COSMIC® Mini Distributing Frame Description and Use

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1. Overview

1.01 This practice describes the ***COSMIC***® Mini Distributing Frame System and its applications, associated apparatus and accessories, operations, and maintenance.

1.02 This practice is reissued for the following reasons:

(a) To add information on associated frame systems.

(b) To add information on layout arrangements

(c) To add information on mechanized engineering with MELD.

(d) To add information on operations and maintenance.

(e) To remove references to ***COSMIC*** Distributing Frames

(f) To change ***COSMIC*** II Mini Distributing Frames references to ***COSMIC*** Mini Distributing Frames

(g) To add metrics to dimensions, measurements, and wire gauges.

(h) To add practices and a manual to the References section.

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2. Description

2.01 Figure 1 shows a front view of a typical ***COSMIC*** Mini Distributing Frame (DF).

The ***COSMIC*** Mini is a single-sided, modular frame system that can terminate and cross-connect both outside plant cables (using 307-type connectors) and equipment cables (using 112-type connecting blocks). Both the outside plant protector field and cross-connect field are on the front side of the frame, allowing the frame to be installed against a wall. It is intended for smaller frame applications up to 50,000 total terminations with preferential assignment.

2.02 These frames are now supported with mechanized engineering aids for more precise records and increased termination capacities.

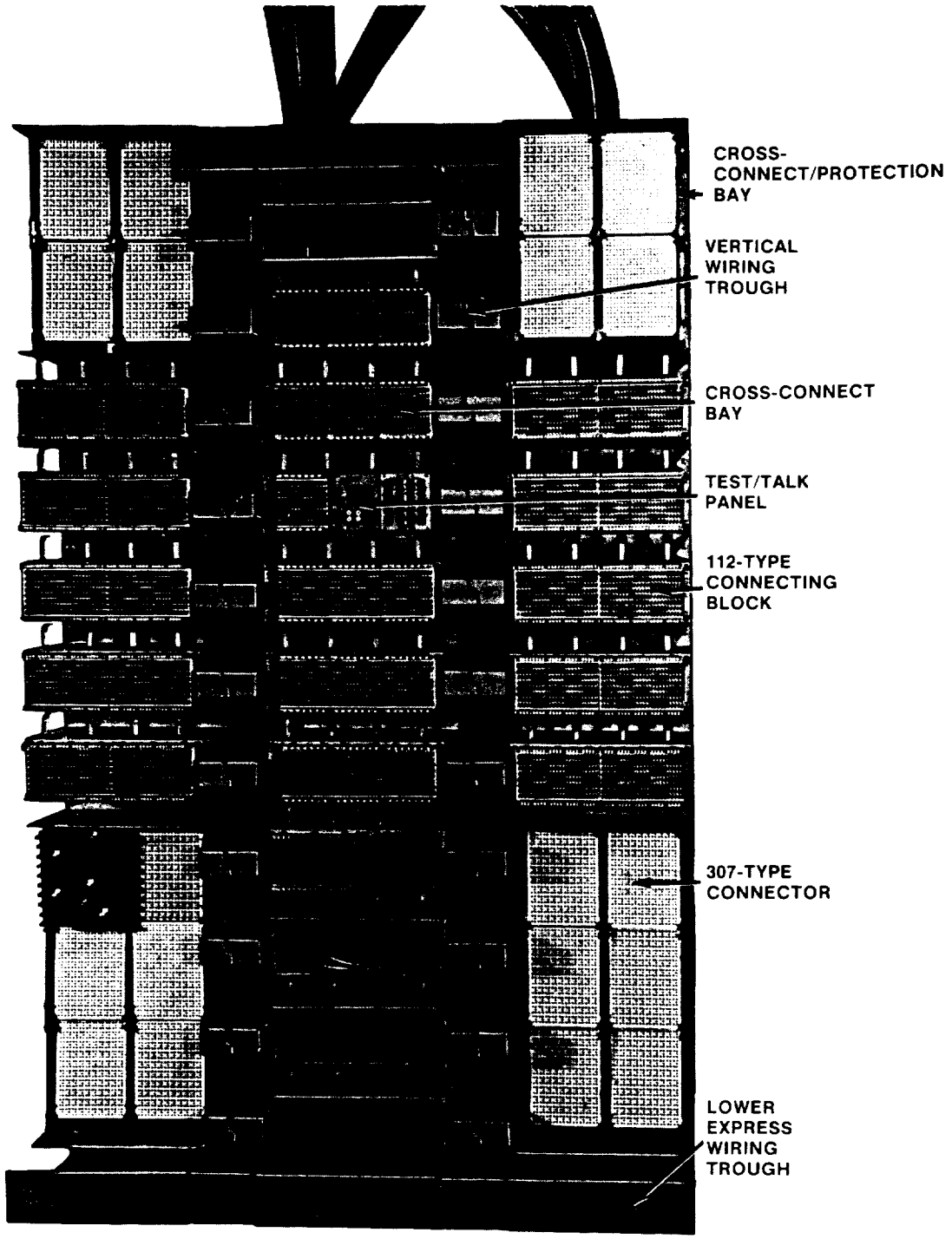

Figure 1. ***COSMIC*** **Mini DF (3 Bays) - 2 Cross-Connect/Protection Bays and 1 Cross-Connect Bay, and Vertical Wiring Troughs (Optional Upper Express Trough Not Shown)**

3. Applications

3.01 ***COSMIC*** Mini DFs are fully compatible with all the electromechanical, electronic, and digital switching systems in use, including AT&T's ***5ESS***®, 1, 1A, 2, 2B, and ***3 ESS***™ switching systems, Northern Telecom's ***DMS**** -10 and DMS-100, and GTE's ***GTD***† -5 EAX switch. Support for these systems includes connecting blocks with circuit identification information stamped on the connecting block fanning strip, as well as mechanized engineering layout with the AT&T MELD System. Other switching systems such as the Ericsson ***AXE***‡ -10 and Plessey ***SYSTEM X***§ are also supported.

3.02 ***COSMIC*** Mini DFs terminate and cross-connect facilities such as outside plant cable pairs and the "drop" side of loop or interoffice carrier systems such as ***SLC***® carrier systems and D4 or D5 Channel Banks, tie pairs to other DFs in the central office, and the full range of transmission, trunk, and toll equipment.

3.03 ***COSMIC*** Mini frames can be cabled from overhead or below the framework to suit most cable access arrangements within a building.

3.04 Typical applications of ***COSMIC*** Mini DFs include small central offices or community dial offices, controlled environment vaults (CEV), mini and maxi huts, and customer premises. Figures 2 and 3 show the ***COSMIC*** Mini DF in a hut and a CEV application.

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* Trademark of Northern Telecom LTD.

† Trademark of GTE.

‡ Trademark of Ericsson.

§ Manufactured by Plessey Co.

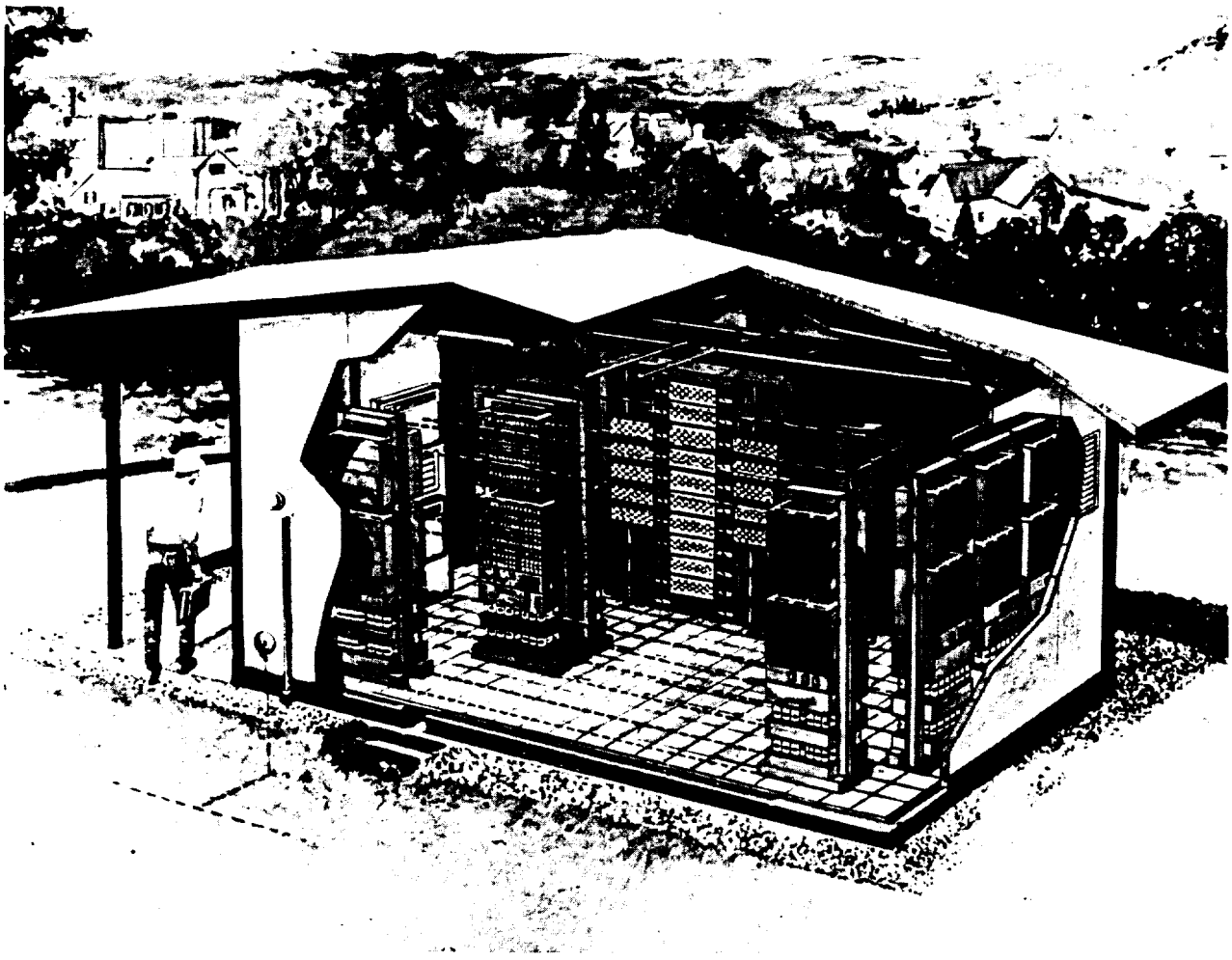


Figure 2. *COSMIC* Mini DF - Hut Application

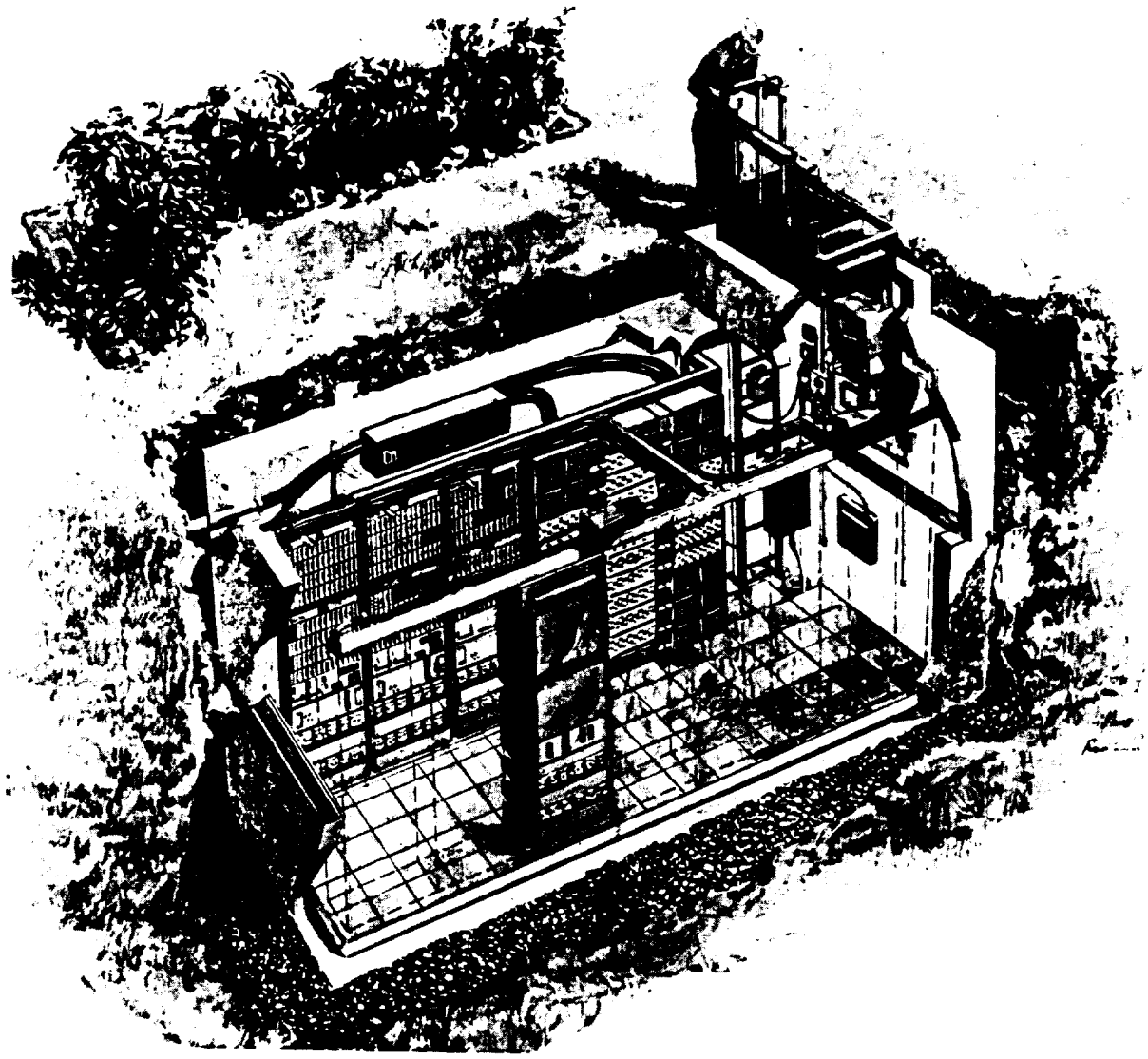


Figure 3. *COSMIC* Mini DF - CEV Application

3.05 The ***COSMIC*** Mini DF has also been used in disaster recovery trailers and containers. Its single-sided work surface, front access cabling, and low height make it ideal for applications where space is at a premium. Figure 4 shows the ***COSMIC*** Mini DF in a mobile application.

Figure 4. ***COSMIC*** **Mini DF - Mobile Application**

4. Framework

4.01 The ***COSMIC*** Mini framework consists of cross-connect/protection bays, cross-connect bays, and vertical wiring troughs bolted together as required to provide the required frame capacity. Vertical troughs are available in 5- or 9-inch (127 or 229 mm) widths. A lower express trough for long jumpers is provided with all framework. An optional upper express trough is available for large installations.

4.02 Each bay is anchored to the floor with two bolts and the vertical cable trough is bolted to the bays. An endguard is available to cover the jumper express trough and provide an end finish.

4.03 In the typical application, one, two, or three cross-connect/protection bays can be placed side-by-side to form a facility module, and one or two cross-connect bays are placed side-by-side to form an equipment module. A vertical wiring trough is used to separate the equipment and facility bay.

4.04 ***COSMIC*** Mini DFs can be configured in a variety of flexible arrangements of cross-connect/protection and cross-connect bays for combined terminations, or all cross-connect bays for use with separate protector frames or as an Intermediate Distributing Frame (IDF).

Cross-Connect/Protection Bay

4.05 The cross-connect/protection bay (Figure 5) is 7 feet (2134 mm) tall, 14 inches (356 mm) wide and 14-3/4 inches (375 mm) deep, and can be used to terminate subscriber (OSP), T-carrier, and special service lines. If the optional upper express trough is used, add 5 inches (127 mm) to the height. The cross-connect/protection bays have ten shelves. Five shelves can mount ten 307-type connectors (two per shelf) with attached factory pre-wired 100-pair 112-type connecting blocks that are mounted on the other five shelves (two per shelf). This results in a maximum capacity of 1,000 protected pairs.

4.06 The 307-type connectors (with 4C-type protector units inserted) provide voltage and current protection to the lines terminated on them.

