COMMON SYSTEMS MAIN INTERCONNECTING FRAME SYSTEM COSMIC II DESCRIPTION

CONTENTS

Figures

1. GENERAL

1.01 This section provides a description of the Common Systems Main Interconnecting Frame System referred to as COSMIC II.

1.02 When this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 Part 13 contains a list of BSPs (Bell System Practices) and other documents associated with COSMIC II 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 (or COSMIC I) System were to overcome the limitations of the ESS (Electronic Switching System) modular MDF (main distributing frame) design, establish and maintain a computer aided assignment and record-keeping system for the frame, and introduce additional labor-saving methods.

2.02 COSMIC II is an enhancement of the first COSMIC 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. (COSMIC I has a separate protector frame.) Testing facilities and test equipment have also been improved.

2.03 A COmputer System for Main frame OperationS (COSMOS) and a Program for Arrangement of Cables and Equipment (PACE) are compatible with the COSMIC II system.

2.04 The initial application of COSMIC II is as a subscriber main distributing frame (SMDF) for No. 1 ESS and No. 1A ESS offices. Other applications are an SMDF and trunk main distributing frame (SMDF/TMDF) for larger No. 2 ESS or small No. 1 ESS offices 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.

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 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 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 outside plant (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 For SMDFs, the front of the 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 or eight 64-pair connecting blocks. The capacity of the bay is 5108 pairs (less allowances for talk/test panels). 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 mini bridgelifter test set can also be mounted on the rear of the bay on the right-hand side.

3.05 The front of the 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 (every other position only) is factory wired to two 50-pair connecting blocks (one stencilled 1-50, the other 51-00). Each connection on shelves 2 through 10 is factory wired to one 100-pair connecting block (stencilled 1-00).

3.06 The superstructure, end guards, and walkthrough framework also form part of the COSMIC II 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. Two labels are available that can be placed on the doors. One label (Fig. 2) describes 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. 3) 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 5 framework groups, 10 modules, are provided with one or more walkthroughs (Fig. 4) 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 A TPDF framework is similar to the framework of a COE module. Usually, one module is provided for every ten SMDF modules. If the TPDF is located remotely from the COSMIC II lineup, COSMIC I framework, which is only 18 inches deep, should be used.

4. CONNECTORS

4.01 The 307-type connector, developed especially for the COSMIC II distributing frame, consists of two main components; the protector panel and the connecting block (Fig. 5 and 6). The protector panel accommodates 100 cable pairs. It is factory wired to either a 100-pair connecting block (307A1-100 connector) or two 50-pair connecting blocks (307B1-100 connector).

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 cable stubs, of varying lengths, having four mating 710-BD1-25 connectors.

5. PROTECTORS

5.01 There are several types of 4C-protectors used on the 307-connector. Table A identifies each type by color and application. Figure 7 identifies the parts of a protector unit. The purpose of a protector is to provide current and voltage protection to the inside plant equipment; except for the 4C12C type protector which provides continuity on circuits not requiring protection.

5.02 The housings for all 4C-protectors 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 (4C3C, red housing), the protector 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 testing the connectors on the

TABLE A

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

COSMIC II frame. The 299A test adapter is used to test 100 pairs of outside plant terminations on a protected or unprotected 307-connector. The P2FL test cord is used to test a single protected circuit.

6.02 The 299A test adapter, Fig. 8, 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 testing the connector with or without protectors. The test adapter is used mainly for outside plant cable pair verification in conjunction with a variety of test equipment. It is used to check for grounds, opens, shorts, reversals, and backtaps.

6.03 The P2FL test cord, Fig. 9, is used to test 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- and 112E- are used on the COSMIC II frame. They differ only in respect to the type terminal, color of the checkboard 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 (central office equipment or cable pairs).

7.02 A 78C-type connecting block is shown in Fig. 10. The terminal portion is colored in a red and white checkerboard pattern in five pair increments on the front (four 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 112C-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 112C-series also requires a different wire-insertion tool. For this reason, frames equipped with 78C-series connecting blocks will continue to use only the 78C-series.

7.03 New COSMIC II 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 and the upper and lower facets of the fanning strip. 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. Computer system for main frame operations (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 a flip-gate designation panel for 112E1A-128 blocks (shelves 2 through 10) and a fixed gate designation panel for 112E1A-64 blocks (shelves 1 and 11). The panel has either rubber stamped characters or pre-printed 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 COSMIC II 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. 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 position of the terminal should be used first. When cross-connecting to a 112-type connecting block, the top position 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 MDF since the only consideration used in this method is traffic load-balance. There is no consideration of the relative location of either the line equipment or the cable pair.

9.03 Preferential assignment procedures 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 terminations.

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 11, 12, and 13 show some of the jack panels used on the COSMIC II 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 11 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. 12 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-21316-69 mounting bracket.

10.04 Figure 13 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. 12 for additional jack capacity. It also requires a KS-21316-69 mounting bracket.

10.05 The frame may also be equipped with optional service observing panels similar to the miniature talk and test panel. Cords, nine 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 COSMIC II are frame supported and comply with the new equipment building standards (NEBS). 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 14 shows auxiliary framing and lighting arrangement on a double lineup.

12. MISCELLANEOUS

A. Miniature Frame Cable Directory

12.01 The miniature frame 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. Individual PACE labels, containing the cable and pair within individual half shelves (2 through 10) or full shelves (1 and 11) 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 non-slip friction pad on the bottom minimizes the possiblity of the reel tipping over.

13. REFERENCES

13.01 The following Bell System Practices contain information relative to the COSMIC II frame system.

SECTION	SUBJECT COVERED
201-208-110	307-Connector- description
201-208-810	307-Connectors-repair
201-216-101	Mini talk and test system
201-222-112	COSMIC II-type of protection
201-222-115	COSMIC II-connecting blocks—description, cross-connecting, and repair.

13.02 Floor plan data is contained in Appendix 1 of BTL COSMIC II Engineering handbook.

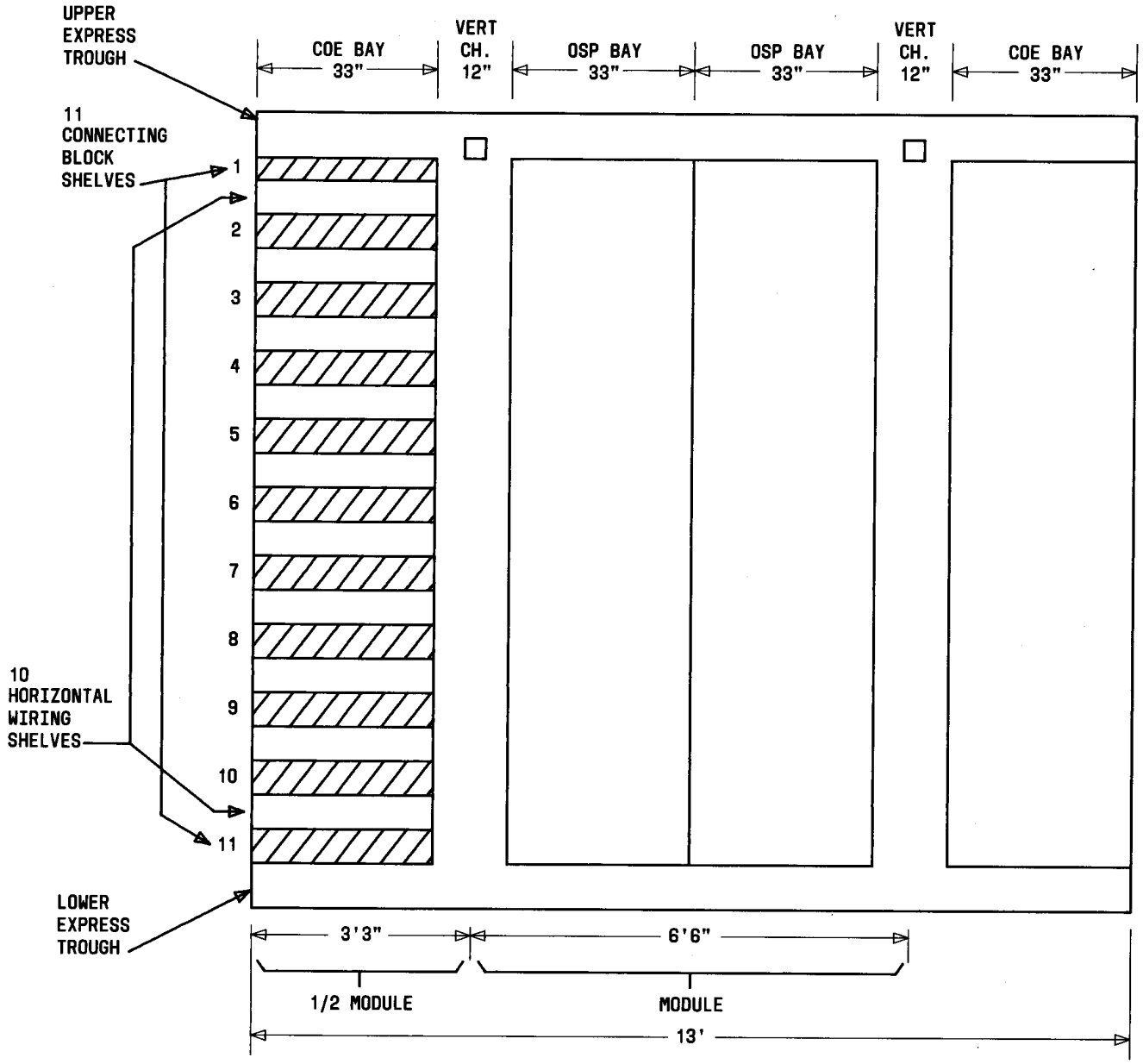
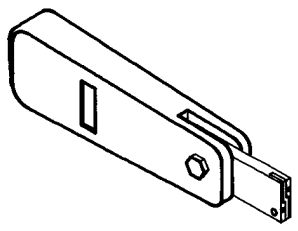


