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## 310/310L- and 310M/310ML-Type Connectors Description, Use, Installation, and Repair Procedures

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## 1. Overview

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- 1.01** This practice covers the description, use, installation, and repair procedures for 310-, 310L, 310M-, and 310ML-type connectors.
- 1.02** This practice is reissued to add new 310L- and 310ML-type connectors which are UL\* or Listed for applications where UL listing is desired, i.e., Customer premises, commercial buildings, Local Area Networks (LAN) environments, etc.
- 1.03** This practice contains a **CAUTION** admonishment.
- 1.04** AT&T welcomes your comments on this practice. Your comments will aid us in improving the quality and usefulness of AT&T documentation. Please use the Feedback Form provided at the end of this practice.
- 1.05** Additional copies of this practice and any associated appendixes may be ordered from the AT&T Customer Information Center as follows:
- Call 1-800-432-6600  
or
  - Complete Form IND 1-80.80 and mail to:  
  
AT&T Customer Information Center  
Attention: Order Entry Department  
2855 N. Franklin Road  
P.O. Box 19901  
Indianapolis, IN 46219-1999
- 1.06** These high-density connectors are used for terminating and protecting outside plant cables on conventional distributing frames.
- 1.07** The 310-family of connectors with protector units provides features for voltage protection, current protection, test access, identification of special circuits, and disconnection of the outside cable pair from the office or customer premises equipment.

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\* Registered trademark of Underwriter's Laboratories, Inc.

**1.08** This practice is issued by:

Document Development Organization  
AT&T Network Systems  
2400 Reynolda Road  
Winston-Salem, NC 27106-4696

## **2. Description**

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**2.01** Two series of 310-type connectors (310/310L and 310M/310ML) are offered for convenience and ease of installation. All 310-type connectors have the same features except for the angled mounting arrangement of the 310M/310ML. The 310M/310ML-type connector mounting bracket is angled 12.5-degrees (Figure 1) to provide improved visual and physical access to the plug-in protector field while also maintaining front access to both the test and cross-connect fields (see Figures 2, 3, and 4). All the exposed wires in the UL Listed connectors are enclosed in a metal casing.

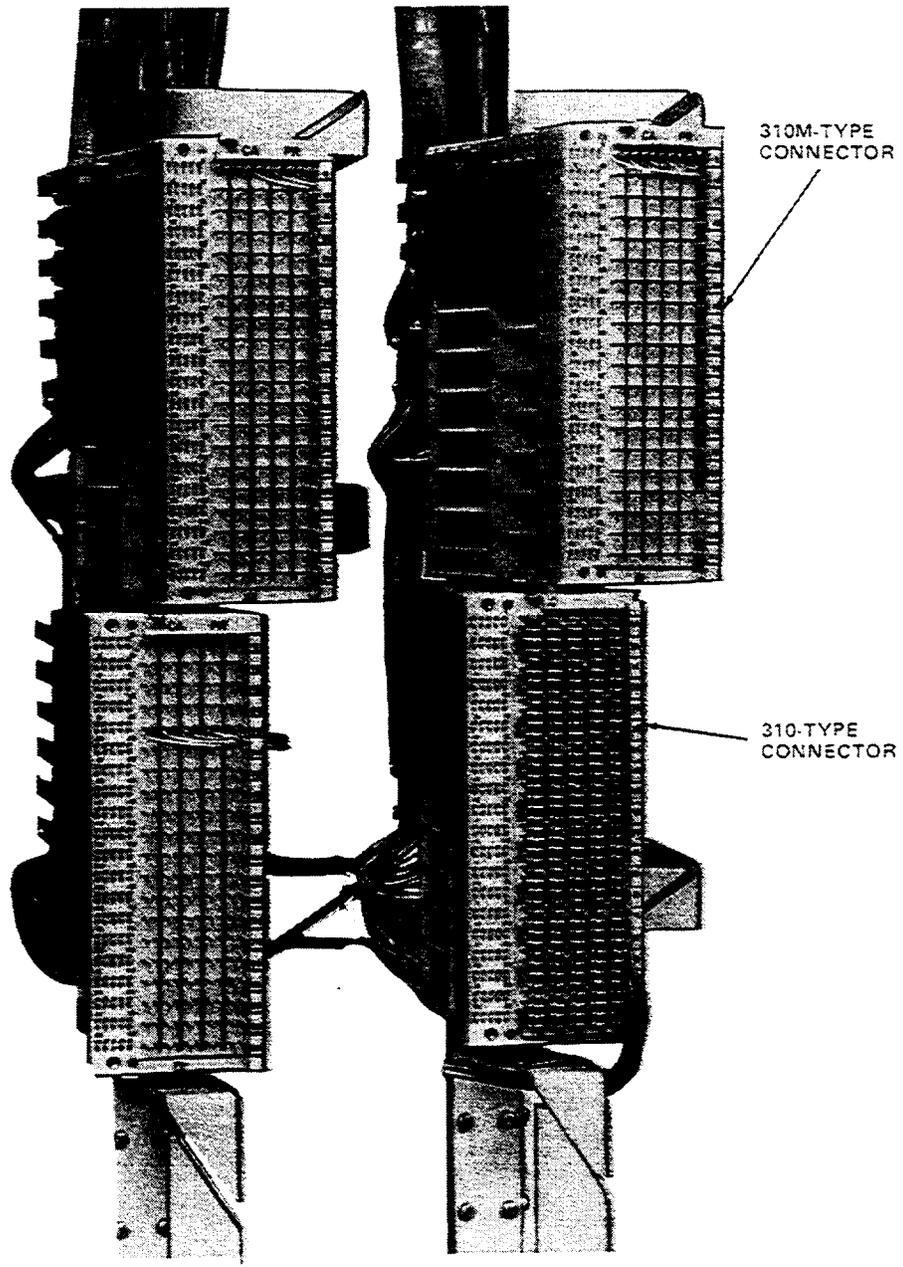


Figure 1. Angle Mounted 310M-Type (Top) and 310-Type Connector (Bottom)  
[Extends 7 Inches (17.78 cm) from Face of Vertical Frame Mounting Bar.]

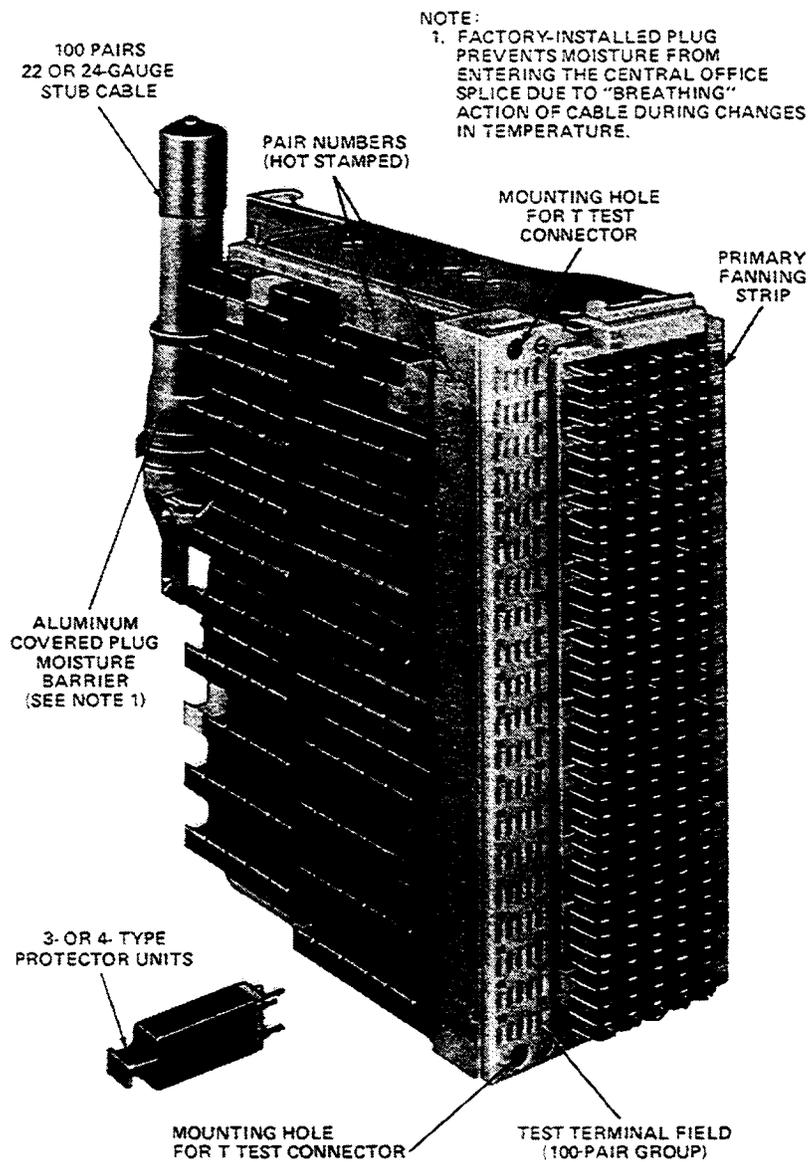


Figure 2. 310-Type Connector — Left Side View — Quick-Clip Cross-Connect Field

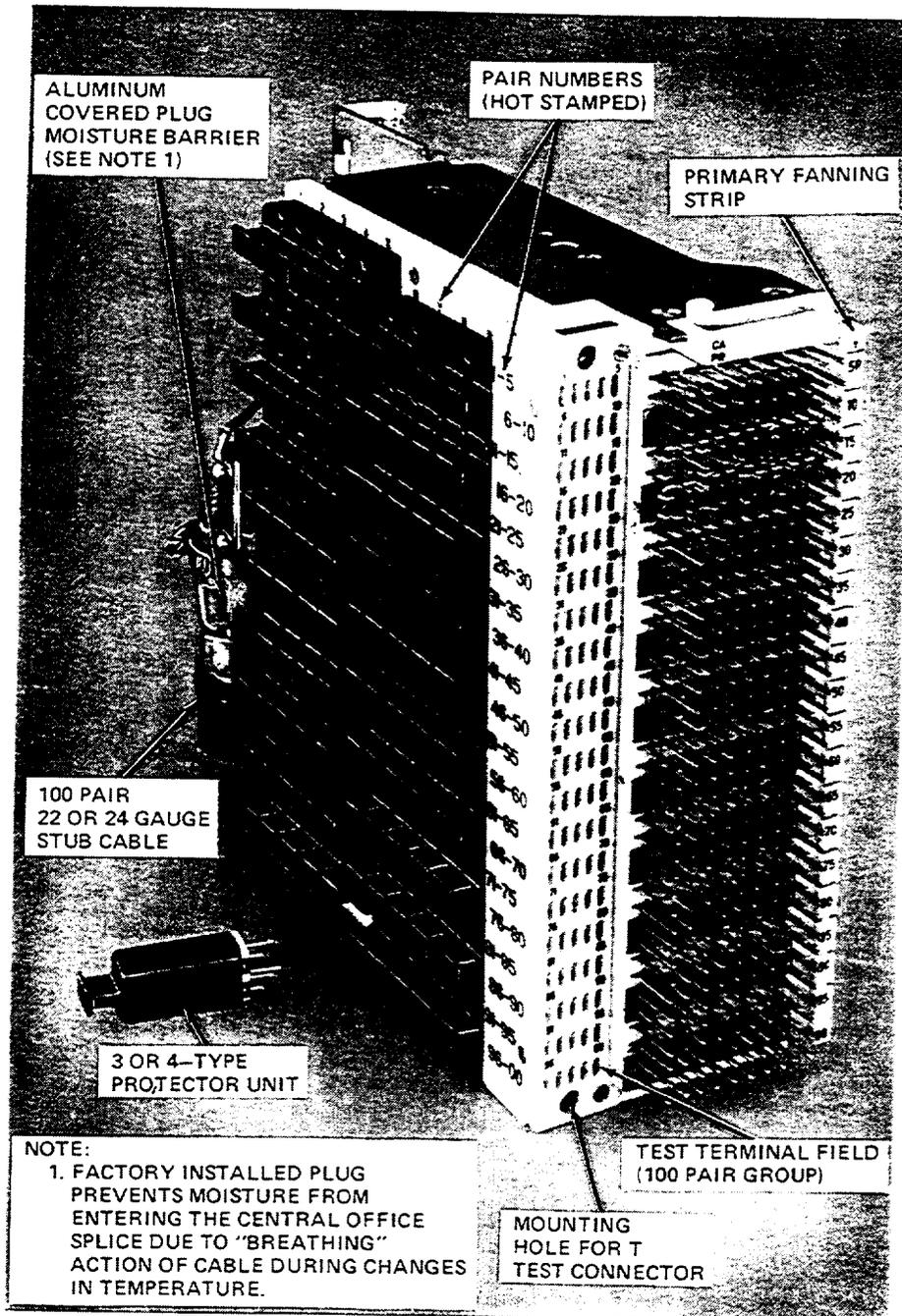


Figure 3. 310-Type Connector — Left Side View — Bifurcated Wire-Wrap Cross-Connect Field

