

# 78- AND 112-TYPE CONNECTING BLOCKS

## METHOD OF MAKING CONNECTIONS, REPAIR, AND REPLACEMENT PROCEDURES

### COSMIC® DISTRIBUTING FRAMES

CONTENTS	PAGE	CONTENTS	PAGE
1. GENERAL . . . . .	2	7. ED-6C142-30, Group 8 Designation Strip Label Holder for COSMIC DFs . . . . .	10
2. FRAME COMPONENTS. . . . .	2	8. ED-6C142-30, Group 11 Designation Strip Label Holder for COSMIC DFs . . . . .	11
3. WIRE . . . . .	24	9. ED-6C314-70, Group 7 Designation Strip Label Holder for COSMIC II Mini DFs . . . . .	12
4. TOOLS AND AIDS . . . . .	24	10. ED-6C142-30 Designation Fanning Strips for Shelf No. 1 or Shelf No. 11 . . . . .	15
5. RUNNING JUMPERS ON COSMIC I, IA, II, OR IIA DISTRIBUTING FRAMES . . . . .	25	11. ED-6C142-30 Designation Fanning Strips for Shelves 2 Through 10 . . . . .	16
6. RUNNING JUMPERS ON COSMIC II MINI DISTRIBUTING FRAMES . . . . .	28	12. ED-6C142-30 Designation Fanning Strips for Shelves 2 Through 10 . . . . .	16
7. INSTALLING CONNECTIONS . . . . .	30	13. 112H Series Connecting Block Mounting Adapters. . . . .	17
8. REMOVING CONNECTIONS . . . . .	31	14. Typical Decal Placements on COSMIC IIA End Guard Assembly . . . . .	20
9. DESIGNATION OF SPECIAL SERVICE LINES . . . . .	31	15. Frame Operations Decal — Cross-Connect Side (78 Blocks) . . . . .	21
10. REPAIR AND REPLACEMENT . . . . .	31	16. Frame Operations Decal — Cross-Connect Side (112 Blocks). . . . .	22
11. REFERENCES . . . . .	38	17. Frame Operations Decal — Protector Side . . . . .	23
<b>Figures</b>		18. Method of Running Jumpers on COSMIC I, IA, II, or IIA Distributing Frames. . . . .	26
1. 78-Type Connecting Block — 100-Pair Terminal Arrangement . . . . .	3	19. Method of Running Jumpers on COSMIC II Mini Distributing Frames . . . . .	29
2. 112-Type Connecting Block — 128-Pair Terminal Arrangement . . . . .	4		
3. 78-Type Connecting Block Features . . . . .	7	<b>Tables</b>	
4. Views of Terminal Used on 78-Type Connecting Block . . . . .	7	A. Typical Terminating Capacities (Pairs) for COSMIC Frames . . . . .	5
5. 112-Type Connecting Block Features. . . . .	8		
6. Views of Quick-Clip Terminal Used on 112-Type Connecting Block. . . . .	8		

CONTENTS	PAGE
B. Designation Strips (Label Holder) . . . . .	9
C. ED-6C144-12 Labels. . . . .	13
D. Designation Fanning Strips . . . . .	14
E. 112H Series Connecting Block Mounting Adapters. . . . .	17
F. Filler (Cover) Panels for Unused Block Positions — Specifications and Ordering Information . . . . .	18
G. Cable Location Directory Holder . . . . .	19
H. 78-Type Connecting Block Ordering Information . . . . .	32
I. 112-Type Connecting Block Ordering Information . . . . .	33

**1. GENERAL**

**1.01** This practice covers the method of making connections, repair, and replacement procedures for 78- and 112-type connecting blocks used on *COSMIC*® distributing frames.

**1.02** This practice is reissued as a part of a general restructuring, updating, and combining of the

201-series of practices. This is a general revision and revision arrows are not used. The following AT&T Practices are combined with this practice:

- 201-222-310
- 201-222-320
- 201-222-801
- 201-222-810
- 201-222-820

**1.03** AT&T 201-222-105 contains descriptions and item codes of the 78- and 112-type connecting blocks and their frame applications.

**2. FRAME COMPONENTS**

**CONNECTING BLOCKS**

**2.01** The 78-type connecting blocks (Figure 1) are used on earlier *COSMIC* I and II distributing frames that were installed prior to the availability of the 112-type connecting blocks and the 112-type connecting blocks (Figure 2) are used on all *COSMIC* distributing frames. *COSMIC* I and II distributing frames can mount the high density 112H-Type connecting blocks only if the ED-6C142-30, G3 or G4 shelf mounting adapters are used.

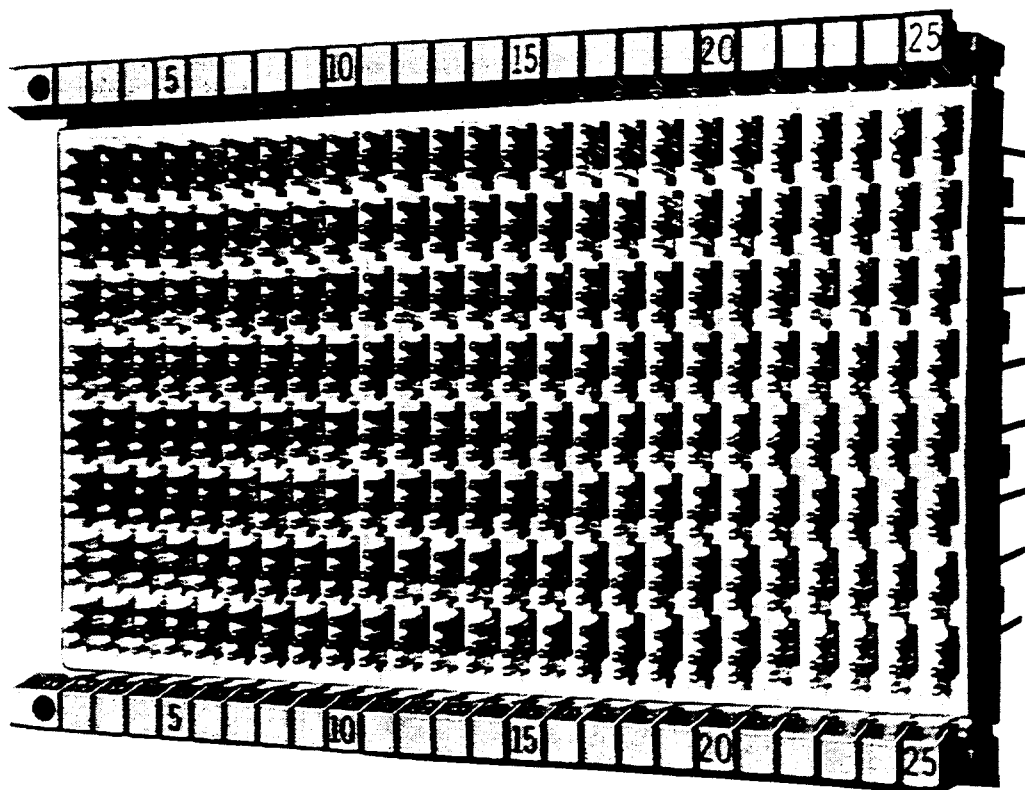


Figure 1—78-Type Connecting Block — 100-Pair Terminal Arrangement

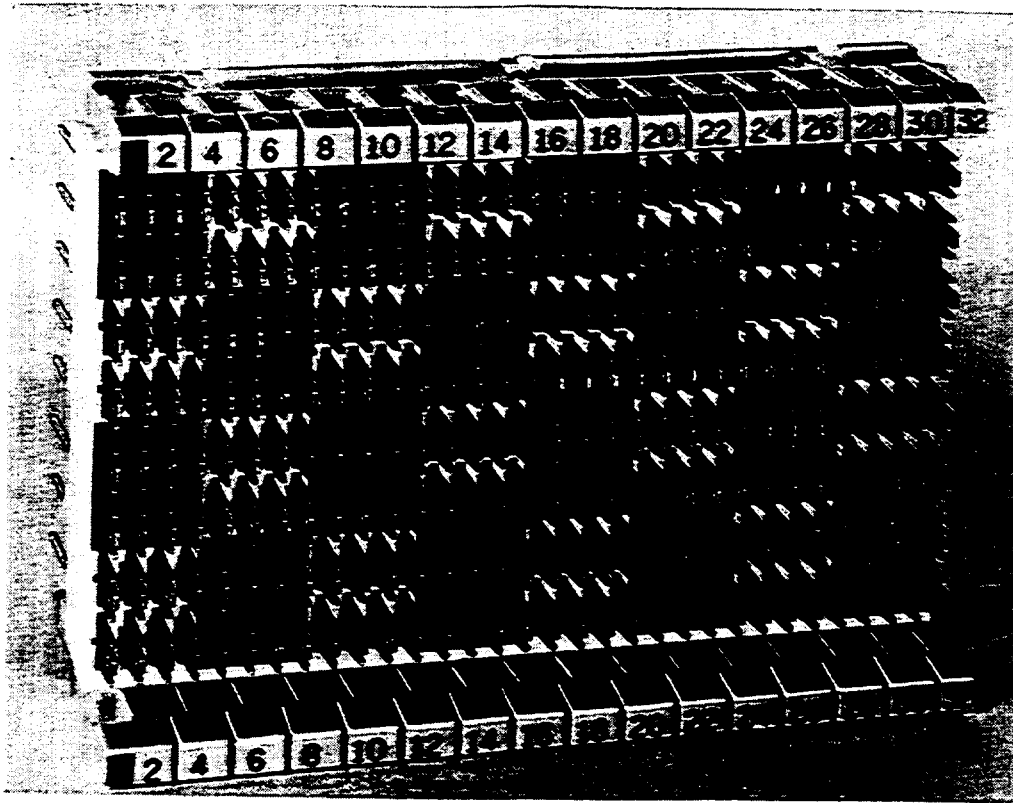


Figure 2—112-Type Connecting Block — 128-Pair Terminal Arrangement

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

2.03 In prewired 307-type connector assemblies, where the 112-type connecting block is supplied as part of the 307-type connector, the high density blocks provide 10,200 outside plant terminations and permit an additional 1,800 tie pairs or derived carrier terminations in each *COSMIC* IIA facility module. Table A shows typical termination capacities (pairs) for the *COSMIC* distributing frames.

TABLE A					
TYPICAL TERMINATION CAPACITIES (PAIRS) FOR <i>COSMIC</i> FRAMES					
FRAME	UNIT	78 BLOCKS	112 BLOCKS	307 CONNECTORS	
<i>COSMIC</i>	I	Facility/ Equipment Module	10,000/ 10,240	10,000/ 12,800‡	—
	IA	Facility/ Equipment Module	—	12,000/ 12,800	—
	II (DA)	Facility Module*	—	12,000‡	10,000
		Equipment Module	—	12,800‡	—
	IIA	Facility Module*	—	12,000	10,200
		Equipment Module	—	12,800	—
<i>COSMIC</i> II	MINI	Facility Bay†	—	1,000	1,000
		Equipment Bay	—	2,560	—

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

† Mounts 307 connectors on front for combined protection applications.

‡ Can be equipped with ED-6C142-30 G3 (Shelves 2-10) and G4 (Shelves 1 and 11) adapter for the high density 112H-type OSP or tie pair connecting blocks; not generally recommended for *COSMIC* I DF.

**2.04** The 78-type connecting block has a red and white checkerboard pattern on the front face of the block and is equipped with 4-beam, quick-connect, insulation displacement terminals. The 112-type connecting block has a blue and white checkerboard pattern on the front face of the block and is equipped with 3-beam, quick-connect, insulation displacement terminals or wire-wrap terminals.

**2.05** The connecting blocks are available in the following sizes:

- 50-pair blocks consisting of 2 paired rows by 25 columns. Ten blocks (or up to twelve 112H-type blocks) may be terminated on each shelf numbered 1 and 11.
- 64-pair blocks consisting of 4 paired rows by 16 columns (for shelves 2 through 10) or 2 paired rows by 32 columns (112-type only on shelves 1 and 11). Sixteen blocks may be terminated on each shelf numbered 2 through 10, and ten blocks may be terminated on each shelf numbered 1 and 11.
- 96-pair blocks consisting of 4 paired rows by 24 columns. Ten blocks may be terminated on each shelf numbered 2 through 10.

- 100-pair blocks consisting of 4 paired rows by 25 columns. Ten blocks (or up to twelve 112H-type connecting blocks) may be terminated on each shelf numbered 2 through 10.
- 128-pair blocks (112-type only) consisting of 4 paired rows by 32 columns. Ten blocks may be terminated on each shelf numbered 2 through 10.

**2.06** Slotted fanning strips attach to the connecting block with screws, except for 112H-type connecting blocks which have snap-on fanning strips. All connecting block fanning strips are color coded to denote the connecting block function; blue for loop pairs, white for tie pairs, yellow for ESS™ and other digital switching equipment, green for crossbar, orange for step-by-step, beige for trunks and miscellaneous circuits, and violet for the facility side of SMAS (Switched Maintenance Access System). Other colors are available upon request.

**2.07** Figures 3 and 4 show the 78-type connecting block features and the 4-beam terminal used on the block, and Figures 5 and 6 show the 112-type connecting block features and the 3-beam terminal used on the block.

