

**“COSMIC*” II MAIN DISTRIBUTING FRAME SYSTEM
DESCRIPTION**

CONTENTS	PAGE	CONTENTS	PAGE
1. GENERAL	2	2. Location of Walkthrough	10
2. SYSTEM DESCRIPTION	2	3. 307-Type Connector Assembly-Front	11
3. FRAMEWORK	3	4. 307-Type Connector Assembly-Rear	12
4. CONNECTORS	4	5. 4C-Type Protector Unit	13
5. PROTECTOR UNITS	4	6. 299A Test Adapter	14
6. CONNECTOR TESTING	4	7. P2FL Single Pair Test Cord	15
7. CONNECTING BLOCKS	5	8. Typical 78C-Connecting Block—(100 Cable Pairs)	16
8. CROSS-CONNECTIONS	6	9. KS-21316-L8 and ED-6C110-10 GRP. 23 Test/Talk Panels	17
9. CROSS-CONNECTION ASSIGNMENT	6	10. ED-6C110-10 GRP. 25 Test/Talk Panel	18
10. MINIATURE TALK AND TEST PANELS	7	11. ED-6C110-10 GRP. 26 Test/Talk Panel	19
11. CABLE RACK AND LIGHTING	7	12. Auxiliary Framing and Lighting	20
12. MISCELLANEOUS	7	13. Frame Operations Decal-Jumper Side (For Frames Equipped With 78C-Type Connecting Blocks)	21
A. Cable Directory	7	14. Frame Operations Decal-Jumper Side (For Frames Equipped With 112-Type Connecting Blocks)	22
B. Rolling Work Platform	8	15. Frame Operations Decal-Protector Side	23
C. Wire Reels	8		
D. Wire Insertion and Removal Tools	8		
13. REFERENCES	8		
		Tables	
Figures		A. 307-Type Connector Assemblies	5
1. COSMIC II Distributing Framework Group	9	B. Connectorized Stub Cables	6
		C. 4C-Protector Units	7

*Trademark of Western Electric

NOTICE

Not for use or disclosure outside the
Bell System except under written agreement

1. GENERAL

1.01 This section provides a description of the ♦COSMIC II Main Distributing Frame System.♦

1.02 This section is reissued for the reasons listed below. Revision arrows have been used to denote the significant changes.

- (a) Refer to this system as the COSMIC II Main Distributing Frame System in the title and also in paragraphs 1.01, 2.01, 2.03, 3.06, and 13.01
- (b) Change the designation of Table A to Table C and add a title, "4C-Protector Units," as well as a list of additional protector unit codes
- (c) Add a new Table A covering 307-type connector codes
- (d) Add Table B covering stub cable codes
- (e) Change designation of Fig. 2 and 3 to Fig. 13 and 15, respectively
- (f) Change designation of Fig. 5 through 14 to Fig. 2 through 12, respectively
- (g) Add a new Fig. 14 showing the decal used on frames equipped with 112-type connecting blocks
- (h) Change Fig. 8 to designate the two parts of the figure as (a) and (b) and to designate the text at the bottom of the figure as a "note"
- (i) Change Fig. 12 to show the auxiliary frame bars behind the cross-connect side of the frame instead of behind the protector side
- (j) Change Fig. 13 to include the 756C-2 wire insertion tool and change the reference to jumper slack **from** 16 **to** 20 inches
- (k) Add information in paragraph 2.04 covering the use of a subscriber main distributing frame with other type distributing frames
- (l) Add information in paragraph 3.04 covering the capacity of a central office equipment bay
- (m) Add information in paragraph 3.05 covering the capacity of the facility bay on a trunk main distributing frame
- (n) Add reference to Fig. 13 and 14 in paragraph 3.08 depicting the different decals used for 78C- and 112-type connecting blocks
- (o) Add information in paragraph 3.10 covering the use of COSMIC II main distributing framework as a trunk main distributing frame
- (p) Add reference in paragraph 4.01 to Table A, 307-type connector codes
- (q) Add reference in paragraph 4.02 to Table B, covering 11C and 11D cable stubs
- (r) Add information in paragraph 9.03 covering long jumper pileup
- (s) Add paragraphs 12.05 and 12.06 covering the wire insertion and removal tools
- (t) Delete paragraph 13.02 which referred to floor plan data.

1.03 Part 13 contains a list of Bell System Practices (BSPs) associated with COSMIC II main distributing frames which the reader may reference for a more complete description of some specific items that are described only briefly in this section.

2. SYSTEM DESCRIPTION

2.01 The objectives of the initial COSMIC I ♦Subscriber Main Distributing Frame♦ System were to overcome the limitations of the modular main distributing frame (MDF) design for the ESS* switch, establish and maintain a computer aided assignment and record-keeping system for the frame, and introduce additional labor-saving methods.

2.02 The COSMIC II main distributing frame is an enhancement of the COSMIC I subscriber main distributing frame design. It provides protected connectors mounted on the rear of the outside plant (OSP) bays with factory-wired connections to connecting blocks which are mounted on the front of the bay. The COSMIC I subscriber main distributing

* Trademark of Western Electric

frame has a separate protector frame. Testing facilities and test equipment have also been improved.

2.03 The computer system for main frame operation (COSMOS) and the program for arrangement of cables and equipment (PACE) are compatible with the COSMIC II Main Distributing Frame System.

2.04 The initial application of the COSMIC II Main Distributing Frame System is as a subscriber main distributing frame (SMDF) for No. 1 and No. 1A ESS switching equipment. Other applications are an SMDF and trunk main distributing frame (SMDF/TMDF) for the larger No. 2 ESS switch or the small No. 1 ESS switch and a combined main distributing frame (CMDF) for small offices. For the SMDF/TMDF arrangement, the TMDF may not exceed six modules. The TMDF may be in the same lineup as the SMDF or in a separate lineup but is always operated as a separate frame. The SMDF can be used with a conventional high- or low-profile TMDF. When used as a CMDF, the length is restricted to seven modules.

2.05 The ultimate length of framework is installed initially. The length is computed on the basis of the best available long-range (25-40 years) forecast. The reason for this is to provide proper balance between cable and line equipment terminals in adjacent modules for use with preferential assignment, resulting in short cross-connections. Using this method of assignment eliminates serious wire congestion caused by long cross-connections.

2.06 If building constraints prevent installation of a single, ultimate length COSMIC II main distributing frame lineup, a multiple lineup is installed. Preferably, a single lineup will not exceed 20 modules.

2.07 A tie pair distributing frame (TPDF) does not require protection. It may or may not be located in the same lineup as the SMDF. It serves two purposes; to provide cable pair access to line equipment terminated in a different lineup, and to eliminate the need for long cross-connections within single and multiple lineups.

3. FRAMEWORK

3.01 The basic framework assembly is a combination of a high density protector frame and a

COSMIC I subscriber main distributing frame. The rear is the protector side and the front is the cross-connect side. Cross-connections are run in vertical and horizontal troughs on the front side of the frame.

3.02 An SMDF or TMDF framework group is 13 feet long, 8 feet 2 inches high (including the superstructure), and 2 feet 8 inches deep and is the equivalent of two modules. Each group (Fig. 1) consists of 4 bays, each 33 inches wide. The two inner bays are OSP bays and the two outer bays are central office equipment (COE) bays. There is a 12 inch wide vertical channel or trough between each COE and OSP bay. Framework groups are joined together in one or more lineups to obtain the desired capacity.

3.03 The two inner or OSP bays of a framework group are called a full module. The two outer or COE bays are called half-COE modules. Where groups are joined together in a lineup, the adjacent COE bays form a full module. Each SMDF lineup will always have a half module containing one COE bay at each end. The frame is administered in terms of modules.

3.04 The front of the SMDF COE bay has 11 shelves numbered 1 through 11 from top to bottom. Shelves 1 and 11 (Fig. 1) each mount up to five 50-pair connecting blocks. Shelves 2 through 10 each mount up to five 100-pair, eight 64-pair, or four 128-pair connecting blocks. The capacity of the bay is from 5108 pairs to 6400 pairs depending on the density of the connecting blocks being used (less allowances for talk/test panels mounted on the front). Up to four miniature test and talk panels are mounted on the rear of the bay on the left side. A protector unit test set or minibridgelifter test set can also be mounted on the rear of the bay on the right-hand side.

3.05 The front of the SMDF OSP bay also has 11 shelves, numbered 1 through 11. Shelves 1 and 11 each mount up to five 50-pair connecting blocks. Shelves 2 through 10 each mount up to five 100-pair connecting blocks. The capacity of the bay is 5000 pairs. The connecting blocks (part of the 307 connector assemblies) are factory wired to protector panels which are mounted on the rear or protector side of the bay. The rear of the bay has five vertical compartments for mounting connectors. Each vertical compartment has a capacity of ten connectors since shelves 1 and 11 are not both equipped within the same vertical. Each connector on shelves 1 and 11 (ev-

ery other position only) is factory wired to two 50-pair connecting blocks (one stencilled 1-50, the other 51-00). Each connector on shelves 2 through 10 is factory wired to one 100-pair connecting block (stencilled 1-00). ♦For terminating carrier facilities on a TMDF, 128-pair connecting blocks are used. This increases the capacity of the bay to 6260 pairs.♦

3.06 The superstructure, end guards, and walkthrough framework also form part of the COSMIC II ♦Main Distributing Frame System.♦

3.07 The superstructure is an integral part of the welded framework assembly. It connects the framework to auxiliary framing bars which support the overhead cable racks.

3.08 End guards are installed at each end of a lineup. They are divided vertically into two sections, each with a door, providing storage for test cords and protector units. Three labels are available that can be placed on the doors. Two labels ♦(Fig. 13 for frames with 78C-type connecting blocks and Fig. 14 for frames equipped with 112-type connecting blocks)♦ describe the tools and procedures required for placing, removing, and tracing cross-connections and is placed on the door nearer the front side of the lineup. The other label (Fig. 15) depicts test cords, equipment arrangement and a cable directory and is placed on the door nearer the rear side of the frame.

3.09 Generally, lineups of more than five framework groups (ten modules) are provided with one or more walkthroughs (Fig. 2) placed between bays of a COE module. The upper and lower express troughs are extended through the walkthrough. The walkthrough has an auxiliary express trough for routing only short jumpers over the passageway and between adjacent modules.

3.10 ♦The COSMIC II tie pair distributing frame framework is similar to the framework of a COE module and should be used when both the SMDF and TPDF are in the same lineup.♦ If the TPDF is located remotely from the COSMIC II subscriber main distributing frame lineup, the COSMIC I subscriber main distributing frame framework, which is only 18 inches deep, can be used.

4. CONNECTORS

4.01 The 307-type connector, developed especially for the COSMIC II subscriber main distribut-

ing frame, consists of two main components; the protector panel and the connecting block (Fig. 3 and 4). The protector panel accommodates 100 cable pairs. It is factory wired to either a 100-pair connecting block or two 50-pair connecting blocks. ♦Table A contains a list of the 307-type connector codes and the application of each code.♦

4.02 The protector panel has backplane wiring which interconnects to four 710-SD1-25 connectors rigidly held in a plastic bracket. These four connectors provide the connecting point for 100-pair ♦11C or 11D♦ cable stubs, of varying lengths, having four mating 710-BD1-25 connectors. ♦The cable stub codes are listed in Table B.♦

5. PROTECTOR UNITS

5.01 There are several types of 4C-protector units used on the 307-connector. Table C identifies each type by color and application. Figure 5 identifies the parts of a protector unit. The purpose of a protector unit is to provide current and voltage protection to the inside plant equipment, except for the 4C12C-type protector unit which provides continuity on circuits not requiring protection.