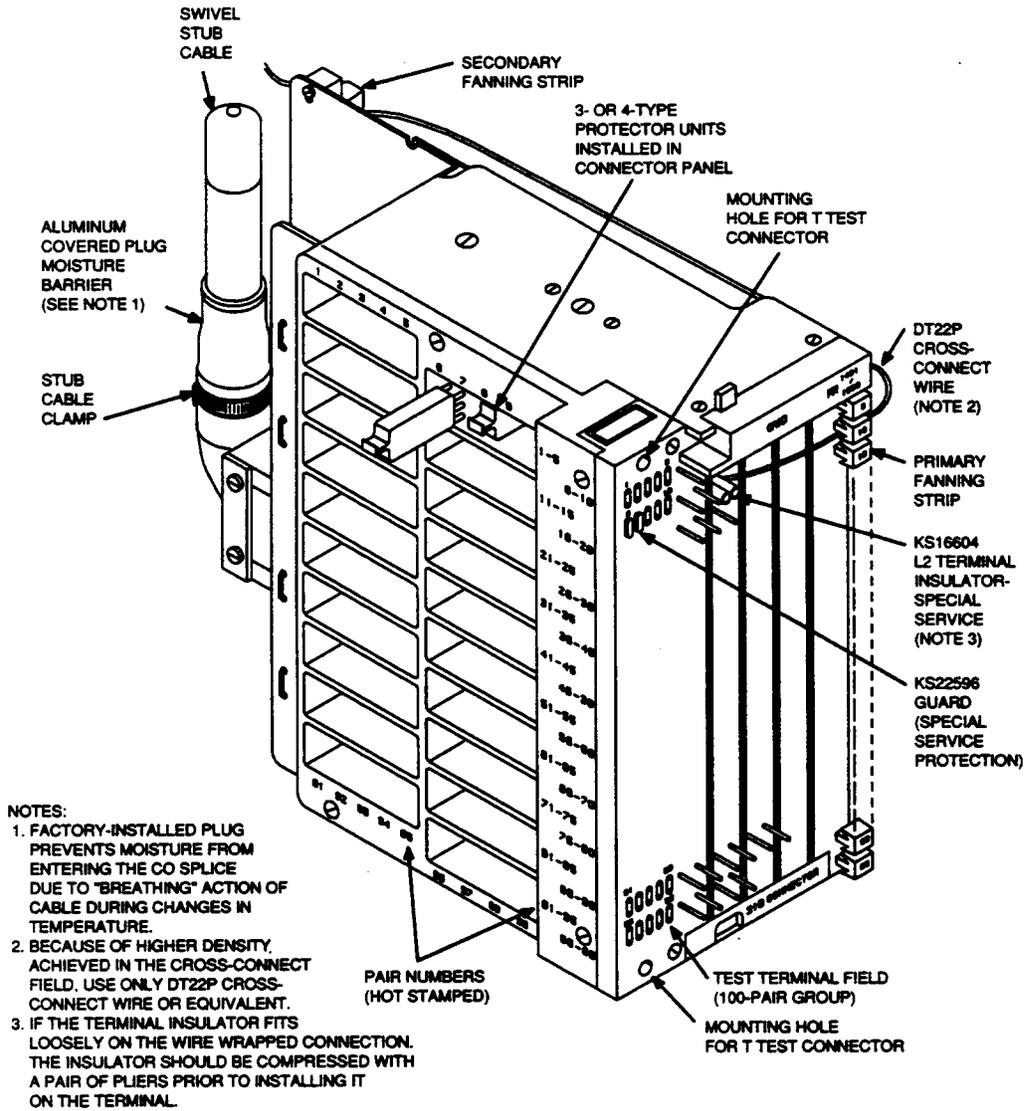
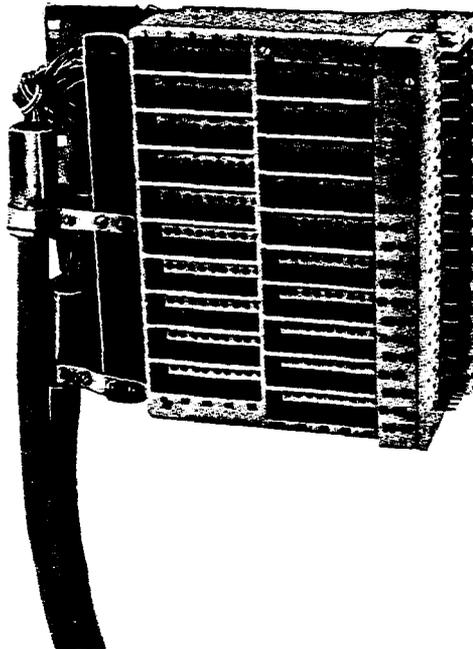


Figure 4. 310-Type Connector — Left Side View — Single Wire-Wrap Cross-Connect Field

- 2.02** The high-density 310-family of connectors offers convenience and ease of installation for terminating outside plant cables on low-profile or tall conventional distributing frames. They consist of plastic panels measuring 9-3/8 inches (23.8 cm) high by 4 inches (10.16 cm) wide (with 4-type protector units installed). The connectors extend 7 inches (17.78 cm) from vertical frame mountings. The left face has two 5 by 10 arrays for 100 of the 3- or 4-type protector units. The protector units must be ordered separately.
- 2.03** Front-facing test terminal, cross-connect fields (toward the work aisle), and snap-through fanning strips simplify cross-connects and testing and facilitate running jumper wires. There are three options in the cross-connect field: single and bifurcated wire-wrap design, or the punch-on quick-clip arrangement which eliminates the need for wire stripping and wrapping.
- 2.04** All options have bridging or back-tapping capability and are compatible with the 89-type high-density central office connecting blocks.
- 2.05** Pair identification is hot-stamped at the factory on the protector unit panel, cross-connect test fields, and fanning strips for quick, positive installation requiring minimal field stenciling (cable number and pair count only).
- 2.06** The 310- and 310M-type connectors are available with both 24- and 22-gauge (0.5 mm and 0.6 mm) stub cables, which are swivel-mounted to accommodate either top or bottom cable access to the frame. Stub cables are offered in six standard lengths [30, 50, 80, 100, 150, and 200 feet (9.14 m, 15.24 m, 24.38 m, 30.48 m, 45.72 m, and 60.95 m)]. Longer stubs are available on request. Stubless 310- and 310M-type connectors are also available for easy termination of pair-gain systems, as are dual 50-pair stubs for T1 Carrier (Figure 5). Factory pre-connectorized versions using either 710- or 711-type splicing connectors also are available upon request.



**Figure 5. 310-Type Connector — Dual Stub**

**2.07** Table A lists the applications, codes, and specifications of the 310-type connectors. Figure 6 shows the 310M-type connector and Table B lists the applications, codes, and specifications of the 310M-type connectors.

**2.08** The 310L- and 310ML- type connectors (UL Listed) are offered with 26-gauge (0.4 mm) stub cables only to facilitate UL's fusing (fuse length) requirements. A detailed description, available codes, and specifications for these units are provided in paragraphs 7.01 through 7.05.

**2.09** The installation, marking, and testing requirements specified in Part 3 and 6 are appropriate for the 310L- and 310ML- Type connectors.

**2.10** Part 8 details special repair requirements which are unique to the 310L and 310ML-type (UL Listed) connectors.

**Table A. 310-Type Connectors**

Application	Cross-Connect Terminal Type	Stub Cable			Item Code	Comcode
		Wire Gauge	Length (Feet) (Meters)	Cabling Direction		
Outside Plant Facility Pairs	Single Wire-Wrap	24 (0.5 mm)	30 (9.14 m)	Up/Down (Swivel)	310A2-100-30	103760872
			50 (15.24 m)		310A2-100-50	103868972
			80 (24.38 m)		310A2-100-80	103868980
			100 (30.48 m)		310A2-100-100	103868998
			150 (45.72 m)		310A2-100-150	103869004
			200 (60.95 m)		310A2-100-200	103869012
		22 (0.6 mm)	30 (9.14 m)		310B2-100-30	103760880
			50 (15.24 m)		310B2-100-50	103869020
			80 (24.38 m)		310B2-100-80	103869038
			100 (30.48 m)		310B2-100-100	103869046
			150 (45.72 m)		310B2-100-150	103869053
			200 (60.95 m)		310A2-100-200	103869012
	Bifurcated Wire-Wrap	24 (0.5 mm)	30 (9.14 m)		310BWA1-100-30	104187844
			50 (15.24 m)		310BWA1-100-50	104287255
			80 (24.38 m)		310BWA1-100-80	104287263
			100 (30.48 m)		310BWA1-100-100	104287271
			150 (45.72 m)		310BWA1-100-150	104287289
			200 (60.95 m)		310BWA1-100-200	104287297
		22 (0.6 mm)	30 (9.14 m)		310BWB1-100-30	104187851
			50 (15.24 m)		310BWB1-100-50	104287305
			80 (24.38 m)		310BWB1-100-80	104287313
			100 (30.48 m)		310BWB1-100-100	104287321
			150 (45.72 m)		310BWB1-100-150	104287339
			200 (60.95 m)		310BWB1-100-200	104287347
	Bifurcated Quick-Clip	24 (0.5 mm)	30 (9.14 m)		310TBA1-100-30	
			50 (15.24 m)		310TBA1-100-50	103731444
			80 (24.38 m)		310TBA1-100-80	103731451
			100 (30.48 m)		310TBA1-100-100	103731469
			150 (45.72 m)		310TBA1-100-150	103731477
			200 (60.95 m)		310TBA1-100-200	103731485

**Table A. 310-Type Connectors (Contd)**

Application	Cross-Connect Terminal Type	Stub Cable			Item Code	Comcode
		Wire Gauge	Length (Feet) (Meters)	Cabling Direction		
Outside Plant Facility Pairs	Bifurcated Quick-Clip	22 (0.6 mm)	30 (9.14 m)	Up/Down (Swivel)	310TBB1-100-30	103749560
			50 (15.24 m)		310TBB1-100-50	103731493
			80 (24.38 m)		310TBB1-100-80	103731501
			100 (30.48 m)		310TBB1-100-100	103731519
			150 (45.72 m)		310TBB1-100-150	103731527
			200 (60.95 m)		310TBB1-100-200	103731535
Pair-Gain Systems (Pseudo Connector for Derived Pairs)	Bifurcated Wire-Wrap	No Stub			310BWE1-100	104187869
	Single Wire-Wrap				310E1-100	103551867
	Bifurcated Quick-Clip				310TBE1-100	103749594
T1 Carrier	Single Wire-Wrap	22 (0.6 mm)	30 (9.14 m)	Down	310B1-50-30*	103655999
			50 (15.24 m)		310B1-50-50*	103725339
			80 (24.38 m)		310B1-50-80*	103725347
			100 (30.48 m)		310B1-50-100*	103725354
			150 (45.72 m)		310B1-50-150*	103725362
			200 (60.95 m)		310B1-50-200*	103725370
			30 (9.14 m)	Up	310D1-50-30*	103656005
			50 (15.24 m)		310D1-50-50*	103725388
			80 (24.38 m)		310D1-50-80*	103725396
			100 (30.48 m)		310D1-50-100*	103725404
			150 (45.72 m)		310D1-50-150*	103725412
			200 (60.95 m)		310D1-50-200*	103725420

**Note:** Other 310-type connector options, such as stubbed and preconnectorized with 710- or 711-type splicing connectors, are also available on a special basis. Please contact your AT&T Sales Representative for ordering information.

\* Two 50-pair cables.