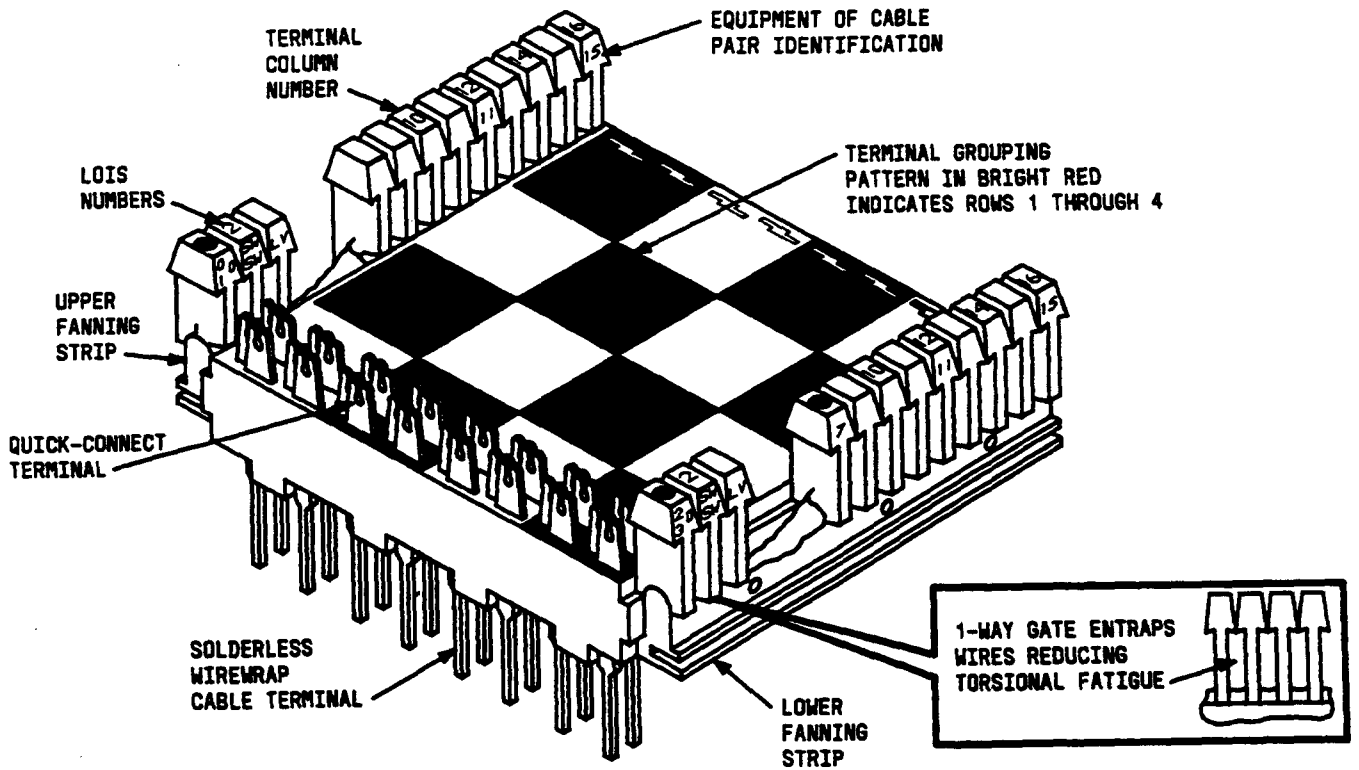


Figure 3—78-Type Connecting Block Features

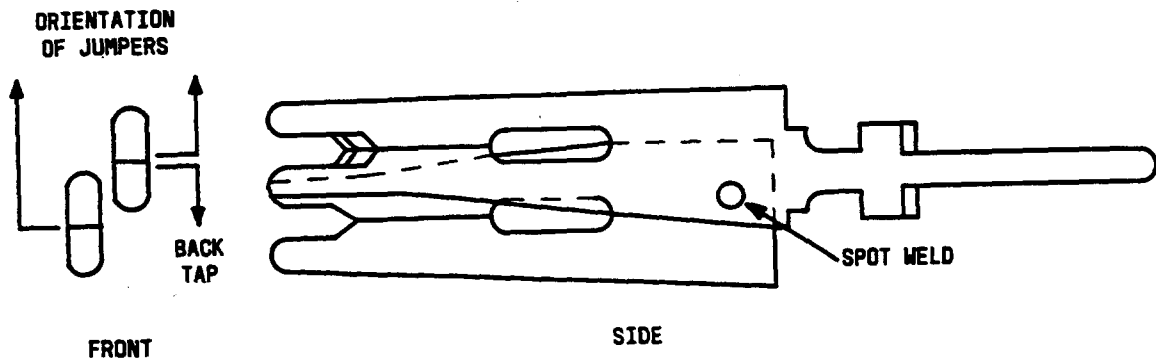


Figure 4—Views of Terminal Used on 78-Type Connecting Block

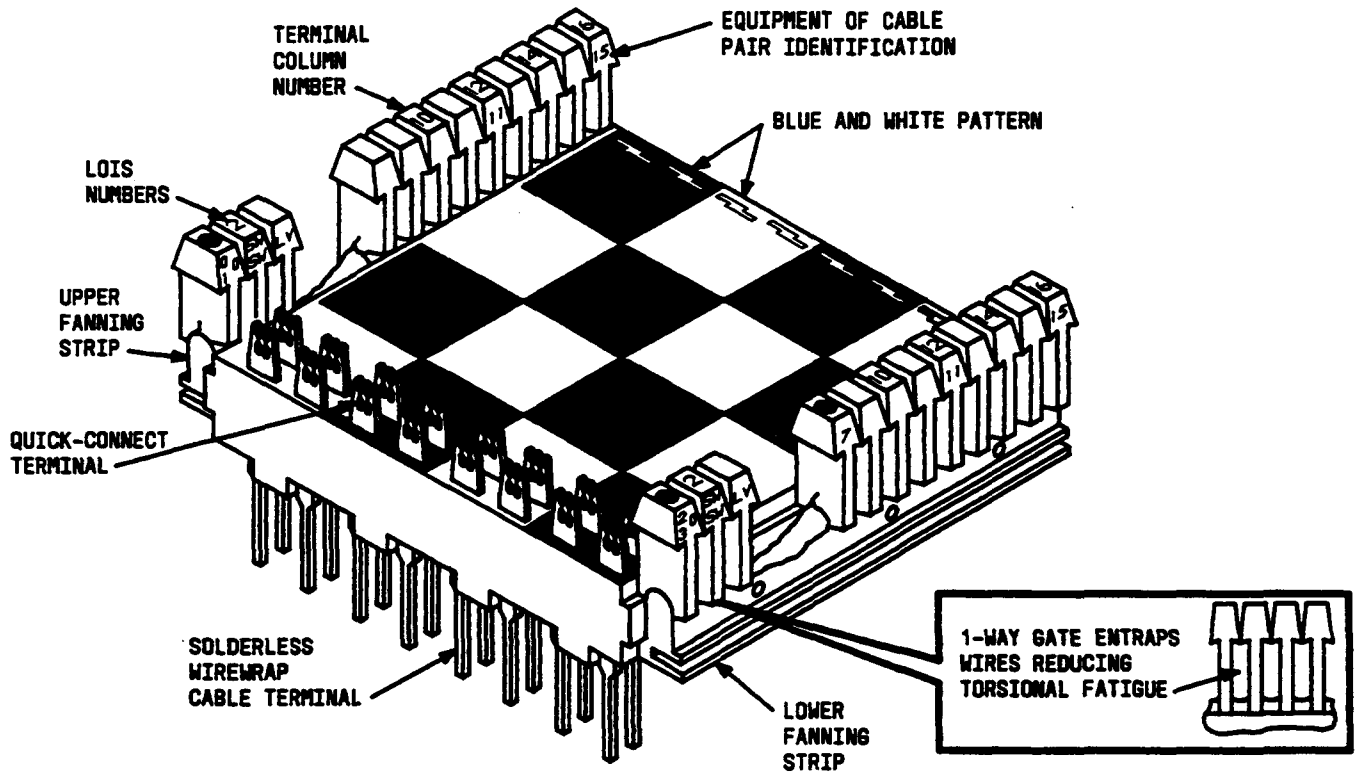


Figure 5—112-Type Connecting Block Features

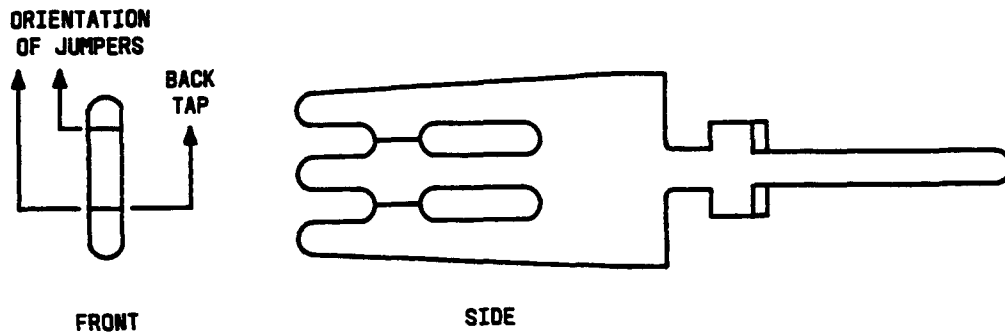


Figure 6—Views of Quick-Clip Terminal Used on 112-Type Connecting Block



**DESIGNATION STRIPS (LABEL HOLDER)**

**2.08** Designation strips, also called Flip Gates (Table B and Figures 7, 8, and 9), provide mounting space for designation labels that identify the circuits terminated on each terminal of a connecting block.

**2.09** Designation strips (ED-6C142-30, G8-11 for *COSMIC* I, IA, II, IIA and ED-6C314-70, G7 for *COSMIC* II Mini distributing frames) are usually used only on those shelves with connecting blocks terminating circuits that do not have connecting blocks with pre-stamped circuit identification. Examples include blocks terminating trunk and toll equipment.

<b>TABLE B</b>		
<b>DESIGNATION STRIPS (LABEL HOLDER)</b>		
<b>FRAME APPLICATION</b>	<b>APPLICATION NOTES</b>	<b>ORDERING CODE</b>
<i>COSMIC</i> I/IA/II/IIA	Mounts on shelves 2 through 10 of a facility or equipment half module	ED-6C142-30 Group 8
	Mounts on any shelf with test/talk panel	ED-6C142-30 Group 9
	Mounts on shelf 1 of a facility or equipment half module	ED-6C142-30 Group 10
	Mounts on shelf 11 of a facility or equipment half module	ED-6C142-30 Group 11
<i>COSMIC</i> Mini	Mounts on any shelf of a facility or equipment module	ED-6C314-70 Group 7

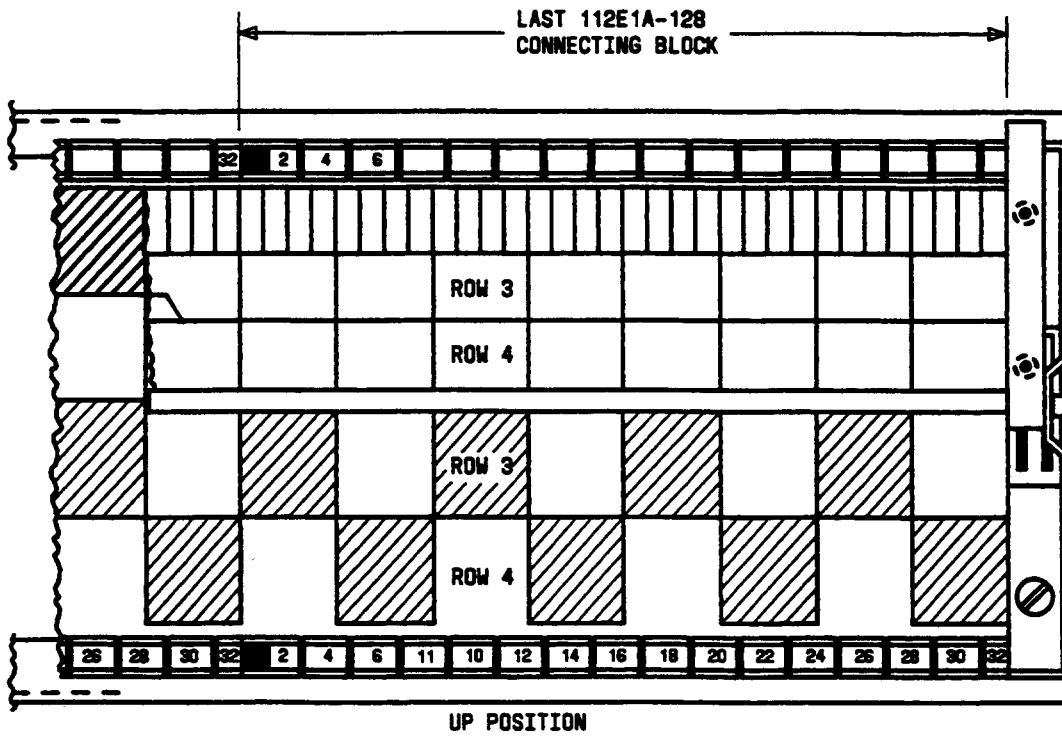
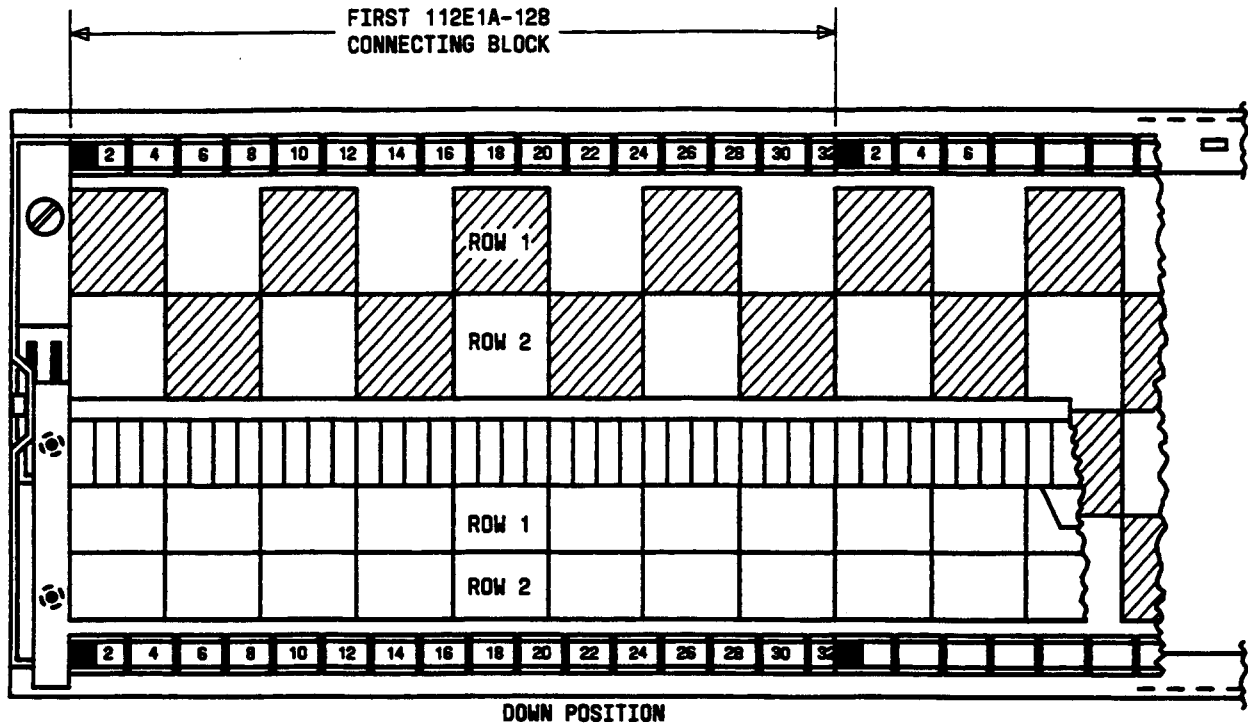