5.02 The housings for all 4C-protector units have the same dimensions. This sameness permits testing the entire 100-pair protector field with a test shoe. Except for the insulated special service protector unit (4C3C or 4C3F, red housing), the protector unit housing has recessed access holes for testing the outside plant tip and ring terminals. Test sets are also available for testing protector units individually.

6. CONNECTOR TESTING

6.01 Two pieces of test apparatus were developed to facilitate accessing the connectors on the COSMIC II main distributing frame. The 299A test adapter is used to access 100 pairs of OSP terminations on a protected or unprotected 307-connector. The P2FL test cord is used to access a single protected circuit.

6.02 The 299A test adapter, Fig. 6, consists of a molded plastic body with a cam-actuated mounting bracket for locking it on the connector. Notches on the mounting bracket provide positions for accessing the connector with or without protectors. The test adapter is used mainly for OSP cable pair verification in conjunction with a variety of test

TABLE A4

307-TYPE CONNECTOR ASSEMBLIES

CODE	CONNECTING BLOCK	TYPE FRAME	SHELVES (NOTE)
307A1-100*	78C1B-100	SMDF, TMDF, CMDF	2 Through 10
307B1-100*	(1) 78C1B-50 (1) 78C2B-50	SMDF, TMDF, CMDF	1 and 11
307C1-100	NONE	TMDF, CMDF	†
307D1-100	112C1B-100	SMDF, TMDF, CMDF	2 Through 10
307E1-100	(1) 112C1B-50 (1) 112C2B-50	SMDF, TMDF, CMDF	1 and 11

Note: This column represents the shelves that the connecting blocks are mounted on.

* These connector assemblies are rated A&M only.

† The 307C1-100 connector assembly is not equipped with connecting blocks and is used only for the termination of T carrier.

equipment. It is used to check for grounds, opens, shorts, reversals, and backtaps.

6.03 The P2FL test cord, Fig. 7, is used to access a single protected pair for service verification. It can be used to short-circuit a pair, ground a shorted pair, or ground either side of a pair.

7. CONNECTING BLOCKS

7.01 One of two types of connecting blocks, 78C- or 112C- are used on the COSMIC II main distributing frame. They differ only in respect to the type terminal, color of the checkerboard pattern, and the tools used for placing and removing cross-connections. Quick-clip, insulation-slicing type terminations are connected on the front (cross-connecting side) and solderless wire-wrap terminations are connected on the rear (COE or cable pairs).

7.02 A 78C-type connecting block is shown in Fig. 8. The terminal portion is colored in a red and white checkerboard pattern in 5-pair increments on the front (4-pair increments on 64-pair block) with a grid pattern on the rear. The block is molded plastic. Slotted plastic fanning strips, color-coded according

to the type of equipment terminated, are provided on the top and bottom of the block. The blocks have 50-, 64-, and 100-pair capacities. The 112-series have equivalent codes to the 78C-series, are identical in size, shape, color, and function; the only difference being the terminal and a blue and white checkerboard pattern. The 112-series also requires a different end of a rotatable tool bit. For this reason, frames equipped with 78C-series connecting blocks will continue to use only the 78C-series.

7.03 New COSMIC II main distributing frames used in SMDF/TMDF and CMDF arrangements will use only a combination of 112C- and 112E-series connecting blocks. The 112E-series has a higher terminal density and is primarily used for trunk, toll terminal, special and miscellaneous terminations on SMDF/TMDF and CMDF arrangements, and for line equipment terminations on CMDFs. Outside plant and tie cables are terminated on 112C-blocks. The 112E-series also has a blue and white checkerboard pattern.

7.04 Terminal identification is provided by factory-stamped characters on the face of all connecting block fanning strips. The upper and lower

TABLE B4

CONNECTORIZED STUB CABLES

CODE (NOTE 1)	GAUGE	PAIRS	APPLICATION (NOTE 2)
11CA -	22	100	OSP
11DA -	24	100	
11CB -	22	50	T-Carrier OSP
11EA -	22	25	T-Carrier ORB
11EB -	22	50	

Note: 1. The cables are available in 40-, 60-, 80-, 100-, 120-, 150-, and 200- foot lengths and are coded accordingly (eg, 11DA-150).

Note: 2. The abbreviations used in this column are:

OSP — outside plant

ORB — office repeater bay.

facets of the connecting block fanning strips used for line equipment, outside plant, and tie pairs are also factory stamped. Two identification schemes are used. The Location Oriented Identification System (LOIS) designation appears in black on the front face of the terminal strip and indicates the terminal-field column number. This scheme provides coordinate information to facilitate terminal location by the frameperson. The COSMOS frame orders contain LOIS information on cable pairs, line equipment, and tie pairs. The second scheme utilizes identical functional designations appearing on the lower and upper facets of the fanning strips in dark red indicating cable pair and line equipment numbers.

7.05 Individual terminal identification for trunks, toll terminal, special and miscellaneous equipment on the TMDF and CMDF applications is accomplished by use of shelf designation strips for 112E1A-128 blocks (shelves 2 through 10) and for 112E1A-64 blocks (shelves 1 and 11). The designation strip is used with blank labels that are field stenciled or with preprinted labels. Black characters representing the

terminal column number appear on the front face of the fanning strip on 112-type blocks.

8. CROSS-CONNECTIONS

8.01 Standard DT-24P distributing frame wire is the only cross-connection wire to be used on the SMDF. It is a twisted pair, 24-gauge, solid copper conductor with irradiated polyvinyl chloride insulation. It is available in different color codes for specific applications. For TMDF or CMDF applications, DT-type wire is available having single, triple, and quadruple conductors, each type having a unique color code.

8.02 A cross-connection is considered short if it runs between any two points of adjacent modules and does not have to be run through the upper or lower express trough. The LOIS indicates to the craftsperson the coordinate information of module, shelf, upper or lower half of the block, block number, column number, and (paired) row in the block for a cross-connection. When cross-connecting to a 78-type connecting block, the bottom slot of the terminal should be used first. When cross-connecting to a 112-type connecting block, the top slot of the terminal should be used first. The unused position of the connecting block terminal is used when a second cross-connection is required.

9. CROSS-CONNECTION ASSIGNMENT

9.01 Two basic procedures are employed to assign line equipment to cable pairs. They are called random assignment and preferential assignment.

9.02 Random assignments usually result in long jumper runs and excessive pileup on the SMDF and should be used only when necessary on certain types of circuits. There is no consideration of the relative location of either end of the jumper.

9.03 Preferential assignment procedures generally provide for the shortest possible jumper. If this type of connection can not be made for a particular assignment, the computer system (COSMOS) performs a full sequential search (alternating direction) of the modules for line equipment. The search starts first to the left, then goes to the right and continues in this alternating manner, such that eventually more distant terminals are searched. When a suitable terminal is found, the cross-connection will be the shortest one possible between the COE and OSP

◆TABLE C◆

4C-PROTECTOR UNITS

CODE (NOTE)	SERVICE APPLICATION	COLOR
4C1C, 4C1F	Standard Line	Black
4C2C, 4C2F	Denied Line	Green
4C3C, 4C3F	Special Line	Red
4C4C, 4C4F	PBX Battery	Yellow
4C9C, 4C9F	Reverse Tip/Ring	White
4C11C, 4C11F	Mini Bridge Lifter	Orange
4C12C	Dummy (No Protection)	Gray

Note: 4C-F type protector units are equipped with 205A gas tubes and have a symbol "Φ" marked on the face of the handle.

terminations. ◆This minimizes long jumper pileup and maximizes craft efficiency.◆

9.04 A connection to a tie cable is the easiest to assign preferentially. The only restriction is that a spare pair exists in the tie cable to the particular distributing frame required.

10. MINIATURE TALK AND TEST PANELS

10.01 Figures 9, 10, and 11 show some of the jack panels used on the COSMIC II main distributing frame. All the miniature test/talk panels are mounted on the COE modules only. They are equipped with various combinations of test and talk jacks.

10.02 Figure 9 shows two panels, one equipped with a transmitter to the test desk, battery and ground test source, and the other equipped with talk jacks. The panels mount on the front of the frame on the COE modules.

10.03 The panel shown in Fig. 10 is equipped basically the same as the two panels described in the previous paragraph. However, it mounts on the rear of the COE module by means of KS-21316-L9 mounting bracket.

10.04 Figure 11 shows a panel equipped with only talk and test jack circuits. The panel is mounted on the rear of the COE module and is intended to be used with the panel in Fig. 10 for addi-

tional jack capacity. It also requires a KS-21316-L9 mounting bracket.

10.05 The frame may also be equipped with optional service observing panels similar to the miniature talk and test panel. Cords, 9 feet long with a miniature plug on one end, are used to patch a service observing circuit to the rear of a line equipment connecting block or to a protector unit position.

11. CABLE RACK AND LIGHTING

11.01 The racking and lighting arrangements for the COSMIC II main distributing frame are frame supported and comply with the new equipment building standards. The racking arrangements are designed to minimize cable congestion and provide a typical cable support structure. Fluorescent lighting fixtures are provided on both sides of the frame. Figure 12 shows auxiliary framing and lighting arrangement on a double lineup.

12. MISCELLANEOUS

A. Cable Directory

12.01 The cable directory is an output of PACE. It provides location information for all cable pairs. It is mounted on a fixed bracket on the rear of the cable chutes on either side of the OSP modules, ◆as required (based on the size of the frame).◆ Individual PACE labels, containing the cable and pair within individual half shelves (1 and 11) or full

SECTION 201-222-110

shelves (2 through 10), are mounted on a hinged bracket also in the cable chutes.

B. Rolling Work Platform

12.02 A wooden rolling work platform (KS-21415) can be used in aisles wider than 21 inches. Since it is portable, it can be used in two or more aisles. The platform can be equipped with a wire reel below the platform.

12.03 The platform is an A-frame ladder with steps on both sides. The unoccupied platform is easily moved on spring-loaded casters. The casters retract under a weight and each leg of the platform rests directly on the floor.

C. Wire Reels

12.04 The KS-21955 wire reel is free standing. The reel has a self-tensioning feature which prevents wire entanglements as sometimes happen with free running reels. It is constructed of lightweight foam plastic with closed flanges. A low center of gravity with a nonslip friction pad on the bottom minimizes the possibility of the reel tipping over.

D. Wire Insertion and Removal Tools

12.05 Wire insertion tools 756C, 756C-2, and 872A are rated Manufacture Discontinued. The 756C-3 and 950A tools are the preferred tools to be used for jumper wire insertion on both the 78C- and 112-type connecting blocks.

12.06 The 724A wire removal tool is rated Manufacture Discontinued. The 980A and the 950A (wire insertion and removal) tools are the preferred tools to be used for jumper wire removal on both the 78C- and 112-type connecting blocks.⚡

13. REFERENCES

13.01 The following BSPs contain information relative to the COSMIC II Main Distributing Frame System.

SECTION	SUBJECT COVERED
201-208-110	307-Connectors—Description
201-208-810	307-Connectors—Repair
201-216-101	Miniature Talk and Test System
201-222-112	Types of Protection
201-222-115	Connecting Blocks—Description
201-222-310	Connecting Blocks — Cross-Connecting
201-222-810	Connecting Blocks—Repair.

