

INSTALLATION OF
"COSMIC II" DISTRIBUTING FRAME

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1. GENERAL INFORMATION

1.1 This section covers only information, methods, and requirements associated with the "COSMIC II" Subscriber Main Distributing Frame (SMDF). Refer to Section 127 of Handbook 8 for "COSMIC I" installation information.

1.1.1 The essential difference between the two distributing frames is that "COSMIC II" incorporates the "protector" frame function on the rear side of the Outside Plant (OSP) modules. These OSP half-modules have added 10 protector frame verticals across the back of the frame and mounts one hundred (max.) 307-type Connectors on each module.

1.1.2 The 307 Connectors have the 78C-Type Connecting Blocks 78C - (red/white pattern) or 112 type block (blue/white pattern) pre-wired to them (form about 20" long) by the shop. They also have four 25 pair 710 SD Connectors pre-wired to them which mates with four 25 pair 710 BD Connectors pre-wire to the end of the outside plant ABAM type cables (see Figures 1 and 2).

2. DRAWINGS, TOOLS AND SUPPLIES

2.1 This paragraph lists the drawings, tools, and supplies that should be furnished, or obtained through the IMDARC, for the installation of a "COSMIC II" Distributing Frame.

2.1.1 Drawings

ED-6C003-70	Mounting Hardware for Installing
ED-6C004-70	End Guards
ED-6C005-70	Method of Grounding
ED-6C006-30	Appliance Outlets
ED-6C009-50	Designation Cards for Modules
ED-6C107-71*	Walk-thru Assembly
ED-6C110-10	Miniature Test/Talk System Hardware Specs
ED-6C111-10	Miniature Test/Talk Typical Equipment Layout, Method of Installation and Cabling
ED-6C111-11	Miniature Test/Talk System Stocklist & Miscellaneous Components
ED-6C112-70-71	Framework Assembly
ED-6C113-30	Framework Specification
ED-6C114-10,11	Method of Cabling
ED-6C115-10	Method of Installing Framework
ED-6C116-10,11	Typical Equipment Layout
ED-6C117-10	Cable Rack Hardware, Typical Arrangement and Method of Installation
ED-6C118-30	Lighting Hardware, Typical Arrangement and Method of Installation and Wiring

*Not required on all "COSMIC II" Installation.

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NOTE: Engineering may feel that some of the above listed drawings are not required in the field; and, therefore, they may not be furnished.

2.1.2 Tools

R-3795 (724A) 756C2	Jumper Wire Removal Tool Jumper Wire Insertion Tool (78C & 112-type blocks)
R-4266	Cable Tie Fastening Tool
R-4370	Cable Tie Holder
R-4451	Wiring Fixture (78C & 112 Blocks)
R-4452	Wiring Fixture (T/T Panels)
R-4893	710 Connector Cutter-Presser Tool
R-4827	Cable Tie Fastening Tool
AT-8927C	Bridge Module Removal Tool
AT-8948	710 Connector, "L" Connector Presser
KS-21345*	Connecting Block Removal Tool (78C & 112)
KS-21955*	Wire Reel (Jumper Wire)
KS-22271*	Connector Block Removal Tool (307-)
KS-22325*	Service Bracket

NOTE 1: Tools normally furnished in the 168 Kit or other normal installation kits are not above.

NOTE 2: *Must be in job specifications and furnished, not in IMDARC.

2.1.3 Supplies

R-2916	Twine
R-4265	Nylon Cable Ties
710BD-25	Connector
710SD-25	Connector
P-68616	Fiber Insulator (Cross Strap)
P-328952	Fiber Insulator (Cross Strap)
RM-583101	1/64" Gray Sheet Fiber

3. TEST SET AND ACCESSORIES

182A	Test Set for Mini-Bridge Lifters
299A	307 Connector Test Shoe Adapter
60D-50	Miniature Test/Talk Head Set
P2FL	Single Pair Test Cord
W2GL	Cord to Access Vacant Protector Position
W2GM	Test Cord for KS-14103 Breakdown Test Set
W2GY	S.O. Test Cord (S.O. to Connector Block)
W2HJ	S.O. Test Cord (S.O. to Protector Block)
W4CT	In-Out Test Cord
W4CU	Automatic Varley Test Cord
KS-14103	Breakdown Test Set
KS-20100-12	Protector Unit Test Set

NOTE 1: For additional information on the above, refer to Drawing ED-6C111-11.

NOTE 2: The above listing is in addition to normal "On Job" Test Sets.

4. CABLE AND WIRE INFORMATION

4.1 Line Equipment (LE) Modules

4.1.1 The standard switchboard cables which are normally run from the line equipment frames to the LE modules are usually 800-Type, 26 gauge wire, such as 810A (128 pair), 806A (100 pair), 809A (64 pair), and 813A (50 pair) for ESS type offices. Other systems will utilize 200-Type 24 gauge wire, such as 262A (100 pair) or 270A (50 pair) cables. These LE cables are segregated from the OSP cables and always run on separate racking. More information on cable running is covered later in this section.

4.2 Outside Plant (OSP) Modules

4.2.1 The outside plant cable stubs will be run from the OSP modules to an auxiliary Cable Entrance Facility (CEF) generally mounted on the wall next to the COSMIC II line-up or vault. These cables may be run by WE installation or by the Bell Operating Company (BOC) Outside Plant Personnel, as specified in the BOC specification.

4.2.2 The OSP cables will be ABAM Type 11CA- (22 gauge) or 11DA- (24 gauge) wire and can be specified in 40, 60, 80, 100, 120, 150, or 200 foot lengths. Each OSP cable will be equipped with four 25 pair 710 Bridging Modules (BD) which insert into the four 710 SD Connectors located on the rear side of the 307 Connectors. The OSP cables run on dedicated cable racks and do not intermix with the LE cables.

4.3 Cross-Connect Wire

4.3.1 The jumper wire used for cross-connecting the OSP blocks to the LE blocks will be the irradiated Poly Vinyl Chloride (IPVC) type DT24P. This 24 gauge pair can be furnished in various color combinations which should be specified by the BOC. The color combinations are: Yellow-Blue, Yellow-Orange, Yellow-Green, and Yellow-Red. The yellow conductor of a pair will always be designated as the "Tip" conductor.

4.3.2 There could be applications on the "COSMIC II" distributing frame which may require the use of single, triple, or quad jumper wire. If this occurs, the following IPVC 24 gauge wire should be used: Single-DT24S-Color; Black, Triple-DT24T Color: Yellow/Blue/Red. Quad-DT24M. Color Yellow/Blue and Red/Green.

4.4 Cable Running Information

4.4.1 The LE module cables will be listed on The standard EFG-35T Output furnished by the Regional Engineering Organization. Therefore, whenever questions or lack of information arises, they should be contacted. For further information on "Cable Running Lists," refer to Handbook 8, Section 110.

4.4.2 The OSP Module Stub Cables - The OSP module cables will also be listed on the EFG-351 output and will have standard cable tags furnished by the Regional Engineering Organization. The cable tags will show the OSP half-module, shelf and block number on the originating end and the splice location on the terminating end. In addition, one of the most important pieces of information shown on the cable tag is the cable rack routing information. This routing of cables must be followed precisely.