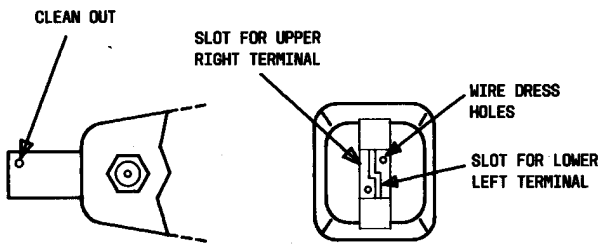
Fig. 1—COSMIC II Framework Group

COSMIC
TERMINATING, TRACING AND REMOVING JUMPERS

TOOL

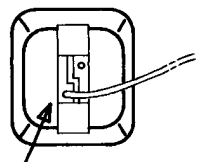


756C WIRE INSERTION TOOL



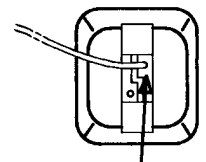
WIRE DRESS IN TOOL

FOR LOWER LEFT TERMINAL

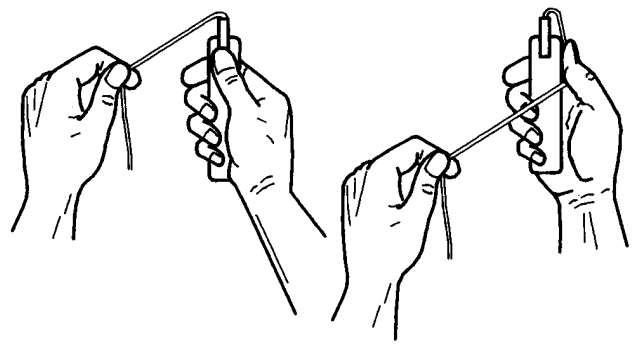


INSERT TO FULL DEPTH INTO WIRE DRESS HOLE AND BEND ACROSS FACE

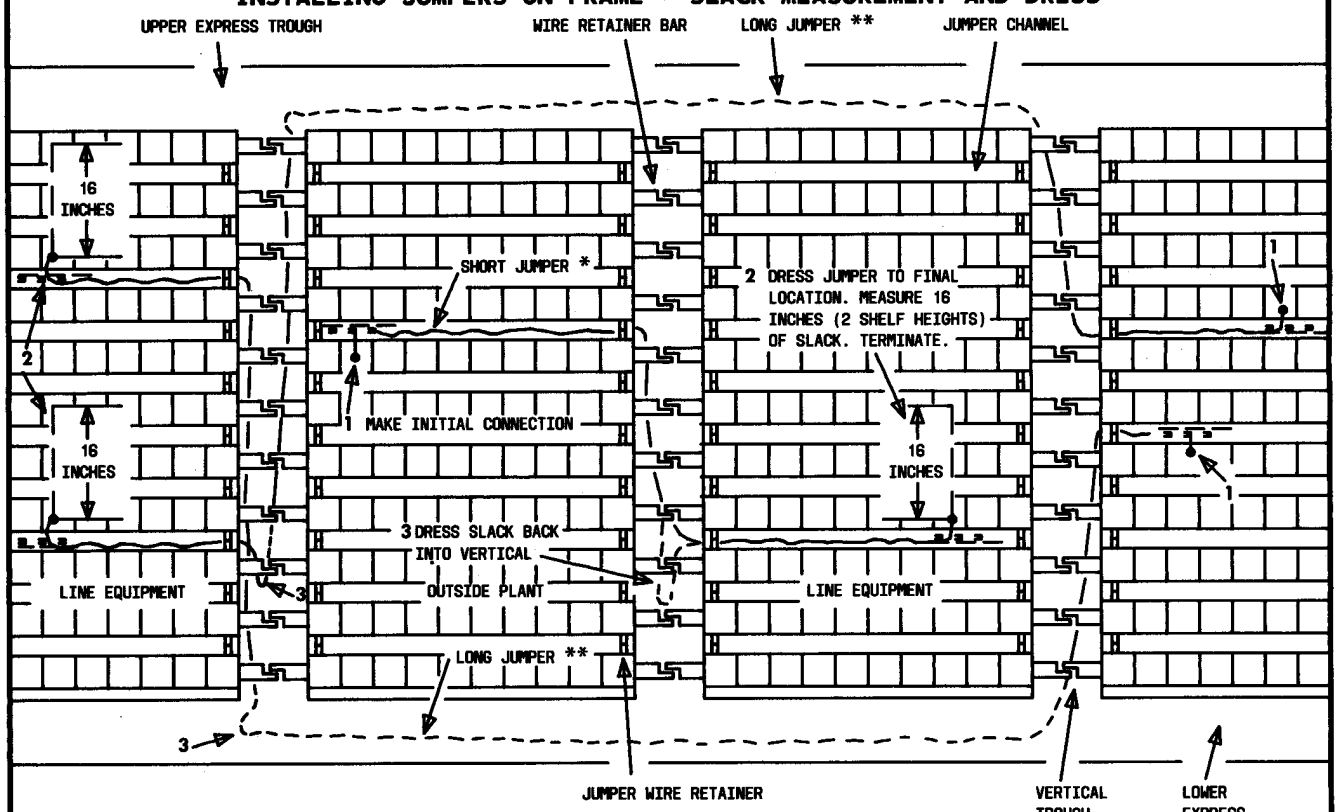
FOR UPPER RIGHT TERMINAL



INSERT TO FULL DEPTH INTO WIRE DRESS HOLE AND BEND ACROSS FACE

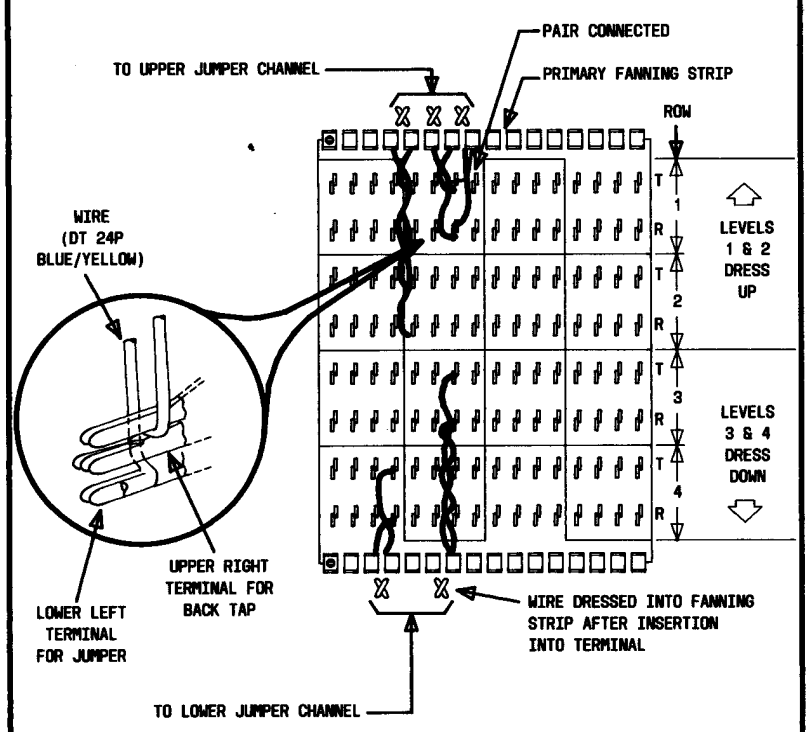


INSTALLING JUMPERS ON FRAME - SLACK MEASUREMENT AND DRESS



* SHORT JUMPER - A CONDUCTOR PAIR THAT IS RUN BETWEEN ADJACENT MODULES. (NEVER FOUND IN EXPRESS TROUGHS).
** LONG JUMPER - A CONDUCTOR PAIR THAT IS RUN BETWEEN NON-ADJACENT MODULES. (ALWAYS FOUND IN EXPRESS TROUGHS).
THE SHELF LOCATION OF THE OUTSIDE PLANT PAIR DETERMINES THE EXPRESS TROUGH USED FOR LONG JUMPERS.
SHELF 1 THRU CENTER SHELF 6 USE UPPER EXPRESS TROUGH. CENTER SHELF 6 THRU SHELF 11 USE LOWER EXPRESS TROUGH.

TERMINATING JUMPERS



TRACING AND REMOVAL OF JUMPERS

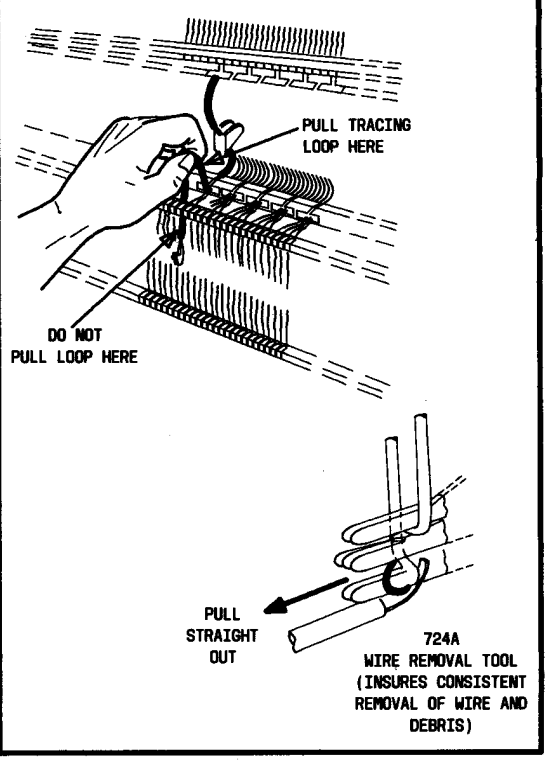


Fig. 2—Frame Operations Decal-Jumper Side (For Frames Equipped With 78C-Blocks Only)

COSMIC II
PROTECTOR SIDE

CABLE DIRECTORY

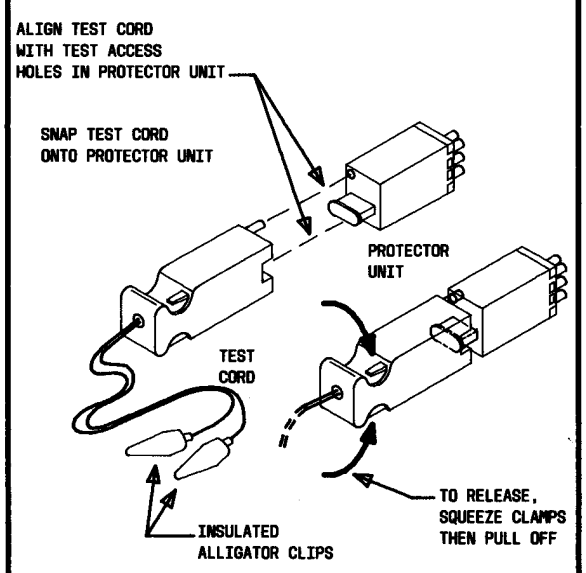
CABLE NO.	PAIRS	MOD/ SHELF	BLOCK	CABLE NO.	PAIRS	MOD/ SHELF	BLOCK	CABLE NO.	PAIRS	MOD/ SHELF	BLOCK
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
5	701-1200	9	5	1-5	—	—	—	—	—	—	—

CABLE NUMBER 1
PAIRS 2
3 MODULE, SHELF, BLOCKS

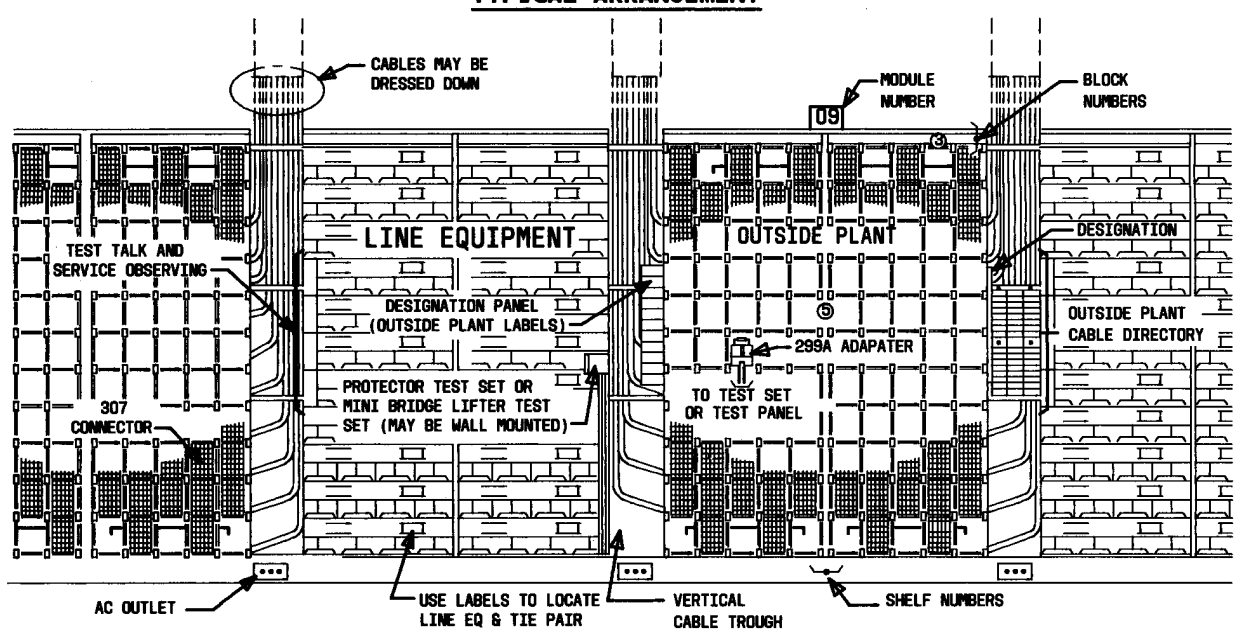
USE CABLE DIRECTORY TO LOCATE MODULE, SHELF, BLOCK AND PAIRS.

EXAMPLE:
TO LOCATE CABLE 5, PAIRS 901-1000:
1ST FIND CABLE NO. ON CABLE DIRECTORY.
2ND FIND RANGE OF CABLE PAIRS THAT INCLUDE THE PAIRS TO BE LOCATED.
3RD SEE MODULE, SHELF AND BLOCK LOCATION.
901-1000 IS LOCATED ON BLOCK NO. 3.
(SEE TYPICAL ARRANGEMENT.)