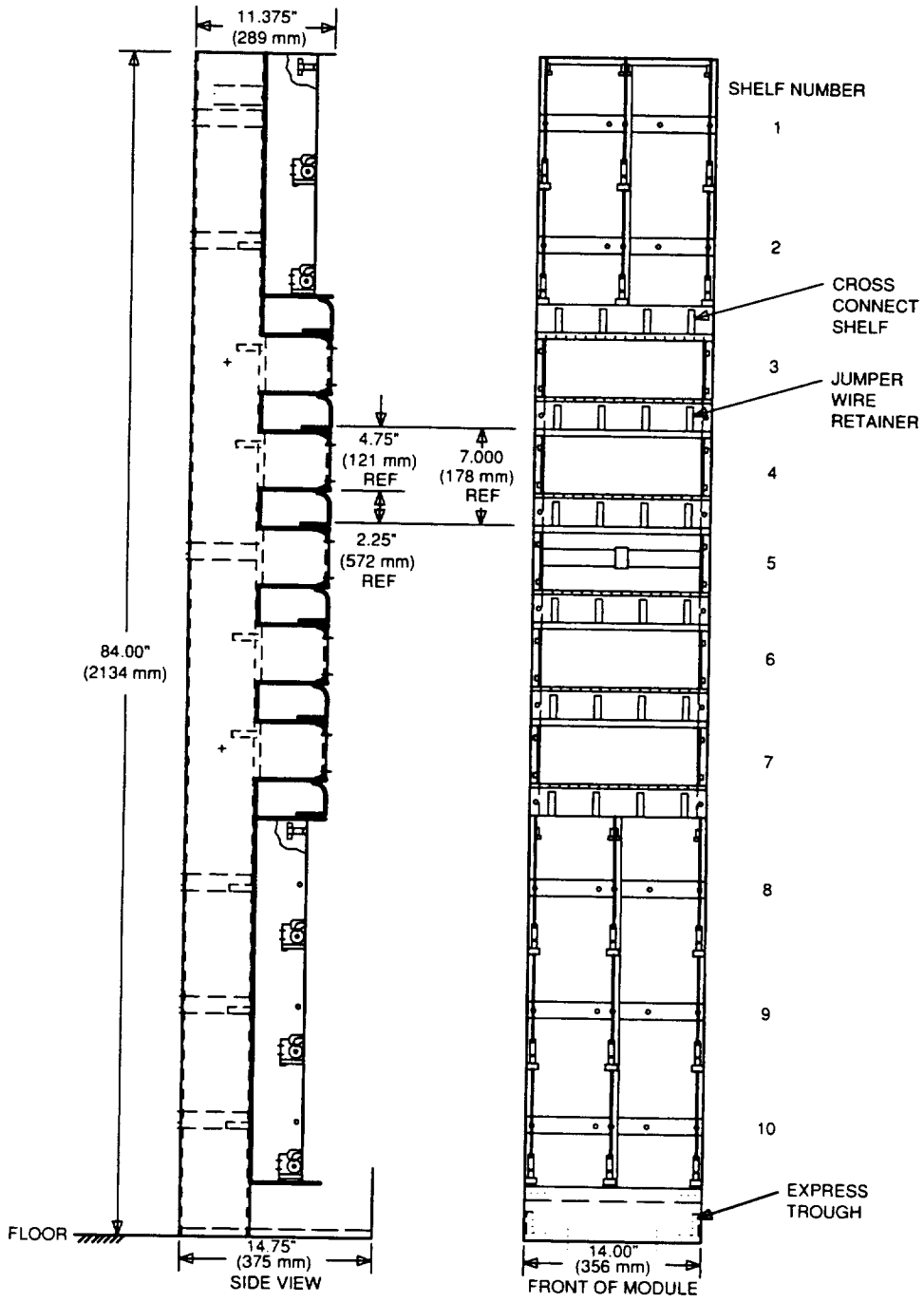


Figure 5. *COSMIC* **Mini DF — Cross-Connect/Protection Bay (Upper Express Trough Not Shown)**

Vertical Cabling Trough

4.07 The vertical cabling trough (Figure 6) is generally provided between cross-connect/protection and cross-connect bays. It is used to route jumper wires between two horizontal wiring shelves of adjacent bays and to route jumpers vertically to the express trough. Two vertical cabling troughs are available: 5 inches (127 mm) wide by 9 inches (229 mm) deep and 9 inches (229 mm) wide by 9 inches (229 mm) deep. The larger is used for custom arrangements with larger numbers of terminations and accepts standard Mechanized Engineering and Layout for Distributing Frames (MELD) frame labels.

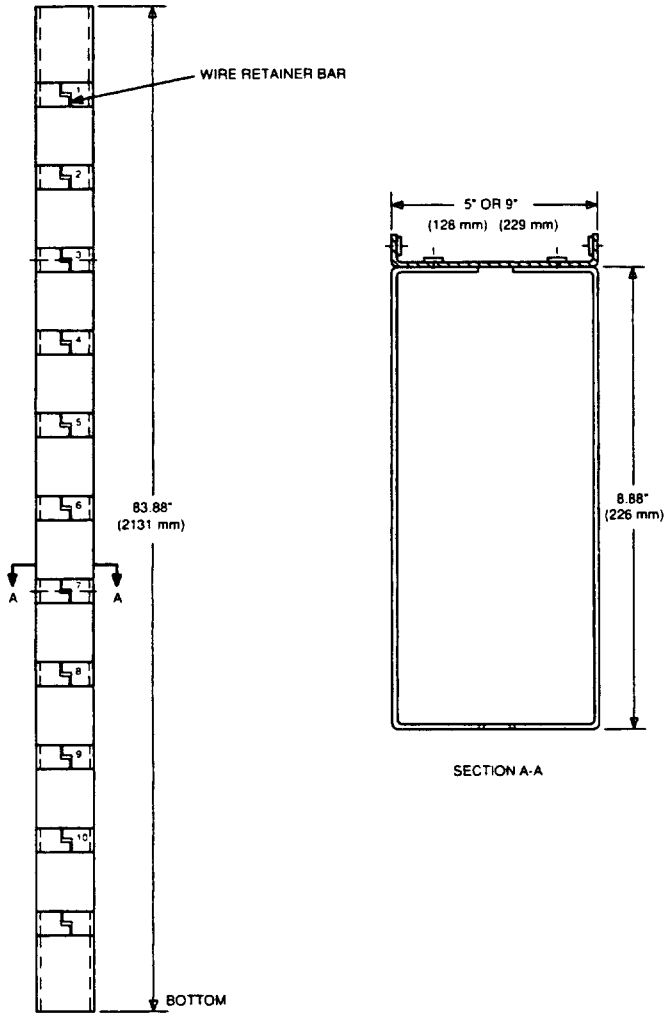


Figure 6. *COSMIC* Mini DF — Vertical Cabling Trough

Cross-Connect Bay

4.08 The cross-connect bay (Figure 7) has the same dimensions as the cross-connect/protection bay and is used to terminate line, trunk, and toll equipment on 112-type connecting blocks. The cross-connect bays have ten shelves and can mount twenty of the 100- or 128-pair, 112- type connecting blocks (2 per shelf) for a maximum capacity of 2560 equipment pairs.

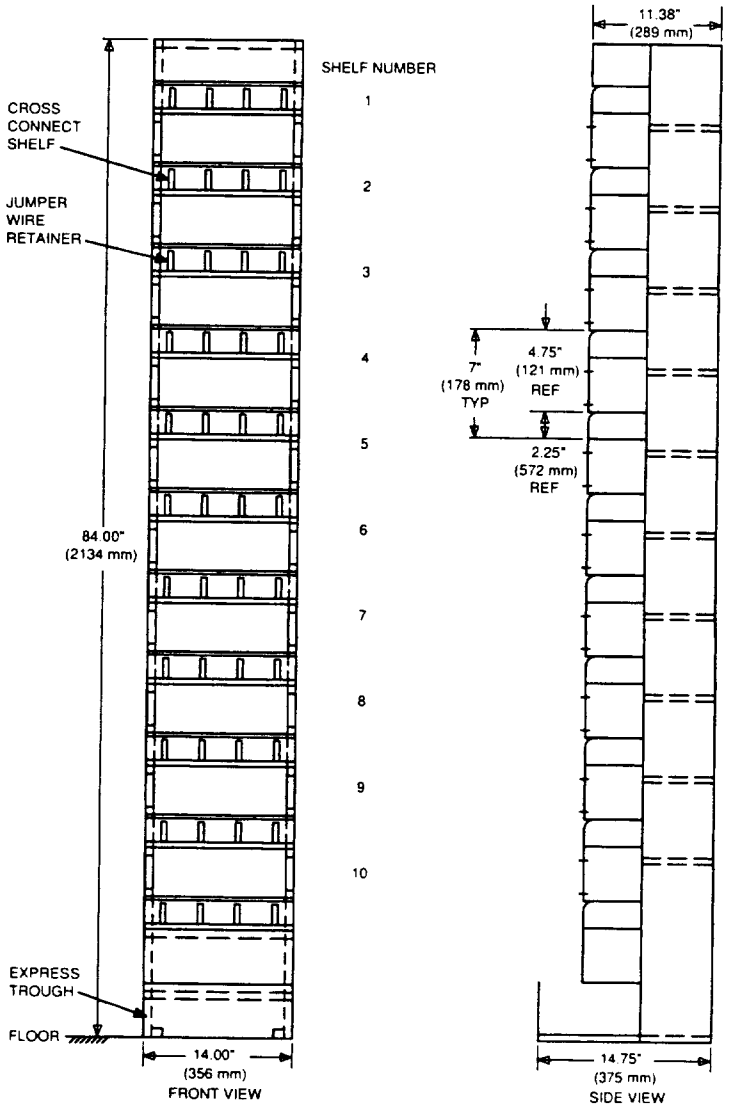


Figure 7. *COSMIC* **Mini DF — Cross-Connect Bay (Upper Express Trough Not Shown)**

4.09 Tables A, B, and C show the ***COSMIC*** Mini frame specifications and ordering information.

Table A. *COSMIC* **Mini Framework Specification**

Framework Description	Dimensions			Capacity	Ordering Code
	Height	Width	Depth		
Cross-Connect Bay, Mounts 112-type blocks	7'0" (2134 mm)	14" (356 mm)	14 3/4" (375 mm)	2,000 equipment pairs (on 100-pair blocks), or 2,560 equipment pairs (on 128-pair blocks)	ED-6C311-30, G5
Cross-Connect/ Protection Bay, Mounts 307- and 407-type connectors, and 112-type blocks	7'0" (2134 mm)	14" (356 mm)	14 3/4" (375 mm)	1,000 facility pairs	ED-6C311-30, G4
Vertical Wiring Troughs*	7'0" (2134 mm)	5" (127 mm)	9" (229 mm)	N/A	ED-6C311-30, G3
	7'0" (2134 mm)	9" (229 mm)	9" (229 mm)	N/A	ED-6C311-30, G6
Upper Express† Wiring Trough	5" (127 mm)	14" (356 mm)	9" (229 mm)	N/A	ED-6C314-70, G10
Upper Express† Wiring Trough Vertical Spanner	5" (127 mm)	5" (127 mm)	9" (229 mm)	N/A	ED-6C314-70, G11
	5" (127 mm)	9" (229 mm)	9" (229 mm)	N/A	ED-6C314-70, G13

* The Group 6 Vertical Wiring Trough is recommended over the Group 3 Vertical Wiring Trough for applications having three or more contiguous bays.

† Upper Express Wiring Troughs and Vertical Spanners are recommended for installation terminating more than 15,000 pairs.

Table B. Jumper Trough Dimensions and Floor Load

Frame Load	Horizontal Shelf Dimension	Vertical Trough Dimension	Express Trough Dimension	Lower Express Trough Dimension
75 Lbs/Ft^2 (366 Kg/m^2)	5.5" x 2.25" (140 mm x 57 mm)	4.5" x 8.6" (114 mm x 218 mm) or 8.5" x 8.6" (216 mm x 218 mm)	8.75" x 4" (222 mm x 102 mm)	8.75" x 4" (222 mm x 102 mm)

Table C. Other Frame Hardware

Item	Description	Ordering Code
End Guards (Pair)	End finish for frame lineup	ED-6C314-70, G4
Floor Mounting Hardware	Anchors for wood floors	ED-6C314-70, G8
	Anchors for concrete floors	ED-6C314-70, G9
Designation Strip (Label Holder)	Provides mounting space for designation labels - 1 shelf	ED-6C314-70, G7

Associated Frame Systems

A. Cable Rearrangement Facility (CRF)

4.10 The CRF (Figure 8) is a sheet metal splicing cabinet that provides a fire-resistant termination capacity of up to 5,000 pairs using 710-type connectors. Support brackets and wire retainers result in splice density and organizational efficiencies unique to this product.

4.11 Vertical splicing of tip cables to riser cables in a CRF is the most efficient and cost effective splice transition. The CRF can be located between the structural columns of an outside wall in a frame room. This arrangement is the most economical for the total system (materials, placement, testing, splicing, and the cost of floor penetrations and vault construction). In addition, it minimizes vault congestion, cable sheath maintenance, and fire stopping problems while (in existing buildings) optimizing the use of riser ducts. Spreading the ultimate number of outside plant pairs equally along the length of the frame lineup minimizes cable pileup in the racks. See AT&T 636-211-101 for additional information.

4.12 Note that the applications depicted in Figures 2 and 3 both included a CRF.

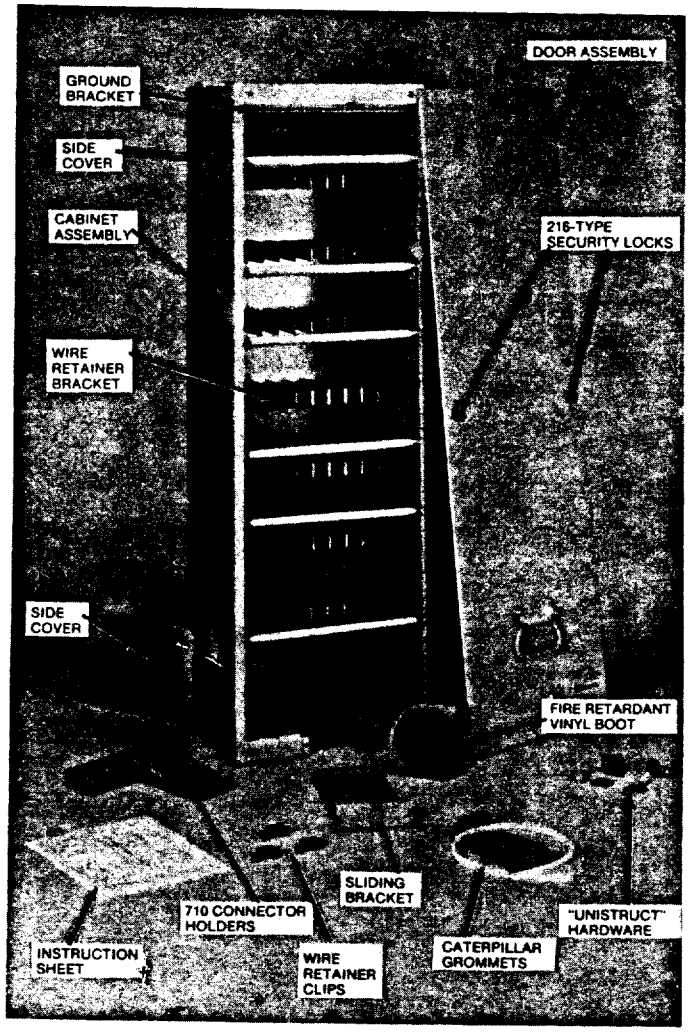


Figure 8. Cable Rearrangement Facility (CRF)

B. AT-9049B, C, or D Protector and Cable Enclosure for 307-Type Connectors

4.13 The high termination density of the AT-9049B, C, or D is well suited for structures with limited floor space such as remote sites. The AT-9049 also serves as a separate protector frame for large ***COSMIC*** Mini DF applications. The modularity permits a wide variety of configurations.

4.14 The AT-9049B (Figure 9) and AT-9049C frames each terminate and protect 900 outside plant pairs. The B unit is designed for lineup growth from left to right, and the C unit for growth from right to left.

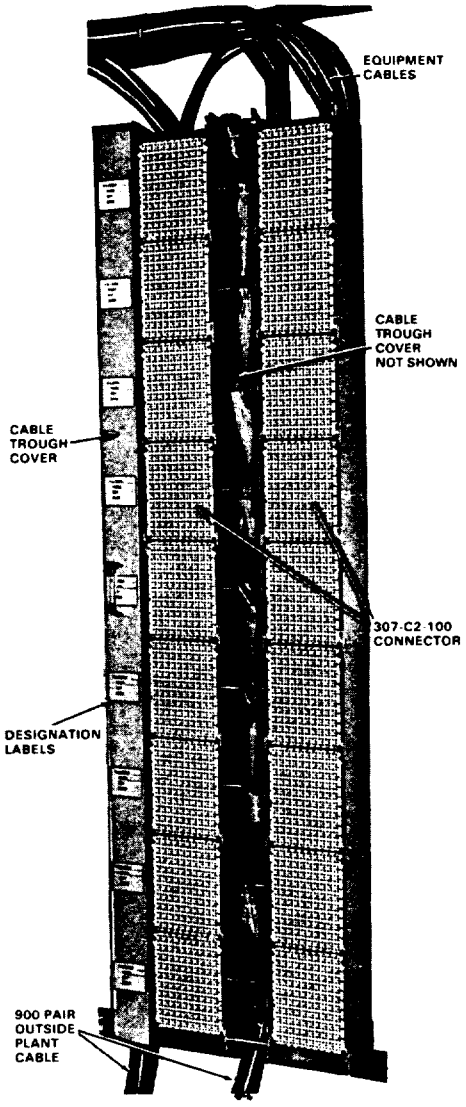


Figure 9. AT-9049B Protector and Cable Enclosure (Left-to-Right Growth) Two B Units Shown (Total Capacity 1800 Pairs)

C. Slide Drawer Assembly (SDA) Protector Frame for 309-Type Connectors

4.15 The SDA (Figure 10) provides high-density bulk protection for voice and data lines using 3- or 4-type protector units. When pulled open, the drawer telescopes out about 15 inches (381 mm) and latches. The connectors are mounted laterally in the frame vertical. After servicing, the drawer is manually unlatched and pushed back into its stored position.

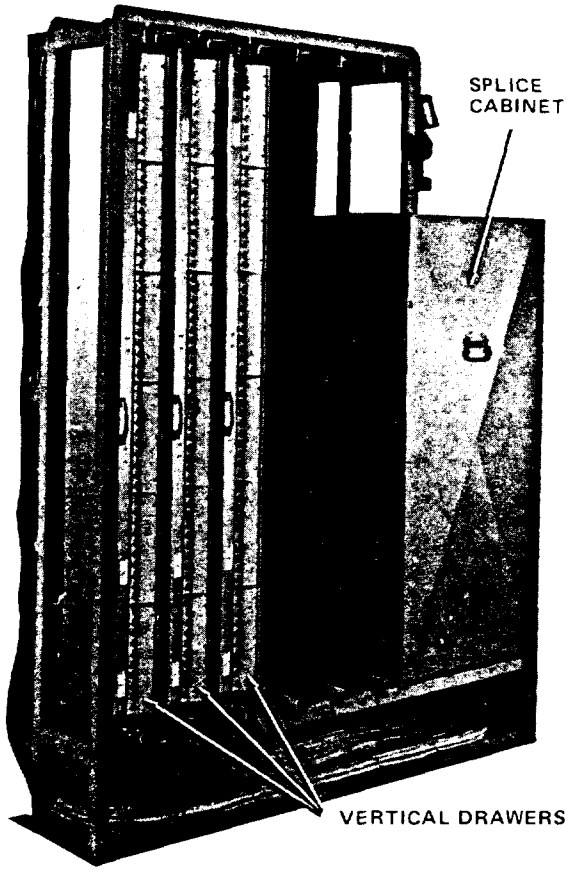


Figure 10. SDA with Splice Cabinet — Cover Installed

4.16 The SDA consists of a steel frame with one to six vertical drawers. Each vertical drawer mounts six 309-type bivertical (200-pair) connectors with 26-gauge (.4 mm) switchboard stub cables to provide protection for 1200 lines. A fully equipped (six-drawer) SDA provides 7200 lines of protection in a relatively small space compared to conventional methods. End guards are not provided but can be custom fabricated.