Figure 7—ED-6C142-30, Group 8 Designation Strip Label Holder for COSMIC DFs

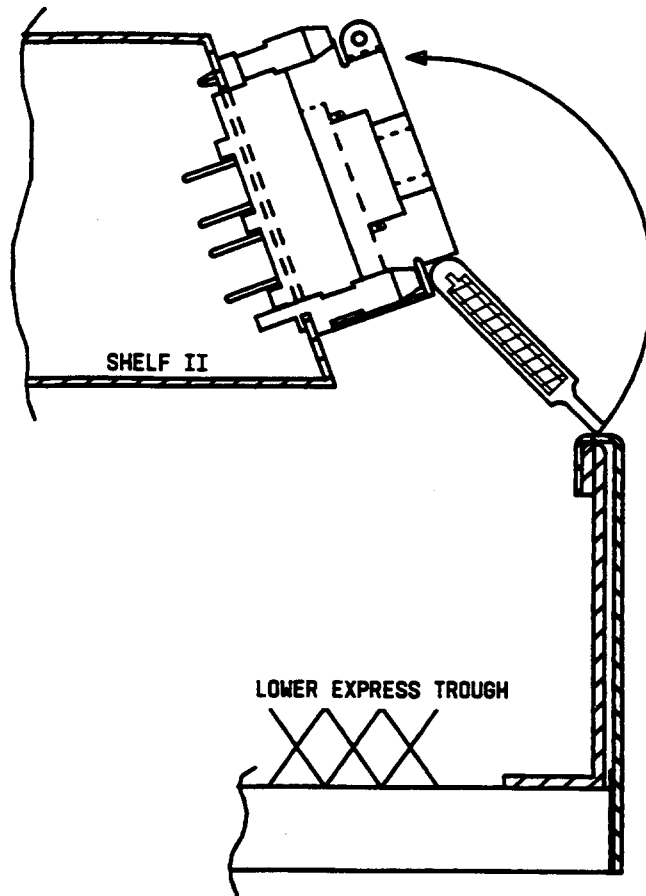


Figure 8—ED-6C142-30, Group 11 Designation Strip Label Holder for COSMIC DFs

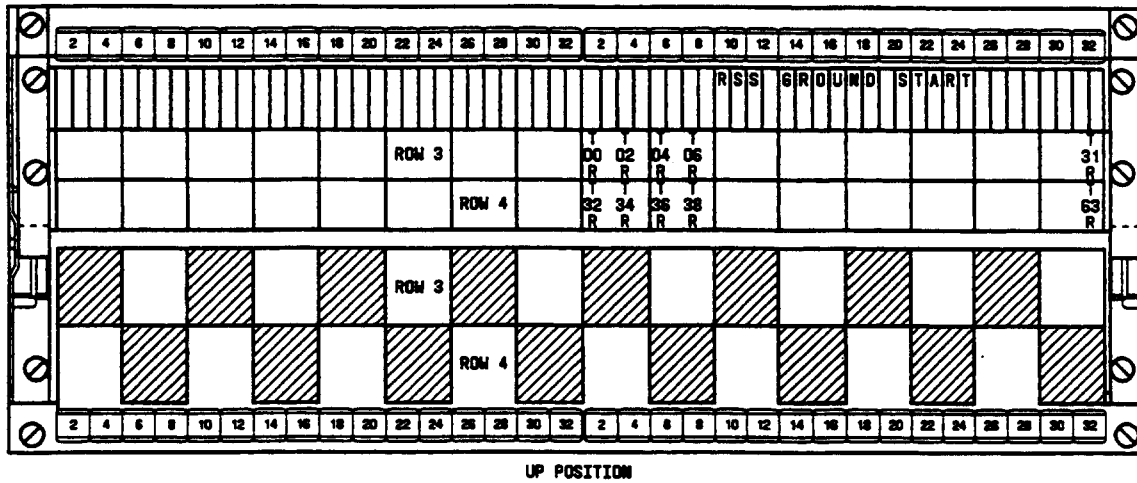
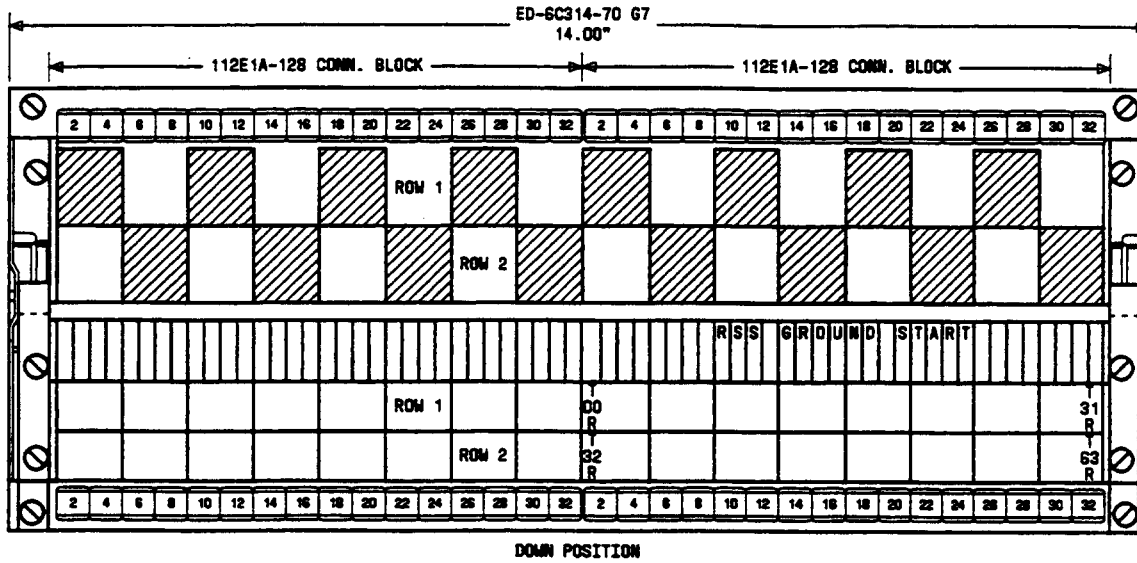


Figure 9—ED-6C314-70, Group 7 Designation Strip Label Holder for COSMIC II Mini DFs

**DESIGNATION STRIP LABELS (FOR FLIP GATES)**

**2.10** Sets of labels (ED-6C144-12, G1-5) (Table C) are available for field stenciling. These labels mount on the half-shelf designation strip and provide room for high-level identification (relay rack, bay, shelf, and mounting plate number).

<b>TABLE C</b>		
<b>ED-6C144-12 LABELS</b>		
<b>APPLICATION</b>	<b>ED-6C144-12</b>	<b>COMCODE</b>
64-Pair Blocks (16 per shelf) Shelves 2-10	Group 1	104437710
96-Pair Blocks (10 per shelf) Shelves 2-10	Group 2	104437728
100-Pair High Density 112H- Blocks (12 per shelf) Shelves 2-10 50-Pair High Density 112H-Blocks (12 per shelf) Shelves 1 and 11	Group 3	104400379
100-Pair Regular Density Blocks (10 per shelf) Shelves 2-10 50-Pair Regular Density Blocks (10 per shelf) Shelves 1 and 11	Group 4	104211065
128-Pair Blocks (10 per shelf) Shelves 2-10 64-Pair Blocks (10 per shelf) Shelves 1 and 11	Group 5	104366653
<i>Note: Each label set provides upper and lower labels for 3 blocks.</i>		

**DESIGNATION FANNING STRIPS (FOR TERMINAL ROW IDENTIFICATION)**

2.11 Designation fanning strips (ED-6C142-30, G23-27) provide designation information space and

end finish (to secure jumper wires) on the connecting blocks when the half-shelf designation strip is not provided, or a half-shelf is partially filled with connecting blocks. Each group provides a left and right fanning strip. (Table D and Figures 10, 11, and 12).

TABLE D DESIGNATION FANNING STRIPS		
APPLICATION	USED ON SHELVES	ORDERING CODE
General use with 50-pair connecting block T, R	1 and 11	ED-6C142-30 Group 23
General use with 100-pair connecting block T, R	2 thru 10	ED-6C142-30 Group 24
Use with SMAS 5A or 5B connecting block TA, RA, TB, RB	2 thru 10	ED-6C142-30 Group 25
Blank fanning strip, stamp as required	2 thru 10	ED-6C142-30 Group 26
Use with shelves associated with 5ESS T, R, SG0, SG1	2 thru 10	ED-6C142-30 Group 27

