CABLE TERMINATING APPARATUS
SELECTION
DISTRIBUTING AND PROTECTOR FRAMES

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1. GENERAL

1.01 This practice provides general information concerning the selection of appropriate distributing frame systems and associated apparatus used to terminate, protect, cross-connect, and provide test access on outside plant and exchange (CO and non-CO) equipment.

1.02 This practice is issued as a part of a general restructuring, updating, and combining of the 201-series of practices.

1.03 In many cases, a choice of apparatus is available for cable terminations. Selection can be based on the following criteria:

(a) Protection considerations (present and future)

(b) Main distributing frame type and available space

(c) Compatibility with existing and proposed equipment in the office

(d) Ordering interval and service commitment

(e) Estimated installed cost

(f) Life cycle costs (i.e., frame administration and frame operations [number of people, etc.])

(g) Consistency with long-range planning and engineering objectives for main distributing frames (reference—Distributing Frame Planning and Engineering Guidelines).

2. PROTECTION CONSIDERATIONS

2.01 The purpose of central office protection is to ensure the safety of telephone personnel and to reduce the possibility and extent of equipment damage in the event foreign potential or current contacts the outside plant.

2.02 **Protector Units** — The AT&T plug-in protector units are utilized with central office connectors and customer premises building entrance protectors to safeguard personnel, equipment, and the network from hazards such as electrical shock, equipment damage, and fire caused by lightning and AC power faults. Each protector unit provides protection for one tip-ring subscriber pair. The 3-, 4-, and 5-type plug-in protector units are not included with the various connectors and must be ordered separately. See AT&T 201-208-100 for detailed information.

2.03 The plug-in protector units (Figure 1) are categorized by three types:

- **3-Type** — For voltage protection only.
- **4-Type** — Includes heat coils for sneak current protection, and devices for over-voltage protection.
- **5-Type** — Dummy protector units that provide continuity only, used only where protection is not required.

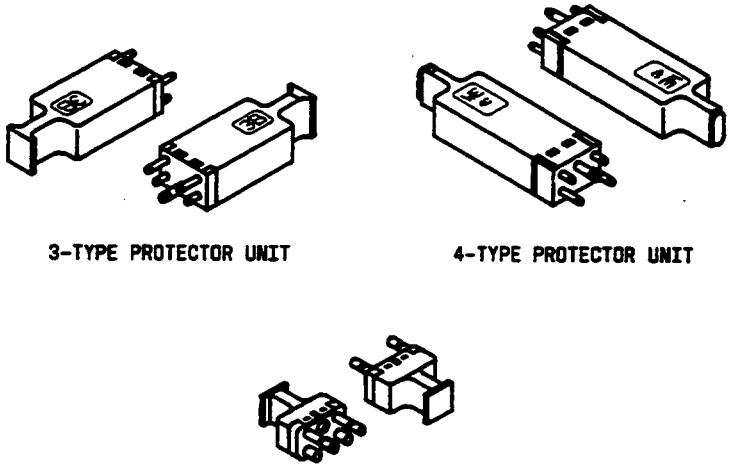


Figure 1—Typical 3-, 4-, and 5-Type Protector Units

2.04 These protector units are also compatible with AT&T multistation protectors (188, 189, and 190-type building entrance protectors) and any other connectors/protectors with a plug-compatible footprint configuration. All 3-, 4-, and 5-type units are characterized by the industry standard 1/2-inch by 3/4-inch footprint with 5-pin arrangement.

2.05 The 3-type protector units may also be used with the 1990 type protector (see AT&T 631-460-125 for details).

2.06 Exposed Cable — If there is a possibility that an unexposed cable may become exposed, the space saving/cost saving advantages of unprotected termination must be weighed against the future cost of providing protection for the individual complements that may become exposed. If space on the main frame is not a controlling factor or if a large portion of the cable may become exposed, a connector with dummy protector units may be used. If the cable later becomes exposed, the dummy protector units may be replaced by the proper protector units to meet the protection requirements.

2.07 In addition to providing protection, the protector unit interface is an in/out test point, is used to deny service in the detent position, and is a point of identification for incoming cables.

2.08 The type of terminating apparatus required for a particular telephone plant layout depends on whether the plant is **exposed** or **unexposed**.

(a) **Exposed Plant:** A telephone plant that is subject to disturbance from lightning, the possibility of contact with electrical circuits operating at more than 300 volts rms, or rise in ground potential or low-frequency induction is classified as **exposed**. An example is shown in Figure 2.

(b) **Unexposed Plant:** Telephone plant that is neither subject to possible contact with an electrical circuit operating at over 300 volts rms to ground nor subject to the effects of lightning, rise in ground potential, or low-frequency induction is classified as **unexposed.**

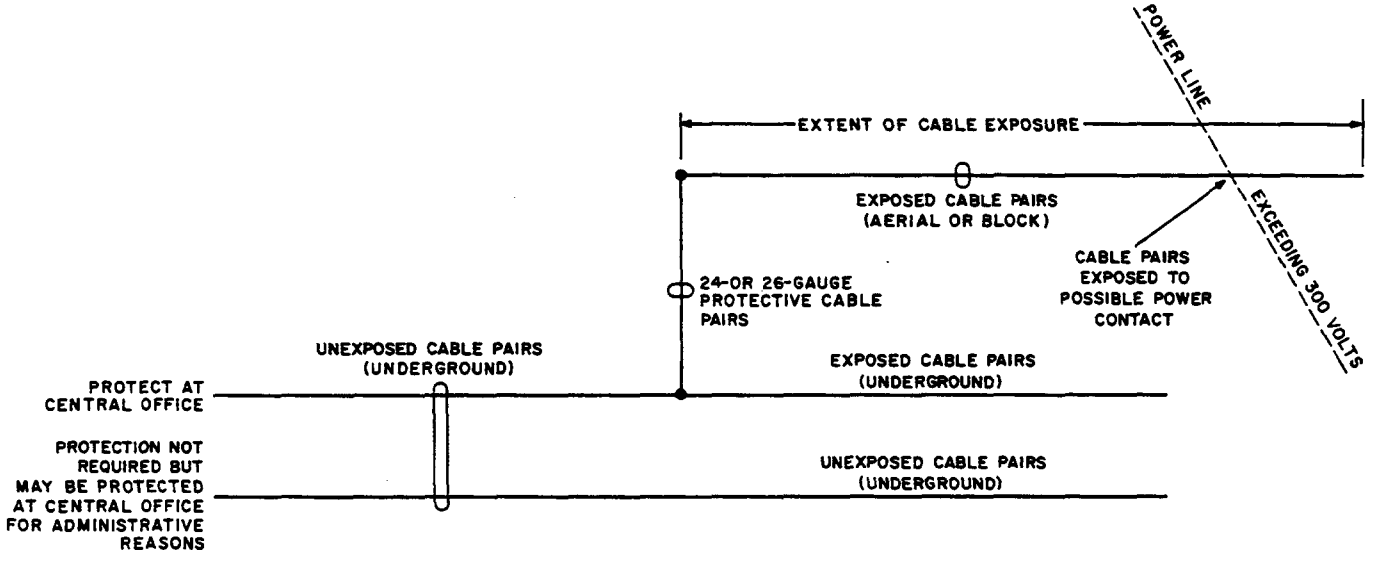


Figure 2—Exposed Cable

2.09 In determining the exposure status of plant, the possibility of changes in exposure due to rearrangements of outside plant should be considered.

2.10 Exposed and unexposed plants are covered in detail in AT&T 918-216-100.

2.11 Overvoltage Protection — For overvoltage protection, three protection technologies are available:

- Carbon Blocks
- Gas Tubes
- Solid-State Electronics.

2.12 Carbon Block Overvoltage Protection — The carbon block protector units (3B-A, 4B-C, 4C-C types) are intended for use in low lightning risk areas, typically for applications where a technician is available to perform expected routine maintenance, such as manned central offices with electromechanical switches.

2.13 Overvoltage protection is accomplished with 3-mil surge-limiting carbon blocks. When voltage on a tip or ring conductor exceeds a predetermined level (typically 500 volts), the voltage will be limited by arcing across the 3-mil air gap. If current flow across this gap is large or persists for an appreciable time (substained power cross faults), the protector units thermal overload mechanism will operate and the protector unit will become permanently grounded, fail safe.

2.14 Carbon block protector units are discharge-type devices. Applications are primarily intended for manned central offices with electromechanical switches. The performance and service life of carbon block protector units are significantly affected by use and operation. Carbon block protector units lack the precision performance and service life of gas tube and new solid-state protector units; and are characterized as having high-maintenance characteristics.

2.15 Typical electrical characteristics for carbon block protector units are as follows:

DC Breakdown @2 kV/s	Nominal 500 volts
Surge breakdown voltage (@ 100 v/μs)	Nominal 700 volts Maximum 1000 volts
Insulation resistance	100 megohms

2.16 All AT&T carbon block protector units meet the BELLCORE requirements per Specification TR-TSY-000300, Issue 1, June 1985, Plug-in Carbon Block Protectors for Use in CO Connectors and Building Entrance Terminals.

2.17 Gas Tube Overvoltage Protection — The general purpose gas tube plug-in protector units (3BE-W, 4BE-W, 4CE-W types) are intended for most central office and customer premises applications where longer service life, reduced maintenance, and more predictable overvoltage protection performance is desirable. The newer wide-gap general purpose gas tube protector units are economical alternatives to carbon block units for protection of central office and customer premises equipment that have an overvoltage threshold greater than 265 volts (typically all applications except the AT&T *5ESS®* switch.)

2.18 For digital central office and PBX equipment that requires precision DC breakdown voltage protection, the 4B-F and 4C-F plug-in protectors are needed.

2.19 For gas tube protector units, overvoltage protection is accomplished with 331-RL wide-gap technology gas tubes (for the general purpose -W codes), and narrow-gap 205A gas tubes (for the -F *5ESS* switch codes). When the voltage across tip and/or ring conductors exceeds the specified range (typically 350 V DC for the W codes, or 240 V DC for the F codes), the voltage will be limited by arcing across the internal gap of the sealed gas tubes. The gas tubes will recover after the potentially damaging energy has been dissipated to ground. If current flow across the gas tubes is large or persists for an appreciable time (sustained power faults), the protector unit's thermal overload mechanism will operate and the protector unit will become permanently grounded (fail-safe condition).

2.20 Gas tube protector units are the preferred economical alternatives to carbon block protector units for all customer premises, and unmanned applications; such as remote pair gain systems, point of presence, and community dial offices. Gas tubes provide longer service life (typical 10 times longer) and require significantly less maintenance as compared to carbon block protector units.

2.21 Electrical and service life characteristics for the general purpose wide gap gas tube W codes (3BE-W, 4BE-W, 4CE-W) are as follows:

Electrical Characteristics	
DC breakdown voltage (@ 2 kV/s)	265-425 volts
Surge breakdown voltage (@ 100 V/μs)	200-800 volts
Insulation resistance (PE-80)	100 megohms typical
DC holdover voltage (IEEE 465.1)	150 volts typical
Vented breakdown voltage (meets UL reqts)	< 1000 volts
DC arc voltage	20 volts typical
Glow-to-arc transition current (IEEE 465.1)	0.5 amp typical
Capacitance (PE-80)	< 10 picofarads
AC discharge (PE-80)	> 65 amps (11 cycles @ 60 Hz)
Maximum impulse discharge (PE-80)	20 K amps (8 x 20 μs waveform)
Sneak current @ 68° F (20°C)	< 210 sec. @ 0.54 amps*
*For 4B4E-W and 4C4E-W < 210 sec. @ 1.875 amps	
Service Life Characteristics	**No. of Operations**
Short duration 60 Hz AC	
1 amp 60 Hz AC/1 s burst	> 60
10 amps 60 Hz AC/1 s burst	> 60
Continuous 60 Hz AC .5 amp	140 seconds
Surges:	
10 amp (10 x 1000 μs waveform)	> 1000
100 amp (10 x 1000 μs waveform)	> 100
300 amp (10 x 1000 μs waveform)	> 50
For the stated number of operations, VB, VL and RL values remain within required ranges as follows:	
VB: 265-425 volts	
VL: < 1000 volts	
RL: > 10M ohms	

2.22 Electrical characteristics for precision gas tube F codes (4BF, 4CF, 3DF) for *5ESS* switch protection are as follows:

Electrical Characteristics

DC Breakdown voltage (@2 kV/s)	215-265 volts
Surge breakdown voltage (@ 100 V/μs*)	180-1000 volts
Insulation resistance @ 100 V DC	100 megohms
Capacitance	< 10 picofarads
Sneak current @ 68° F (20° C)	< 210 sec. @ 0.54 amps†

* With a *5ESS* switch, peak surge voltages are limited by diodes (secondary protection) incorporated in the input circuits of the line unit.

† For 4B4F and 4C4F < 210 sec. @ 1.875 amps

2.23 Service life characteristics for F series gas tubes are similar to that for the W codes.

2.24 Solid-State Overvoltage Protection — The newer family of SSP (solid-state protector) units provide a premium alternative to both carbon block and gas tube protector units for central office, building entrance, and other applications where superior protection and improved reliability are desirable. Fast clamping at low voltages as well as stable, quiet, and truly balanced electronic SSP performance can significantly reduce failure rates for both protector units and protected surge sensitive equipment. Where improved protector reliability is important for applications such as critical service lines, precise breakover voltage and lower power dissipation due to the low on-state voltage and high surge-current capability make the SSPs ideal.

2.25 Solid-state overvoltage protection is accomplished with semiconductor devices in a design which ensures excellent balance across tip, ring, and ground. Upon reaching the specified breakdown voltage in either direction between any two conductors (tip, ring, or ground), the SSP switches to a on-state low-voltage, thus, shorting tip and ring to ground simultaneously. Conduction and power dissipation will continue until the fault current drops below the holding current. The normal off-state condition is a high impedance, low leakage state that prevents loading of the telecommunication line. If the current flow across the SSP device is large or persists for an appreciable time, the heat coil mechanisms will operate and permanently ground tip and ring terminals.

2.26 Electrical characteristics for the 3C-S and 4C-S solid-state protector units are as follows:

Electrical Characteristics (@ 20° C)	
DC breakdown voltage (@ 2 kV/s)*	220-300 volts
Surge breakdown voltage (@ 100 V/μs)*	220-300 volts
Insulation resistance (PE-80)	> 100 megohms
DC holdover current†	260 mA/52 volts
	200 mA/135 volts
	140 mA/150 volts
On-state voltage (@ 100A)	< 10 volts
Response time	< 100 nanoseconds
Rated impulses current‡	200 amps
Capacitance§	< 100 picofarads
Line series resistance	> 4 ohms (4-types only)
Operational temperature range	-40° C to +75° C
Sneak current @ 68° F (20° C)	< 210 sec. @ 0.54 amps

* Breakover voltages remain within the specified limits regardless of age, use, or rate-of-rise of applied voltage.

† DC holdover test per IEEE (ANSI/IEEE C62.31 1984) is used to establish the level of DC current for a specified open circuit voltage in which a device will extinguish in less than 150 ms.

‡ Impulse discharge test applies 200 amp 10 x 1000 μs current waveform between any two long terminals (T-R, T-G, R-G) or 100 amp 10 x 1000 μs applied simultaneously to T-G and R-G. Below rated impulse current, the number of operations is unlimited.

§ Capacitance as measured between any two terminals at a frequency of 1 kHz at 1 VAC rms with an applied bias of 50 VDC.

2.27 Protective Fuse Cable: Current flows through the conductor to ground when a high voltage causes the central office protector unit to operate. When 24-gauge or smaller feeder cable conductors are used, the conductor will act as a fuse and burn apart before the protective equipment overheats. Cables of heavier gauge conductors require a section of fine gauge protective fusing cable spliced into the conductors. This protection is usually accomplished by making the aerial-underground junction cable 24 or 26 gauge. In some cases, for transmission reasons, it may be desirable to keep the length of protective fusing cable as short as possible. A protective fusing cable, 2 feet or longer, is typically placed in the last manhole from the exposed sections.

2.28 Connector Stub: The gauge of the connector stub is determined by the gauge of the cable to be terminated. Use Table A as a guide for selecting the gauge of stub cable. **The connector stub should be at least 2 gauges larger than the cable to be terminated.** For example, a 24-gauge connector stub would be used to terminate a 26-gauge cable. Frequently, it may be necessary to terminate 22- or 19-gauge cables. Since connector stubs larger than 22 gauge are not provided, a **protective** fusing cable must be placed between 19- or 22-gauge cable and the connector stubs. The gauge of the protective fusing cable then becomes controlling. In this case, the gauge of the connector stub must be at least two gauges larger than that of the protective fusing cable. For example, if the protective fusing cable is 24 gauge, the connector stub cable should be 22 gauge. In the event of a power cross, maximum heating occurs at the finest gauge wire. Thus, coarser gauge conductors are used next to central office equipment to minimize chances of damage from overheating.

TABLE A

STUB CABLE GAUGE SELECTION CHART

WHERE ENTRANCE CABLE GAUGE IS:	ORDER CONNECTOR STUB CABLE GAUGE
26 (Exposed or unexposed)	22 or 24
24 (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.

3. MODULAR DISTRIBUTING FRAMES

3.01 Modular distributing frame systems feature single-sided jumper operations for increased craft efficiency; compared to the traditional double-sided arrangement used with conventional distributing frames. Table B is a modular distributing frame selection guide.

TABLE B
MODULAR DISTRIBUTING FRAMES SELECTION GUIDE

FRAME		UNIT	HEIGHT	WIDTH	DEPTH	TYPICAL TERMINATION CAPACITY (PAIRS)		
						307 CONN-ECTORS	112 BLOCKS	78 BLOCKS
COSMIC®	IIA	Facility Module*	8′2″	6′6″†	27″	10,200	12,000	—
		Equipment Module	8′2″	6′6″†	27″	—	12,800	—
	IA	Facility/ Equipment Module	8′2″	6′6″†	27″	—	12,000/ 12,800	—
	I	Facility/ Equipment Module	8′0″	6′6″†	18″	—	10,000/ 12,800‡	10,000/ 10,240
	II (DA)	Facility Module*	8′2″	13′0″†	32″	10,000	12,000‡	—
		Equipment Module	8′2″	13′0″†	32″	—	12,800‡	—
COSMIC II	MINI	Facility Bay§	7′0″**	14″¶	15″	1,000	1,000	—
		Equipment Bay	7′0″	14″¶	15″	—	2,560	—
ESS (Electronic Switching System) Modular DF		10-Vertical Module	8′0″	6′5″	12″	—	—	12,160
		6-Vertical Module	7′0″	4′4″	12″	—	—	6,080

* Mounts 307 connectors on rear, with factory cabled 112 block on front, for combined protection applications.

† With one 12″ wide vertical trough.

‡ Can be equipped with ED-6C142-3 G3 (shelves 2-10) and G4 (shelves 1 and 11) adapter for the new high density 112H-type OSP or tie pair connecting blocks; not generally recommended for *COSMIC* I DF.

§ Mounts 307 connectors on front for combined protection applications.

¶ With one 5″ wide vertical trough. For larger applications, a 9″ wide trough is also available.

** Add 5″ if upper express trough is used.

COSMIC I, IA, II, AND IIA DISTRIBUTING FRAMES

3.02 The *COSMIC*® distributing frame systems (Figure 3) are modular frameworks designed for equipment and facility terminations that are generally placed in alternating modules of a frame lineup. These distributing frames can terminate subscriber, trunk, toll, and tie pair circuits in a central office. See AT&T 201-222-101 for detailed information.

Figure 3—*COSMIC* Distributing Frame Installation

COSMIC DF CONFIGURATIONS

3.03 *COSMIC* frameworks can be engineered with or without separate protector frames for virtually any application. Typical applications include:

- SMDF (Subscriber Main Distributing Frame) — provides terminations of line equipment, outside plant cable pairs, and tie pairs to other DFs in the office.
- TMDF (Trunk Main Distributing Frame) — provides terminations of miscellaneous, trunk, and toll equipment and facilities.
- CMDF (Combined Main Distributing Frame) — combines the SMDF and TMDF functions into one frame.
- Two-Stage Distributing Frames — usually consisting of a FDF (Facility Distributing Frame) interconnected by tie pairs to a separate EDF (Equipment Distributing Frame).
- MEDF (Miscellaneous Equipment Distributing Frame) — often used in conjuntion with Two-Stage Frame Systems, the MEDF is similar to a TMDF.
- SDDF (Subscriber Digital Distributing Frame) — terminates outside plant cables dedicated to T-carrier circuits, T-carrier equipment (e.g., Office Repeater Bays or Subscriber Carrier Systems), and tie cables to other DFs. The SDDF reduces the need for long shielded jumpers on the SMDF.

3.04 In each of these applications, the frame hardware can be customized to allow an optional balance of facility and equipment modules that matches the mix of equipment and facility terminations for the CO wire center. For example, offices that require more outside plant cable termination space than equipment, can be arranged with up to twice as much facility module space as equipment. The half-size equipment modules also result in shorter lineups and fewer frameworks.

APPLICATIONS

3.05 *COSMIC* DFs are fully compatible with all of 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 dedicated 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, Plessey *SYSTEM X* §, *and NEC NEAX 61E* ¶ are also supported.

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

DESCRIPTION

3.06 The objectives of the initial *COSMIC I* Subscriber MDF System were to overcome the limitations of the modular MDF design for *ESS* switching equipment, establish and maintain a computer aided assignment and record-keeping system for the frame, and introduce additional labor-saving methods.

3.07 The *COSMIC I* DF also can be used as a TPDF or as an MDF with a separate PF. This framework is narrower (1 foot 6 inches deep) with smaller wiring shelves than the *COSMIC* IA DF. The *COSMIC* I DF is typically used as an SMDF or a TPDF (Tie-Pair Distributing Frame). All circuits are terminated on 78-type or 112-type connecting blocks.

* Trademark of Northern Telecom LTD.
† Trademark of GTE
‡ Trademark of Ericsson.
§ Manufactured by Plessey Co.
¶ Manufactured by Nippon Electric Company

3.08 The *COSMIC* II MDF (DA) is an enhancement of the *COSMIC* I SMDF (subscriber MDF) design. The *COSMIC* II MDF provides protected connectors mounted on the rear of the FAC (facility) bays with factory-wired connections to connecting blocks that are mounted on the front of the bay. The testing facilities and test equipment used with the *COSMIC* II MDF System are an improvement over those offered with the *COSMIC* I SMDF (Figure 4).