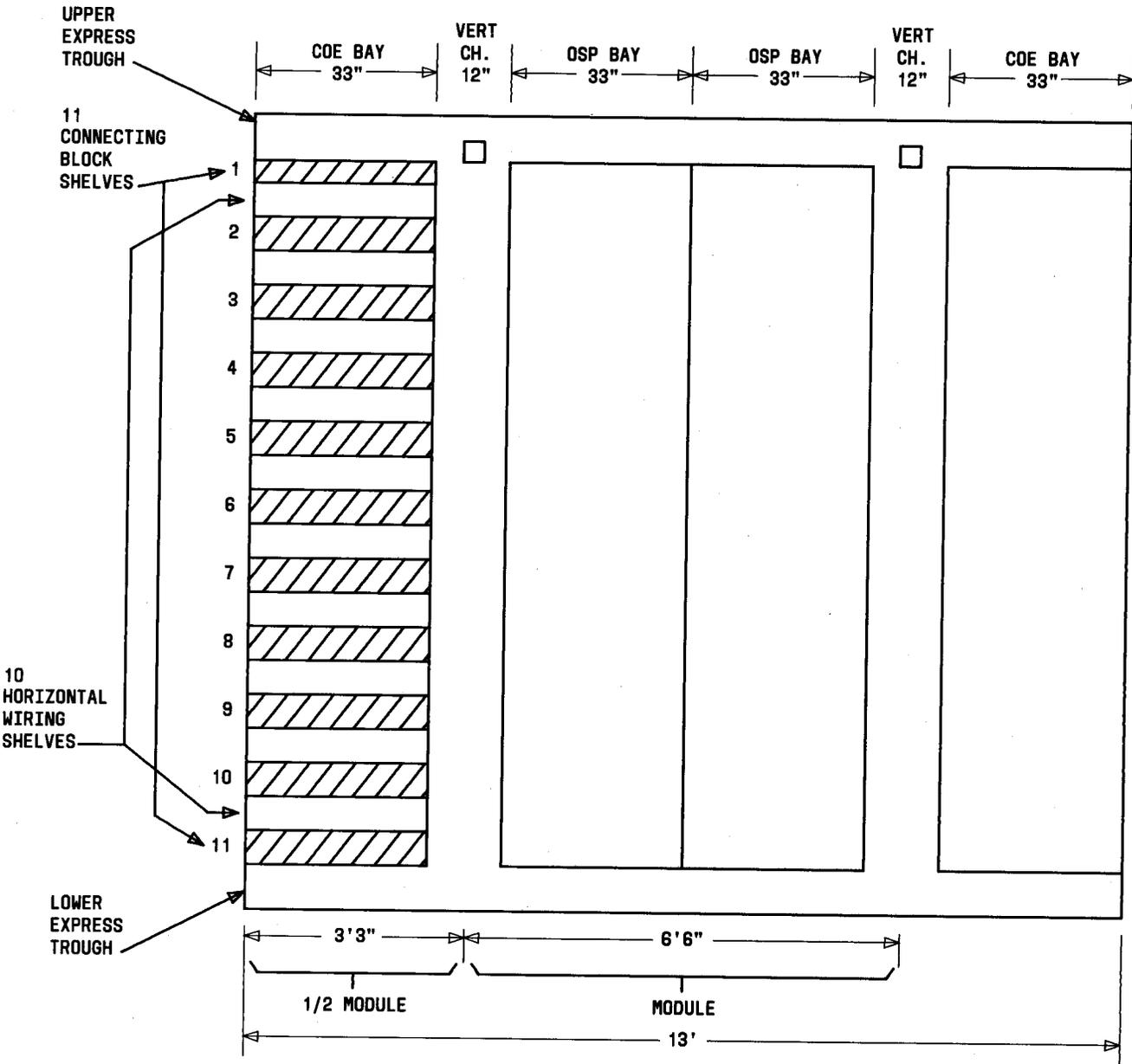


Fig. 1 —COSMIC II Distributing Framework Group

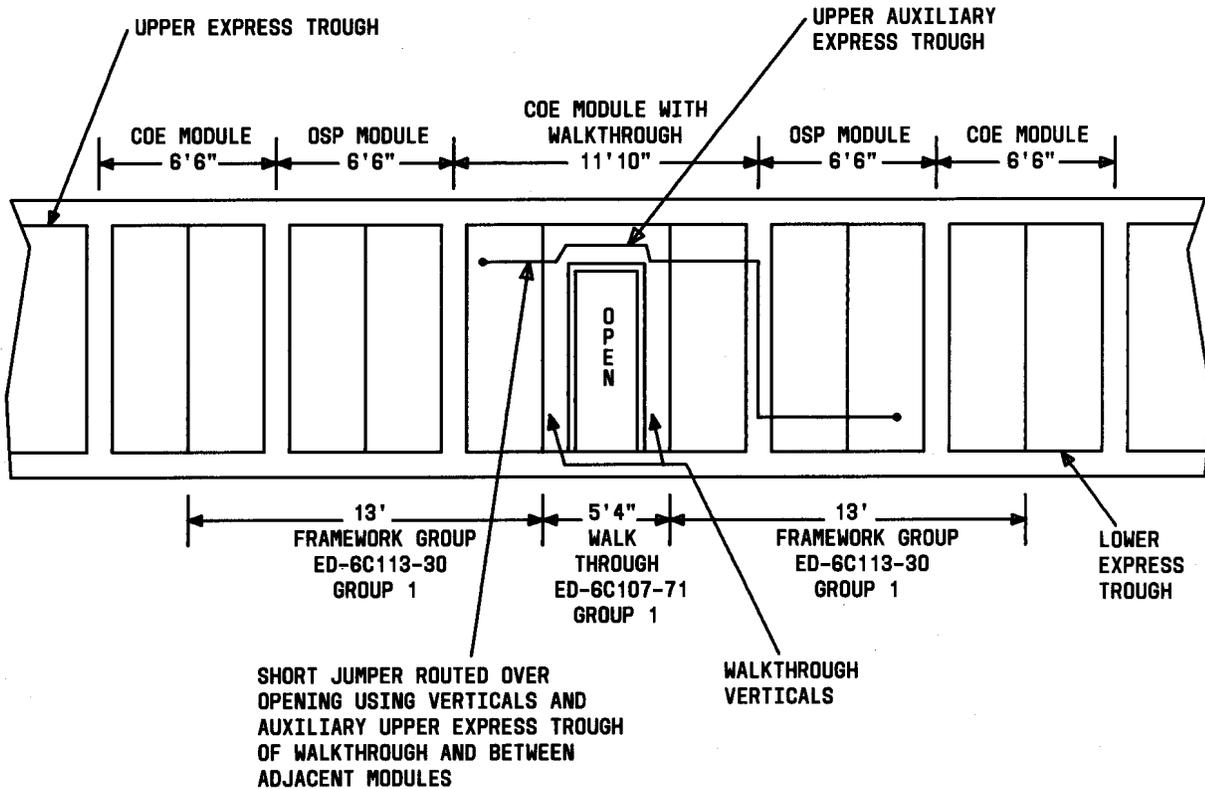


Fig. 2—Location of Walkthrough

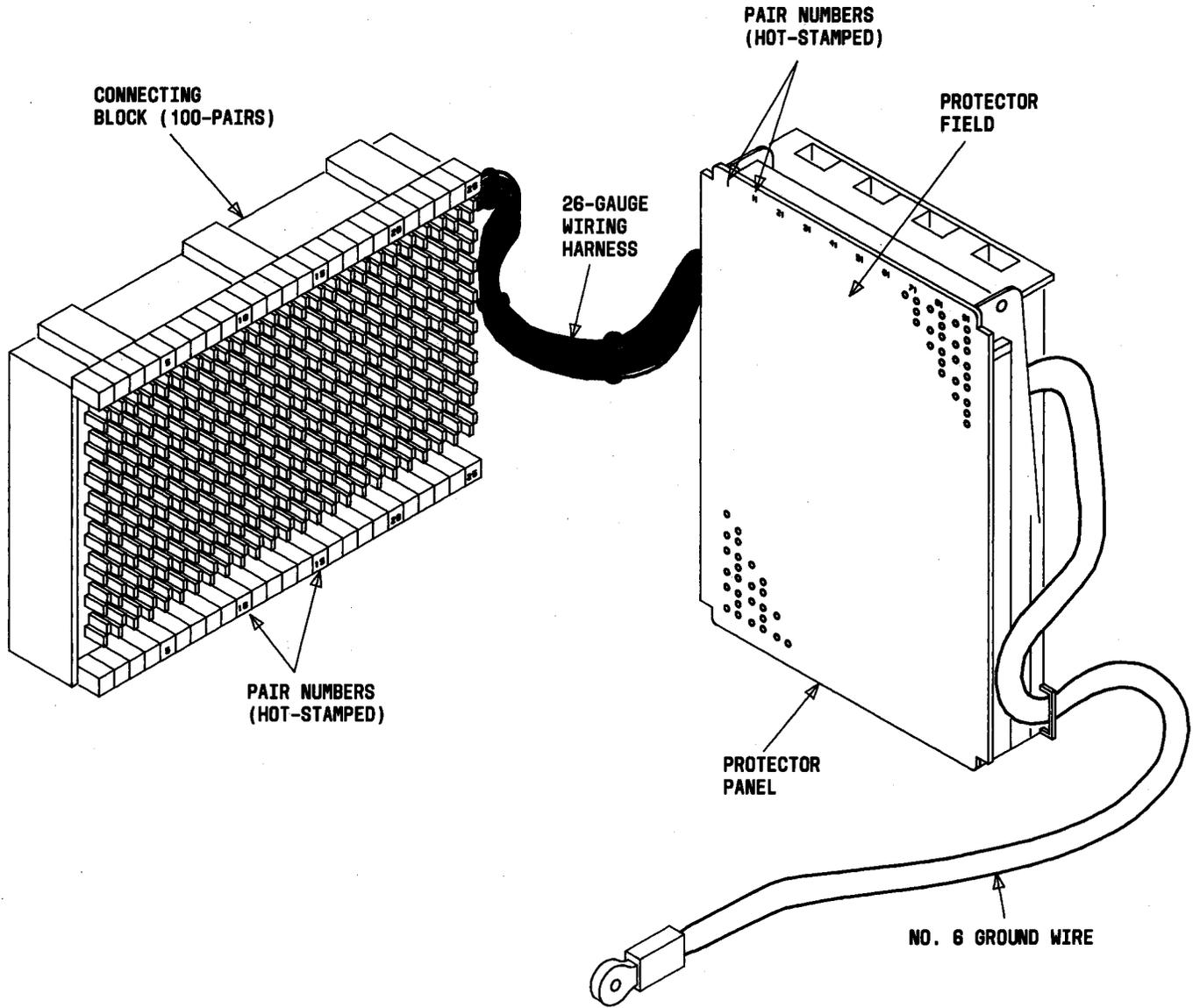