4.17 The optional splice cabinet is a sheet metal splicing facility providing up to 5000 terminations in the mini cabinet and up to 7200 in the maxi cabinet. Vinyl boots on top of the cabinet organize the cable entering the cabinet; the bottom of the cabinet is open.

5. Connectors and Stub Cables

5.01 The 307-type connectors were developed especially for ***COSMIC*** DFs. A maximum of ten 307-type connector assemblies can be mounted on a cross-connect/protection bay. The connectors are mounted on shelves 1, 2, and 8 through 10. The 112-type connecting blocks that are attached to the 307-type connectors are mounted on shelves 3 through 7. For example, a 307-type connector mounted on the right side on shelf 8 will have its associated 112-type connecting block mounted on the right side on shelf 5. The 307-type connectors used on the ***COSMIC*** Mini DFs are listed in Table D.

Table D. 307-Type Connectors for *COSMIC* Mini DFs

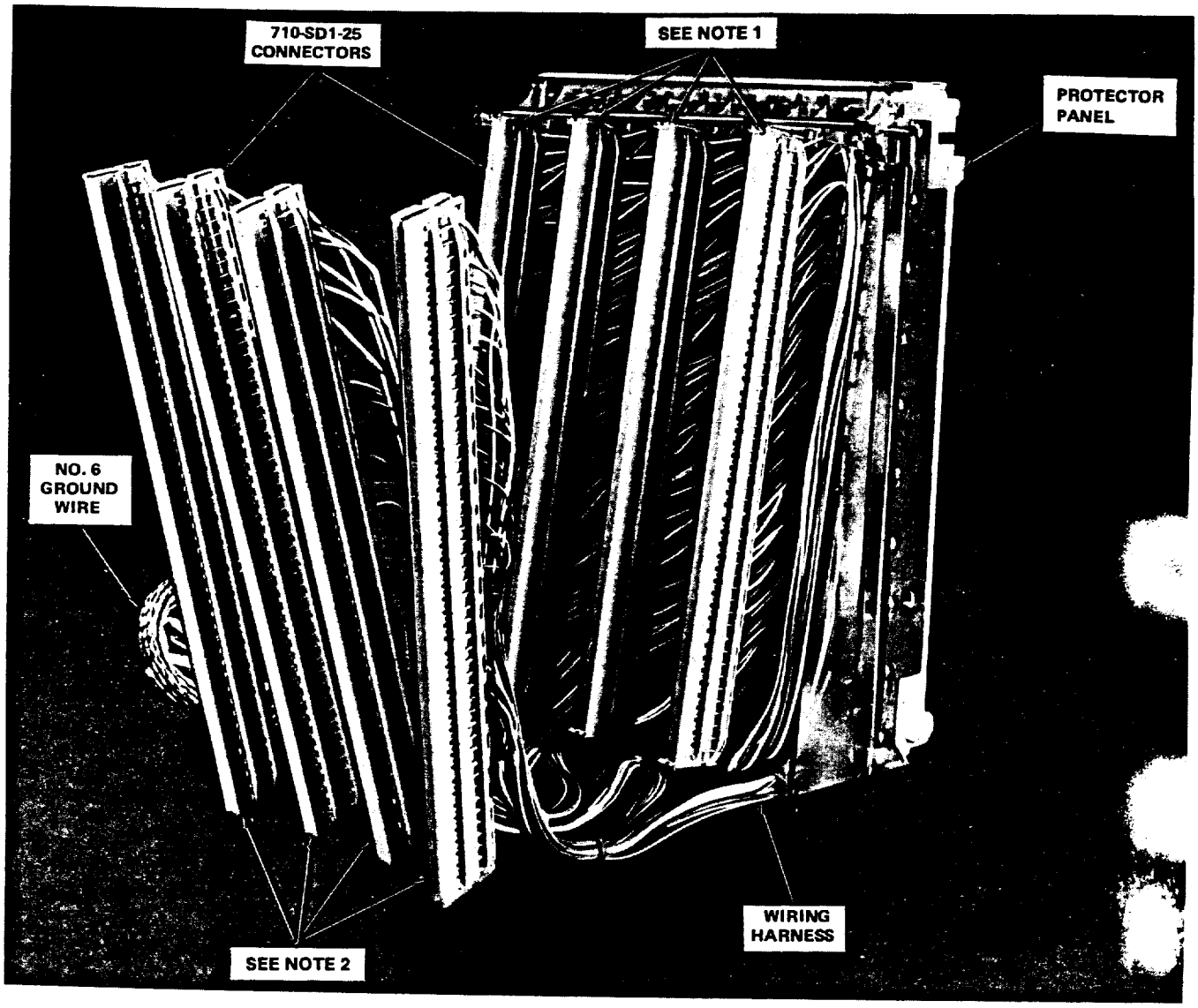
Connector Item Code	Equipped with Connecting Block	Terminal Type (Note)	Comcode
307C1-100*	None†	N/A	103334009
307D2-100	112C1B-100	BQC	103554747
307D2B-100	112C1BB-100	BWW	105571699
307D2S-100	112C1BS-100	SWW	105571707

Note: BQC = Bifurcated Quick-Clip SWW = Single Wire-Wrap
BWW = Bifurcated Wire-Wrap

* Outside plant side is 22 gauge (.6 mm) and equipment side is 26 gauge (.4 mm).

† This code is equipped with a set of (4) 25-pair 710-type connectors instead of a connecting block.

5.02 The 307C1-100 connector (Figure 6) provides protection only and is used for protection and test access for T-Carrier systems. No connecting block is provided. It consists of a protector panel, interconnected with eight 710-SD1-25 splicing module connectors. Four of the 710 splice connectors are dedicated to the T-Carrier equipment cable. The other four connectors provide connection to two 50-pair or one 100-pair tip cable to the outside plant. The 710 splice modules provide rapid connection to 11-type cable stubs equipped with mating 710 bridge connectors.



NOTES:

1. CONNECTS TO ONE 11CA (22 GAUGE) OR ONE 11DA (24 GAUGE) 100-PAIR CONNECTORIZED STUB CABLE FROM THE CABLE ENTRANCE FACILITY OR TWO 11CB (22 GAUGE ONLY) 50-PAIR CONNECTORIZED STUB CABLES FROM THE CABLE ENTRANCE FACILITY.
2. CONNECTS TO FOUR 11EA (25-PAIR 609B CABLE [ABAM]) CONNECTORIZED TIE CABLES TO THE CENTRAL OFFICE REPEATER BAY OR TWO 11EB (50-PAIR 610B CABLE [ABAM]) CONNECTORIZED TIE CABLES TO THE CENTRAL OFFICE REPEATER BAY.

Figure 11. 307C1-100 Connector — Back View

5.03 The 307D2-100, 307D2B-100, and 307D2S-100 connectors have a protector panel interconnected to a 100-pair 112-type connecting block. The connecting block is connected to the panel with four, 25-pair twisted-conductor pair, cables. The 307D2-100 connector is equipped with a 112C1B-100 connecting block, and has "3-beam" type insulation displacement clips. The 307D2B-100 connector is equipped with a 112C1BB-100 connecting block, and has bifurcated wire-wrap terminals. The 307D2S-100 connector is equipped with a 112C1BS-100 connecting block, and has single wire-wrap terminals. All of these connectors have additional backplane wiring that interconnects the protector panel to four 710-SD-25 splicing connectors. The connectors provide for rapid connection to 100-pair stub cables (11C or 11D type).

5.04 A new UL-Listed 307LD2-100 connector (Figure 12) offers the features of the standard 307D2-100 connector, but with the added benefit of being listed by UL. This connector is factory-equipped with a 26-gauge (.4 mm), 100-pair stub cable. Table E lists the 307LD2-type connectors.

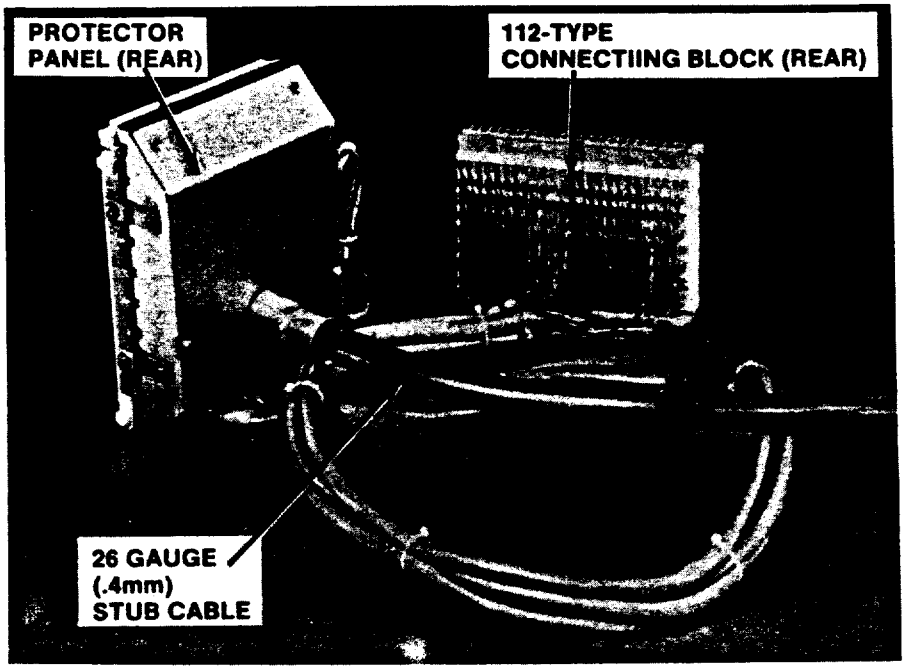


Figure 12. 307LD2-100 Connector (UL Listed)

Table E. UL-Listed 307LD2-Type Connectors

Product Code	Comcode	Terminal Type (Note)	Equipped with Connecting Block	Frame
307LD2-100-30	106060387	BQC	112C1B-100 and 30 foot (9.1 m) stub	2-10 1-10
307LD2-100-50	106287089	BQC	112C1B-100 and 50 foot (15.2 m) stub	2-10 1-10
307LD2-100-100	106287121	BQC	112C1B-100 and 100-foot (30.5 m) stub	2-10 1-10

Note: BQC = Bifurcated quick-clip.

5.05 See AT&T 201-208-110 for description, use, installation, and repair procedures for the 307-type connector.

11-Type Connectorized Stub Cables

5.06 Stub cables (Figures 13 and 14) are used with 307-type connectors to interconnect to outside plant cables and must be ordered separately (with the exception of the 307L2D-100 UL connector, which is factory-wired with a 26-gauge (.4 mm) stub cable). These stubs have 22- or 24-gauge (.6 or .5 mm) 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 cable contains 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. This cable is UL-Listed type "CMR," suitable for riser applications. Both the 22- and 24-gauge (.6 and .5 mm) stub cables have a nonflammable light olive-gray sheath. The 22-gauge (.6 mm) stub cable can be identified by a red binder around the core wrapper; the 24-gauge (.5 mm) cable has a white binder. Figure 13 shows the 11-type stub cable and Tables F and G provide selection and ordering information.

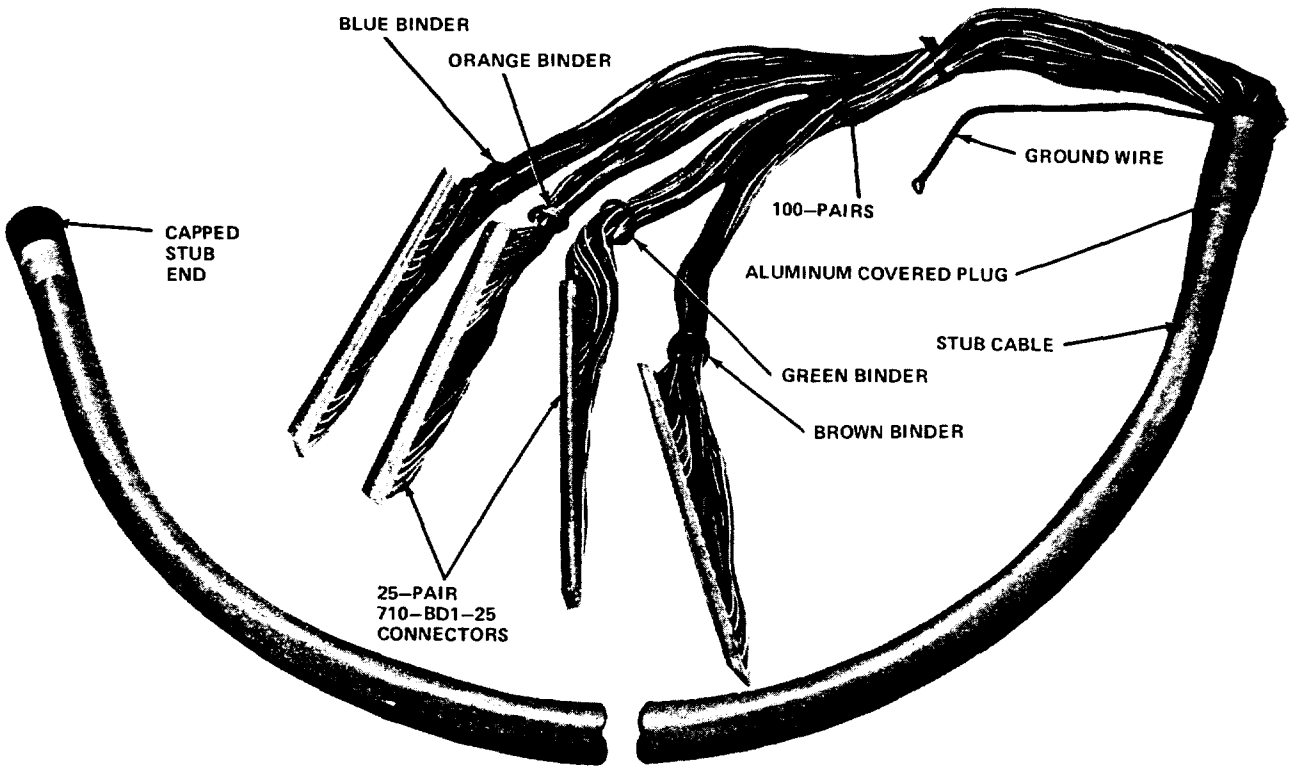


Figure 13. 11-Type Connectorized Stub Cable

Table F. Stub Cable Gauge Selection Guide

Entrance Cable Gauge	Connector Stub Cable
26 (.4 mm) Exposed or unexposed	22 (.6 mm) or 24 (.5 mm)
24 (.5 mm) Exposed or unexposed	22 (.6 mm)
22 (.6 mm) Exposed	22 (.6 mm)*
19 (.9 mm) Exposed	22* (.6 mm)
22 (.6 mm) Unexposed	22 (.6 mm)
19 (.9 mm) Unexposed	22 (.6 mm)

* Provide a length of 24- (.4 mm) or 26-gauge (.5 mm) protective fusing cable.

Table G. 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 11DA cables are generally spliced to feeder/riser cables)	307A1,B1 D1, D2, and E1. Also 309G1-200	22 (.6 mm)	40 (12 m)	100	Four 25-Pair 710BD1-25	11CA-40	103271334
			60 (18 m)			11CA-60	103271342
			80 (24 m)			11CA-80	103226486
			100 (30 m)			11CA-100	103226494
			120 (37 m)			11CA-120	103271359
			150 (46 m)			11CA-150	103226502
			200 (61 m)			11CA-200	103226510
		24 (.5 mm)	40 (12 m)			11DA-40	103271367
			60 (18 m)			11DA-60	103271375
			80 (24 m)			11DA-80	103226551
			100 (30 m)			11DA-100	103226569
			120 (37 m)			11DA-120	103271383
			150 (46 m)			11DA-150	103226577
			200 (61 m)			11DA-200	103226528
T-Carrier Facility Cables (Split 50-Pair Transmit and Receive Counts)	307C1-100	22 (.6 mm)	40 (12 m)	50*	Two 25-Pair 710BD1-25	11CB-40	103681474
			60 (18 m)			11CB-60	103681482
			80 (24 m)			11CB-80	103681490
			100 (30 m)			11CB-100	103681508

See note/footnotes at end of table.

Table G. 11-Type Connectorized Stub Cables (Contd)

Application	Used with Connector	Stub Cable			Equipped with Bridge Module	Item Code	COMCODE
		Wire Gauge	Length (Feet)	Capacity Pairs			
			120 (37 m)			11CB-120	103681516
			150 (46 m)			11CB-150	103681524
			200 (61 m)			11CB-200	103681532
T-Carrier Office Repeater Bay	307C1-100	22 (.6 mm)	40 (12 m)	25†	One 25-Pair 710BD1-25	11EA-40	103318580
			60 (18 m)			11EA-60	103318598
			80 (24 m)			11EA-80	103318606
			100 (30 m)			11EA-100	103318549
			120 (37 m)			11EA-120	103318556
			150 (46 m)			11EA-150	103318564
			200 (61 m)			11EA-200	103318572
			40 (12 m)	50‡	Two 25-Pair 710BD1-25	11EA-40	103681540
			60 (18 m)			11EB-60	103681557
			80 (24 m)			11EB-80	103681565
			100 (30 m)			11EB-100	103681573
			120 (37 m)			11EB-120	103681581
			150 (46 m)			11EB-150	103681599
			200 (61 m)			11EB-200	103681607

Note: Different lengths or gauge of stub cable can be provided on a special order basis, such as 26-gauge (.4 mm) 300-foot (91 m) stub cable.

* Each 307C1 requires two 50-pair 11CB stub cables.

† Each 307C1-100 requires four 11EA stub cables.