P2FL TEST CORD

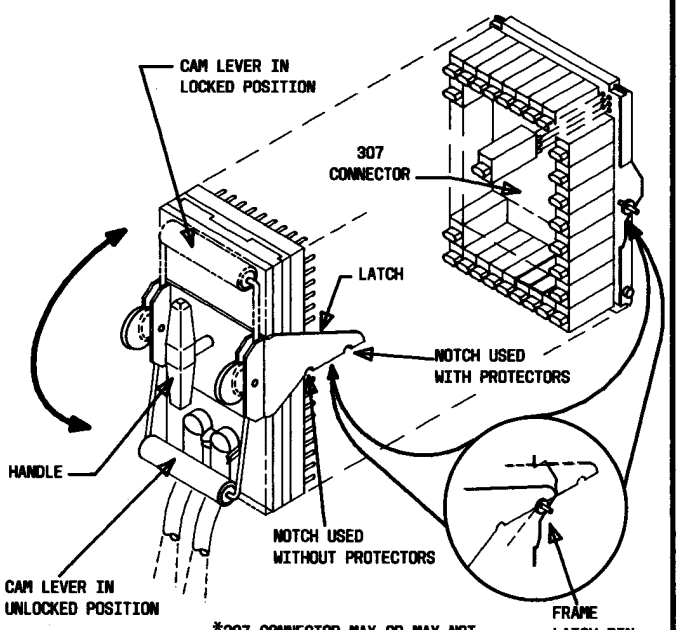


TYPICAL ARRANGEMENT



299A TEST ADAPTER

TO CONNECT TEST ADAPTER GRASP HANDLE AND ALIGN WITH THE 307 CONNECTOR.* PLACE THE ADAPTER ONTO THE CONNECTOR,** PIVOTING THE LATCH SLIGHTLY UPWARD AND ONTO FRAME LATCH PINS. LOCK ADAPTER IN PLACE BY SWINGING CAM LEVER UP. TO REMOVE, SWING CAM LEVER DOWN, GRASP HANDLE AND LIFT OFF.



*307 CONNECTOR MAY OR MAY NOT BE EQUIPPED WITH PROTECTOR UNITS.