4.4.3 There are several basic rules and information that must be known and followed when running the OSP cables, they are:

- A. Remember the connector protector cables are aligned in a horizontal plane (by the horizontal shelf) and not in a vertical fashion which is utilized on other protector frames.
- B. Each cable group (5 cables) must be run in the sequence shown on the cable running list.
- C. Each group of 5 cables must enter into the correct compartment (slot) of the vertical cable chute according to the sequence running. They must be aligned in the compartment according to shelf and block location (see Figure 3 and Drawing 6C 114-10).
- D. All OSP cables must be run from the "COSMIC" OSP half-module to their splice locations. (Reference cable tags and drawing ED-6C114-11.)
- E. Because of the unique way the cables are spread over the "COSMIC II" half-modules, they must be run in a specific sequence. Refer to Paragraph 4.5.
- F. The transition of the cables from the vertical cable chute onto the overhead cable racks is extremely critical. Therefore, they must be run correctly or else the succeeding runs will be blocked by the preceding runs. Shelves 6 and 7 of module X, side 1 or shelves 5 and 6 of module X, side 2 form the "A" foundation for future running groups. These running groups transition on to the inline spreading rack by folding over the stringer or spiraling a quarter turn. The remaining groups stack over one another following the base foundation in forming the "A" transition. This arrangement is non-blocking and provides adequate space for future cable groups. See transitioning from cable chute to spreading rack. Also see Drawing ED-6C114-11, Figures 14A, 14B, 15A, and 15B.
- G. Transition from inline spreading rack to a lateral. This transition is used on multiple frame line-ups to provide non-blocking drop. The "Gull Wing" cable transition was developed for COSMIC II

in order to reduce the number of cross aisle or lateral racks. Three basic cable transitions are illustrated in Figure 5A. Any or all of these combinations can be used on the job conditions.

- H. When a group of cables has been run up onto the correct overhead racking system, they must be "clipped" together at approximately 3 foot intervals. These KS-22411 Clips are designed to hold the group of 5 cables together, they do not clip on to the cable rack cross straps (see Figure 6).
- I. Keep groups of cables from crossing over another group of cables. This will meet the requirements of NEBS (New Equipment Building System).
- J. Cable groups can be shifted and interchanged along the rack, so cable groups drop off sequentially at splice position without crossing.

4.4.4 Cabling for the Test/Talk Panels, service observing jack panels, etc. will be listed on the standard EFG-351 Regional Output. The standard method used to cable these panels is to feed them with a common buss cable run on the overhead racks. The individual panels are then fed with a single cable which is spliced into the common buss cable with a 710 Connector. See Drawing ED-6C111-10 and Section 374 of Handbook 9 for further information and methods of half-tapping with the 710 Connector R-4893 Tool.

4.5 Pre-Planned Cabling

4.5.1 All OSP cable racks should be identified by placing temporary signs on the side of the stringer bars; therefore, cable routing should be easier to follow. Remember, the sequential running, cable routing, and cable group locations on the overhead racks is essential and must be followed.

NOTE: On multiple line-ups of COSMIC II, it will be beneficial to leave off the second layer of lateral rack. Install the first cross aisle or lateral rack. Install each lateral rack as needed, filling the lateral racks in sequence. Finally install the equipment racks. This is a suggested method, each job must be evaluated by the Job Supervisor, for some jobs require the second level of rack be installed before the first level rack, if ceiling supported.

4.5.2 Prior to cable running operations at the "COSMIC II" distributing frame, it would be very expedient to consider the use of scaffolding in the area. Where room permits, 10-12" wide staging should be placed along side racks on top of the auxiliary framing bars to allow the cable crew a place to stand or sit while pulling cables.

4.5.2.1 When the OSP cables are run to splice enclosures located on a wall, not in the cable vault, the use of staging placed on the auxiliary framing bars above this area will greatly assist the cable crew while dropping cables.

4.5.2.2 Because each OSP half-module shelf accommodates 5 ABAM type cables, they should all be run in at one time as a running group. Consider the weight factor involved and be prepared to furnish sufficient manpower for the running crew. Looping of the cable will reduce the amount of cable pulled at one time.

4.5.2.3 The OSP ABAM type cables are sent to the job site in individually boxed cartons with the lengths stamped on the outside of the carton. Pick out the cable lengths required for the first running group, open the cartons, and run each of the 5 cables out straight on the floor utilizing an open area. Remember the non-formed ends of the cables enter the rack first. Using an R-3409 Dispenser with one of the boxes as a base, will simplify rolling out of the cable.

4.5.3 Prior to running the OSP ABAM type cables, a complete understanding of the cable running sequence and of the drop point locations to the splice enclosures is required. The following subparagraphs will attempt to explain the cable running sequence and splice drop points.

4.5.3.1 A running group consists of 5 cables terminating on a half-module shelf which is designated as X-1 or X-2. Therefore, each run referred to is actually 5 cables. The following example is for a single line-up - Two level rack: 1- The first run of (5) cables will be from half-module (1-1, shelf-6). The second run of cables should be from (5-1, shelf-6). The third run of (5) from (9-1, shelf-6), etc.

NOTE: Cables for Modules 1, 5, 9, 13, etc., are run on the lower level of rack, while cables for modules 3, 7, 11, 15, etc., are run on the upper rack. Do not mix these cable runs on a common rack.

4.5.3.2 When there is only one crew running cable, it would be expedient to continue working on the lower cable rack. Therefore, using the same sequence, run the cables for the X-2 Half-Modules Shelf-6 next, i.e., 1-2, 5-2, 9-2, etc. You have probably noticed by now that Shelf 6 is the center shelf of the module. This cable routing scheme was designed to start in the middle and then alternate up (Shelf-5) and then down (Shelf-7), again up (Shelf 4), then down (Shelf 8), and continue alternating until the module is completely filled or cable running is complete.

4.5.3.3 The shelf running sequence is 6-5-7-4-8-3-9-2-10-1-11 and the half-module running sequence is 1-1, 5-1, 9-1, 10-1, etc. Then repeat the cycle 1-2, 5-2, 9-2, 13-2,

etc. Continue running the cable groups in this sequence until completed. This will then finish cable running on the lower cable rack.

4.5.3.4 On the upper level rack, again using the same shelf and module running sequence, start with Shelf-6, half-module 3-1, 7-1, 11-1, etc. Then 3-2, 7-2, 11-2, etc. Alternate to shelves 5-7-4-8-3-9-2-10-1-11 until the upper cable rack running has been completed.

NOTE: If 2 cable crews are available for running OSP cables in a single line-up, one crew can run cables on the upper rack (modules 3, 7, 11, etc.) and one crew can run on the lower rack (modules 1, 5, 9, etc.) without interfering with one another.

4.5.4 When a double frame line-up is being utilized, there are 4 low level OSP spreading racks, one on each side of each line-up, designated A1, B1, C1, and D1. There is one upper level OSP spreading rack, designated A2, and there are lateral (cross aisle) racks, designated 1, 2, 3, etc., which allow the OSP cable groups to be distributed from the low level racks to the OSP upper spreading racks to the splice locations.

4.5.4.1 To facilitate running of the cables on a double frame line-up, do not place the cross-aisle racks, other than the first OSP cross-aisle rack. The running list is to be followed exactly as printed. The cables should be run in groups of 5 (one complete half shelf) from the module to the splice location. The cables are collated by splice position and lateral (cross-aisle) rack. Each lateral will be filled (approximately 150 cables on double line-up, 250 cables on a triple line-up) before moving to the next lateral rack.