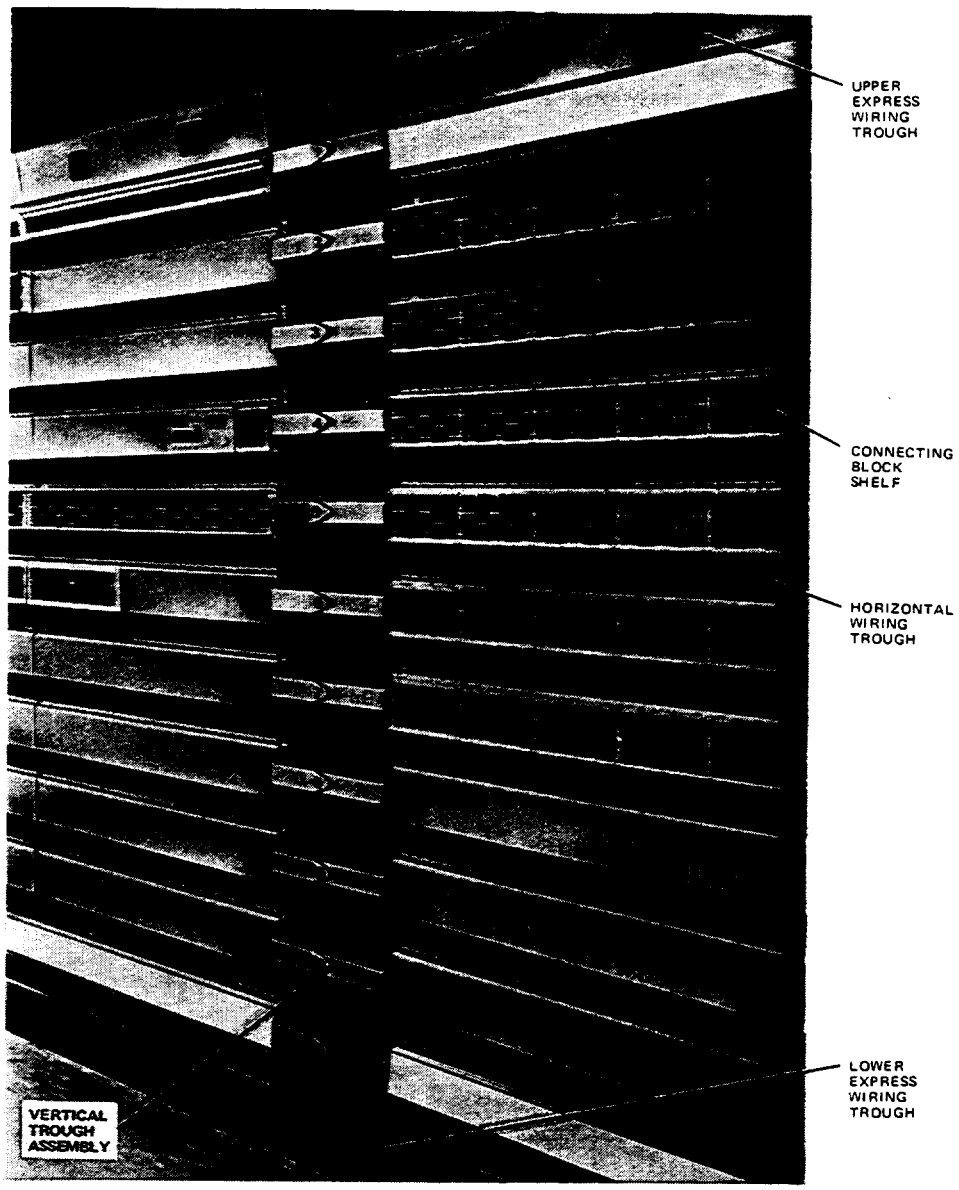


Figure 4—Typical *COSMIC*-Type Distributing Frame (Front View)

3.09 The *COSMIC* IIA MDF System has the same functional frame configurations as the *COSMIC* II MDF. Primary differences are that the *COSMIC* IIA MDF is five inches narrower and allows the use of higher density outside plant and tie pair connecting blocks than the *COSMIC* II MDF.

3.10 The *COSMIC* IA MDF System is similar to the *COSMIC* IIA MDF physically. *COSMIC* IA frames consist of equipment modules only and are used in applications where a separate protector frame is required.

3.11 A **modular cable racking system** (Figure 5) minimizes cable congestion, and ensures that the *COSMIC* IIA DFs can be cabled to its capacity. The frame is equipped and cabled starting at the most convenient shelf height first, which increases craft efficiency.

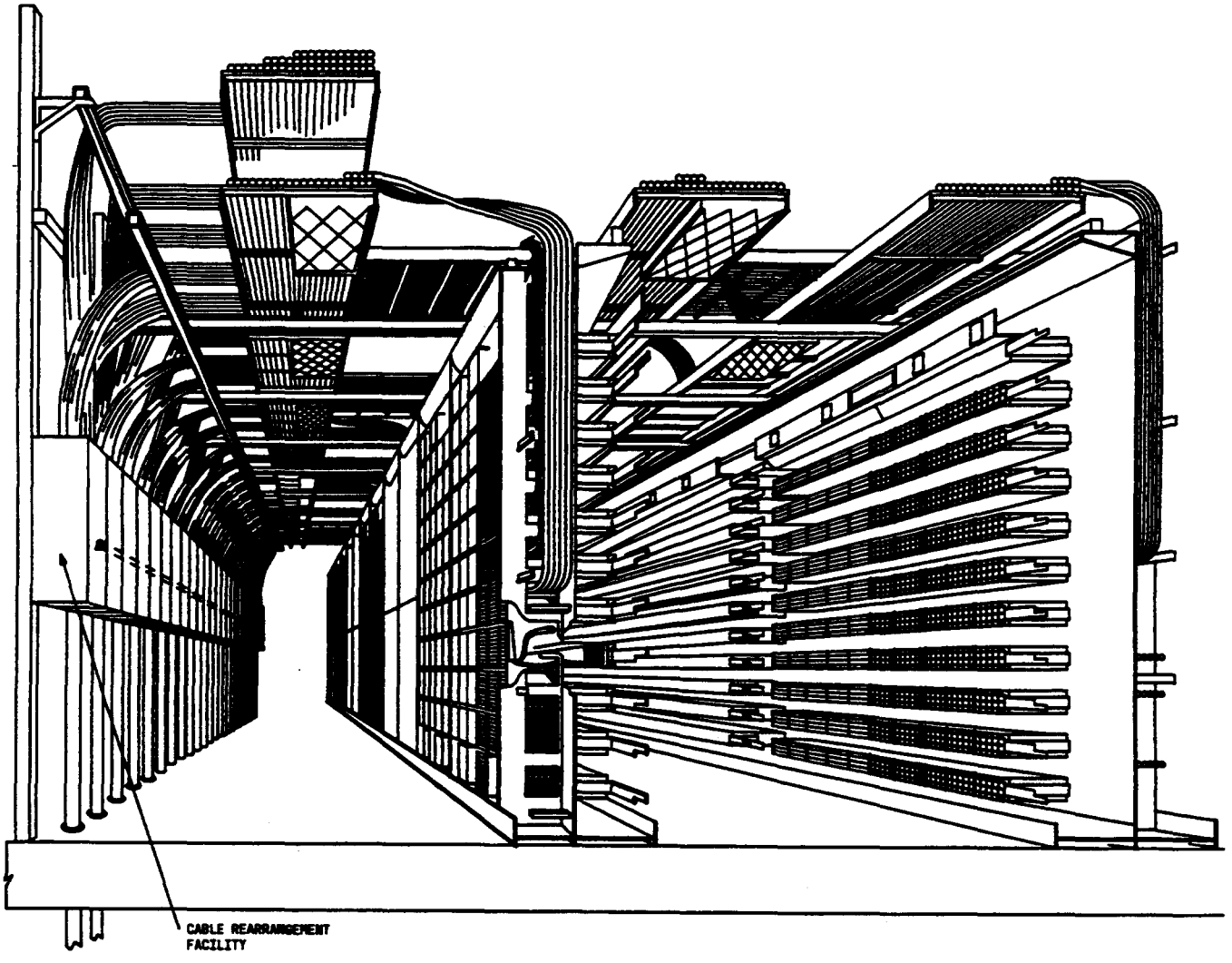


Figure 5—*COSMIC* IIA Frame System (Cutaway View Showing Cabling Details)

3.12 Facility cable installation and growth with *COSMIC* II-type DFs can be greatly simplified with AT&T's CRF (Cable Rearrangement Facility). These central office splicing cabinets facilitate cable spreading and provide a readily accessible 710 connector splice interface for bridging, rearrangement, and retermination of up to 5,000 facility cable pairs. See AT&T 636-211-101 for detailed CRF description and ordering information.

3.13 Table C shows the *COSMIC* frames specifications and Table D shows the jumper trough cross-sections and floor loading.

TABLE C

***COSMIC* FRAMES SPECIFICATIONS AND ORDERING INFORMATION**

FRAMEWORK				APPARATUS MOUNTING CAPACITY		DIMENSIONS			ORDERING CODE
				307 CONN REAR	112 (NOTE) BLOCKS FRONT	HEIGHT	WIDTH	DEPTH	
Basic IA/IIA Framework Components	Facility Bay = (F) §			51	50-60	8′2″	2′9″	2′3″	ED-6C141-30, G8
	Equipment Bay = (E)			—	50-60	8′2″	2′9″	2′3″	ED-6C141-30, G4
	Vertical Trough = (v)			—	—	8′2″	1′	2′3″	ED-6C141-30, G9,G10*
Multiple Bay Assemblies	Combined Protection	IIA	E v FF v E	102	200-240	8′2″	13′	2′3″	ED-6C141-30, G1
			F v EE v F	102	200-240	8′2″	13′	2′3″	ED-6C141-30, G5
			F v E v F	102	150-180	8′2″	10′3″	2′3″	ED-6C141-30, G6
			F v E or E v F	51	100-120	8′2″	6′6″	2′3″	ED-6C141-30, G3
		II	E v FF v E	100	200-240†	8′2″	13′	2′8″	DA‡
	Blocks Only	IA	E v E	—	100-120	8′2″	6′6″	2′3″	ED-6C141-30, G2
			E v E v E	—	150-180	8′2″	10′3″	2′3″	ED-6C141-30, G7
		I	E v E	—	100-120†	8′0″	6′6″	1′6″	ED-6C001-30, G3
Walk-Through Modules		IA/IIA	—	—	—	8′2″	5′4″	2′3″	ED-6C142-30, G1
		II	—	—	—	8′2″	5′4″	2′8″	ED-6C107-71, G1
		I	—	—	—	8′0″	5′4″	1′6″	ED-6C107-70, G1
End Guards		IA/IIA	—	—	—	8′2″	2″	2′3″	ED-6C142-30, G2
		II	—	—	—	8′2″	4″	2′8″	ED-6C004-70, G4
		I	—	—	—	8′0″	4″	1′6″	ED-6C004-70, G3
Base, AC Channel and Cover		II	—	—	—	4″	6′6″	5″	ED-6C142-30, G31
			—	—	—	4″	13′0″	5″	ED-6C142-30, G32
			—	—	—	4″	10′3″	5″	ED-6C142-30, G33
			—	—	—	4″	2′9″	5″	ED-6C142-30, G34
			—	—	—	4″	5′4″	5″	ED-6C142-30, G35

Note: The low number is the maximum quantity of 6.4″ wide blocks (100 pair or 128 pair) that can be mounted on all shelves. The high number is the maximum quantity of 4.0″ wide 112H series blocks (100-pair OSP or tie pairs) that can be mounted on all shelves. For facility bays, this number includes the 112H blocks associated with the rear 307 connectors. In both cases, each pair of half-size blocks mounted on shelves 1 and 11 are counted as equivalent to one full-size block.

* The Group 9 trough is used whenever a facility bay is on either side of the trough; the Group 10 trough is used whenever equipment bays are on both sides of the trough.

† Equipped with 112H blocks mounting adapters.

‡ Additions to *COSMIC* II frames can be made with *COSMIC* IIA framework (2′3″ deep) equipped with 5″ deep base AC channel and cover (ED-6C142-30, G31-35) to match the 2′8″ deep *COSMIC* II framework.

§ F, E, and v are symbolic notations used to describe framework combinations.

TABLE D

COSMIC JUMPER TROUGH CROSS-SECTIONS AND FLOOR LOADING

JUMPER TROUGH CROSS-SECTIONS AND FLOOR LANDING		COSMIC IIA	COSMIC IA	COSMIC I
Jumper Trough Cross-Sections	Horizontal Apparatus Shelves	83/4"d x 31/2"h	83/4"d x 31/2"h	71/4"d x 3"h
	Vertical Trough	113/4"w x 11"d	113/4"w x 11"d	113/4"w x 83/4"d
	Upper Express Trough	133/4"d x 5"h	133/4"d x 5"h	83/4"d x 41/2"h
	Lower Express Trough	131/2"d x 41/4"h	131/2"d x 41/4"h	113/4"d x 33/4"h
Floor Loading		122 lbs/sq ft	82 lbs/sq ft	97 lbs/sq ft

COSMIC II MINI DISTRIBUTING FRAMES

3.14 The *COSMIC* Mini DF (Distributing Frame) 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, (Figure 6)]. 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) than the larger *COSMIC* IIA DF. See AT&T 201-222-120 for detailed information.

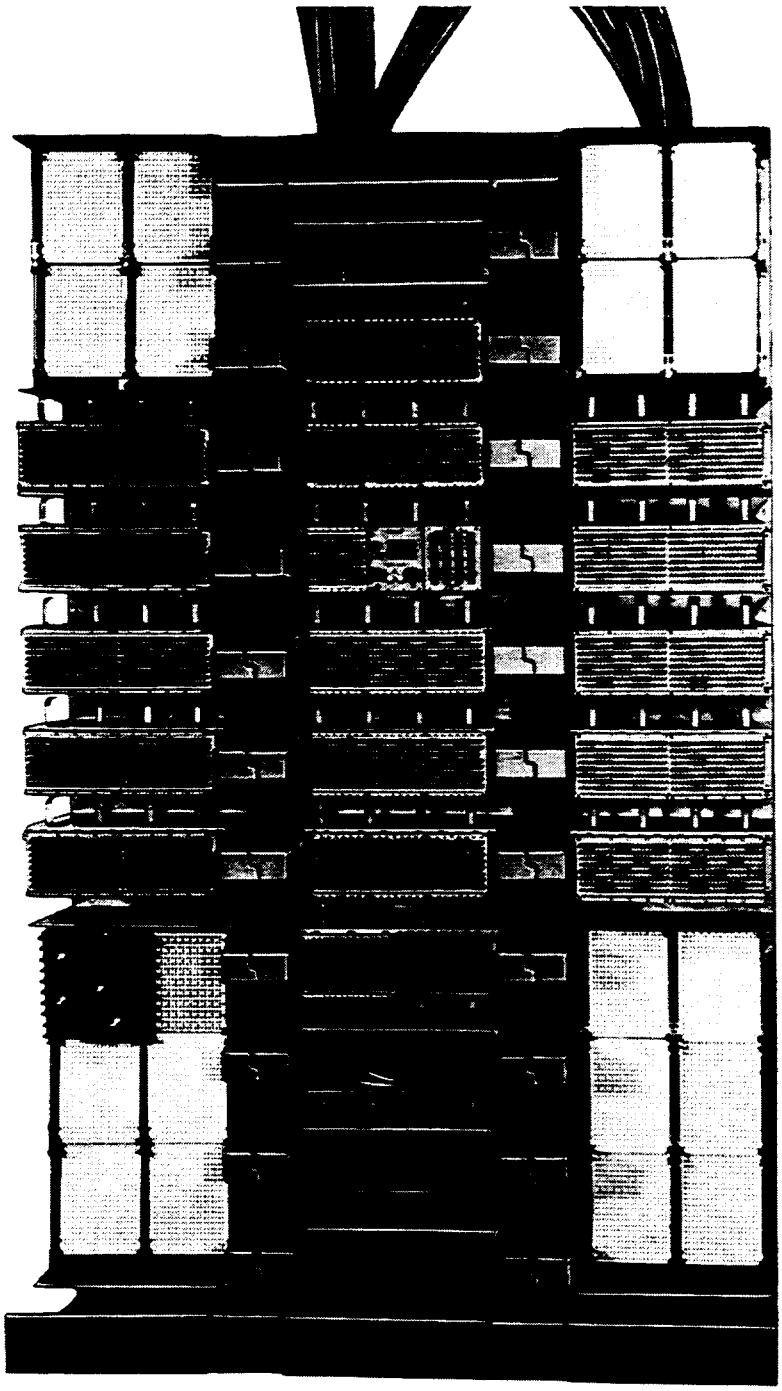


Figure 6—*COSMIC* II Mini Distributing Frame (3 Bays) (Upper Express Trough Not Shown)

3.15 The *COSMIC* Mini framework consists of facility bays, equipment bays, and vertical wiring troughs bolted together as required to provide the required frame capacity. Vertical troughs are available in 5- or 9-inch widths. A lower express trough for long jumpers is provided with all framework. An optional upper express trough is available for large installations.

3.16 Each bay is anchored to the floor with two bolts and the trough is bolted to the bays. At both ends of a lineup, an endguard is added to contain the wires and provide an end finish.

3.17 In the typical application, the first bay in a lineup is a facility bay numbered 00-2 and the second bay is an equpment bay numbered 01-1. A vertical cabling trough is mounted between these two bays.

3.18 *COSMIC* Mini distributing frames can be configured in a variety of flexible arrangements of facility and equipment bays for combined protection, or all equipment bays for use with separate protector frames or as an IDF (Intermediate Distributing Frame).

FACILITY BAY

3.19 The facility bay is 7 feet tall, 14 inches wide and 14-3/4 inches deep and terminates subscriber, T-carrier, and special service lines. If the optional upper express trough is used add 5 inches to the height. The facility bays have ten shelves. Five shelves can mount ten 307-type connectors (two per shelf) with attached 100- or 128-pair 112-type connecting blocks which are mounted on the other five shelves (two per shelf).

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

VERTICAL CABLING TROUGH

3.21 The vertical cabling trough is generally provided between facility and equipment bays. It is used to run jumper wires between two horizontal wiring shelves of adjacent bays and to run jumpers vertically to the express trough. Two vertical cabling troughs are available: 5 inches wide by 9 inches deep and 9 inches wide by 9 inches deep. The larger is used for custom arrangements with larger numbers of terminations and accepts standard MELD (Mechanized Engineering and Layout for Distributing Frames) frame labels.

EQUIPMENT BAY

3.22 The equipment bay has the same dimensions as the facility bay and is used to terminate line, trunk and toll equipment on 112-type connecting blocks. The equipment bays have ten shelves and can mount twenty 100- or 128-pair, 112-type connecting blocks (2 per shelf). Equipment bays can also be used for outside plant terminations when a separate protector frame is used.

3.23 Table E shows the *COSMIC* II Mini frame specifications and ordering information.

TABLE E

COSMIC II MINI FRAME SPECIFICATIONS AND ORDERING INFORMATION

ITEM		HEIGHT	WIDTH	DEPTH	TERM. CAPACITY (PAIRS)	SHELVES	JUMPER TROUGH CROSS-SECTION		ORDERING CODE
							SHELF TROUGHS	LOWER EXPRESS TROUGH	
Bays	Equipment (Blocks Only)	7"§	14"	14¾"	2560¶	10	5½" × 2½"	9" × 4"	ED-6C311-30 Group 5
	Facility (307 Connectors)	7"§	14"	14¾"	1000	10*	5½" × 2¼"	9" x 4"	ED-6C311-30 Group 4
Vertical Wiring Troughs	5" Wide 9" Deep	Provides trough for running jumpers between adjacent bays.							ED-6C311-30 Group 3
	9" Wide† 9" Deep	Provides trough for running jumpers between adjacent bays. Used for custom arrangements with larger numbers of terminations; accepts standard MELD frame labels.							ED-6C311-30 Group 6‡
Upper Express Wiring Trough	Basic Trough	Provides additional jumper capacity for large applications.** One for each facility and each equipment bay; adds 5" to frame height.							ED-6C314-70 Group 10
	Vertical Spanner	One above each 5" vertical wiring trough.							ED-6C314-70 Group 11
End Guards (Pair)		End finish for frame lineup.							ED-6C314-70 Group 7
Floor Mounting Hardware	Wood	Hardware for mounting to wood floor.							ED-6C314-70 Group 8
	Concrete	Hardware for mounting to concrete floor.							ED-6C314-70 Group 9

Note: Typical, fully equipped *COSMIC* Mini DF installations yield floor loading of 75 lbs/sq ft.

* Five shelves can mount ten 307-type connectors (two per shelf) with attached 100- or 128-pair 112-type connecting blocks which are mounted on the other five shelves (two per shelf).

† Contains 11 LA2044 wireways and 1 LA2045 base.

‡ Previously LA2046-525A (Comcode 105392245).

§ Without upper express trough, which adds 5" to height.

¶ Or 2000 pairs using 100-pair blocks.

** Recommended for applications exceeding 15,000 termination pairs.

ESS MODULAR DISTRIBUTING FRAMES

3.24 The *ESS* modular distributing frames (Table F and Figure 7) were designed specifically for *ESS* switch applications. Frames are single-sided units available in 8-foot high by 6-foot 6-inch wide and 7-foot high by 4-foot 4-inch wide modules. The modules are equipped with vertical apparatus mounting arrangements separated by vertical wiring troughs for short jumpers between adjacent verticals. Two horizontal troughs at the top of the frame, and one at the bottom, provide for long jumper routing between nonadjacent verticals. See AT&T 201-221-101 for detailed information.

TABLE F

ESS MODULAR DISTRIBUTING FRAME SPECIFICATIONS AND ORDERING INFORMATION

ORDERING CODE	APPLICATION	RATING	HEIGHT	WIDTH	DEPTH	NO. OFF VERT	BLOCK DENSITY	BLOCKS/ VERTICAL	PAIRS/ VERTICAL
ED-1A222-31	SMDF, MDF, IDF	GA	8'0"	6'6"	1'0"	10	64 PR	19	1216
ED-1A224-31	TDF, IDF	LA	7'0"	4'4"	1'0"	6	64 PR	19	1216

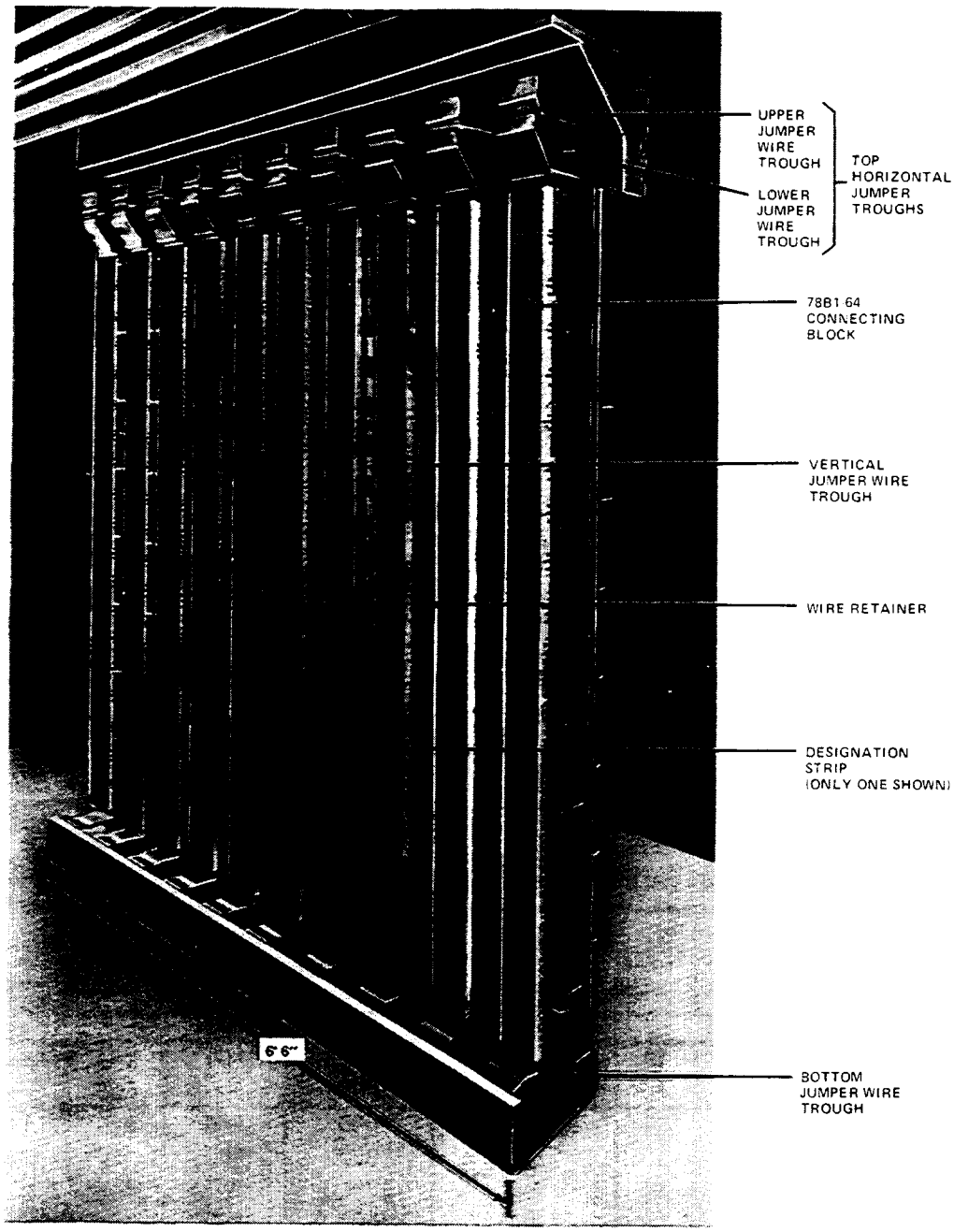


Figure 7—*ESS* Modular Distributing Frame

3.25 Facility and equipment cable terminations are made on alternate verticals. All cross-connections are made using quick-clip 64-pair 78-type or earlier 66-type (DA) cross-connect blocks with DT22-type jumper wire on the front of the frame.Cable terminations are wire-wrapped connections made at the rear of the frame.