** IT MAY BE NECESSARY TO MOVE ADAPTER SIDE TO SIDE TO ALIGN PINS.

TEST PANEL

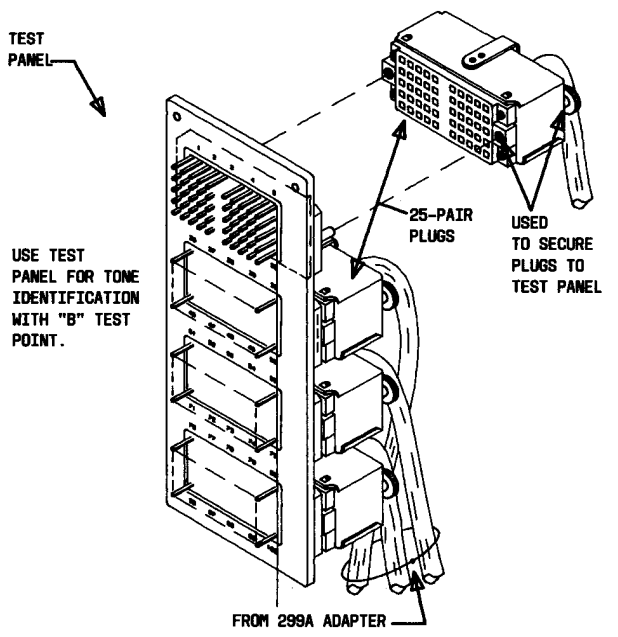


Fig. 3—Frame Operations Decal-Protector Side

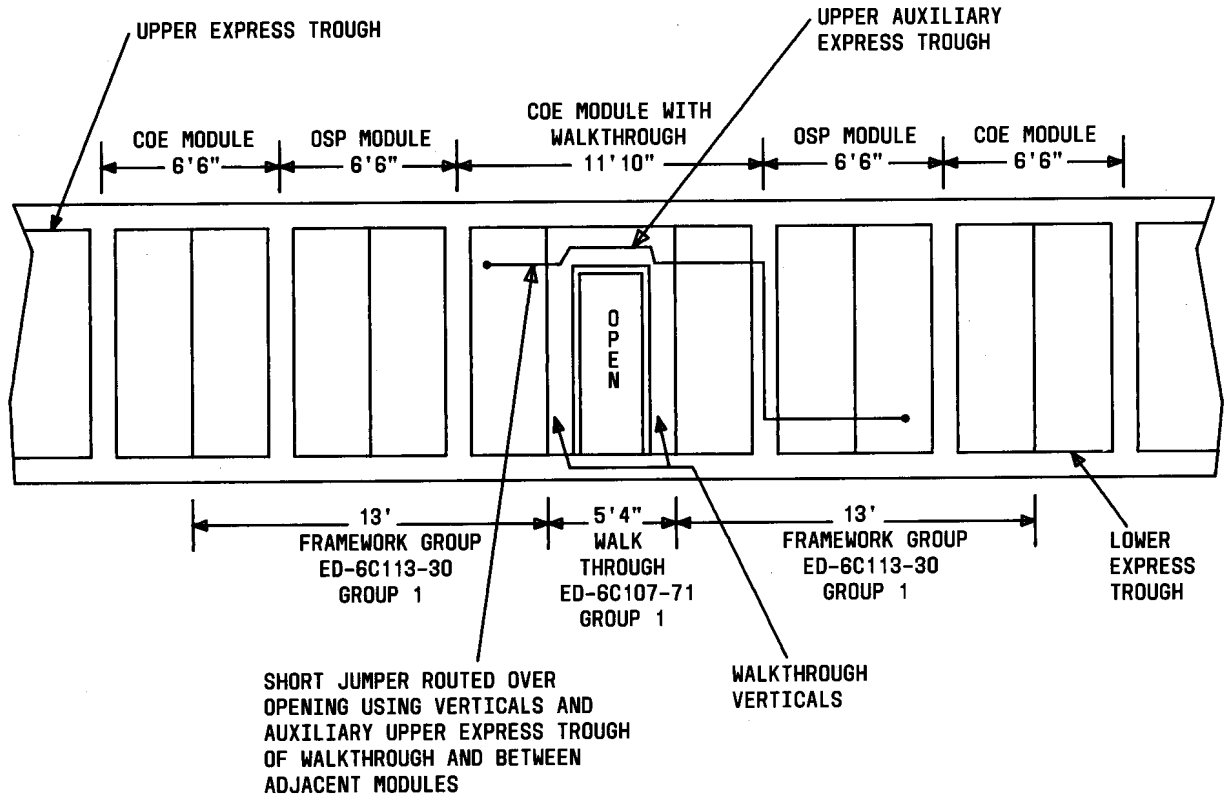


Fig. 4—Location of Walkthrough

