407-Type Unprotected Connectors
Description, Use, Installation, and Repair Procedures

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1. Overview

1.01 This practice covers the description, use, installation, and repair procedures for the 407-type unprotected connectors, connecting block, and stub cables used with the 407-type connectors.

1.02 Whenever this practice is reissued, the reason(s) for reissue will be listed in this paragraph.

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 unprotected connectors are used for terminating and cross-connecting circuits on the ***COSMIC***® II and ***COSMIC*** IIA Distributing Frame Systems. They are ideal for termination of loop carrier terminals and/or derived pairs from pair-gain systems.

1.07 The 407-type unprotected connectors provide test access, service denial, and cross-connect capabilities. However, the 407-type connectors do not have the capability to provide protection and have no ground system.

1.08 The two main components of the 407-type unprotected connector are the panel and connecting block, which are interconnected with a 100-pair wiring harness. This harness consists of 200 individual leads of 26-gauge wire.

1.09 The 407-type connectors are available with standard 112-type blocks equipped with three-beam quick clip cross-connect terminals (bifurcated quick-clips). Wire-wrap cross-connect terminal options may be obtained on request.

1.10 The 407D1-100 unprotectored connector maybe used on ***COSMIC II*** and ***IIA*** distributing frame system.

1.11 The high-density 407F1-100 unprotected connector can be used on ***COSMIC*** IIA frames. The 407F1-100 connector can be used on ***COSMIC*** II frames with shelf adapters per ED6C142-30, G3 and G4 (see AT&T 201-222-101).

1.12 The 407-type connectors have additional backplane wiring which interconnects the panel to four 710-SD-25 connectors. These connectors provide for rapid connection to 100-pair cable stubs (11C or 11D type) which are factory equipped with mating 710-BD-25 connectors, or to switchboard cable that are field-connectorized with the 710BD-25 connectors. The 11-type stub cables must be ordered separately from the connectors.

1.13 The 407-type unprotected connectors with either 5-type continuity plugs or 4C12C continuity-only plug-in units provide test access and pair at a time disconnect capability of the outside plant cable pair or T1 derived cable pairs from central office equipment.

1.14 When used to terminate derived pairs for loop carrier systems, this feature may be used for test isolation or service denial on individual pairs.

1.15 This practice is published by the AT&T Document Development Organization.

2. Description

2.01 Table A lists the various codes of the 407-type connector and associated connecting blocks and frame applications. The 407-type connector is for use with ***COSMIC*** II and ***COSMIC*** IIA Distributing Frame Systems. Like the 307-type connector, it mounts in the facility modules of the frame. The 407 type connector is equipped with a 100-pair 112-type connecting block and four 710-type splicing connectors. It does not have a ground system. Continuity between the cabling and the cross-connect block can be made using either 5-type continuity plugs or 4C12C continuity only plug-in units which provide test access.

Table A. 407-Type Connectors

Application	Equipped with	Cross- Connect Terminal Type	Description	Comcode	Shelf
COSMIC II,II A	112C1B-100 and four 710-type 25 pair splicing connector	Bifurcated Quick-clip	407D1-100	106 055 460	2 through 10
COSMIC II*,II A	112H1B-100 and four 710-type 25 pair splicing connector	Bifurcated Quick-clip	407F1-100	106 055 486	2 through 10

Note: Other 407-type unprotected connector options, such as versions equipped with bifurcated or single wire-wrap terminals, can also be made available on a special basis. Please contact your AT&T Sales Representative for ordering information.

* Frame equipped ED6C142-30 shelf adapters.

2.02 These connectors are ideal for cross-connecting and terminating voice frequency pair circuits of loop carrier central office terminals or outside plant cables that do not require protection, for example, metropolitan areas with underground plant. Refer to Figure 1, Sheet 1 and 2 for typical applications of the 400-type connector.

⚠ CAUTION:
The use of the 407-type connector to terminate outside plant cable is recommended only where their is no need for protection. Use the 307-type connector wherever protection is needed.

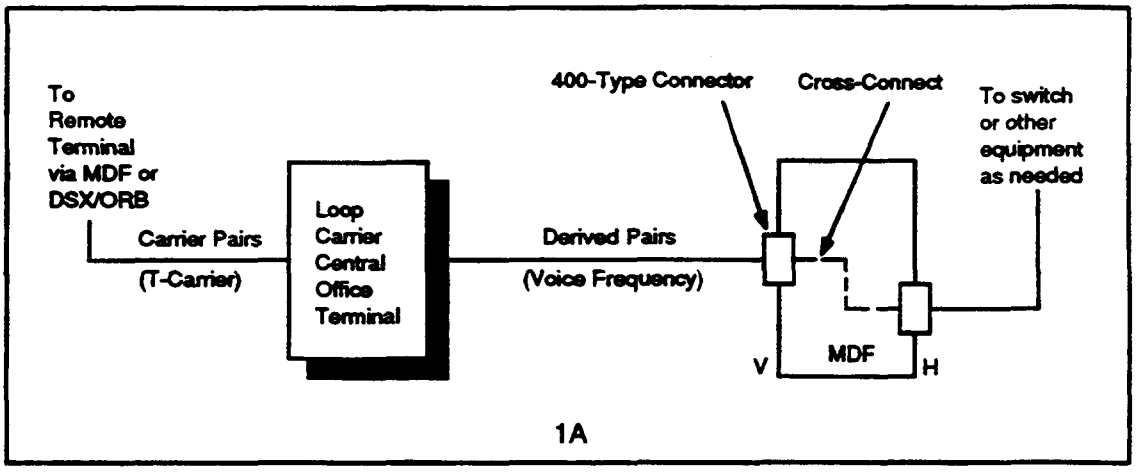


Figure 1. Typical Application with Digital Loop Carrier Systems (Sheet 1 of 2)