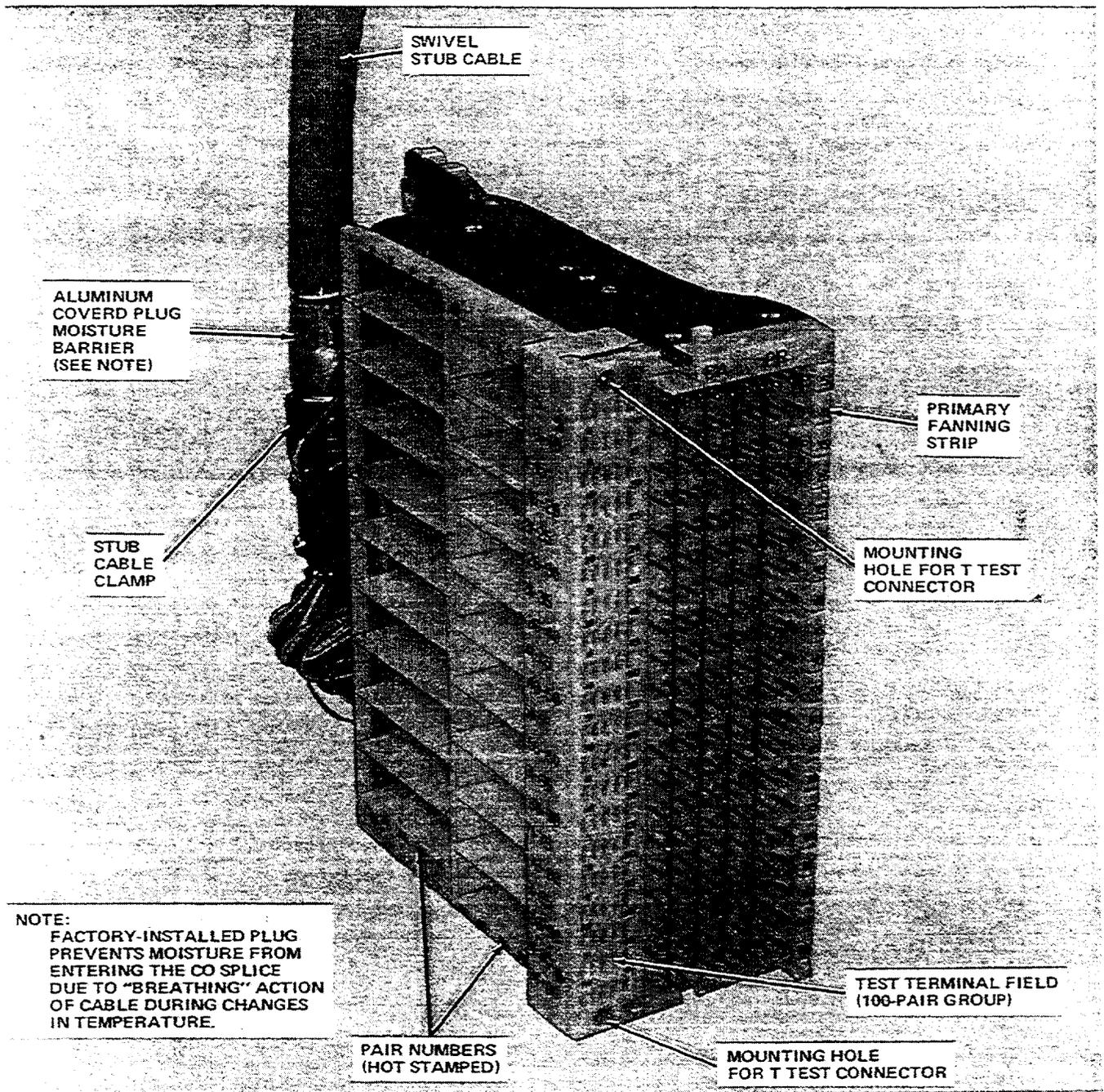


Figure 6. 310M-Type Connector — Left Side View

**Table B. 310M-Type Connectors**

Application	Cross-Connect Terminal Type	Stub Cable			Item Code	Comcode
		Wire Gauge	Length (Feet) (Meters)	Cabling Direction		
Outside Plant Facility Pairs	Single Wire-Wrap	24 (0.5 mm)	30 (9.14 m)	Up/Down (Swivel)	310MA1-100-30	104401575
			50 (15.24 m)		310MA1-100-50	105267454
			80 (24.38 m)		310MA1-100-80	105267462
			100 (30.48 m)		310MA1-100-100	105267470
			150 (45.72 m)		310MA1-100-150	105267488
			200 (60.95 m)		310MA1-100-200	105267496
		22 (0.6 mm)	30 (9.14 m)		310MB1-100-30	104401583
			50 (15.24 m)		310MB1-100-50	105267504
			80 (24.38 m)		310MB1-100-80	105267512
			100 (30.48 m)		310MB1-100-100	105267520
			150 (45.72 m)		310MB1-100-150	105267538
			200 (60.95 m)		310MB1-100-200	105267546
	Bifurcated Wire-Wrap	24 (0.5 mm)	30 (9.14 m)		310MBWA1-100-30	104407275
			50 (15.24 m)		310MBWA1-100-50	105314371
			80 (24.38 m)		310MBWA1-100-80	105314389
			100 (30.48 m)		310MBWA1-100-100	105314397
			150 (45.72 m)		310MBWA1-100-150	105314405
			200 (60.95 m)		310MBWA1-100-200	105314413
		22 (0.6 mm)	30 (9.14 m)		310MBWB1-100-30	104407283
			50 (15.24 m)		310MBWB1-100-50	105314439
			80 (24.38 m)		310MBWB1-100-80	105314412
			100 (30.48 m)		310MBWB1-100-100	105315006
			150 (45.72 m)		310MBWB1-100-150	105315030
			200 (60.95 m)		310MBWB1-100-200	105315048

Table B. 310M-Type Connectors (Contd)

Application	Cross-Connect Terminal Type	Stub Cable			Item Code	Comcode		
		Wire Gauge	Length (Feet) (Meters)	Cabling Direction				
Outside Plant Facility Pairs	Bifurcated Quick-Clip	24 (0.5 mm)	30 (9.14 m)	Up/Down (Swivel)	310MTBA1-100-30	104407309		
			50 (15.24 m)		310MTBA1-100-50	105315055		
			80 (24.38 m)		310MTBA1-100-80	105315063		
			100 (30.48 m)		310MTBA1-100-100	105315071		
			150 (45.72 m)		310MTBA1-100-150	105315089		
			200 (60.95 m)		310MTBA1-100-200	105315097		
		22 (0.6 mm)	30 (9.14 m)		310MTBB1-100-30	104407317		
			50 (15.24 m)		310MTBB1-100-50	105315105		
			80 (24.38 m)		310MTBB1-100-80	105315513		
			100 (30.48 m)		310MTBB1-100-100	105315121		
			150 (45.72 m)		310MTBB1-100-150	105315139		
			200 (60.95 m)		310MTBB1-100-200	105315147		
			Pair-Gain Systems (Pseudo Connector for Derived Pairs)		Bifurcated Wire-Wrap	No Stub	310MBWE1-100	104407291
					Single Wire-Wrap		310ME1-100	104401591
Bifurcated Quick-Clip	310MTBE1-100	104407325						

**Note:** Other 310M-type connector options, such as stubbed and preconnectorized with 710- or 711-type splicing connectors, are also available on a special basis. Please contact your AT&T Sales Representative for ordering information.

### 3. Installation

#### A. Precautions

- 3.01 Store the connectors in a dry location. Do not leave these units on loading docks or in locations exposed to the weather.
- 3.02 When unpacking the connectors, open the carton on the side marked "OPEN FROM THIS SIDE".
- 3.03 Do not bend the cable stubs in a radius of less than 5 inches (12.7 cm) nor to a 5-inch (12.7 cm) radius more than twice at the same general location.
- 3.04 Do not remove the packing material from the connector until it is ready for installation on the vertical frame.

#### B. Installing the 310/310L and 310M/310ML Type Connectors

- 3.05 The 310-type connectors are installed on conventional distributing frames. AT&T 201-220-101 describes the conventional distributing frames.
- 3.06 The termination capacities of vertical main frames equipped with 310-type connectors are shown in Table C.

Table C. 310/310L and 310M/310ML Type Connector Termination Capacities

Height of Vertical Main Frame	No. of Terminations Per Vertical
07 Feet (2.13 m)	600 Pairs
08 Feet (2.43 m)	800 Pairs
09 Feet (2.74 m)	1000 Pairs
11 Feet 6 inches (3.5 m)	1200 Pairs
12 Feet 5 inches (3.78 m)	1200 Pairs*
14 Feet 5 inches (4.39 m)	1200 Pairs*

\* A maximum of 1200 pairs per vertical is recommended to avoid possible jumper and cable congestion in the vertical.

- 3.07** The 310M/310ML-type connector has the same features as the 310/310L-type connector except the mounting bracket is angled 12.5 degrees.

**⇒ NOTE:**

It is not recommended that the 310/310L- and 310M/310ML-type connectors be mixed on the same vertical. Do not mount 310M/310ML-type connectors to the left of a vertical containing other type connectors with protector units that plug in the left side unless no other space is available.

- 3.08** Prior to installing 310-type connector(s), proceed as follows:

- (1) Open the cable entrance slots or ferrules in the floor in accordance with local instructions.
- (2) Mark the cable number and pair count of each connector stub cable on a linen tag or glass tape and attach to stub cable prior to placing it through the floor to the cable entrance facility.

***For tall conventional MDFs which have mounting holes drilled for mounting C50-, 300-, 301-, and 303-type connectors, use the same mounting holes for the 310-type connectors as shown in Figure 7. The mounting bracket of the connector has two slotted mounting holes and a half hole at each end. Each connector is attached to the frame vertical by using one slotted hole and one half hole. Since the mounting hole pattern differs at the top and bottom of most tall conventional MDF verticals, a mounting bracket must be used. The mounting bracket (Comcode 842354136) must be ordered separately. See Figures 8 and 9 for mounting bracket installation.***

For low-profile conventional distributing frames (LPCDFs) ED-97754 manufactured in 1976 and later, frame mounting holes have been incorporated on the verticals to accommodate the 310-type connector as well as all standard connectors.

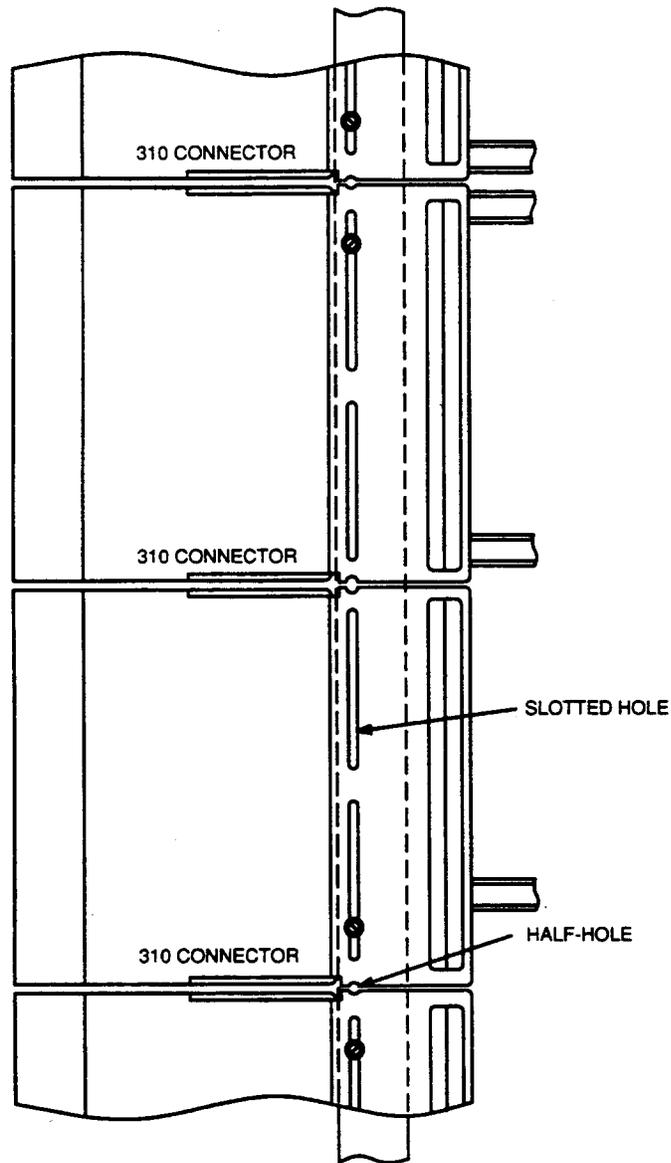
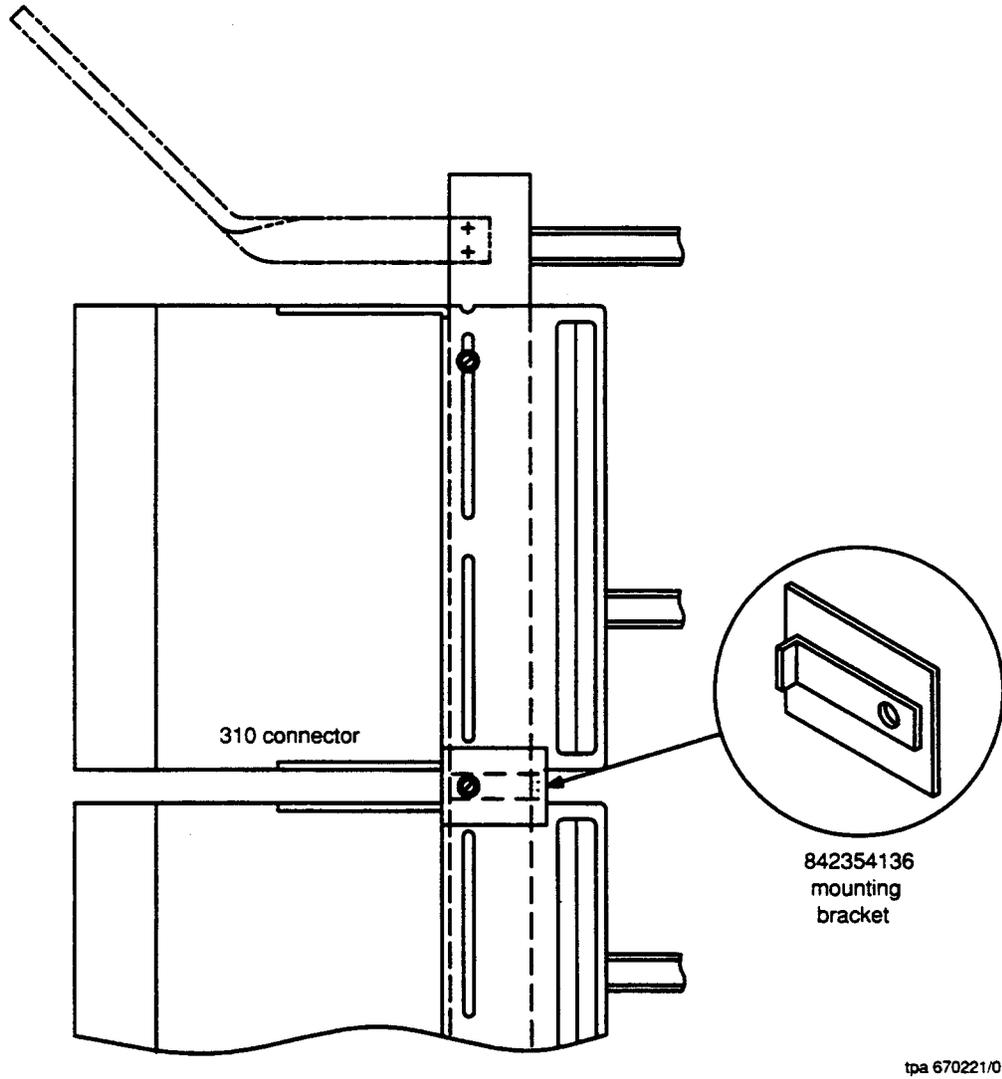
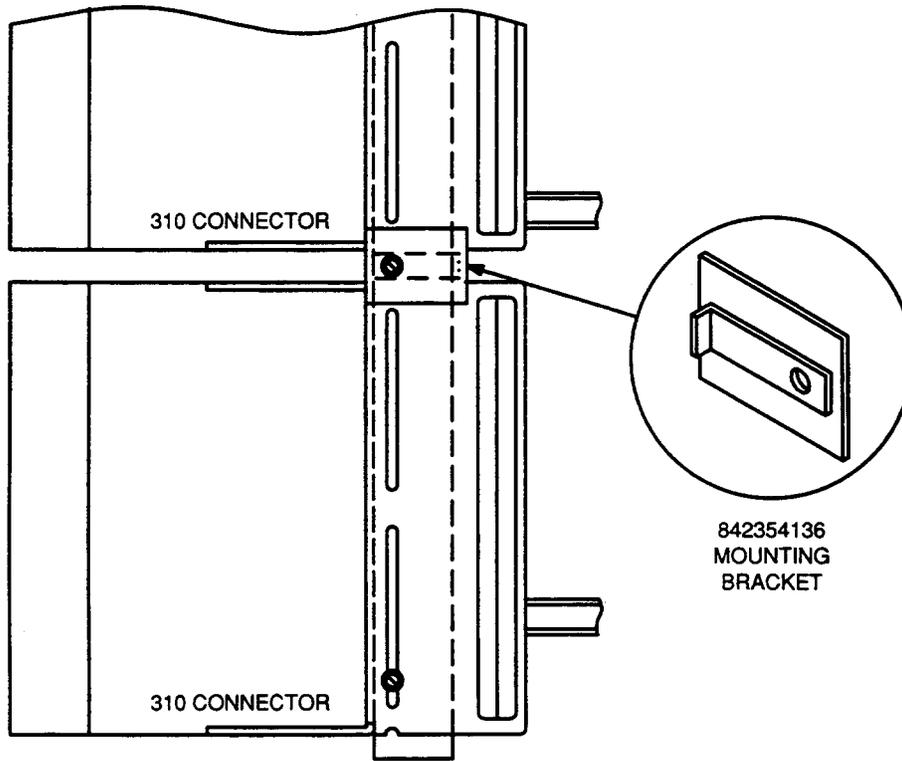