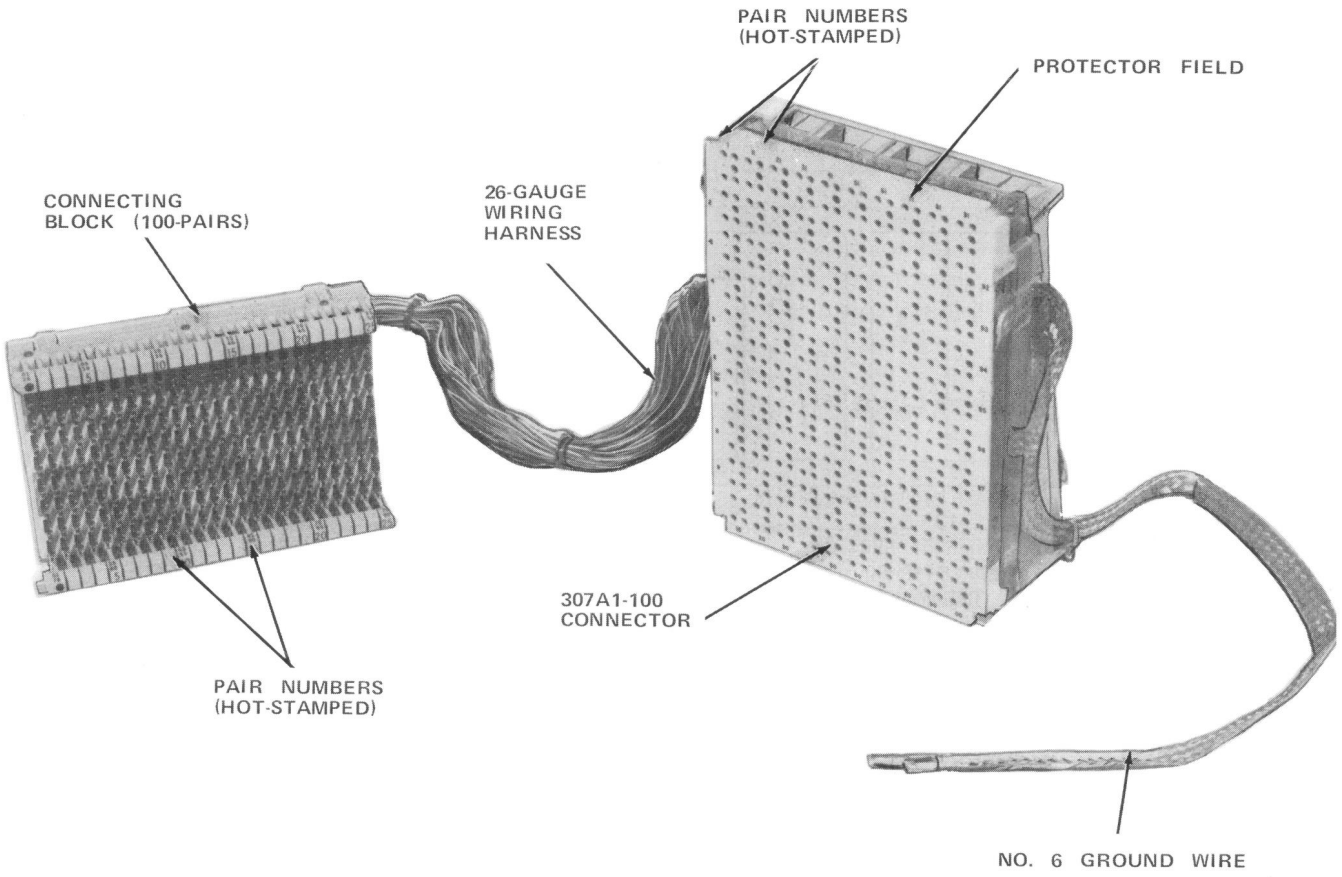


Fig. 5—307-Type Connector Assembly-Front

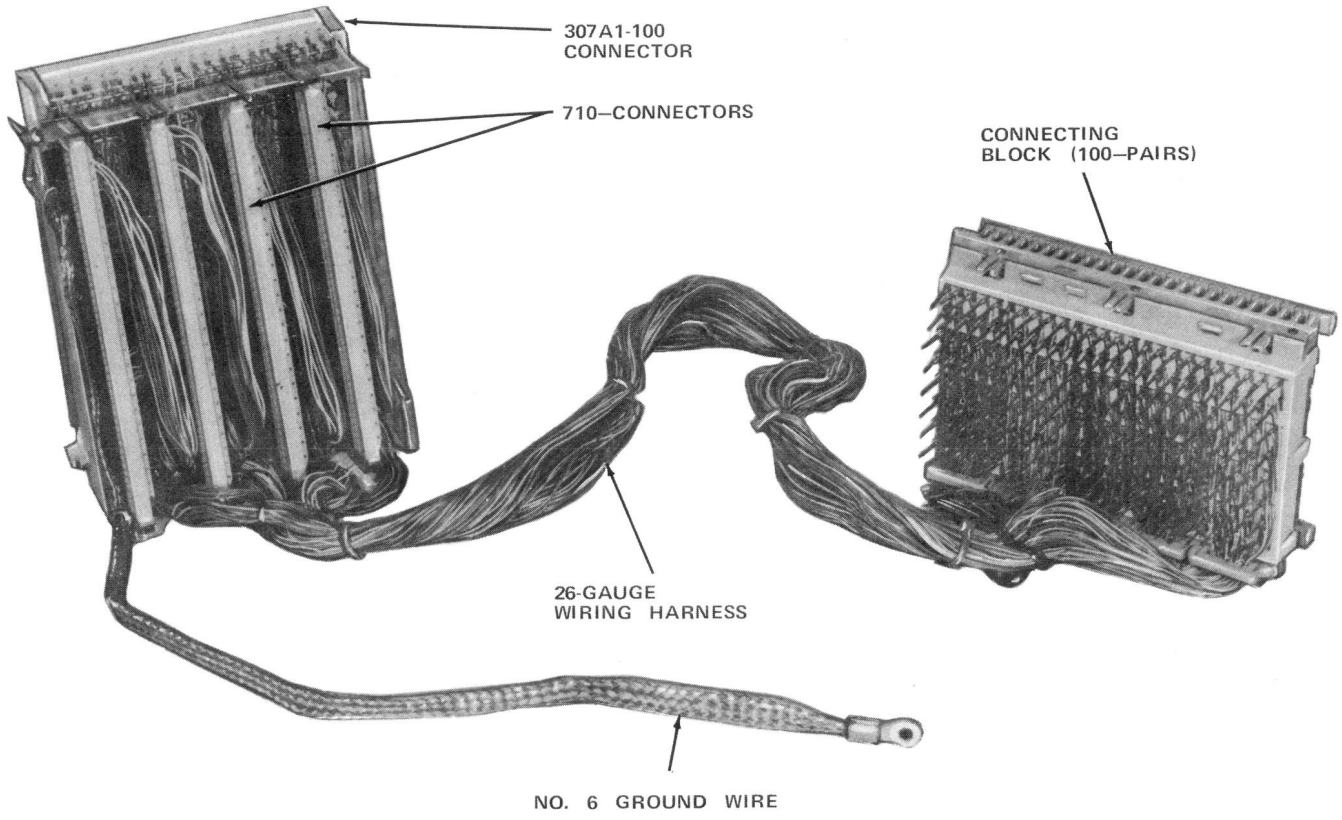


Fig. 6—307-Type Connector Assembly-Rear

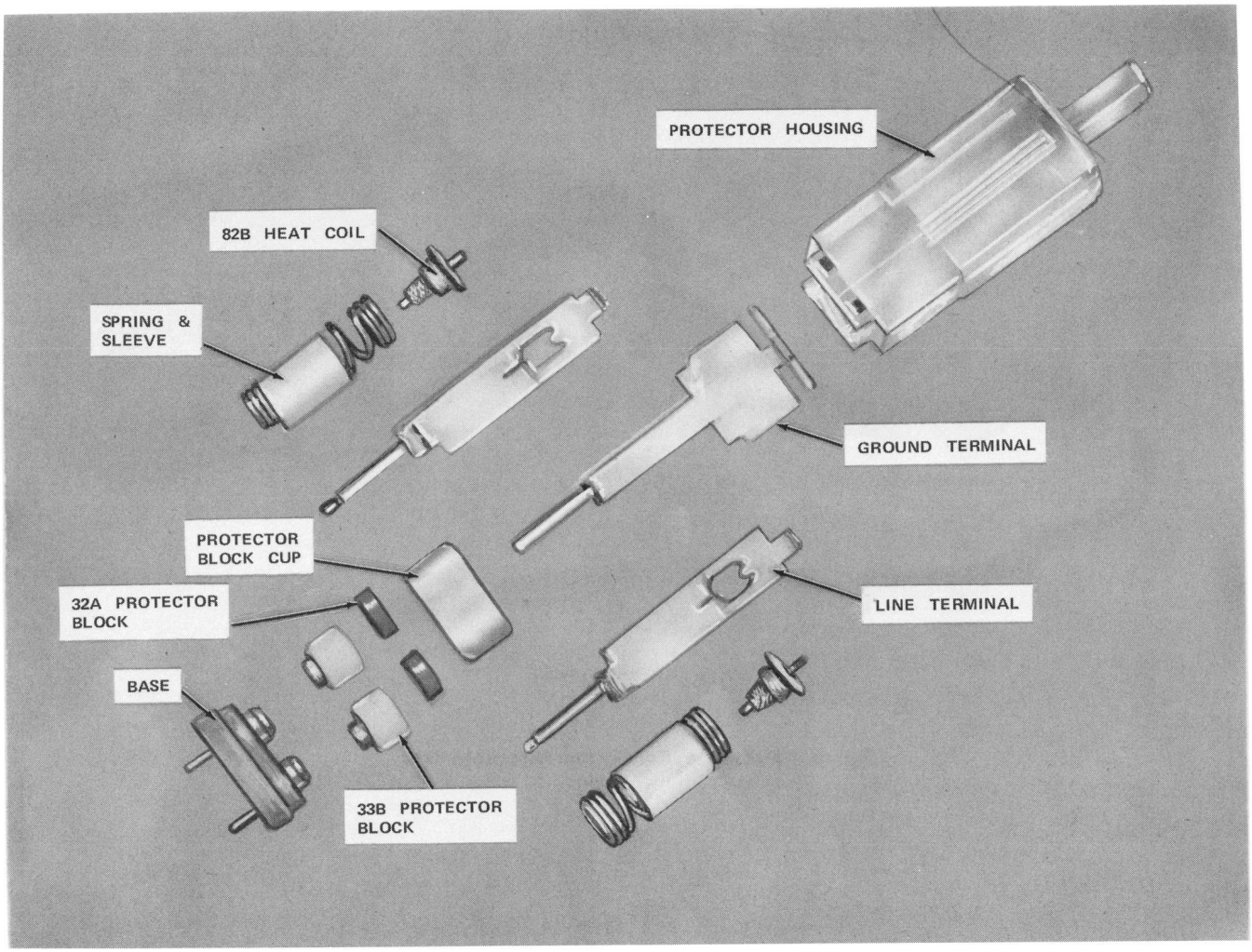


Fig. 7—4C-Type Protector Unit