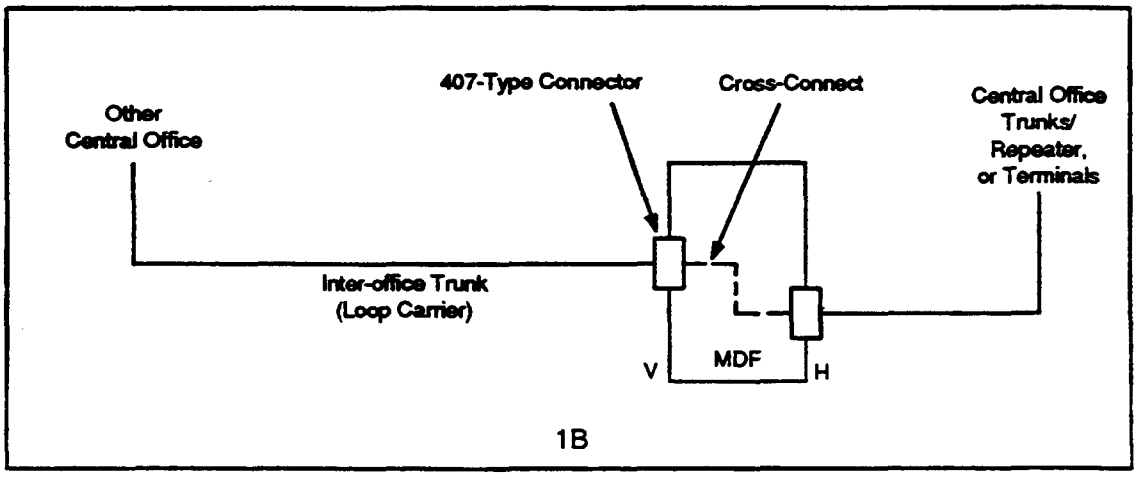


Figure 1. Typical Application with Digital Loop Carrier Systems (Sheet 2 of 2)

407D1-100 Unprotected Connectors

2.03 The 407D1-100 unprotected connector (Figures 2 and 3) has a plug-in unit panel interconnected to one 100-pair 112C1B-100 connecting block. The block is stenciled and used on the ***COSMIC*** II and IIA frames, shelves 2 through 10.

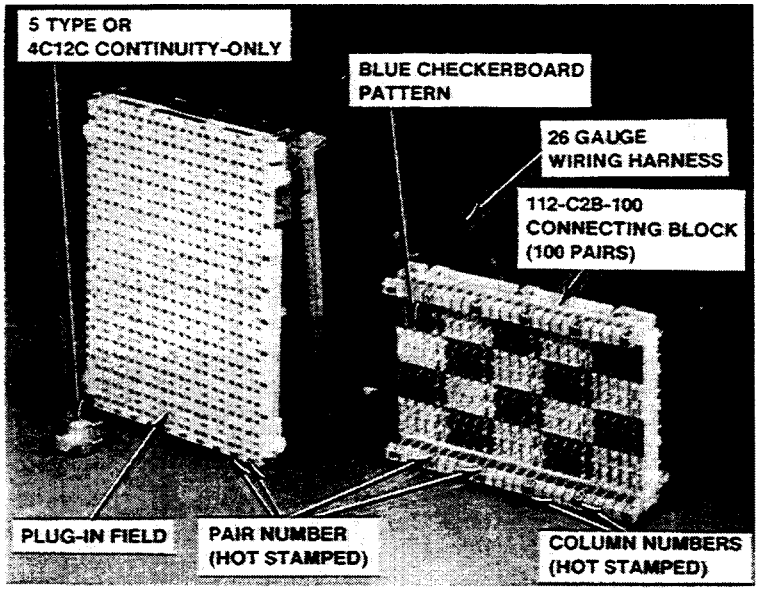


Figure 2. 407D1-100 Connector — Front View

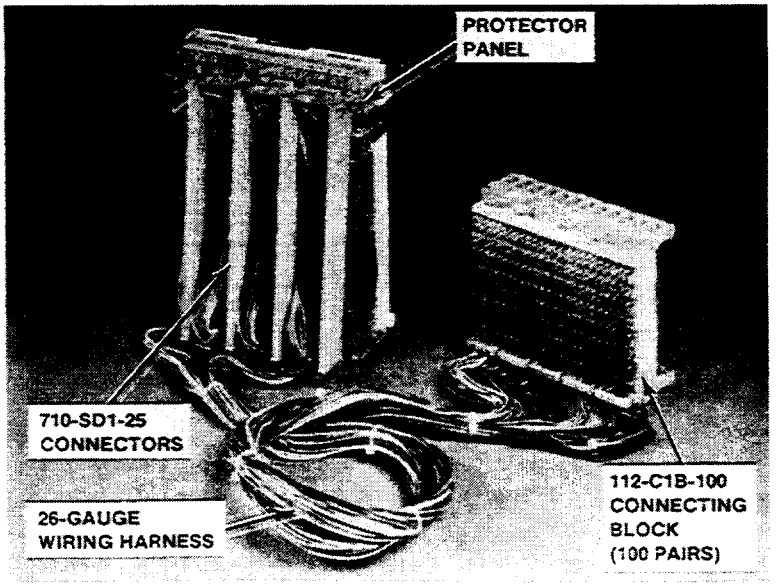


Figure 3. 407D1-100 Connector — Back View

407F1-100 Connector

2.04 The 407F1-100 connector (Figures 4 and 5) has a plug-in unit panel interconnected to one 100-pair 112H1B-100 (high-density) connecting block. The connector mounts on shelves 2 through 10 of the ***COSMIC*** IIA (or the ***COSMIC II*** frames equipped with ED6C142-30 shelf adapter). These high-density connecting blocks provide shelf space for two additional 112H1B-100 connecting blocks per shelf.