Figure 7. Mounting Arrangement for the 310/310L- or 310M/310ML-Type Connectors Using Existing Mounting Holes



**Figure 8. Mounting Arrangement for the 310/310L- or 310M/310ML-Type Connectors at the Top of a Tall Conventional MDF Vertical**



**Figure 9. Mounting Arrangement for the 310/310L- or 310M/310ML-Type Connectors at the Bottom of a Tall Conventional MDF Vertical**

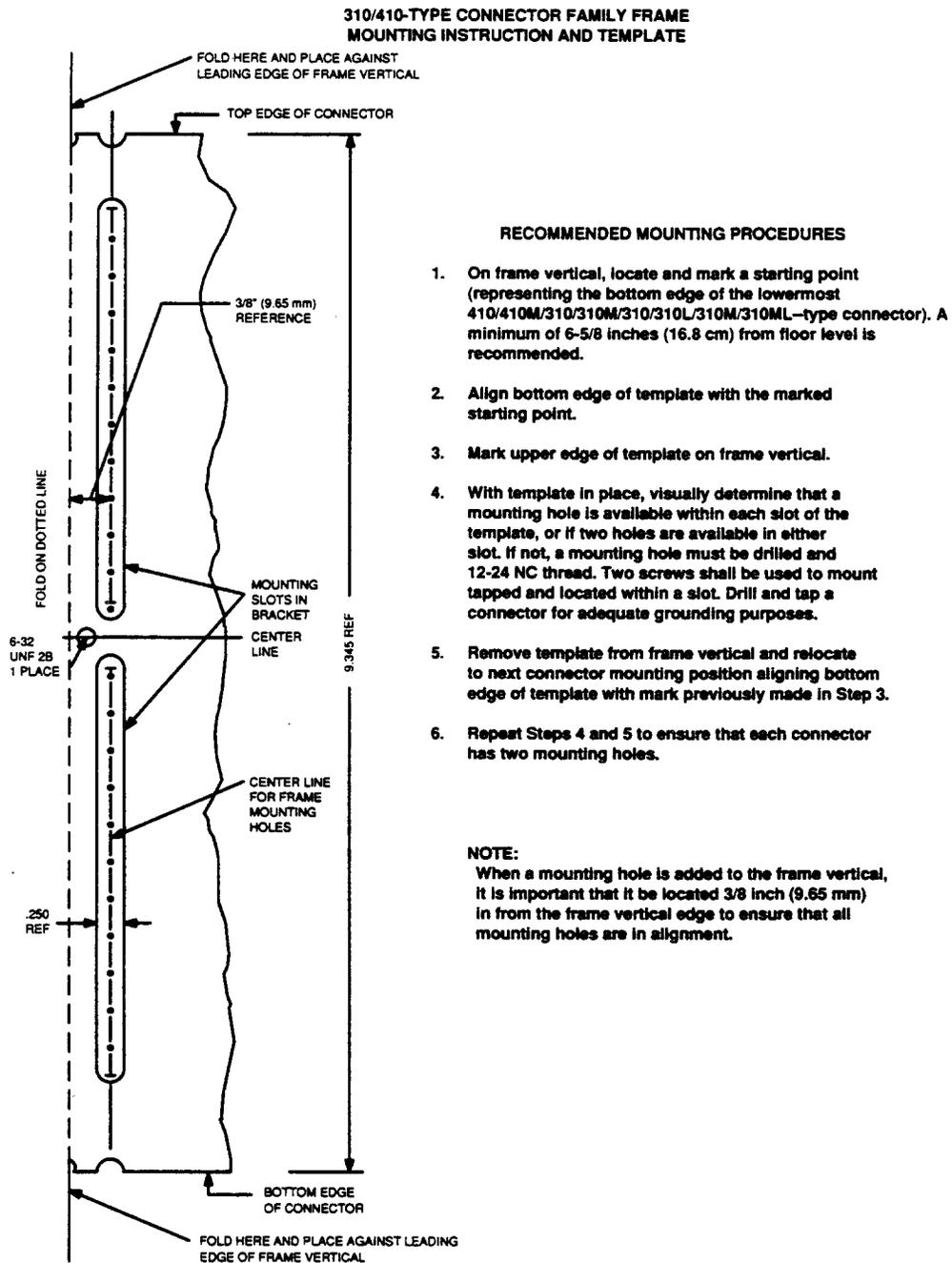


Figure 10. 310/410-Type Connector Family Instruction Sheet

**3.09** Install 310-type connectors as follows:



**CAUTION:**

*When the 310-type connector is used for frame compression, on some frames it may be necessary to extend the guard rail and the ladder track toward the aisle to compensate for the additional depth of the connector as mounted on the frame vertical.*

- (1) Attach the connectors to the **right side** of the distributing frame vertical mounting bar. Mount connectors with upward-mounted stubs beginning at the top of the vertical. Mount connectors with downward-mounted stubs beginning at the bottom of the vertical. Use the screws furnished with the connectors. Install both screws through the mounting bracket on each connector and attach to the vertical bar. Do not tighten screws. Continue placement of the balance of the connectors until the vertical is filled with the maximum number of connectors.

**⇒ NOTE:**

A mounting instruction sheet (Figure 10) is packed with each connector. It contains a template for marking the frame vertical for ease of installation. If mounting holes are not available on the frame, drill and tap a 12-24 NC threaded hole per the instruction sheet. Two screws are used to mount the connectors for adequate grounding purposes.

- (2) Tighten the mounting screws after all connectors are placed on the vertical mounting bar.
- (3) Neatly arrange the stub cables of all connectors on the vertical mounting bar against the transverse arms of the frame. Lash the stub cables to these transverse arms in a neat manner using lacing twine or cable ties.
- (4) Seal the cable entrance slots or ferrules in the floor in accordance with local instructions and/or fire protection practices.

**3.10** When a 310-type connector is mounted immediately to the right of a 303-type connector, it is recommended that one frame vertical be skipped to facilitate access to 303-type connectors for running cross-connects.



**NOTE:**

A 310M/310ML-type connector should not be mounted immediately to the left of a frame vertical containing connectors with plug-in protector units on the left side (such as 303- and 305-type connectors). One frame vertical should be skipped.

**3.11** A safety cover is available from Monarch Molding, Council Grove, Kansas, 66846, as an accessory item for the 310-type connector. The cover, Part No. SC-794, is used to identify cable and cable pairs when split cable counts occur within the 100-pair complements of the connector. Labels are furnished and attached to the cover as shown in Figure 11.