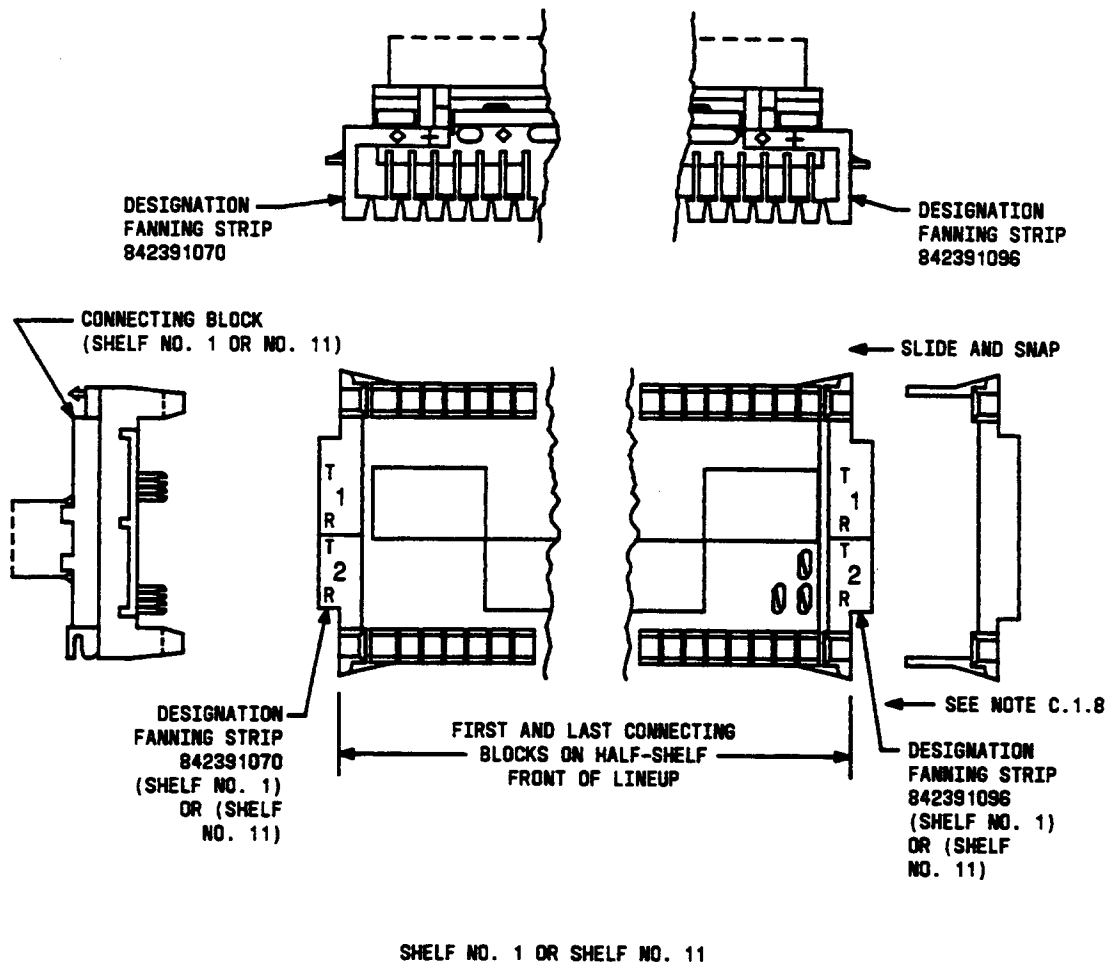


Figure 10—ED-6C142-30 Designation Fanning Strips for Shelf No. 1 or Shelf No. 11

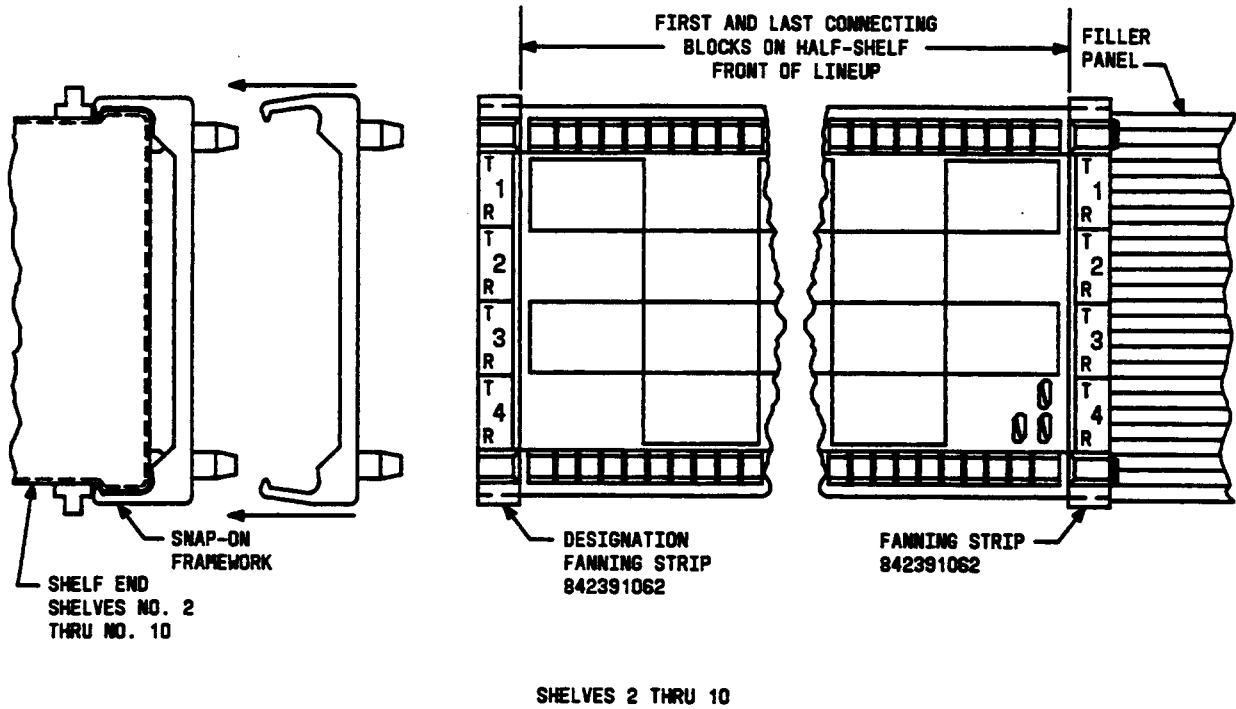
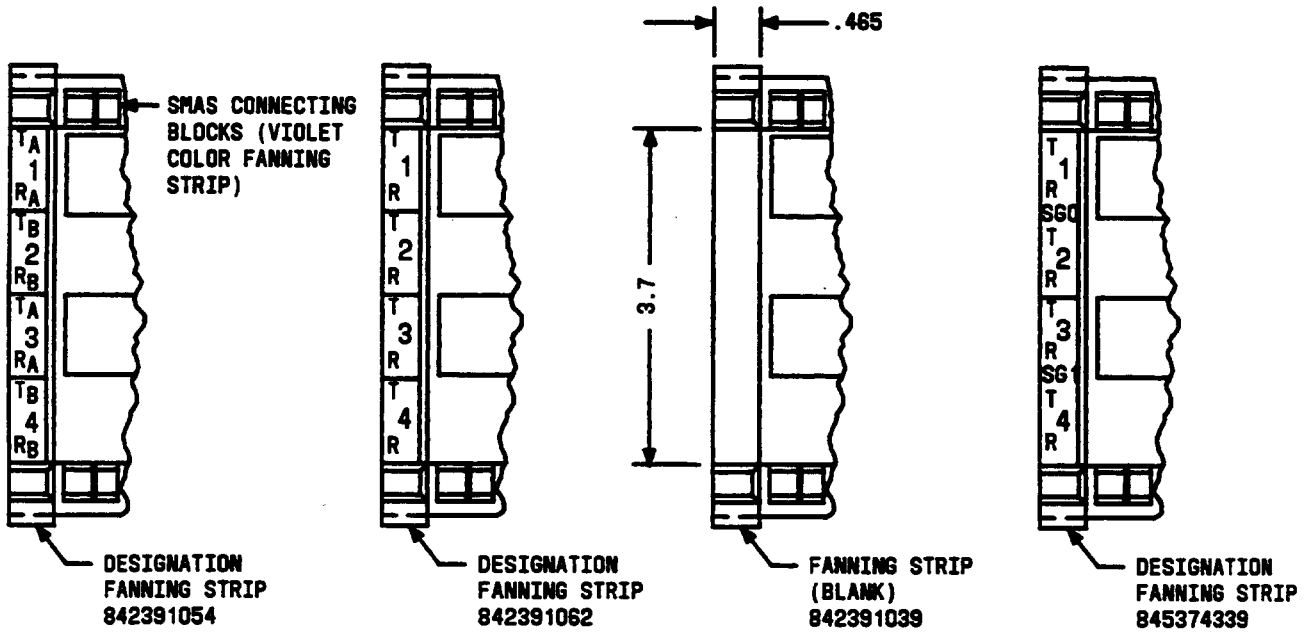


Figure 11—ED-6C142-30 Designation Fanning Strips for Shelves 2 Through 10



DESIGNATION FANNING STRIPS AVAILABLE FOR SHELVES 2 THRU 10. SEE TABLE FOR APPLICATION.

Figure 12—ED-6C142-30 Designation Fanning Strips for Shelves 2 Through 10

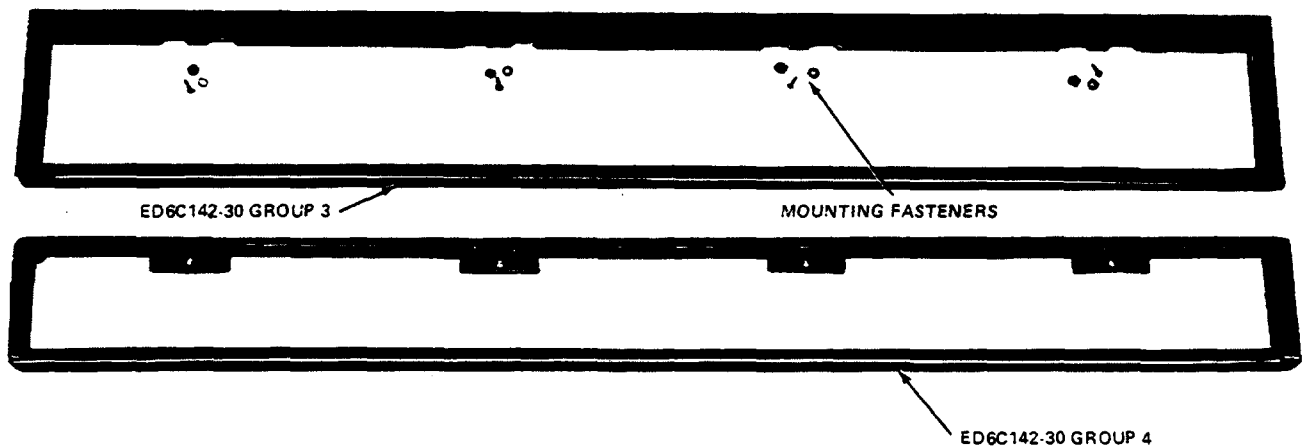


**MOUNTING ADAPTERS FOR 112H-SERIES CONNECTING BLOCKS**

2.12 High density 112H-series connecting blocks (100-pair OSP or tie pairs) can be mounted on earlier *COSMIC* I/II framework using these adapters. A maximum 1200 pairs per shelf (12 blocks per module shelf) or 600 pairs (6 blocks per half-module

shelf) may be mounted. Each adapter spans a 33 inch shelf of a half module. Two are needed for an entire shelf or module. ED-6C142-30, Group 3 is used for shelves 2 through 10, and ED-6C142-30, Group 4 is used for top and bottom shelves 1 and 11. Installation of these adapters is normally done with unoccupied shelves. Mounting fasteners are included with each adapter. (Table E and Figure 13).

TABLE E					
112H SERIES CONNECTING BLOCK MOUNTING ADAPTERS					
FRAME APPLICATION	SHELVES	DIMENSIONS			ORDERING CODE
		HEIGHT	WIDTH	DEPTH	
<i>COSMIC</i> I/II	2-10	4"	33"	3/4"	ED-6C142-30, G3
	1 and 11	4"	33"	3/4"	ED-6C142-30, G4



**Figure 13—112H Series Connecting Block Mounting Adapters**

**FILLER (COVER) PANELS FOR UNUSED CONNECTING BLOCK POSITIONS**

2.13 The KS-21341 framework filler panel (Table F) is used to cover openings in the *COSMIC* I, IA, II, or IIA distributing frames where connecting blocks are to be installed at a later date, or to fill unused openings in the frame. List 1 is 4.86 inches wide and

yellow for switching equipment modules (shelves 2-10). List 2 is 4.86 inches wide and blue for loop cable modules (shelves 2-10). List 3 is 3.5 inches wide and white for all modules (shelves 1 and 11). All the filler panels are approximately 32 inches long and are made of thin plastic with top and bottom lips for snap-in installation. The panels may be cut to the desired length with scissors.

TABLE F			
FILLER (COVER) PANELS FOR UNUSED BLOCK POSITIONS — SPECIFICATIONS AND ORDERING INFORMATION			
FRAME APPLICATION	APPLICATION NOTES	COLOR	ORDERING CODE
<i>COSMIC</i> I/IA/II/IIA	4.86 inches wide for switching equipment modules (Shelves 2-10)	Ochre yellow	KS-21341, L1
	4.86 inches wide for loop cable modules (Shelves 2-10)	Blue	KS-21341, L2
	3.5 inches wide for all modules (Shelves 1 and 11)	White	KS-21341, L5

**FILLER (COVER) PANELS FOR UNUSED 307-TYPE CONNECTOR PANELS**

**2.14** A framework filler panel (Comcode 105583116) is available to cover openings where 307-type connectors are to be installed at a later date on *COSMIC* II/IIA DF facility modules or *COSMIC* II Mini DF facility bays. The panel is 7-7/8 inches high and 6-3/8 inches wide and snaps into the framework. No mounting hardware is required.

**CABLE LOCATION DIRECTORY HOLDER**

**2.15** The cable location directory holder (ED-6C142-30, Group 14) (Table G) is used on *COSMIC* II/IIA distributing frames for mounting up to four cable location directory pages (an output of MELD [Mechanized Engineering and Layout of Distributing frames]). The cable location directory shows the starting

module and shelf location for each group of consecutive cable pairs. The holder can be located in the rear of the vertical cable trough on either side of a facility module.

TABLE G CABLE LOCATION DIRECTORY HOLDER		
FRAME APPLICATION	APPLICATION NOTES	ORDERING CODE
<i>COSMIC</i> II/IIA	Mounts 4 frame cable directories (an output of MELD) in the rear of the vertical cable trough	ED-6C142-30 Group 14

**FRAME OPERATIONS DECALS**

2.16 Frame operations decals (ED-6C129-50, G1, 2, and 3) show pictorial information for the operations on the cross-connect and protector sides of the frame. The decals are normally mounted in the field on

the frame lineup end guards, or on the inside of walk-through modules. Installation of the decals is per the instructions printed on the back of the decals. Figure 14 shows typical placement of decals on a *COSMIC II* DF end guard.