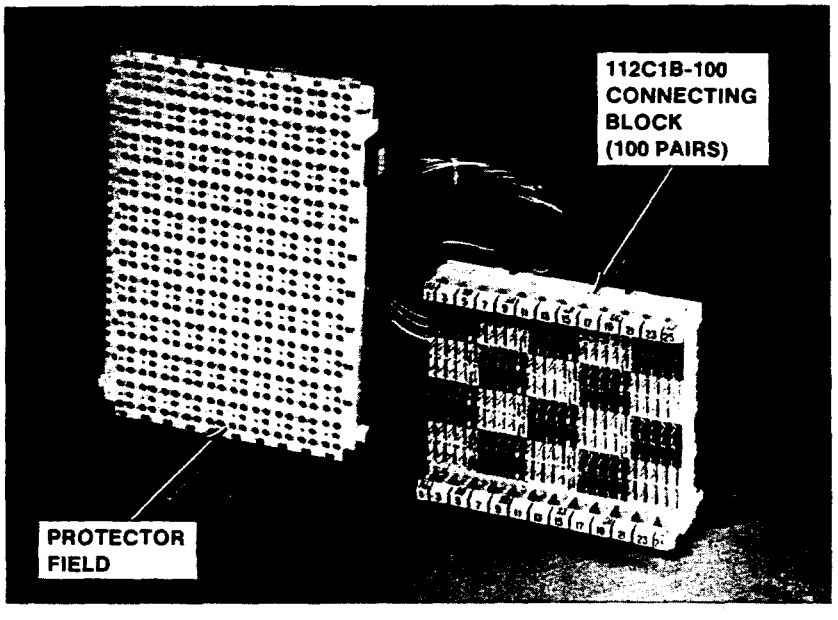


Figure 4. 407F1-100 Connector — Front View

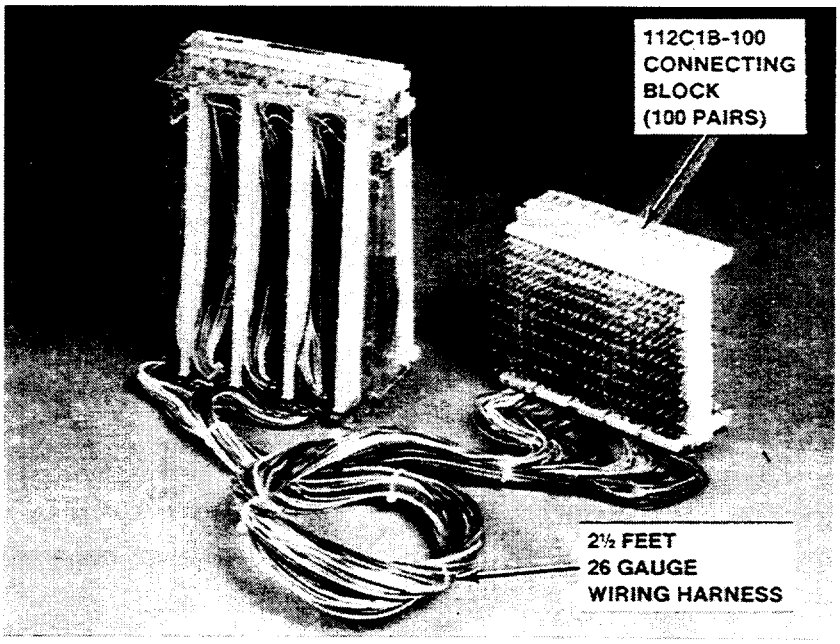


Figure 5. 407F1-100 Connector — Back View

3. 112-Type Connecting Blocks

3.01 The 112-type connecting blocks are designed for use with all AT&T ***COSMIC*** Distribution Frame Systems. They use bifurcated insulation displacement quick-clip type terminals, for cross-connections at the front of the block. Solderless wire-wrap terminals for terminations from plug-in unit panel are located at the rear.

3.02 The blue and white checkerboard pattern on the front face of the 112-type connecting blocks delineates rows of paired terminals which facilitate jumper running and minimize parallax.

3.03 Optional 112-type connecting blocks, equipped with bifurcated or single wire-wrap terminals as well as 50- or 100-pair termination capacities, can be made available on a special basis. Please contact your AT&T Sales Representative for ordering information.

3.04 The 112-type connecting blocks are described in AT&T 201-222-105.

4. 11-Type Connectorized Stub Cables

4.01 For outside plant cable applications, stub cables (Figure 6) are used to interconnect the 407-type connector to the outside plant. The stub-cables must be ordered seperately. Stub-cables with 22-gauge conductor are recommend for use with all outside plant gauge sizes. Stub cables with 24-gauge conductors are recommended for use with 26-gauge or smaller outside plant cables.

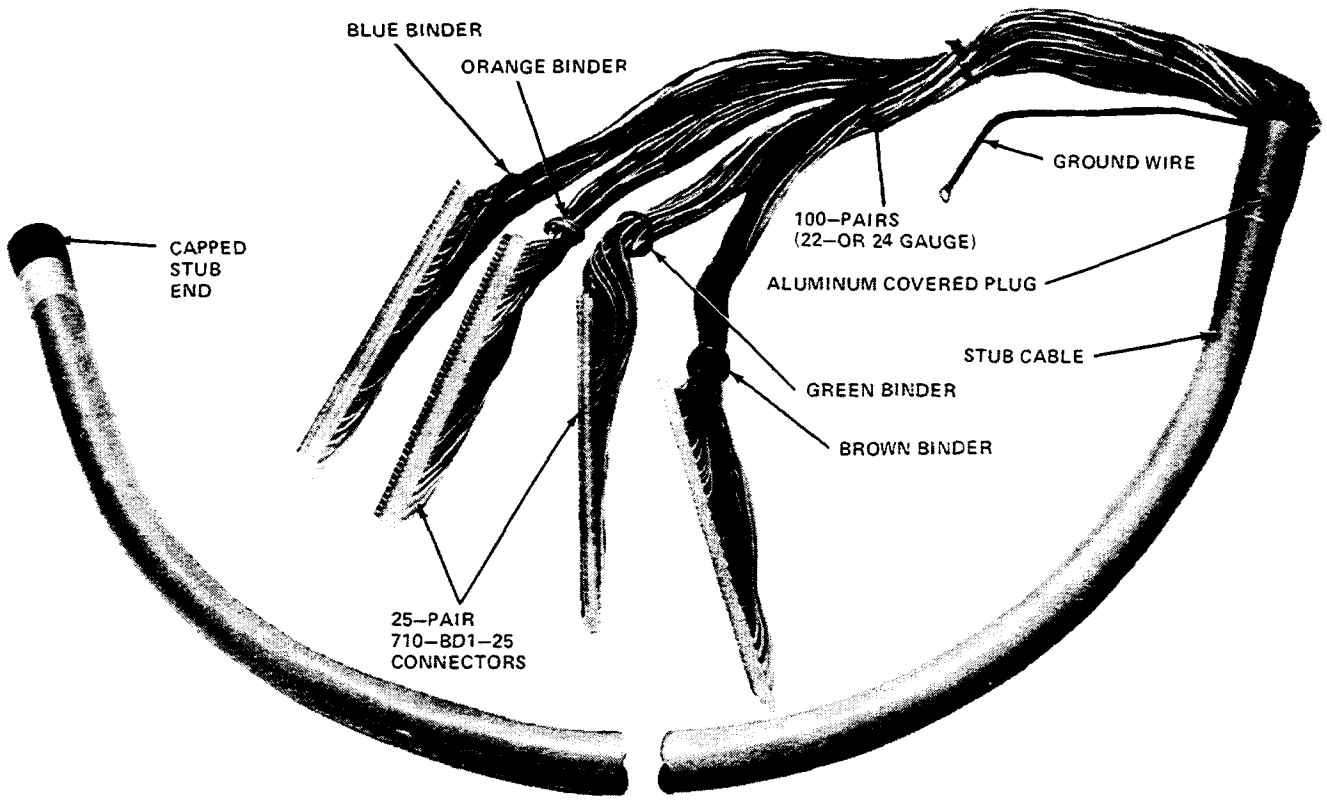


Figure 6. 11-Type Connectorized Stub Cable

4.02 These stubs are 22- or 24-gauge copper conductors and are insulated with color-coded polyvinyl chloride (PVC). One end of the stub is terminated with 25-pair 710-BD1-25 bridging modules. The core has a mylar tape wrap, a corrugated aluminum shield, an outer PVC sheath, and an aluminum-covered moisture plug at the connectorized end of the stub cable.