4.5.4.2 The lateral OSP racks are added as the cable running proceeds. Remember to fill the cable rack in layers. Each layer is to be filled before starting another. This insures the least amount of cable pile-up.

4.5.4.3 The "Gull Wing" cable transition is used in multiple frame line-ups. The "Gull Wing" forms the basic transition from inline spreading rack to lateral rack (see Figure 5A).

4.5.4.4 The cable group position is determined by collating the future groups in the rack, either to the left or to the right of a lateral, which will make up a level of 4 groups. For example, if there are 4 cable chutes (Figure 5B) being served by an inline rack to the left of lateral 2, the first and second group in rack B form transitions directly to the lateral. It should be noted that these 2 cable groups are closest to the auxiliary CEF; therefore, groups 3 and 4 on rack C also form transitions directly to the lateral. Cable groups furthest from the auxiliary CEF (Groups 3 and 4 in rack B, and 1 and 2 in rack C) pass under the lateral

and up the opposite side.

4.5.4.5 Suppose only 2 cable chutes appear to the left of lateral 14 (Figure 5C). Two cable groups from each chute are combined and then routed as described in the preceding paragraph. The transition points are marked by 2 cable brackets spaced 14" apart on each rack. These brackets are also used at bends, along the rack to retain cable, and at cable chutes. The first layer of 10 cables must be secured to the rack stringer. Future cable groups should be banded to the first layer.

4.5.5 The OSP cables never run on the LE cable racks. Sequential routing of the OSP cables must be followed. Therefore, always follow the cable route for each cable group. Refer to cable running list for the correct sequence of running from the modules.

4.5.6 When this or other handbook sections associated with cabling or wiring do not agree with the standard or job drawing, the drawing will take precedence. Questions involving unusual conditions should be referred to the Regional Technical Assistance Center (RTAC) Organization.

4.5.7 The LE cables never run on racks that are designed for OSP usage. The LE cable fags can be sorted into route bundles to attain maximum cable running efficiency. Further information on cable running is in Section 120 of Handbook 8.

4.5.8 All cable reels shall be checked to verify that the type of cable on the reel agrees with the cable reel tag prior to any cable running operations.

4.6 Drop Point

4.6.1 The drop location of a cable group will vary on the size, number of splices, frame line-up lengths, and number of frame line-ups. Each cable group can be dropped off the rack at the corresponding splice location without crossing. The cable group is shifted into the proper rack position. Shifting and interchanging of cable groups between levels should only take place along the rack where the cable level is only partially filled. The crossing of cables should take place after the cables leave the rack heading for a splice location.

4.7 Cable Protection

4.7.1 The OSP ABAM type cables have an aluminum shield and a heavy PVC jacket. These cables do not need fiber protection applied on the cable rack.

4.7.1.1 Where the OSP cables break off the cable rack (drop points) at wall mounted splice locations, it is not necessary to apply protector to the auxiliary or unistrut bars located above the splice enclosures.

4.7.2 The LE cables shall be protected at locations where they bend sharply around or run across edges of metal work. If

the metal work cannot be protected, then firmly secure fiber protection around the cables at these points being sure it cannot be dislocated.

4.7.3 Where cables require protection, the P-68616, P-328952 Fiber Insulators or RM-56310 FT/64" Gray Sheet Fiber can be used. For further information on cable protection, refer to Handbook 8, Section 131.

4.8 Securing Cables

4.8.1 The LE module cables originating at the equipment frames shall be secured to the cable racks by either sewing or clipping. Do not use cable ties on the cable racks. For further information on securing switchboard cables, refer to Handbook 8, Section 320 (Sewing) or Sections 301 and 312 (Clipping).

4.8.2 The OSP module cables run from the "COSMIC II" half-module to their specified splice location. The cables do not require securing except for the following:

- A. When a group of cables make a transition from one level of rack onto another level, they must be secured to the cable rack stringer or to a previously secured group before they leave the rack and to the stringer entering the next level of rack. This will assure a smooth transition of cable racks.
- B. Cables shall be secured to the cable rack stringer prior to entering the OSP half-module cable chute.
- C. On all vertical cable racks, the cables, shall be secured to every cross strap. They can either be clipped or sewed. Reference Handbook 8, Sections 311 (Clipping) and 320 (Sewing).
- D. Although OSP cables are not secured to the rack, except where mentioned above, the KS-22411 Cable Clip shall be used to hold each running group of 5 cables together at approximately 3' intervals.

4.9 (From-To) Cable Check

4.9.1 All cables and wires should be checked to be sure they are in their proper (from-to) locations after cable running operations have been completed. This verification should be done prior to any securing, butting, stripping, or connecting operations are performed within the individual framework. This effort will minimize cable errors and omissions. Use the ITE-4137 Continuity Test Set or other standard test set to perform this verification.

4.9.2 A simple buzz test of the aluminum ground shield for the OSP cables will be sufficient to verify cable end locations.

NOTE: When continuity testing these OSP cables, be sure the shields and ground leads are not in contact with any common ground. The stub ends of the cables are insulated so it would be best to "pick" through the insulation to the ABAM shield and leave the insulated ends intact.

5. BUTTING AND STRIPPING

5.1 (OSP) Modules

5.1.1 Basically there is no butting and stripping done in the OSP modules due to the use of connectorized stub cables. The connectorized end of these cables are fed into their proper shelves (the shelf above the connector block they serve) and are secured to the shelf with cable ties placed around the pressure nipple and then tightened and cut off with the R-4266 or R-4287 Tool. The 710 Connector Form runs over the back edge of the shelf, then under the shelf out to connector block position on the rear of the frame. (See Drawing ED-6C114-10.)

5.1.2 As mentioned before, the S.O. Jack Panels and Mini-test/Talk Panels are fed with individual cables that splice into their common buss cables on the cable racks above the frame. These cables will have to be butt and stripped at the panel locations. (See Drawing ED-6C111-10.)

5.2 LE Modules

5.2.1 The LE module cables for the "COSMIC" Frame are fed into the frame in a different manner than they are for the "COSMIC" Frame. These cables are fed through openings at the top on both the left and right sides of the half-module. Viewing the frame from the rear side, the cables for Shelves 1 through 5 enter from the left side. The cables for Shelves 6 through 11 enter from the right side. The sheathing for these cables will remain intact until they reach the shelf they serve. Therefore, each group of cables serving a given shelf shall be butt and stripped approximately 1-1/2 inches below the last point they are secured to prior to entering the shelf they serve. (See Drawing ED-6C114-10.)

NOTE: Fiber Insulators are not required on the frame cable straps as long as the cable jacket protects the leads from the metal. Twine or cable ties may be used for securing purposes. Twine must be used at the top-most cable strap.

6. USE OF NYLON CABLE TIES

6.1 General

6.1.1 The R-4265 Cable Ties may be used in place of twine for general banding, for banding at breakouts on bay vertical loose wire forms, for superimposing operations involving cable and wire forms, and for

positioning at cable brackets. Refer to Section 205 of Handbook 9 for the methods and specific requirements associated with nylon cable ties.