Fig. 3—307-Type Connector Assembly-Front

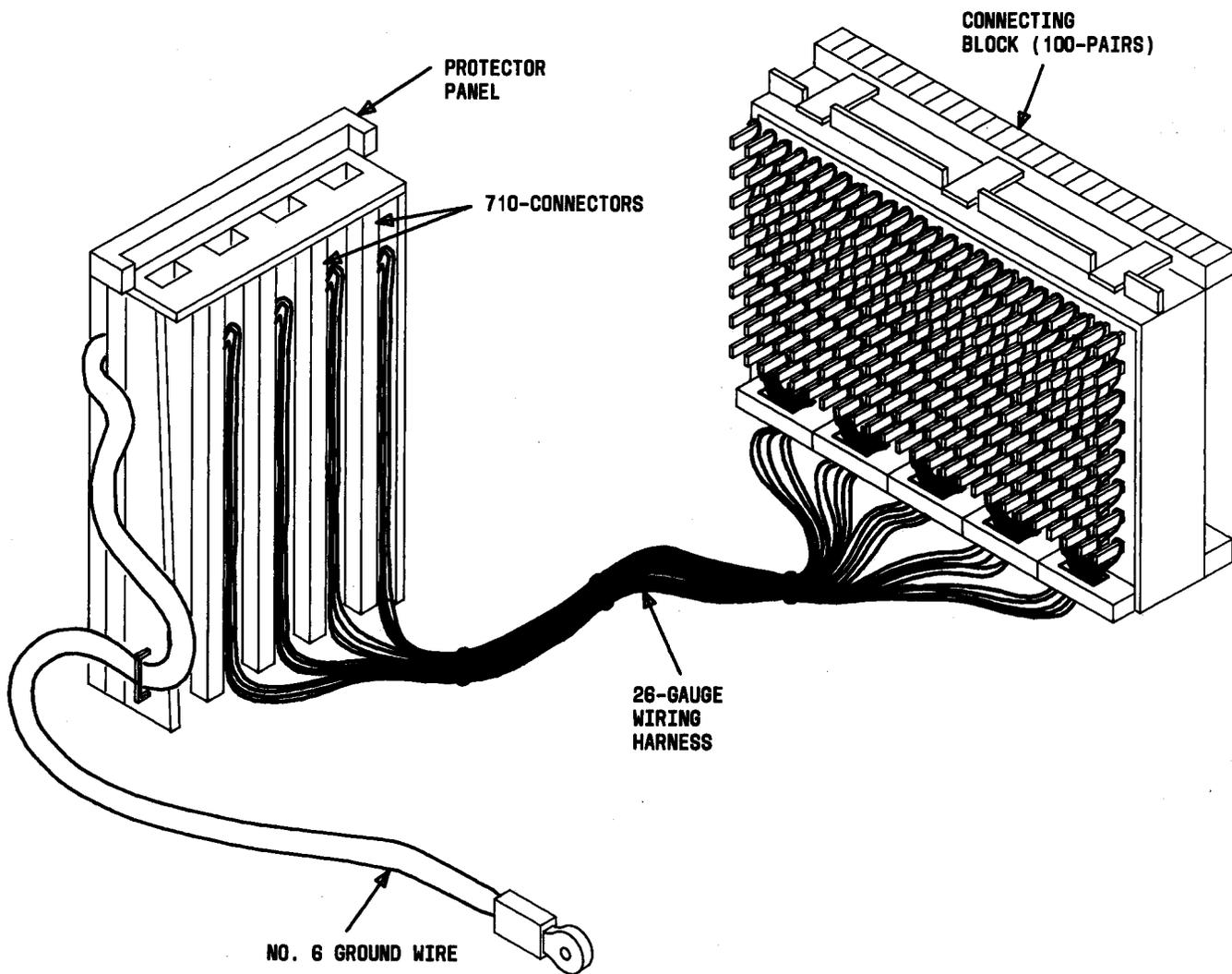


Fig. 4—307-Type Connector Assembly-Rear

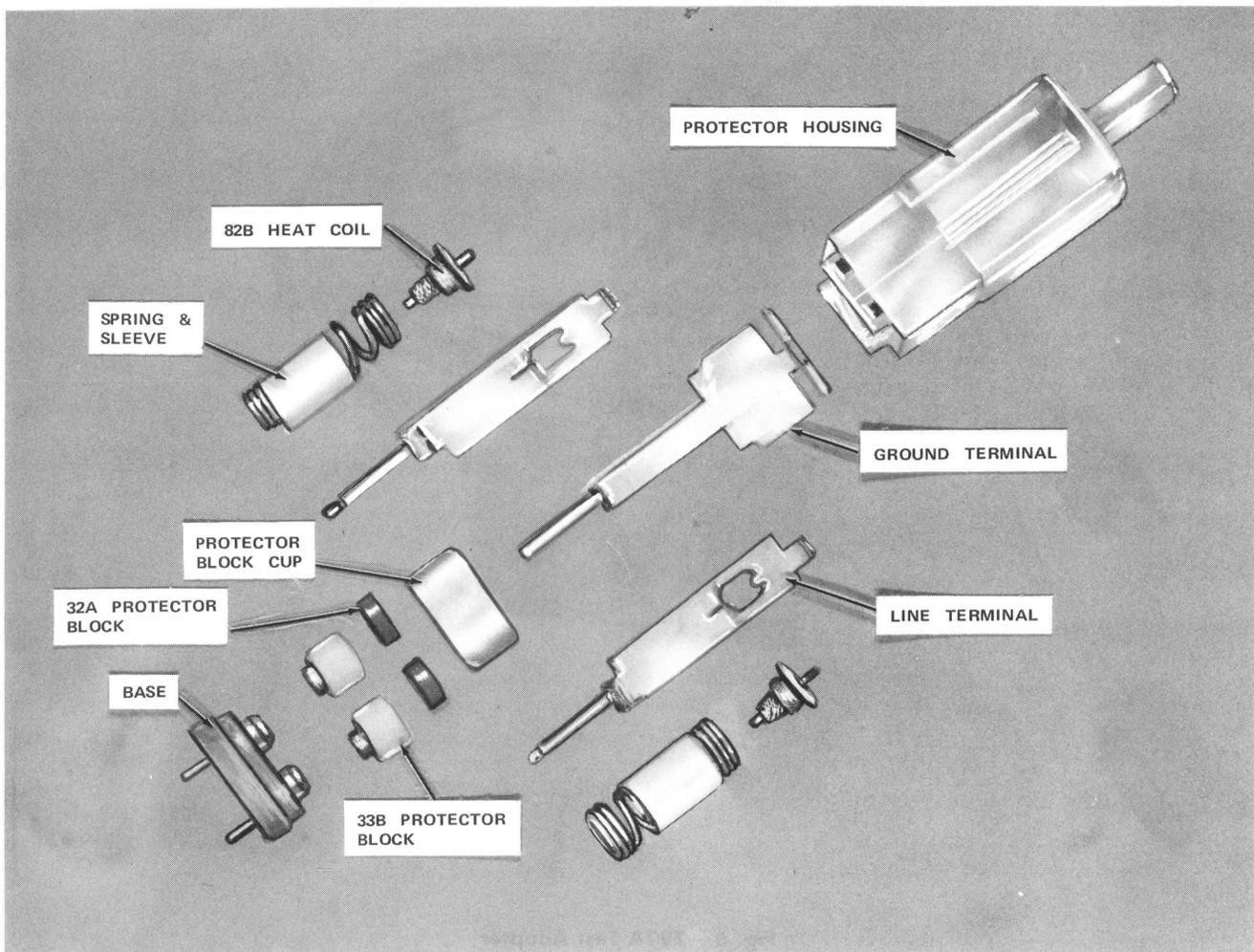


Fig. 5—4C-Type Protector Unit

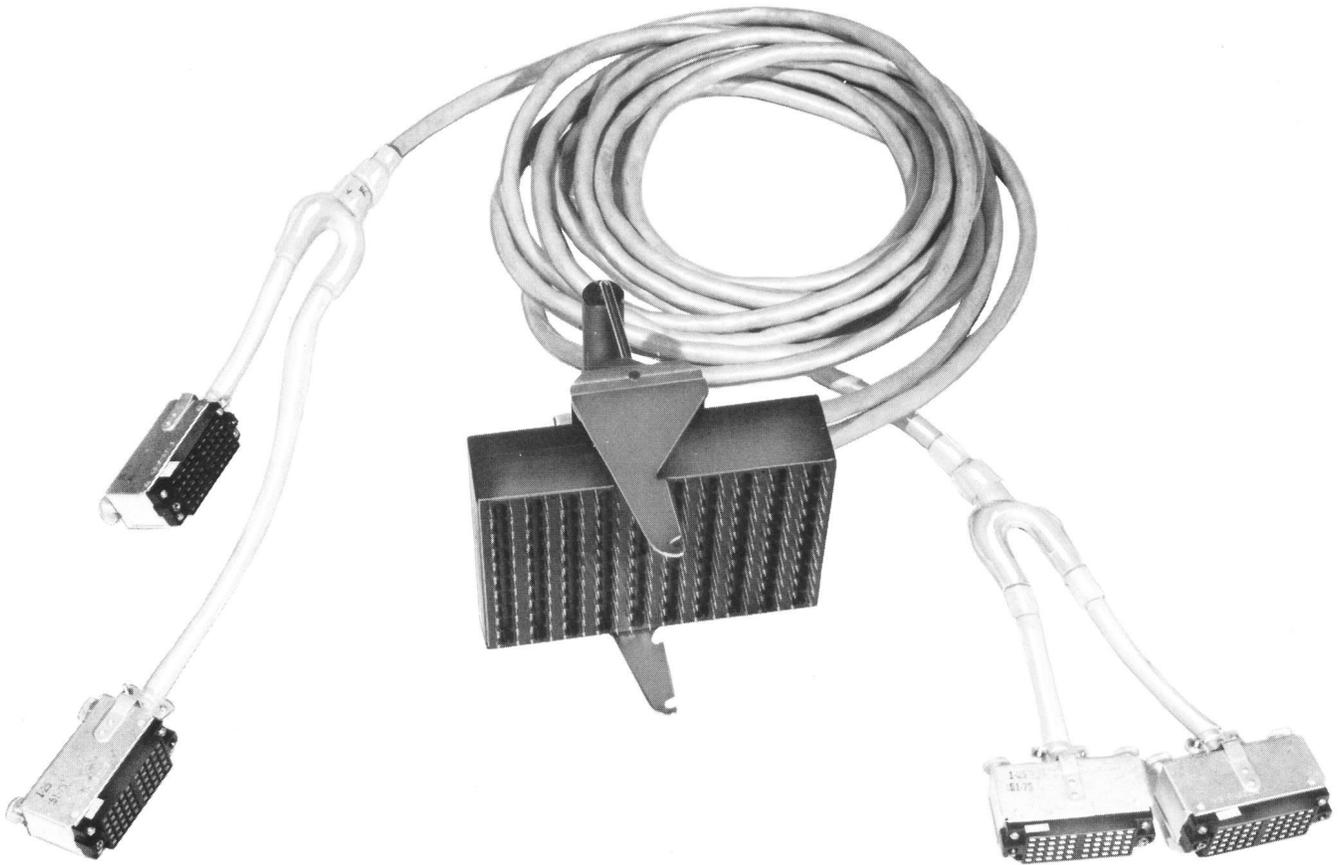