4.03 Both the 22- and 24-gauge stub cables have a nonflammable light olive-gray sheath. The 22-gauge stub cable can be identified by a red binder around the core wrapper; the 24-gauge cable has a white binder. The stub cable applications, codes, and specifications are given in Table B.

Table B. Stub Cable Gauge Selection Guide

Entrance	Connector
Cable Gauge	**Stub Cable**
26 Exposed or unexposed	22 or 24
25 Exposed or unexposed	22
22 Exposed	22*
19 Exposed	22*
22 Unexposed	22
19 Unexposed	22

* Provide a length of 24- or 26-gauge protective fusing cable.

4.04 When used to terminate digital loop carrier central office terminals, or other central office equipment, or other central office equipment, 26-gauge switch board cable equipped with 710 bridging modules may be used instead of the 11-type stub cables.

5. Continuity-Only Plug-Ins

5.01 Two types of continuity-only plug-ins are available for use with the 407-type unprotected connectors. These plug-ins provide continuity between the cable termination (11-type stub or switchboard cable) and the 112-type connecting block.

5.02 The 5A1D plug-in is a continuity-only plug. The 4C12C plug-in is also a continuity-only plug, but has test access holes in the top. This allows the use of the single-pair P2FL test cord or the 100-pair 299A or 299B test adapters with the 407-type connectors.

6. Installation

Precautions

6.01 Store the 407-type connectors in a dry location. Do not leave these units on loading docks or in locations exposed to the weather.

6.02 When unpacking the connector, open the carton on the side marked "OPEN FROM THIS SIDE".

6.03 Do not remove the packing material from the connector until it is ready for installation.

Installing 407-Type Connectors

6.04 The 407-type connectors are installed on the ***COSMIC*** II and IIA main distributing frames. Table A shows the frame applications and the shelf for each connector.

6.05 Installation information for the various types of 407-type connectors is provided in the ED6C114-10, ***COSMIC*** Systems Framework Cabling, and ED6C114-11, ***COSMIC*** Systems Cable Routing and Installation.

7. Repair Procedures

7.01 Before making repairs, technicians should be familiar with the contents of the following practices:

Practice	Title
069-132-811	Punches or Wire-Type Terminals (Not Having Notches or Perforations) Method of Making and Removing Wrapped Connections
069-140-811	Soldered Connections — Using Soldering Coppers — Method of Making and Removing

Precautions

7.02 This practice covers only those parts that can be replaced in the field. No attempt should be made to replace parts not designated. ***Only*** the connector terminals are designated as replaceable parts on the 407-type connector. (AT&T 201-222-301 describes the repair procedures for the connecting blocks.)

7.03 Exercise extreme care when removing and connecting wires or replacing terminals to prevent damage to adjacent connections and to avoid crosses to operating circuits.

7.04 The end 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 the insulation removed before reconnecting. 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. (See AT&T 069-132-811.)

Tools

7.05 The following tools are needed to perform the repair procedures.

Code/Spec No	Description
AT-7424	E Rosin-core solder
AT-7860	B Long-nose pliers
R-4773	Combination skinning tool
Detail 18	(For 26-gauge wire—blue dot on blade)
Detail 19	(For 24-gauge wire—orange dot on blade)
KS-22271	Connector panel removal tool
KS-6320	Spudger
KS-20962	Distributing frame bag
KS-22325, L1	Service bracket
KS-8740	Soldering copper (or other KS-copper rated at 95 watts)
KS-16363, L2	Wire-wrapping gun
KS-20551	Wire unwrapping gun
KS-20827, L1	Wire unwrapping tool.

Material

7.06 The following materials are needed to perform the repair procedures.

Code/Spec No	Description
842360976	Tip or ringing terminal
842362188	Mounting bracket
402066104	Cable tie (blue)
402066088	Cable tie (orange)
402066096	Cable tie (green)
402066070	Cable tie (brown)
401787726	Cable tie (gray)
402633168	Cable tie (white)
R-2916	Twine.

Replacing Defective Terminals

A. Overview

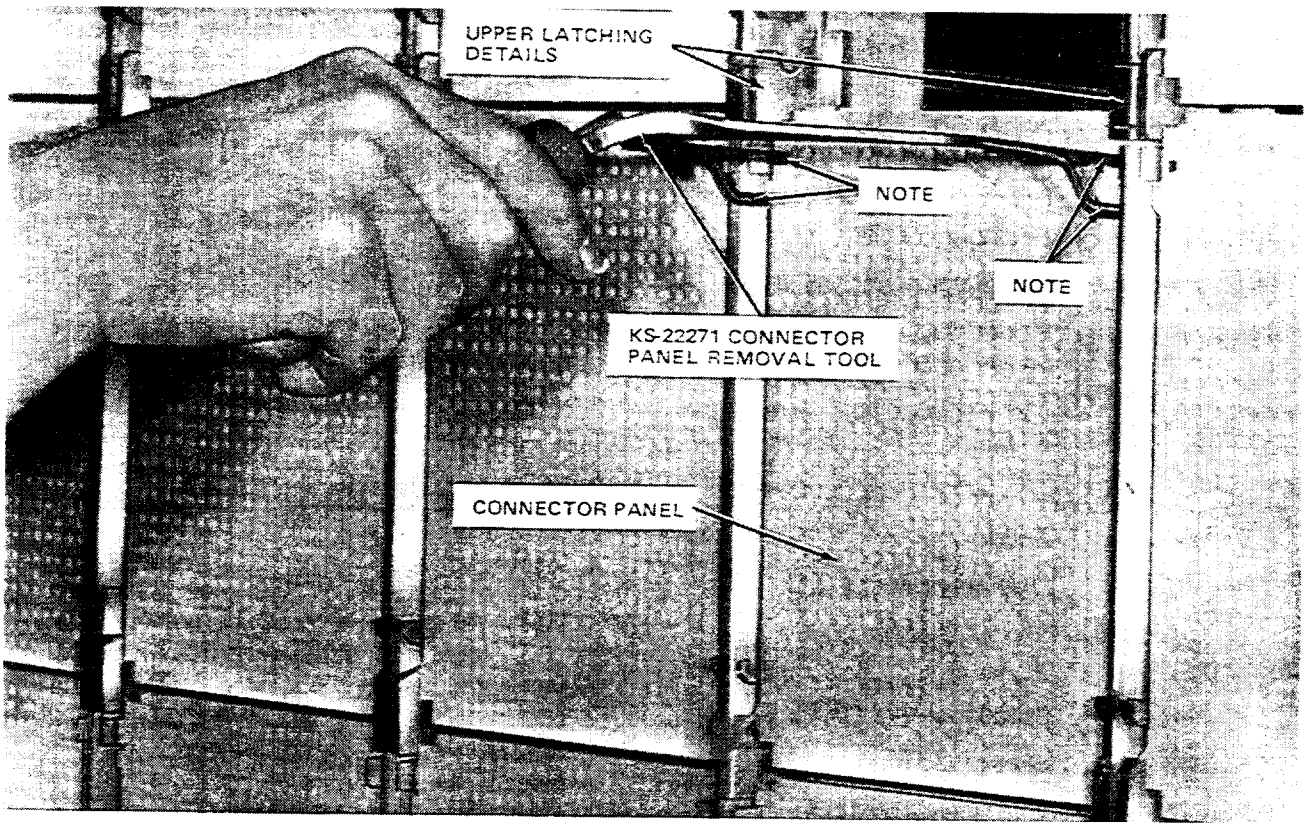
7.07 To replace a tip or ring terminal, the connector panel must be removed from the frame and placed in a service bracket to gain access to the wiring side of the terminal. After the new terminal is installed, the connector panel is placed back on the frame.