7. FAN, FORM, AND DRESS

7.1 OSP Modules

7.1.1 Because the 307 Connector Assemblies are wired and furnished by the shop, there is no fan and form operation. However, these assemblies have a form that is somewhat long due to the lead length required to mount the connector block on the KS-22325 Service Bracket for pressing the 710 Connectors together. The slack for these cable forms shall be laid onto the individual shelves in the neatest possible workmanship manner. Be sure the form for the connector block above does not interfere with the mounting of the connector block directly below. The two forms (stub cable and assembly forms) will have to be banded together and formed back out of the way of the connector below. (See Paragraph 8.3.1.1.)

7.2 LE Modules

7.2.1 The cable lead fanning strip located at the rear edge of each shelf has "Loop Type" openings spaced every 2". Therefore, with a 64-pair connecting block being approximately 4" long, the equal distribution of cable leads across the rear of the shelf for the block should be 32 cable pair per fanning loop.

7.2.1.1 Assume five 100 pair connecting blocks are serving a given shelf, the following pattern, although not completely balanced, should be used. Start at the butt end of the cable arm and fan 32 pair into each of the first 7 fanning loops, fan 24 pair into the eighth fanning loop, then again fan 32 pair into each of the ninth through fifteenth loops, then fan the last 28 pair into the sixteenth loop.

7.2.1.2 Shelves 1 and 11 which utilize 80 pair connecting blocks can have one 100 pair cable serving 2 blocks. However, the odd-numbered block (first or fifth) should be cabled separately. It is not advisable to use a 100 pair cable split over 2 half-modules, because it is almost impossible to run 50 pair between the 2 half-modules. This paragraph does not apply to the first and last half-modules of a frame lineup.

7.2.1.3 Where 50 pair connecting blocks are utilized in either the first or last half-module of a frame lineup, the odd-numbered connecting block (1, 5, 6, or 10) should be cabled individually with a 50 pair cable.

7.3 Service Observing Panels

7.3.1 The Service Observing (S.O.) jack cable is fed into the individual panel by a cable spliced (710 Connectors) into a common buss cable run on the overhead frame rack. These cables must be butt, stripped, formed,

and connected at the panels according to Drawing ED-6C111-10.

7.4 Test/Talk Panels

7.4.1 These panels are also fed by a cable(s) that is spliced (710 Connector) into the common bus cable run on the overhead frame rack. These individual cables will vary in size according to the number of talk stations furnished on the panel. Each of these cables should be butt, fanned, formed, and connected according to the ED-6C111-10 Drawing.

8. CONNECTING

8.1 General

8.1.1 The LE modules utilize 78C Type or 112 Type Connecting Blocks which have solderless wrap terminals on the rear (Installer) side and slotted beam quick-connect terminals on the front (BOC) jumper side.

8.1.2 All Solderless Wrapped Connections (SWC) should be made using standard wire wrapping tools listed in Section 311 of Handbook 9 and in accordance with the methods and requirements of Section 310. The 78C or 112 Type Blocks utilized on the LE modules are approved for SWC wire gauges 20 through 26. For other apparatus terminals, refer to Sections 314 through 314Z of Handbook 9.

8.1.3 All SWC's should be inspected prior to turnover to the BOC any defective connections should be soldered before considered as qualified and approved. The R-4121 L-2 Soldering Station with low melting RM-728225 or RM-728226 Solder is recommended.

8.1.4 There is basically no individual lead terminating operation performed on the OSP modules. The 78C Type Blocks are connected to the 307 Type Connectors by the shop and sent to the field as assemblies 307D1-100 (for Shelves 2 through 10) and 307E1-100 (for Shelves 1 and 11). See Figures 7 and 8. The only individual lead terminating operation that will have to be performed on the OSP modules will be done on the Test/Talk Panels.

8.2 LE Modules

8.2.1 The R-4451 Wiring Fixture is designed to hold the 78C Type or 112 Type Connecting Blocks in place during the wire terminating operation. This fixture was originally designed to be used on either the front or rear side of the frame. The design of the "COSMIC II" frame has eliminated several service observing cord brackets from the rear of each shelf. Therefore, connecting from the rear side cannot be accomplished. 78C or 112 Type Blocks for the TTB equipment must be terminated on the front side of the frame.

8.2.2 Connecting (front side) - The R-4451 Wiring Fixture has "Fab" type brackets located in the upper right and left corners on the rear side. These 2 brackets allow the fixture of a frame shelf. This fixture also has two 1/4" holes located in the lower

portion of the fixture to accommodate tilting. If tilting is desired, cut 2 pieces of rigid PVC tubing to the desired length (tilting angle desired) and secure them to the fixture with twine or nylon cable ties (see Figure 9).

8.2.2.1 After the fixture has been mounted, the following procedure can be used:

- A. Fan cable leads through the appropriate loops of the rear shelf fanning strips as described in Paragraph 7.2.1.1.
- B. Mount all connecting blocks (wire wrap terminals toward front) on the wiring fixture in the position that they will finally appear on the frame shelf.

NOTE: Remember, with the wire wrap terminals facing outward, the blocks are now mounted in an upside down position (top row at the bottom).

- C. Fan leads through the connecting block fanning strips and start terminating the leads. Connect leads starting at the bottom row and work toward the top row. Connect leads left to right. (Remember the above note.)
- D. After all leads for the shelf have been terminated, verify the connections and solder all defects.
- E. Remove the blocks from the wiring fixture and place them in the shelf channel in their proper mounting positions.
- F. After each module has been completed (wire) or near the end of the work day, "snap" the blocks into their correct mounting positions (see Figure 10).
- G. At the rear of the shelves, secure the cable forms to the rear shelf fanning strips in at least 4 evenly spaced locations. Use two strands of approved twine or nylon cable ties.
- H. After the shelf connecting blocks have been mounted in place, and the cable form secured to the rear shelf fanning strip, dress the cable leads for each block into a flat "S" shaped curve. This dress is required to allow service observing cords to be connected on the rear (cable side) of the connecting block terminals.

8.3 (OSP) Modules

8.3.1 As previously stated, there is no individual lead termination performed on the OSP modules due to connectorized cables being furnished by the shop. However, the four 25 pair 710BD Connectors on each cable stub (11CA- or 11DA-) end must be pressed into the four 25 pair 710SD Connectors wired into the back side of each 307 Connector Block. After the cable stubs have been run into their correct shelf locations, and secured in place, the following operations should be performed:

- A. Mount the KS-22325 Service Bracket (Figure 11) on the protector vertical uprights one shelf below the location you intend to apply the 710 Connectors to the 307 Connector Block (Figure 12). The use of this bracket holds the block while the 710 Connectors are being applied and keeps it within the confines of the guard rail to eliminate possible damage from ladders, etc. An alternate method to using the KS-22325 Service Bracket, is an on the job made tool (see Figure 13). This fixture consists of a bar 1/2" dia. x 36" long and Z brackets or small chains with a hook on the end to hold the bar in position. The length of the bracket or chain gives the angle to the block when mounted.

NOTE: When adding Shelf 11 (bottom row) you must also set the bracket in Shelf 11 location the same as you did for Shelf 10 or you can lay the block on the AC trough. Be Careful not to damage these Shelf 11 blocks.