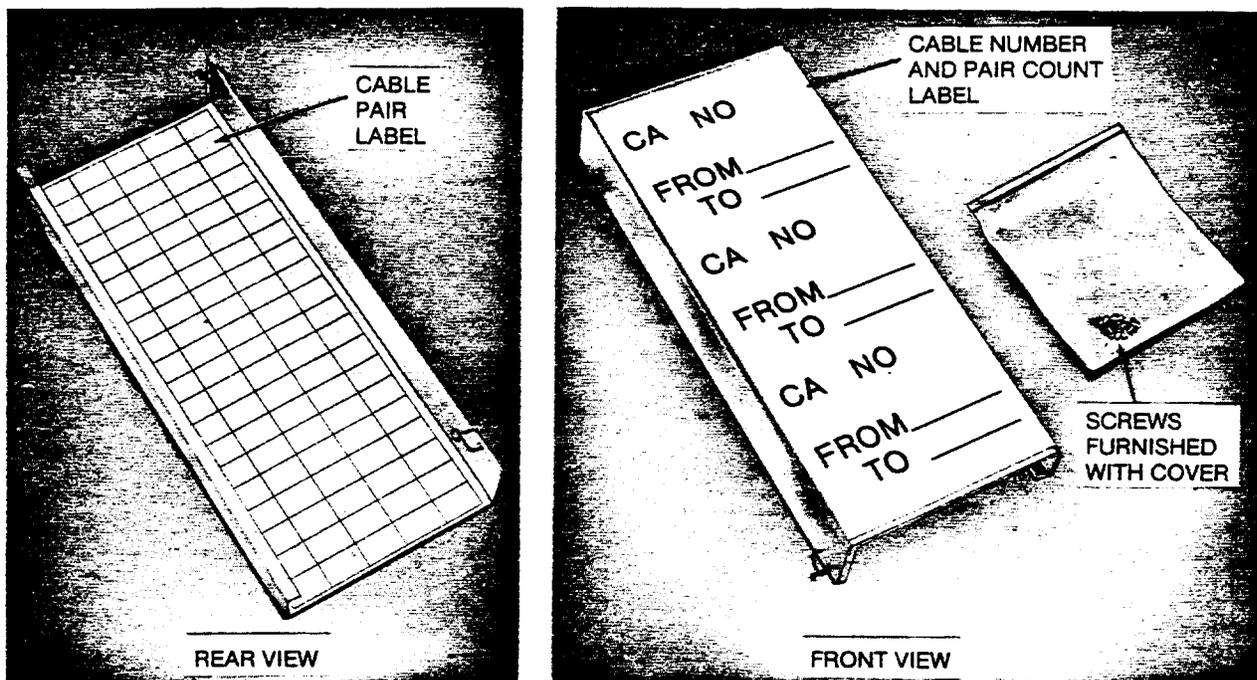


Figure 11. Safety Cover

3.12 Mount the cover on the connector as shown in Figure 12.

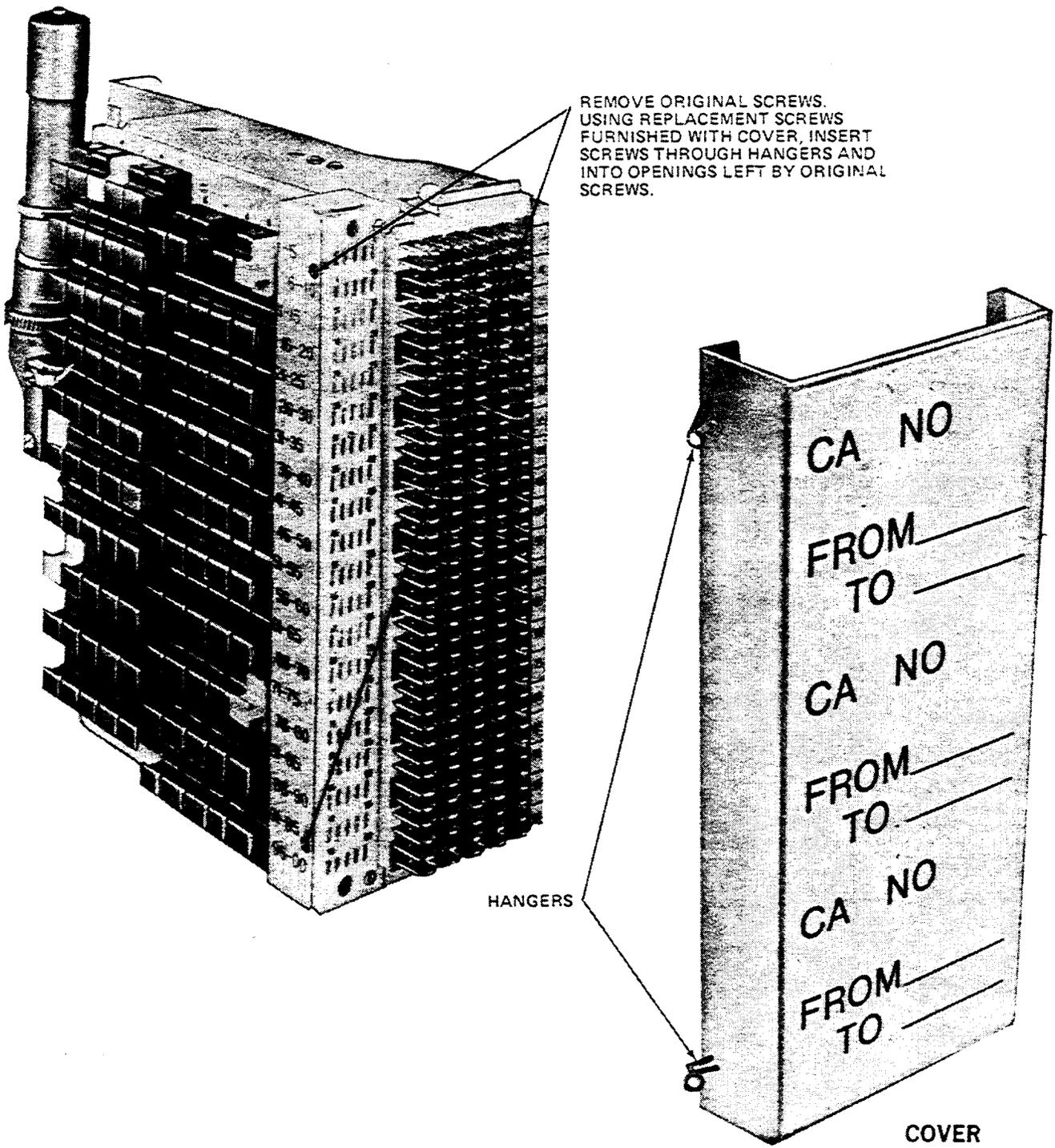


Figure 12. Installing Cover on Connector



## 4. Repair Procedures

**4.01** Before making repairs to the apparatus referred to in this part, craft personnel should be familiar with the contents of the following practices:

Number	Title
AT&T 069-132-811	<i>Punched or Wire-Type Terminals (Not Having Notches or Perforations) Method of Making and Removing Wrapped Connections</i>
AT&T 069-140-811	<i>Soldered Connections — Using Soldering Coppers — Method of Making and Removing.</i>

### A. Precautions

**4.02** This practice covers only those parts that can be replaced in the field. No attempt should be made to replace parts not designated. Part 8 details special repair requirements which apply to the 310L- and 310ML-type (UL Listed) connections.

**4.03** Exercise extreme care when removing, connecting, and replacing terminals to prevent damage to adjacent connections and to avoid crosses to operating circuits.

**4.04** The ends of wire previously used for a solderless wrapped connection or soldered connection shall not be reused for subsequent connections. The end of the wire must be cut off and reconnected by solderless wrapping or soldering. Except in cross-connection fields, it will be necessary to splice the wire if there is not enough slack to provide the number of turns required for solderless wrapped connections. In cross-connection fields, the wire shall be rerun to provide sufficient length for a solderless wrapped connection (AT&T 069-132-811).

### B. Tools and Materials

**4.05** The following is a list of the tools and materials used in repair procedures:

Code/Spec No.	Description
AT-7860	B long-nose pliers
658B	Terminal extractor
AT-7825	4-inch E screwdriver
—	Off-set screwdriver
—	Wrench, 5/16-inch box or open-ended
401787726	Cable ties
KS-6320	Orange stick

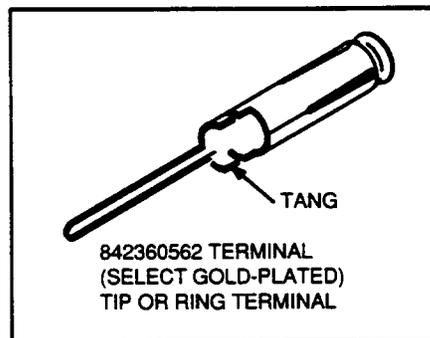
Code/Spec No.	Description
KS-16748	Insertor
—	Sleeving
AT-7424	E rosin-core solder
KS-8740	Soldering copper
KS-16363,L3	Wire-wrap gun
KS-20827,L1 or KS-20551	Wire unwrapping tool
R-2916	Twine.

### C. Removing and Replacing Defective Terminals

**4.06** Four types of terminals are replaceable on the 310-type connectors. They are the tip or ring, ground, cross-connect, and test terminals. The following paragraphs detail the removing and replacing of these terminals.

#### Tip or Ring Terminal

**4.07** To remove the 842360562 tip or ring terminal (Figure 14), proceed as follows:



**Figure 14. Tip or Ring Terminal**

- (1) Using an off-set screwdriver, remove the back cover (side of connector) by removing the screw holding the cover to the bracket (Figure 15).
- (2) On the wiring side of the connector, tag and remove the leads from the terminal to be replaced.
- (3) Using the B long-nose pliers, close the tangs on the terminals or break the terminal flush with the back side of the connector panel.

- (4) Remove the terminal from the front side of the connector panel.

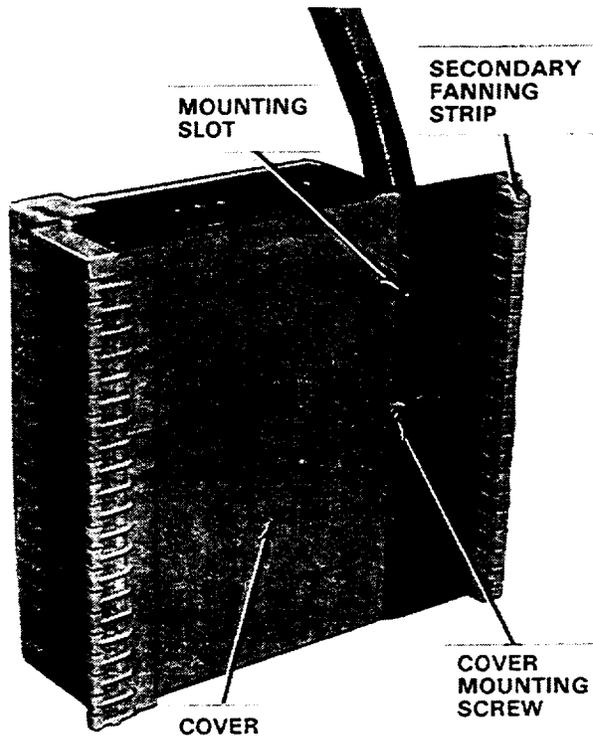


Figure 15. 310/310M Cover Mounting Screw

**4.08** To replace the 842360562 tip or ring terminal, proceed as follows:

- (1) On the front of the connector panel, properly orient the new terminal and insert it into the same hole from which the old terminal was removed.
- (2) Using the fingers, push the terminal into the hole as far as possible.
- (3) Insert a protector unit into the connector to hold the terminal in place.
- (4) On the wiring side of the connector, use the B long-nose pliers to pull the terminal into its proper position. Pay attention to the orientation of the terminal. Determine that the terminal is in the correct position by observing the position of adjacent terminals.
- (5) Using the B long-nose pliers, carefully spread the tangs of the terminal to lock the terminal in place in the connector panel.
- (6) Reconnect all leads to the terminal.

**⇒ NOTE:**

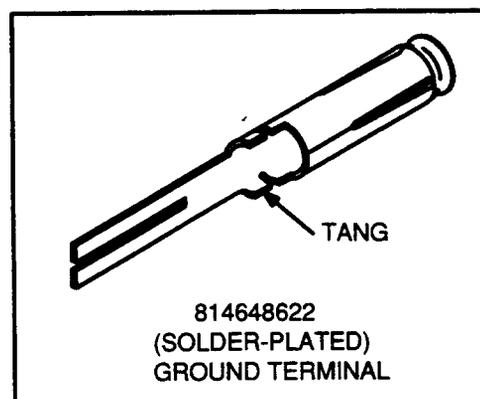
Prior to making connections to the terminal, refer to paragraph 4.04.

- (7) Replace the back cover by reversing the procedure of paragraph 4.07, Step 1.

### Ground Terminal

**4.09** To remove the 814648622 (P-46D862) ground terminal (Figure 16), proceed as follows:

- (1) Follow the procedure outlined in paragraph 4.07, Step 1.
- (2) On the wiring side of the connector, use a soldering copper to remove all solder from the terminal to be replaced.
- (3) Follow the procedure outlined in paragraph 4.07, Steps 2 through 4.



**Figure 16. Ground Terminal**

**4.10** To replace the 814648622 (P-46D862) ground terminal, proceed as follows:

- (1) Follow the procedure outlined in paragraph 4.08, Steps 1 through 5.
- (2) Using the soldering copper, solder the terminal to the ground bus.

**⇒ NOTE:**

Prior to making connections to the terminal, refer to paragraph 2.24.

- (3) Remove the protector unit.
- (4) Follow the procedure outlined in paragraph 4.08, Step 7.

**Cross-Connect and Test Terminals**

**4.11** The 843826447 cross-connect and the 843473380 test terminals (Figure 17), and the quick clip terminals cannot be easily replaced without unfastening the connector and moving it out from the framework vertical. For this reason, no removal or replacement procedures are given. If it is necessary to replace one of these terminals or the top or bottom insert, contact your local AT&T Account Executive.

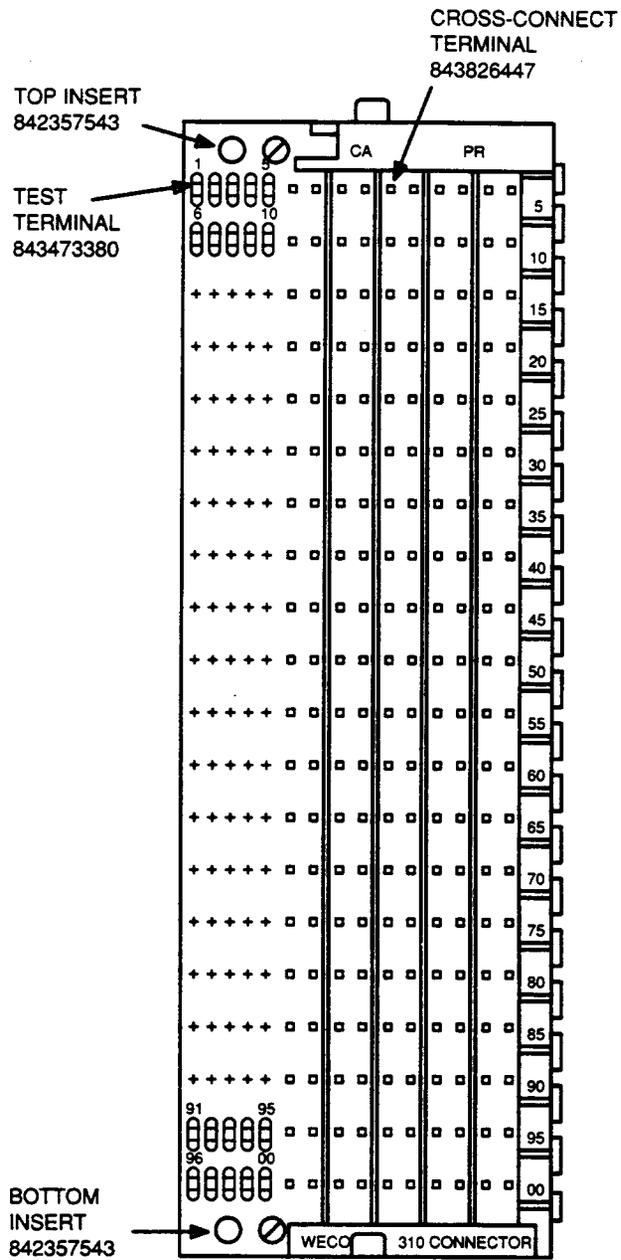


Figure 17. 310-Type Connector, Front View

## 5. Repair

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### Repair of Broken or Damaged Wire Conductors

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- 5.01** To repair a broken or damaged wire conductor leading from the moisture plug of the stub cable proceed as follows:
- (1) Identify the wire conductor to be repaired leading from the moisture plug of the stub cable.
  - (2) Remove the wire-wrap connection at the corresponding terminal.
  - (3) Cut the defective portion of the wire and splice a new length of wire to the remaining section. Provide sufficient length for the solderless wrapped connection.
  - (4) Rerun the new length of wire back to the corresponding terminal.
  - (5) Reconnect the wire conductor to the terminal.

## 6. Testing

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### A. Protector Units

- 6.01** The 3- and 4-type protector units are used with all 310-type connectors to provide electrical protection. The protector units are ordered separately from the connectors. The 3- and 4-type protector units are described in AT&T 201-208-100.
- 6.02** All standard plug-in protector units are equipped with four gold-plated tip and ring pins and a solder-plated ground pin.
- 6.03** Protector units with gold-plated pins should be used with connectors containing gold-plated socket terminals (that is, all current protector unit and connector codes). Protector units with gold-plated or solder-plated pins can be used in vintage connectors containing solder-plated socket terminals.