Fig. 6—299A Test Adapter

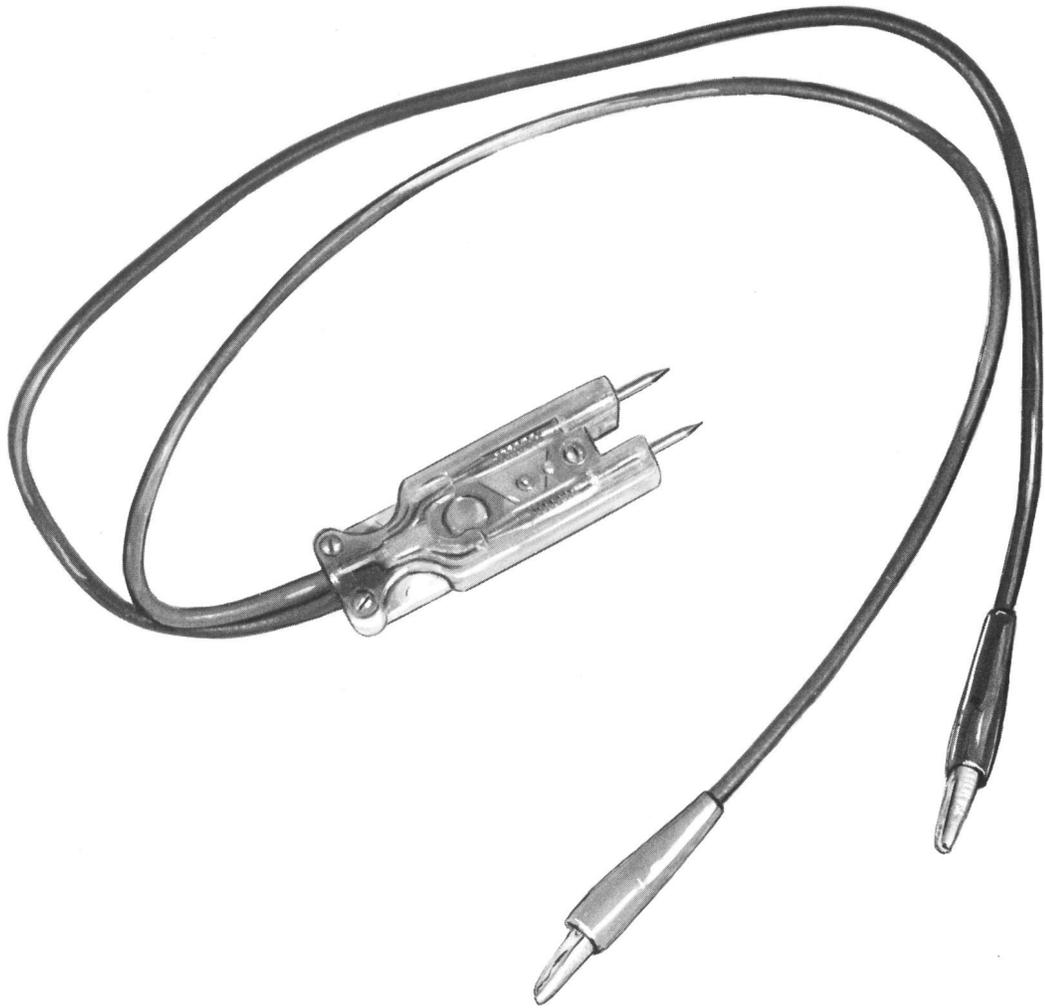
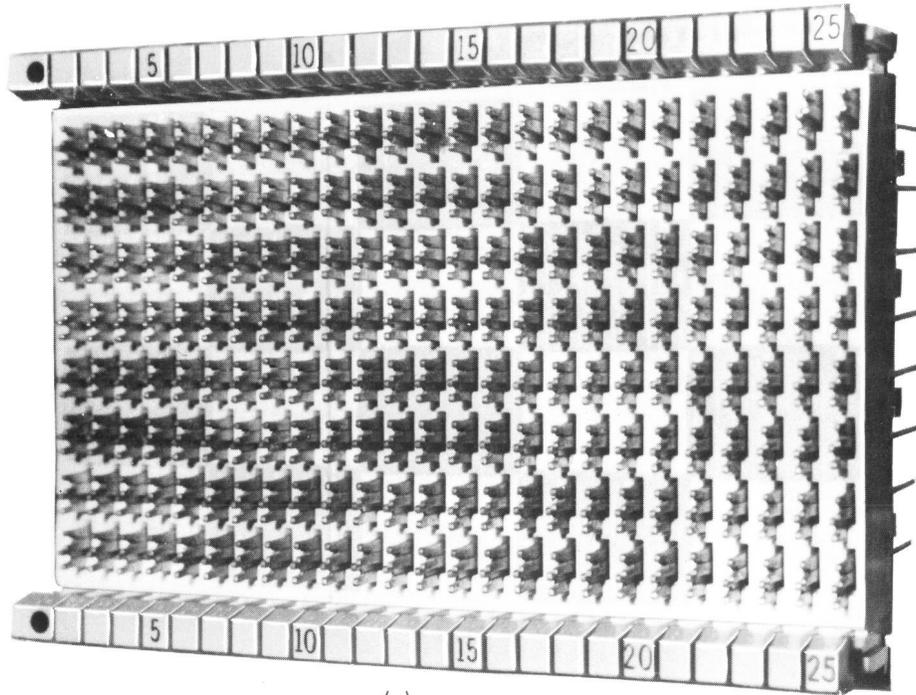
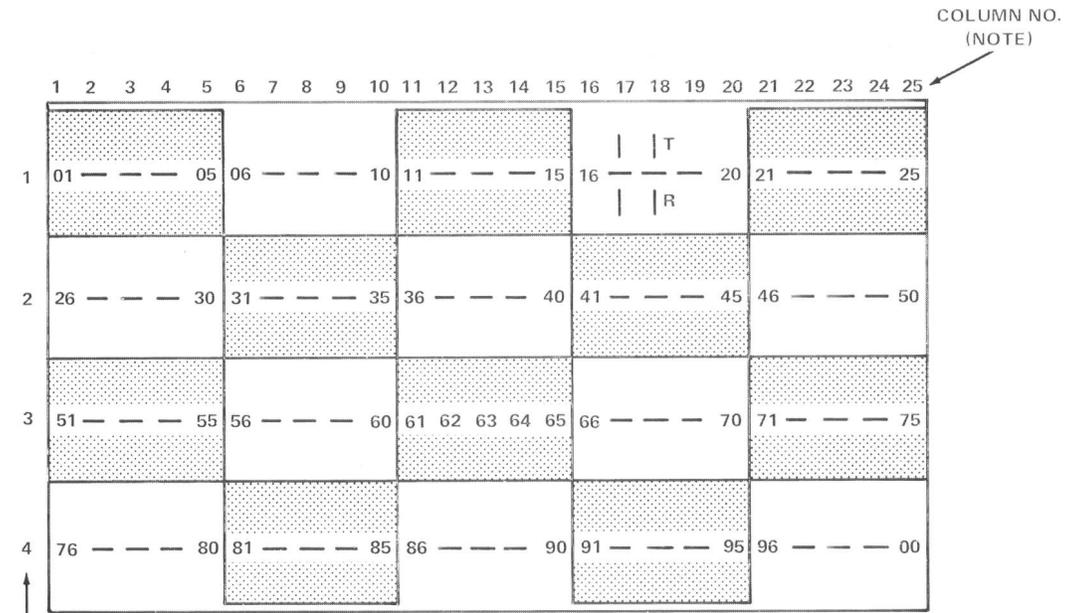


Fig. 7—P2FL Single Pair Test Cord



(a)