B. Removing the Connector Panel from the Frame

7.08 To remove the connector panel from the frame, proceed as follows:

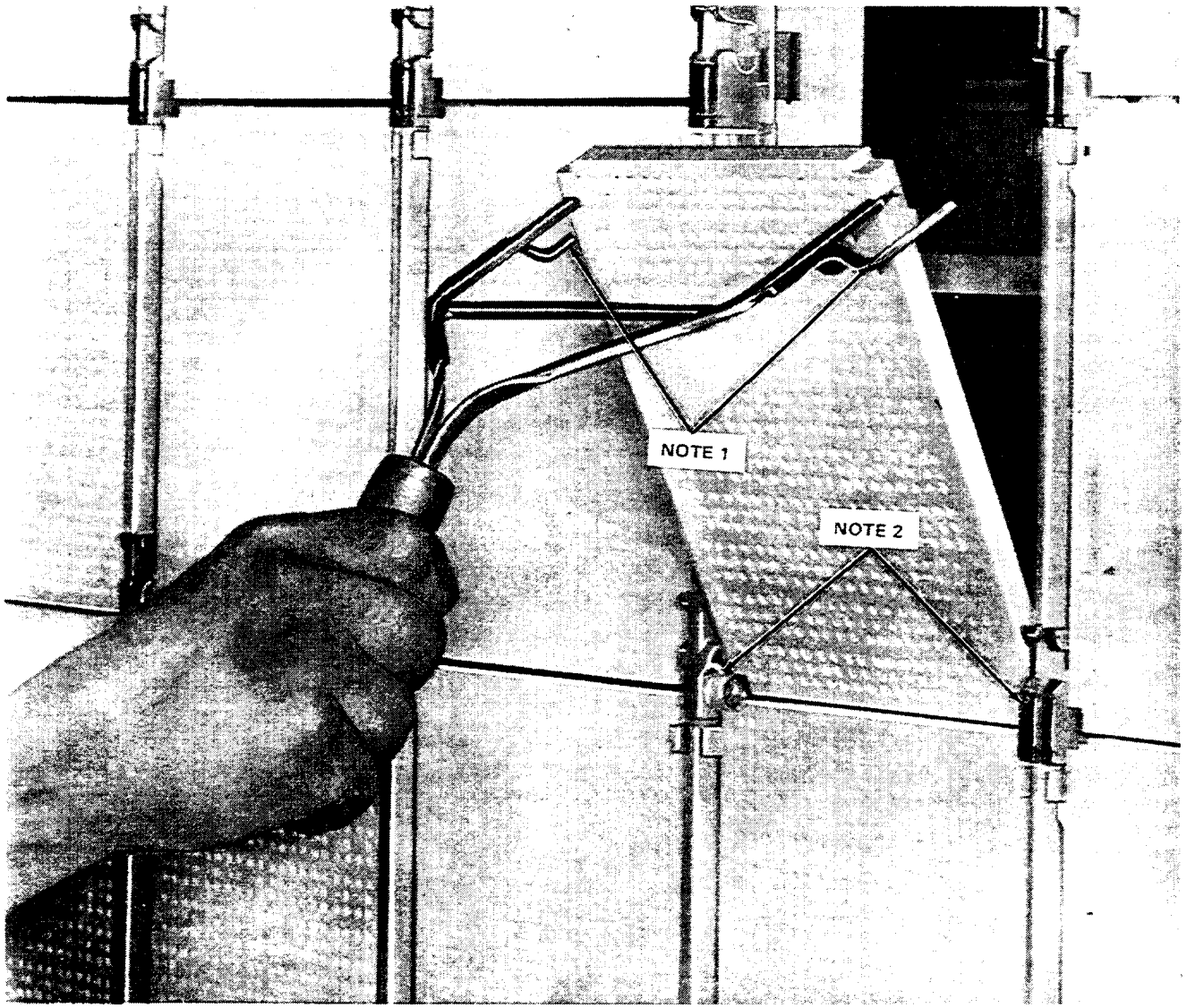
(1) Remove the 4C12C or 5-type unit from the defective circuit.

(2) Insert the connector panel removal tool (Figures 7 and 8) into the connector panel.



NOTE:
INSERT UPPER PRONGS OF 407 PANEL REMOVAL TOOL INTO SLOTS IN 407-TYPE PANEL. LOWER PRONGS WILL BE PROPERLY ENGAGED AT THE SAME TIME.

Figure 7. Engaging Connector Panel Removal Tool into Panel



NOTES:
1. PUSH TOOL IN TO DISENGAGE UPPER LATCHING DETAILS AND TILT 407-TYPE PANEL WITH TOOL DOWN AND OUTWARD.
2. MANUALLY RELEASE LOWER PIVOT PINS AND REMOVE 407-TYPE PANEL.

Figure 8. Removing Connector Panel

(3) Apply a slight downward pressure on the handle to release the upper latching details.

(4) Tilt the top of the connector panel outward and downward.

(5) Lift the connector panel off the bottom pivot pins.

(6) Hold the connector panel in one hand and use the other hand to place the service bracket (Figure 9) on the frame pins. Figure 10 shows a service bracket in place on a new frame installation.

(7) Place the lower connector panel pins into the upper slots of the service bracket.