**CAUTION:**

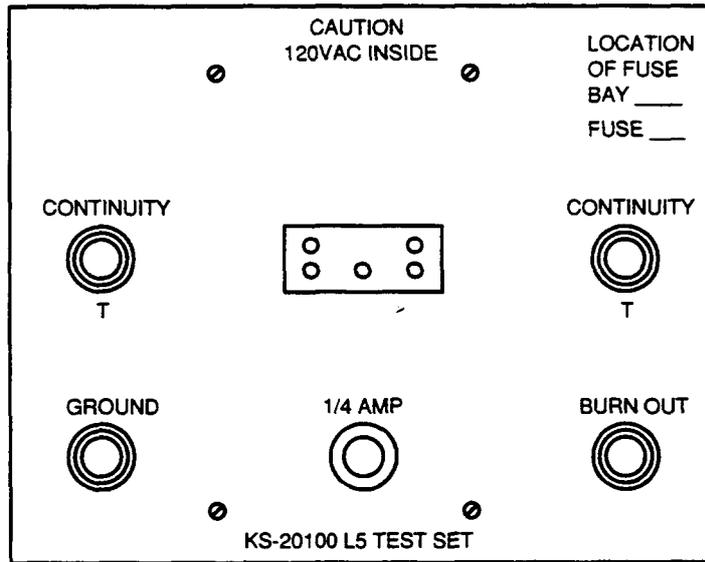
*Protector units with solder-plated pins should not be used on connectors with gold-plated socket terminals. This combination of plating and contact surfaces results in higher contact resistance and surface degradation of gold-plated socket terminals.*



**CAUTION:**

*UL Listed 5-pin modules are to be used in UL Listed 310L1 and 310ML1 Listed connectors.*

**6.04** Before installing the 3-, 4-, or 5-type protector units onto the connectors, each unit may be tested. The KS-20100, L5 test set (Figure 18) is used to test for the presence or absence of tip and ring continuity and ground and also provides a burnout feature to clear protector units shorted by carbon or dust particles. The 182A test set (Figure 19) is used to test the minibridge lifter protector units for tip and ring continuity and for shorted protector blocks. It also tests the function of the 410A switch contained in the protector unit. For test procedures, see AT&T 201-208-100.



**Figure 18. KS-20100, L5 Test Set**

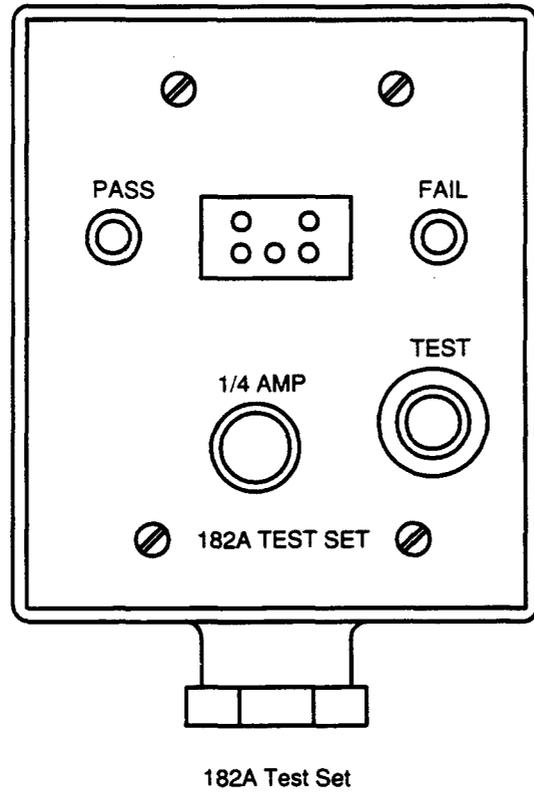
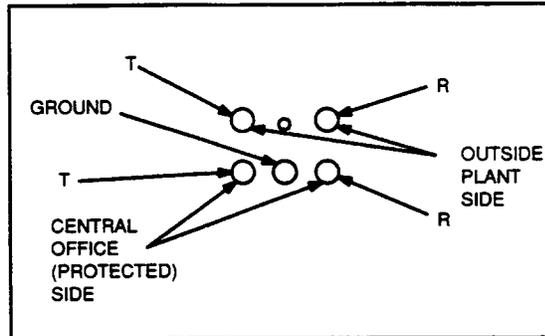
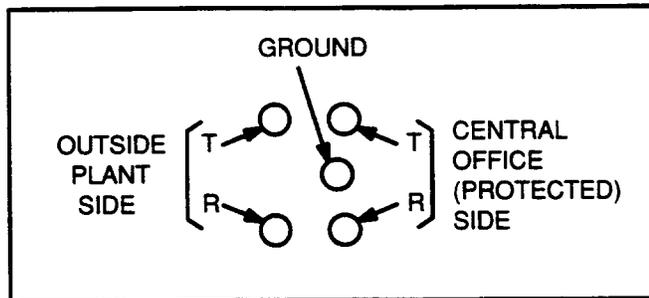


Figure 19. 182A Test Set

**⇒ NOTE:**  
 The jacks (receptacles) for the protector units in the 303-, 305-, 307-, 309-, 310-, and 311-type connectors have reversed tip and ring orientation from the 302- and 308-type connectors (see Figures 20 and 21).



**Figure 20. Jack for Protector Unit on 302- and 308-Type Connectors**



**Figure 21. Jack for Protector Unit on 303-, 305-, 307-, 309-, 310-, and 311-Type Connectors**

**B. Test Connectors, Cords, Plugs, Warning Markers, Guards, Insulators, and Indicators**

**6.05** The T test connector and the pick test panel and cords and plugs may be used with the 310-type connectors for testing purposes. Warning markers, guards, insulators, and indicators are used on special service circuits to provide additional visibility and protection. See AT&T 201-208-106 for description and use of these items.

6.06 The T test connector (Figures 22 and 23) is a 100-pair test connector that is used for making multiple pair tests on the 310-type connectors.

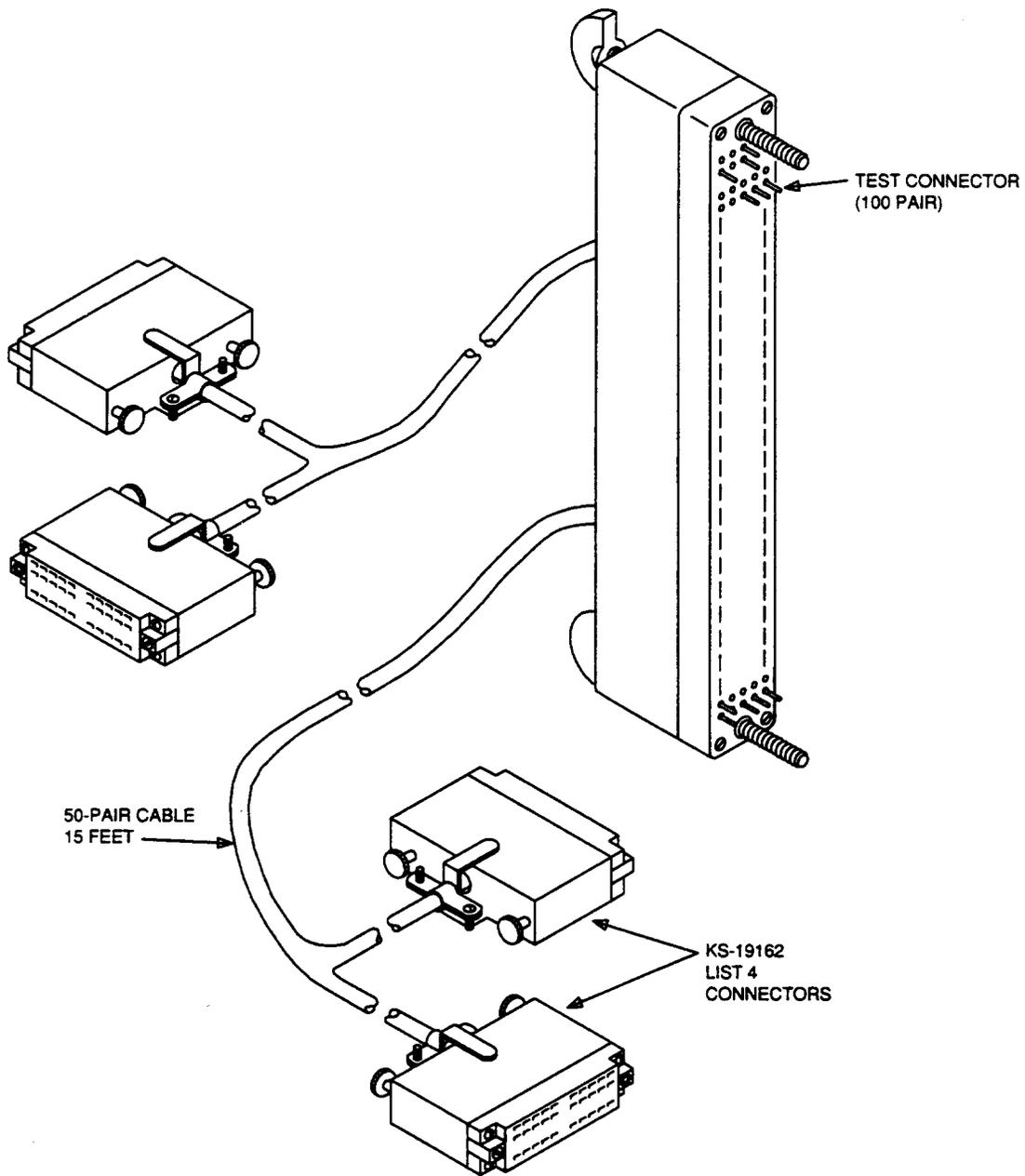
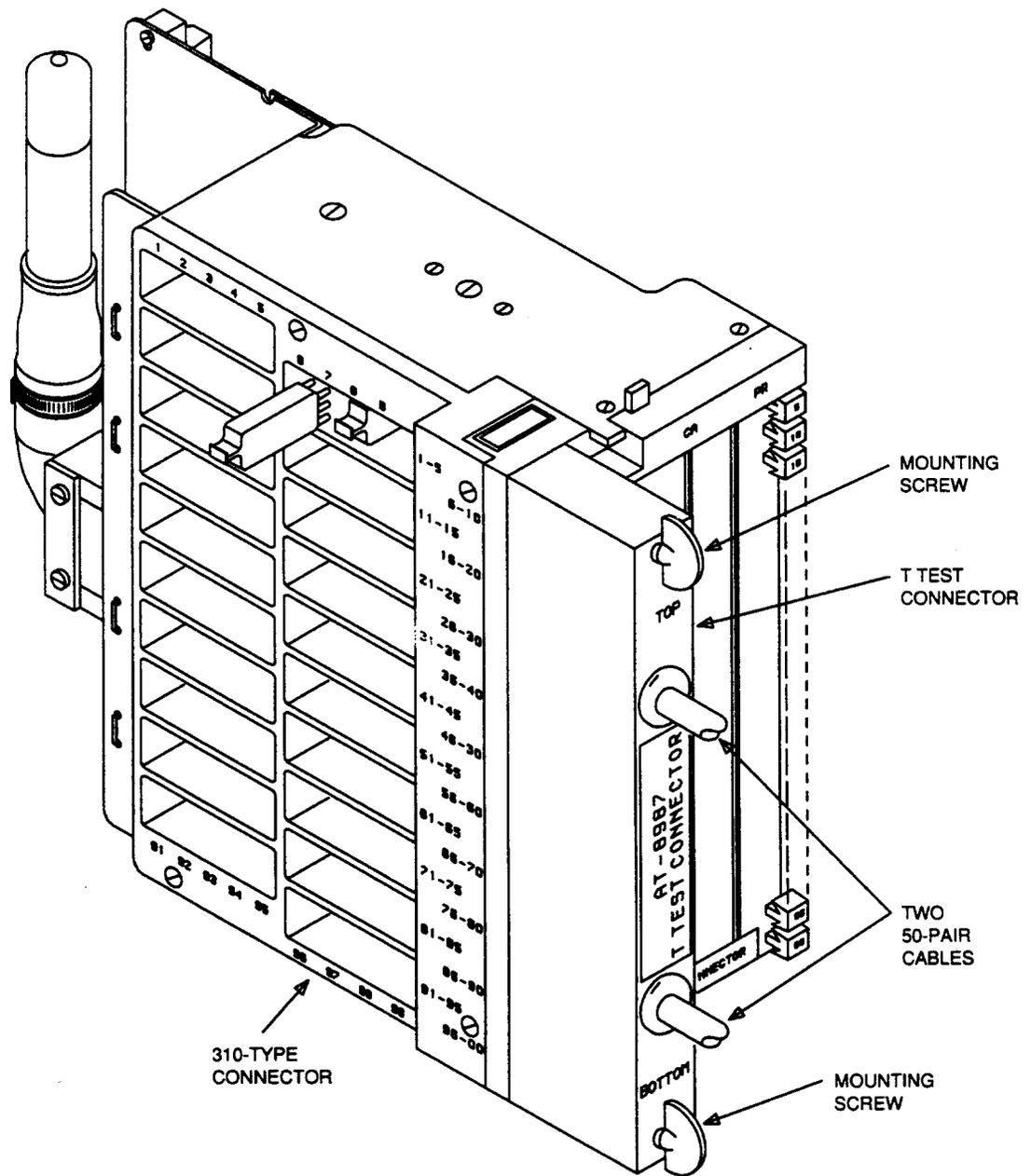


Figure 22. T Test Connector (AT-8987)



**Figure 23. T Test Connector (AT-8987) Mounted on a 310-Type Connector**

**6.07** A separate pick test panel assembly (Figure 24) is furnished with the T test connector. When in use, the four KS-19162, L4 connectors are attached to the pick test panel, tone is applied, and a B test point is used to identify individual pairs.