NOTE:
 S X S LINE EQUIPMENT IS DESIGNATED BY TWO DIGITS
 FIRST DIGIT - LEVEL
 SECOND DIGIT - TERMINAL

EXAMPLE: LEVEL 6, TERMINAL 4, LINE EQPT. DESIGNATION: 64
 LOCATED IN COLUMN 14 AND ROW 3

◆Fig. 8—Typical 78C-Connecting Block— (100 Cable Pairs)◆

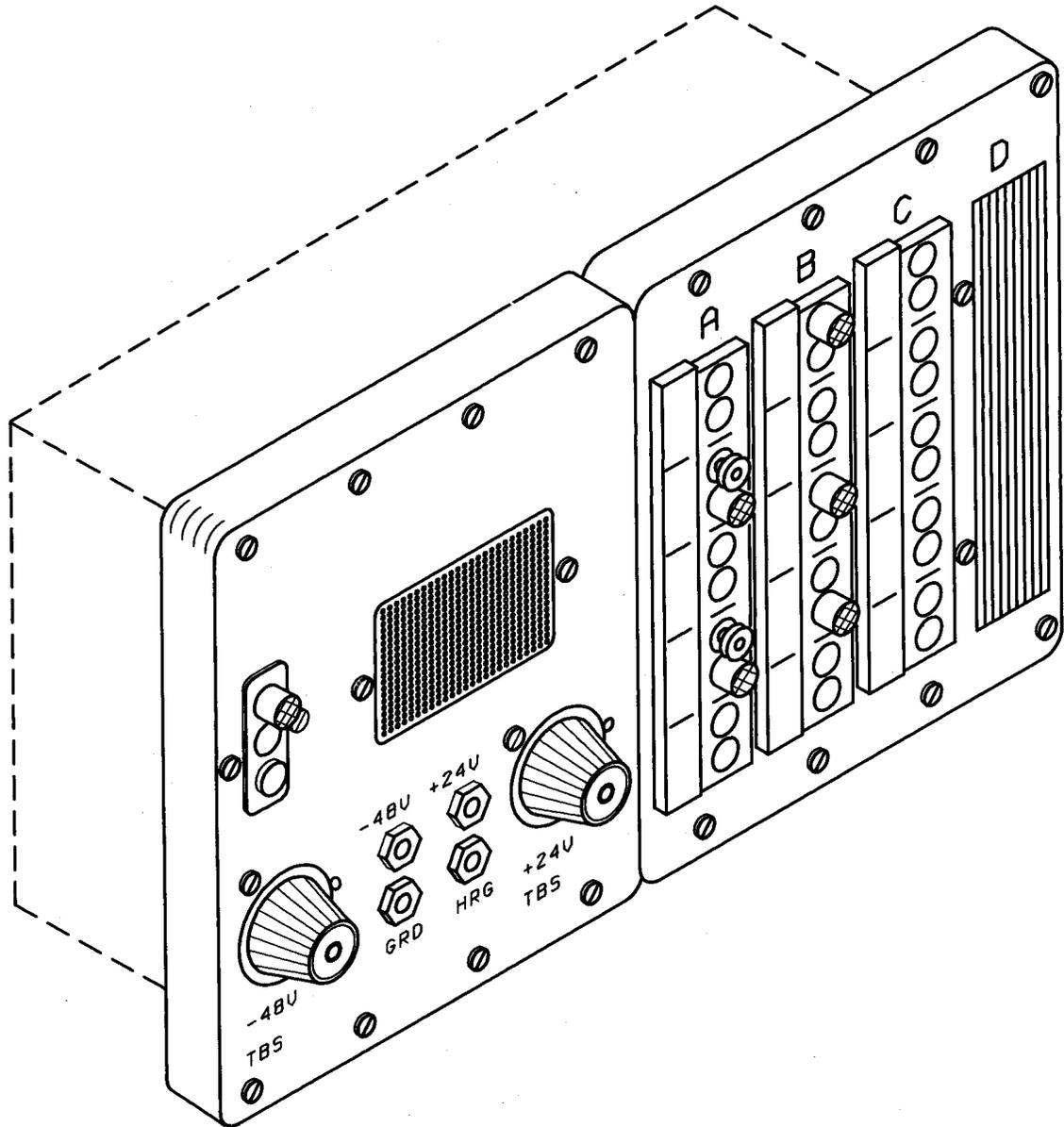


Fig. 9—KS-21316-L8 and ED-6C110-10 GRP. 23 Test/Talk Panels

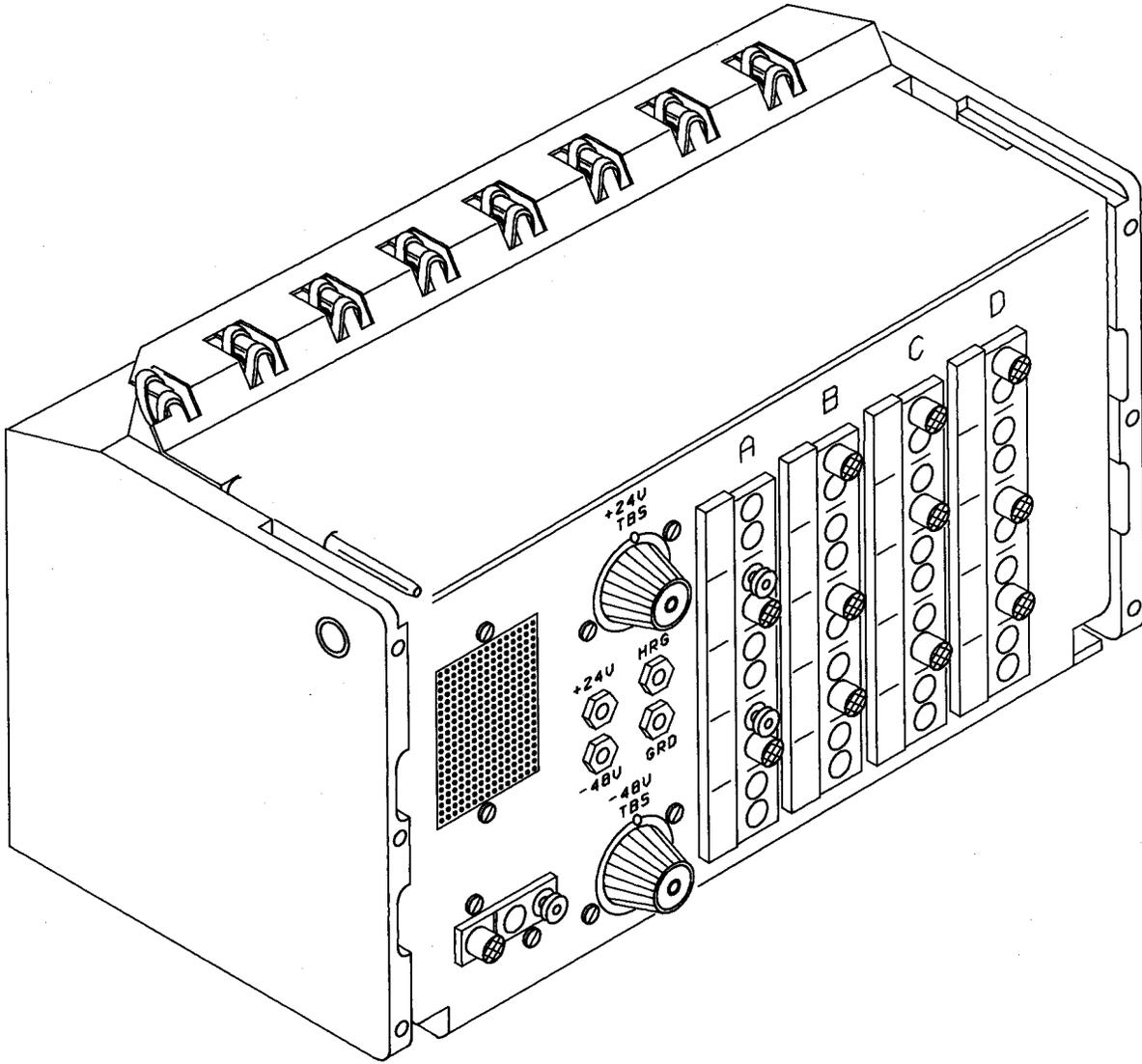


Fig. 10—ED-6C110-10 GRP. 25 Test/Talk Panel

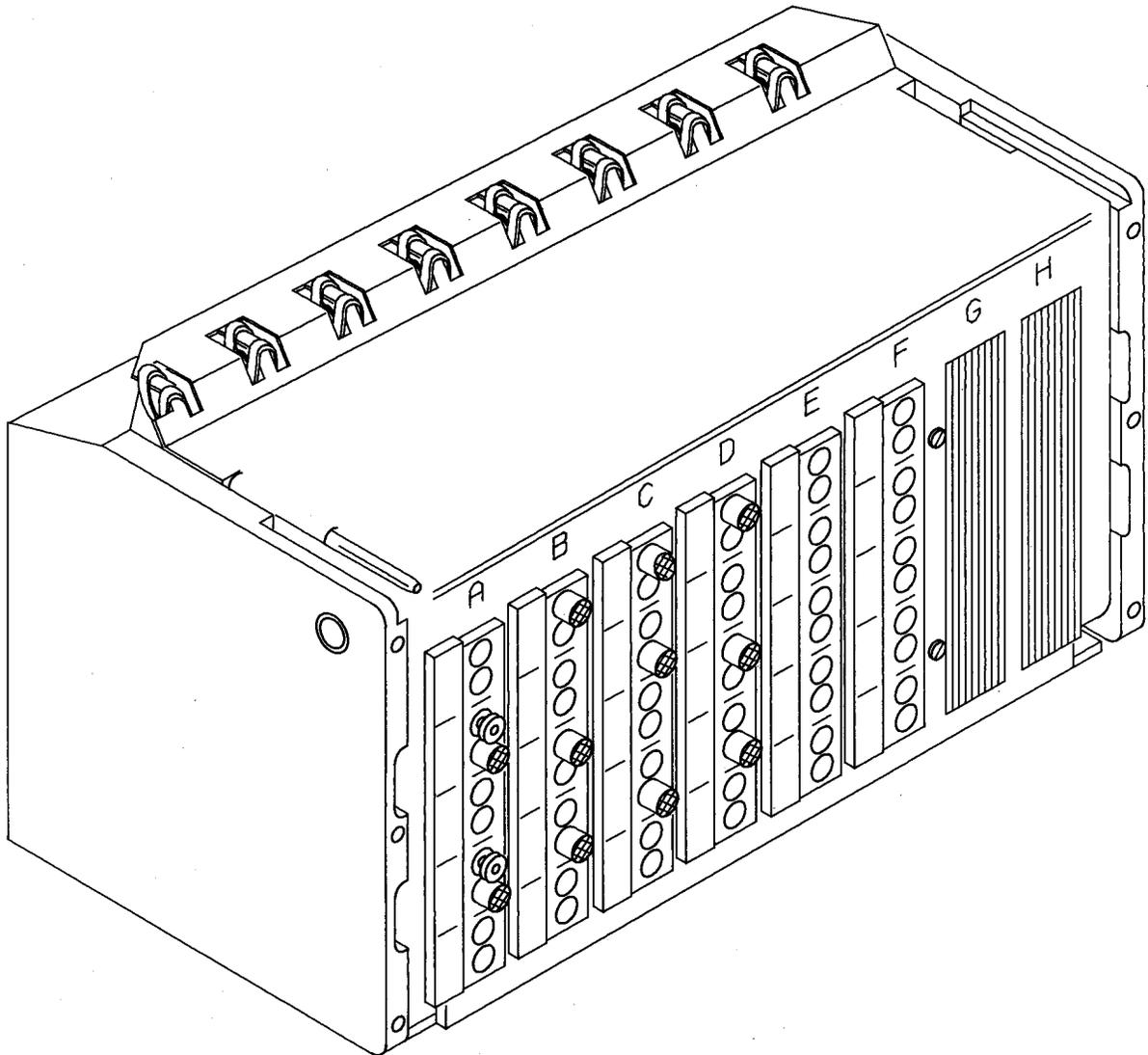
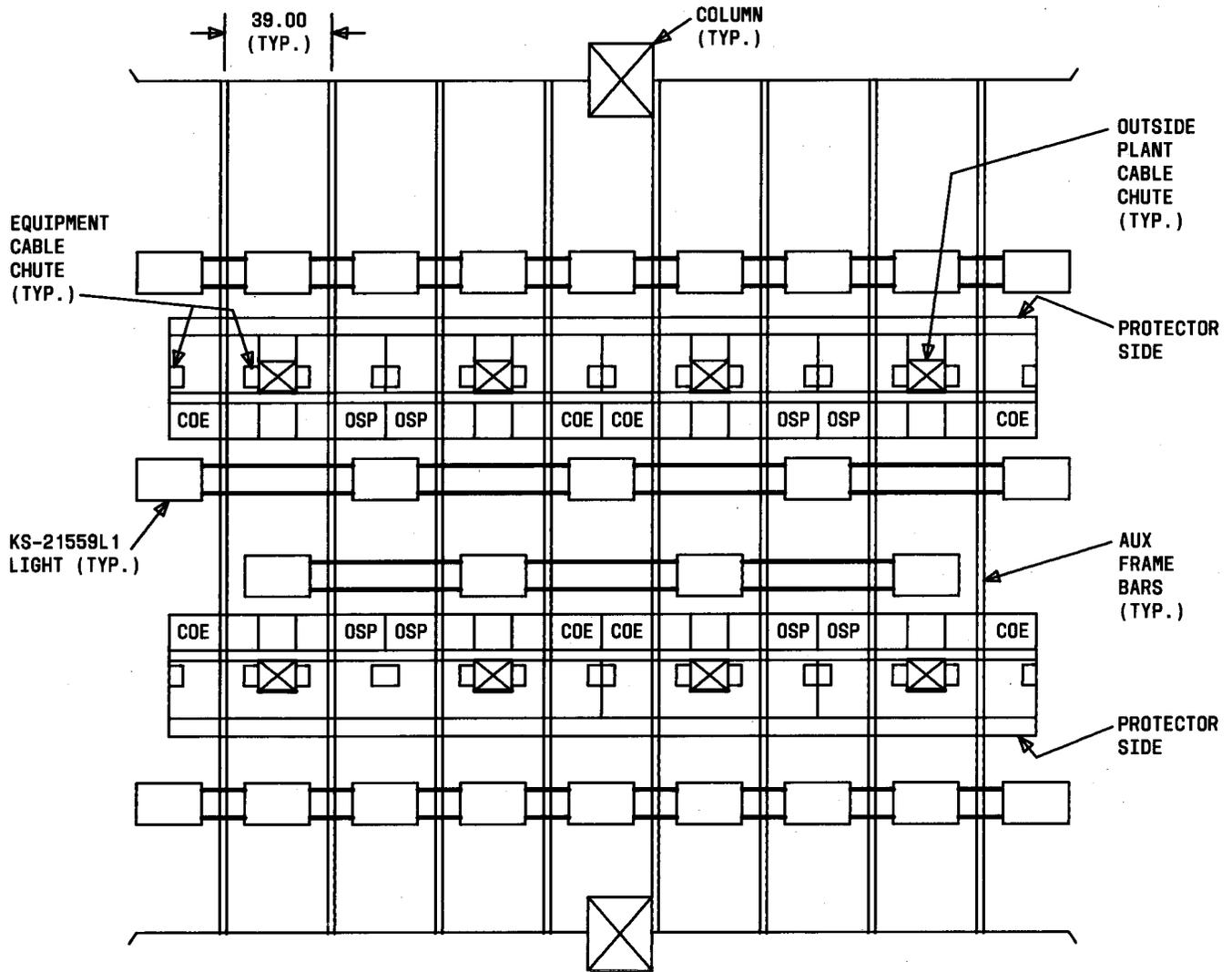