3.26 A separate protector frame is needed for SMDF applications. A modular protector frame or an existing double-sided conventional protector frame may be used.

4. CONVENTIONAL DISTRIBUTING FRAMES

4.01 Conventional DFs (Distributing Frames) are characterized by open framework structured with vertical uprights for mounting CO connectors and/or connecting blocks and (typically) horizontal shelves for mounting connecting blocks and for holding cross-connect jumpers.

4.02 ***The Double-Sided Conventional Distributing Frames*** generally have vertical uprights exclusively on the vertical side and horizontal shelves (transverse arms) on the horizontal side. In large applications, such frames may carry literally "tons" of jumper wire. The LPCDF (Low Profile Conventional Distributing Frame), continues to provide the industry standard for new installations.

4.03 ***The Single-Sided Conventional Distributing Frames*** provide for all apparatus mounting and jumper routing on one side. The SSLPDF (Single-Sided, Low Profile Distributing Frame) mounts both CO connectors and/or connecting blocks on vertical uprights and utilizes bolt-on horizontal wireways for intervertical jumpers. Earlier single-sided DFs with fixed horizontal shelves have considerably less apparatus arrangement flexibility than the SSLPDF.

4.04 ***Apparatus Mounting*** — The LPCDF and SSLPDF readily mount all AT&T connecting apparatus and miniature test/talk panels. Although earlier conventional frames were designed to mount specific apparatus, virtually any current AT&T DF apparatus, may be accommodated with the use of adapters and/or modifications.

4.05 Table G is a framework selection guide.

TABLE G

CONVENTIONAL DISTRIBUTING FRAMES SELECTION GUIDE (8" VERTICAL SPACING)

FRAME	HEIGHT	DEPTH	SHELVES		CONNECTOR TERMINATIONS PER VERTICAL (PAIRS)				
			QTY	JUMPER (NOTE) X-SEC (SQ IN.)	310, 310M, 305	311, 309	303	301, 444	300, C50
Double-Sided									
LPCDF	8′ 0″	4′3″	10	600	800	800	400	—	—
	8′10″	4′3″	10	600	1000	900	500	—	—
Other Standard Frames	9′ 0″	2′0″	10	100	1000	800	500	—	—
	9′ 0″	2′6″	10	220	1000	800	500	—	—
	11′ 6″	4′3″	15	840	1200	1000	600	600	300
	12′ 5″	4′3″	15	840	1200	1000	600	600	300
	14′ 5″	4′3″	19	1064	1200*	1200*	800	800	400
Single-Sided									
SSLPDF	7′ 0″	15″	1	39	700	600	300	—	—
		15″	2	79	700	600	300	—	—
	7′ 6″	15″	1	39	800	700	400	—	—
		15″	2	79	700	600	300	—	—
	9′0″ and 11′6″ heights are also available.								

Note: Jumper cross-section is given as usable shelf space allowing about 4-inch clear hand space and trapezoid jumper profile above jumper pileup on double-sided frames. The entire shelf wireway cross-section is given for the SSLPDF.

* Maximum recommended vertical terminations to avoid jumper congestion within the vertical.

LPCDF (LOW PROFILE CONVENTIONAL DISTRIBUTING FRAMES)

4.06 The double-sided LPCDF (Figure 8) was designed for large capacity CO environments, but it is also used in large premises distribution installations as well, such as universities and military sites. The LPCDF is available in 8-foot or 8-foot 10-inch heights, each with 10 horizontal shelves, and accommodates all standard CO distributing frame connecting and test/talk apparatus.

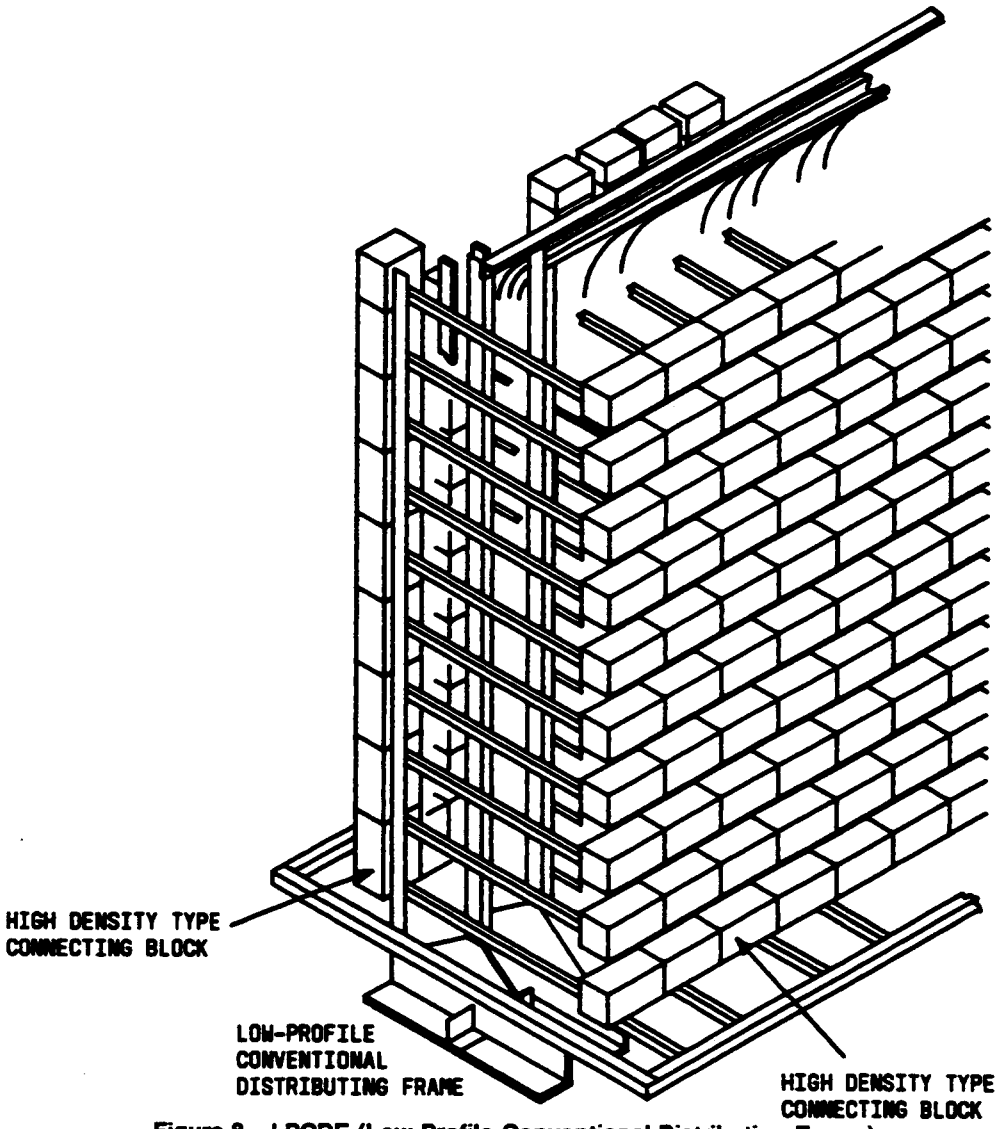


Figure 8—LPCDF (Low Profile Conventional Distributing Frame)

4.07 The LPCDF 6-vertical assemblies are 4 feet 3 inches deep, with ten 19-inch deep shelves on 8-inch centers and are available in 8-foot, and 8-foot 10-inch heights.

4.08 A complete installation provides end guards, guard rails, distributing rings, cable retention rods, upper designation boards and a variety of block mounting options, including tilt details for top and bottom shelves, and vertical-side block mounting adapters. Tables H, I, and J show specifications, capacity and ordering information for the LPCDF.

TABLE H

LPCDF DIMENSIONS, CABLING, AND FLOOR LOAD

HEIGHT	DEPTH	VERTICALS			SHELVES			CABLE CROSS-SECTION PER VERTICAL	FLOOR LOAD (LBS/SQ FT)
		SPACING	DEPTH	APP SPACE	QTY	SPACING	DEPTH		
8′ 0″	4′3″	8″	15″	89″	10	8″	19″	30 sq in.	100
8′10″	4′3″	8″	15″	99″	10	8″	19″	30 sq in.	125

End guards are typically 6″ wide each.
Continuous bars are used for apparatus mounting on verticals and shelves.

TABLE I

LPCDF CAPACITY PER VERTICAL

HEIGHT	VERTICALS					SHELVES	
	QTY CONNECTORS/PAIRS			QTY 89-BLOCKS	JUMPER X-SEC (SQ IN.)	QTY 89-BLOCKS	JUMPER X-SEC (SQ IN.)
	310, 310M, 305	311, 309	303				
8′ 0″	8/800	8/800	4/400	10	33	10	600
8′10″	10/1000	9/900	5/500				

TABLE J

LPCDF ORDERING INFORMATION

BASIC 6-VERTICAL ASSEMBLY	EQUIPPED TO MOUNT ON EACH VERTICAL					DRAWING
	311	310, 310M	303	309	89-BLOCKS	
8′ 0″ High	8	8	4		*	ED-97754-71 G1
				8	*	ED-97754-74 G1
8′10″ High	9	10	5		*	ED-97754-71 G2
				9	*	ED-97754-74 G2

* ED-97754-G6 provides adapter bar to mount 89-type blocks on one vertical. Alternatively, one SSLPDF ED-6C331-70 G80 89-block mounting bracket can be used for each 89-type block or equivalent (e.g., miniature test/talk block) to be mounted.

SSLPDF (SINGLE-SIDED, LOW PROFILE DISTRIBUTING FRAMES)

4.09 The SSLPDF is designed as a high density conventional distributing frame with maximum pair capacity in a minimum amount of space.

4.10 The SSLPDF accommodates conventional frame apparatus (CO connectors, blocks, terminal strips, and test-talk) for a wide variety of distributing frame applications within the sizing guidelines of approximately 21,000-pair unshielded or equivalent shielded termination capacity at 100% jumper fill.

4.11 The basic SSLPDF unit (Figure 9) provides two vertical uprights on 8-inch centers in a single-sided arrangement 16 inches wide by 15 inches deep. Standard heights available are 7 feet, 7 feet 6 inches, 9 feet, and 11 feet 6 inches. (The 9-foot and 11-foot 6-inch options are designed to accept apparatus only to the 7-foot 6-inch level.) The standard black and ivory colors will blend with nearly any office color scheme.

4.12 The SSLPDF mounts standard AT&T CO connecting apparatus and bolt-on jumper wireways in configurations ranging from all connectors, 89-type connecting blocks, or combinations of connectors and blocks to meet a variety of requirements.

4.13 The SSLPDF also mounts a steel designation stamping panel and a steel kick-panel at the top and bottom, respectively, of each 2-vertical unit.

4.14 The optional SSLPDF open end guard is designed for use on both the right and left ends of a lineup. An optional sheet-metal cover is available where a closed end guard arrangement is desired.

4.15 The end guards, horizontal and vertical jumper wireways, the office ground bar, and standard apparatus are separately orderable items.

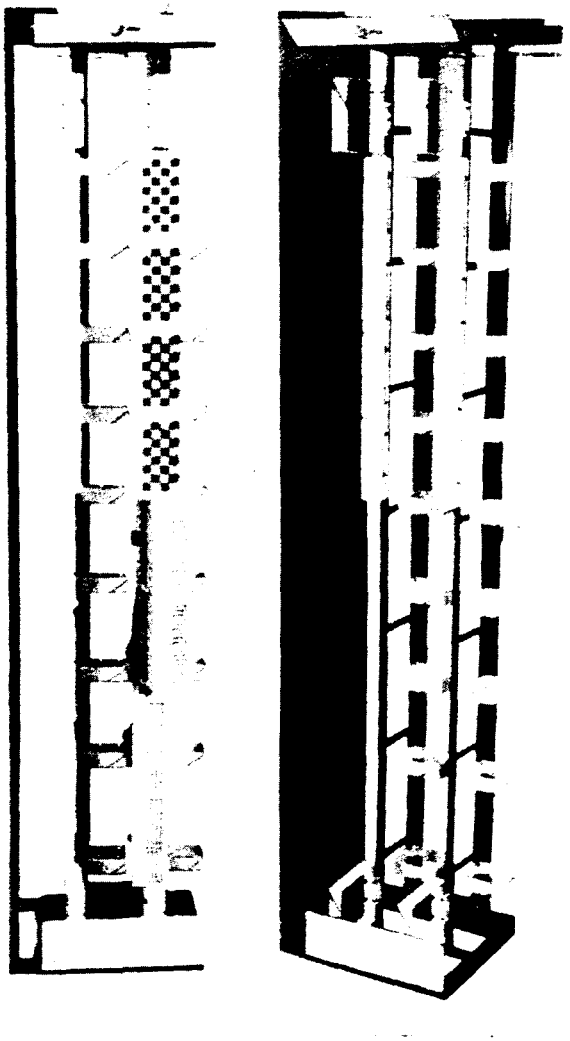


Figure 9—SSLPDF (Single-Sided, Low Profile Distributing Frame)

4.16 Tables K through Q contain specifications and ordering information for the SSLPDF.

TABLE K

SSLPDF APPARATUS CAPACITIES PER VERTICAL

WITH ONE HORIZONTAL WIREWAY/VERTICAL (10,500 UNSHIELDED TERMINATION PAIRS CAPACITY)						
QTY 89s	7'0" FRAME			7'6" FRAME		
	310s/ 310Ms	309s/ 311s	303s	310s/ 310Ms	309s/ 311s	303s
9	0	0	0	0	0	0
8	0	0	0	1	1	0
7	1	1	0	2	2	1
6	2	2	1	3	2	1
5	3	3	1	4	3	2
4	4	3	2	5	4	2
3	5	4	2	5	5	2
2	6	5	3	6	5	3
1	6	5	3	7	6	3
0	7	6	3	8	7	4

WITH TWO HORIZONTAL WIREWAYS/VERTICAL (21,000 UNSHIELDED TERMINATION PAIRS CAPACITY)						
QTY 89s	7'0" FRAME			7'6" FRAME		
	310s/ 310Ms	309s/ 311s	303s	310s/ 310Ms	309s/ 311s	303s
9	—	—	—	0	0	0
8	0	0	0	0	0	0
7	1	1	0	1	1	0
6	2	1	1	2	2	1
5	2	2	1	3	3	1
4	3	3	1	4	3	2
3	4	3	2	5	4	2
2	5	4	2	6	5	3
1	6	5	3	6	5	3
0	7	6	3	7	6	3

TABLE L

SSLPDF APPARATUS MOUNTING SPACE ON UPRIGHT (NOTE)

FRAMEWORK	7'0"	7'6"	9'0"*	11'6"*
— With no horizontal wws	79"	85"	9'0"	11'6"
— With one horizontal wws	73"	79"	9'0"	11'6"
— With two horizontal wws	67"	73"	9'0"	11'6"

Note: With bottom of lowermost horizontal wireway or connecting apparatus positioned flush with top of base (i.e., 2" from floor), and designation panel or front junction brace mounted at top of front uprights.

* Taller frameworks (9'0" and 11'6") are not tapped for apparatus mounting above the 7'6" level; thus, table data for 7'6" framework applies.

TABLE M

SSLPDF TYPICALLY MOUNTED APPARATUS HEIGHT REFERENCE DIMENSIONS

Horizontal Wireway	6"
89-Block	8"
Miniature Test-Talk*	8"
310, 310M Connector	9.4"
309, 311 Connector	11.0"
303 Connector	19.0"
* Test-Talk ED-6C110-10 Groups 25 or 26.	

TABLE N

SSLPDF FRAME DIMENSIONS AND FLOOR LOADING

Unit Framework	2-Vertical Unit
Width	16"
Depth	15"
Vertical Spacing	8"
End Guard Width	4" each
Floor Loading (fully loaded)	65 lbs/sq ft (7'6" frame)

TABLE O

SSLPDF CABLING AND WIRING CROSS SECTIONS (SQ IN.)

CABLE-WAYS (PER VERTICAL)			WIREWAYS (EACH)		
Top	—	24	Horizontal	—	39.5
Bottom	—	24	Std Vertical	—	18.4
Within Vertical	—	18	309 Vertical	—	24.7

TABLE P

SSLPDF ED-6C331-70 ORDERING INFORMATION

SSLPDF ORDERING GROUPS						NOTES
EQUIPMENT ITEM		ORDERABLE ED-6C331-70 GROUP				1
One 7'6" Framework Unit (G20) With All Wireways and Brackets to Equip for Mounting: Two Horizontal Wireways, Four 89-Type Blocks and four 310/310M Connectors on Each of Two Verticals		G01				2
Framework	Height	7'0"	7'6"	9'0"	11'6"	
	Unit (two verticals)	G10	G20	G30	G40	3
End Guards	Basic Open End Guard	G11	G21			
	End Guard Cover Panel	G12	G22			4
Wireways	Horizontal WW	G50				
	Std Vertical WW	G60				5
	309-Type Vertical WW	G70				
89-Type Block Mounting Bracket		G80				
Office-Originating Ground Bar		G90				6

Notes:

1. All groups include attaching hardware for frame assembly; anchoring and top support hardware is not included.
2. G01 provides: one G20 7'6" framework unit, four G50 horizontal wireways, eighteen G60 standard vertical wireways, eight G80 89-block mounting brackets, and all assembly hardware.
3. Each framework unit includes one each: framework bonding ground bar, designation panel, kick panel, and details for joining to an existing SSLPDF lineup.
4. One end guard group fits either end of an SSLPDF lineup; order 7'6" (G21 end guard and G22 optional cover panel) for 9'0" and 11'6" framework.
5. See the following table for general ordering quantities.
6. Includes 8 feet of #0 stranded copper wire and two terminal lugs for connecting to framework bonding bar. (Normally used only where SSLPDF will be principal DF in structure.)

TABLE Q

SSLPDF GENERAL WIREWAY AND 89-BRACKET ORDERING FOR ONE FRAMEWORK UNIT

QTY HORIZONTAL WIREWAYS PER VERTICAL (TERMINATION CAPACITY)	ONE (10,500 PAIRS)	TWO (21,000 PAIRS)
Horizontal Wireways G50	2	4
Vertical Wireways G60 or G70	Twice the quantity of blocks and connectors on one vertical	As at left, plus 2
89-Type Block Bracket G80	One for each 89-type or miniature Test-Talk Block	

4.17 Ordering information for additions to the earlier LA2012 prototype version of the SSLPDF (which has angle-iron front uprights and rod-type wireways) is available in the SSLPDF Product Application Guidelines document, Select Code 202-010.

EARLIER DOUBLE-SIDED CONVENTIONAL DISTRIBUTING FRAMES

4.18 Listed in Table R are dimensions and ordering drawings for taller conventional DFs that are still used by some companies for new installations in older buildings with high ceilings. The 9-foot 0-inch ED-97797-70 frame is the popular "3 *ESS*™ LPCDF" now used in many small (shallow shelf) double-sided applications. The deeper 11-foot shelf is recommended for applications from 10-18 verticals large.

TABLE R

EARLIER DOUBLE-SIDED CONVENTIONAL DISTRIBUTING FRAMES — SPECIFICATIONS AND ORDERING INFORMATION

HEIGHT	DEPTH	ORDERING DRAWING	VERTICALS		SHELVES	
			DEPTH	APPARATUS MOUNTING SPACE	QUANTITY	DEPTH
9′0″	2′0″	ED-97797-70 G1, 2	8″	95″	10	5″
9′0″	2′6″	ED-97797-70 G3, 4	8″	95″	10	11″
11′6″	4′3″	ED-91670-77	14″	114″	15	20″
12′5″	4′3″	ED-91006-79	14″	114″	15	20″
14′5″	4′3″	ED-91235-79	1″	149″	19	20″

Note: These frames feature 8-inch vertical and 8-inch shelf-spacing. Continuous bar apparatus mounting on vertical uprights and shelves is provided.

EARLIER SINGLE-SIDED CONVENTIONAL DISTRIBUTING FRAMES

4.19 Listed in Table S are selected available single-sided DFs that are still used by some companies for specialized new installations. As these frames tend to have small wireways for intervertical jumpers, they are suitable only for small applications. The SSLPDF is more versatile and is recommended in most instances where frames of this type are being considered.

TABLE S

EARLIER SINGLE-SIDED CONVENTIONAL DISTRIBUTING FRAMES — SPECIFICATIONS AND ORDERING INFORMATION

HEIGHT	DEPTH	ORDERING DRAWING	VERTICALS				WIRE-WAYS	
			SPACING	DEPTH	APP SPACE	APP* MTG	QTY	CROSS-SEC (SQ IN. EACH)
8′0″	1′0″	H241-144	8″	6¼″	5′⅓″	B, C	2, 3	24
8′8″	1′0″	H241-144	8″	6¼″	6′0″	B, C	2, 3	24
9′0″	1′0″	H241-144	8″	6¼″	6′0″	B, C	2, 3	24
11′6″	1′0″	H241-114	8″	6⅛″	8′8″	B	3	20⅜

Note: Apparatus Mounting
B = Butterfly Lugs — Typically P11008 on Verticals, and P67525 on Horizontals
C = Continuous Bar.

5. PROTECTOR FRAMES

5.01 Protector frames are provided for the termination of outside plant cable pairs. These frames have no provisions for cross-connections, and are typically used in conjunction with separate distributing frames. Outside plant cable pairs are terminated on protected connectors and tie-cabled to connecting blocks on the vertical side of the DF (distributing frame). The outside plant cable tie pairs on the DF can then be cross-connected to central office equipment terminations elsewhere on the DF. The use of separate PFs (protector frames) generally facilitates higher density DF configurations since more blocks (with ties from the PF) can be mounted on the DF than on connectors. Though multiple lineups are involved, such separate PF/DF arrangements can sometimes fit in constrained floor space where a single DF with connectors would not fit. In small enclosures, for example, the AT-9049 protector frame can be installed along the short wall, and a *COSMIC*® Mini DF (with blocks only) can be installed along the long wall. Table T contains typical capacities for selected protector frames.

TABLE T

TYPICAL CAPACITIES FOR SELECTED PROTECTOR FRAMES

FRAMEWORK					OSP PAIRS PER UNIT				
PROTECTOR FRAME	UNIT	HEIGHT	DEPTH	WIDTH	CONNECTOR TYPE				
					309	308	307	302	195 (UL LISTED)
High Density Modular	12-Vertical Module	8′ 0″	1′0″	6′6″		9600			
Modular	12-Vertical Module	8′0″	1′0″	6′6″				6000	
LPDSPF	6 Verticals	8′0″	2′5″	4′0″	9600	9600		6000	
AT-9049	1 Bay	6′0″	9′0″	10″			900		
Slide Drawer PF	6 Drawers	5′4″	1′7″	4′7″	7200				
XLBET PF	1 Bay	7′0″	1′6″	2′0″					3600
Tall Double- sided Conventional PFs	1 Vertical	11′6″	2′6″	8″	See Specific ED Drawing				
		12′5″	2′6″	8″					
		14′5″	2′6″	8″					

HIGH-DENSITY MODULAR PROTECTOR FRAME FOR 308-TYPE CONNECTORS

5.02 The high-density modular protector frame (Figure 10) is recommended wherever large, single-sided protector frames are planned. It is especially suitable with *COSMIC* I type distributing frames for cabling and operation. With such *COSMIC* applications, MELD (Mechanized Engineering and Layout for Distributing frames) produces cable identification labels for each connector. This frame offers higher termination density than the ED-1A220-31 modular protector frame. The frame is equipped with a KS-20100 protector unit test set for protector unit tests.