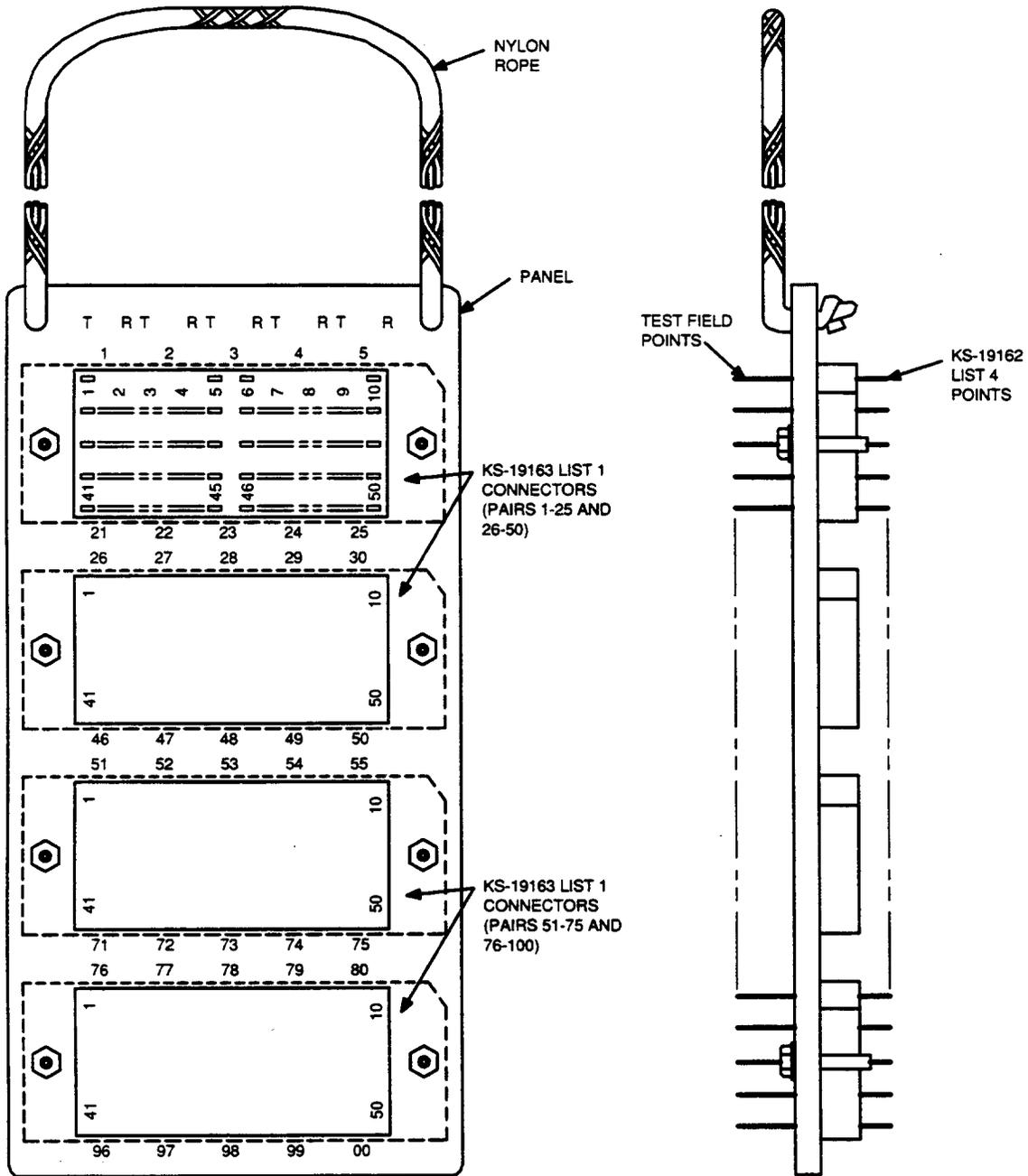
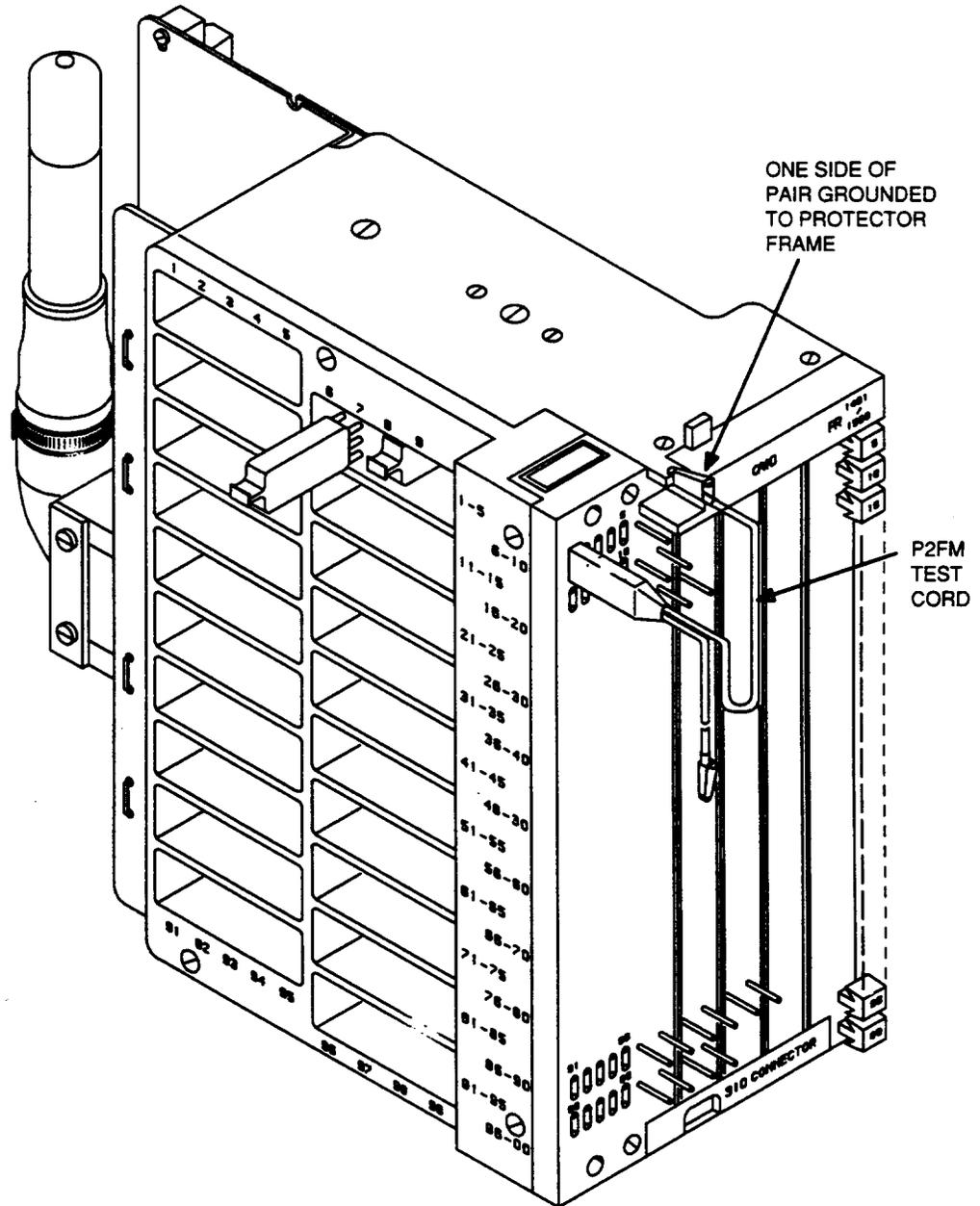


Figure 24. Pick Test Panel Assembly

**6.08** The P2FM test cord (Figure 25) is used to short the tip and ring or to ground the tip and/or ring of an individual cable pair by inserting the plug end into a pair of recessed test terminals on the 310-type connectors.



**Figure 25. P2FM Test Cord for Testing Individual Pairs**

## 7. 310L- and 310ML-Type (UL Listed) Connectors

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**7.01** The 310L- and 310ML-type connectors have been UL Listed for use on conventional distributing frames in a Building Entrance Protection environment, i.e., customer premises, commercial buildings, Local Area Networks (LAN), etc. They may, however, be used in any environment (including telephone equipment central offices or COs) where UL Listing is either desired or required. They are intended for use in large pair cross-connect systems (conventional DFS) and comply with the 1990 National Electrical Code which mandates UL Listing of all telephone network products that come under UL Specification 1863. Only UL Listed 5-pin plug-in protector units should be used with these UL Listed connectors.

**⇒ NOTE:**

The UL testing and subsequent listing of these products were predicated upon their use with conventional distributing frame designs which incorporate access to building ground directly through the frame ironwork and integrated ground bar arrangement. Use with any other ground arrangement may not comply with UL requirements.

**7.02** The 310L- and 310ML-Type connectors conform with all the characteristics of the 310/310M-Type connectors as specified in paragraphs 2.01 through 2.05 of this practice. Although most outward appearances are identical (Figure 26), there are several physical characteristics which are unique to these products.

**7.03** The UL Listed 310L- and 310ML-series connectors are all equipped with 26-gauge (0.4 mm) stub cables to facilitate UL's fusing (fuse length) requirement. The stub cables are attached to the connector with a special swivel type metal coupling (Figure 27) which encases all the individual cable conductors. The loose wire conductors inside the connector (between the swivel coupling and the appropriate outside plant terminal of the protector panel) serve as the fuse length.

**7.04** As in other Building Entrance Protector designs, the loose fusible length conductors are encased with a metal side cover (Figure 28) to form a fusing chamber and prevent any arcing or fusing activity from affecting adjacent equipment or terminations.