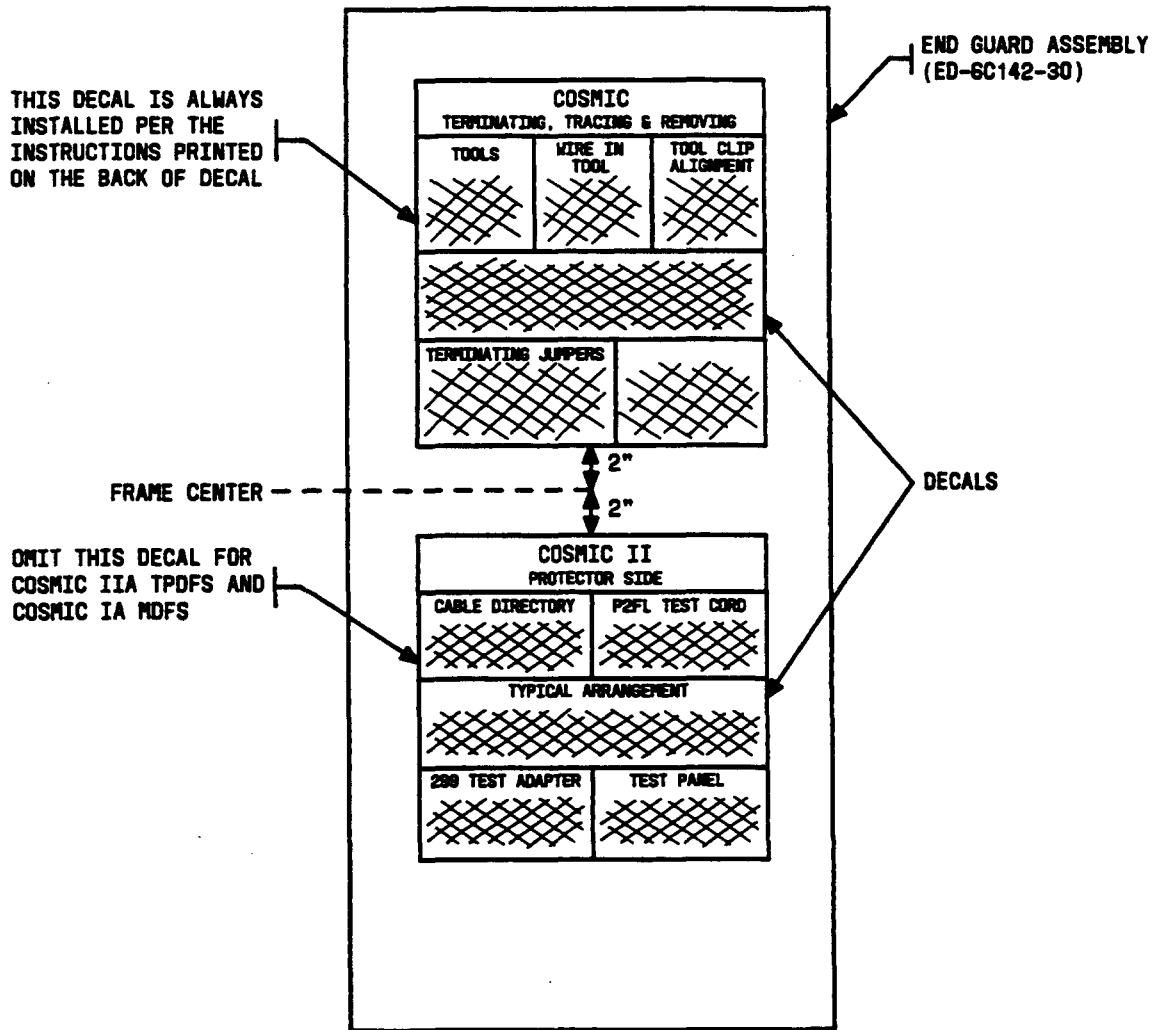


Figure 14—Typical Decal Placements on *COSMIC IIA* End Guard Assembly

2.17 Cross-Connect Side for COSMIC I, IA, II, and IIA — This decal (Figures 15 and 16) describes the tools and procedures used for placing, removing,

and tracing cross-connections and is placed on the door near the front side of the frame lineup.

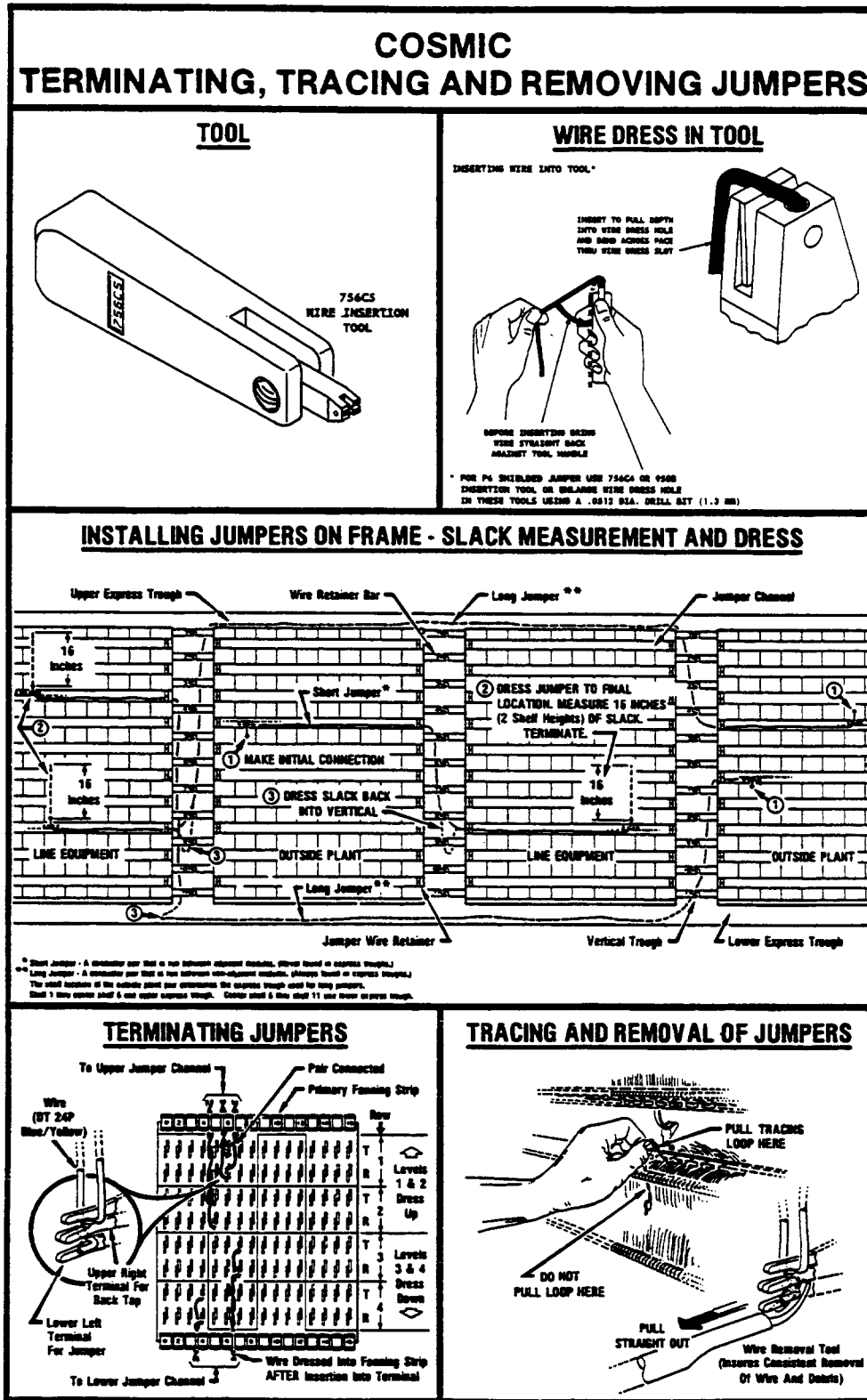
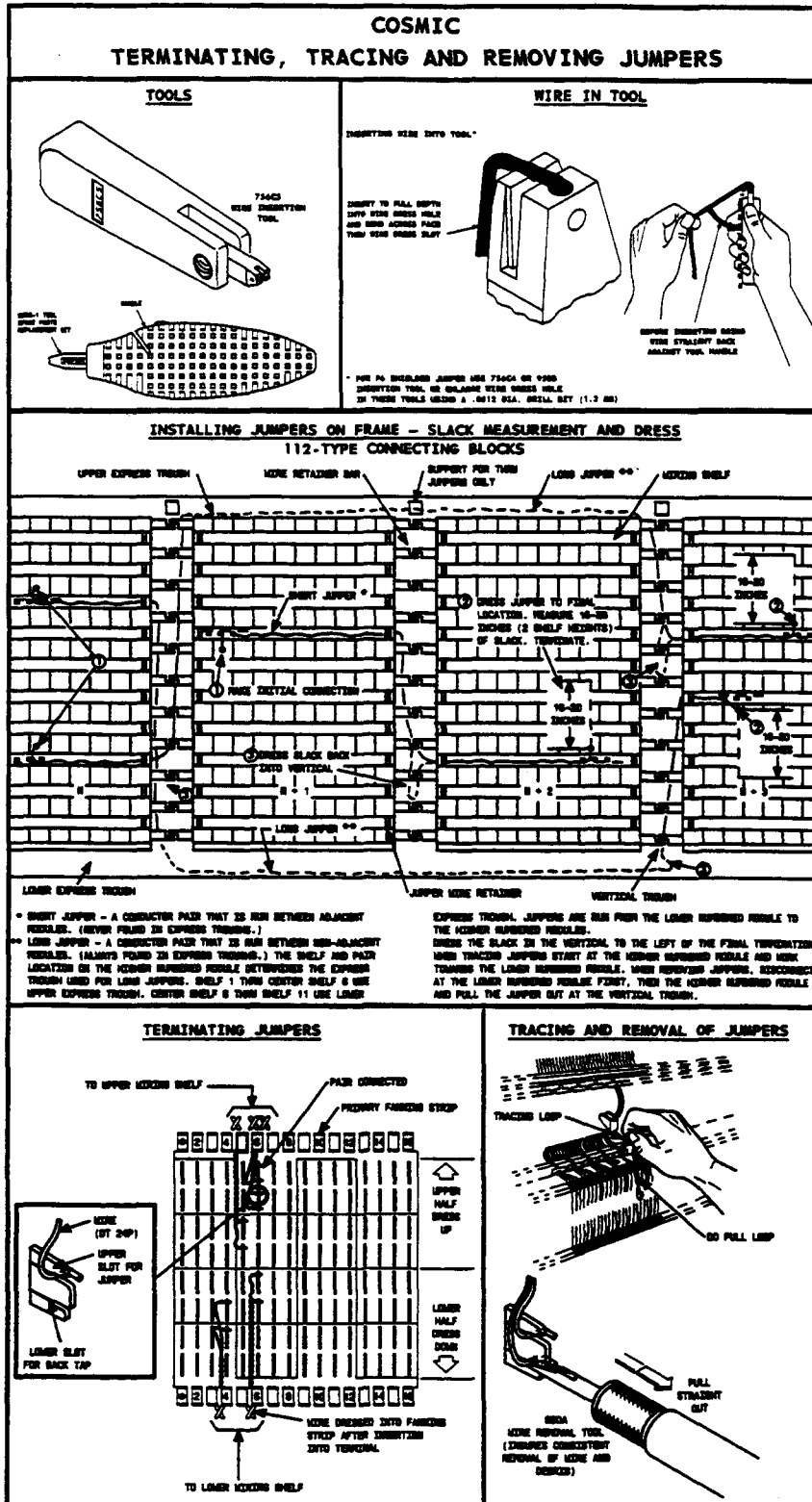


Figure 15—Frame Operations Decal — Cross-Connect Side (78 Blocks)



#### TERMINATING JUMPERS

TO UPPER LOWER SHELF    PAIR CONNECTED    FREQUENCY FABRICATION STRIP

WIRE DRESSER    UPPER HALF DRESS UP    LOWER HALF DRESS DOWN

WIRE DRESSER INTO FABRICATION STRIP AFTER TERMINATION INTO TERMINAL

TO LOWER LOWER SHELF

WIRE (LEFT SHIP)    UPPER SLOT FOR JUMPER    LOWER SLOT FOR BACK TAP

PULL STRAIGHT OUT

WIRE REMOVAL TOOL. (EXHAUSTIVE CONSULTATION REQUIRED FOR WIRE AND DESIGN)

#### TRACING AND REMOVAL OF JUMPERS

TRACING LOOP    DO NOT PULL LOOP

PULL STRAIGHT OUT

WIRE REMOVAL TOOL. (EXHAUSTIVE CONSULTATION REQUIRED FOR WIRE AND DESIGN)

Figure 16—Frame Operations Decal — Cross-Connect Side (112 Blocks)

2.18 Protector Side for COSMIC II and IIA — This decal (Figure 17) depicts the test cords and

equipment arrangement and includes a cable directory which is placed near the rear side of the frame lineup.