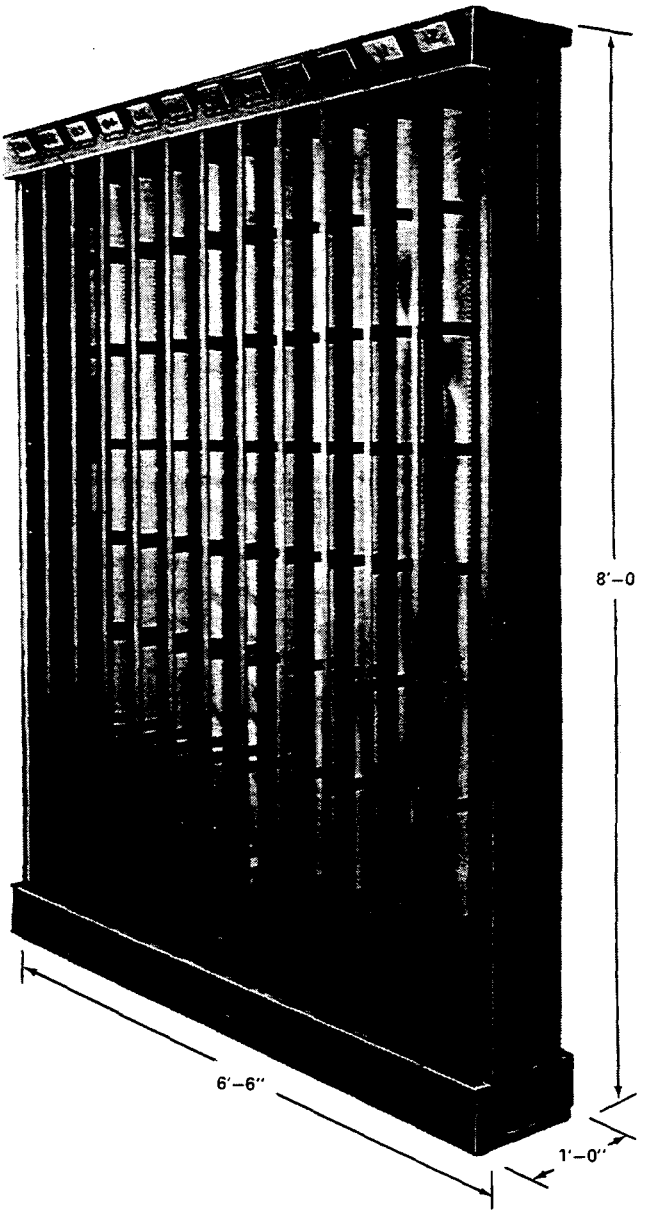


Figure 10—High Density Protector Frame — Front View (12 Verticals)

5.03 The basic framework for each module consists of 12 verticals, each arranged to mount eight 308 type 1 connectors for a capacity of 96 connectors or 9600 outside plant cable pairs (Table U).

TABLE U

HIGH DENSITY MODULAR PROTECTOR FRAME SPECIFICATIONS

DIMENSIONS				CAPACITY		
UNIT	HEIGHT	DEPTH	WIDTH	308 CONN	PAIR TERMINATIONS	DRAWING
12-Vertical Module	8′	1′	6′6″	8/Vert 96/Mod	800/Vert 9600/Mod	ED-97898-31
End Guard						ED-1A198-71

5.04 The frame is equipped with a KS-20100, L1 test set for protector unit continuity tests. Connectors and associated protector units must be ordered separately. Appliance outlets are provided with the frame.

5.05 As with the modular protector frame, stub cables may be run through the floor or run overhead to cable racks. Cable from the protector frame to separate DPs is typically 100-pair 26-gauge shielded or unshielded switchboard cable, run through overhead cable racks. Wiring operations are performed from the rear.

MODULAR PROTECTOR FRAME FOR 302-TYPE CONNECTORS

5.06 The modular protector frame for 302-type connectors (Figure 11) has been primarily used with earlier *ESS*™ and *COSMIC* I-type modular DFs. Framework is available for additions to this PF as described in the following paragraphs. Note that the newer high density modular PF, which mounts 308-type connectors, is also compatible for additions.

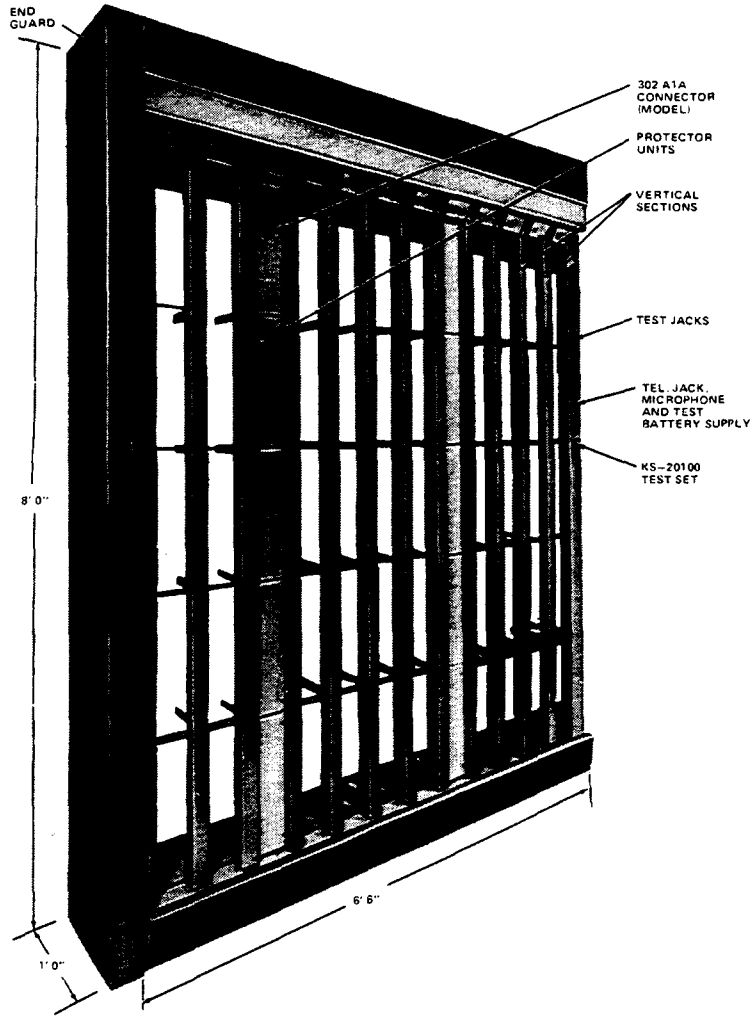


Figure 11—Modular Protector Frames — Front View (12 Verticals)

5.07 Each module consists of 12 verticals, each arranged to mount five 302 type 1 connectors for a capacity of 60 connectors or 6000 outside plant cable pairs. There are three separate arrangements of the protector frame (Table V).

TABLE V

MODULAR PROTECTOR FRAME SPECIFICATIONS AND ORDERING INFORMATION

USE	UNIT	DIMENSIONS			CAPACITY		
		HEIGHT	DEPTH	WIDTH	302 CONN	PAIR TER-MINATIONS	DRAWING
General	12-Vertical Module	8′	1′	6′6″	5/Vert 60/Mod	500/Vert 6000/Mod	ED-1A220-31 G8
COSMIC	12-Vertical Module	8′	1′	6′6″	5/Vert 60/Mod	500/Vert 6000/Mod	ED-1A220-31 G7
	12-Vertical Module	8′	1′	6′6″	5/Vert 60/Mod	500/Vert 6000/Mod	ED-1A220-30(DA)
End Guards							ED-1A198-71

5.08 The ED-1A220-31 G7 is used as a *COSMIC* protector frame. The frame is equipped with KS-20100 protector test set and appliance outlets. The jack panel, test panel, and test/talk system are ordered separately.

5.09 The ED-1A220-31 G8 is used as a separate protector frame with DFs. The frame is equipped with a test/talk system to the test desk, jack panel, test panel for miscellaneous circuits, KS-20100 protector test set, and appliance outlets.

5.10 The older ED-1A220-30 (rated DA) protector frame can only be provided for additions to existing ED-1A220-30 frame lineups. The frame is equipped with a test/talk system to the test desk, jack panel for miscellaneous circuits, and appliance outlets. A protector test set KS-20100 is ordered separately.

5.11 End guards are available for finishing each end of a lineup. End guards have storage space for storing cords and protector units. Orderable end guard options are described in ED-1A198-71.

5.12 As with the modular protector frame, stub cables may be run through the floor or run overhead to cable racks. Cable from the protector frame to separate DPs is typically 100-pair 26-gauge shielded or unshielded switchboard cable, run through overhead cable racks. Wiring operations are performed from the rear.

LPDPF (LOW PROFILE DOUBLE-SIDED PROTECTOR FRAME) FOR 302, 308, AND 309 CONNECTORS

5.13 The LPDPF (Figure 12) is used to terminate outside plant cable pairs on central office connectors for cabling to connecting blocks on the distributing frame. The LPDPF conforms to NEBS (Network Equipment Building System Standards) 8-foot height requirements.

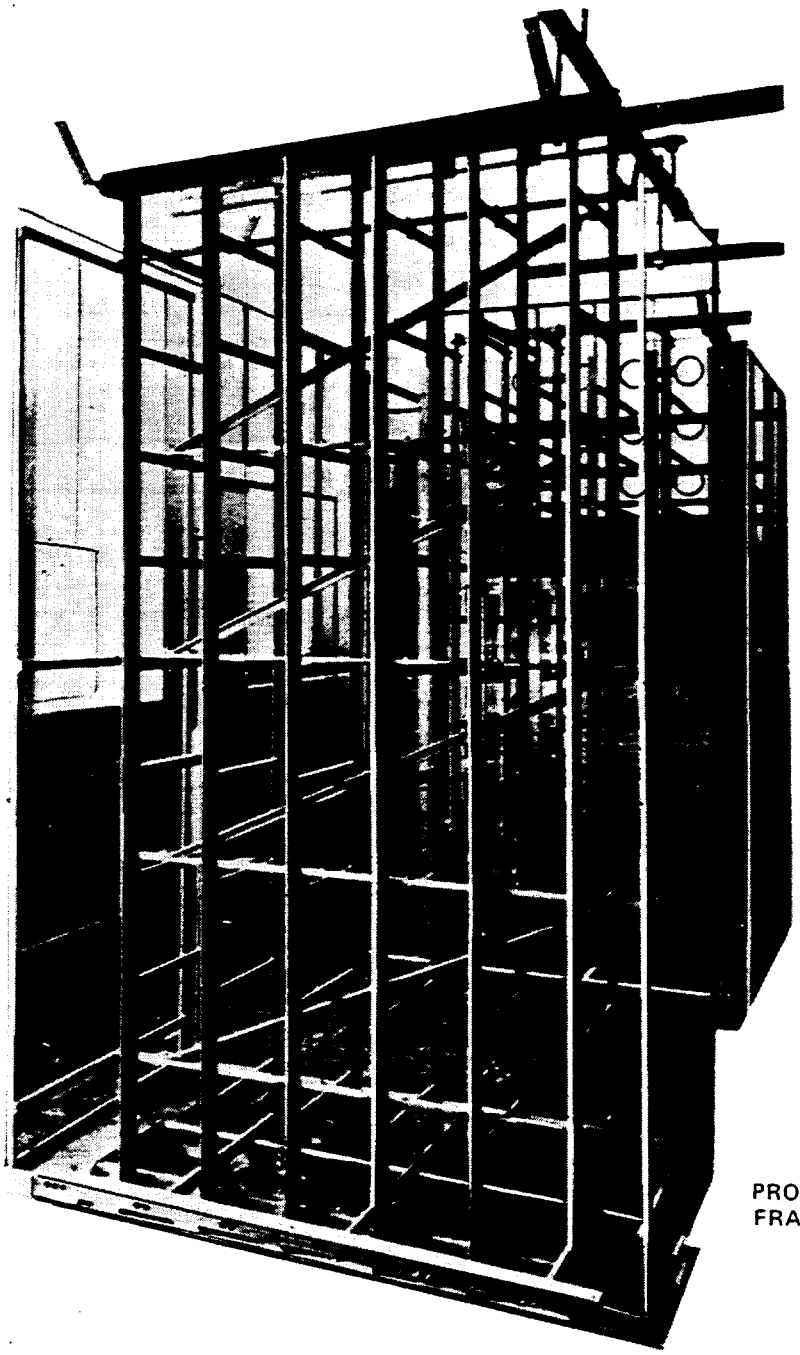


Figure 12—Low Profile Double-Sided Protector Frame

5.14 The LPDPF is intended for use with the LPCDF (Low Profile Conventional Distributing Frame) for NEBS installations. The frame is 8 feet high by 2 feet 5 inches deep at the guardrails. The frame is supplied in six vertical ordering groups each with 8-inch vertical spacing (Table W).

TABLE W

LPDPF SPECIFICATIONS AND ORDERING INFORMATION

VERTICALS	HEIGHT	VERTICAL SPACING	FRAME DEPTH (NOTE)	TERMINATIONS/VERTICAL CONNECTORS (BOTH SIDES)			
				302	308	309	DRAWING
6	8′0″	8″	1′3-3/8″	1000	1600	1600	ED-97755-72*

Note: Excluding guardrails (with guardrails — 2′5″).

* For older installed ED-97755-70 frames, use H-400-087 drawing to modify the frame for 308-type connector installations.

5.15 The ED-97755-72 LPDPF front and rear verticals are arranged for mounting 302-, 308-, and 309-type connectors. Connector terminations are tie-cabled from both sides to a separate distributing frame. End guards are available but ordered separately.

EARLIER PROTECTOR FRAMES (SINGLE AND DOUBLE SIDED)

5.16 Both single- and double-sided PFs in earlier, generally tall versions, are still in use in many central offices (Table X). Additions can be provided to these frames as well as new installations of selected codes. Terminating densities vary with frame height and connector type used.

TABLE X

EARLIER PROTECTOR FRAMES SPECIFICATIONS AND ORDERING INFORMATION

HEIGHT	FRAME DEPTH (NOTE)	VERTICAL SPACING	END GUARD DRAWING	FRAMEWORK	
				RATING	DRAWING
SINGLE SIDED					
11'6"	1'4"	8"	ED-60239-70	GA	ED-60242-72
11'6"	11"	8"		LA	H-592-642
14'5"	11"	6-1/2"		LA	H-592-582
DOUBLE SIDED					
8'0"	1'3-3/8"	8"		DA	ED-97755-70
11'6"	2'5-1/2"	8"	ED-60239-70	GA	ED-60242-72
11'8"	1'4"	8"	ED-90581-10	GA	ED-92976-71
11'8"	1'3-3/8"	8"		DA	ED-92976-70
12'5"	1'4"	8"	ED-90581-10	GA	ED-90275-71
12'5"	1'3-3/8"	8"		DA	ED-90275-72
14'5"	1'4"	8"	ED-90278-10	GA	ED-90274-71
14'5"	1'3-3/8"	8"		DA	ED-90274-72

Note: Excluding guardrails. Guardrails generally add about 14" in depth.

5.17 Frames are available with various number of verticals as specified by group in the associated ED-drawing. Tall frames usually require mezzanines or rolling ladders for operation. End guards, connectors, and associated test equipment are ordered separately. In general, these earlier frames can be modified to mount newer connector types such as the 308 connector (for example, see Drawing H-400-087 for modifying ED-97755-70).

AT-9049B, C, OR D PROTECTOR AND CABLE ENCLOSURE

5.18 The high termination density of this enclosure is well suited to structures with limited floor space such as concrete huts and equipment platforms. The capacity of the protection and cable enclosure is sufficient to accommodate a full complement of *SLC* Series 5 carrier system. The AT-9049 (Figure 13) also serves well as a separate protector frame for large *COSMIC* Mini applications. The modularity of the enclosure permits a wide variety of configurations (Table Y).

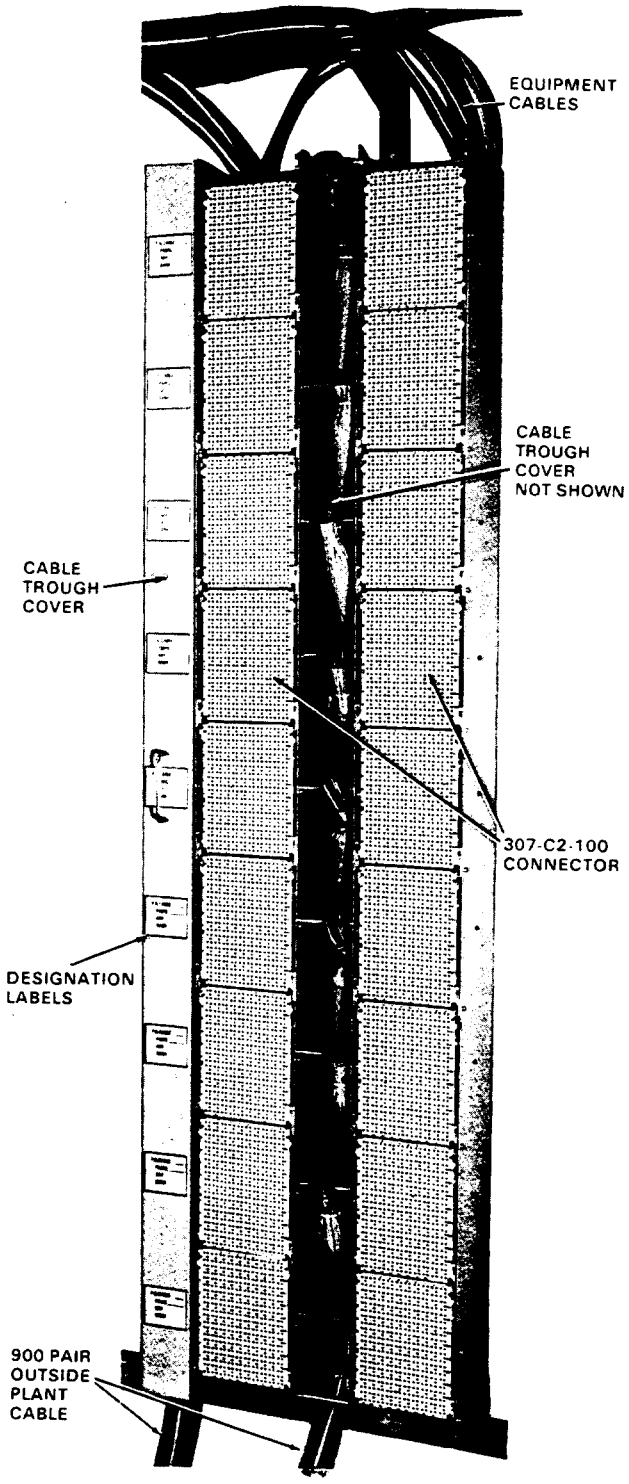


Figure 13—AT-9049B Protector and Cable Enclosure (Left-to-Right Growth) Two B Units Shown (Total Capacity 1800 Pairs)

TABLE Y
AT-9049 SPECIFICATIONS AND ORDERING INFORMATION

	GROWTH	H	W	D	307 CONN PAIRS	AT SPECIFICATION	COMCODE
Framework	L-R	75″	10″	9.12″	9 (900)	AT-9049B	403249170
	R-L	75″	10″	9.12″	9 (900)	AT-9049C	403249162
	None	75″	19.32″	9.12″	18 (1800)	AT-9049D	403249147
Cable Trough End Guard						AT-9050B	403249253
Empty 307 Connector Slot Filler Panel						AT-9059B	403652647
Labels	Digital Lines Cable Pair Label						845114040
	P.G. Cable Number Label						403037070
	Miscellaneous Pairs Label						403037088
307C2-100 connectors are ordered separately.							

5.19 The AT-9049B 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.

5.20 The AT-9049B and C protector and cable enclosure are sheet metal frames 75 inches high by 10 inches wide by 9.12 inches deep. Two compartments are provided in each framework. One is approximately 75 inches high by 3 inches wide by 9 inches deep and holds the outside plant cable. The second compartment, 75 inches high by 6.5 inches wide by 9.12 inches deep, mounts nine 307-C2-100 protector blocks. Ample space is available behind the protector blocks to run and interconnect nine 100-pair equipment cables.

5.21 A single 900-pair frame is constructed by fastening one AT-9049B or C enclosure directly to a wall or to wall-mounted "U" section channel. To complete the assembly, one AT-9050B cable trough end guard is assembled to the AT-9049 enclosure. After the initial cable enclosure and cable trough have been installed, each additional AT-9049B or C enclosure expands the capacity by 900 pair.

5.22 The AT-9049D protector and cable enclosure is 75 inches long by 19.75 inches wide by 9.12 inches deep and has a capacity of 1800 cable pairs. It is a complete system equipped with sheet metal covers on each end, and is not designed for growth.

5.23 A cable trough front cover is also provided to physically protect the outside plant splice on the AT-9049B, C, and D enclosures.

5.24 Optional snap-in filler panels AT-9059B are available for empty 307 connector positions.

SDA (SLIDE DRAWER ASSEMBLY) PROTECTOR FRAME FOR 309-TYPE CONNECTORS

5.25 The SDA (Figure 14) provides high-density bulk protection for voice and data lines using 3- or 4-type protector units. When pulled, the drawer telescopes out about 15 inches 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.

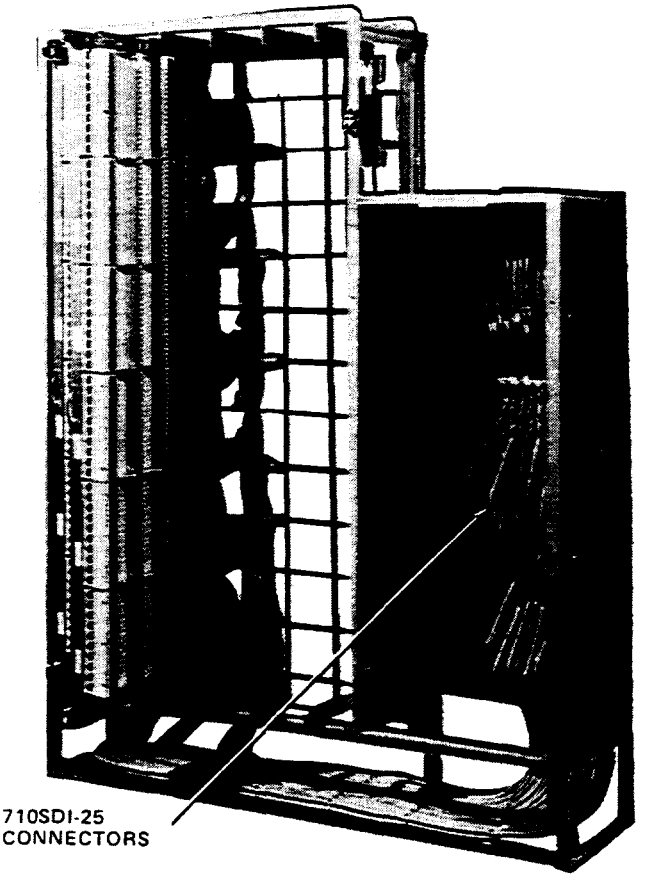


Figure 14—SDA With Splice Cabinet Cover Removed

5.26 Each connector is cabled with 100-pair switchboard 26-gauge cable. The OSP side is a 70-foot loop than can be cut and connectorized by the customer to suit length and connector needs. The equipment side is cut and connectorized with 710 SD1-25 connectors. In some applications, the floor space saved is considerable over the use of conventional protector mountings. The modular concept of the SDA facilitates additions of protection and cabling to new or existing systems with a minimum of effort.