‡ Each 307C1-100 requires two 11EB stub cables.

407-Type Connectors

5.07 The 407-type non-protected connector (Figure 14) is used on ***COSMIC*** IIA and ***COSMIC*** Mini DF Systems. Like the 307-type connector, it mounts in the cross-connect/protection bays of these frames. The 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 cabling and the cross-connect block can be made using either 5-type continuity plugs or 4C12C continuity only protectors that provide test access.

5.08 The 407-type connector is intended for applications where protection is not required, such as to terminate the derived-pair circuits of loop carrier systems. Many telephone companies have been using standard 307-type protected connectors for these circuits. This allows the craft to perform cross-connect and service-denial operations for these circuits. Connectors used in this manner are often referred to as "pseudo-connectors."

5.09 The 407-type non-protected connector, equipped with continuity-only plugs, is a lower cost alternative to the 307-type "pseudo-connector." Table H lists the 407-type connectors.

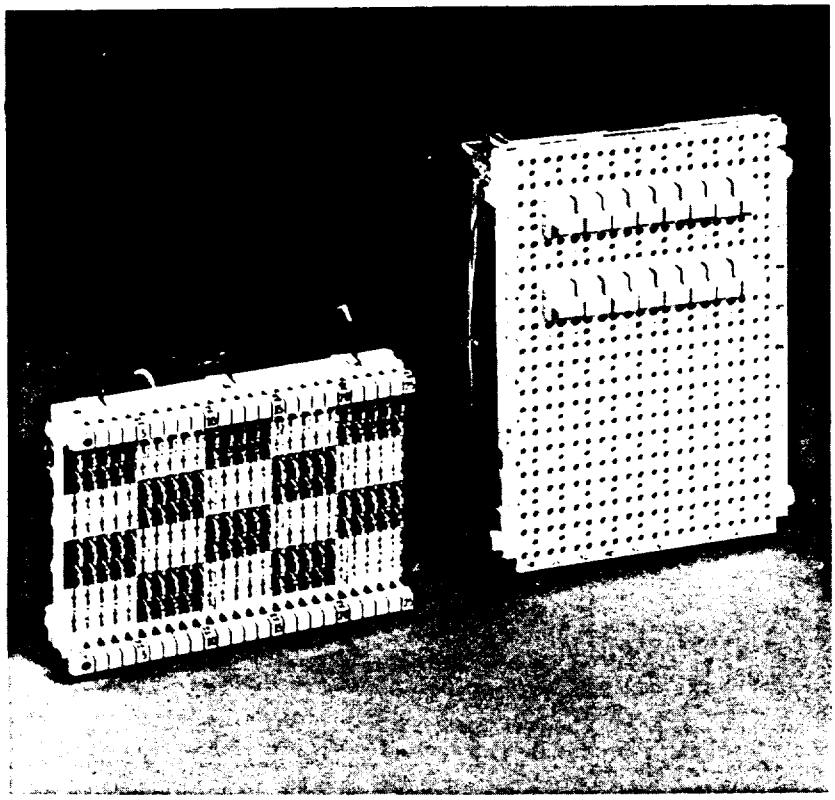


Figure 14. 407-Type Connector — Front View

Table H. 407-Type Connectors — Non-Protected

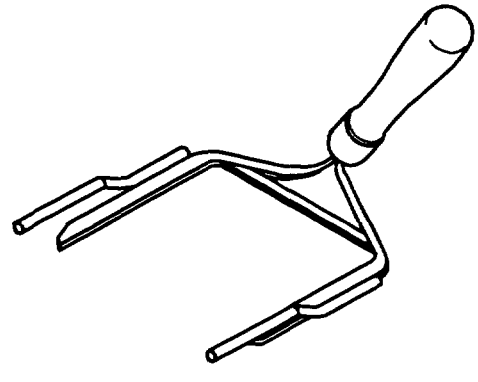
Product Code	Comcode	Terminal Type	Equipped with
407D1-100	106055460	Bifurcated Quick-Clip	112C1B-100 and four 710-type 25 pair splicing connectors
407F1-100	106055486	Bifurcated Quick-Clip	112H1B-100 and four 710-type 25 pair splicing connectors

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.

Connector Panel Removal Tool and Service Bracket

A. KS-22271, L1 307-Type Connector Panel Removal Tool

5.10 The KS-22271, L1 connector removal tool is used to unseat the protector panel of the 307-type connector from the ***COSMIC*** IIA or ***COSMIC*** Mini DFs or AT-9049 protector frames. It is not used with ***COSMIC*** I or IA DFs. Two tools per frame system are recommended (Figure 15).

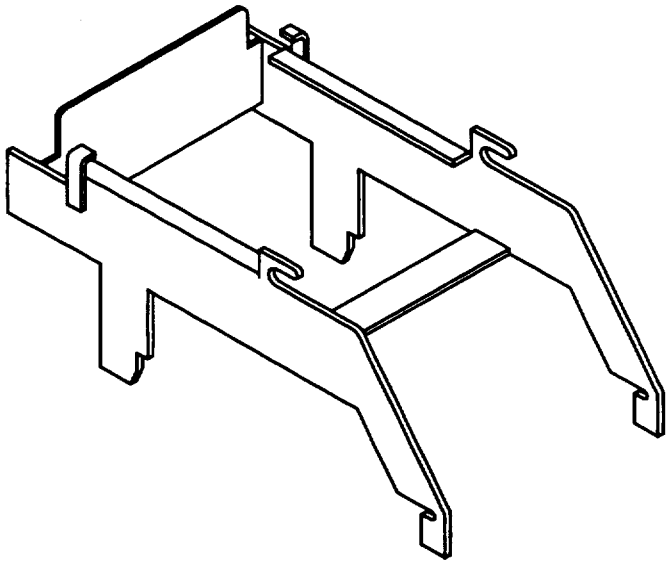


tpa 779866/01

Figure 15. KS-22271, L1 307-Type Connector Panel Removal Tool

B. KS-22325, L1 Service Bracket for 307-Type Connectors

5.11 The KS-22325, L1 service bracket is used to temporarily hold the protector panel of the 307-type connector away from the framework for installation and maintenance procedures. It is used with ***COSMIC*** IIA or ***COSMIC*** Mini DFs or AT-9049 protector frames. Two brackets per frame system are recommended (Figure 16).



tpa 779868/01

Figure 16. KS-22325, L1 Service Bracket for 307-Type Connectors

Connector Presser Tool

A. AT-8948L Connector Presser Tool and AT-8927C Bridge Module Removal Tool

5.12 The AT-8948L connector presser tool is used to connect the 710-type connector bridge module (supplied as part of the 11-type stub cable) to the 710-type connector splice module on the 307-type connector (Figure 17).

5.13 The AT-8927C bridge module remover tool is used to disconnect the 710-type connector bridge module from the splice module (Figure 17).

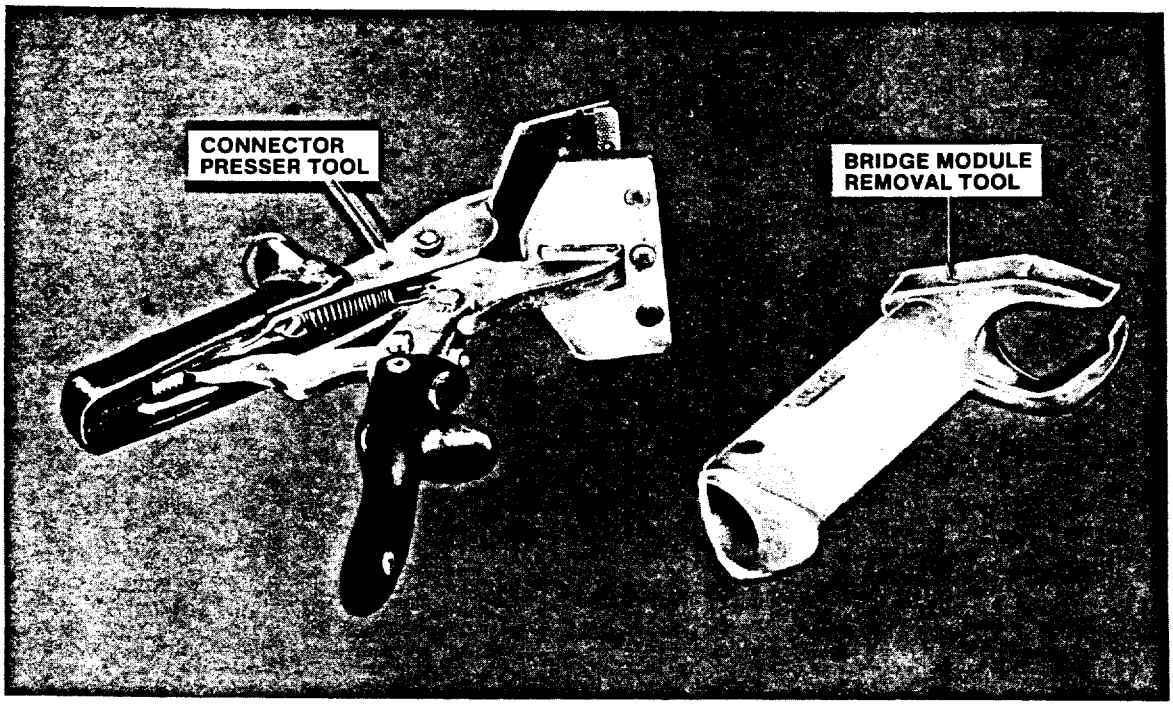


Figure 17. AT-8948L Connector Presser and AT-8927C Bridge Module Removal Tool

6. Protector Units

6.01 The 3C- and 4C-type protector units are used on the 307-type connector for ***COSMIC*** Mini DFs. The 3C-type protector units provide voltage protection, while 4C-type protector units provide both sneak current and voltage protection. The 4C12C protector units provide continuity only. Figure 18 shows 4C-type protector units, and Tables I and J list the various codes, housing characteristics, and circuit applications.

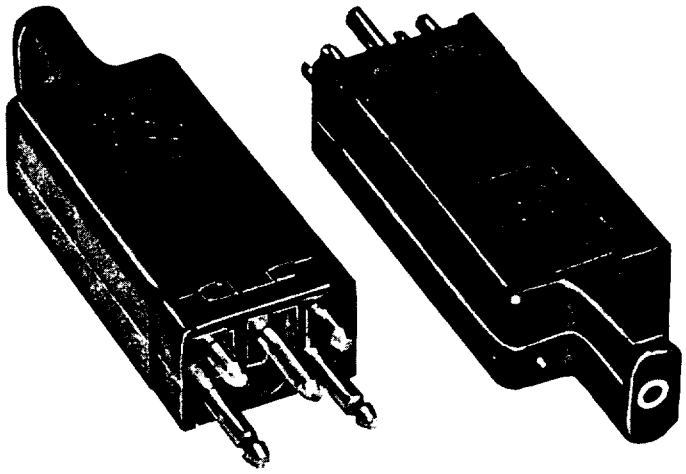


Figure 18. 4C-Type Protector Units

Table I. 3C-Type Protector Units — Voltage Protection

Circuit Application	Housing Color	Product Code	Comcode
Wide Gap Gas Tube Protector Units			
Standard	Black	3C1E-W	104410188
Special	Red	3C3E-W	104410196
Solid-State Protector Units			
Standard	Black	3C1S	105514756
	Black	3C1SC	106021066
Special	Red	3C3S	105695969
	Red	3C3SC	106021074

Table J. 4C-Type Protector Units — Voltage and Sneak Current Protection

Carbon Block Protector Units			
Circuit Application	**Housing Color**	**Product Code**	**Comcode**
Standard	Black	4C1C	103051470
Service denied	Green	4C2C	103051488
Special	Red	4C3C	103051496
	Red	4C3C-2	104152152
PBX battery	Yellow	4C4C	103051504
Reverse ring & tip	White	4C9C*	103051512
Minibridge lifter	Orange	4C11C*	103051520
Continuity only	Gray	4C12C†	103290755
Gas Tube Protector Units			
Standard	Black	4C1E*	102869450
		4C1E-W	104401898
		4C1F	103324034
Service denied	Green	4C2E*	102869468
		4C2E-W	104401906
		4C2F	103324059
Special	Red	4C3E*	102869476
		4C3E-W	104401914
		4C3F	103324067
		4C3E-2	104271093
		4C3F-2	104271101
PBX battery	Yellow	4C4E*	102869484
		4C4E-W	104401930
		4C4F	103324075
Reverse ring & tip	White	4C9E*	102869492
		4C9F	103324083
Minibridge lifter	Orange	4C11E*	102869500
		4C11F	103324042

See note/footnotes at end of table.

Table J. 4C-Type Protector Units — Voltage and Sneak Current Protection (Contd)

Carbon Block Protector Units			
Circuit Application	**Housing Color**	**Product Code**	**Comcode**
Solid-State Protector Units			
Standard	Black	4C1S	104386545
Standard	Black	4C1SC	105743124
Special	Red	4C3S-75	105581086
Special	Red	4C33C	105775001

Note: 4C-type protector units are intended primarily for AT&T 307- and 309-type central office connectors that do not have a separate test field. However, 4Cs may also be used with all AT&T 300 series connectors and building entrance protectors where test access through the protector unit is desirable.

* Discontinued Availability (DA) 4C9C and 4C9E are replaced by 4C9F
4C11C and 4C11E are replaced by 4C11F
4C-Es are replaced by 4C-E-Ws
† 4C12C is used for continuity only and does not have carbon blocks of gas tubes for protection.

6.02 The housings for most 3C- and 4C-protector units have test access holes provided in their caps. The protector unit housing has recessed access holes for testing the outside plant tip and ring terminals. Special service protector units (red housing) are not equipped with test access holes to ensure the complete insulation from accidental test access. The test access design feature permits testing the entire 100-pair protector field with the 299A or 299B test adapter. The P2FL test cord is also available for testing protector units ndividually. See AT&T 201-208-100 for description, use, maintenance, and test procedures for the 4C-type protector units.

7. Testing the 307-Type Connector

7.01 To test circuit terminated on the 307-type connector on the ***COSMIC*** Mini Distributing Frames, two test adapters and several test cords are available as follows. (See AT&T 201-208-106 for further details.)

- ***299A Test Adapter*** —Used to connect the 100-pair protector panel of the 307-type connector to automatic pair identification equipment. The test adapter makes contact with the outside plant T and R conductors through the test points in the top of the 4C-type protector units. If the 307-type connector is not equipped with the protector units, the contacts in the test adapter make contact with the outside plant T and R conductors through their respective jacks in the protector panel.

- ***299B Test Adapter*** — Used to connect the 100-pair protector panel of the 307-type connector to automatic pair identification equipment. The test adapter can be mounted onto a full complement of protector units without disturbing those protector units that are in a "detent" position. The protector units may be fully inserted or in the "detent" position. It also provides the capability of manually placing any protector unit in the fully inserted or "detent" position while the test adapter is mounted in place on the 307-type connector. The test adapter makes contact with the outside plant T and R conductors through the test points in the top of the 4C-type protector units.
- ***P2FL Test Cord*** — Used to access a single protected pair for service verification. The test cord can be used to short-circuit a pair, ground a shorted pair, or ground either side of a pair. It bridges onto the test access holes of a 3C- or 4C-type protector unit equipped with alligator clips.
- ***P2DB Test Cord*** — Used in series with W2GM test cord for high voltage breakdown.
- ***W2GM Test Cord*** — Used in series with P2DB test cord for high voltage breakdown.
- ***W2GL Test Cord*** — Used to access unprotected circuits. Equipped with alligator clips.
- ***W4CU Test Cord*** — Used for making manual or automatic Varley measurements.
- ***W2HN Test Cord*** — Used to test an individual pair via the test points of a 3C- or 4C-type protector unit equipped with a duplex patch plug.
- ***W2HJ Test Cord*** — Used for conductor ID tone tests.
- ***W4CT Test Cord*** — Used for making IN and OUT tests.
- ***P100A and P100B Cords*** — Extensions for test adapters.

8. Connecting Blocks

8.01 Only the 6.4-inch (163 mm) wide 112-type connecting blocks are used on the ***COSMIC*** Mini DFs. The 78- and the high density 112H-type connecting blocks and the 112-type blocks designed for use on shelves 1 and 11 of the ***COSMIC*** I, IA, and IIA distributing frames are not used on the ***COSMIC*** Mini DFs.

8.02 These connecting blocks are listed by Underwriter's Laboratories as communication circuit accessories for use only with ***COSMIC*** DFs.

8.03 The 112-type connecting block (Figure 19) has a blue and white checkerboard pattern on the front of the block and is equipped with bifurcated 3-beam, quick-connect, insulation displacement terminals or wire-wrap terminals. Most connecting blocks are equipped with bifurcated or single wire-wrap terminals for cross connection. All 112-type connecting blocks contain wire-wrap terminals on the rear of the block for cable terminations.

