, tags or other identifying devices may be used.

C. Conductors Requiring Drainage Coil or Relay Protective Equipment

2.05 Where circuits on main frames require drainage coil or relay protector equipment to minimize interference, protector blocks shall be provided as follows:

(a) ***Protector Mountings at Main Frame:*** The protector mountings associated with circuits to which the drainage coil assembly or relay protector is connected shall be equipped with No. 32B and 33A protector blocks.

Note: Where the mutual drainage reactors are used, use the 34A1 dummy protector with the No. 33B block in place of the No. 32B and 33A combination.

(b) ***Protector Mountings at Drainage Coil Assembly or Relay Protector Mounting:*** The protector mountings associated with the drainage coil assembly or relay protector shall be equipped with No. 32B and 33B protector blocks.

3. PROTECTORS OTHER THAN 300-TYPE

A. Spare Conductors

3.01 A conductor is considered spare if it is connected to the protector but not to other office equipment.

3.02 Spare conductors shall be provided with protector units equipped as listed in Table C.

B. Working Conductors

3.03 Working conductors are provided with protector units equipped as listed in Table C.

C. Conductors Requiring Drainage Coil or Relay Protective Equipment

3.04 Where circuits on main frames require drainage coil or relay protector equipment to minimize interference, protector blocks shall be provided as follows:

(a) ***Protector Mountings at Main Frame:*** The protector mountings associated with circuits to which the drainage coil assembly or relay protector is connected shall be equipped with No. 28 and 29B protector blocks where the protector mountings are on 3/8-inch centers and No. 26 and 30 protector blocks where the protector mountings are on 1/2-inch centers.

Note: Where the mutual drainage reactors are used, use dummy blocks No. 15 for 3/8-inch or No. 9 for 1/2-inch protectors.

(b) ***Protector Mountings at Drainage Coil Assembly or Relay Protector Mounting:*** The protector mountings associated with the drainage coil assembly or relay protector shall be equipped with No. 26 and 27 protector blocks.

TABLE C

PROTECTORS OTHER THAN 300-TYPE			
ITEM	CLASS P	CLASS NP	CLASS TP
Spare Conductors	Protector Blocks, No Heat Coils	Dummy Protector Blocks, No Heat Coils	Protector Blocks, No Heat Coils
Working Conductors	Customer Lines: Protector Blocks, Heat Coils*	Working Lines: Dummy Protector Blocks, Metal Dummy Heat Coils or Soldered Straps. (See Note 2.)	Working Lines: Protector Blocks, Metal Dummy Heat Coils or Soldered Straps. (See Note 2.)
	Battery Feeders: Protector Blocks, Yellow 75A Heat Coils*		
	Special Lines: (Fig. 5) Protector Blocks, Heat Coils*, Guards KS-14539 or Equivalent, Terminal Punching Insulators, Indicators KS-6660 or Equivalent. (See Note 3.)	Special Lines: (Fig. 5) Dummy Protector Blocks, Metal Dummy Heat Coils or Soldered Straps (Note 2), Terminal Punching Insulators, Indicators KS-6660 or Equivalent, Guards KS-14539 or Equivalent. (See Note 3.)	Special Lines: (Fig. 5) Protector Blocks, Metal Dummy Heat Coils or Soldered Straps (Note 2), Terminal Punching Insulators, Indicators KS-6660 or Equivalent, Guards KS-14539 or Equivalent. (See Note 3.)
	Denied Lines: Protector Blocks, Insulating Dummy Heat Coils*		

*The heat coils will be specified locally.

Notes:

1. Where TP or NP conductors do not appear on the main frame in well defined groups which readily distinguish them from Class P conductors, heat coils and protector blocks should be used in order to minimize the probability of accidentally omitting such protection from Class P conductor terminations.
2. Not required where heat coil springs are not provided.
3. Procedures for the protection of special lines against service interruptions are covered in Section 069-120-801.

3.05 Figure 5 shows a typical protector, other than a 300-type connector, with one cable pair protected with the special attachments used on special lines. Procedures for the protection of special lines against service interruptions are given in Section 069-120-801.

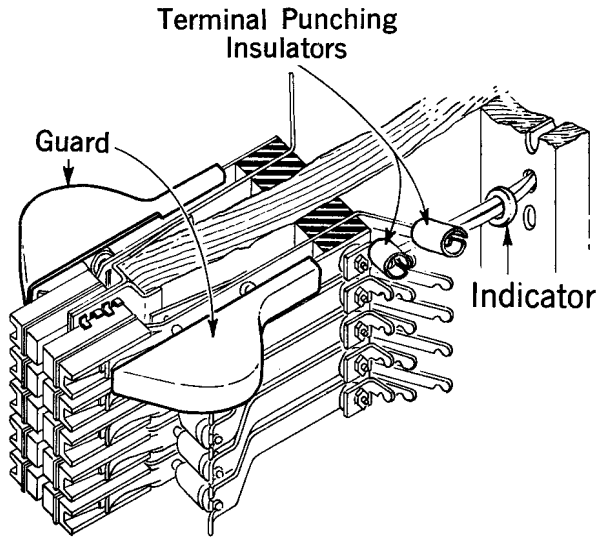

Fig. 5 — Protector Mounting Showing Special Line Attachments

4. 444-TYPE JACKS

A. Working Conductors Except Special Lines

4.01 The 444-type jacks provide for connecting Class NP cable conductors to central office circuits through normally closed precious metal contacts. This is essentially the same as standard protectors equipped with dummy metal heat coils and dummy protector blocks. No electrical protective devices are used.

B. Special Lines

4.02 Special lines shall be equipped with 9A, 9B, or 9C marker guards and 11A protective guards or 12A and 12B guards as specified by local instructions. KS-6660 indicators, or equivalent, and No. 4 and 5 terminal punching insulators shall also be placed. (See Fig. 6.)

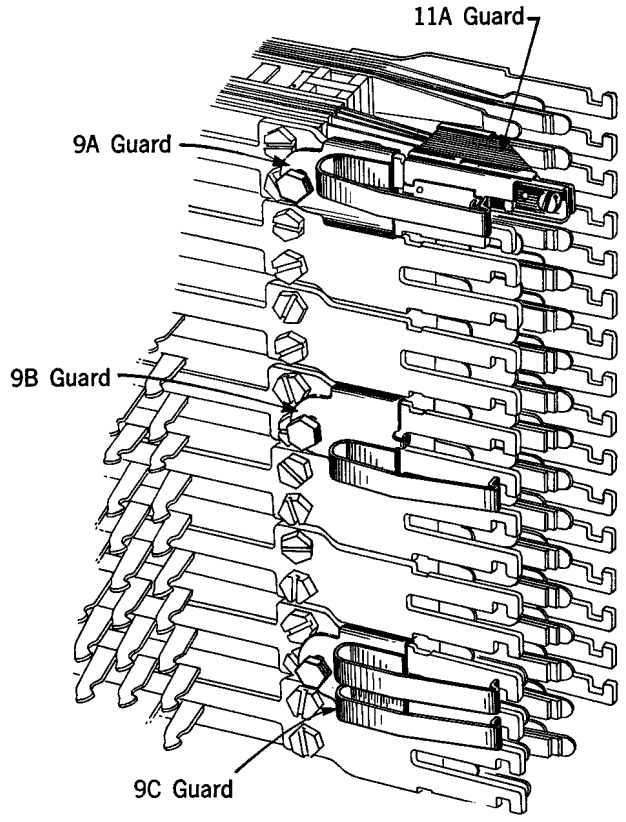

Fig. 6 — Jack Mounting Showing Special Line Attachments