5.27 The SDA (Table Z) 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 switchboard stub cables to provide protection for 1200 lines. A fully equipped (6-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.

TABLE Z

SLIDE DRAWER ASSEMBLY SPECIFICATIONS AND ORDERING INFORMATION

CAPACITY (PAIRS)	NUMBER OF DRAWERS	NUMBER OF 309 CONNECTORS	SPLICE CABINET	DIMENSIONS (IN.)			DESCRIPTION	COMCODE
				H	W	D		
6000	6	30	136 Max	84.0	65.0	16.0	PX6672-30L136	105727648
			None	84.0	42.5	15.0	PX6672-30L1*	105727754
3600	3	18	136 Max	84.0	46.5	16.0	PX6672-30L136	105727671
			134 Mini	84.0	37.5	15.0	PX6672-30L134	105727655
			None	84.0	22.5	15.0	PX6672-30L1	105727689
2400	2	12	136 Max	84.0	40.5	16.0	PX2624-30L136	105727697
			134 Mini	84.0	31.5	15.0	PX2624-30L134	105727705
			None	84.0	16.5	15.0	PX2624-30L1	105727713
1200	1	6	136 Max	84.0	34.3	16.0	PX1612-30L136	105727721
			134 Mini	84.0	25.3	15.0	PX1612-30L134	105727739
			None	84.0	10.3	15.0	PX1612-30L1	105727747

* The sixth drawer is unequipped and is typically used for digital T1 circuits for remote terminal host CO spans. Custom arrangements of additional 309 connectors and 89-type blocks can be provided for such T1 applications. Alternatively, the sixth drawer can also be completely equipped with 309 connectors for a total capacity of 7200 pairs.

5.28 The optional splice cabinet (Table AA) 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.

TABLE AA

SPLICE CABINET SPECIFICATIONS AND ORDERING INFORMATION

CAPACITY PAIRS	CABINET	DIMENSIONS (IN.)			DESCRIPTION	COMCODE
		H	W	D		
7200	136 Max	65.0	24.0	16.0	PXAM66C136	405427121
5000	134 Min	60.0	15.0	11.8	PXAM66C134	405427162

5.29 The door completely covers the entire front face of the cabinet to protect the splices. The door is equipped with a handle for easy opening and closing. Each cabinet utilizes a ground bar mounted on the side plate for cable-to-cable shield continuity.

XLBET PROTECTOR FRAME FOR 195-TYPE (307 BASED) UL LISTED PROTECTOR

5.30 The AT&T XLBET (Extra Large Building Entrance Terminal) framework (Figure 15) equipped with 195-type protectors provides a high-density single- or double-sided protector frame for many applications in a minimum amount of space. The XLBET can be cabled from the top or bottom.

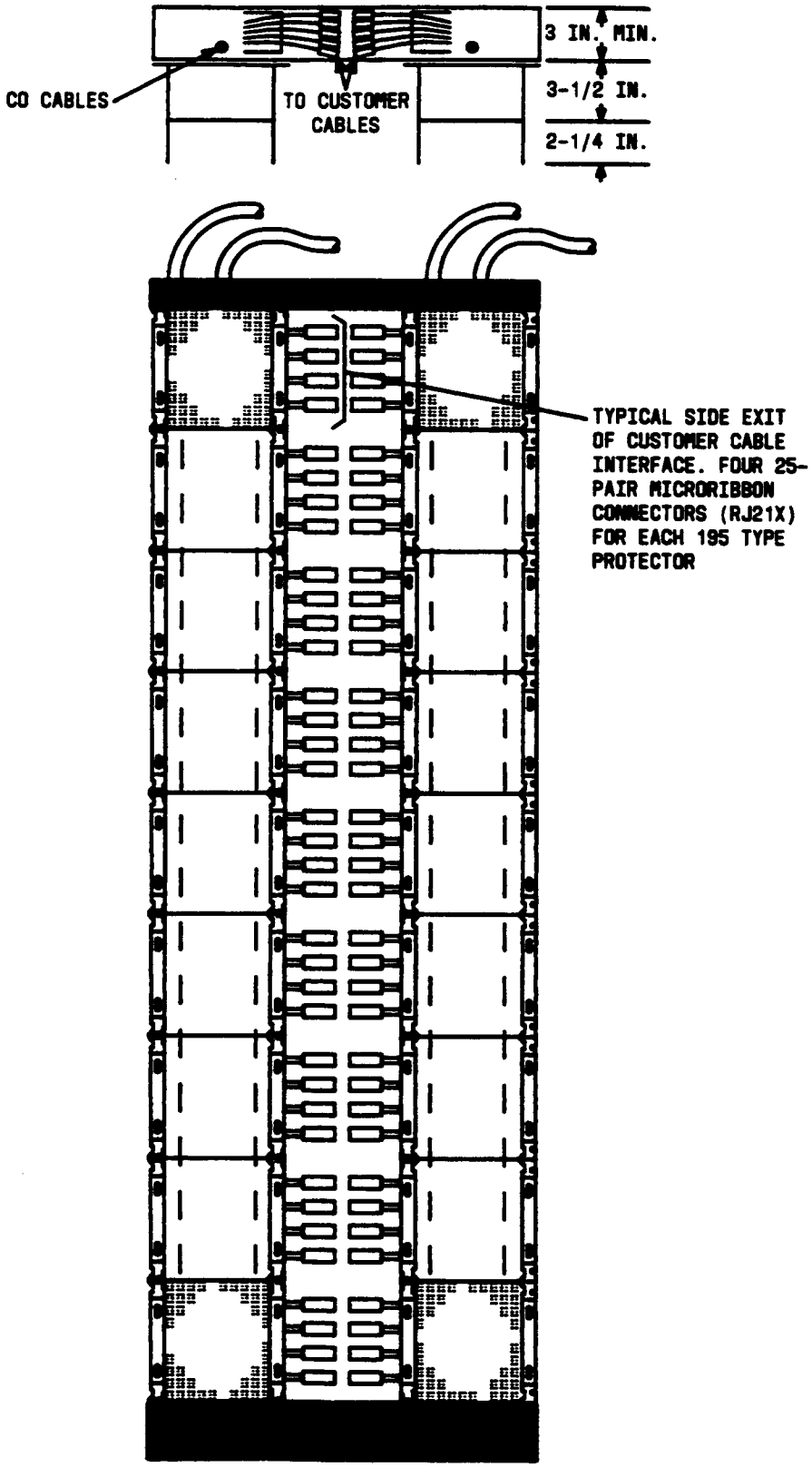


Figure 15—XLBET Protector Frame — Two-Column Configuration (Single Sided)

5.31 The XLBET consists of a steel frame with one mounting bracket for a single-sided frame or two brackets for a double-sided frame. The bracket mounts from 1 to 27 of the 195-type protectors in a 3-column by 9-row arrangement.

5.32 The XLBET frame (Tables AB and AC) can also be arranged with 195-type protectors, 66-type blocks, or 110-type connectors for DF applications in PDS environments.

TABLE AB
CONFIGURATION SELECTION AND ORDERING GUIDELINES

CAPACITY PAIRS PER BAY	CONFIGURATION	CAPACITY 195 PROTECTORS	QTY FRAMEWORK ORDERING UNITS		
			3" BAY	6" BAY	MOUNTING BRACKET FOR 195 PROTECTOR
1800	Two-column Single Sided	18	1	—	1
2700	Three column Single Sided	27	—	1	1
3600	Four column (Two Columns Back-to-Back) Double Sided	36	—	1	2

TABLE AC
XLBET FRAMEWORK FOR MOUNTING 195 PROTECTORS — SPECIFICATIONS AND ORDERING INFORMATION

FRAMEWORK	DIMENSIONS			FRAME CODE	COMCODE
	H	D	W		
3" Deep Bay	7'	3"*	24"	LA2003-139	105158224
6" Deep Bay	7'	6"*	24"	LA2006-139	105158240
Mounting Bracket for 195 Protector	7'	1"	23"	LA2070-139**	105516496

* Excluding front and rear base mounting flanges, each 6" deep, which are included, preassembled to the framework bay.

** Also available in smaller sizes as follows:
Group 3 for three 195 protectors (Comcode 105661805)
Group 6 for six 195 protectors (Comcode 105661797)
Group 12 for twelve 195 protectors (Comcode 105661771).

6. CO CONNECTORS

6.01 Connectors are used in central offices to terminate and protect outside plant cables. The connectors are mounted on distributing and protector frames. The connectors available include units with cross-connect terminal fields such as the 311, 310, 310M, 309, 305, and 303 types and connectors without cross-connect terminal fields such as 307, 308, 302, and 195 types. Most of the connectors use the 3-, 4-, or 5-type protector units, that are ordered separately, to provide electrical protection. The 5-type protector units provide continuity only. Table AD is a quick overall connector selection guide.

TABLE AD

CONNECTOR — FRAME SELECTION GUIDE

CONNECTOR CODES	COSMIC FRAMES	PROTECTOR FRAMES			CONVENTIONAL DISTRIBUTING FRAMES	ARRANGED FOR PROTECTOR UNITS TYPE
	II, IIA, MINI	MODULAR	DOUBLE-SIDED	LOW-PROFILE DOUBLE-SIDED		
311					X	3, 4
310, 310M					X	3, 4
309				X	X	3, 4
308		X*		X*		3, 4, 5
307	X					3, 4
305					X	3, 4, 5
303					X	3, 4, 5
302		X	X	X		3, 4, 5
301			X		X	None
300			X		X	1-B
444C			X		X	None
C50/C52			X		X	Equipped with coils and blocks

Note: The 195 protector is mounted on the XLBET (extra large building entrance terminal) or also on walls and backboards.

* High density.

311-TYPE CONNECTOR (ANGLED MOUNTING)

6.02 The 311-type connector (Figure 16) is a high density, angled mounting connector used to terminate outside plant cables, requiring protection on conventional distributing frames. For the connector codes and more detailed information, refer to AT&T 201-208-114.

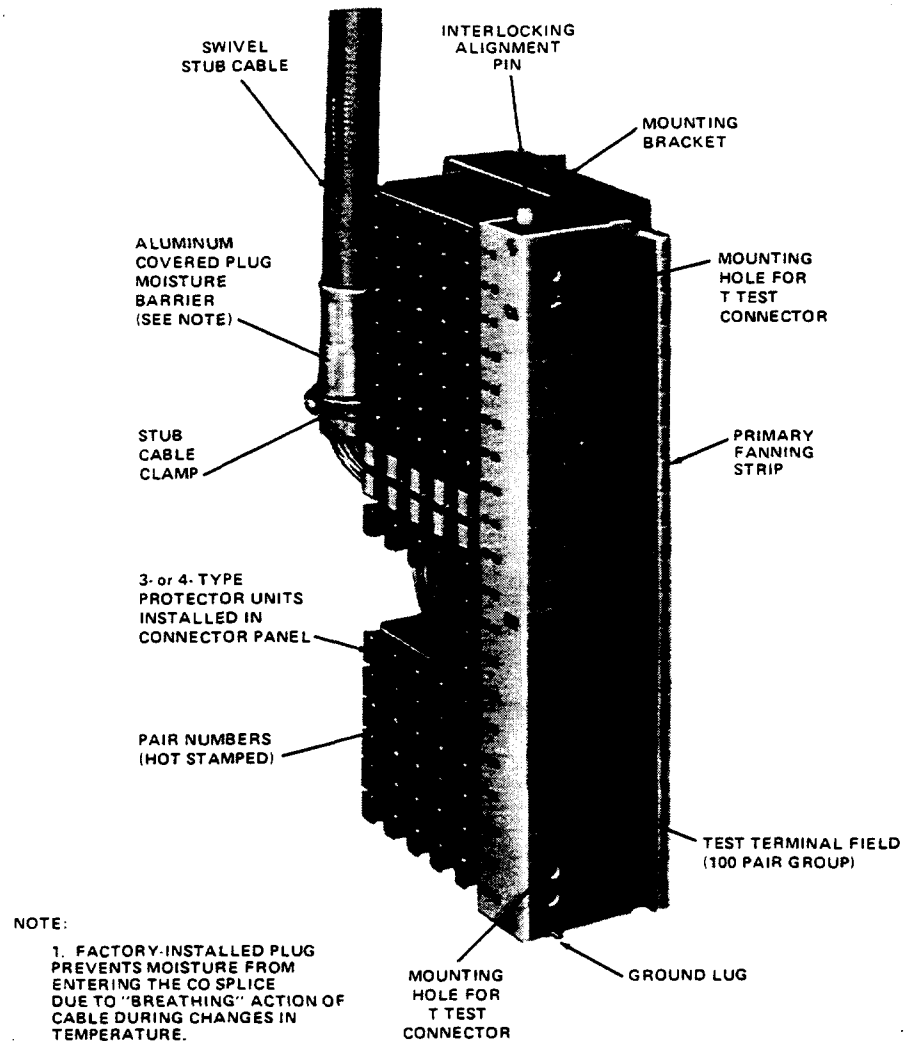


Figure 16—311-Type Connector

310- AND 310M-TYPE CONNECTORS (HIGH DENSITY)

6.03 The 310- and 310M-type connectors (Figures 17 and 18) are high density connectors used to terminate outside plant cables, requiring protection on conventional distributing frames. The 310- and 310M-type connectors have the same features except the 310M-type connector mounting bracket is at a 12.5-degree angle (Figure 19). For the connector codes and more detailed information, refer to AT&T 201-208-113.

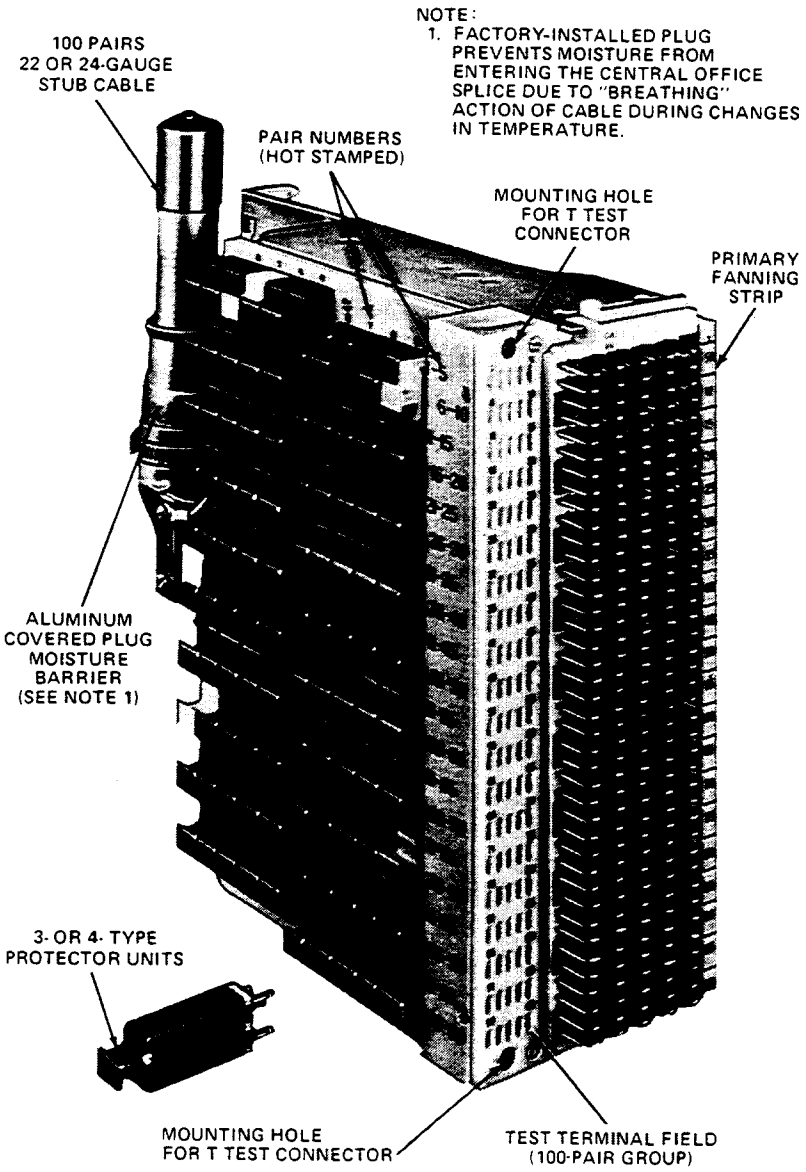


Figure 17—310-Type Quick-Clip Connector

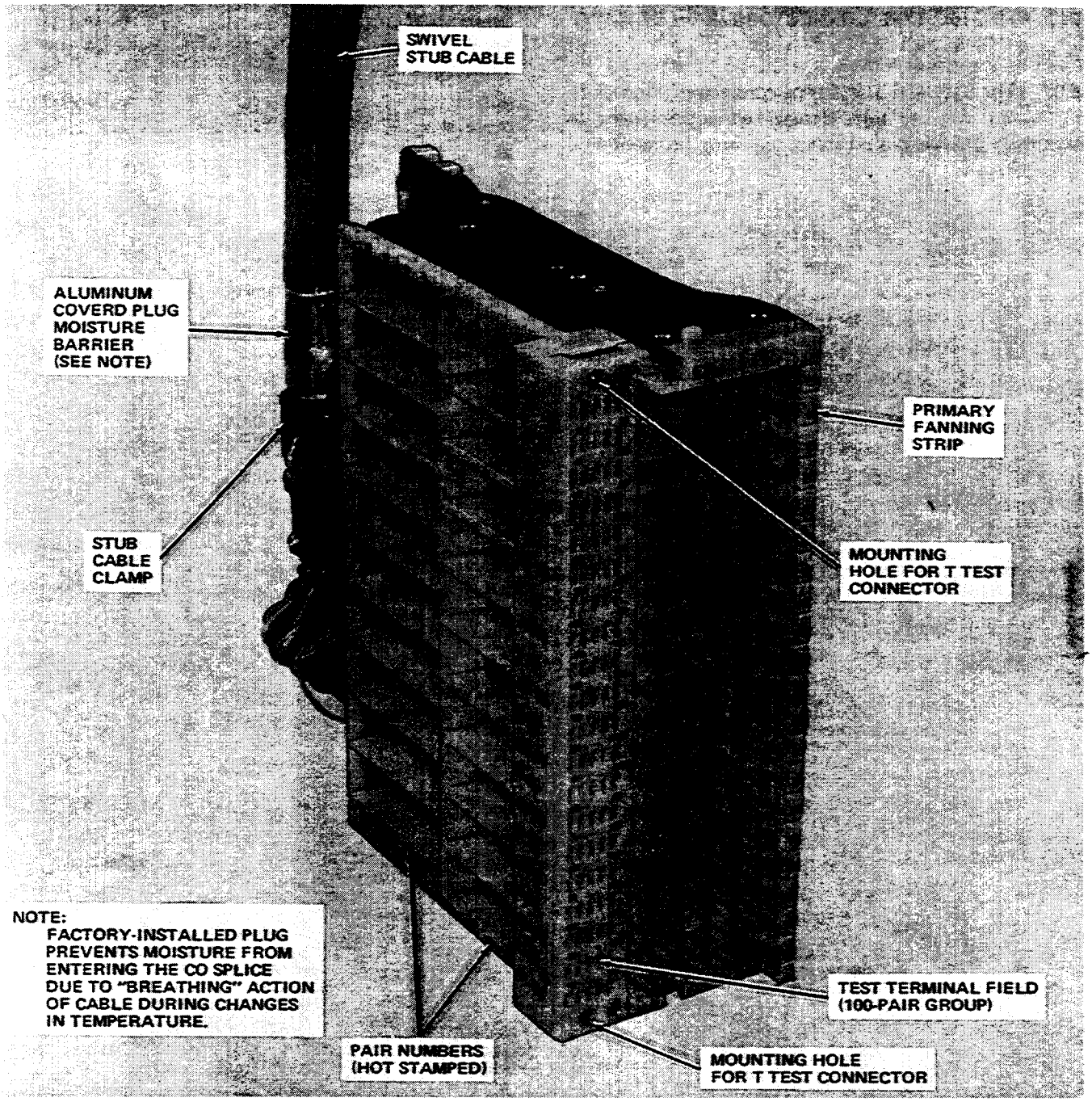


Figure 18—310M-Type Connector

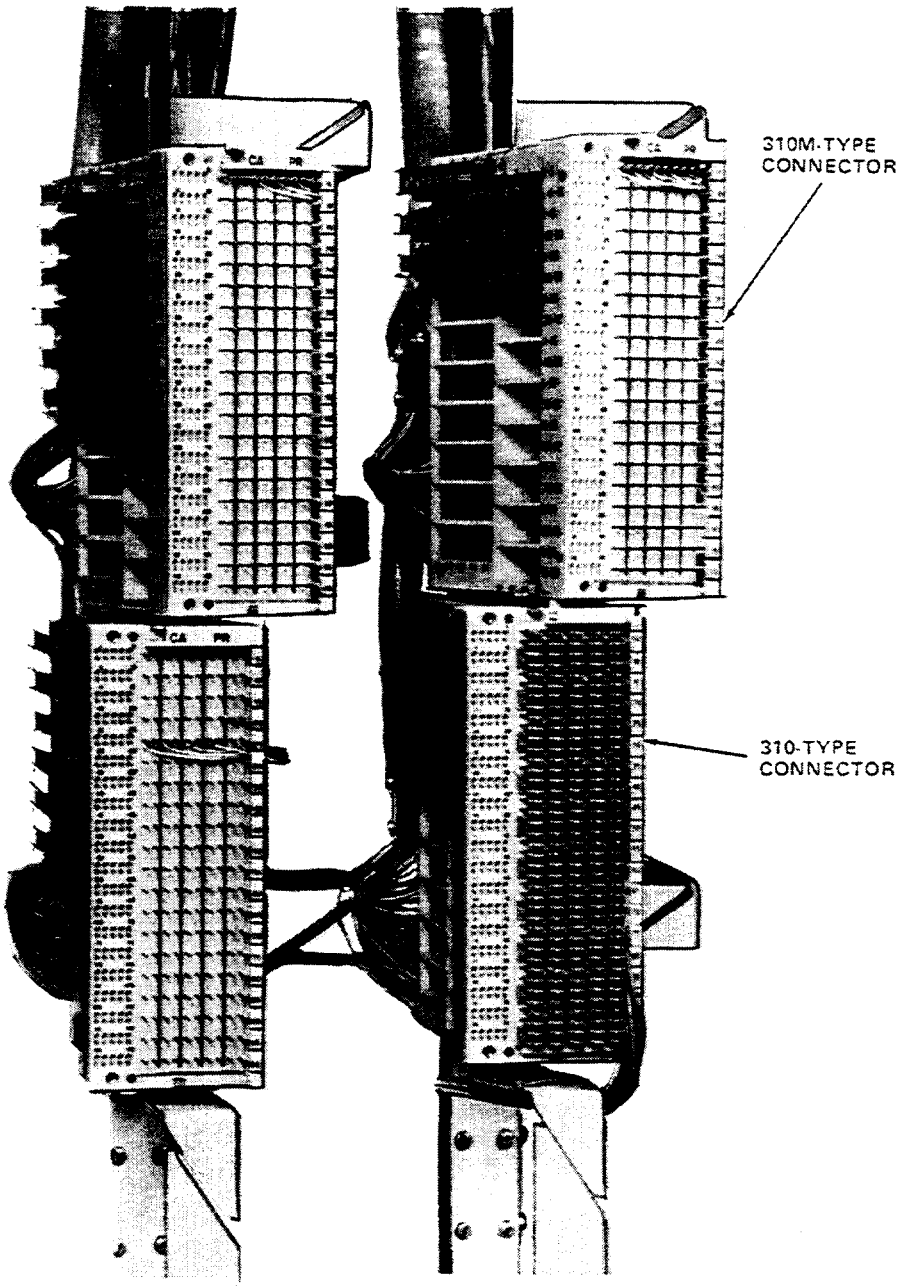


Figure 19—310M Connector (Extends 7 Inches From Face of Vertical Frame Mounting Bar at a 12.5-Degree Angle)

309-TYPE CONNECTOR

6.04 The 309-type connector (Figure 20) is designed for use on the ED-97754-74 LPCDF (Low Profile Conventional Distributing Frame), the ED-6C331-70 single-sided low profile distributing frame, and the ED-97755-72 low profile double-sided protector frame for use with *COSMIC* subscriber main distributing frame systems. The 309-type connector is also used in sliding drawer assembly protector frames. For the connector codes and more detailed information, refer to AT&T 201-208-112.