Fig. 11—ED-6C110-10 GRP. 26 Test/Talk Panel



◆Fig. 12—Auxiliary Framing and Lighting◆

COSMIC TERMINATING, TRACING AND REMOVING JUMPERS

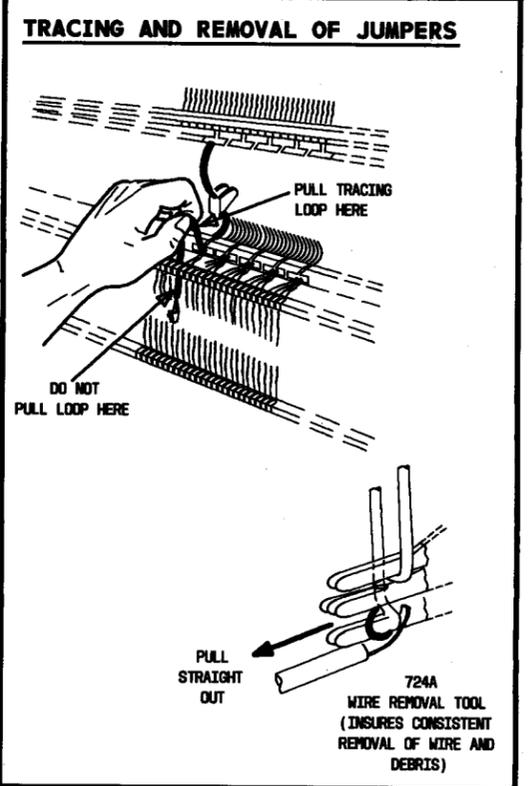
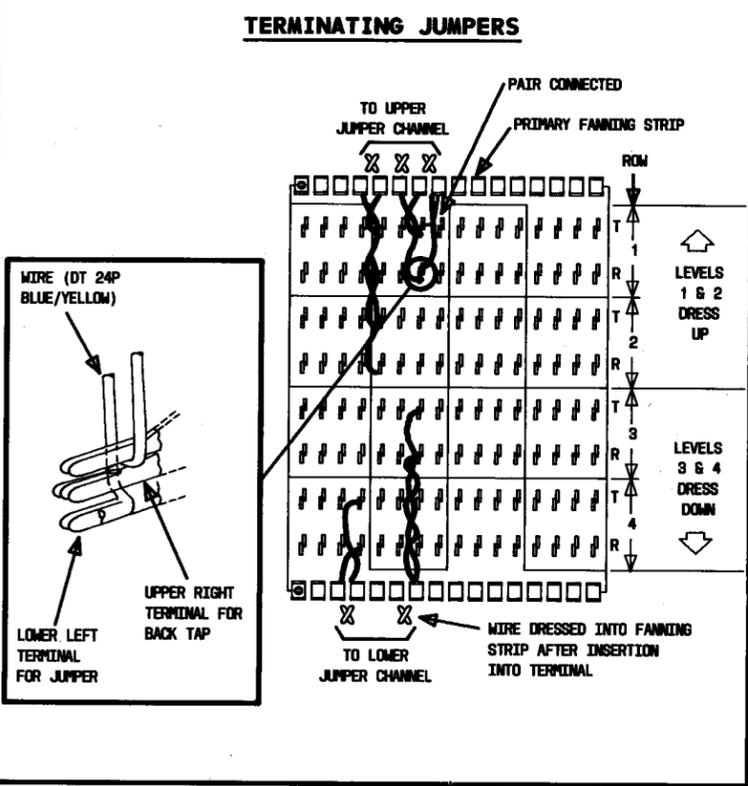
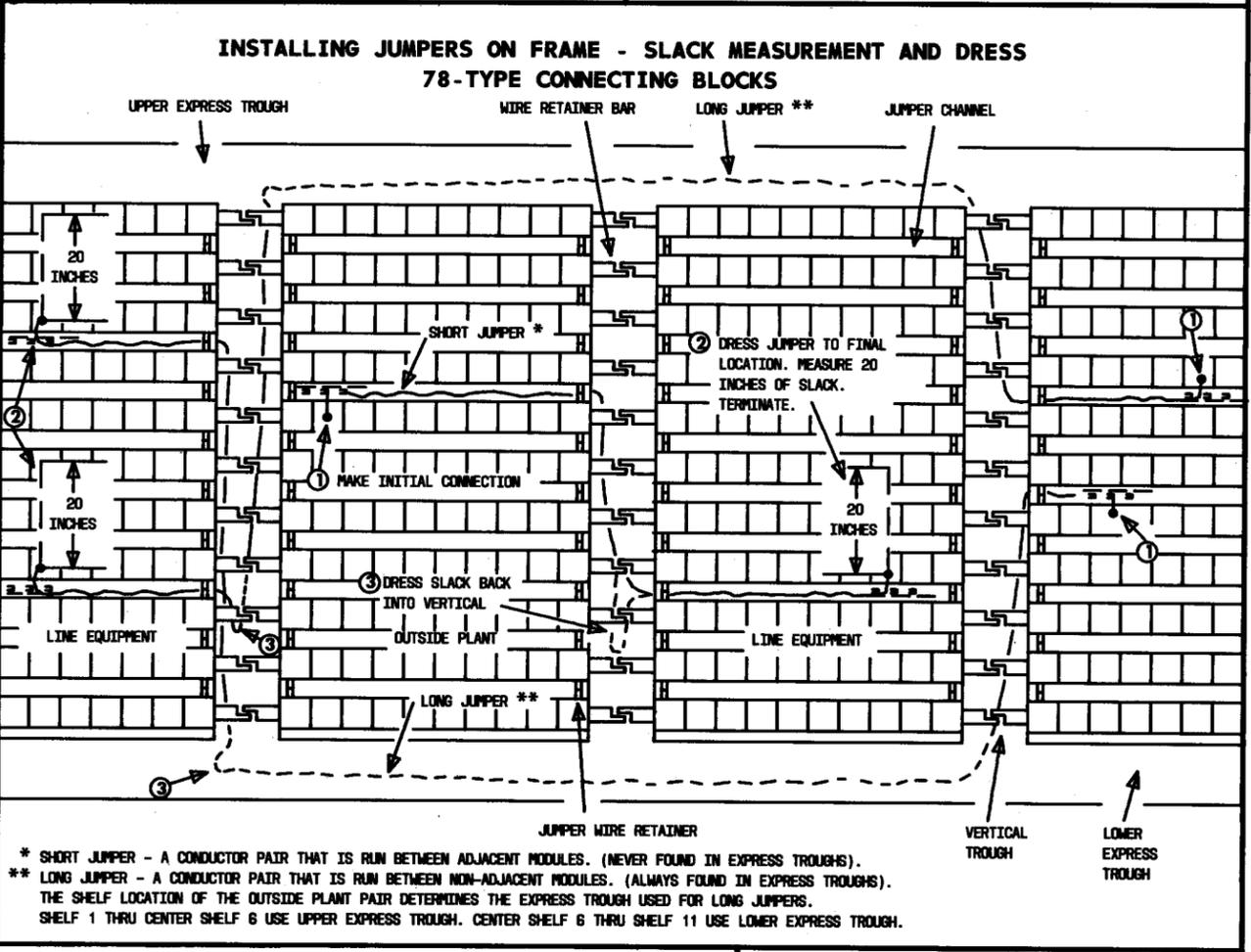
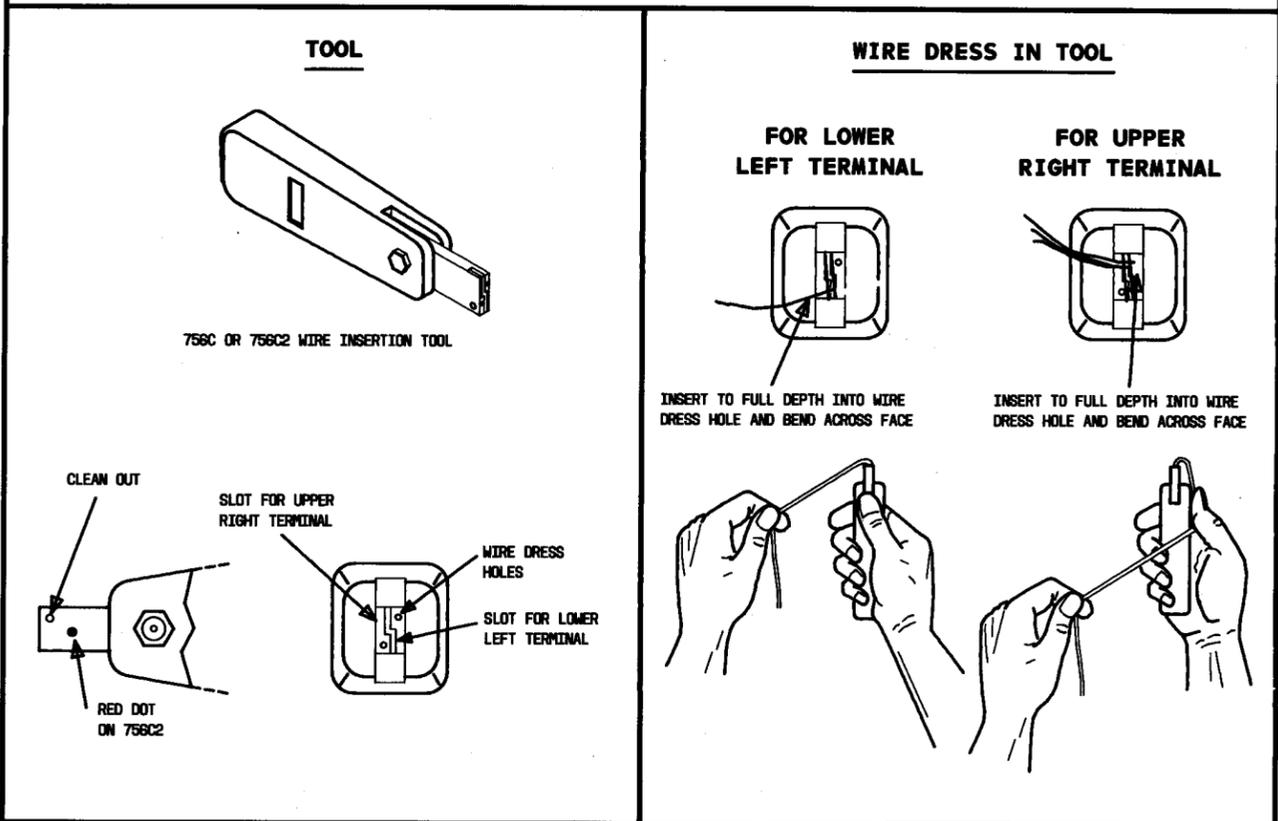