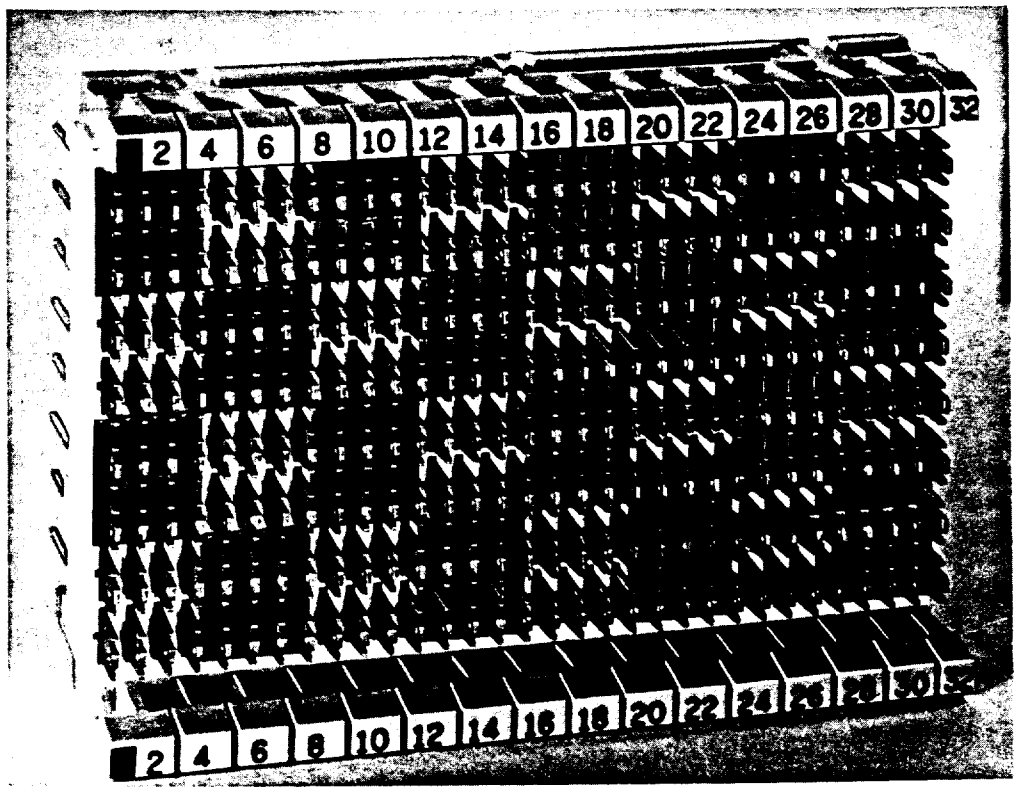


Figure 19. 112-Type Connecting Block — 128-Pair Terminal Arrangement

8.04 The 756C- and 950C-type multipurpose wire insertion tools are used to install the cross-connection wire into the terminals. The same tool can be used for inserting 24- (.5 mm) or 22-gauge (.6 mm) cross-connect wire into 3- and 4-beam insulation displacement clips.

8.05 The tool bits are available in either high-impact nylon plastic or stainless steel. The plastic bits are low cost and disposable; they wear out after several thousand insertion operations. Replacement bits are available in bags or 5 or 50.

8.06 Table K below lists the tools and replacement bits. The 950-type tools are multipurpose tools that are equipped with a wire-insertion tool, wire cutter, and wire removal tool. The 756-type tools are wire-insertion tools only. These tools replace the older 950A, 950B, 756C3, and 756C4 tools. See AT&T 201-208-103 for information on tools and aids.

Table K. Wire Insertion Tools and Bits

Apparatus Code	Ordering Comcodes	Description
950C Tool	105 564 835	Multipurpose tool equipped with a plastic bit and 5 replacement bits
950C-1 Tool Spare Parts	105 611 537	Replacement plastic bits (Qty 5)
950C-1 Tool Spare Parts	106 435 365	Replacement plastic bits (Qty 50)
950C1 Tool	106 230 543	Multipurpose tool equipped with a metal bit
950C1-1 Tool Spare Parts	106 230 568	Replacement metal bit (Qty 1)
756C5 Tool	105 564 827	Tool equipped with a plastic bit and 5 replacement bits
756C5-1 Tool Spare Parts	105 611 545	Replacement plastic bits (Qty 5)
756C5-1 Tool Spare Parts	106 435 182	Replacement plastic bits (Qty 50)
756C6 Tool	106 230 527	Tool equipped with a metal bit
756C6-1 Tool Spare Parts	106 230 535	Replacement metal bit (Qty 1)

8.07 Table L shows the applications and other information for the 112-type connecting blocks that may be used on the ***COSMIC*** Mini DFs. See AT&T 201-222-105 for information on all the 112-type connecting blocks.

Table L. 112-Type Connecting Blocks

Application	Terminal Type	Row and Column Field	Fanning Strip Color	Item Code Number	Comcode
Tie pairs (1-100)	BQC	8 x 25	White	112C1A-100	103288189
Tie pairs (1-100)	SWW	8 x 25	White	112C1AS-100	104440888
Tie pairs (1-128)	BQC	8 x 32	White	112E1D-128	103634879
Tie Pairs (1-128) (Interconnecting Equip.)	BQC	8 x 32	White	112E2D-128	106005838
Tie Pairs (129-256) (Interconnecting Equip.)	BQC	8 x 32	White	112E3D-128	106005846
Tie Pairs (257-384) (Interconnecting Equip.)	BQC	8 x 32	White	112E4D-128	106005853
Tie Pairs (385-512) (Interconnecting Equip.)	BQC	8 x 32	White	112E5D-128	106005994
Outside plant pairs (1-100)	BQC	8 x 25	Blue	112C1B-100	103288213
Outside plant pairs (1-100)	BWW	8 x 25	Blue	112C1BB-100	104440904
Outside plant pairs (1-100)	SWW	8 x 25	Blue	112C1BS-100	104448766
Outside plant pairs (1-100) (folded ***COSMIC*** IIA)	BQC	8 x 25	Blue	112G1B-100	104016878
1/1A ***ESS***™ (4:1 LCR) line equip.	BQC	8 x 16	Yellow	112C1A-64	103288205
1/1A ***ESS*** (4:1 LCR) line equip.	BWW	8 x 16	Yellow	112C1AB-64	104440870
1/1A ***ESS*** (2:1,4:1 LCR) ***5ESS***® (4:1-10:1 LCR) line equip.	BQC	8 x 16	Yellow	112C2A-64	103288262
1/1A ***ESS*** (2:1 LCR) 2/2B ***ESS*** (2:1, 4:1 LCR) ***5ESS*** (4:1-10:1 LCR) -line equip.	BWW	8 x 16	Yellow	112C2AB-64	104450192
1/1A ***ESS*** (2:1 LCR) 2/2B ***ESS***, ***5ESS*** (4:1-10:1 LCR) line equip.	BQC	8 x 32	Yellow	112E1B-128	103288296
1/1A ***ESS*** (2:1 LCR) 2/2B ***ESS***, ***5ESS*** (4:1-10:1 LCR) line equip.	BWW	8 x 32	Yellow	112E1BB-128	104447750
1/1A ***ESS*** (2:1,4:1 LCR) line equip.	BQC	8 x 32	Yellow	112E2B-128	103758140

See note/footnote at end of table.

Table L. 112-Type Connecting Blocks (Contd)

Application	Terminal Type	Row and Column Field	Fanning Strip Color	Item Code Number	Comcode
1/1A ***ESS*** (2:1,4:1 LCR) line equip.	BWW	8 x 32	Yellow	112E2BB-128	104447768
5ESS ISLU or RISLU (2-wire), ***DMS****-10/100 line equip.	BQC	8 x 16	Yellow	112C2F-64	104017330
5ESS ISLU (2-wire), ***DMS****-10/100 line equip.	BWW	8 x 16	Yellow	112C2FB-64	104447719
5ESS ISLU or RISLU (4-wire) line equip.	BQC	8 x 16	Yellow	112C3F-64	104373204
5ESS ISLU or RISLU (4-wire) line equip.	BWW	8 x 16	Yellow	112C3FB-64	104447727
5ESS line equip.,10A remote switching system	BQC	8 x 32	Yellow	112E1C-128	103556247
5ESS ISLU or RISLU (2-wire and 4-wire) ***DMS***-10/100 line equip.	BQC	8 x 32	Yellow	112E2F-128	104017348
5ESS ISLU or RISLU (2-wire and 4-wire) ***DMS***-10/100	BWW	8 x 32	Yellow	112E2FB-128	104447776
5ESS (4:1-10:1 LCR) line equip.	BQC	8 x 32	Yellow	112G1B-128†	103665212
5ESS ISLU or RISLU (2-wire)-line equip.	BQC	8 x 32	Yellow	112G2B-128†	104377429
5ESS ISLU or RISLU (4-wire)-line equip.	BQC	8 x 32	Yellow	112G4B-128†	104407879
5ESS (4:1-10:1) line equip.	BQC	8 x 32	Yellow	112J1B-128‡	104430459
5ESS metallic service unit, resistor 13A announcement	BQC	8 x 32	Beige	112G1C-128†	103749354
Misc and trunk equip. for ***5ESS*** trunk units	BQC	8 x32	Beige	112G1A-128†	103665204
DMS-10/100 Line Equip.	BQC	8 x 32	Yellow	112G1D-128‡	104199781
AXE§-10 line equip.(line interface cards 0-63) ***SYSTEM X***¶	BQC	8 x 16	Yellow	112E3F-64	104432687

See note/footnote at end of table.

Table L. 112-Type Connecting Blocks (Contd)

Application	Terminal Type	Row and Column Field	Fanning Strip Color	Item Code Number	Comcode
AXE-10 line equip. (line interface cards 64-127), ***SYSTEM X***	BQC	8 x 16	Yellow	112E4F-64	104432695
AXE-10 line equip., ***SYSTEM X***	BQC	8 x 32	Yellow	112E3F-128	104401302
GTD*-5 line equip.	BQC	8 x 25	Yellow	112C1F-100	104017322
SMAS 5A (facility side) quadrant A	BQC	8 x 24	Violet	112C1A-96	103634812
SMAS 5A (facility side) quadrant B	BQC	8 x 24	Violet	112C2A-96	103634820
SMAS 5A (facility side) quadrant C	BQC	8 x 24	Violet	112C3A-96	103634838
SMAS 5A (facility side) quadrant D	BQC	8 x 24	Violet	112C4A-96	103634846
SMAS 5B (facility side) (00-49)	BQC	8 x 25	Violet	112C4A-100	103634861
SMAS 5B (facility side) (50-99)	BQC	8 x 25	Violet	112C5A-100	103634853
Misc applications, ***SLC***®-96 carrier, shielded tie pairs from SDDF	BQC	8 x 25	Beige	112C2E-100	103815510
Misc applications, ***SLC***-96 carrier, shielded tie pairs without shield grounds	BQC	8 x 25	Beige	112C2EB-100	104447693
Misc applications, ***SLC***-96 carrier, shielded tie pairs without shield grounds	BQC	8 x 25	Beige	112C2ES-100	104447701
Misc Equipment	BWW	8 x 32	Yellow	112A1A-128	106005812
Misc Equipment	BWW	8 x 32	Yellow	112A1AB-128	106005820

See note/footnotes at end of table.

Table L. 112-Type Connecting Blocks (Contd)

Application	Terminal Type	Row and Column Field	Fanning Strip Color	Item Code Number	Comcode
Misc. and trunk equip.	BQC	4 x 32	Beige	112E1A-64	103317905
Misc and trunk equip. on CMDF, TMDF,high freq. ***SLC***,SMAS on SMDF, SMDF ***5ESS*** trunk units	BQC	8 x 32	Beige	112E1A-128	103288288
	BWW	8 x 32	Beige	112E1AB-128	104447735
	SWW	8 x 32	Beige	112E1AS-128	104447743
Carrier pairs with shield terminations	SWW	4 x 25	Orange	112C1CS-50	104447651

Note: The following abbreviations are used in this table:

BWW - Bifurcated Wire Wrap
SWW - Single Wire Wrap
LCR - Line Concentration Ratio (:)
SDDF - Subscriber Digital Distributing Frame
CMDF - Combined Main Distributing Frame
ISLU - Integrated Service Line Unit
BQC - Bifurcated Quick Clip
ESS - Electronic Switching System
SMAS - Switched Maintenance Access System
SMDF - Subscriber Main Distributing Frame
TMDF - Trunk Main Distributing Frame
RISLU - Remote Integrated Service Line Unit.

* Trademark of Northern Telecom
† Wired to four 32-pair 711-type connectors
‡ Wired to four 32-pair TRW†† (or equiv.) connectors
§ Trademark of Ericsson
¶ Trademark of Plessey
** Trademark of GTE.
†† Trademark of TRW

KS-22616, L1 Connecting Block Removal Tool

8.08 The KS-22616, L1 connecting block removal tool is a hand tool used to unseat the 112-type connecting blocks from the ***COSMIC*** Mini DFs (Figure 20).

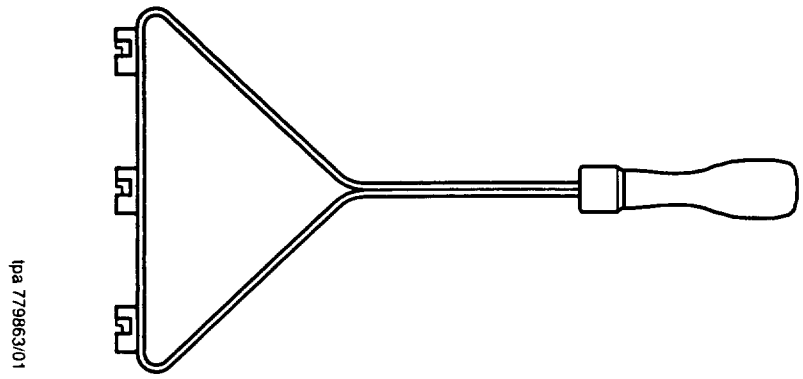


Figure 20. KS-22616, L1 Connecting Block Removal Tool

9. Cross-Connect Wire

9.01 Cross-connect wire is used to cross-connect facilities and equipment on the ***COSMIC*** DF Systems. Cross-connect wire may be used with solder, solderless wrap, or insulation displacement terminals.

A. DT-Type Terminal Copper (Irradiated PVC)

9.02 DT-type wire is unshielded and has a tinned copper conductor and irradiated polyvinyl chloride (IPVC) insulation, and its overall diameter is 0.036 inch (.9 mm). It is recommended for all ***COSMIC*** distributing frames.

B. DU-Type Tinned Copper (Semirigid PVC)

9.03 DU-type wire is unshielded and has tinned copper conductors with a single layer of semirigid PVC insulation. It is a lower cost alternative to DT-type wire.

C. P6-Type (Braid Shield) and P7-Type (Foil Shield)

9.04 P6- and P7-type wire is shielded. Shielded wire is used for carrier system connections.

9.05 P6-type wire has dual insulation of irradiated PVC over semirigid PVC, a braided shield, and a PVC jacket. Its outside diameter is 0.18 inch (4.5 mm).

9.06 P7-type wire is similar to P6-type wire but has a longitudinal polyester-aluminum foil overshield and a 24-gauge (.5 mm) drain wire. The P7-type wire is recommended because of its smaller [0.16 inch (4 mm)] outside diameter.

10. Miniature Test/Talk Systems

10.01 The ED-6C110-10, Group 23, miniature test/talk hardware is the standard test/talk system for the ***COSMIC*** Mini DFs.

10.02 The test/talk system used on this frame is a miniature, multichannel communication system. It provides frame testing capability and a communication link between the distributing frame and the local test desk (LTD), other distributing frames, and loop-plant personnel outside the office.

10.03 The miniature test/talk system contains a transmitter and battery test panel, as well as a jack panel equipped with talk and test jacks (Figure 21). The equipment is usually mounted on shelf number 3 of a cross-connect bay.

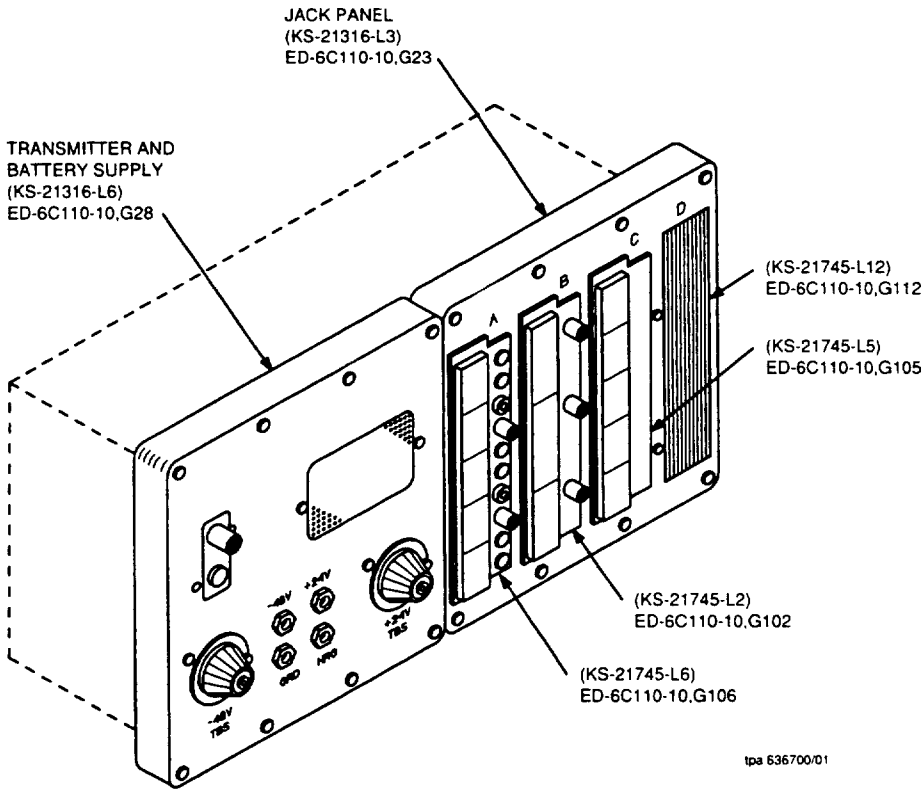


Figure 21. ED-6C110-10, Group 23 Miniature Test/Talk Panels

11. Frame Accessories

Filler (Cover) Panels for Unused 307-Type Connector Positions

11.01 A framework filler panel (Comcode 105583116) is available to cover openings where 307-type connectors are to be installed at a later date on the ***COSMIC*** Mini Distributing frame. The panel is 7-7/8 inches (200 mm) high and 6-3/8 inches (162 mm) wide and snaps into the framework, therefore requiring no mounting hardware.

Bay Shelf Designation Strips (Label Holder)

11.02 ED-6C314-70, Group 7 designation strips (Figure 22) provide mounting space for designation labels (ED-6C144-12) that identify the circuits terminated on each terminal of a connecting block.

11.03 Designation strips (also called Flip Gates) are available for those shelves with connecting blocks that do not have pre-stamped circuit identification. Examples include blocks terminating trunk and toll equipment.

ED-6C144-12 Designation Strip Labels (For Bay Shelf Designation Strips)

11.04 Sets of labels (Table M) are available for field-stenciling. These labels mount on the bay shelf designation strip and provide room for high-level identification (relay rack, bay, shelf, and mounting plate number).