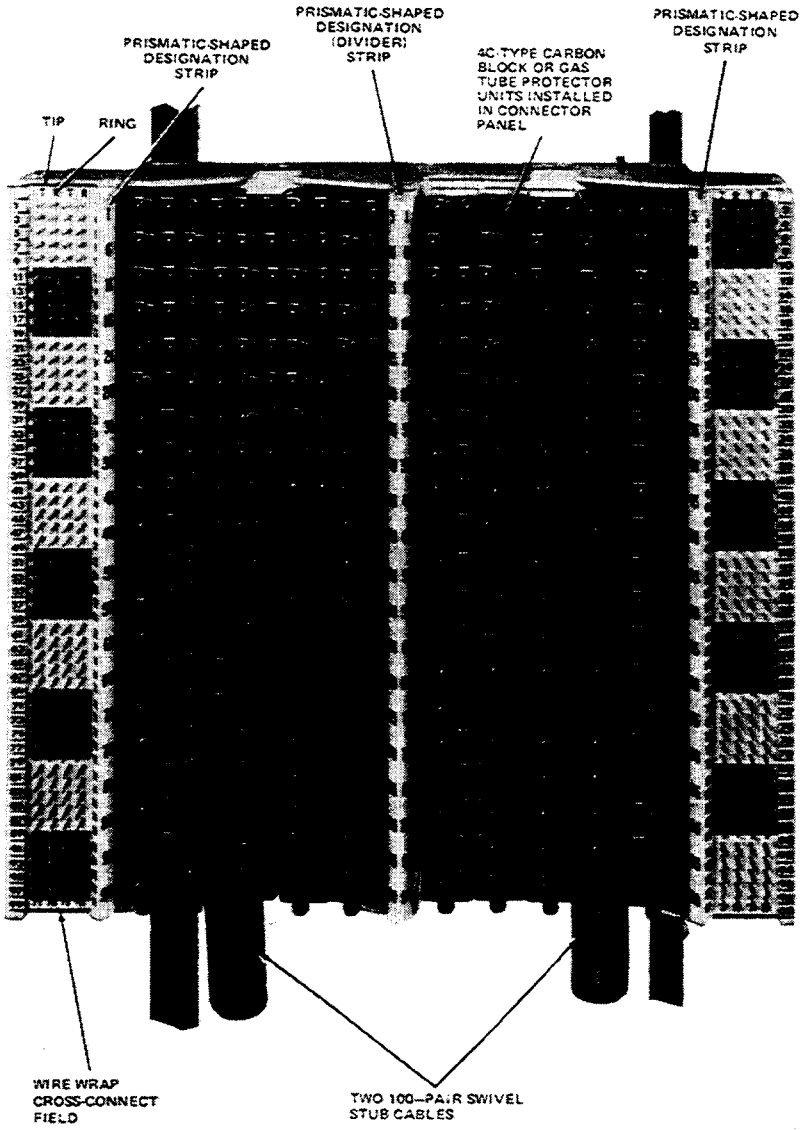


Figure 20—309-Type Connector

308-TYPE CONNECTOR

6.05 The 308A1, B1, or E connector (Figure 21) is used to terminate outside plant cables on the high density modular protector frame (ED-97898-31), and the 308A3, B3, or E2 connector is used to terminate outside plant cables on the low profile double-sided conventional protector frame or a modified ED-97755-70 frame. For the connector codes and more detailed information, refer to AT&T 201-208-111.

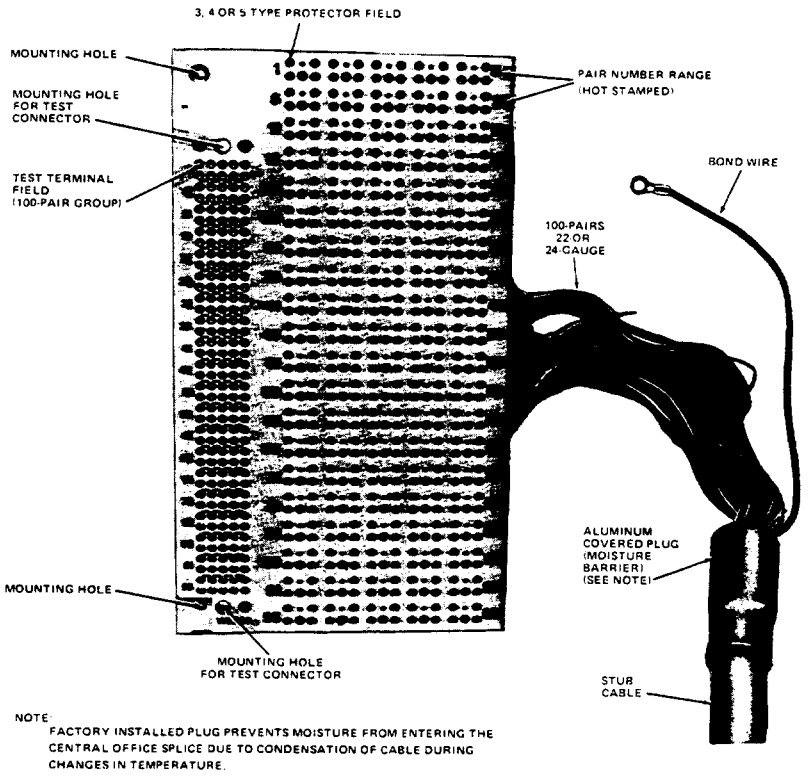


Figure 21—308-Type Connectaor for Use on High Density Modular Protector Frame

307-TYPE CONNECTOR

6.06 The 307-type connectors (Figure 22) are designed for use on the *COSMIC* II, *COSMIC* IIA, and *COSMIC* II Mini distributing frame systems, and the wall-mounted AT-9049 protector frames. They are also used for *SLC* system applications in 80- and 51A-type cabinets. For the connector codes and more detailed information, refer to AT&T 201-208-110.

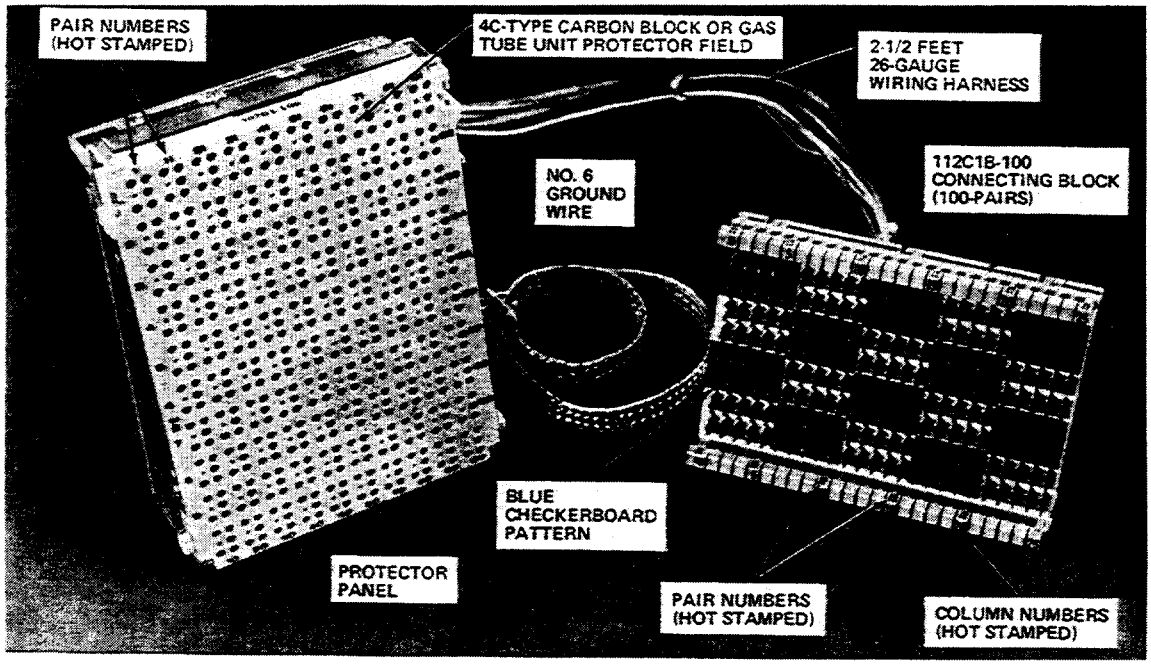
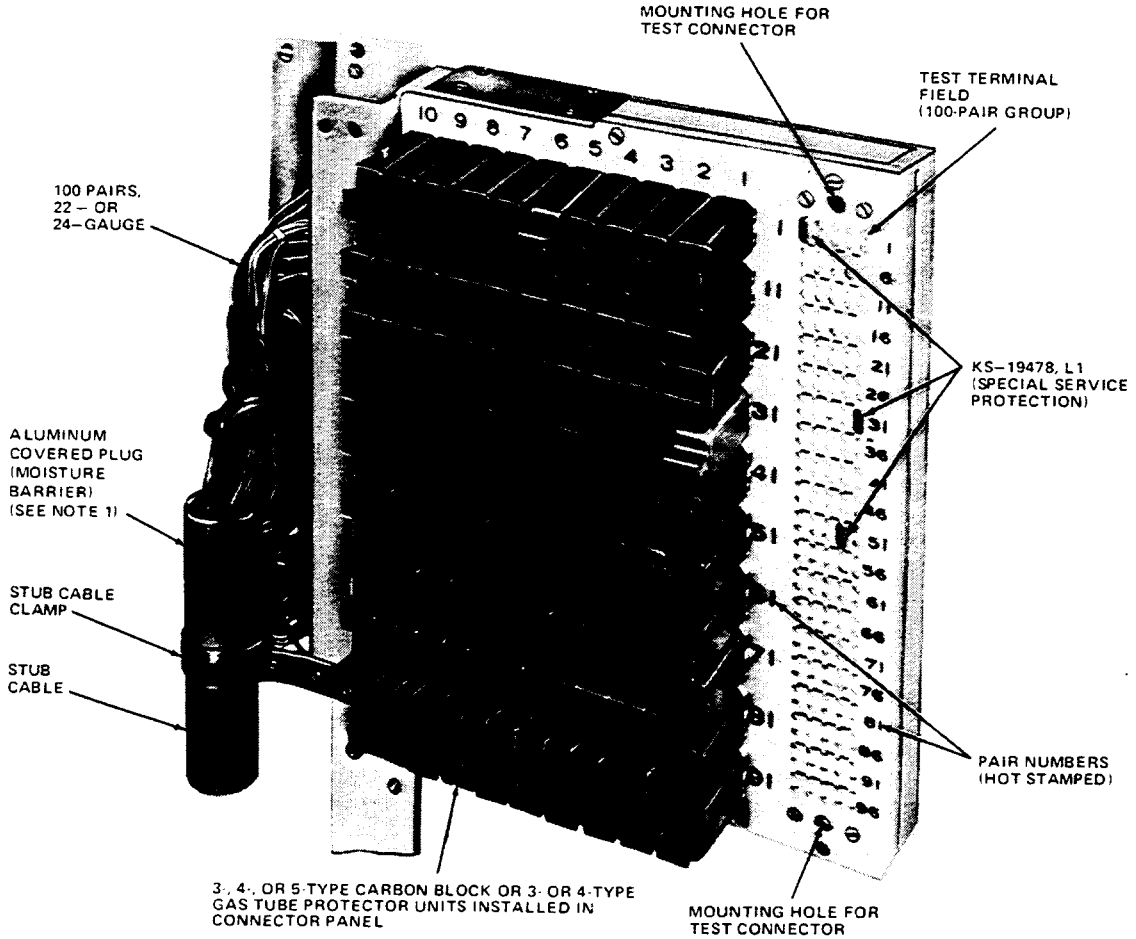


Figure 22—307D1-100 Connector

305-TYPE CONNECTOR — LA (LIMITED AVAILABILITY)

6.07 The 305-type connectors (Figure 23) are used for terminating and protecting outside plant cables on conventional and low profile conventional distributing frames. The 305-type connector is rated LA (Limited Availability) and recommended replacements are the 310- and 311-type connectors. For the connector codes and more detailed information, refer to AT&T 201-208-109.



NOTE:
1. FACTORY–INSTALLED PLUG PREVENTS MOISTURE FROM ENTERING THE CO SPLICE DUE TO "BREATHING" ACTION OF CABLE DURING CHANGES IN TEMPERATURE.

Figure 23—305-Type Connector

303-TYPE CONNECTOR

6.08 The 303-type connector (Figure 24) terminates outside plant cables requiring protection on conventional and low profile conventional distributing frames. The 303-type connector can serve as a replacement for the 300-type connector and C-type protectors to achieve a 100-percent increase in terminating capacity. For the connector codes and more detailed information, refer to AT&T 201-208-108.

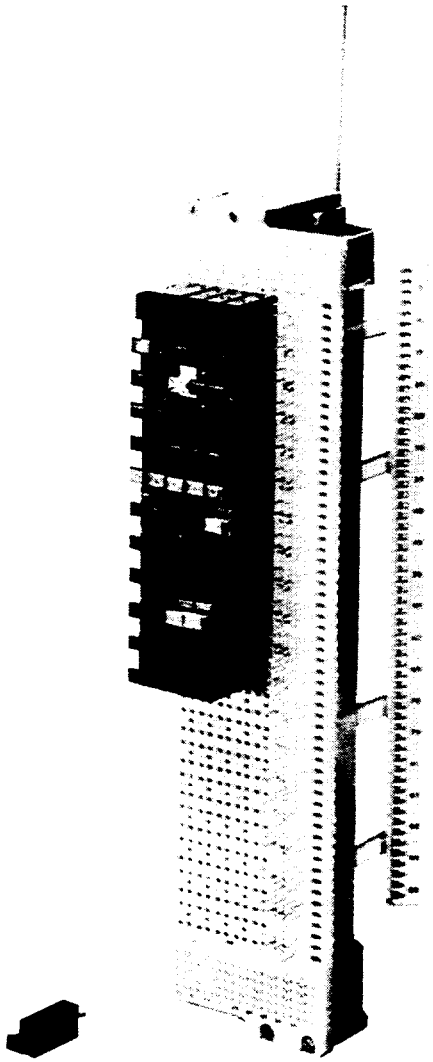


Figure 24—303-Type Connector

302-TYPE CONNECTOR

6.09 The 302A1, B1, and E1 connectors (Figure 25) are used to terminate outside plant cables on the ED-1A220-31 modular protector frame, and the 302A4, B4, and E3 connectors are used to terminate outside plant cables on the low profile and tall double-sided conventional protector frame. These connectors, used for double-sided protector frames, have a hinged mounting bracket that allows the connector panel to swing out for access to the backplane cable. For the connector codes and more detailed information, refer to AT&T 201-108-107.

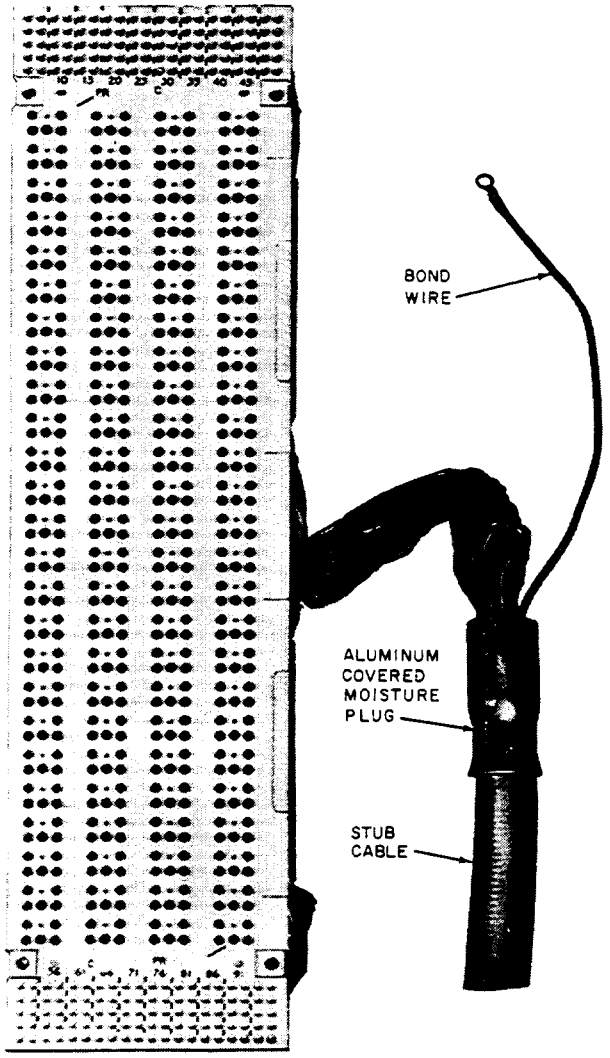


Figure 25—302-Type Connector for Use on Modular Protector Frame

301-TYPE CONNECTOR — DA (DISCONTINUED AVAILABILITY)

6.10 The 301-type connector (Figure 26) terminates outside plant cables not requiring protection on double-sided protector frames and conventional distributing frames. The 301-type connector is essentially a 444C-type jack equipped with a 100-pair 24-gauge stub. These connectors do not accept protector devices and were intended as outside plant termination apparatus only. The connector is rated DA (Discontinued Availability) and the recommended replacements are 303-, 305-, 309-, 310, 310M- or 311-type connectors. For the connector codes and more detailed information, refer to AT&T 201-206-101.

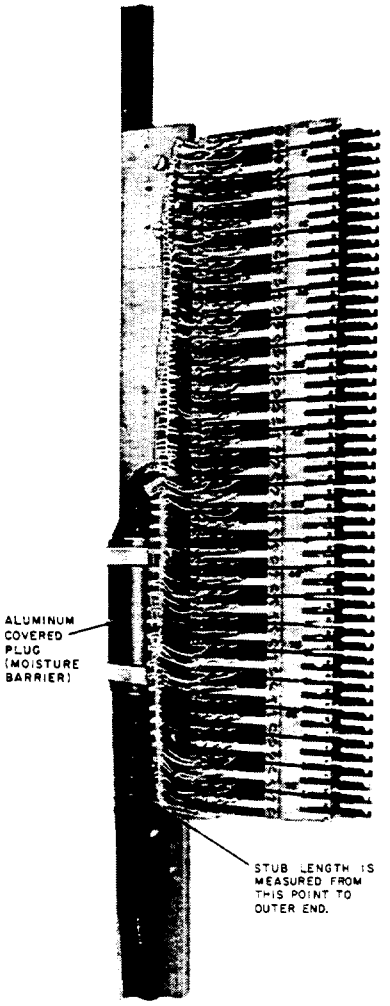


Figure 26—301-Type Connector

300-TYPE CONNECTOR — DA (DISCONTINUED AVAILABILITY)

6.11 The 300-type connector (Figure 27) terminates outside plant cable requiring voltage and sneak current protection on double-sided protector frames and conventional distributing frames. The 300-type connector is rated DA (Discontinued Availability), and the recommended replacements are 303-, 305-, 309-, 310-, 310M-, or 311-type connectors. For the connector codes and more detailed information, refer to AT&T 201-207-101.

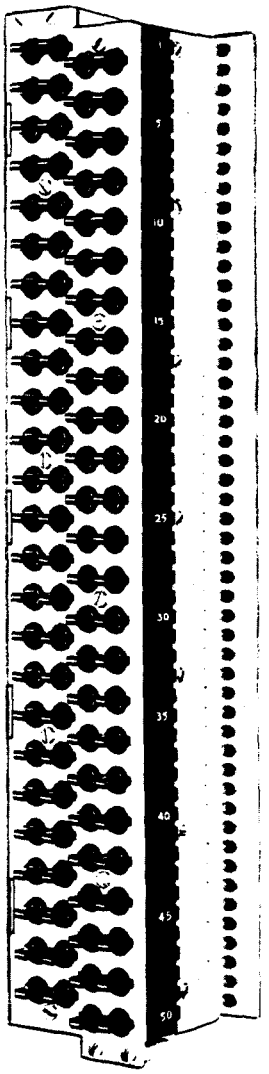


Figure 27—300-Type Connector With 50-Pair Stub

444C JACK — DA (DISCONTINUED AVAILABILITY)

6.12 The 444C jack (Figure 28) terminates outside plant cables not requiring protection on double-sided protector frames and conventional distributing frames. These connectors do not accept protector devices and were intended as outside plant termination apparatus only. The 444C jack is rated DA (Discontinued Availability), and the recommended replacements are 303-, 305-, 309-, 310-, 310M-, or 311-type connectors. For more detailed information, refer to AT&T 201-206-101.

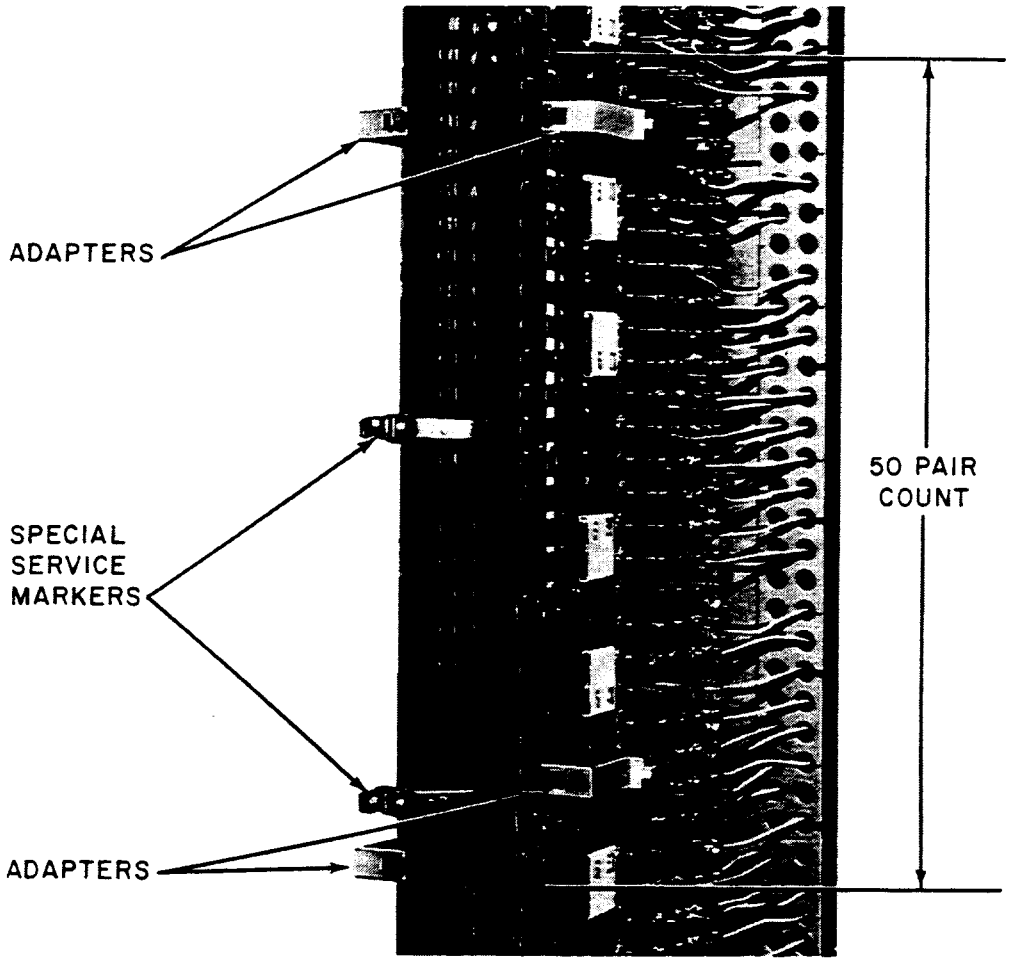


Figure 28—444C Jack

C50 and C52 PROTECTORS — DA (DISCONTINUED AVAILABILITY

6.13 The C50 and C52 protectors (Figure 29) terminate outside plant cables requiring voltage and sneak current protection on double-sided protector frames and conventional distributing frames. The C50 and C52 protectors are rated DA (Discontinued Availability), and the recommended replacements are 302-, 303-, 305-, 308-, 309-, 310-, 310M-, and 311-type connectors. For more detailed information, refer to AT&T 201-206-101.