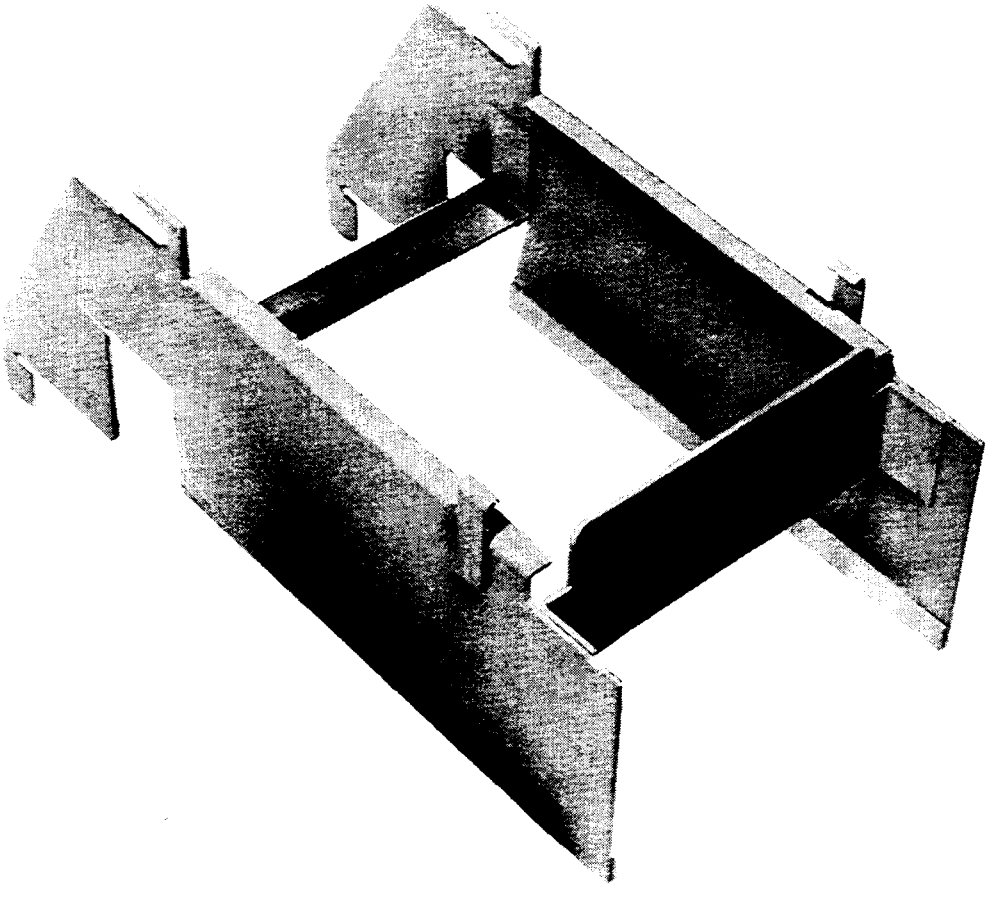
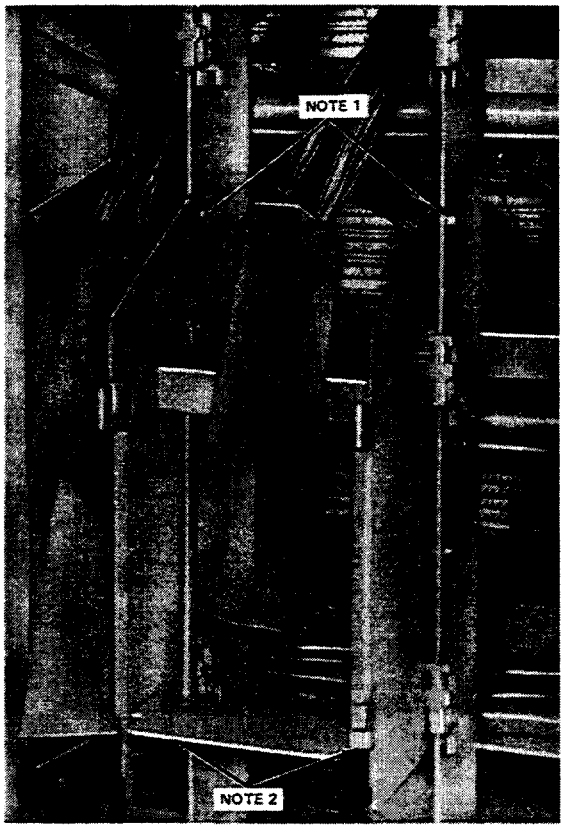


Figure 9. Service Bracket (KS-22325, LI)

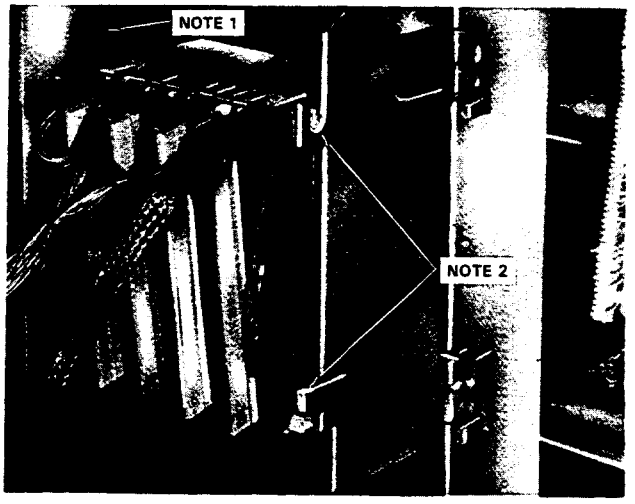


NOTES:

1. WITH BOTTOM OF SERVICE BRACKET TILTED TOWARD THE AISLE, ALIGN AND ENGAGE FRAME PINS AND SERVICE BRACKET SLOTS.
2. PIVOT BOTTOM OF SERVICE BRACKET TOWARD FRAME UNTIL IT RESTS AGAINST FRAME AND SNAP IN LOCKS.

Figure 10. Installing KS-22325, L1 Service Bracket

(8) Rotate the connector panel downward so that the top is resting against the bottom of the service bracket and the wiring side of the connector is facing outward (Figure 11).



NOTES:

1. MOVE CONNECTORIZED END OF STUB CABLE TO SIDE OF SERVICE BRACKET.
2. MOUNT 307 CONNECTOR PIN INTO UPPER SLOT OF SERVICING SHELF, BOTTOM AND SIDES OF CONNECTOR RESTS AGAINST SERVICE BRACKET.

Figure 11. Installing 407 Connector on KS-22325, L1 Service Bracket

C. Replacing a Tip or Ring Terminal

7.09 To replace a tip or ring terminal (Figure 12), proceed as follows:

(1) Remove the connect panel from the frame as described in paragraph 6.08.

(2) Remove the plastic mounting bracket which houses the 710-connectors as follows:

(a) Tie each individual group (25 pairs) of connecting block leads or carrier bay leads using twine or tape.

(b) Identify each group according to the color of the cable tie (blue, orange, green, or brown) presently fastened to the mounting bracket.

(c) Cut and remove the cable ties.

(d) Disengage the two tangs at the top of the plastic bracket and then disengage the two tangs at the bottom.

(e) Remove the bracket with the 710 connectors in place, and carefully move it back toward the frame to gain access to the wiring side of the connector panel terminals.