- B. The 78C or 112 type Connecting Blocks should be set into their respective positions on the shelf and "snapped" into place (Figures 14 and 15).
- C. After the connector block part of the assembly has been positioned on the service bracket, bring the 710BD connectors of the cable stub into position and prepare to press them into the four 710SD Connectors on the connector/protector block (see Figure 16).
- D. The OSP cable stub form is protected with a corrugated paper that has been taped in place. Cut the tape bands and remove the protection. Note the clear plastic caps that are protecting the 710 slotted beam terminals. Leave these plastic caps in place until you are ready to seat each of the connectors.
- E. Each of the 4 formed arms of the cable stub have plastic ring color coded identifiers on them. Match these identifiers with the ones on the rear of the 307 Connector. The forms as they are shipped from the shop makes it somewhat difficult to insert the connectors together. Therefore, a slight bending of these formed arms will ease connector insertion.
- F. Remove the clear plastic terminal guard for the first connector located in the left side and align the 710BD (Bridging Module) with the slots in the 710SD Connector Module. Be very careful not to damage, bend or distort these bridging terminals. This is a "blind" type operation that requires a sense of "feel." A step in the plastic bracket can be used to index the bottom of the bridge module into the side of the splicing module. When the terminals have been aligned properly, begin at the bottom and press together with thumb pressure to hold them together (see Figure 17). If excessive pressure is encountered, remove the bridging module using the AT-8927C Tool check and realign terminals if necessary and begin to reinsert.
- G. Because of the difficulty to properly align the bridge terminals to the 710 Connector module, it may benefit the installer to remove the 710 Connector from the 307 Block. The 710 Connector can be released by pushing out the plastic tab holding the connector in place. Remove only one connector at a time, so as not to mix the locations of the connectors. Insert the corresponding color coded bridge terminal and form the leads back.
- H. Using the AT-8948 Connector Presser Tool, begin at the bottom and start pressing them together. Working up, it will take about 3 or 4 operations of the tool (squeezes) to properly seat the 2 parts together (see Figure 18).
- I. Working from left to right, continue to press the connectors together being sure that the connector parts are fully seated in the 2 jaw flanges of the AT-8948 Connector Pressing Tool. When you start pressing the last connector parts together, you will have to dress the ground strap conductor out of the way to allow room for the pressing tool. After the 4 connectors are pressed together, apply a cable tie or a double strand of twine around both the tie leads and stub cable leads at the top of the 710 Connector Assembly. Apply the tie or band just above the assembly as shown in Figures 19 and 20.
- J. If cable ties were used, cut off the ends with the R-4266 or R-4827 Fastening Tool.
- K. Take the ground lead from the cable stub and the braided ground lead from the protector block assembly and secure them to the hole provided in the shelf directly behind the protector block. Place the barrel side of the lug of the protector panel ground lead in toward the shelf and the barrel side of the lug of the cable stub ground lead outward (away from the shelf) so the 2 even surfaces are flat against each other. Insert the hex headed thread forming screw through the holes in the 2 lugs and through an internal tooth lock washer and screw them into the hole in the shelf. Be sure the washer is between the lugs and the framework. This washer and screw will cut through the painted surface and provide a bonded ground. Be sure the screw is tightly secured to the shelf, but do not over tighten (see Figure 21).

- L. Remove the assembly from the service bracket, then rotate it up and backwards and mount it in the details furnished on the vertical uprights (see Figure 22).

NOTE: Shelf one only mounts 307 Connector Blocks in positions 1, 3, 5, 7, and 9. Shelf eleven only mounts connector blocks in positions 2, 4, 5, 8, and 10. This is done because Shelves 1 and 11 are considered half-shelves and only utilize 50 pair 78C or 112 Type Connecting Blocks with the shop furnished assemblies (see Figure 8).

8.4 Service Observing Panels

8.4.1 The S.O. panels are mounted in 89 type Block Housings and utilize mini-jacks which are approved for SWC. Each KS-21330 L-3 Panel provides 50 jack circuits within each housing and it is possible to furnish 200 circuits (4-housings) at each location. The cables serving these jacks shall be fanned, formed, and connected according to ED-6C111-10.

8.5 Test/Talk Panels

8.5.1 The test/talk panels contain the 48V and 24V test battery and ground posts along with the communication channels (as specified by the BOC). The test battery and ground leads are soldered connections and the talk channel leads are solderless wrapped. These leads also splice into common buss cables located on the frame rack. Mount the test-talk panel on the R-4452 Wiring Fixture on the front side of the frame as shown in Figure 23 and proceed to connect the cable leads (see Drawing ED-6C111-10).

8.6 Storing Spare and Unused Leads

8.6.1 The spare and unused leads serving a particular connecting block, test, or jack panel shall be left long enough to reach the ultimate terminating point. The leads for the test and jack panels should be cut off and doubled back along the form serving that particular unit.

8.6.1.1 The leads serving the 78C or 112 Type Connecting Blocks should reach the last rear fanning strip loop serving the last block the cable serves. Measure the leads to be sure they are long enough, cut off excess lead length, and double them back on the rear fanning strip form. Additional bands or cable ties may be required to hold these leads in place.

9. BLOCK REMOVAL PROCEDURE

9.1 78C or 112 Type Connecting Blocks

9.1.1 After a 78C Type Block has been positioned and "snapped" into place from the front side of the frame, it may have to be removed. This block removal may be necessary to locate a short, open, or cross in the cable leads of the line equipment or

possibly in the shop form of the connector block assembly.

9.1.1.1 To release a 78C or 112 Type

Connecting Block from a position on an LE module go around to the rear side of the frame and locate the block to be removed. Then using the KS-21345 Removal Tool reach into the wiring shelf and insert the tool over the locking tabs of the block as shown in Figure 24. A firm steady forward pressure on the tool will compress the locking tabs and release the block.

9.1.1.2 To remove a 78C or 112 Type

Connecting Block from a position on an OSP module, the same method of releasing the locking tabs should be used as stated above. However, the 307 Connector Block directly behind the block being removed must be taken out first to gain access to the wiring shelf.

9.2 307-Type Connector Blocks

9.2.1 To remove a 307 Connector Block from its locked in position on the frame, insert the KS-22271 Tool into the top of the block as shown in Figure 25. The pressure from the top set of prongs will release the locking mechanism of the mounting details. The bottom set of prongs actually grasps the block; therefore, pull back and outwards on the tool (as shown in Figure 26) and the block will be released from its locked in position.

10. CROSS-CONNECTIONS

10.1 General

10.1.1 The 78C Type Connecting Blocks have twin clip quick-connect terminals for terminating the DT24P Jumper Wires. The 112 Type Connecting Blocks have a three-beam, quick-connect terminal for terminating the Jumper Wires. The 756C2 is the only tool approved for terminating the jumper wires in these terminals. The inadvertent use of other tools will cause poor connections, opens, nicked wires, or other wire damage.

10.1.2 The 756C2 tool does not have a cutoff blade; therefore, the jumper leads must be cut to the proper length prior to termination. After leads have been cut to length, insert either the tip or ring lead into the upper or lower hole in the face of this tool (no stripping required), bend it across the tool face, and proceed to terminate. See Section 340 of Handbook 9 for further terminating information.

10.2 If WE Installation is to do the Jumper running operation, the cross-connecting information should be provided on job site by the Operating Company at least 3 weeks (minimum) prior to turnover date.

10.3 Procedures - Jumper running on the "COSMTC TT" distributing frame shall follow the procedures listed below: (See Figure 27 and ED-6C114-10.)