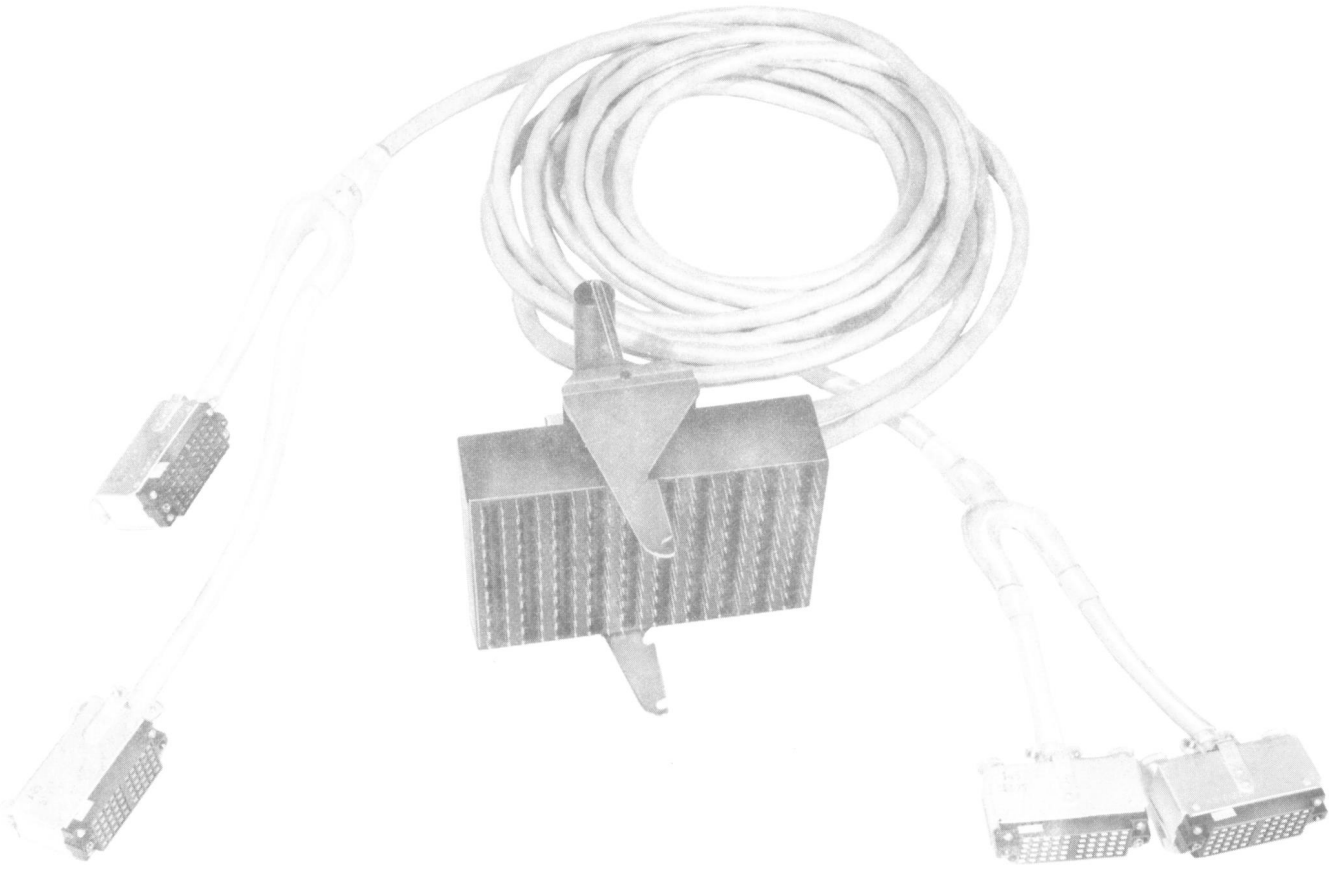
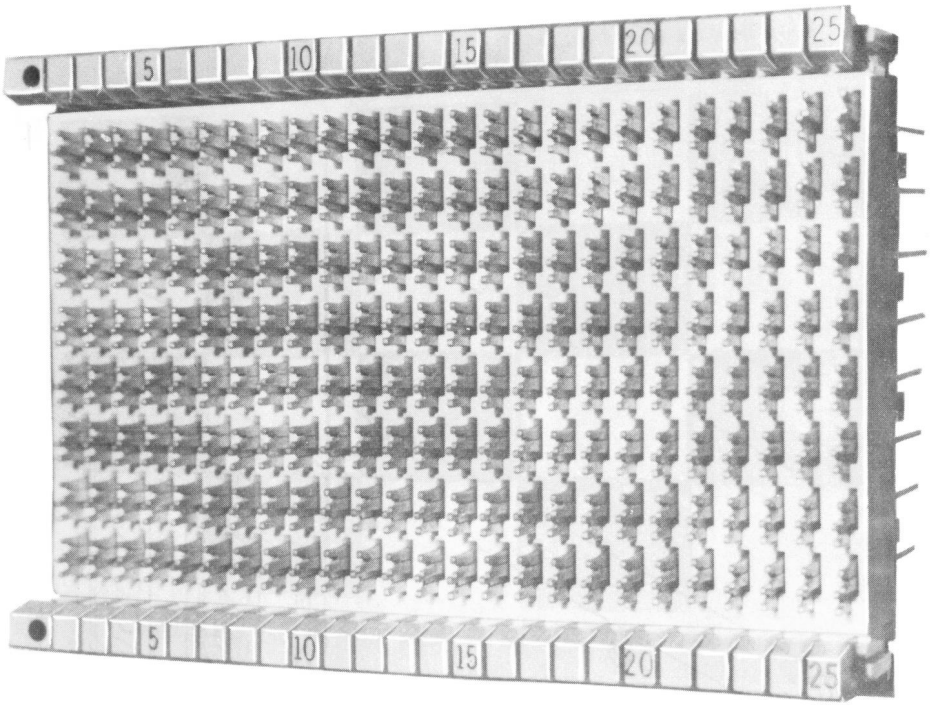


Fig. 8—299A Test Adapter

Fig. 9—P2FL Single Pair Test Cord



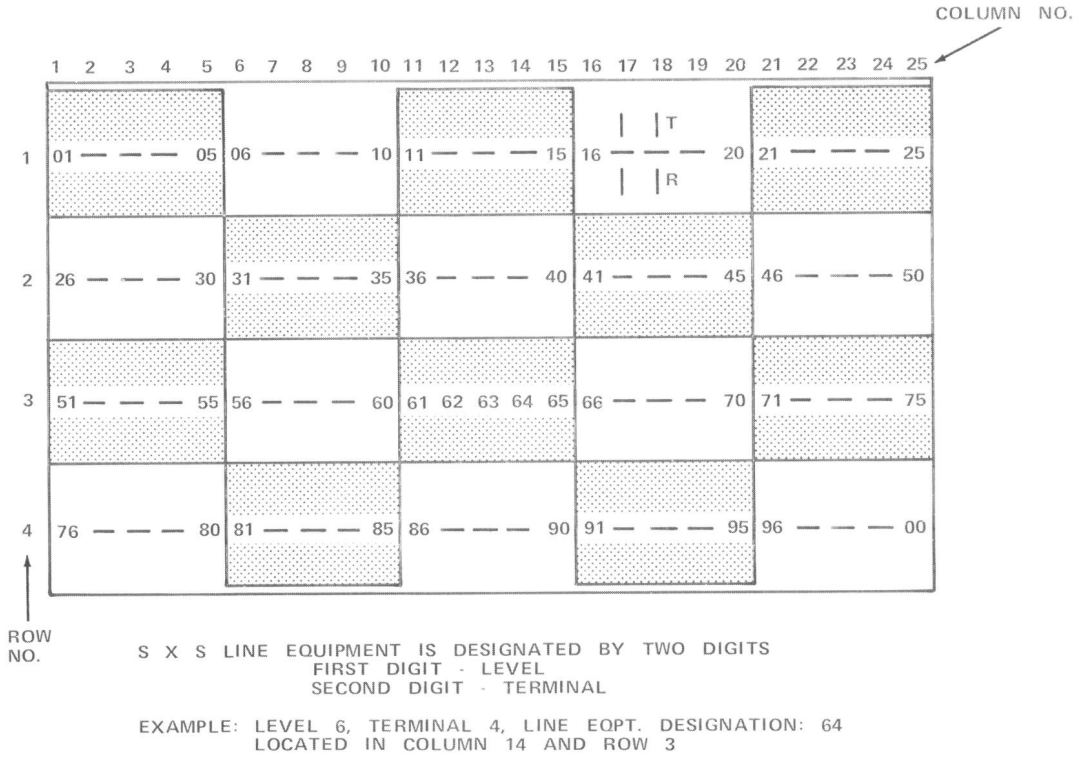


Fig. 10—Typical 78C-Connecting Block—(100 Cable Pairs)