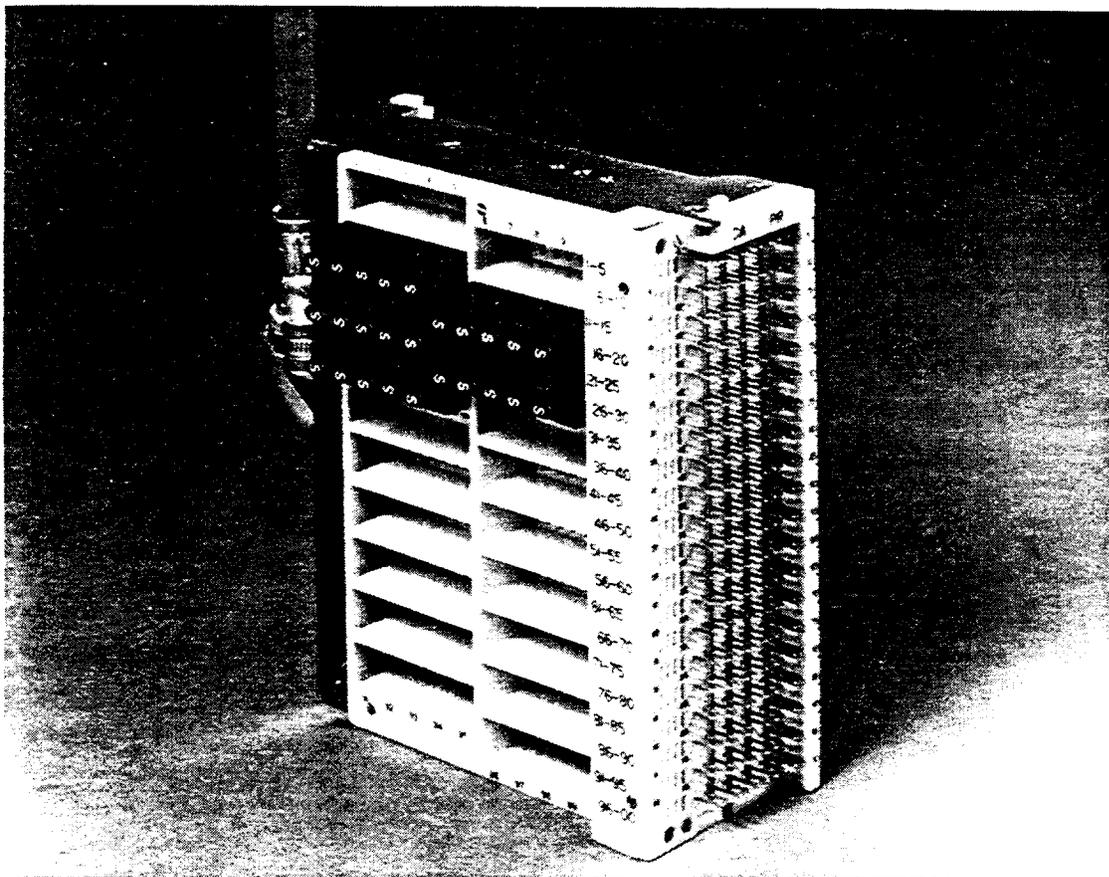


Figure 26. Front View 310L/ML UL Listed Connector

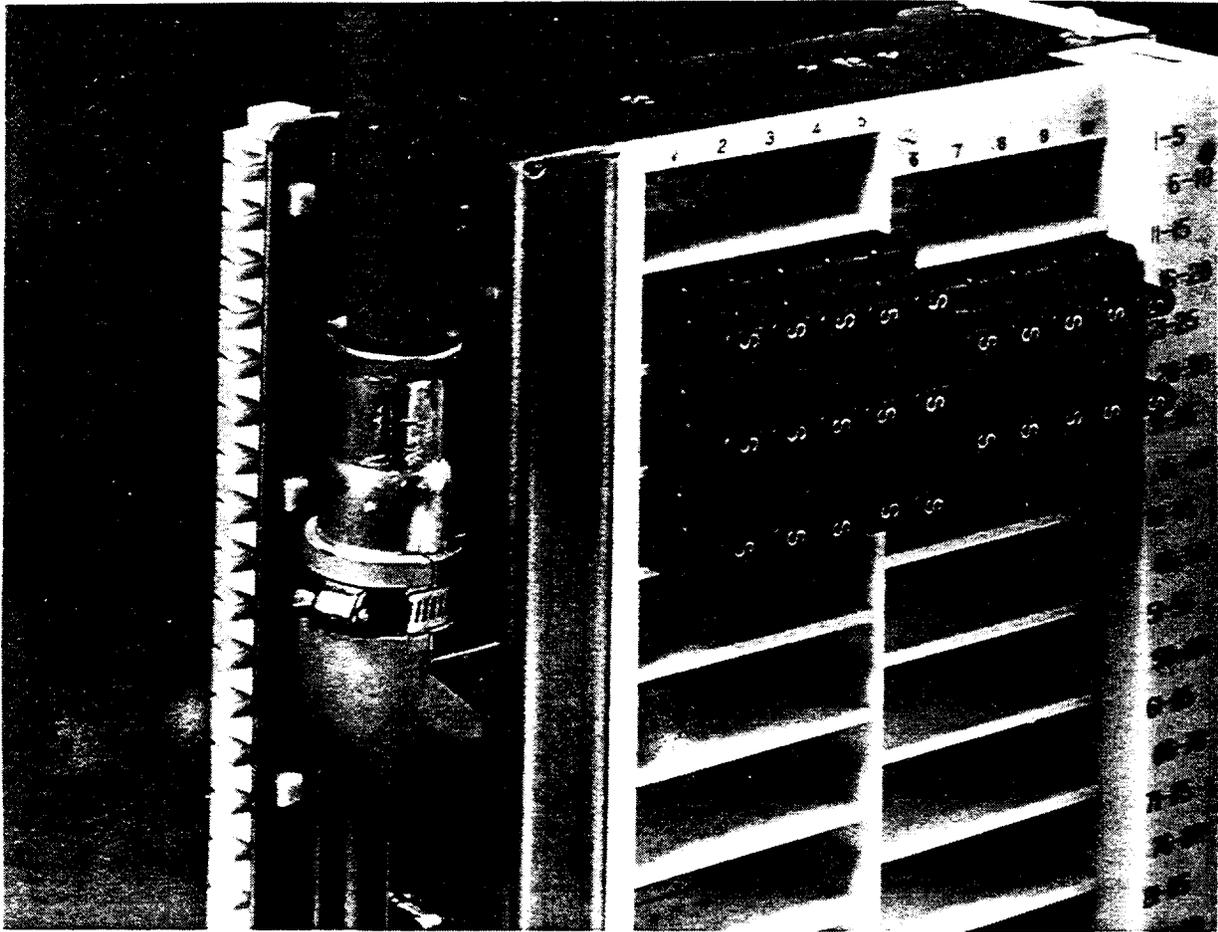


Figure 27. Left Side View 310L/ML UL Listed Connector

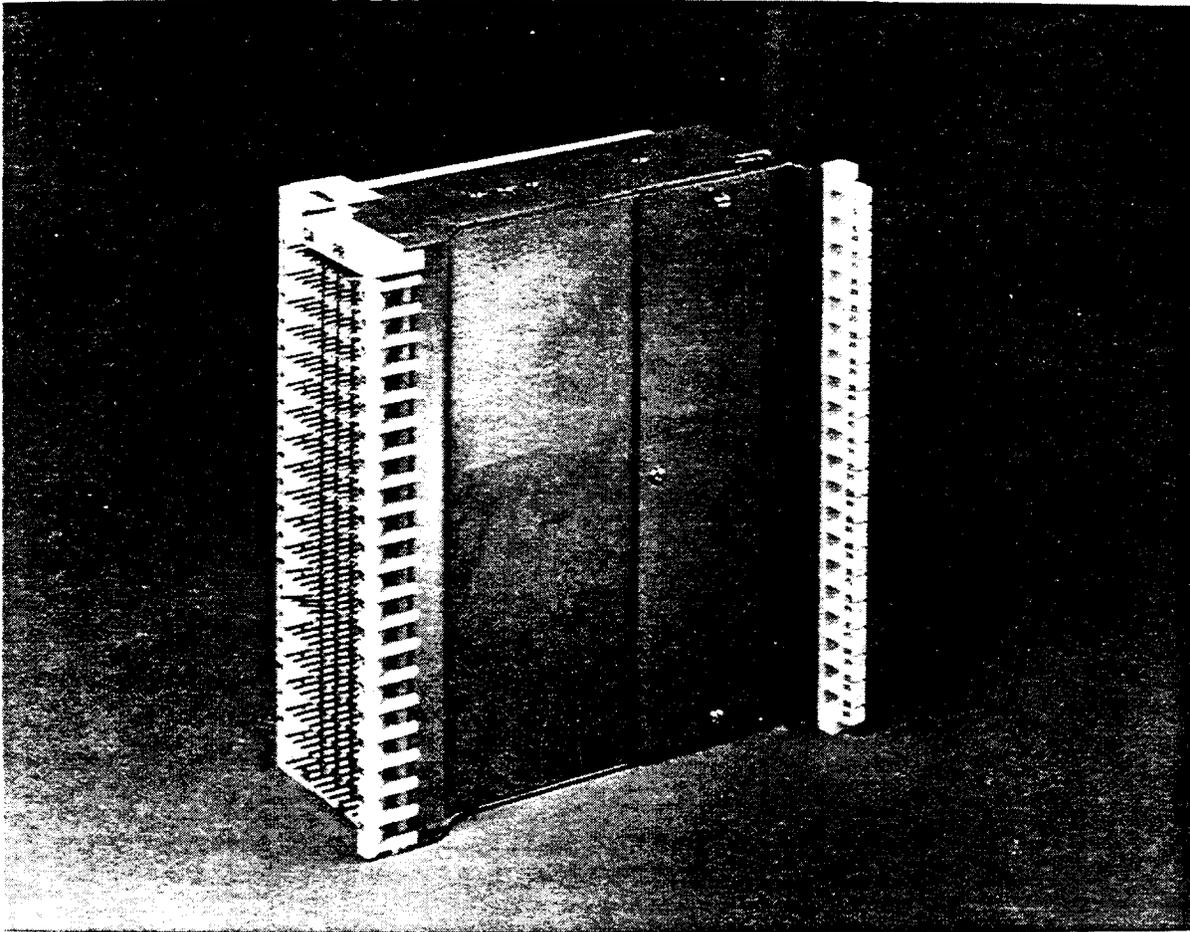


Figure 28. Right Side View 310L UL Listed Connector

7.05 Unlike the other 310-type connectors, the 310L- and 310ML-type connectors are only available in a single wire-wrap cross-connect terminal arrangement. Table D lists the applications, codes, and specifications of all currently available codes. Other cross-connect options and cable stub lengths may be provided upon request.

**Table D. 310L-/310ML-Type UL Connectors (See Note)**

Application	Cross-Connect Terminal Type	Stub Cable		Description	Comcode
		Length (Feet) (Meters)	Wire Gauge		
Outside Plant	Single	30 (9.14 m)	26 (0.4 mm)	310L1-100-30	106060395
Facility Pairs		50 (15.24 m)		310L1-100-50	106285281
UL Environments		80 (24.38 m)		310L1-100-80	106285299
Straight Mount		100 (30.48 m)		310L1-100-100	106285497
front facing		150 (45.72 m)		310L1-100-150	106285505
Arrangement		200 (60.95 m)		310L1-100-150	106285513
Outside Plant	Wire-Wrap	30 (9.14 m)	26 (0.4 mm)	310ML1-100-30	106062003
Facility Pairs		50 (15.24 m)		310ML1-100-50	106285539
UL Environments		80 (24.38 m)		310ML1-100-80	106285596
Angled Mount		100 (30.48 m)		310ML1-100-100	106285612
Semi-Front facing		150 (45.72 m)		310ML1-100-150	106285646
Arrangement		200 (60.95 m)		310ML1-100-200	106285703

Note: Other 310L1/310ML1-type connector options, such as stubbed and preconnectorized with 710- or 711-type splicing connectors, are also available on a special basis. Please contact your AT&T Sales Representative for ordering information.

Note: The UL testing and subsequent listing of these products were predicated upon their use with conventional distributing frame designs which incorporated access to building ground directly through the frame ironwork and integrated ground bar arrangements.

## **8. Repair Procedures for 310L- /310ML-Type Connectors**

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**8.01** The repair procedures for the 310L/310ML-Type connectors are essentially the same as those for the other 310-series connectors (paragraph 4.01 thru 4.11). However, repairs to the internal components may require temporary support and repositioning of the connector to gain access behind the metal side cover.

**8.02** The 843826447 cross-connect and 843473380 test terminals (Figure 17) cannot be easily replaced. In addition, repair of broken or damaged wire conductors leading from the swivel type metal coupling to the 842360562 tip or ring terminal (Figure 14) must comply with special requirements to protect the integrity of the UL Listed design. If it is necessary to perform either of these operations, contact your local AT&T Account Executive for assistance.

## **9. Associated Equipment and Reference Documents**

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**9.01** The following equipment and AT&T Practices are associated with this document.

### **Associated Equipment**

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3- and 4-Type Protector Units (AT&T 201-208-100)  
SC-794 Safety Cover from Monarch Molding,  
Council Grove, Kansas, 66846,  
used to identify cable and cable pairs  
Mounting Bracket (Comcode 842354136), used for  
tall frames only, top and bottom.

### **Test Equipment (AT&T 201-208-106)**

T Test Connector (AT-8987) (Comcode 402796841)  
P2DB Test Cord (Comcode 101433852)  
P2FM Test Cord (Comcode 103643987)  
W2GL Test Cord (Comcode 101945590)  
W2GM Test Cord (Comcode 012490935)  
W4CJ Test Cord (Comcode 101898633)  
W4CM Test Cord (Comcode 101981603).

**Warning Markers, Guard, Indicators, and Insulator (AT&T 201-208-106)**

E Warning Marker (Comcode 400614202)  
 E Sign (Comcode 400359196)  
 KS-22596 Guard (Comcode 402800627)  
 KS-6660 Indicator (Comcode 996698239)  
 KS-16847 Indicator (Comcode 997726088)  
 KS-16604 Insulator (Comcode 401299474).

**Tools and Aids (AT&T 201-208-103)**

Description	Comcode	
756C5	105564827	<b>Jumper insertion tool w/plastic bit.</b> Use 24(0.5 mm)- and 22(0.6 mm)-gauge jumper wire.
756C5-1 Bits	105611545	Pkg. of (5) Replacement plastic bits.
756C5-1 Bits	106435183	Pkg. of (50) Replacement plastic bits.
756C6 Tool	106230527	Jumper insertion tool w/metal bit use 24- and 22-gauge wire.
756C6-1 Bit	106230535	(1) Replacement Metal Bit.
950C Tool	105564835	Combination jumper insertion, removal and cutter tool w/plastic bit 22 and 24 gauge.
950C-1 Bits	105611537	Pkg. of (5) Replacement plastic bits.
950C-1 Bits	106435365	Pkg. of (50) Replacement plastic bits.
950C1 Tool	106230543	Jumper Insertion Tool w/metal bit use 24 and 22 gauge wire.
950C1-1 Bit	106230568	(1) Replacement Metal Bit.
980A Tool	103809125	Wire Removal Tool
KS22616 Tool	402757173	Connecting Block Removal Tool 112 Type (Front)
KS22271 Tool	402470553	Protector Panel Removal Tool 307 Type
KS22345L1 Bracket	402446504	Service Bracket for 307 Connector
AT 8948 Presser	402490064	L Connector Presser for 710 Connectors
AT 8927 Tool	402321590	C Bridge Removal 710 Connectors

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**Reference Documents**

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<b>Number</b>	<b>Title</b>
AT&T 069-132-811	<i>Punched or Wire Terminals (Not Having Notches or Perforations) — Method of Making and Removing Wrapped Connections</i>
AT&T 069-140-811	<i>Soldered Connections Using Soldering Coppers — Method of Making and Removing</i>
AT&T 081-860-105	<i>Transfer Stenciling Kits — Description and Use</i>
AT&T 201-208-100	<i>3-, 4-, and 5-Type Protector Units — Description, Use, Maintenance, and Test Procedures</i>
AT&T 201-208-103	<i>Tools and Aids — Distributing and Protector Frames</i>
AT&T 201-208-106	<i>Test Equipment, Cords, Plugs, Warning Markers, Guards, Insulators, and Indicators — Description and Use — Distributing and Protector Frames</i>
AT&T 201-220-101	<i>Conventional Distributing Frames — Description</i>
AT&T 201-220-301	<i>Terminal Strips — Method of Making Connections</i>
AT&T 201-220-501	<i>Conventional Distributing Frames — Inspections</i>
AT&T 201-220-801	<i>Terminal Strips — Repair Procedures</i>
AT&T 636-200-011	<i>Marking Main Frames — Pair and Cable Numbers</i>
AT&T 916-559-770	<i>Cable Terminating Facilities — Central Office Type — General</i>

**9.02** The AT&T Practices listed in paragraph 9.01 are stocked in Indianapolis, Indiana, at the AT&T Customer Information Center. To order copies:

- Call 1-800-432-6600  
or
- Complete Form IND 1-80.80 and mail to:

AT&T Customer Information Center  
Attention: Order Entry Department  
2855 N. Franklin Road  
P.O. Box 19901  
Indianapolis, IN 46219-1999