- A. On the 78 type blocks, the bottom clip of the "twin clip" assembly is the preferred clip to be used. This lower clip is on the left side of the assembly; therefore, leads terminating in it should be dressed to the left side. However, if the top clip is used, which is on the right side of the assembly, the leads dress to the right. (See Figure 28.)
- B. On the 112 type block, the top slot of the quick-connect clip is preferred. Again if the top slot is used, leads dress to the right; if the bottom slot is used, the leads dress to the left.
- C. When a jumper pair terminates on either row 1 or 2 of Shelves 2 through 10, or on Shelf 11, the jumper pair must enter through the top fanning strip of the block being served.
- D. When a jumper pair terminates on either Row 3 or 4 of Shelves 2 through 10, or on Shelf 1, the jumper pair must enter through the bottom fanning strip of the block being served.
- E. Do not use the upper or lower express troughs for jumpers run between adjacent modules.
- F. When jumper are run between non-adjacent modules, the express troughs must be used.
- G. The jumpers must use the upper express trough when the point of origin (beginning of jumper run) is located on Shelves 1 through 5 or on the top two rows of blocks located of Shelf 6 (upper half of frame).
- H. The jumpers must use the lower express trough when the point of origin is located on Shelves 7 through 11 or on the bottom 2 rows of blocks located on Shelf 6 (lower half of frame).
- I. When jumpers are run from point "A" to point "B" (refer to Figure 27) using the express trough, enter the express trough from the vertical trough adjacent to the module containing point "A" heading toward point "B." Do not cross vertical troughs. The jumper must leave the express trough at the vertical trough preceding the module containing point "B." Do not run beyond point "B" and come back.
- J. When entering or leaving the express troughs, do not use the jumper support bars located directly above these vertical troughs. These support bars are used to support jumpers passing over the vertical troughs.
- K. Slack in a jumper run must be 16" dressed back into the shelf at both ends of the run. A convenient method of obtaining the 16" of required slack is

to measure down to the bottom of a block 2 shelves below or measure up to the top of a block 2 shelves above. Figure the face of each connecting block and each jumper wire shelf at 4" in height to obtain the desired slack length.

11. VERIFICATION ITEMS

	VERIFICATION ITEMS AND BRIEF STATEMENT OF REQUIREMENT	REFERENCE	
		PAR. NO.	FTG. NO.
11.1	OSP cables run on dedicated racking and do not mix with LE cables.	4.2.2	
11.2	Yellow Conductor of jumper wire pair to be the "tip" conductor.	4.3.1	
11.3	OSP cable routing must be followed.	4.4.2 4.4.4E	
11.4	OSP cables must enter the half-module in the correct compartments.	4.4.4C	3
11.5	The transition of the cables from the vertical cable chute onto the overhead rack is not to block proceeding runs.	4.4.4F	4A, 4B
11.6	Transition from inline spreading rack to a lateral ("Gull Wing") is to provide a non-blocking drop.	4.4.4G	5A
11.7	OSP running groups "clipped" together at approximately 3' non-adjacent intervals.	4.4.4H	6
11.8	Do not run OSP cables on the LE racks.	4.5.5	
11.9	Do not run LE cables on OSP racks.	4.5.7	
11.10	Verify cable on reel agrees with reel tag.	4.5.8	
11.11	OSP cables do not need fiber protection where they make direct contact with the edge of the stringer bar.	4.7.1	
11.12	LE cables protected where they bend sharply around or across metalwork.	4.7.2	
11.13	Secure LE cables on rack-no cable ties.	4.8.1	
11.14	Secure OSP cables where they:	4.8.2	
	a. Make a transition from one level rack to another.	A	
	b. Enter into the half-module.	B	
	c. Run on vertical cable rack.	C	
11.15	Secure cable stubs to shelves at nipple locations.	5.1.1	
11.16	Butt LE cables 1-1-1/2" below last strap prior to entering shelf they serve.	5.2.1	
11.17	Connector block form placed in a manner so it does not interfere with other connector blocks.	7.1.1	
11.18	SWC made according to requirement of Sections 310 and 314 of Handbook 9.	8.1.2	
11.19	Secure cable form to rear shelf fanning strips in at least 4 evenly spaced locations.	8.2.2.1G	
11.20	Dress cable leads into flat "S" shaped form at bottom of shelf.	8.2.2.1H	
11.21	Band stub and protector forms together.	8.3.1I	20
11.22	Ground stub and connector leads to shelf.	8.3.1K	21

	VERIFICATION ITEMS AND BRIEF STATEMENT OF REQUIREMENT	REFERENCE	
		PAR. NO.	FIG. NO.
11.23	Spare and unused leads left long enough to reach furthest terminating point.	8.6.1	
11.24	Use correct tool for terminating cross-connections.	10.1.1	

Vertical lines at side of paragraph
indicates requirements.

Indicates new or changed information.

Engineering Planning Manager
(Installation)

Attachment:
A - Figures

Reason for Reissue:
Extensive revisions.