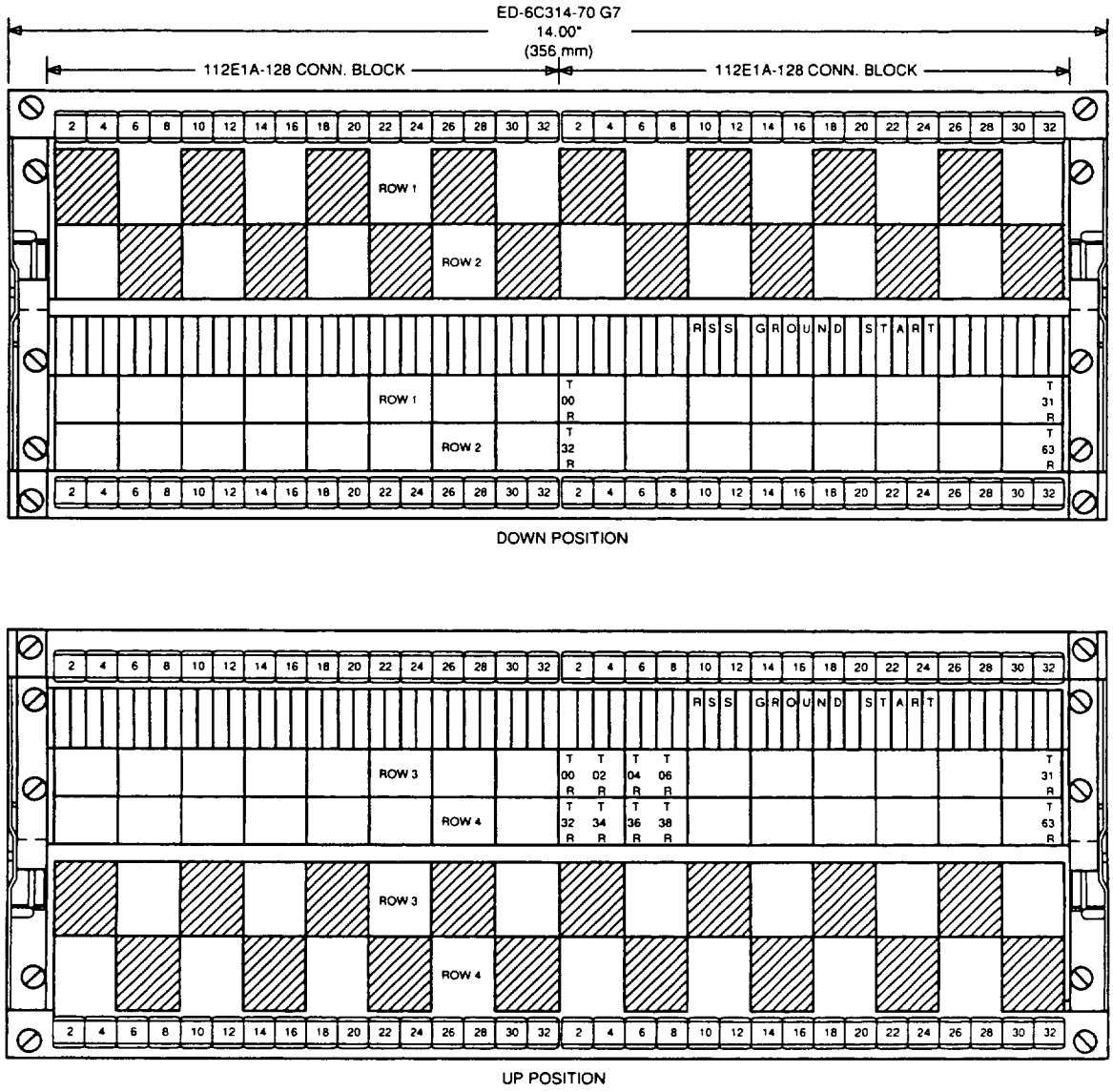


Figure 22. ED-6C314-70, Group 7 Bay Shelf Designation Strip Label Holder for *COSMIC* Mini DFs

Table M. ED-6C144-12 Labels

Application	ED-6C144-12	Comcode
64-Pair Blocks (16 per shelf) Shelves 2-10	Group 1	104437710
96-Pair Blocks (10 per shelf) Shelves 2-10	Group 2	104437728
100-Pair High Density 112H-Blocks (12 per shelf) Shelves 2-10	Group 3	104400379
50-Pair High Density 112H-Blocks (12 per shelf) Shelves 1 and 11		
100-Pair Regular Density Blocks (10 per shelf) Shelves 2-10	Group 4	104211065
50-Pair Regular Density Blocks (10 per shelf) Shelves 1 and 11		
128-Pair Blocks (10 per shelf) Shelves 2-10	Group 5	104366653
64-Pair Blocks (10 per shelf) Shelves 1 and 11		

Note: Each label set provides upper and lower labels for 3 blocks.

12. Engineering

COSMIC Mini DF Layout Arrangement

12.01 A ***COSMIC*** Mini DF frame arrangement is typically one, two, or three cross-connect/protection bays placed side-by-side to form a facility module, and one or two cross-connect bays placed side-by-side to form an equipment module. A vertical wiring trough is placed between the equipment and facility module. Figure 23 shows a typical ***COSMIC*** Mini DF layout.

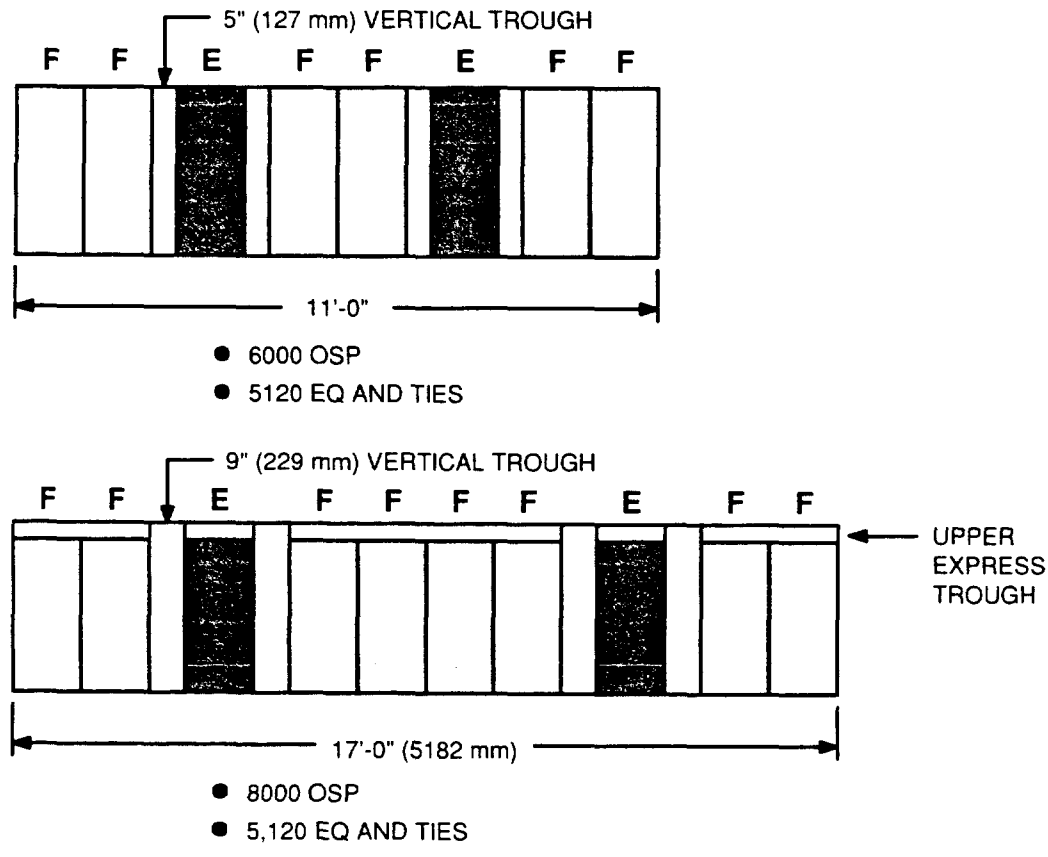


Figure 23. *COSMIC* Mini DF Frame Layout

12.02 Two choices of vertical wiring troughs are available; either ED-6C311-30, Group 3, which is a 5-inch (127 mm) wide version, or Group 6, which is 9-inches (229 mm) wide. Group 3 is recommended when no more than two bays are located side-by-side without an intervening vertical trough. Group 6 is recommended whenever three or more bays are located side-by-side to accommodate the larger number of jumpers.

12.03 The optional upper express trough (ED-6C314-70, Groups 10 and 11) are recommended for frames exceeding 15,000 total terminated pairs. The trough adds 5-inches (127 mm) to the normal 7-foot (2134 mm) frame height.

12.04 Another possible arrangement, which provides a higher termination density, is to use only the cross-connect capability of the ***COSMIC*** Mini DF, and a separate protector frame for sneak-current and/or over-voltage protection of the outside plant cables. The protector frame is typically an AT-9049 frame or a slide drawer assembly. The protector frame terminates outside plant stub cables, and is connected to connecting blocks on the ***COSMIC*** Mini DF via 100-pair, 26-gauge (.4 mm) strap cables, which in turn are terminated on 112-type connecting blocks. The ***COSMIC*** Mini DF framework in this arrangement consists of cross-connect bays (ED-6C311-30, Group 5) and vertical troughs (Groups 3 and 6), typically arranged into alternating modules for equipment and outside plant terminations. The advantage of this arrangement over the "standard" ***COSMIC*** Mini DF is that more terminations can be placed into a shorter lineup.

Mechanized Engineering Support

12.05 Mechanized Engineering and Layout for Distributing Frames (MELD) is the latest AT&T engineering system for laying out ***COSMIC*** main distributing frames. The current version supports all ***COSMIC*** applications, and some special ***COSMIC*** mini applications. MELD spreads and inventories outside plant cable, tie pairs, and line equipment for major digital switches, including ***5ESS*** ISDN and analog switches. MELD produces the engineering drawings, directories, frame labels, and Operation Support Systems (OSS) tape maintains an ongoing history of all the frames and erminations engineered in a wire center.

12.06 MELD's OSS magnetic tape is used for initializing a mechanized frame administration system such as Computer System for Main Frame Operation (COSMOS) and Computerized Frame Administration System (CFAS). ***COSMIC*** Mini DFs that are engineered by MELD and administered by COSMOS or CFAS can accommodate up to 50,000 terminations. Moreover, such arrangements with 9-inch (229 mm) wide vertical troughs accept standard MELD ***COSMIC*** frame labels for outside plant, tie, and line equipment terminations (Figure 24).

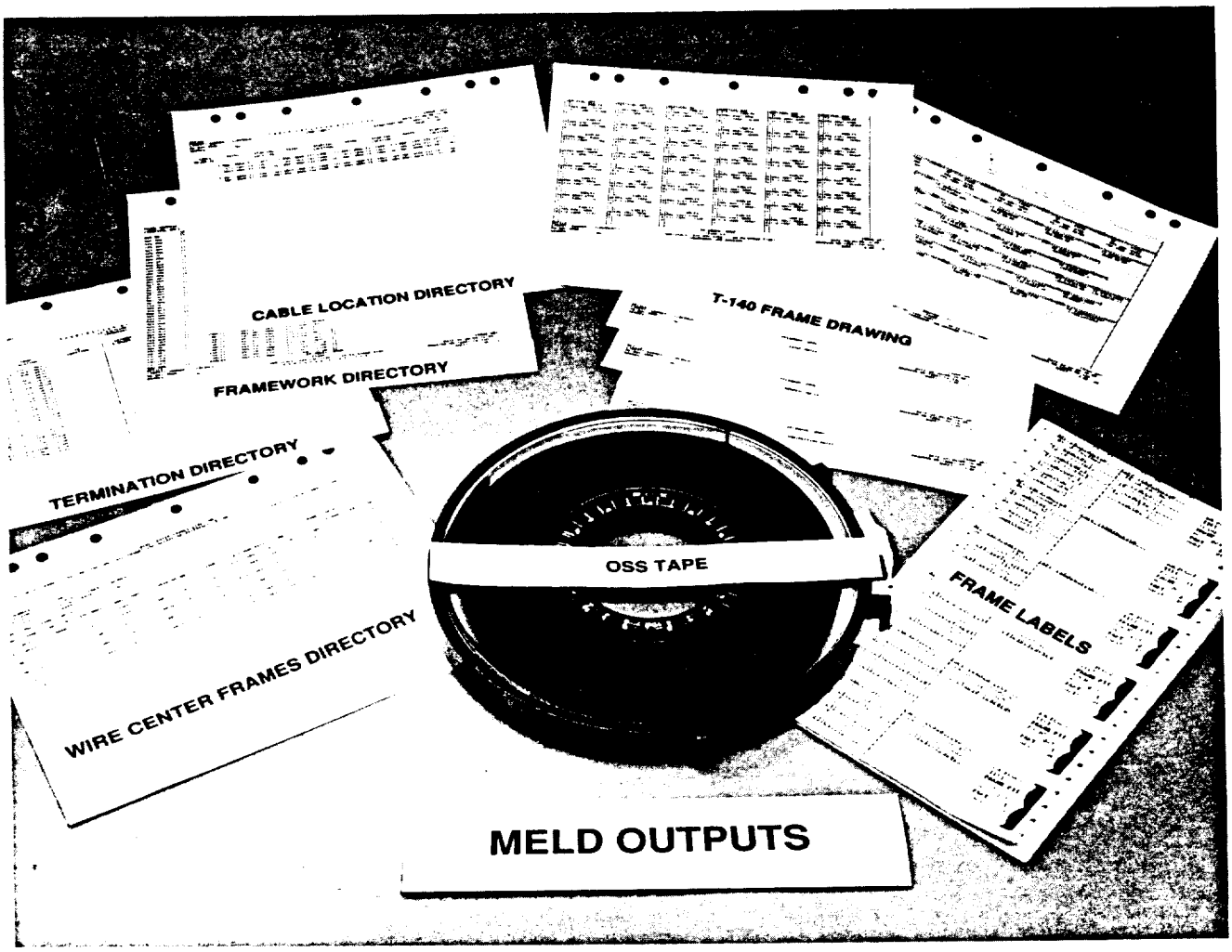


Figure 24. MELD Outputs

13. Frame Operations

Administration System

CAUTION:
Sprays and cleaners can damage plastic parts. Do not apply any sprays or cleaners to products that have not been approved. Be especially careful not to expose any plastic parts to chemicals containing trichloroethane, such as certain cleaning fluids and lubricant sprays.

13.01 The Bellcore COSMOS and the AT&T Computerized Frame Administration System (CFAS) provide frame orders for the frame technician specifying the cross-connects to be installed or removed. When an order involves frame terminated facilities, the frame order shows all facilities in the circuit that are maintained in the data base and identifies the facilities being added to, removed from, and reused in the circuit.

13.02 The frame order also includes the following items:

- Service order number and type
- Frame work due date
- Frame location of all frame terminated facilities including Location Oriented Identification System (LOIS)
- Remarks.

13.03 If necessary, the system will assign tie pairs between any specified frame locations, assigning short jumpers and TPDF ties, if required. A report on the availability of tie pairs between any or all frame zones can also be provided.

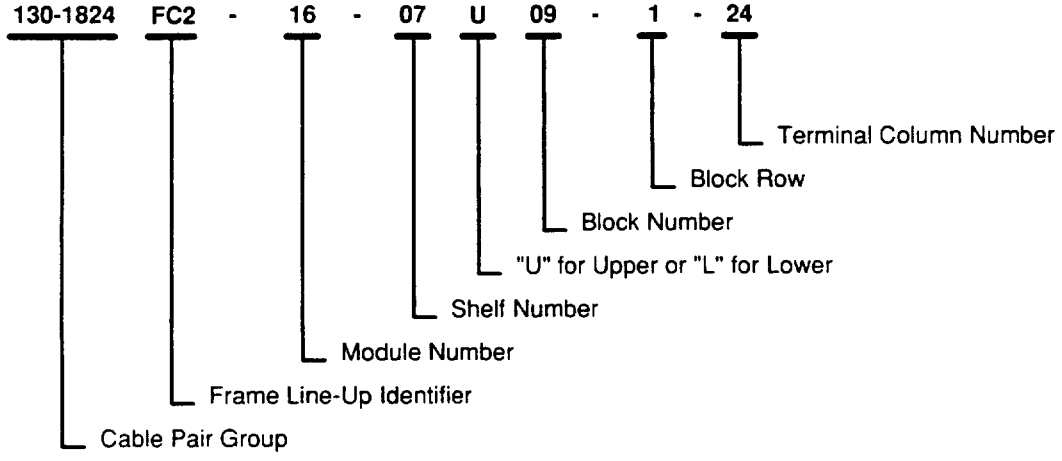
13.04 After an order is completed, service order information including the completion date, the facilities involved, and the frame technician initials are usually retained in the system for reference for a period of time set by the system administrator.

Running Jumpers

A. Location Oriented Identification System (LOIS)

13.05 The LOIS designation provides the exact frame locations of the terminals and is keyed to the geometry and identification characters provided on the ***COSMIC*** Mini DF connecting blocks. All work and service orders controlled by COSMOS or CFAS use LOIS to instruct frame personnel on jumper termination locations. The character "U" or "L" is inserted between the module shelf numeric designation and the connecting block numeric designation. The character "U" or "L" indicates the direction from which the connecting block is entered by the jumper wire (that is, from the upper or lower fanning strip). The alpha character "U" is shown when the connecting block terminal row is 1 or 2 or when the module shelf number is 11, and the alpha character "L" is shown when the connecting block terminal row is 3 or 4 or when the module shelf number is 1.

13.06 The LOIS format is as follows:



Service Order Example

B. Wire

13.07 The DT-type 24-gauge (.5 mm) wire is the recommended jumper wire to be used on the ***COSMIC*** distributing frames. The DU-type 24-gauge (.5 mm) wire may be used where less rigid wire is desired. For applications requiring shielded jumper wire (such as T-carrier circuits for subscriber loop carrier systems), P6-type (braided shield) or P7-type (foil shield) wire is recommended. Jumper wire is available in various color combinations. Recommended colors for Plain Old Telephone Service (POTS) is yellow/blue and special services is yellow/red.