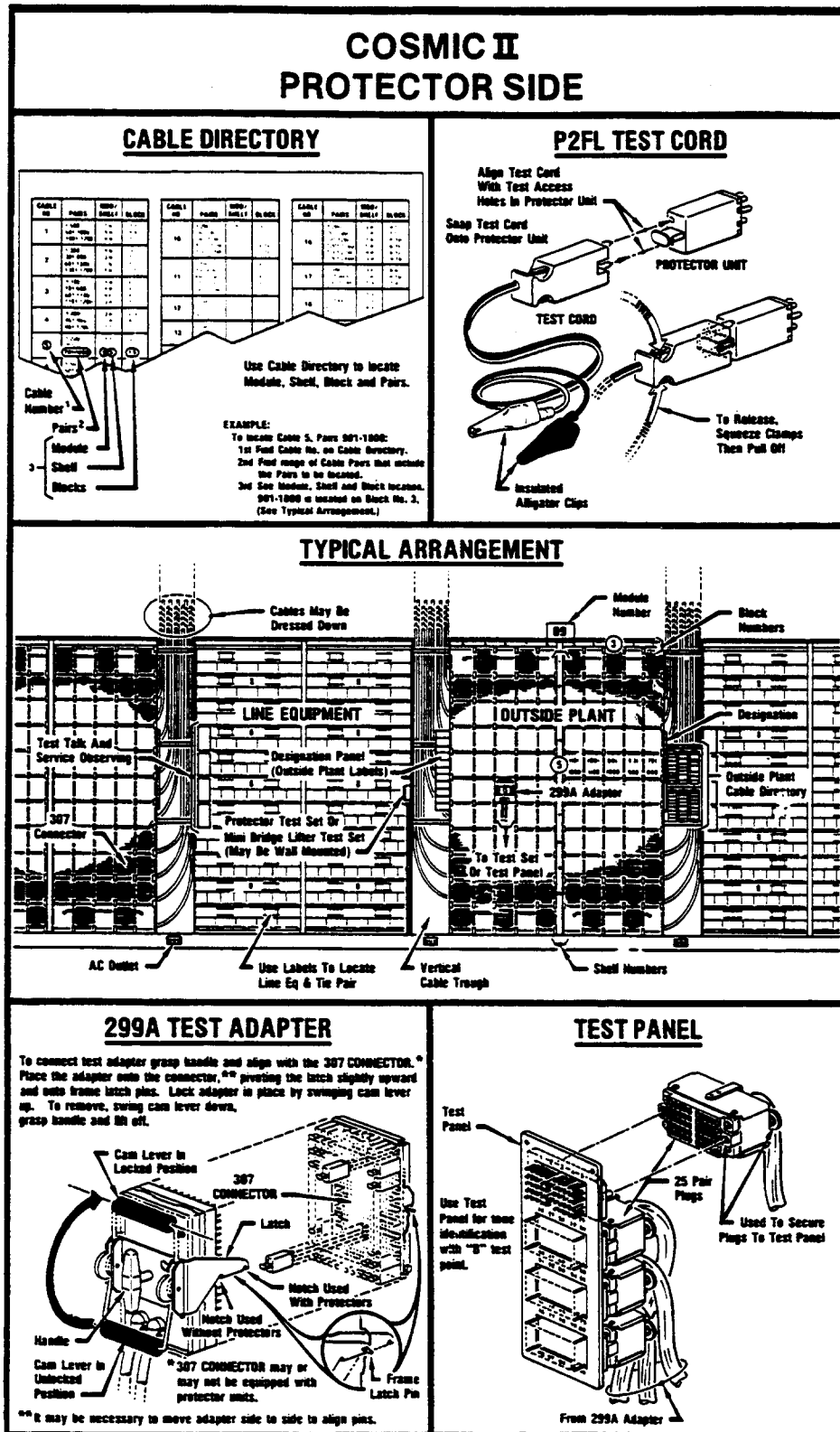


Figure 17—Frame Operations Decal — Protector Side

**3. WIRE**

**3.01** Wire coded DT-24P is the recommended jumper wire to be used on the *COSMIC* distributing frames except for applications requiring shielded jumper wire (such as, subscriber loop carrier systems). The DT-24P is the preferred jumper wire to be used on the *COSMIC II* Mini DF.

**3.02** The DT-24P wire consists of a twisted pair, 24-gauge, solid copper conductor with IPVC (Irradiated Polyvinyl Chloride) insulation. This wire is available in various color combinations and applications are as follows:

- Blue-yellow — Use for 'everyday' cross-connections of outside plant cable pair to central office equipment location.
- Red-yellow — Use for special service cross-connections.
- Green-yellow, or orange-yellow — Use for line transfers, cable transfers, etc. The color of the wire and its use depend on local policies.

**3.03** Other DT-24 wire types are available and typically used on the TMDF (Trunk Main Distributing Frame) and the CMDF (Combined Main Distributing Frame).

- DT-24S, single conductor; color black
- DT-24T, triple conductor; color yellow/blue/red
- DT-24M, 4-wire conductor; color yellow/blue/red/green.

**4. TOOLS AND AIDS**

**4.01** The following is a list of tools and aids used for performing the procedures in this practice. The tools and aids are described in AT&T 201-208-103.

CODE OR SPEC NO.	DESCRIPTION
950C	"Quick-Clip" Wire Insertion Tool (Replaces 950A and 950B tools)
950C-1	Replacement Bit for 950A, 950B, and 950C tools

CODE OR SPEC NO.	DESCRIPTION
756C5	Quick-Clip Wire Insertion Tool (Replaces 756C3 and 756C4 tools)
756C5-1	Replacement Bit for 756C3, 756C4, and 756C5 tools
980A	Wire Removal Tool
KS-16902, L1	Wire Stripper Tool
KS-20620, L1-L7	Wire Stripper Tool
KS-16363, L3	Wire Wrapping Tool
KS-21232, L1	Electric Wire Wrapping Gun
KS-16734, L1	Wire Wrapping Bit (22, 24 gauge) for KS-16363, L3 and KS-21232, L1 tools
KS-16903, L1	Wire Wrapping Bit (24, 26 gauge) for KS-16363, L3 and KS-21232, L1 tools
KS-20963, L1	Wire Wrapping Sleeve (22, 24 gauge) for KS-16363, L3 and KS-21232, L1 tools
KS-20963, L3	Wire Wrapping Sleeve (24, 26 gauge) for KS-16363, L3 and KS-21232, L1 tools
KS-20827, L1	Wire Unwrapping Tool
KS-21345, L2	Block Removal Tool for removing 78- or 112-type blocks from rear of frame
KS-21616, L1	Block Removal Tool for removing 78- or 112-type blocks from front of frame
KS-22271, L1	Connector Removal Tool for removing 307-type connectors
KS-22325, L1	Service Bracket for 307-type connector
KS-21257, L1-L4	Pliers
AT-7860	B Long-Nose Pliers



CODE OR SPEC NO.	DESCRIPTION
AT-7858	V-Notch Diagonal Pliers
AT-7825	4-Inch E Screwdriver
KS-22035, L2	Spudger
KS-21415, L1, L2	Rolling Platform Ladder
KS-21955, L1, L9	Wire Reel
KS-21415, L3	Jumper Running Tool
KS-20096, L1	Wiring Needle (Jumper)
KS-20962, L2	Bag (Wire Clippings)
R-2916	Twine
R-1682	Electrician's Scissors

#### 5. RUNNING JUMPERS ON COSMIC I, IA, II, OR IIA DISTRIBUTING FRAMES

##### A. Amount of Slack

**5.01** About 16 to 20 inches of slack should be left in all jumpers. Slack must be dressed back from both terminations (equipment and cable) through the fanning strips, horizontal wiring channels, and into the vertical trough.

**5.02** A convenient method of measuring 16 to 20 inches of slack is to measure up to, or down to,

two and a half shelves above or below the terminal shelf where the terminations are to be made.

##### B. LOIS (Location Oriented Identification System)

**5.03** The LOIS designation provides the exact frame locations of the terminals and is keyed to the geometry and identification characters provided on the COSMIC I, IA, II, and IIA main distributing frame connecting blocks. All work and service orders controlled by COSMOS (Computer System for Main Frame Operations) or CFAS (Computerized Frame Administration System) use LOIS to instruct frame personnel on jumper termination locations. The character "U" or "L" is inserted between the module shelf numeric designation and the connecting block numeric designation. The character "U" or "L" indicates the direction from which the connecting block is entered by the jumper wire (i.e., from the upper or lower fanning strip). The alpha character "U" is shown when the connecting block terminal row is 1 or 2 or when the module shelf number is 11, and the alpha character "L" is shown when the connecting block terminal row is 3 or 4 or when the module shelf number is 1.

##### C. Short Jumpers

**5.04** A short jumper is a cross-connection wire between any two horizontal terminal wiring shelves of adjacent modules using only the vertical troughs between modules but *not* the upper or lower express troughs.

**Note:** Refer to Figure 18 for jumper running functions and reference to letter designations for running short jumpers.

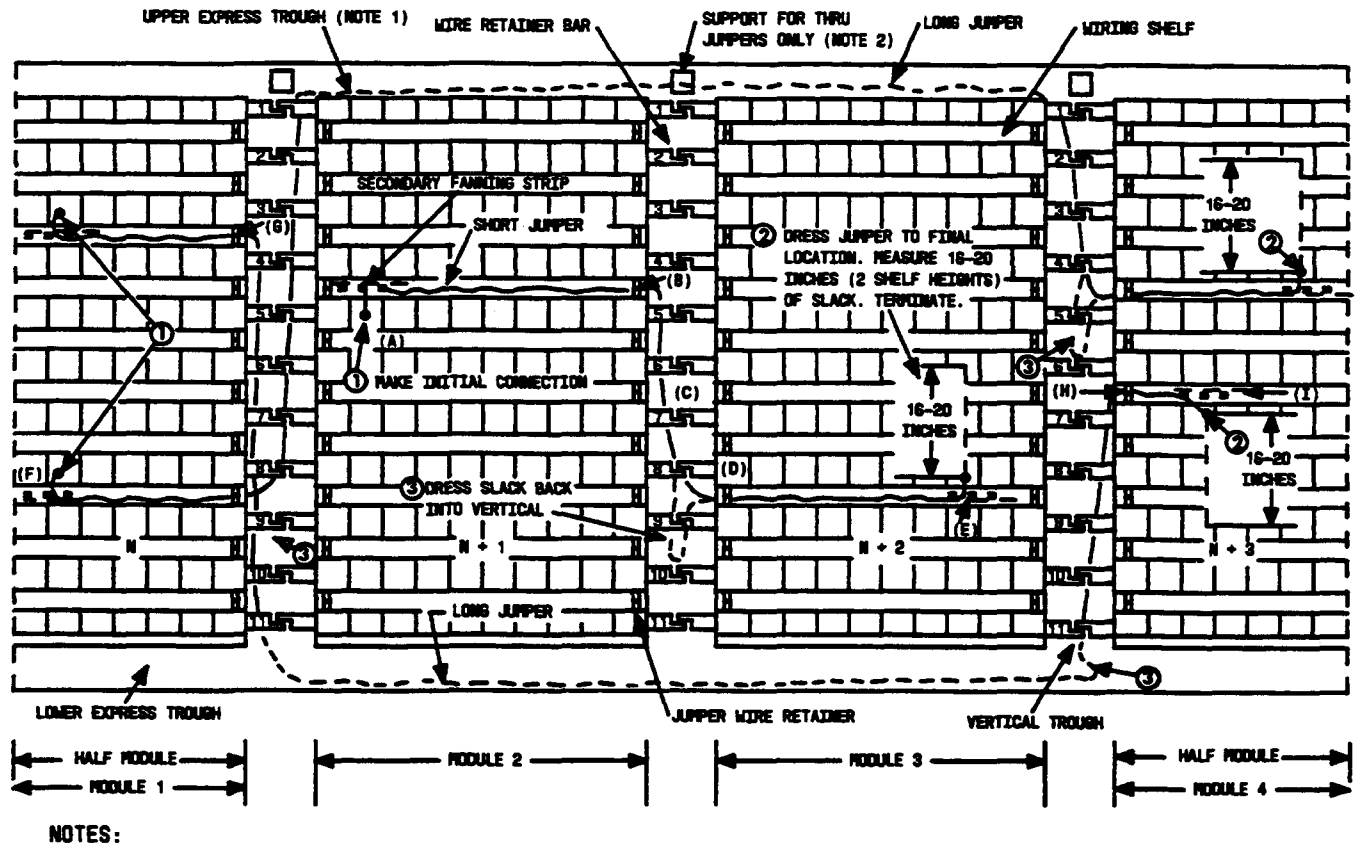


Figure 18—Method of Running Jumpers on COSMIC I, IA, II, or IIA Distributing Frames

**5.05** Jumpers are run from the lower numbered module to the higher numbered module. The procedure used in running short jumpers is as follows:

- (1) Using the correct wire insertion tool, connect the jumper to the designated terminals.
- (2) Dress the jumper into the primary fanning strip (Figure 18 [A]) that is closest to the terminals (top for rows 1 and 2 and all of shelf 11, bottom for rows 3 and 4 and all of shelf 1).
- (3) Then, dress the jumper into the secondary fanning strip and into the vertical trough, working toward the second termination. The jumper must be run behind the jumper wire retainer (Figure 18 [B]).
- (4) Run the jumper up, or down (as required), into the vertical trough until reaching the proper horizontal shelf.
- (5) Place the jumper behind the wire retainer bars (Figure 18 [C]).

**Note:** If LOIS indicates "U" (upper), run the jumper wire on the shelf above the indicated connecting block shelf, and if LOIS indicates "L" (lower), run the jumper wire on the shelf below the indicated connecting block shelf (Figure 18).

- (6) Run the jumper wire on the horizontal shelf, behind the jumper wire retainer (Figure 18 [D]). Leave about 16 to 20 inches of slack, and then cut the jumper wire.
- (7) Using the proper wire insertion tool, connect the jumper wire to the tip and ring terminals, then into the primary, and then into the secondary fanning strip.
- (8) Dress the slack into the vertical trough (Figure 18 [E]).

#### D. Long Jumpers

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

**Note:** Refer to Figure 18 for jumper running functions and references to letter designations for running long jumpers.

**5.07** To run long jumpers, perform the following procedures:

- (1) Locate the assigned terminal on the lower numbered module (Figure 18 [F]).
- (2) Using the correct wire insertion tool, connect the jumper to the designated terminal
- (3) Dress the jumper on the shelf, working toward the second termination on the higher numbered module.
- (4) Place the jumper into the vertical trough behind the jumper wire retainers (Figure 18 [G]).
- (5) Run the jumper to the proper express trough by proceeding as follow:
  - (a) If the shelf location of the higher numbered module is in shelves 1 through 6U, run jumper upward in the vertical trough to the upper express trough.
  - (b) If the shelf number of the higher numbered module is shelves 6L through 11, run the jumper downward in the vertical trough to the lower express trough.