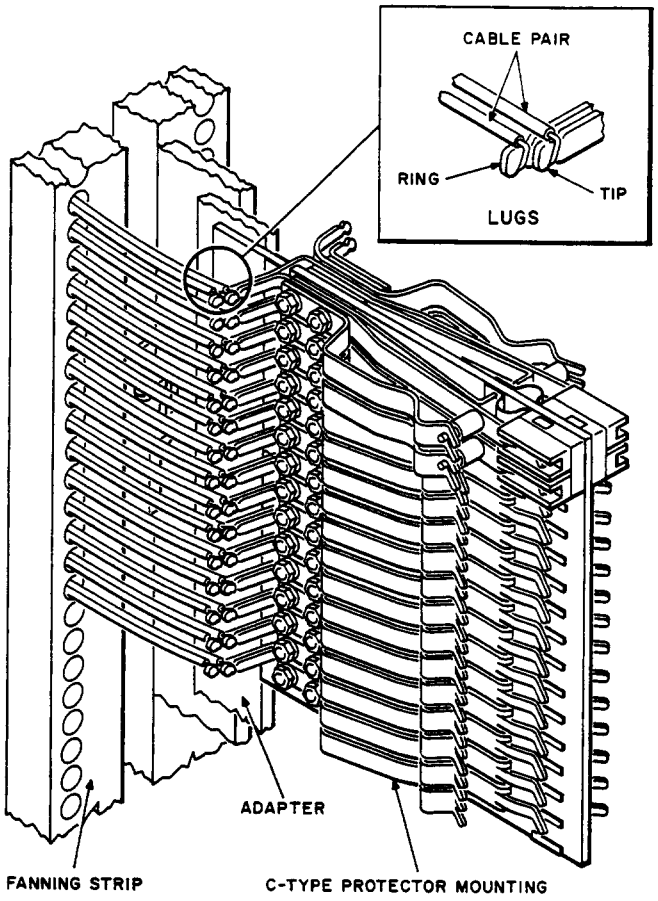


Figure 29—C50 and C52 Protectors

195-TYPE PROTECTOR FOR XLBET (EXTRA LARGE BUILDING ENTRANCE TERMINAL) PROTECTOR FRAMES

6.14 The 195-type protector (Figure 30) is used as a station protector in buildings served by exposed cable. The 195 protector is specifically designed for large pair size installations where space limitations prevent the use of conventional building entrance protectors. The 195-type protector is UL (Underwriters Laboratories) listed for indoor use and mounts on the XLBET or on walls and backboards. For protector codes and more detailed information, refer to AT&T 631-460-118.

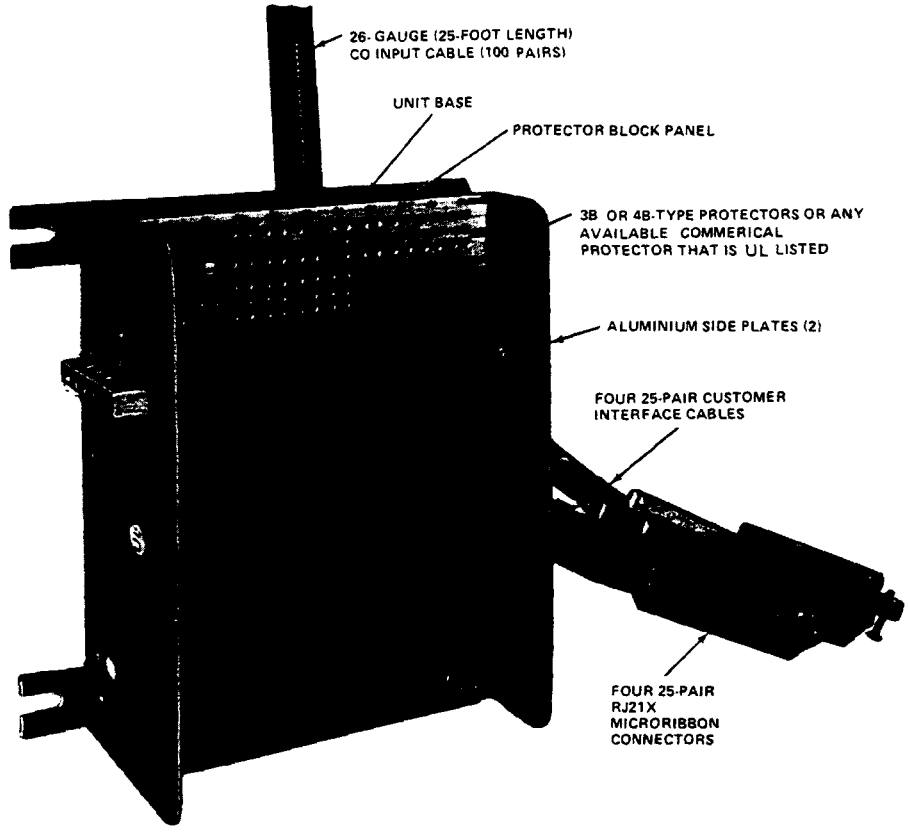


Figure 30—195-Type Protector

7. CONNECTOR STUB CABLE

7.01 Most connectors are equipped with a factory-terminated color-coded 22- or 24-gauge stub cable consisting of tinned-copper PVC (polyvinyl chloride) insulated conductors that are spliced to the feeder cable. The stub cables can be ordered in up or down mounting positions, swivel or stubless versions in 30-, 50-, 80-, 100-, 150-, or 200-feet lengths. The 307-type connector uses the 11-type connectorized stub cable, ordered separately.

7.02 The required length of stub cable is determined by measuring from the bottom or the top of the individual connector to the central office splice, making allowances for setting up and splicing the cables.

7.03 In the **cable entrance facility,** the stubs are grouped and taken into the openings of a splice case.

11-TYPE CONNECTORIZED STUB CABLES FOR 307-TYPE CONNECTORS

7.04 The 11-type connectorized stub cables (Figure 31) are used with the 307-type connector to interconnect to outside plant cables, and are ordered separately.

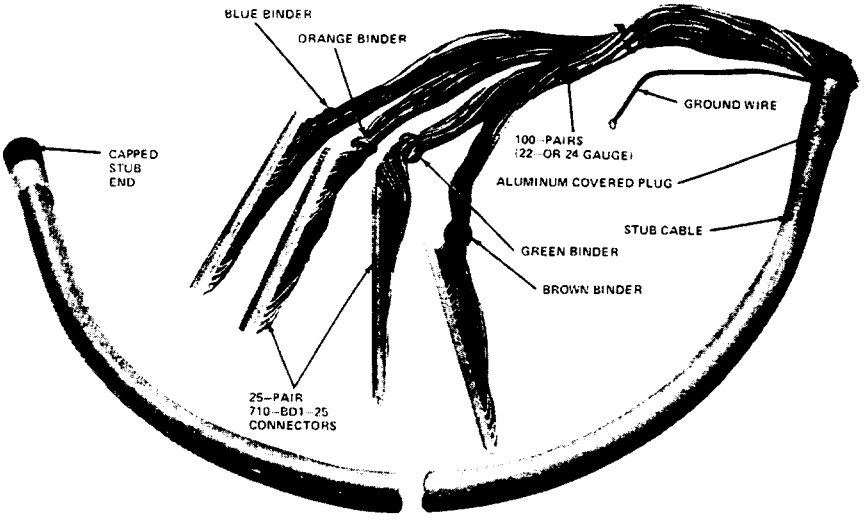


Figure 31—11-Type Connectorized Stub Cable

7.05 These stubs are 22- or 24-gauge copper conductors and are insulated with color-coded PVC (polyvinyl chloride). One end of the stub is terminated with 25-pair 710BD1-25 bridging modules. The cable 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.

7.06 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 AE.

TABLE AE

11-TYPE CONNECTORIZED STUB CABLES

Application	Used With Connector	Stub Cable			Eqipped 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)	307A1, B1 D1, D2, and E1. Also 309G1-200	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
T-Carrier Facility Cables (Split 50-Pair Transmit and Receive Counts)	307C1-100	22	40	50*	Two 25-Pair 710BD1-25	11CB-40	103681474
			60			11CB-60	103681482
			80			11CB-80	103681490
			100			11CB-100	103681508
			120			11CB-120	103681516
			150			11CB-150	103681524
			200			11CB-200	103681532

* Each 307C1-100 requires two 50-pair 11CB stub cables.

TABLE AE (Contd)

11-TYPE CONNECTORIZED STUB CABLES

Application	Used With Connector	Stub Cable			Eqipped With Bridge Module	Item Code	Comcode
		Wire Gauge	Length (Feet)	Capacity Pairs			
T-Carrier Office Repeater Bay	307C1-100	22	40	25†	One 25-Pair 710BD1-25	11EA-40	103318580
			60			11EA-60	103318598
			80			11EA-80	103318606
			100			11EA-100	103318549
			120			11EA-120	103318556
			150			11EA-150	103318564
			200			11EA-200	103318572
			40	50‡	Two 25-Pair 710BD1-25	11EB-40	103681540
			60			11EB-60	103681557
			80			11EB-80	103681565
			100			11EB-100	103681573
			120			11EB-120	103681581
			150			11EB-150	103681599
			200			11EB-200	103681607

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

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

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

8. CO CONNECTING BLOCKS

8.01 Connecting blocks are used in the central office on distributing frames for terminations and cross-connections. A selection of terminal types, such as single or bifurcated wire wrap or bifurcated quick clip, are available to offer the best method of terminating, changing, or removing wires. Table AF is a connecting block selection guide.

TABLE AF

CONNECTING BLOCK — SELECTION GUIDE

FRAME APPLICATION	CONNECTING BLOCK TYPE
COSMIC® Distributing Frames	112, 78
Conventional Distributing Frames	89, 89M, 93 (DA)
ESS™ Modular Distributing Frames	78A & B, 66G & H (DA)

78-TYPE CONNECTING BLOCK

8.02 The 78-type connecting blocks (Figure 32) are used with earlier *COSMIC* I and II distributing frames that were installed prior to the availability of the 112-type connecting blocks.

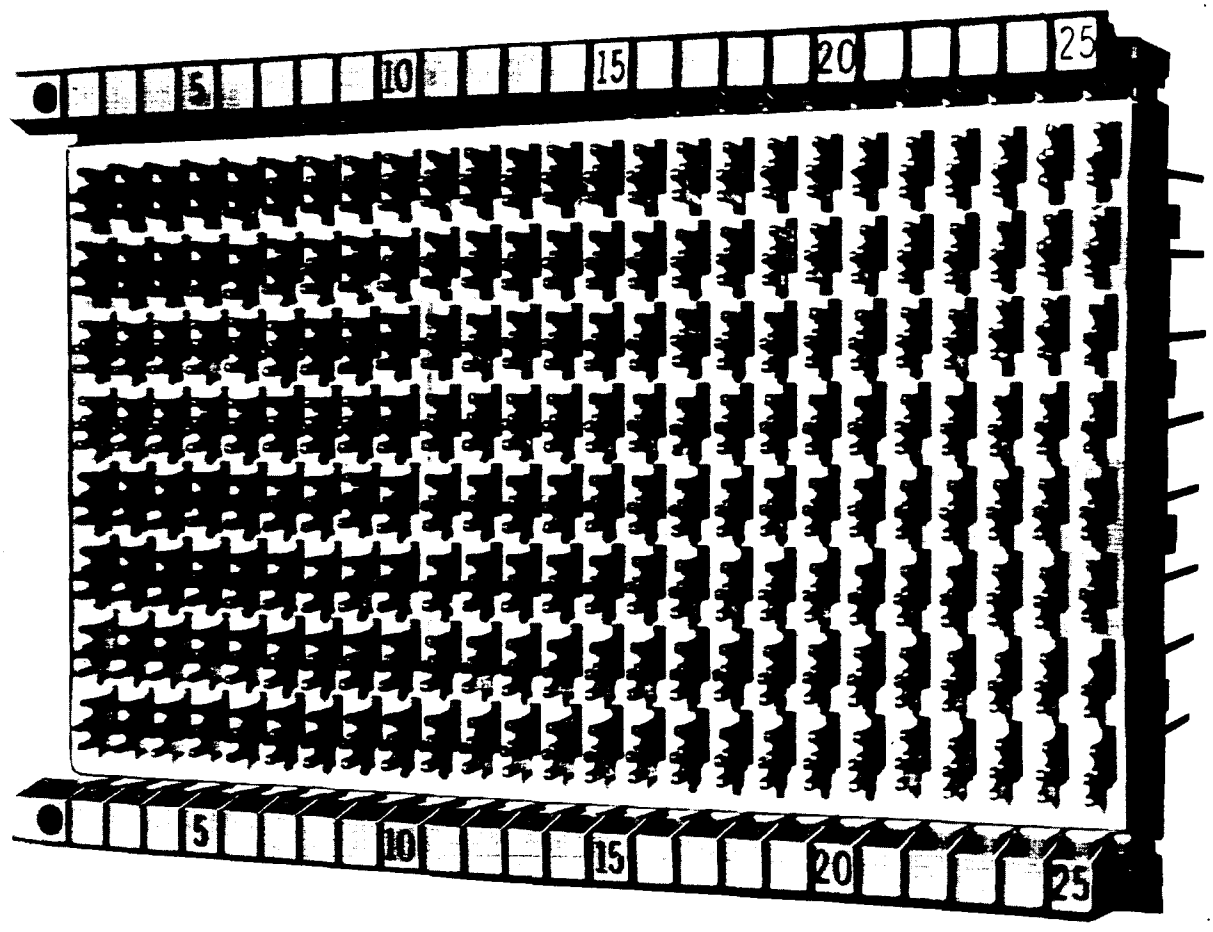


Figure 32—78-Type Connecting Block — 100-Pair Terminal Arrangement

8.03 The 78C-type connecting block is made of molded plastic and utilizes bifurcated, insulation displacement-type, quick-clip terminals for cross-connections at the front of the block. Wire-wrap terminals are located at the rear for cable terminations. The terminals are solder plated.

8.04 A red and white checkerboard pattern on the front face of the block designates cable or switching equipment groupings. This pattern also delineates rows of paired terminals. The rear of the block has a grid pattern that groups the terminals in the same fashion as the front to facilitate cable terminations during installation.

8.05 Slotted fanning strips are provided at the top and bottom of the block. These fanning strips are color-coded to indicate the type of equipment being terminated. Color codes are blue for loop pairs, white for tie pairs, yellow for *ESS* and other digital switching equipment, green for crossbar, beige for miscellaneous and trunk applications, violet for SMAS, and orange for step-by-step equipment.

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

8.07 The capacities of the 78-type connecting blocks are 50, 64, 96, and 100 pairs as indicated by the last numbers in the product code. For example, 78C1A-50 is a 50-pair connecting block. For the connecting block codes and more detailed information, refer to AT&T 201-222-105.

78A- AND 78B-TYPE CONNECTING BLOCKS

8.08 The 78A- and 78B-type connecting blocks (Figure 33) are used with the *ESS* modular distributing frames, and are recommended replacements for 66G- and 66H-type connecting blocks.

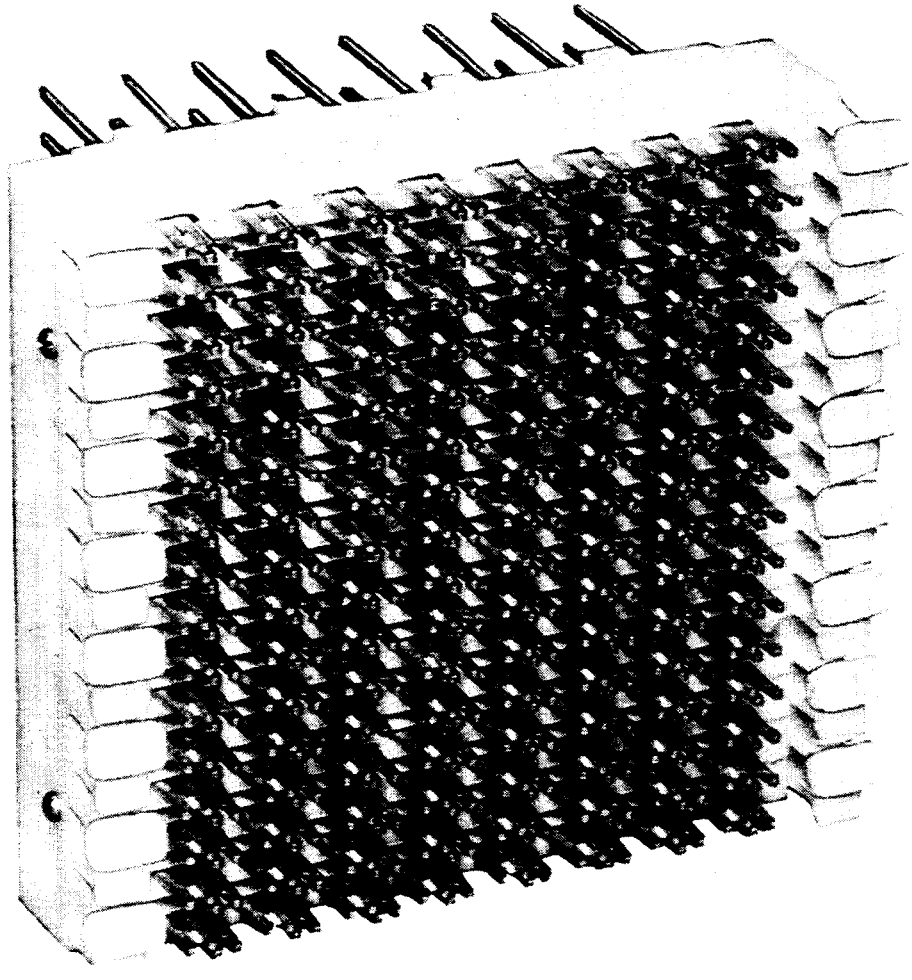


Figure 33—78B1-64 Connecting Block

8.09 The 78A1-64 block, with single-clip terminals, is arranged to mount on the 7-foot TDF (Trunk Distributing Frame), and the 78B1-64 block, with twin-clip terminals, is arranged to mount on the *ESS* 8-foot IDF (Intermediate Distributing Frame) or MDF (Main Distributing Frame). For more detailed information, refer to AT&T 201-221-105.

112-TYPE CONNECTING BLOCK

8.10 The 112-type connecting blocks (Figure 34) are designed for use with all AT&T *COSMIC* Distributing Frame Systems. These connecting blocks are a molded plastic design with bifurcated insulation displacement-type quick-clip or wire-wrap terminals. The front of the block is used for jumper cross-connections. Wire-wrap terminals for cable terminations are located at the rear of the block. The terminals are solder plated.

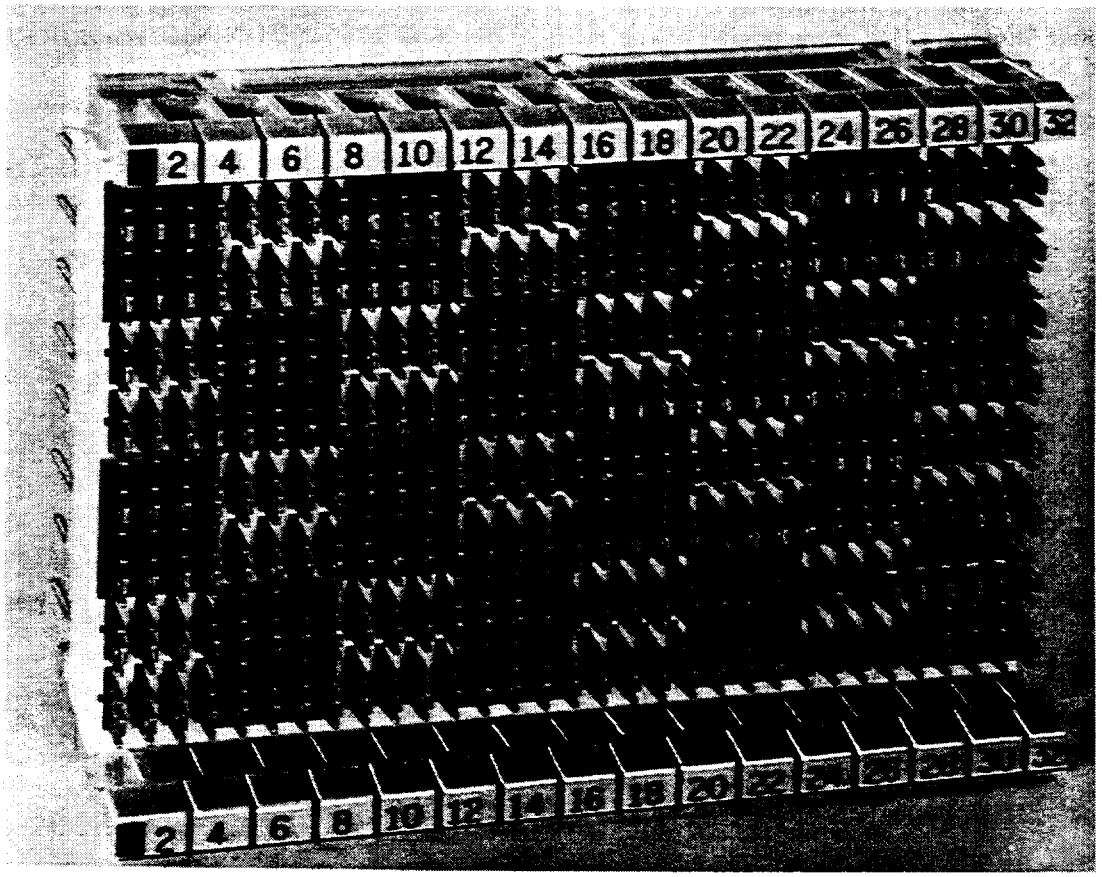


Figure 34—112-Type Connecting Block — 128-Pair Terminal Arrangement

8.11 The blue and white checkerboard patterns on the front face of the 112-type connecting blocks delineate rows of paired terminals, which facilitate jumper running and minimize parallax.

8.12 Color-coded fanning strips clearly denote the connecting block function for quick, easy identification. Factory hot-stamping saves time by eliminating the need for costly stenciling in the field. Snap-in mountings make installation easy, and locking snap-through fanning strips provide strain relief protection against jumper wire breakage. The fanning strip color codes are blue for loop pairs, white for tie pairs, yellow for ESS and other digital switching equipment, green for crossbar, beige for miscellaneous and trunk applications, violet for SMAS, and orange for step-by-step equipment.

8.13 Codes of the AT&T 112-type connecting blocks are available for virtually all central office switching applications, including AT&T's 1, 1A, 2, 2B, 3, and *5ESS®* Switching Systems, Northern Telecom *DMS* -100 System, and *GTE GTD-5 EAX* Switches, Ericsson *AXE* -10, Plessey *SYSTEM X*, and NEC NEAX 61E.

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

8.15 The capacities of the 112-type connecting blocks are 50, 64, 96, 100, and 128 pairs as indicated by the last numbers in the product code. For example, 112C1A-50 is a 50-pair connecting block. For the connecting block codes and more detailed information, refer to AT&T 201-222-105.