C. Amount of Slack

13.08 Approximately 10 inches (254 mm) of slack should be left in all jumpers on ***COSMIC*** Mini DFs. Slack must be dressed back from both terminations (equipment and cable) through the fanning strips, horizontal wiring channels, and into the vertical trough.

13.09 A convenient method of determining the proper amount of slack is to measure two and a half shelves above or below the terminal shelf where the terminations are to be made. This slack should then be dressed into the vertical wiring trough.

D. Short Jumpers

13.10 A short jumper is a cross-connection wire between any two locations on the same or adjacent modules. Short jumpers use the vertical troughs between modules, but ***not*** the upper or lower express troughs. Jumpers between adjacent modules should never be routed in the express trough.

13.11 The procedure used in running short jumpers is as follows:

Step 1

(a) Using the 950- or the 756C-type wire insertion tool, connect the jumper into the designated terminals (Figures 25, 26, and 27). Maintain the twist in the jumper wire as close to the terminal as possible.

(b) Dress the jumper into the block fanning strip that is closest to the terminals.

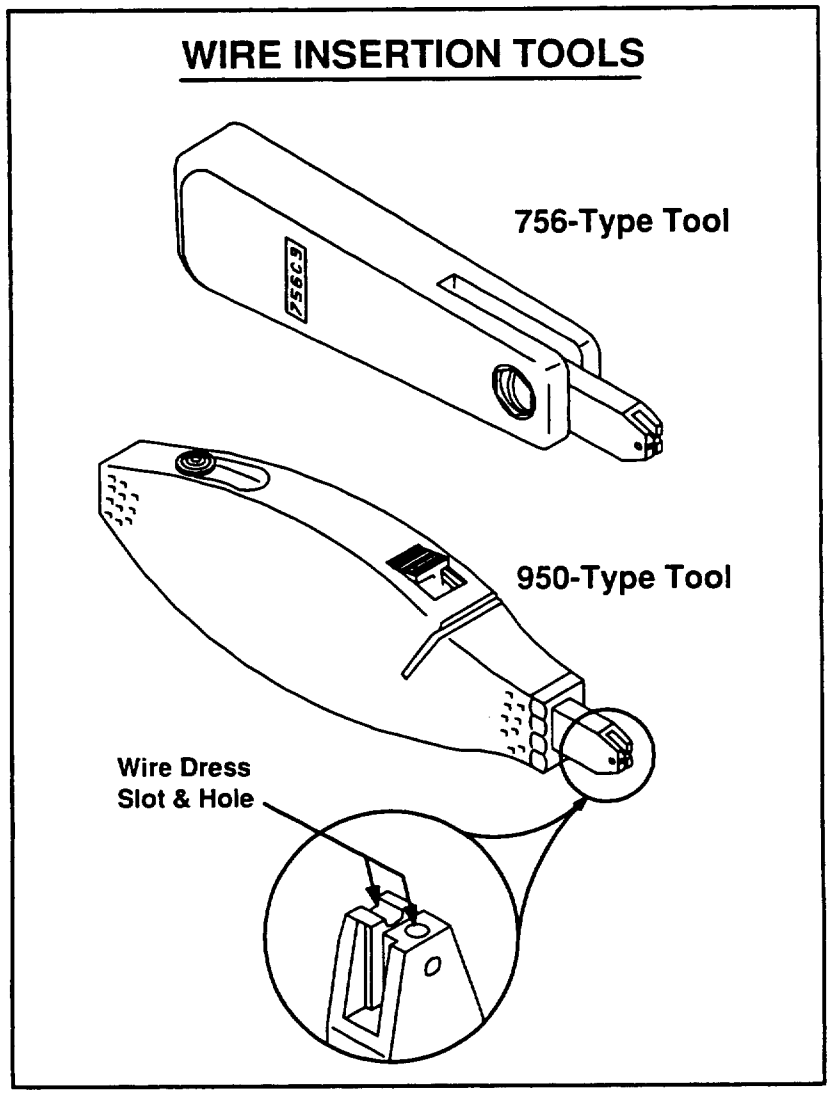


Figure 25. 950C- and 756C-Type Wire Insertion Tools

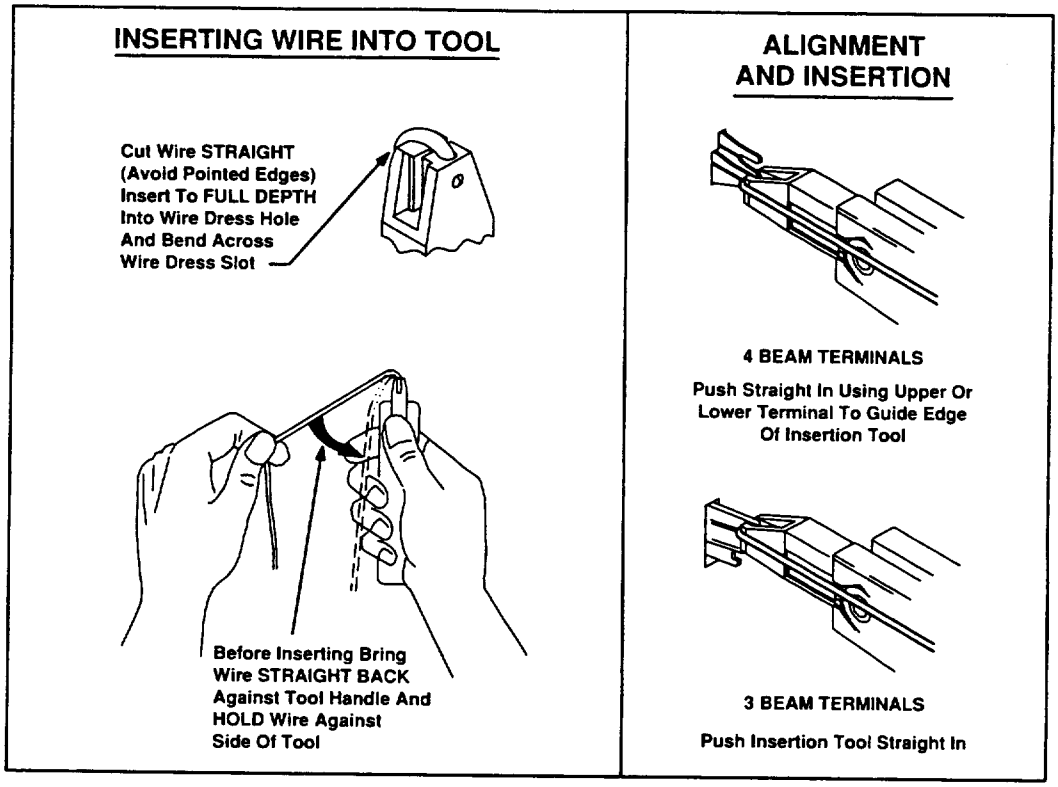


Figure 26. Inserting Jumper Wire in Wire Insertion Tool

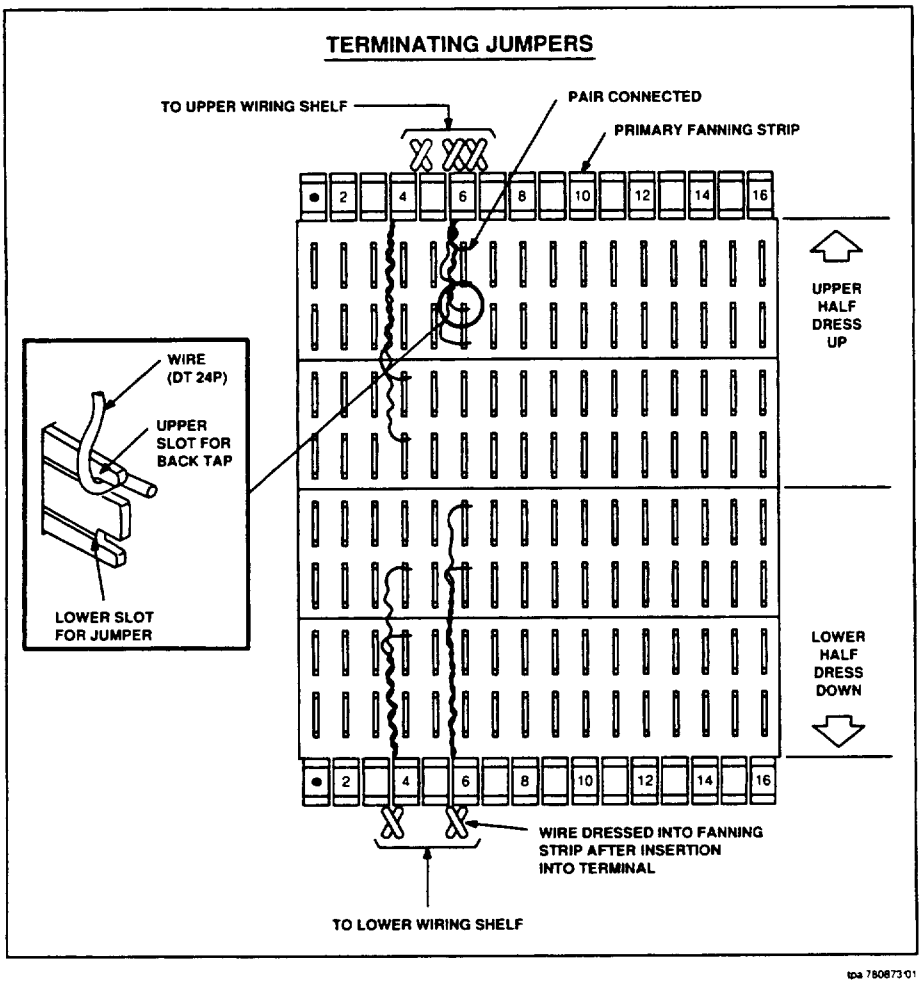


Figure 27. Terminating Jumpers on 112-Type Connecting Block

Step 2

(a) Then dress the jumper into the frame fanning strip and into the vertical trough, working toward the second termination. The jumper must be run behind the jumper wire retainer.

(b) Run the jumper up or down (as required) into the vertical trough until reaching the proper horizontal shelf.

(c) Place the jumper behind the wire retainer bars.

NOTE:
If LOIS indicates "U" (upper), run the jumper wire on the shelf above the indicated connecting block shelf, and if LOIS indicates "L" (lower), run the jumper wire on the shelf below the indicated connecting block shelf.

(1) Run the jumper wire on the horizontal shelf, behind the jumper wire retainer. Leave about 10 inches (254 mm) of slack, and then cut the jumper wire.

(2) Using the 950C- or the 756C-type wire insertion tool, connect the jumper wire to the tip and ring terminals, then into the block, and then into the frame fanning strip.

Step 3

(a) Dress the slack into the vertical trough.

E. Long Jumpers

13.12 A long jumper is a cross-connection between any two horizontal terminal wiring shelves of nonadjacent modules using both the vertical trough between the modules and the upper or lower horizontal express troughs.

13.13 To run long jumpers, perform the following procedures:

Step 1

(a) Locate the assigned terminal on the lower numbered module.

(b) Using the 950C- or the 756C-type wire insertion tool, connect the jumper to the designated terminals (Figures 25, 26, and 27).

Step 2

(a) Dress the jumper on the shelf, working toward the second termination on the higher numbered module.

(b) Place the jumper into the vertical trough behind the jumper wire retainers.

(c) Run the jumper to the proper express trough by proceeding as follows:

- If the shelf location of the higher numbered module is in shelves 1 through 5U, run jumper upward in the vertical trough to the upper express trough.
- If the shelf number of the higher numbered module is shelves 6L through 10, run the jumper downward in the vertical trough to the lower express trough.

NOTE:
This method of choosing express troughs should cause both the upper and lower express troughs to be about equally filled.

(d) Dress the jumper behind the wire retainer bars.

(e) Run the jumper wire in the upper or lower express trough to the vertical trough that is immediately prior to the final terminal location regardless of the terminal location within the module.

(f) If the upper express trough is used, place jumper behind the jumper support bar.

(g) Run the jumper up or down the vertical trough (as required) until reaching the proper horizontal shelf.

(h) Place the jumper behind the jumper wire retainer bars.

If LOIS indicates "U" (upper), run the jumper wire on the shelf above the indicated terminal connector; and if LOIS indicates "L" (lower), run the jumper wire on the shelf below the indicated terminal connector.

To determine whether the upper or lower express trough should be used, it is recommended that the procedure described previously in Step 2(c) be followed. However, if the initial cross-connections on the frame did not use this procedure but instead used the facility location to determine which express trough to use, this procedure should be continued. Be consistent; use one method or the other to determine which express trough to use.

To complete the routing of the jumper, proceed as follows:

(i) Run the jumper wire on the horizontal shelf and through the appropriate frame fanning strip.

(j) Before cutting the jumper wire, allow approximately 10 inches (254 mm) of slack. Dress the slack back through the frame fanning strip along the horizontal shelf and into the vertical trough.

(k) Place the wire into the block fanning strip.

(l) Using the wire insertion tool, connect the jumper wire to the tip and ring terminals.

NOTE:
Once jumper wires are connected and are within the block fanning strip, avoid removing them from the fanning strip for identification or tracing. This could cause the wire to break at the terminal because of torsional stress.

Step 3

(a) Dress the slack into the vertical trough.

Installing Connections

A. Installing Cross-Connect Wires into Connecting Block Terminals

13.14 AT&T 800-612-164 covers the procedure for terminating shielded cable. When installing nonshielded cross-connect wire into connecting block terminals, use the following procedure:

⇒ NOTE:
Before reconnecting previously connected wires, cut off the broken insulation at the end of the wire.

(1) Determine if the terminals to be connected appear in the upper or lower half of the connecting block.

⇒ NOTE:
Use the upper fanning strip for terminals in the upper half of the block, and use the lower fanning strip for terminals in the lower half of the block.

(2) Locate the block column number in which the terminal appears.

(3) Connect the wire on 112-type connecting blocks as follows.

(a) Grasp the wire insertion tool in such a way that pressure will be applied with the palm of the hand while holding the tool loosely with the insertion head in a vertical position.

(b) Insert the tip (or ring) conductor to full depth into wire dress hole and bend across face through wire dress slot, and bring wire straight back against tool handle (Figure 26).

(c) Position the tool directly over the lower slot of the terminal and gently push forward until the tool is in proper alignment between the second and third beams on the terminal. Push the tool forward until it bottoms on the terminal. At this point, the wire has been inserted to the proper depth (Figure 27).

(d) Withdraw the tool straight out from the terminal. If unusual pressure is encountered, inspect the connection. If the connection is bad, remove the wire with the wire removal tool. Clip the end of the poorly connected wire and reconnect it.

(e) Perform the same Steps (a) through (d) for the mating wire of the pair, and dress the pair of wires into the proper block and frame fanning strip slot.

B. Back-Tap Connections

13.15 Adding a jumper to a terminal on which another jumper already exists is sometimes called a back tap. It is usually done to add a new facility or equipment. Upon removal of the original jumper, the second jumper provides a new circuit configuration.

13.16 To install the second jumper (back-tap) on the connecting block terminals, repeat the previous procedure except insert the second jumper into the upper slot of the terminal between the first and second beam (Figure 27).

Removing Connections

⚠ CAUTION:
If tools other than the 980A or 950C are used, connections on adjacent terminals might be disturbed or the reliability of the terminal (to make a good connection) might be reduced thus affecting service.

13.17 To remove wires from the terminal block, proceed as follows:

(1) Place the tool hooks around the terminal beam behind the wire.

(2) Using the wire removal tool as shown in Figure 28, pull the wire from the terminal and away from adjacent terminals.

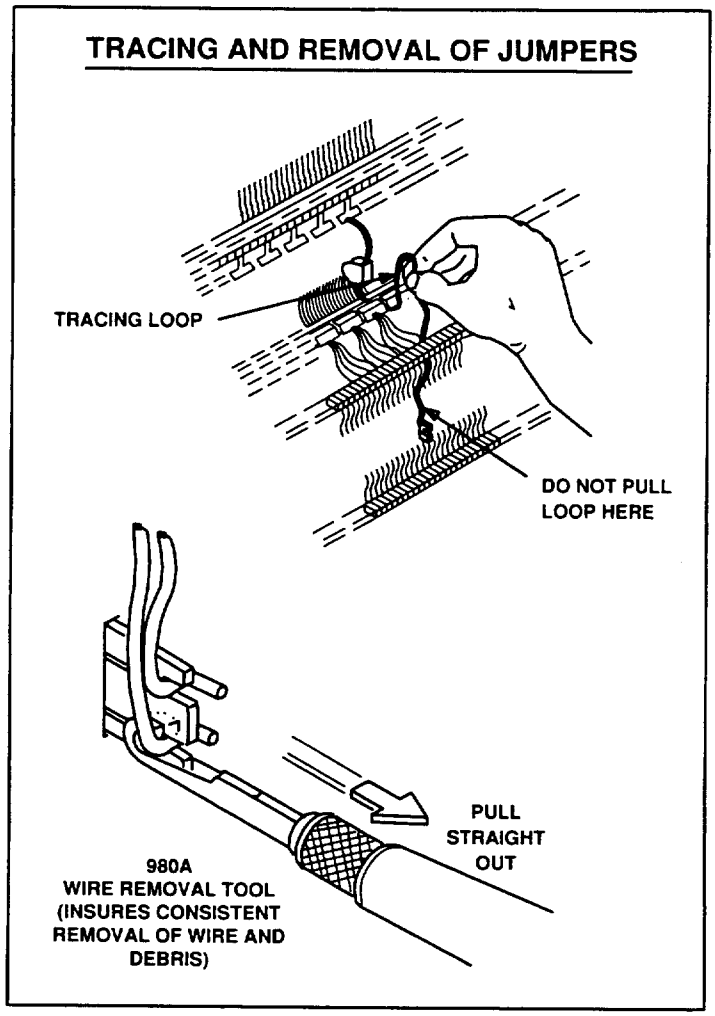


Figure 28. Tracing and Removal of Jumpers (112-Type Connecting Block)

Testing and Verifying Circuit

13.18 Test connectors, adapters, and test cords are used to connect to the test terminal fields of connectors to test outside plant cable pairs. Multiple testing or one-at-a-time testing is provided.