FIG. 1 307 CONNECTOR BLOCK ASSEMBLY

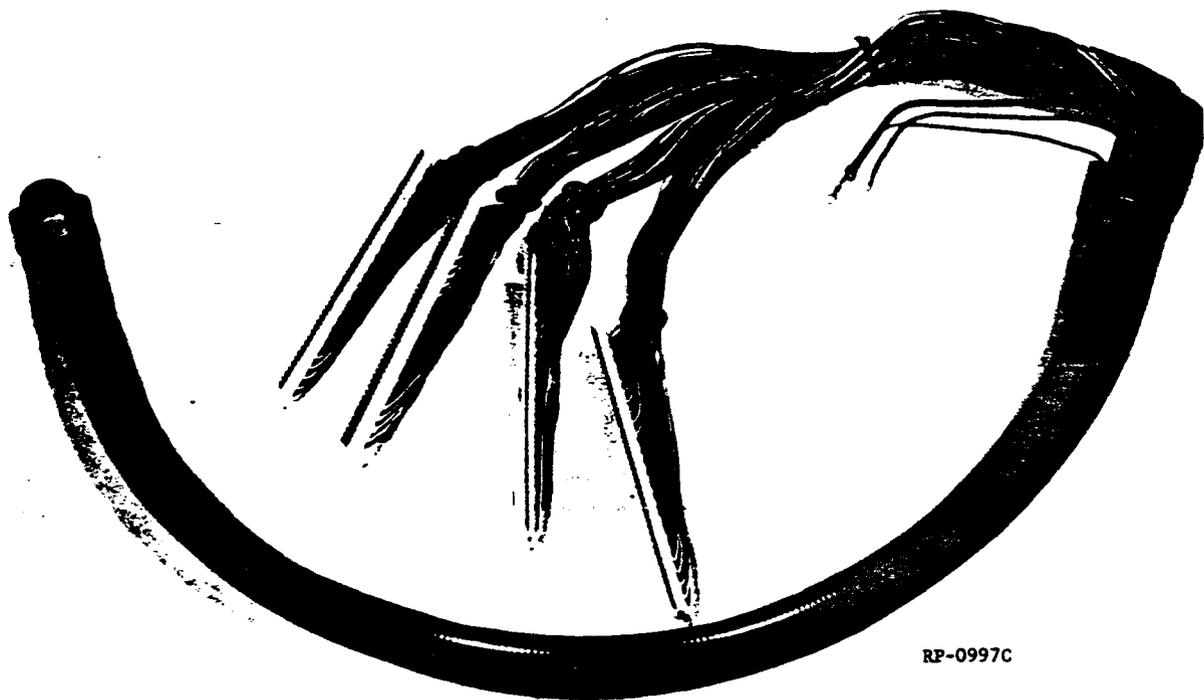


FIG. 2 100 PAIR CONNECTORIZED CABLE STUB

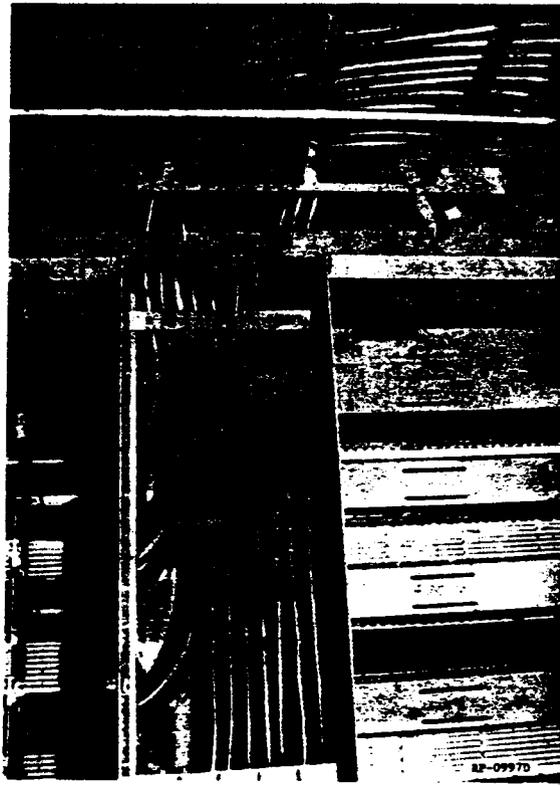
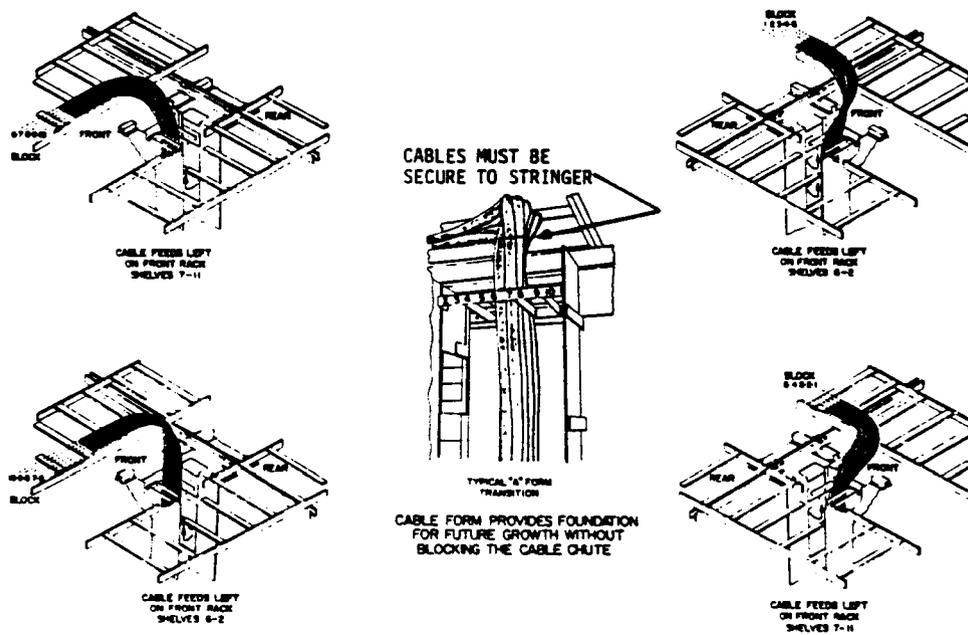