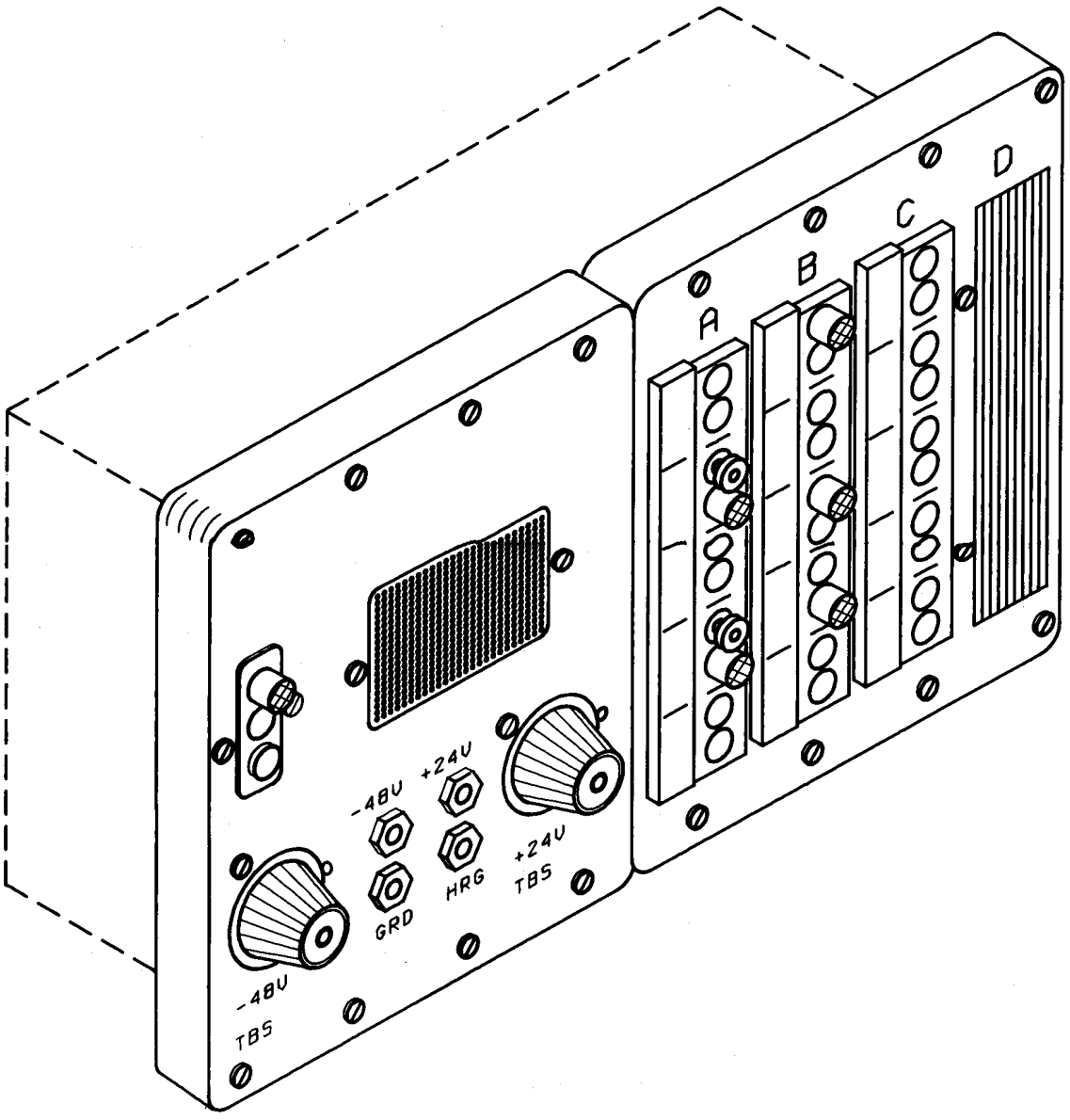


Fig. 11—KS-21316-L8 and ED-6C110-10 GRP. 23 Test/Talk Panels

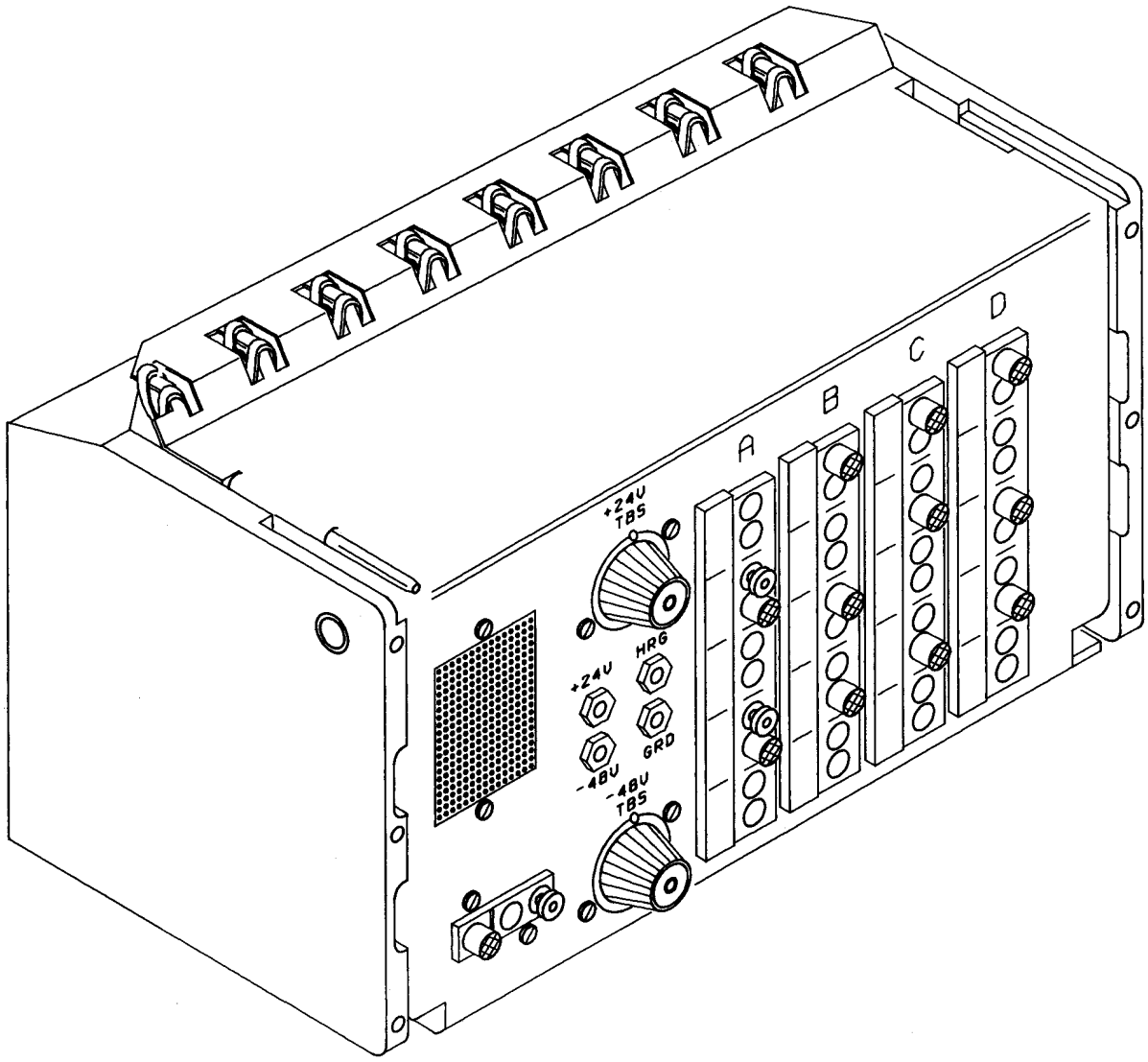


Fig. 12—ED-6C110-10 GP. 25 Test/Talk Panel