(3) Remove the wire wrap termination, cut and dispose of the bare wire.

(4) Use the wire stripping tool to remove insulation (1-5/8 inches for 22- or 24-gauge wires and 1-7/8 inches for 26-gauge wire) on the remaining wire for the new termination. The wire is now prepared for connection to the new terminal.

(5) Use the long-nose pliers to bend the tangs on the defective terminal until they line up with the slots in the connector panel.

(6) Use the long-nose pliers and twist the terminal until it breaks.

(7) Have the proper replacement terminal handy before proceeding with the next step.

(8) Lift the connector panel from the bottom of the service bracket (as though it were hinged at the top) high enough to remove the defective terminal.

(9) Use the long-nose pliers to remove the defective terminal and note the position of the tangs as the terminal is removed.

(10) Using the position of the tangs as a reference, insert the new terminal into the connector panel.

(11) Use the tip of the long-nose pliers to push the terminal until it is fully seated in the connector panel.

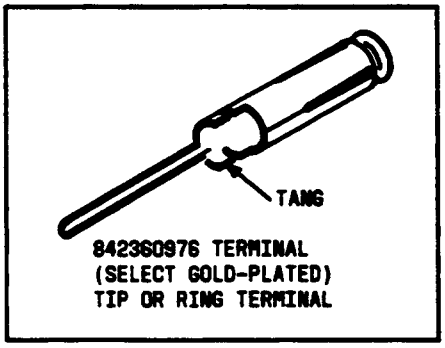


Figure 12. Tip or Ring Terminal

(12) Lower the connector panel onto the service bracket.

(13) Use the long-nose pliers to bend the tangs approximately 45 degrees to hold the terminal in the connector panel.

(14) Connect the previously skinned wire to the terminal.

(15) Follow the steps in paragraph 6.10 for reinstalling the connector panel on the frame.

D. Reinstalling the Connector Panel on the Frame

7.10 To reinstall the connector panel on the frame, proceed as follows:

(1) Place the plastic mounting bracket containing the 710 connectors onto the connector panel. Be sure the four tangs are properly seated on the connector panel.

(2) Fasten the wire groups removed in paragraph 6.09, Steps 2 a, b, and c to the plastic mounting bracket. Use the correct colored cable ties.

(3) Remove the twine or tape used to separate the wires into groups.

(4) Inspect each portion of the plastic mounting bracket housing to be sure the 710-connectors are contained properly in their portion of the housing.

(5) Remove the connector panel from the service bracket.

(6) Support the connector panel with one hand and remove the service bracket from the frame with the other hand.

(7) Dress the connecting block wiring and stub cabling back onto the frame.

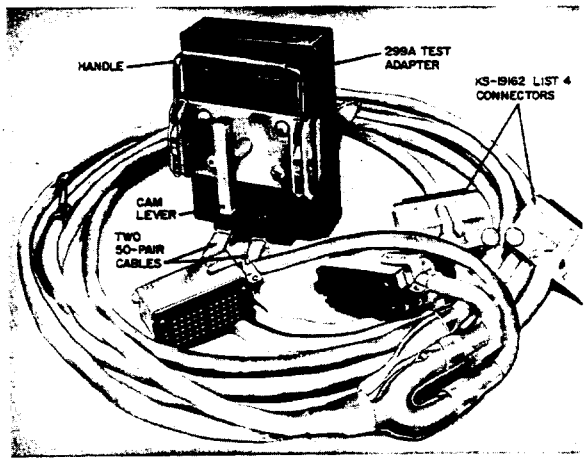
(8) Place the connector panel into the lower snap-in locks on the frame.

(9) Pivot the connector panel upright and toward the frame until the upper latching details are engaged.

(10) Insert the proper 4C12C or 5-type plug-in units.

8. Test Adapters

8.01 The 299A and 299B test adapters (Figures 13 and 14) are used in testing the 407-type connector. The 299A test adapter provides testing with or without the 4C type units. The 299B provides testing with the 4C units in the service position or in the detent position. See AT&T 201-208-106 for description and use.



FRONT VIEW

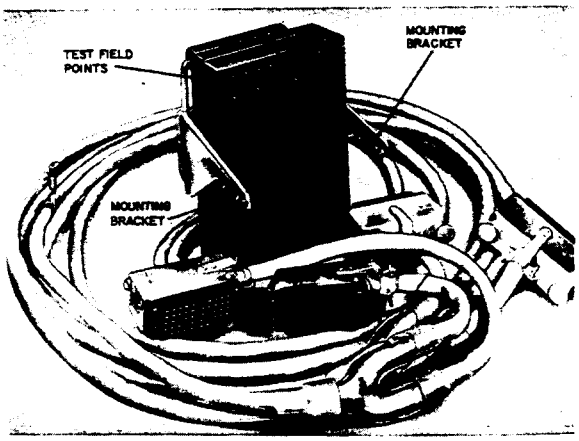


Figure 13. 229A Test Adapter

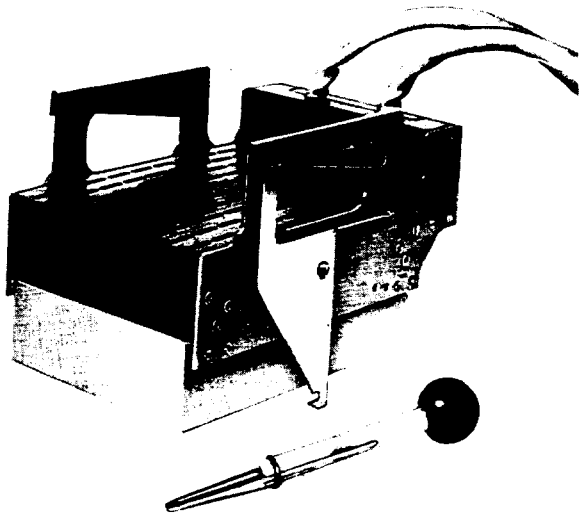


Figure 14. 299B Test Adapter

Cords, Plugs, Warning Markers, and Indicators

8.02 Cords and plugs may be used with the 407-type connector for testing purposes, and warning markers 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.

8.03 The P2FL test cord (Figure 15) is used to short the tip and ring inserting the plug end into the test points of a 4C-type plug-in unit on the 407-type connector.