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

- (6) Dress the jumper behind the wire retainer bars.
- (7) Run the jumper wire in the upper or lower express trough to the vertical trough that is immediately prior to the final terminal location regardless of the terminal location within the module.
- (8) If the upper express trough is used, place jumper behind the jumper support bar.
- (9) Run the jumper up or down the vertical trough, as required, until reaching the proper horizontal shelf.
- (10) Place the jumper behind the jumper wire retainer bars (Figure 18 [H]).

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

*Note:* It may be necessary, at the lower numbered module, to have the jumper run more than one half of the vertical trough height.

**5.09** To determine whether the upper or lower express trough should be used, it is recommended that the procedure described previously in Step 5 (of paragraph 5.07) be followed. However, if the initial cross-connections on the frame did not use this procedure, but instead used the facility location to determine which express trough to use, this procedure should be continued. Be consistent; use one method or the other to determine which express trough to use.

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

- (1) Run the jumper wire on the horizontal shelf and through the appropriate secondary fanning strip (Figure 18 [I]).

- (2) Before cutting the jumper wire, approximate 16 to 20 inches of slack. Dress the slack back through the secondary fanning strip along the horizontal shelf and into the vertical trough.

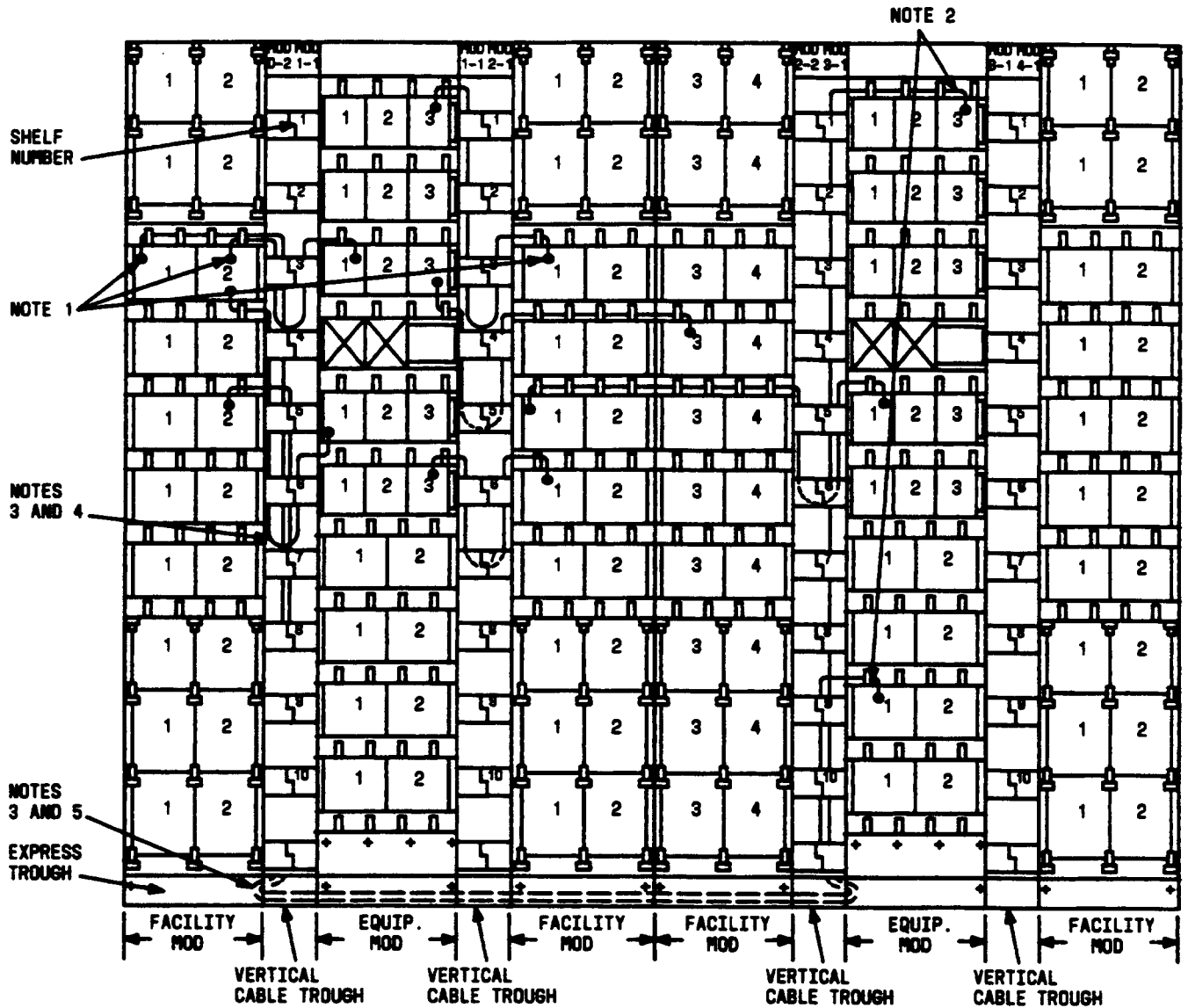
- (3) Place the wire into the primary fanning strip.

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

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

## **6. RUNNING JUMPERS ON COSMIC II MINI DISTRIBUTING FRAMES**

**6.01** Terminations are assigned randomly. Therefore, the cross-connection wire (jumper) may be short or long (Figure 19).



**NOTES:**

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1. INITIAL CONNECTION (ON FACILITY MODULE)</li> <li>2. FINAL CONNECTION (ON EQUIPMENT MODULE)</li> <li>3. DRESS SLACK (10 INCHES) INTO VERTICAL CABLE TROUGH</li> </ul> | <ul style="list-style-type: none"> <li>4. SHORT JUMPER - RUN BETWEEN ADJACENT MODULES</li> <li>5. LONG JUMPER - RUN BETWEEN NON-ADJACENT MODULES USING EXPRESS TROUGH</li> </ul> |
|--|--|

Figure 19—Method of Running Jumpers on COSMIC II Mini Distributing Frames

**A. Short Jumper**

**6.02** A short jumper is a cross-connection wire run between the horizontal wiring shelves of adjacent modules using *only* the vertical cabling (VCA) trough.

**6.03** The initial connection is made at the facility module. After making the initial connection, the jumper is placed in the fanning strip, then behind the wire retainers on the horizontal wiring shelf.

**6.04** The jumper is then run through the VCA trough, the wire retainers on both the VCA trough and the horizontal wiring shelf and through the upper or lower fanning strip of the equipment connecting blocks where the final connection is made. The upper fanning strip is used for terminals located on connecting block rows 1 and 2. The lower fanning strip is used for connecting block rows 3 and 4.

**Note:** Before cutting the wire, measure 10 inches of slack. Rewind the excess wire onto the reel.

**B. Long Jumper**

**6.05** A long jumper is a cross-connection wire run between the horizontal wiring shelves of non-adjacent modules using *both* the VCA and express troughs.

**6.06** A long jumper is run the same as a short jumper (paragraphs 6.03 and 6.04) except that the wire is placed in both the VCA and express troughs.

**Note:** Before cutting the wire, measure 10 inches of slack. Rewind the excess wire onto the reel.

**7. INSTALLING CONNECTIONS**

**A. Installing Cross-connect Wires Into Connecting Block Terminals**

**7.01** Practice 800-612-164 covers the procedure for terminating shielded cable. When installing non-shielded cross-connect wire into connecting block terminals, use the following procedure:

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

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

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

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

(3) Connect the wire per paragraph 7.02 (for 78C-type connecting blocks) or paragraph 7.03 (for 112-type connecting blocks).

**B. 78C-Type Connecting Blocks**

**7.02** To connect wires to 78C-type connecting block terminals, use the 950C or 756C5 quick-clip wire insertion tool and proceed as follows:

**Note:** It is recommended that several trial connections be made on unused terminals to gain experience in the use of the wire insertion tool before making actual connections. Do not wiggle or rock the tool as this may cause the wire to break, and excessive pressure or striking the tool may force the terminal through the block.

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

(2) Insert the tip (or ring) conductor to full depth into wire dress hole and bend across face through wire dress slot, and bring wire straight back against tool handle (Figure 15).

(3) Position the tool directly over the twin clip of the lower left terminal, with the wire entry from the left side of the terminal, and gently push forward until the tool is in proper alignment with the terminal. Push the tool forward until it bottoms on the terminal. At this point, the wire has been inserted to the proper depth.

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

(5) Perform the same steps [Steps (1) through (4)] for the mating wire of the pair, and dress the pair of wires into the proper primary and secondary fanning strip slot.

(6) For backtap connections, repeat Steps (2) through (5) for the upper right terminal, with the wire entry from the right side of the terminal.

### C. 112-Type Connecting Blocks

**7.03** To connect wires to the terminals of 112-type connecting blocks, use the 950C or 756C5 quick-clip wire insertion tool and proceed as follows:

(1) Perform Steps (1) and (2) of paragraph 7.02.

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

(3) Perform Step (4) of paragraph 7.02.

(4) Perform the same Steps, (1) through (3), for the mating wire of the pair, and dress the pair of wires into the proper primary and secondary fanning strip slot.

(5) For backtap connections repeat Steps (2) through (4) for the lower slot of the terminal (between the second and third beam).

### 8. REMOVING CONNECTIONS

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

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

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

(2) Using the wire removal tool as shown in Figures 15 and 16 pull the wire from the terminal and away from adjacent terminals.

### 9. DESIGNATION OF SPECIAL SERVICE LINES

**9.01** Indicators and insulators provide visibility and protection for circuits assigned to special services. Indicators are used on cross-connecting wires, and insulators are placed on apparatus terminations for additional protection. Descriptions and applications of indicators and insulators are contained in AT&T 201-208-106.

**9.02** The following indicators and insulators are available for use on the 78-type connecting blocks:

- KS-6660 Indicator
- KS-16847 Indicator
- AT-8301 D Clip Insulator

**9.03** The following insulators are available for use on the 112-type connecting blocks:

- KS-16604 Insulator (Wire-wrap terminals)
- KS-21168, L1 Insulator (Wire-wrap terminals)
- AT-8993 J Clip Insulator (Quick-clip terminals)

### 10. REPAIR AND REPLACEMENT

**10.01** Procedures are not written for the replacement of screws where the procedure is obvious and consists of a simple operation.

#### REPLACEMENT PARTS

**10.02** The connecting block code is stamped on the rear of the block. The following four terminals may be ordered for replacement on the 78- and

112-type connecting blocks and Tables H and I contain the comcodes for ordering the connecting blocks or their fanning strips.

- 824733109 Terminal (Bifurcated 4-beam quick-clip for 78-type connecting blocks)

- 842367823 Terminal (Bifurcated 3-beam quick-clip for 112-type connecting blocks)
- 844534834 Terminal (Single wire-wrap for 112-type connecting blocks)
- 844040030 Terminal (Bifurcated wire-wrap for 112-type connecting blocks)

TABLE H			
78-TYPE CONNECTING BLOCK ORDERING INFORMATION			
ITEM CODE NUMBER	CONNECTING BLOCK ASSEMBLY COMCODE	FANNING STRIP (TOP) COMCODE	FANNING STRIP (BOTTOM) COMCODE
78C1A-50	102371770	841087901	841639909
78C1A-64	102371788	841088081	841639974
78C1A-96	103679551	842365546	842365488
78C1A-100	102371796	841087901	841639917
78C1B-50	102463486	841087919	841639925
78C1B-100	102371804	841087919	841639933
78C1C-100	102371812	841087943	841639966
78C2A-50	102995198	842358830	841639917
78C2A-64	102371838	841088099	841639982
78C2A-96	103679569	842365553	842365496
78C2A-100	102415882	841087927	841639941
78C2B-50	102995206	842358848	841639933
78C2E-100	103815528	843264490	843264482
78C2F-64	104017355	844044131	844044123
78C3A-96	103679577	842365561	842365504
78C3A-100	102730462	841634777	841640014
78C3F-64	104404926	844044131	844044123
78C4A-96	103679585	842365579	842365512
78C4A-100	103679593	842365587	842365520
78C5A-100	103679601	842365595	842365538
78E1-64	106005796	842141095	842141087
78E1A-64	106005804	842141137	842141103
78E3F-64	104472703	841088099	841639982
78E4F-64	104432711	841088099	841639982
78G1B-64	104411657	841088099	841639982



TABLE I			
112-TYPE CONNECTING BLOCK ORDERING INFORMATION			
ITEM CODE NUMBER	CONNECTING BLOCK ASSEMBLY COMCODE	FANNING STRIP (TOP) COMCODE	FANNING STRIP (BOTTOM) COMCODE
112A1A-128	106005812	846407096	846407088
112A1AB-128	106005820	846407096	846407088
112C1A-50	103288197	841087901	841639909
112C1A-64	103288205	841088081	841639974
112C1A-96	103634812	842365546	842365488
112C1A-100	103288189	841087901	841639917
112C1AB-64	104440870	841088081	841639974
112C1AS-50	104440896	841087901	841639909
112C1AS-100	104440888	841087901	841639917
112C1B-50	103288221	841087919	841639925
112C1B-100	103288213	841087919	841639933
112C1BB-50	104440912	841087919	841639925
112C1BB-100	104440904	841087919	841639933
112C1BS-50	104447644	841087919	841639925
112C1BS-100	104448766	841087919	841639933
112C1CS-50	104447651	841087943	841639966
112C1F-100	104017322	844534818	844534800
112C2A-50	103288254	842358830	841639917
112C2A-64	103288262	841088099	841639982
112C2A-96	103634820	842365553	842365496
112C2AB-64	104450192	841088099	841639982
112C2AS-50	104447669	842358830	841639917
112C2B-50	103288270	842358848	841639933
112C2BB-50	104447677	842358848	841639933
112C2BS-50	104447685	842358848	841639933
112C2E-100	103815510	843264490	843264482
112C2EB-100	104447693	843264482	843264490
112C2ES-100	104447701	843264490	843264482
112C2F-64	104017330	844044131	844044123
112C2FB-64	104447719	844044131	844044123
112C3A-96	103634838	842365561	842365504
112C3F-64	104373204	841088099	841639982
112C3FB-64	104447727	841088099	841639982
112C4A-96	103634846	842365579	842365512
112C4A-100	103634861	842365587	842365520