Fig. 13 — Frame Operations Decal-Jumper Side (For Frames Equipped With 78C-Type Connecting Blocks)

COSMIC TERMINATING, TRACING AND REMOVING JUMPERS

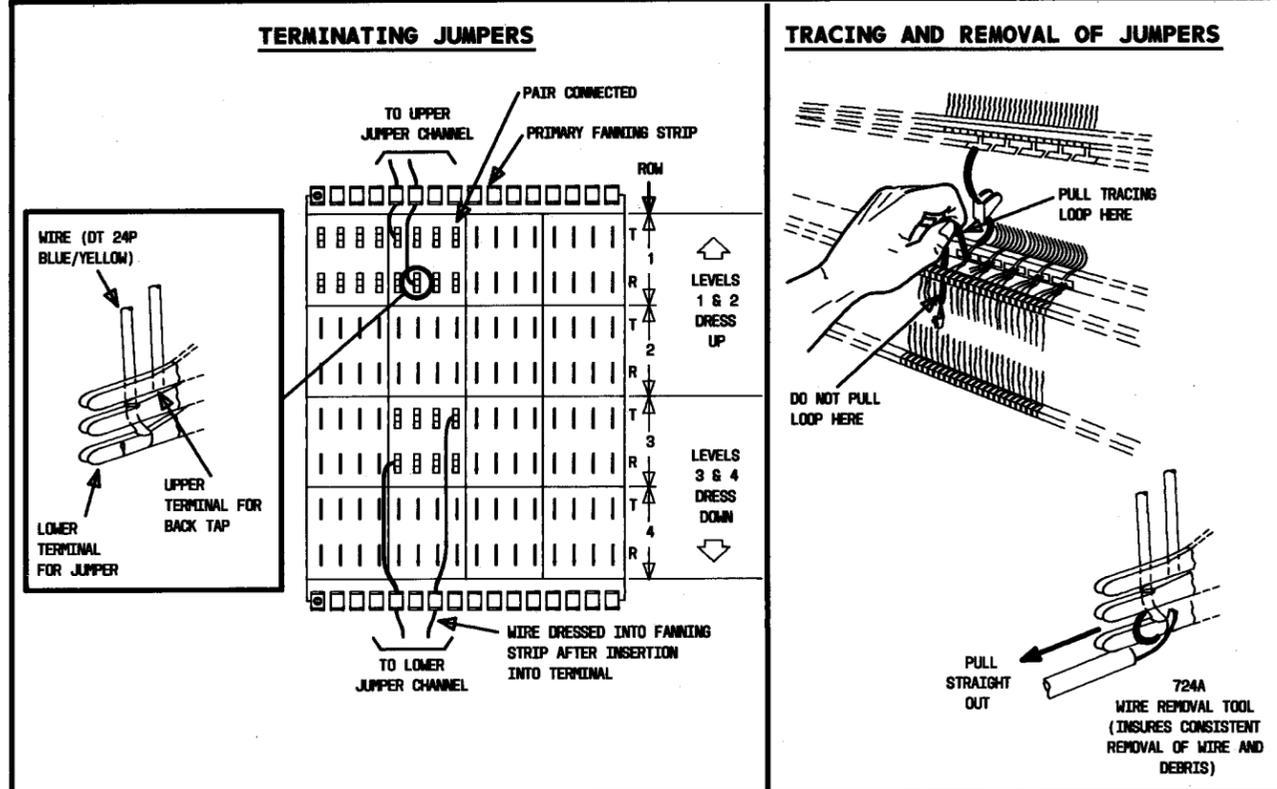
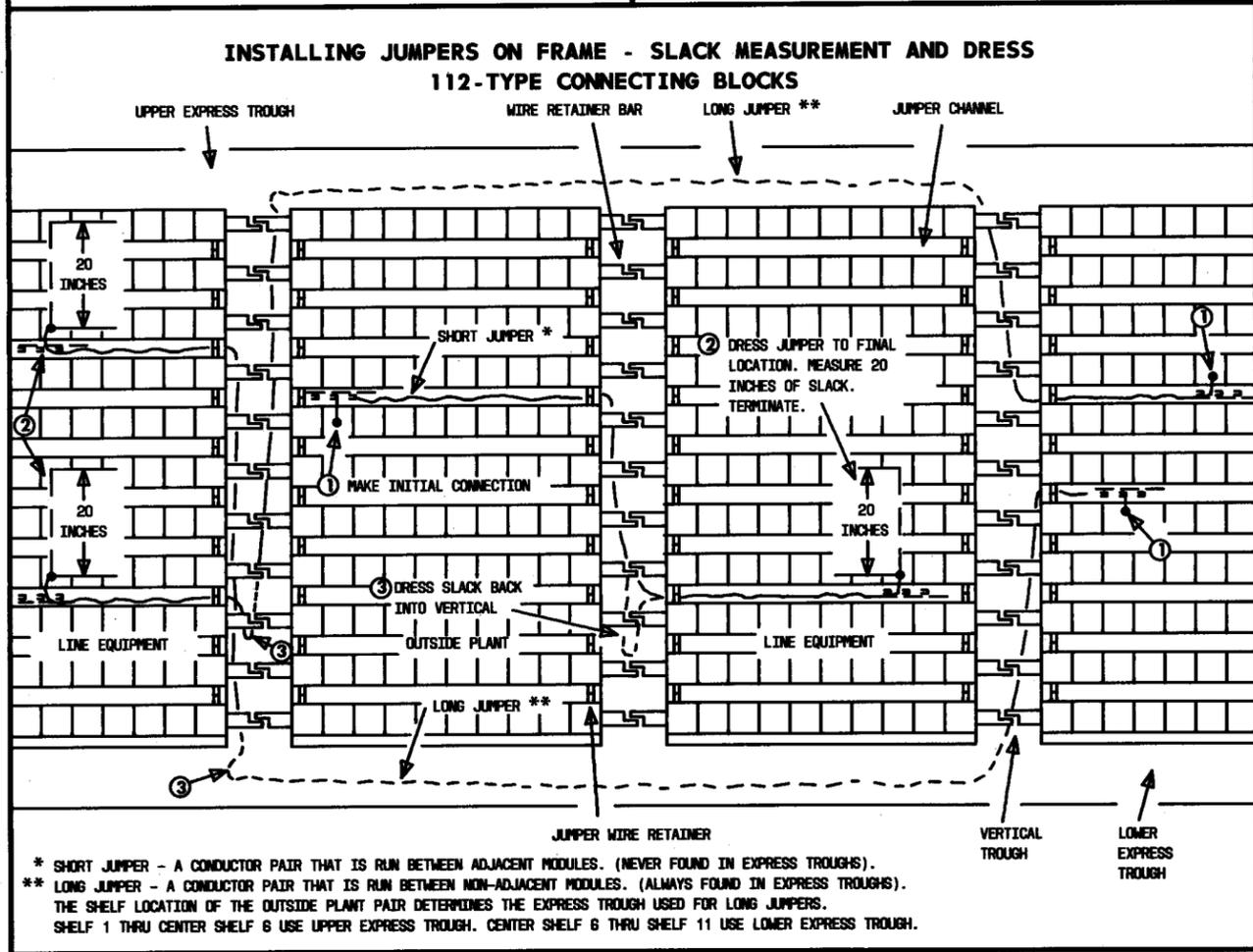
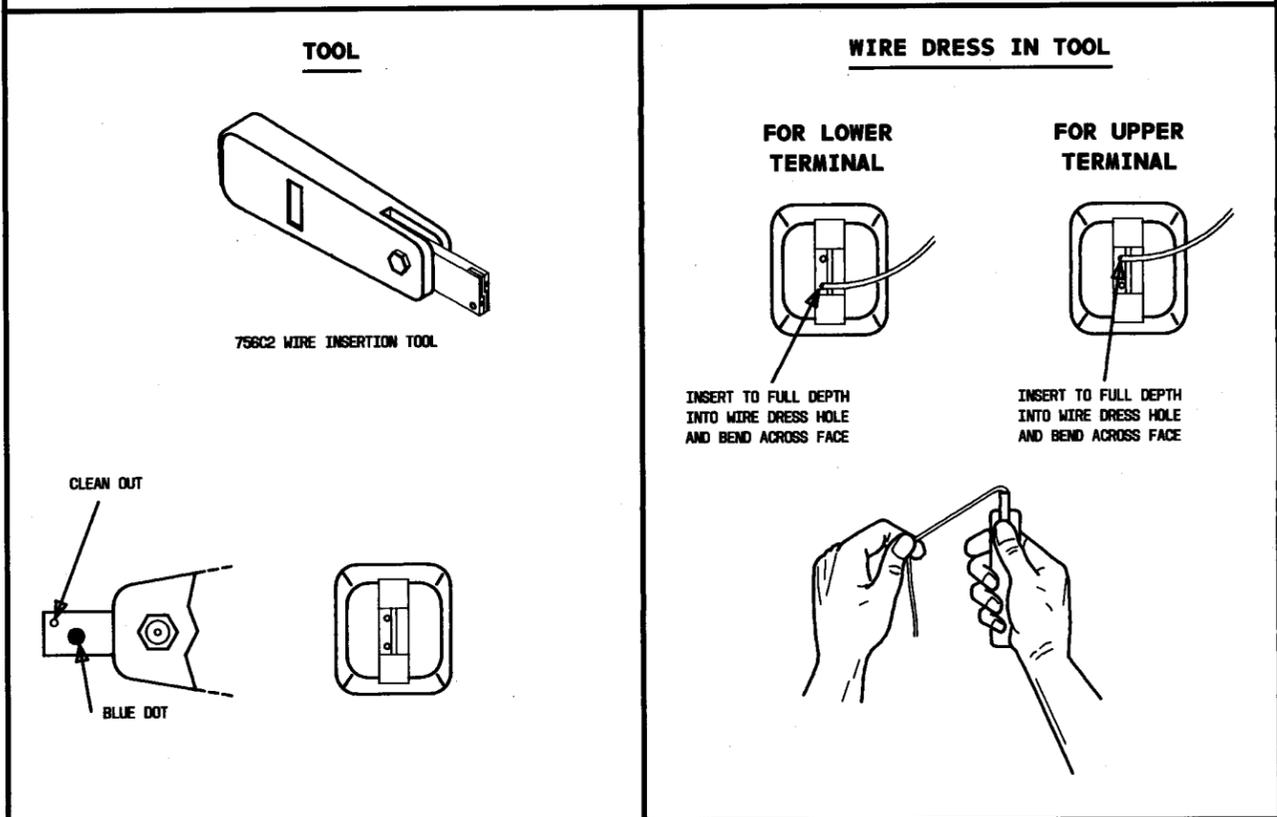


Fig. 14 — Frame Operations Decal-Jumper Side (For Frames Equipped With 112-Type Connecting Blocks)