A. 299A Test Adapter for 307-Type Connectors

13.19 The 299A test adapter (Figure 29) is used to connect the 100-pair protector panel of the 307-type connector to automatic pair identification equipment. The test adapter makes contact with the outside plant T and R conductors through the test points in the top of the 4C-type protector units. If the 307-type connector is not equipped with the protector units, the contacts in the test adapter make contact with the outside plant T and R conductors through their respective protector sockets in the protector panel. The test adapter contains 200 (100 pairs) spring-loaded contacts that are internally connected to two 50-pair, 15-foot (4572 mm) long cables. Each cable terminates on two 25-pair KS-19162, L4 (or equivalent) connectors for attachment to automatic pair identification equipment. The four connectors are numbered 1-25, 26-50, 51-75, and 76-100 to identify the respective cable pair count. A separate pick test panel is furnished with the 299A test adapter for single or pair-at-a-time testing.

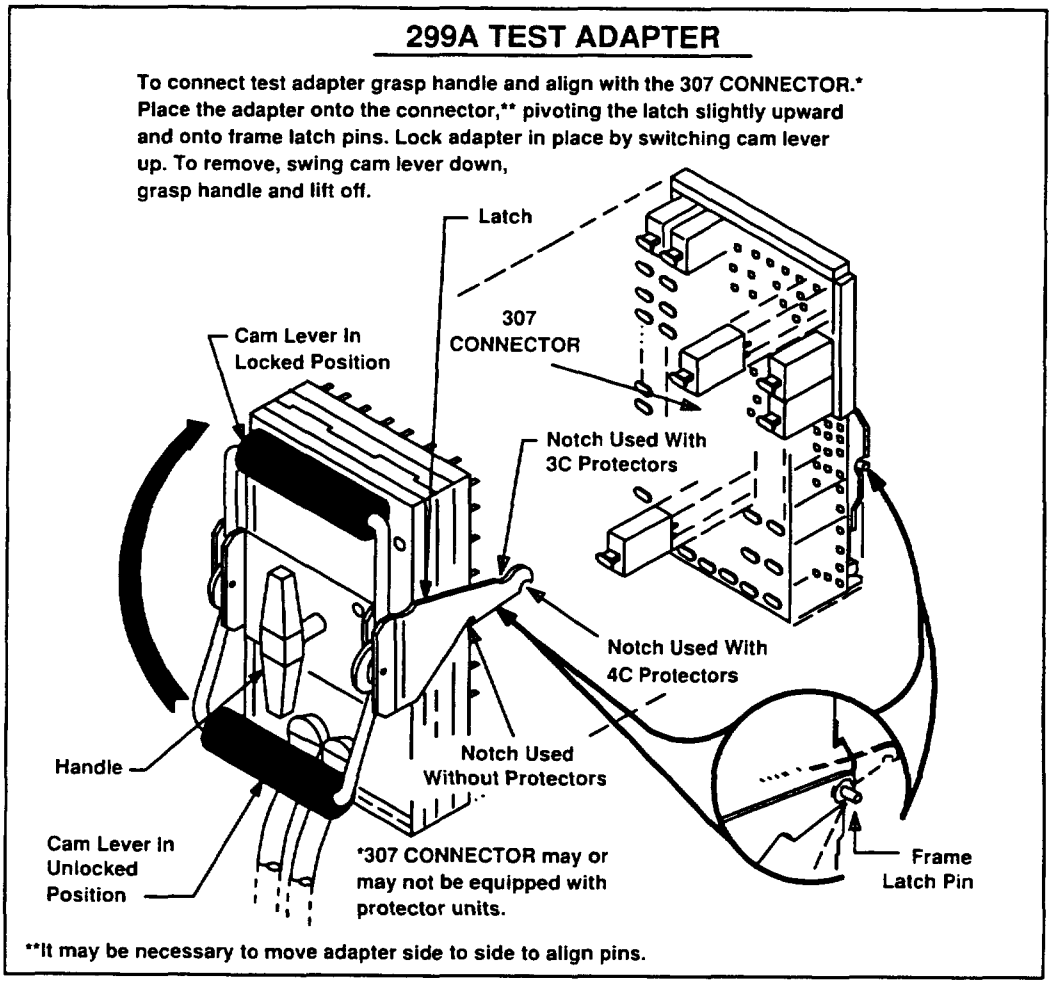


Figure 29. Mounting the 299A Test Adapter

B. Pick Test Panel Assembly

13.20 The pick test panel assembly (Figure 30) is furnished with the 299A and 299B test adapters to access the 100-pair field of the adapters for single or pair-at-a-time testing. The four KS-19162, L4 (25-pair) connectors on the adapters are attached to the pick test panel, tone is applied, and a B test point tester is used to identify individual pairs.

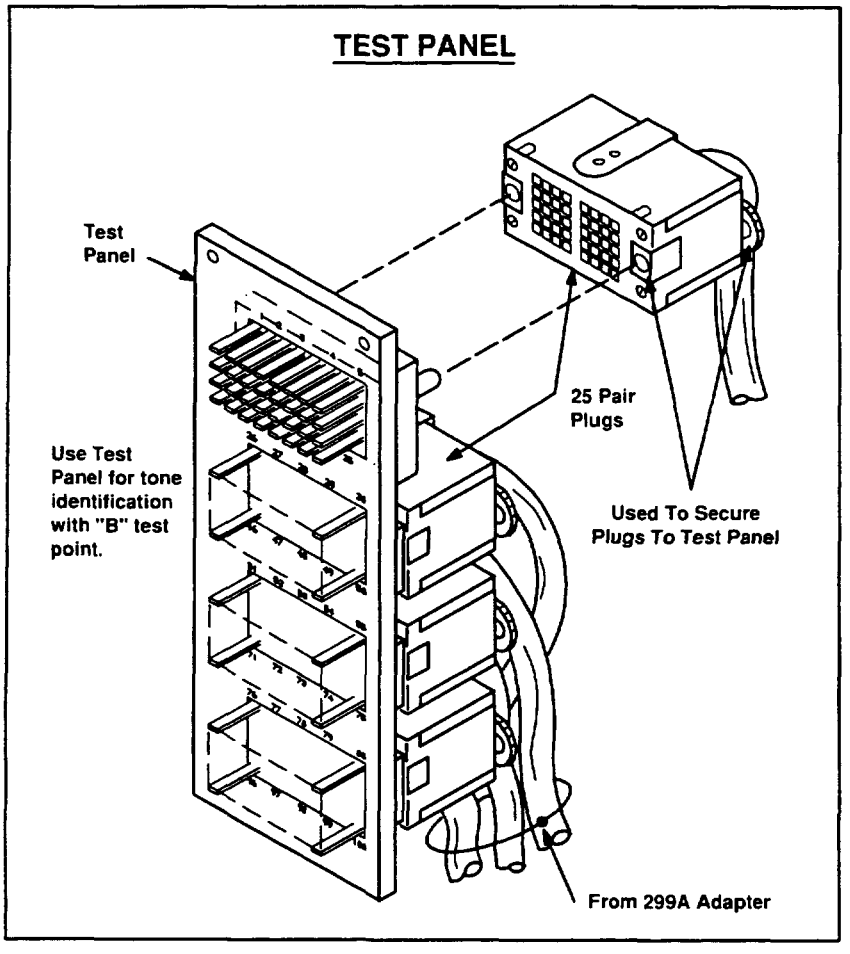


Figure 30. Mounting 299A Test Adapter Connectors on Pick Test Panel

C. P2FL Test Cord

13.21 The P2FL test cord (Figure 31) 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 the test points of a 4C-type protector unit on the 307-type connector.

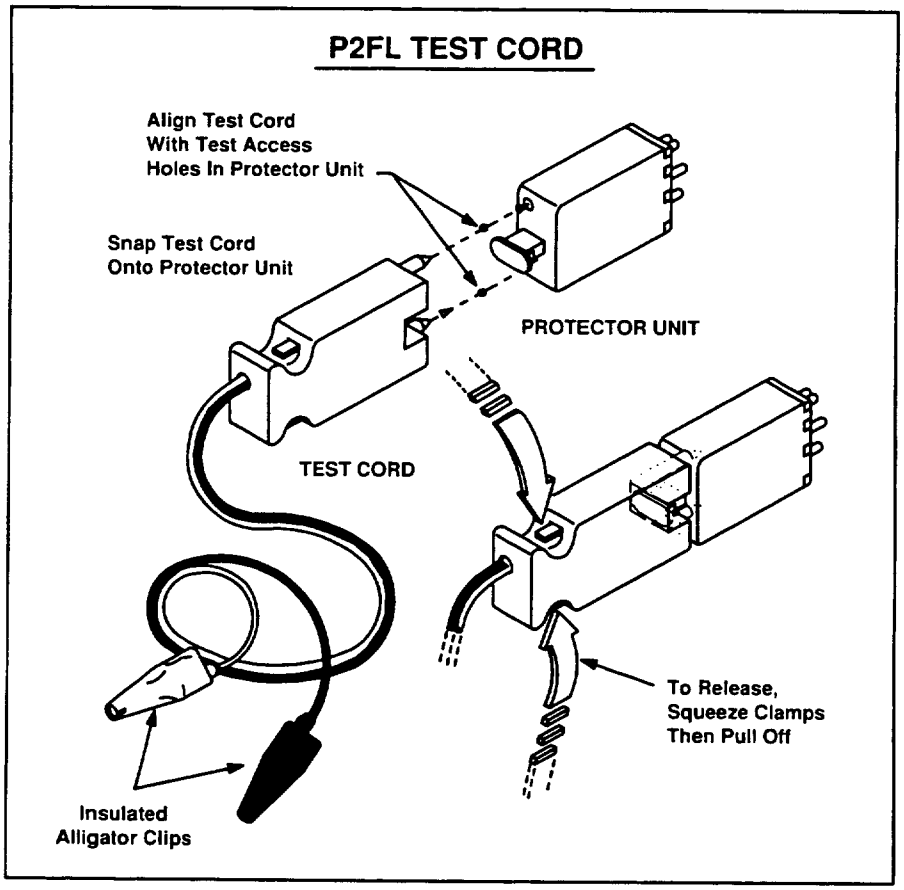


Figure 31. Mounting the P2FL Test Cord on Protector Unit

Monitoring Jumper Pileup

13.22 The pileup of jumpers in the upper and lower express troughs of the frame should be monitored regularly to ensure that jumpers are routed properly and that dead jumpers are removed. This can significantly help to extend the life of the frame. The following operations and administrative guidelines using reports from the administrative system can help avoid jumper congestion and minimize long cross-connections.

A. Operations Guidelines

(1) Verify that jumpers are routed correctly and that the proper amount of slack is in the vertical trough.

(2) Remove disconnected jumpers.

(3) Monitor jumper fill in the express troughs.

(4) If jumper pile-up becomes excessive, one or more of the following should be implemented:

(a) Initiate jeopardy reports to force short jumpers.

(b) Remove Dedicated Inside Plant (DIP) restrictions.

(c) Perform short jumper line equipment transfers.

(d) Alert the Central Office Engineer to start corrective action (additional tie cables or line equipment).

B. Administrative Guidelines

13.23 The following steps can help alert the CO supervisor and/or engineer to situations that may contribute to excessive jumper pileups in the express troughs of the frame, and hence, potentially troublesome operations.

(1) Obtain regular reports on Out of Zone (for example, "long") jumpers.

(2) Track areas of potential express trough congestion.

(3) Tabulate the effects of jumper "churn." An existing frame will eventually balance itself through continuous cable throw and subscriber disconnect activity. This process is often referred to as ***frame churning***; it represents the equivalent retermination of every circuit over a two- to five-year period.

(4) Obtain reports on equipment availability. Lack of equipment often forces long jumpers.

(5) Consider reducing the percentage of DIPs to increase the availability of switching equipment.

(6) Relax switch load balance rules to increase the percentage of short jumpers.

(7) Set administrative search parameters (such as the "M" number in COSMOS) equal to the lineup length to reduce intralineup tie pair usage.

(8) Use line equipment transfers to convert long jumpers to short.

14. Maintenance

Connecting Block Repair and Replacement Procedures for *COSMIC* Mini DFs

A. Terminal

14.01 Replace defective terminal as follows:

(1) Remove the cross-connection wire(s) from the defective terminal, using the 980A wire removal tool or the 950C wire insertion and removal tool.

(2) The connecting block must be removed from the wiring shelf. Use the KS-22616 tool and proceed as follows:

(a) Insert the prongs of the tool into three slots on the top of the fanning strip. There are three groups of three slots. Use the rightmost slot of each group.

(b) Press down until the three prongs of the tool are seated properly in the slots.

(c) The tool handle is offset in an upward direction. Rotate the handle downward until the three tangs on the fanning strip disengage from the wiring shelf.

(d) Lift the connecting block up slightly to disengage the bottom fanning strip, which is slotted lengthwise, from the track on the wiring shelf track.

(3) Remove the cable wire(s), using the KS-20827 wire-unwrapping tool.

(4) Use a pair of long-nose pliers to twist the terminal at its base until it breaks. The remainder of the terminal can then be easily pulled out from the front of the block using the long-nose pliers.

(5) Place the new terminal into the front of the block with pliers and using a slight pressure, push the terminal into the block until it is seated properly (indicated by a "click").

(6) Use pliers at the rear of block to twist terminal slightly either to the left or right to lock terminal in place.

(7) Reconnect the cable wire(s) on the new terminal.

(8) Reinstall the connecting block on the wiring shelf by first engaging the grooved bottom fanning strip on the wiring shelf track. Next, push the upper fanning strip against the shelf until the three fanning strip tangs snap into place.

(9) Reinsert the cross-connection(s) into the new terminal using the 756C-5 wire-insertion tool, or the 950C wire insertion and removal tool.

B. Fanning Strip

14.02 Replace fanning strip as follows:

(1) The cross-connections must be removed from the fanning strip one-way gates.

(2) The connecting block must be removed from the wiring shelf. Use the KS-22616 tool and proceed as follows:

(a) Insert the prongs of the tool into the three slots on the top of the fanning strip. There are three groups of three slots. Use the rightmost slot of each group.

(b) Press down until the three prongs of the tool are seated properly in the slots.

(c) The tool handle is offset in an upward direction. Rotate the handle downward until the three tangs on the fanning strip disengage from the wiring shelf.

(d) Lift the connecting block up slightly to disengage the bottom fanning strip, which is slotted lengthwise, from the track on the wiring shelf.

(3) The fanning strip can be removed from the block by removing the three machines screws. Using the same screws, fasten the new fanning strip to the block.

(4) Reinstall the connecting block on the wiring shelf by first engaging the grooved bottom fanning strip on the wiring shelf track. Next, push the upper fanning strip against the shelf until the three fanning strip tangs snap into place.

(5) Reinsert the cross-connect wires into the proper one-way gates on the fanning strip and dress the wires back on the wiring shelf.

(6) Make a visual inspection of the front of the block to be sure that none of the wires have been removed from the quick-connect terminal. Use the plastic spudger to dress the wires along the front of the block.

15. Associated Equipment

- Wiring and Cabling
- Tools and Aids (AT&T 201-208-103)
- Test Equipment (AT&T 201-208-106)
- MELD, CFAS, and COSMOS
- ED-6C110-10 Miniature Test/Talk System (AT&T 201-216-101)
- 4-Type Connectors (AT&T 201-208-100)
- 307-Type Connectors (AT&T 201-208-110)
- 11-Type Tip Cables (AT&T 201-222-110)
- 112-Type Connecting Blocks (AT&T 201-222-105)
- ED-6C314-70 End Guard and Designation Strips

16. References

Number	Title
AT&T 201-208-100*	*3-, 4-, and 5-Type Protector Units — Description, Use, Maintenance and Test Procedures*
AT&T 201-208-103*	*Tools and Aids — Distributing and Protector Frames*
AT&T 201-208-106*	*Test Equipment, Cords, Plugs, Warning Markers, Guards, Insulators, and Indicators — Description and Use*
AT&T 201-208-110*	*307-Type Connectors — Description, Use, Installation, and Repair Procedures*
AT&T 201-208-116*	*407-Type Unprotected Connectors — Description, Use, Installation, and Repair Procedures*
AT&T 201-216-101*	*Miniature Test/Talk System — Description — Distributing and Protector Frames*
AT&T 201-222-105*	*78- and 112-Type Connecting Blocks — Description and Use — **COSMIC** Distributing Frames*
AT&T 201-222-301*	*78- and 112-Type Connecting Blocks, Method of Making Connections, Repairs and Replacement Procedures — **COSMIC** Distributing Frames*
AT&T 201-222-501	*Inspections — **COSMIC** Distributing Frames*
AT&T 636-211-101*	*Cable Rearrangement Facility (CRF) — Description, Installation and Splicing*
AT&T 680-830-012	***COSMIC** Frame — Manual Assignment Procedures*

Drawings	Title
ED-6C110-10	Miniature Test/Talk System
ED-6C111-10	Miniature Test/Talk Systems, Typical Equipment Layout
ED-6C146-30	***COSMIC*** Frame System Specifications for Test/Talk System
ED-6C312-10	Typical Equipment Arrangement — ***COSMIC*** Mini DF
ED-6C313-10	Method of Installing Framework — ***COSMIC*** Mini DF
ED-6C316-10	Method of Cabling and Wiring — ***COSMIC*** Mini DF
ED-6C317-10	Cable Rack Arrangement — ***COSMIC*** Mini DF

* These practices are all contained in AT&T 201-200-060, Distributing Frame System Practices

Questionnaires	Title
E Form 8196A	Engineering Summary Questionnaire for MELD Layout or PACE to MELD Conversion of ***COSMIC***-Type Distributing Frames
E Form 8203	Hardware Ordering Questionnaire for New ***COSMIC*** Distributing Frames

Manual	Title
AT&T 201-200-050	*Distributing Frame Systems Product Manual*
AT&T 201-222-050	**COSMIC** *Distributing Frames Systems Planning, Engineering, Installation, and Operation*

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Document Title: **COSMIC®** Mini Distributing Frame - Description and Use

Document No.: AT&T 201-222-120 Issue 3 Date: February 1992

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