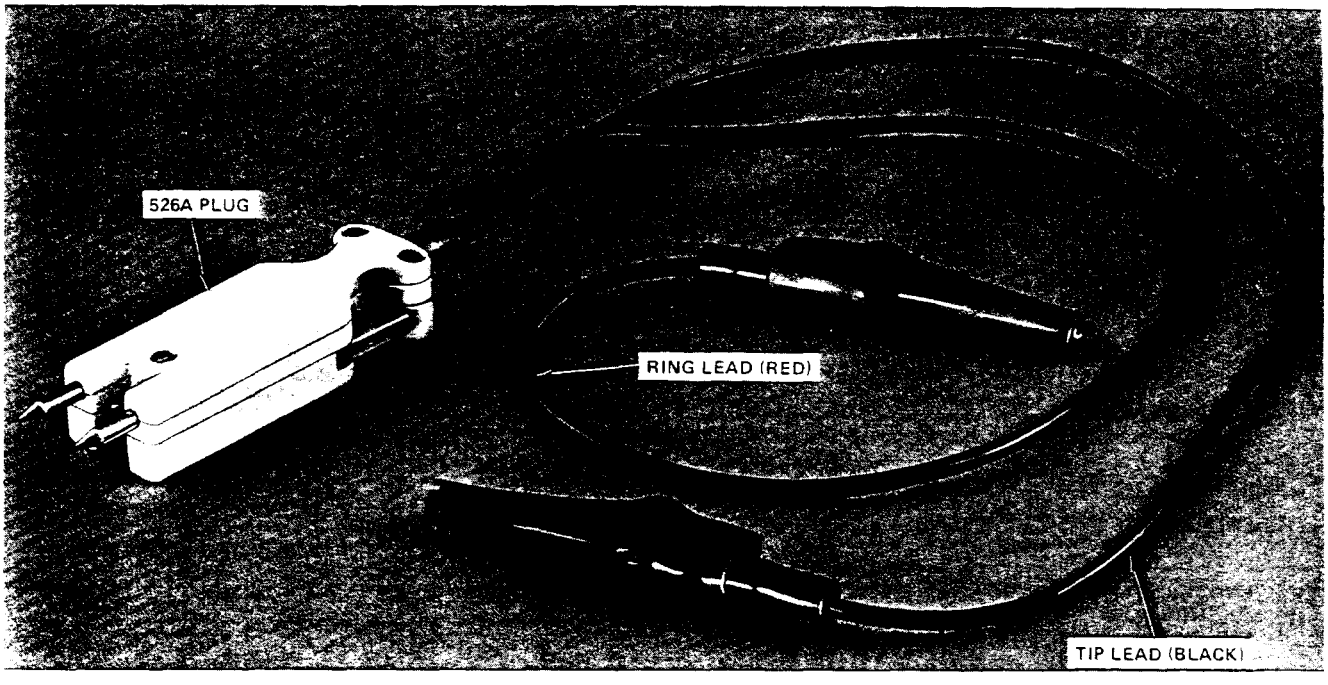


Figure 15. P2FL Test Cord

9. Associated Equipment and References

3- and 4-Type Protector Units (AT&T 201-208-100)

11-Type Connectorized Stub Cables

ED-6C142-30, G3 and G4 — 112H Series Connecting Block Mounting Shelf Adapters — For use on earlier ***COSMIC*** II frames (G3 is for shelves 2 through 10 and G4 is for shelves 1 and 11). (See AT&T 201-222-101.)

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

299A Test Adapter (Comcode 103065819)
299B Test Adapter (Comcode 105053862)
P2DB Test Cord (Comcode 101433852)
P2FL Test Cord (Comcode 103105268)
W2GL Test Cord (Comcode 101945590)
W2GM Test Cord (Comcode 102490935).

Warning Markers and Indicator (AT&T 201-208-106)

E Warning Marker (Comcode 400614202)
E Sign (Comcode 400359196)
KS-16847 Indicator (Comcode 997726088).

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

756C4	Wire Insertion Tool (Comcode 104378351)
756C5	Multipurpose Quick-Clip Wire Insertion Tool (Comcode 105564827)
756C5-1	Replacement Bit for 756C3, 756C4, and 756C5 Tools (Comcode 105611545)
756C6	Multipurpose Quick-Clip Wire Insertion Tool equipped with metal bit (Comcode 106230527)
756C6-1	Replacement metal bit for 756C6, 756C3, 756C4, 756C5 and 756C6 Comcode 106230535
950A	Cutoff/Insertion/Removal Tool (Comcode 103318614)
950B	Cutoff/Insertion/Removal Tool (Comcode 104378369)
950C	Multipurpose Quick-Clip Wire Insertion Tool (Comcode 105564835)
950C-1	Replacement Bit for 950A, 950B, and 950C Tools (Comcode 105611537)
950C1	Cutoff/insertion/Removal tool equipped with metal bit (Comcode 106230543)
950C1-1	Replacement metal bit for 950A, B, C, C1 (Comcode 106230568)
KS-22271, L1	Connector Removal Tool (Comcode 402470553)
KS-22325, L1	Service Bracket (Comcode 402446504).

References

Practice	Title
069-132-811	Punches or Wire-Type Terminals (Not Having Notches or Perforations) — Method of Making and Removing Wrapped Connections
069-140-811	Soldered Connections — Using Soldering Coppers — Method of Making and Removing
201-208-100	3-, 4-, and 5-Type Protector Units — Description, Use, Maintenance, and Test Procedures
201-208-103	Tools and Aids — Distributing and Protector Frames

Practice	Title
201-208-106	Test Equipment, Cords, Plugs, Warning Markers, Guards, Insulators, and Indicators — Description and Use — Distributing and Protector Frames
201-222-101	***COSMIC*** I, IA, II, and IIA Main Distributing Frame Systems — Description
201-222-105	78C- and 112-Type Connecting Blocks — Description and Use — ***COSMIC*** Distributing Frames
201-222-301	78C- and 112-Type Connecting Blocks, Method of Making Connections, Repair, and Replacement Procedures — ***COSMIC*** Distributing Frames
201-222-501	Inspections — ***COSMIC*** Distributing Frames
801-005-164	(J90610) — ***COSMIC*** II Frame Systems.

Table C. 11-Type Connectorized Stub Cables

Application	Used With Connector	Stub Cable			Equipped With Bridge Module	Item Code	Comcode
		Wire Gauge	Length (Feet)	Capacity Pairs			
Tip Cable (The 11CA and 11DA cables are generally spliced to feeder/riser cables)	407D1,F1	22	40	100	Four 25-Pair 710BD1-25	11CA-40	103271334
			60			11CA-60	103271342
			80			11CA-80	103226486
			100			11CA-100	103226494
			120			11CA-120	103271359
			150			11CA-150	103226502
			200			11CA-200	103226510
		24	40			11DA-40	103271367
			60			11DA-60	103271375
			80			11DA-80	103226551
			100			11DA-100	103226569
			120			11DA-120	103271383
			150			11DA-150	103226577
			200			11DA-200	103226528

Note: Different lengths or gauge of stub cable can be provided on a special order basis, such as 26-gauge 300-foot stub cable.