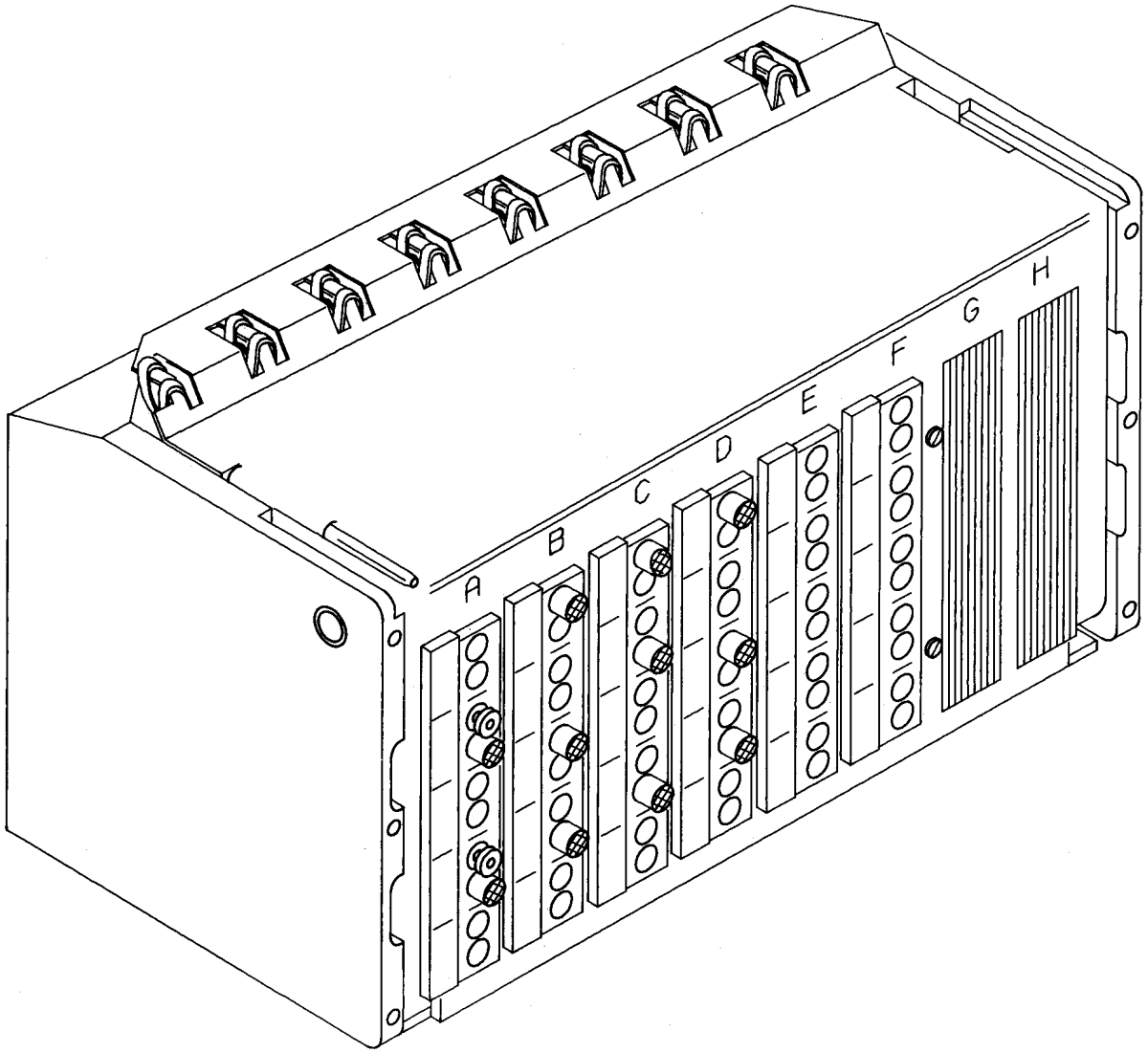


Fig. 13—ED-6C110-10 GP. 26 Test/Talk Panel

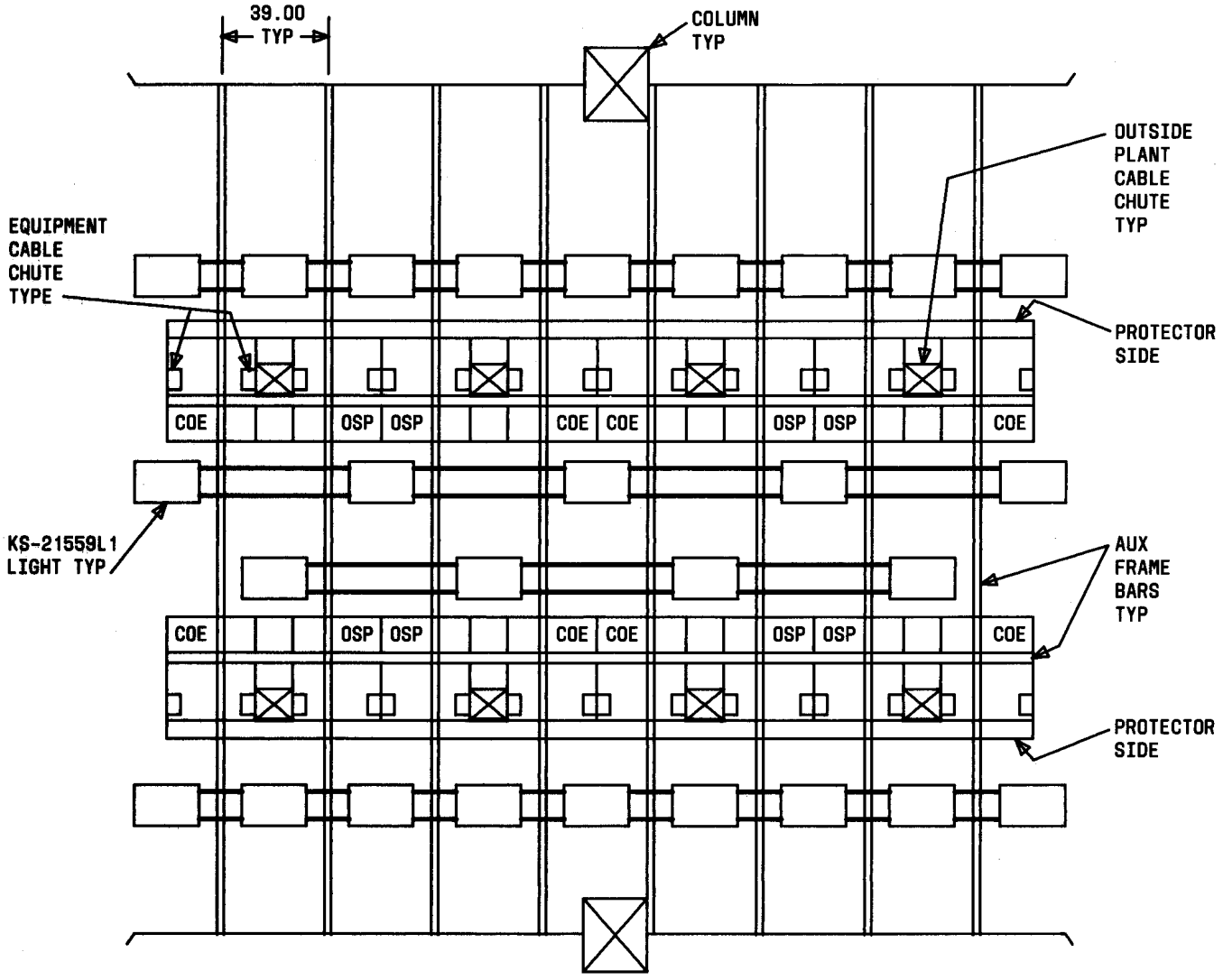


Fig. 14—Aux. Framing and Lighting