89-TYPE CONNECTING BLOCK

8.16 The 89-type connecting blocks (Figure 35) are designed for use with all conventional and low profile conventional distributing frames. They can be utilized to terminate the *ESS*, *2ESS*, *5ESS*, and other vendor switches. In addition, they can also be used to terminate all trunk, toll, and miscellaneous circuits.

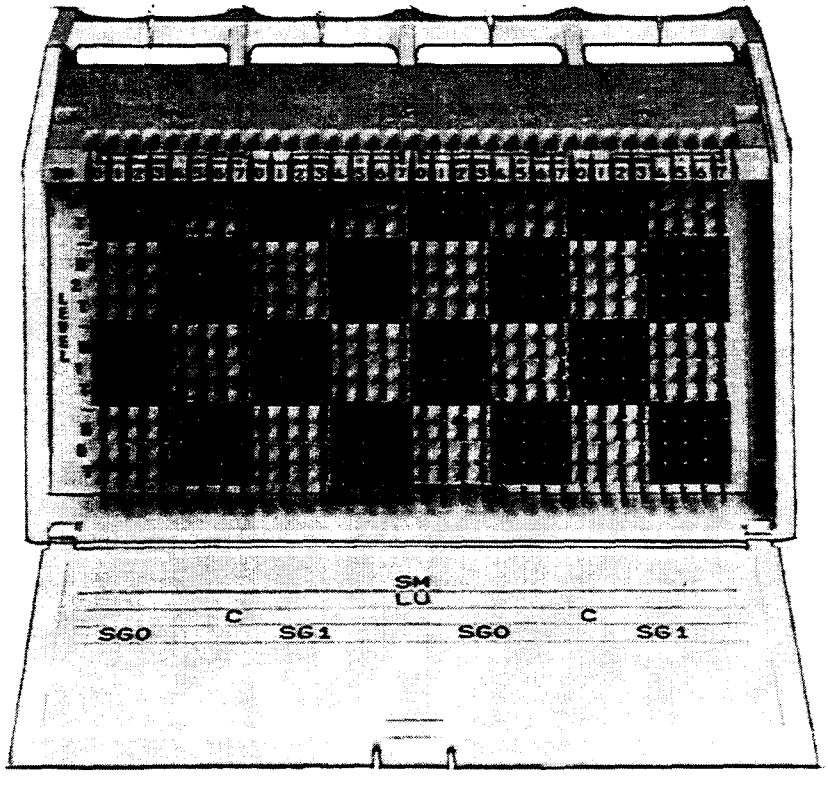


Figure 35—89-Type Connecting Block

8.17 The 89-type connecting blocks consist of a terminal block and a housing. The front side of the terminal block assembly offers a front-facing, high density cross-connect terminal field with a blue and white checkerboard pattern, and may be ordered with single or bifurcated wire-wrap or bifurcated quick-clip terminals arranged for terminating up to 256 pairs. For the connecting block codes and more detailed information, refer to AT&T 201-220-303.

89M-TYPE CONNECTING BLOCK

8.18 The 89M connecting blocks (Figure 36) are specifically designed to provide high density termination of CO equipment and cross-connect facilities on conventional distributing frames. Each block is factory preconnectorized with either 25 or 32 pair 711 or *TRW* (male) connectors that are permanently mounted inside the block housing.

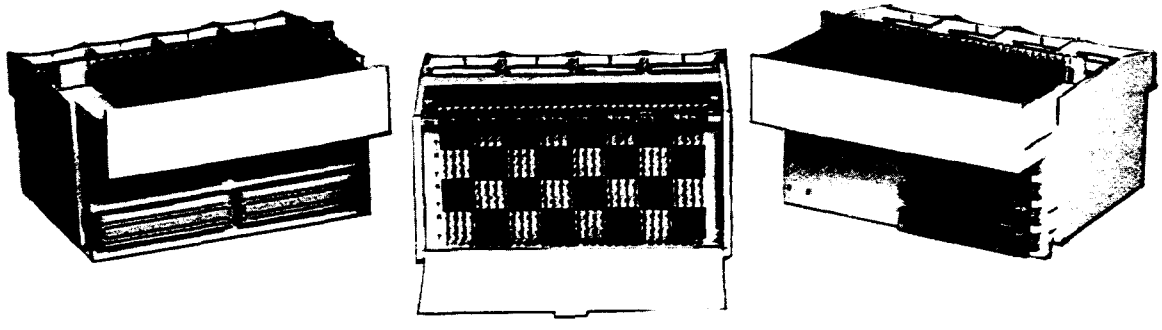


Figure 36—89M-Type Connecting Blocks

8.19 Standard codes are available for the following applications:

- *5ESS* Switch Line Equipment
- *5ESS* Switch ISLU & RISLU Line Equipment
- *DMS* Line Equipment
- Siemens Line Equipment
- Tie Pairs
- Loop Pairs
- Trunk, Toll, and Miscellaneous Equipment.

8.20 The 89M blocks are also available in a custom block offering designed to meet specific requirements. For the connecting block codes and more detailed information, refer to AT&T 201-220-303.

66G- AND 66H-TYPE CONNECTING BLOCKS — DA (DISCONTINUED AVAILABILITY)

8.21 The 66G- and 66H-type connecting blocks (Figure 37) were designed for use with the *ESS* modular distributing frames. The blocks are rated DA (Discontinued Availability) and the recommended replacements are 78A- and 78B-type connecting blocks.

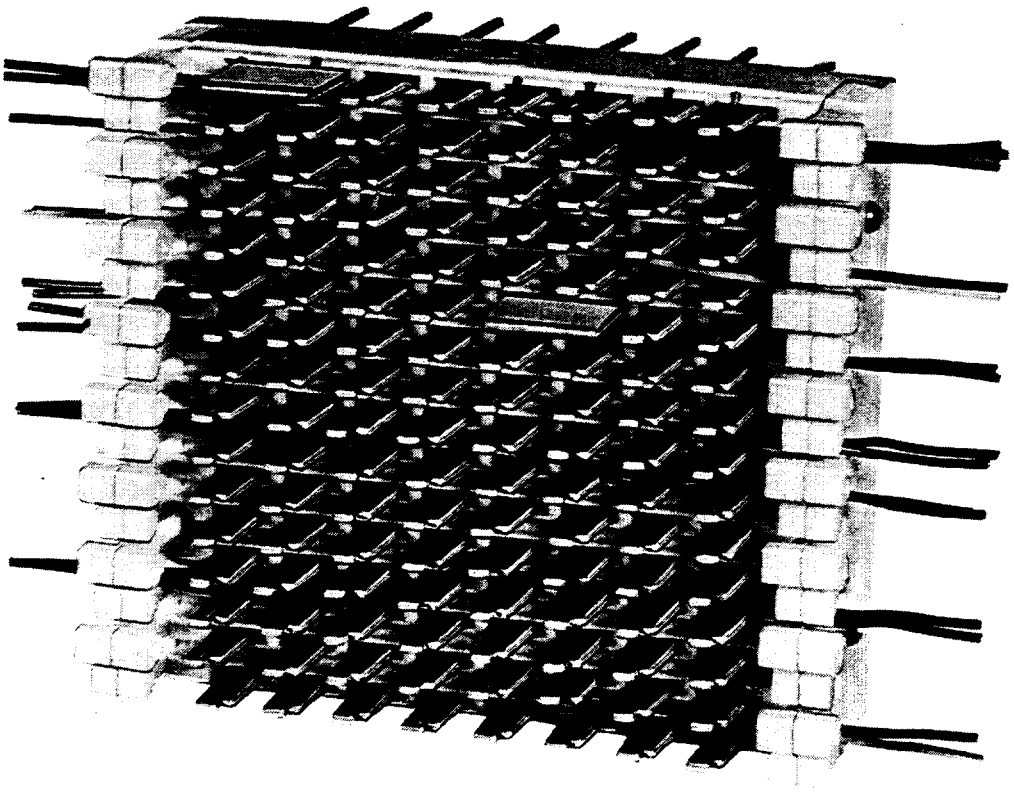


Figure 37—66G2-64 Connecting Block

8.22 The 66G2-64 block, with single-clip terminals, is arranged to mount on the 7-foot TDF (Trunk Distributing Frame), and the 66H2-64 block, with twin-clip terminals, is arranged to mount on the 8-foot IDF (Intermediate Distributing Frame) or MDF (Main Distributing Frame). For more detailed information, refer to AT&T 201-221-105.

93-TYPE CONNECTING BLOCKS — DA (DISCONTINUED AVAILABILITY)

8.23 The 93-type connecting block (Figure 38) was designed for use with facility terminal equipment such as MFT (Metallic Facility Terminal), DFT (Digital Facility Terminal), and AFT (Analog Facility Terminal) on low profile or tall conventional distributing frames. The blocks are rated DA (Discontinued Availability).

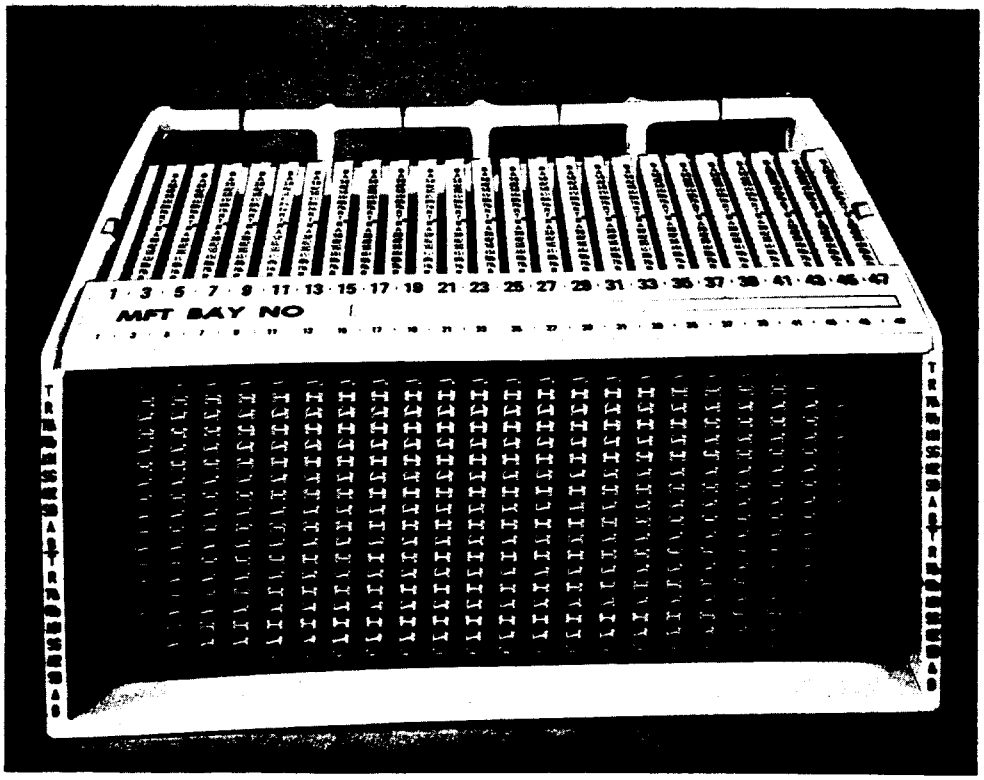


Figure 38—93-Type Connecting Block

8.24 The 93-type connecting block is a high density unit designed to terminate special services equipment on the distributing frames. For more detailed information, refer to AT&T 201-220-302.

FRAME MOUNTED BRIDGE LIFTER BLOCKS

8.25 The purpose of a bridge lifter is to open (lift) idle bridge-tapped cable pairs from a telephone circuit.

8.26 The 1574D saturable inductor presents a high impedence-to-voice frequency in the idle bridged pair and a low impedence-to-voice frequency in a busy pair.

8.27 The bridge lifter assemblies (Figures 39 and 40), designed for mounting on a central office distributing frame, are equipped with 1574D inductors terminated to one side of a wire-wrap terminal block. The 1574D comes equipped with a 5800-ohm shunt that reduces the AC inductors. These saturable inductors are miniature toroid cores that are bifilar wound, and minimizes inductive imbalance and reduces resulting line noise. The standard bridge lifter comes equipped with 64 inductors and provides 32 circuits. Bridge lifters with 25 circuits are available.

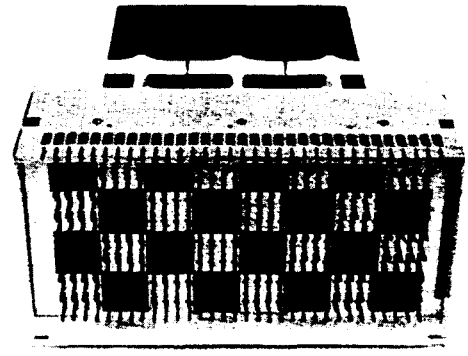


Figure 39—Bridge Lifter Block — 89-Type

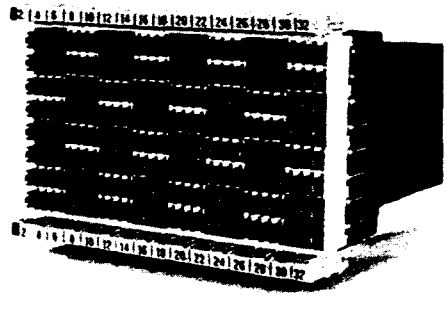


Figure 40—Bridge Lifter Block — 112-Type

9. TERMINAL STRIPS

9.01 Terminal strips (Figure 41) are used for the termination of equipment cabling and cross-connections to outside plant and intraoffice equipment on various distributing frames.

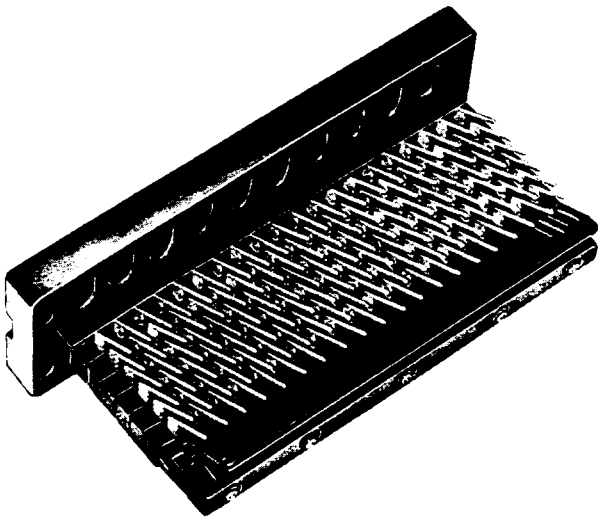


Figure 41—Terminal Strip

9.02 Terminal strips have two basic compositions — cast resin and laminated phenolic. The 286- and 336-type terminal strips are cast resin molded blocks with terminals arranged for wire-wrap connections on both the cabling and cross-connect sides. Most other terminal strips are constructed with laminated phenolic. The terminals are insulated with phenolic molded strips or phenolic fiber strips.

9.03 There are three basic types of terminals — a single terminal arranged for soldered connections on both the cabling and cross-connect sides, a single tang terminal arranged for wire-wrap connections on the cabling side and soldered connections on the cross-connect side, and single or bifurcated wire-wrap terminals on both sides.

9.04 Terminal strip selection should be based upon terminal type, total terminations, row and column configuration, and length. For codes and more detailed information, refer to AT&T 201-220-105. Table AG shows the terminal strip frame applications.

TABLE AG

TERMINAL STRIP FRAME APPLICATIONS

FRAME (NOTE)	TERMINAL STRIP	
	LENGTH (INCHES) HORIZONTAL SIDE	LENGTH (INCHES) VERTICAL SIDE
MDF	8, 16	8
MDF with PROT	8, 16	8, 16
CDF	8	8
IDF	6-1/2	8
TIDF	8	8
TDF	6-1/2	6-1/2
LDF, TRDF, MRDF	6-1/2	13-1/2
GDF	7-1/16, 8-5/16	7-1/16, 8-5/16

Note: The following abbreviations are used in this table:
MDF = Main Distributing Frame
PROT = Protector Frame
CDF = Combined Distributing Frame
IDF = Intermediate Distributing Frame
TDF = Trunk Distributing Frame
LDF = Line Distributing Frame
TRDF = Traffic Register Distributing Frame
MRDF = Message Register Distributing Frame
GDF = Group Distributing Frame.

10. ORDERING INTERVAL AND SERVICE COMMITMENT

10.01 The ordering of central office terminating apparatus must be done in sufficient time to allow for the specified manufacturing and shipping interval and still permit time for installation prior to the date the cable is to be placed in service.

10.02 The responsibility for ordering terminating apparatus depends on local arrangements.

11. REFERENCES

PRACTICE	TITLE
069-1 Layer	Distributing Frame Cross-Connectors
069-3 Layer	Reconditioning Central Office connectors
106-3 Layer	Test Equipment for Main Distributing Frames
201-2 Layer	Distributing Frames
636-3 Layer	Main Frame Terminations and Connectors
802-0 Layer	Protective Grounding Systems
876-1 Layer	Electrical Protection Devices
876-2 Layer	Electrical Protection — Central Offices
876-3 Layer	Electrical Protection — Stations
201-010 (Select Code)	Single-Sided Low-Profile Distributing Frame (SSLPDF) — Product Application Guidelines
069-132-811	Punched or Wire 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
081-860-105	Transfer Stenciling Kits — Description and Use
106-315-119	Multiple Pair Test Connectors for 302- and 303-Type Connectors
201-206-101	C-, E-, and Similar-Type Protectors, Including 444-Type Jacks (301-Type Connectors) — Description
201-206-102	C-, E-, and Similar-Type Protectors, Including 444-Type Jacks (301-Type Connectors) — Associated Cords and Plugs
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
201-208-106	Test Equipment, Cords, Plugs, Warning Markers, Guards, Insulators, and Indicators — Description and Use
201-208-107	302-Type Connectors — Description, Use, Installation, and Repair Procedures
201-208-108	303-Type Connectors — Description, Use, Installation, and Repair Procedures
201-208-109	305-Type Connectors — Description, Use, Installation, and Repair Procedures
201-208-110	307-Type Connectors — Description, Use, Installation, and Repair Procedures
201-208-111	308-Type Connectors — Description, Use, Installation, and Repair Procedures

PRACTICE	TITLE
201-208-112	309-Type Connectors — Description, Use, Installation, and Repair Procedures
201-208-113	310- and 310M-Type Connectors — Description, Use, Installation, and Repair Procedures
201-208-114	311-Type Connectors — Description, Use, Installation, and Repair Procedures
201-216-101	Miniature Test/Talk System — Description — Distributing and Protector Frames
201-216-102	Cords and Plugs — Description — Miniature Test/Talk System
201-216-801	Miniature Test/Talk System — Piece Parts and Replacement Procedures — Distributing and Protector Frames
201-219-101	Protector Frames — Description
201-220-101	Conventional Distributing Frames — Description
201-220-103	Types of Protection — Description — B-Type Frames and Double-Sided Protector Frames
201-220-105	Conventional Distributing Frame Terminal Strips — Description
201-220-301	Terminal Strips — Method of Making Connections
201-220-302	93-Type Connecting Blocks — Description, Methods of Cross-Connecting, and Repair Procedures
201-220-303	89-Type Connecting Blocks — Description, Methods of Cross-Connecting, and Repair Procedures — Conventional Distributing Frames
201-220-801	Terminal Strips — Repair Procedures
201-221-101	Modular Distributing and Protector Frames — Description — 1 and 2 *ESS* Switches
201-221-103	*ESS*-Type Modular Distributing Frames — Warning Markers and Guards
201-221-105	Modular Distributing Frames — Connecting Blocks — Description — 1 and 2 *ESS* Switches
201-221-301	Method of Cross-Connecting — 66G-, 66H-, 78A1-, and 78B1-Type Connecting Blocks — 1 and 2 *ESS* Switches
201-221-501	Inspections — 1 and 2 *ESS* Switches
201-221-801	66- and 78-Type Connecting Blocks — Replacement Procedures — 1 and 2 *ESS* Switches
201-222-101	*COSMIC* I, IA, II, and IIA Main Distributing Frame Systems — Description
201-222-105	78- and 112-Type Connecting Blocks — Description and Use — *COSMIC* Distributing Frames
201-222-120	*COSMIC* II Mini Combined Distributing Frame System — Description
201-222-301	78- and 112-Type Connecting Blocks, Method of Making Connections, Repair and Replacement Procedures — *COSMIC* Distributing Frames
201-222-501	Inspection — *COSMIC* Distributing Frames
460-110-100	SSM (Special Safeguard Measures) and Special Service Protection

PRACTICE	TITLE
631-460-118	195-Type Protector — Description and Installation
636-200-011	Marking Main Frames — Pair and Cable Numbers
636-211-101	CRF (Cable Rearrangement Facility) — Description, Installation, and Splicing
636-300-100	300-Type Connectors — Description, Installation, Marking, and Testing Protector Blocks
636-310-100	301-Type Connectors — Description, Installation, and Marking
640-250-237	51A Remote Terminal Cabinet (ED-7C601-30) Placement — *SLC* Series 5 Carrier System
640-250-248	Precabled Structures Using Bulk Protection — Remote Terminal Splicing (Metallic) — *SLC* Series 5 Carrier System
640-250-253	AT-9049 Type Protector and Cable Enclosure — Description and Installation — *SLC* Carrier Systems
640-252-310	Concrete Hut (ED-7C285-30) Splicing (Metallic and Fiber) — Combined *SLC* 96 and *SLC* Series 5 Carrier Systems
640-252-311	C Equipment Platform (ED-97973-31) — Splicing (Metallic and Fiber) — Combined *SLC* 96 and *SLC* Series 5 Carrier Systems
640-252-312	80-Type Cabinet — Description, Installation, and Splicing — Combined *SLC* 96 and *SLC* 5 Carrier Systems
680-830-012	COSMIC Frame — Manual Assignment Procedures
781-880-005	CEF (Cable Entrance Facility) — Common Systems Planning and Design
801-005-150	(J97029) — Single-Sided — 11'6" High — 10" Guardrail Width — Verticals on 8" Centers
801-005-151	(J97030) — Single-Sided — Arranged for Protectors and Associated Radio Frequency Line Filters — 7'0" and 9'0" High
801-005-152	(J97031) — Main Distributing Frames — Protector Frames
801-005-153	(J97032) — Intermediate Distributing Frames — Trunk Distributing Frames
801-005-164	(J90610) — *COSMIC* II Frame Systems
801-801-150	(J1A044) — Main, Intermediate, and Trunk Distributing Frames
801-801-154	(J1A050) — Protector Frame — 1 *ESS* Switching System
804-001-150	(J67002) — Distributing Frame — 11'6" High — Jacks, Protectors, or 8" Terminal Strips on Vertical Side — 8" Terminal Strips Mounted Vertically on Horizontal Side
816-020-150	(J27058) — Line Distributing Frame
816-021-150	(J27057) — Message Register Distributing Frame
816-401-150	(J27053) — District Junctor Grouping Frame
919-559-700	*COSMIC* II Main Distributing Frame — Implementation Guidelines — Distributing Service Planning, Engineering, and Construction

DRAWINGS	TITLE
ED-1A194-10	Cable Plan Protectors Frame — MDF, IDF, TDF
ED-1A222-10	Typical 1 *ESS* Protector Frame
ED-1A223-10	Typical 1 *ESS* MDF Equipment — 8-Foot High
ED-1A223-11	Typical 1 *ESS* IDF Equipment — 8-Foot High
ED-1A225-10	Typical 1 *ESS* TDF Equipment — 7-Foot High
ED-1A225-11	Typical 1 *ESS* IDF Equipment — 7-Foot High
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QUESTIONAIRES	TITLE
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E-8113B	PACE Engineering Questionnaire for Existing *COSMIC* II Distributing Frames Maintained by PACE
E-8196A	Engineering Summary Questionnaire for MELD Layout or PACE to MELD Conversion of *COSMIC*-Type Distributing Frames
E-8203	Hardware Ordering Questionnaire for New *COSMIC* Distributing Frame

12. ISSUING ORGANIZATION

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