TABLE I (contd)			
112-TYPE CONNECTING BLOCK ORDERING INFORMATION			
ITEM CODE NUMBER	CONNECTING BLOCK ASSEMBLY COMCODE	FANNING STRIP (TOP) COMCODE	FANNING STRIP (BOTTOM) COMCODE
112C5A-100	103634853	842365595	842365538
112E1A-64	103317905	842365694	842365678
112E1A-128	103288288	842365694	842365678
112E1AB-128	104447735	842365694	842365678
112E1AS-128	104447743	842365694	842365678
112E1B-64	103317913	843270380	843270364
112E1B-128	103288296	843264474	843264466
112E1BB-128	104447750	843264474	843264466
112E1C-128	103556247	843266305	843266297
112E1D-128	103634879	843270364	843270380
112E2B-128	103758140	844038000	844037994
112E2BB-128	104447768	844038000	844037994
112E2D-128	106005838	844533737	844533802
112E2F-128	104017348	844044024	844044016
112E2FB-128	104447776	844044024	844044016
112E3D-128	106005846	844533745	844533810
112E3F-64	104432687	841088099	841639982
112E3F-128	104401302	845793884	845793876
112E4D-128	106005853	844533752	844533828
112E4F-64	104432695	846040368	846040350
112E5D-128	106005994	844533760	844533836
112G1A-128	103665204	842365694	842365678
112G1B-50	104016886	841087919	841639925
112G1B-100	104016878	841087919	841639933
112G1B-128	103665212	843264474	843264466
112G1C-128	103749354	842365694	842365678
112G1D-128	104199781	845134162	845134170
112G2B-50	104016894	842358848	841639933
112G2B-128	104377429	845134162	845134170
112G4B-128	104407879	845134162	845134170
112H1B-50	104052071	845130268	845130467
112H1B-100	104052063	845130368	845130442
112H1BS-100	105571681	845130368	845130442
112H1D-50	104052097	845130376	845130483

TABLE I (contd)			
112-TYPE CONNECTING BLOCK ORDERING INFORMATION			
ITEM CODE NUMBER	CONNECTING BLOCK ASSEMBLY COMCODE	FANNING STRIP (TOP) COMCODE	FANNING STRIP (BOTTOM) COMCODE
112H1D-100	104052089	845130376	845130459
112H1DS-50	104447792	845130376	845130483
112H1DS-100	104447784	845130376	845130459
112H1E-100	104188024	845130400	845130491
112H1E1-100	104199700	845130418	845130509
112H1G-100	104193925	845130368	845130442
112H2B-50	104052105	845130384	845130442
112H2D-50	104052113	845130392	845130459
112H2DS-50	104447800	845130392	845130459
112H2G-100	104199807	845130400	845130491
112J1B-128	104430459	843264474	843264466

#### PREPARATION

**10.03** Before beginning any replacement procedure, refer to local practices for access procedures.

**10.04** To replace a terminal or the entire connecting block, it is necessary to remove the cross-connections and the cable wiring from the affected terminals. For a single terminal replacement, the wires do not have to be tagged for identification. However, to replace a connecting block, take extreme care to identify and tag each lead or pair of leads as they are removed from the terminals.

**10.05** Generally, there is enough slack in the cross-connection wires to allow for the replacement of the fanning strip without removing the wires from the terminals. Each lead can be pulled through the fanning strip one-way gate (Figure 3 or 5), using the long-nose pliers. The wires should remain seated in the quick-connect terminals, and as an added precaution, tie or tape the wires associated with each column together to aid in placing the wires into the proper gate after the new fanning strip has been installed.

**10.06** If any special service insulating clips are removed during the replacement procedure, note the circuit(s) involved.

**10.07** To gain access to the rear of connecting blocks on an FAC (facility) bay, in *COSMIC II* and *IIA*

MDFs (main distributing frame) only, first remove the associated 307-connector and place it in a service bracket. See AT&T 201-208-110 for a detailed description of the procedure used to gain access to the rear of the connecting blocks.

#### REPAIR AND REPLACEMENT PROCEDURES FOR *COSMIC I, IA, II, IIA DFs*

##### A. Terminal

**10.08** The following steps give the procedure used to remove and replace connecting block terminals.

- (1) Using the 980A wire removal tool or the 950C wire insertion and removal tool, remove the cross-connection wire from the defective terminal.
- (2) At the rear of the block, remove the cable wire, using the KS-20827 wire-unwrapping tool.
- (3) After removing the cable wire, use a pair of longnose pliers to twist the terminal at its base until it breaks.
- (4) Using the long-nose pliers, pull the remainder of the terminal out from the front of the block.

- (5) Place the new terminal into the block from front with pliers and using a slight pressure, push the terminal into the block until it is seated properly (indicated by a "click").
- (6) Use pliers at the rear of block to twist terminal slightly either to the left or right to lock terminal in place.
- (7) Reconnect the wires on the new terminal.
- (8) Place all wire clippings into the KS-20962 wire clipping bag.
- (9) Verify that the circuit is working properly.

#### B. Fanning Strip

**10.09** The following procedure describes the method used to replace a defective fanning strip.

- (1) Pull all the cross-connection wires through the fanning strip gates (paragraph 10.05).
- (2) To remove the defective fanning strip, follow Step 2(a) for connecting blocks other than 112H-type blocks, or follow Step 2(b) for 112H-type connecting blocks.
  - (a) Holding the fanning strip to the connecting block, remove the fanning strip screws, and then remove the defective fanning strip.
  - (b) For 112H-type blocks, hold the fanning strip to the block body, use a screwdriver to lift the latch on the end of the fanning strip, slide the fanning strip over to disengage it from the block body, and then lift the defective fanning strip off the block body.
- (3) To install the new fanning strip, follow Step 3(a) for connecting blocks other than 112H-type blocks, or follow Step 3(b) for 112H-type connecting blocks.
  - (a) Install the new fanning strip using the screws to fasten the fanning strip to the connecting block.
  - (b) For 112H-type blocks, align the tabs on the connecting block body with the fanning strip, and then snap the fanning strip in place.

- (4) Reinsert the cross-connection wires into the proper fanning strip gates, and dress the wires back on the frame.
- (5) Make a visual inspection to be sure that none of the wires have been removed from their quick-connect terminals.
- (6) Use the KS-22035 plastic spudger to dress the wires along the front of the connecting block.

#### C. Connecting Block

**10.10** The following procedure describes how to remove and replace connecting blocks on the MDF.

- (1) Using the wire removal tool, remove each cross-connection wire from the connecting block.
- (2) After removing the cross-connection wires from the fanning strips (both top and bottom), tag each wire for identification, and tie or tape together all wires associated with the same connecting block column.
- (3) Cut back the end of each wire approximately one-half inch and deposit the clippings into the wire clipping bag.

*Note:* The wires are now prepared for reconnecting to the new connecting block.

- (4) Lay the wires back on the framework so they will not interfere with the removal of the connecting block.

*Note:* The KS-21345 connecting block removal tool is used to remove the connecting block from the shelf.

- (5) Align the inclined projections on the face of the KS-21345 connecting block removal tool with the snap-in tabs on the top rear of the block.
- (6) Press the connecting block removal tool toward the front of the frame. This action releases the top of the block allowing it to tip forward.
- (7) Lift the connecting block off the frame by disengaging the groove in the lower connecting block fanning strip from the edge of the shelf.

- (8) With the cable wiring side of the connecting block facing upward, place the block against the shelf so that the bottom of the lower fanning strip is flush against the outside surface of the shelf.
- (9) Using the roll of twine, lash the block to the shelf by making several wraps around the front part of the bottom fanning strip and the shelf. This should hold the block firmly in place.
- (10) Remove, insulate, and identify (by tagging or other means) each cable wire and place them back out of the way.
- (11) Cut the twine holding the block to the frame.
- (12) Place the new block against the shelf (cable side up), and follow the procedure outlined in Steps 8 and 9 to lash it to the shelf.
- (13) Using the proper wire-wrapping bit, reconnect the cable wires to the connecting block.
- (14) Dress the cable back on the framework.
- (15) Replace any cable ties that may have been removed to gain slack when removing the cable wiring.
- (16) Cut the twine holding the block to the shelf, and place the block on the shelf so that the groove in the bottom fanning strip is seated over the edge of the shelf.
- (17) With the thumbs placed on the front facets of the top fanning strip, push the block firmly toward the framework until the tabs "snap" into place on the shelf.
- (18) Reconnect all the cross-connections, and dress the slack back onto the frame shelf.
- (19) Following local practices, verify that all circuits are working properly.

## **REPAIR AND REPLACEMENT PROCEDURES FOR COSMIC II MINI DFs**

### **A. Terminal**

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

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

- (1) Insert the prongs of the tool into the three slots on the top of the fanning strip. There are three groups of three slots. Use the rightmost slot of each group.
- (2) Press down until the three prongs of the tool are seated properly in the slots.
- (3) The tool handle is offset in an upward direction. Rotate the handle downward until the three tangs on the fanning strip disengage from the wiring shelf.
- (4) Lift the connecting block up slightly to disengage the bottom fanning strip, which is slotted lengthwise, from the track on the wiring shelf.

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

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

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

**10.16** Use pliers at the rear of block to twist terminal slightly either to the left or right to lock terminal in place.

**10.17** Reconnect the cable wire(s) on the new terminal.

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

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

**B. Fanning Strip**

- 10.20 The cross-connections must be removed from the fanning strip one-way gates using the procedure outlined in paragraph 10.05.
- 10.21 The connecting block must be removed from the wiring shelf using the procedures outlined in paragraph 10.12.
- 10.22 The fanning strip can be removed from the block by removing the three machines screws. Using the same screws, fasten the new fanning strip to the block.
- 10.23 Reinstall the connecting block on the wiring shelf using the procedure outlined in paragraph 10.18.
- 10.24 Reinsert the cross-connection wires into the proper one-way gates on the fanning strip and dress the wires back on the wiring shelf.
- 10.25 Make a visual inspection of the front of the block to be sure that none of the wires have been removed from their quick-connect terminal. Use the plastic spudger to dress the wires along the front of the block.

**C. Connecting Block**

- 10.26 Use the wire removal tool to remove the cross-connection wires from the terminals. Cut back each wire past the pierced insulation, approximately 1/4 inch. Deposit wire clippings into the wire clipping bag. Tag each wire for identification and tie or tape together all wires associated with the same fanning strip one-way gate. Remove the wires from the one-way gates (see paragraph 10.05), and place the wires on the wiring shelf so that they will not interfere with the removal of the connecting block.
- 10.27 Use the KS-22616 connecting block removal tool and follow the procedures outlined in paragraph 10.12 for removing the connecting block from the wiring shelf.
- 10.28 With the cable wiring side of the block facing upward, place the block against the shelf so that the bottom of the lower fanning strip is flush against the outside surface of the shelf. Use the roll of twine to lash the block to the shelf by making several wraps around the front part of the bottom fanning strip and the shelf. This should hold the block firmly in

place. Remove and cut off skinned portion of the cable wires and identify each cable wire (by tagging or other means). Place wire clippings into distributing frame bag.

- 10.29 Cut the twine holding the defective connecting block to the frame. Place the new block against the shelf and follow the procedure outlined in paragraph 10.28 to lash it to the shelf.
- 10.30 Reconnect the cable wires, using the proper wire-wrapping bit. Dress the cable back on the shelf.
- 10.31 Cut the twine holding the block to the shelf. Install the new connecting block on the wiring shelf following the procedure outlined in paragraph 10.18.
- 10.32 Reconnect all the cross-connections and place them in the proper fanning strip one-way gates. Remove the identification tags and the ties. Dress the wires on the front of the block and dress the slack back into the vertical cabling trough.
- 10.33 Following local practices, verify that all circuits affected are working properly.

**11. REFERENCES**

PRACTICE	TITLE
069-132-811	Punched or Wire-Type Terminals — Method of Making and Removing Wrapped Connections
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 — Distributing and Protector Frames
201-208-110	307-Type Connectors — Description, Use, Installation, and Repair Procedures
201-222-101	COSMIC I, IA, II, and IIA Distributing Frame Systems — Description

<b>PRACTICE</b>	<b>TITLE</b>	<b>PRACTICE</b>	<b>TITLE</b>
201-222-105	78- and 112-Type Connecting Blocks — Description and Use — <i>COSMIC</i> Distributing Frames	201-222-501	Inspections — <i>COSMIC</i> Distributing Frames
201-222-120	<i>COSMIC</i> II Mini Combined Distributing Frame System — Description		

**12. ISSUING ORGANIZATION**

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