FIG. 3 TYPICAL (OP) CABLE ARRANGEMENT



RP-1004-D

FIG. 4A CABLE CHUTE TRANSITION TO FRONT RACK

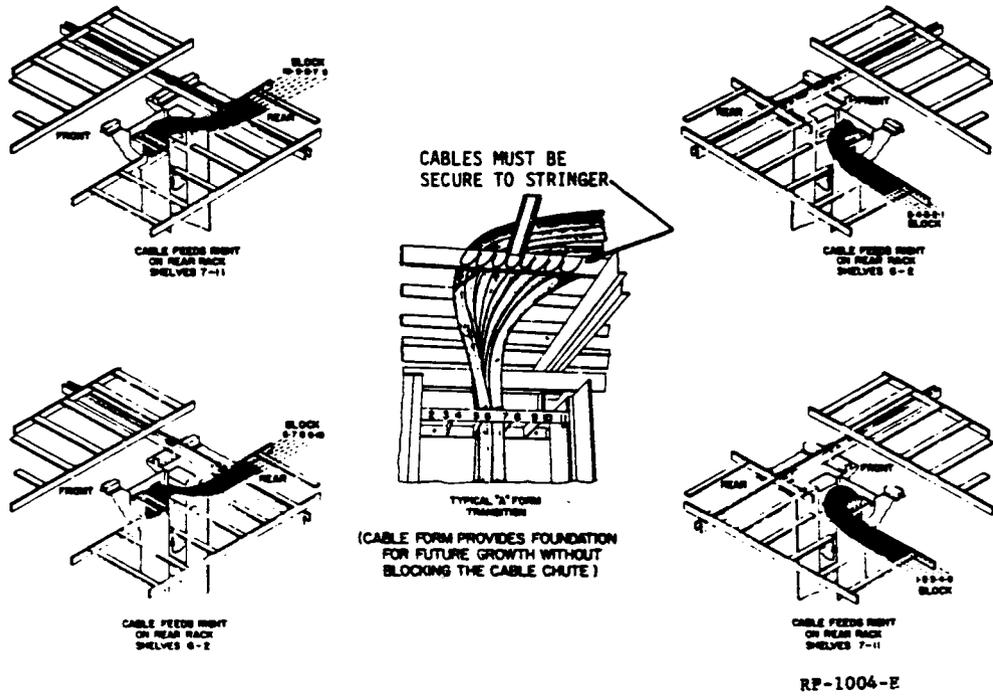


FIG. 4B CABLE CHUTE TRANSITION TO REAR RACK

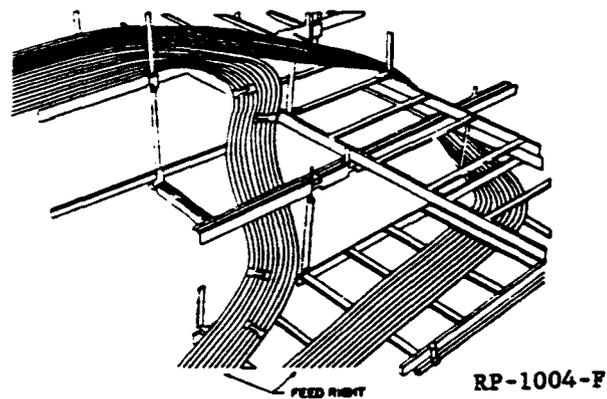
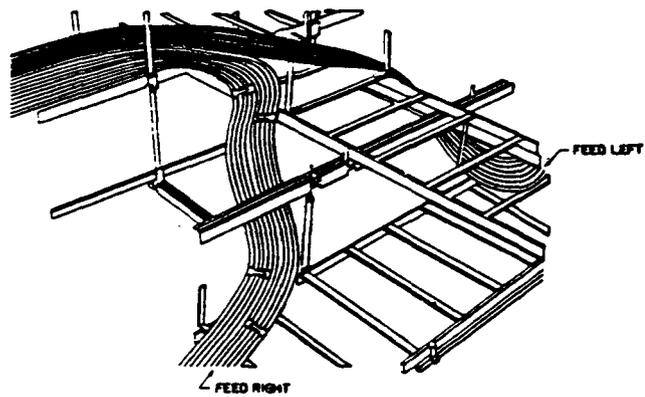
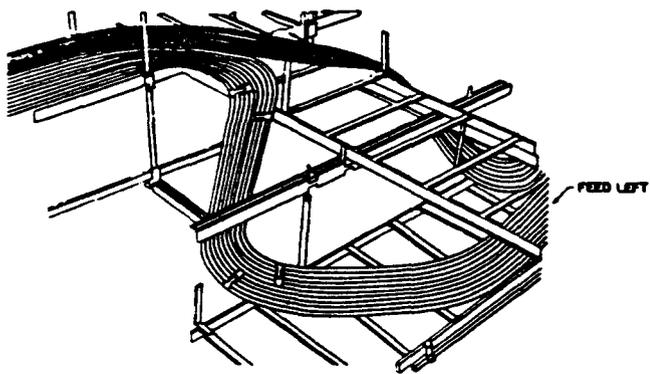


FIG. 5A GULL WING TRANSITIONS

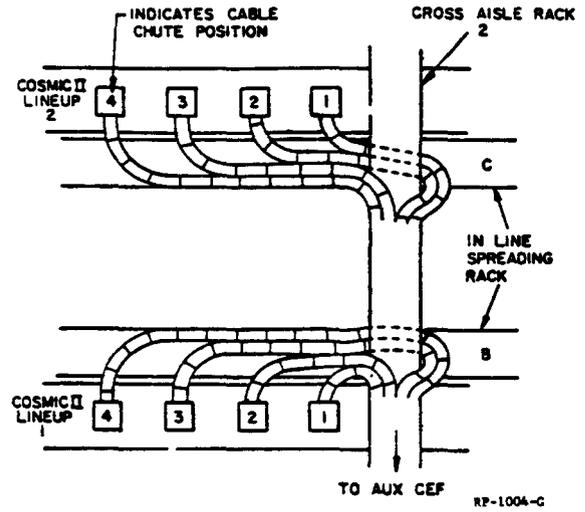


FIG. 5B "GULL WING" CABLE GROUP POSITION - FOUR MODULES

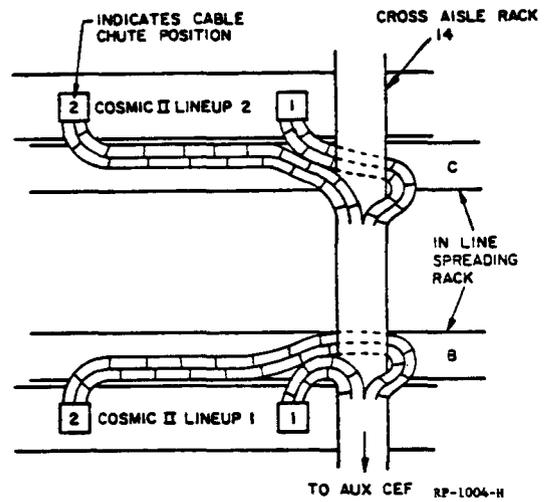


FIG. 5C "GULL WING" CABLE GROUP POSITION - TWO MODULES

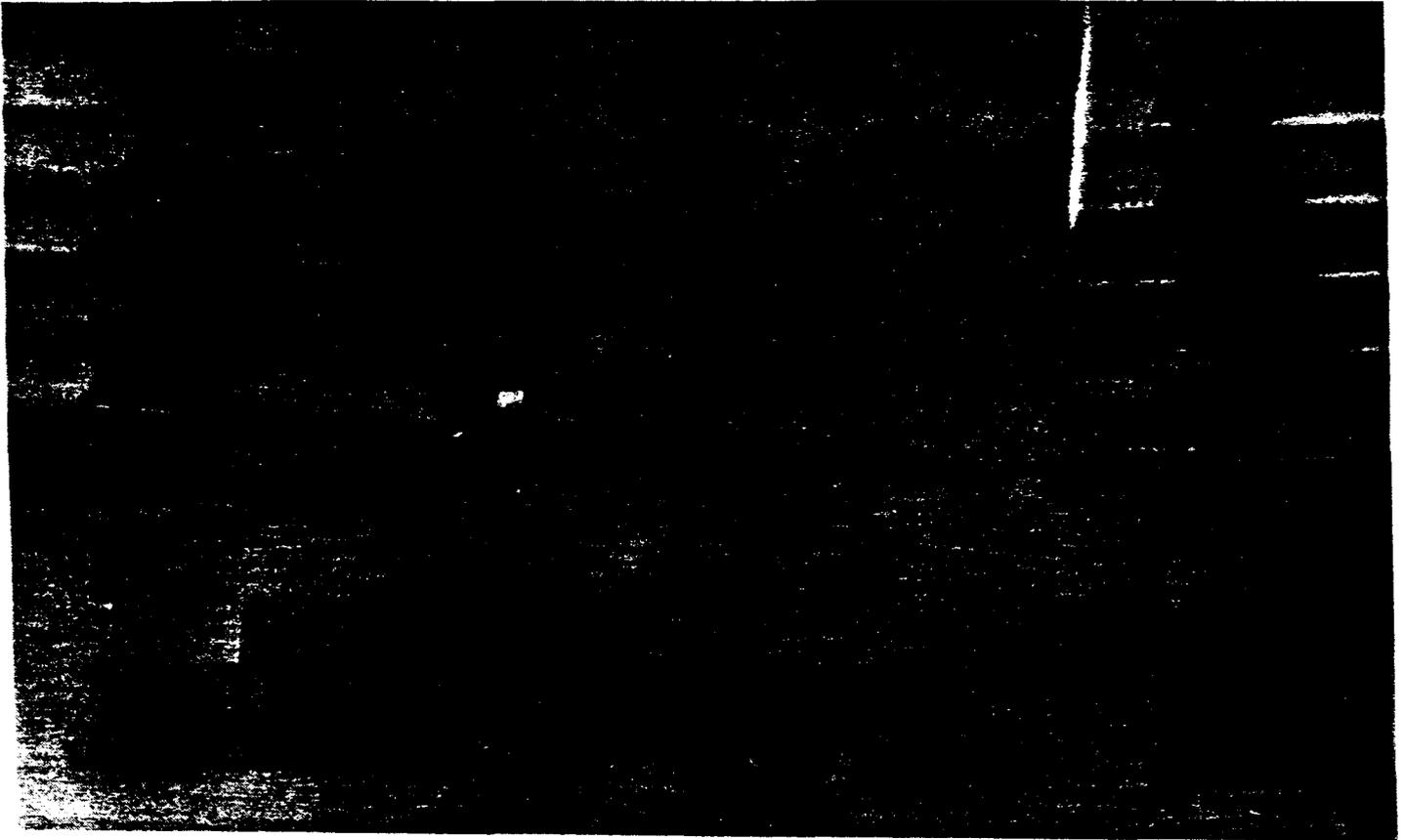
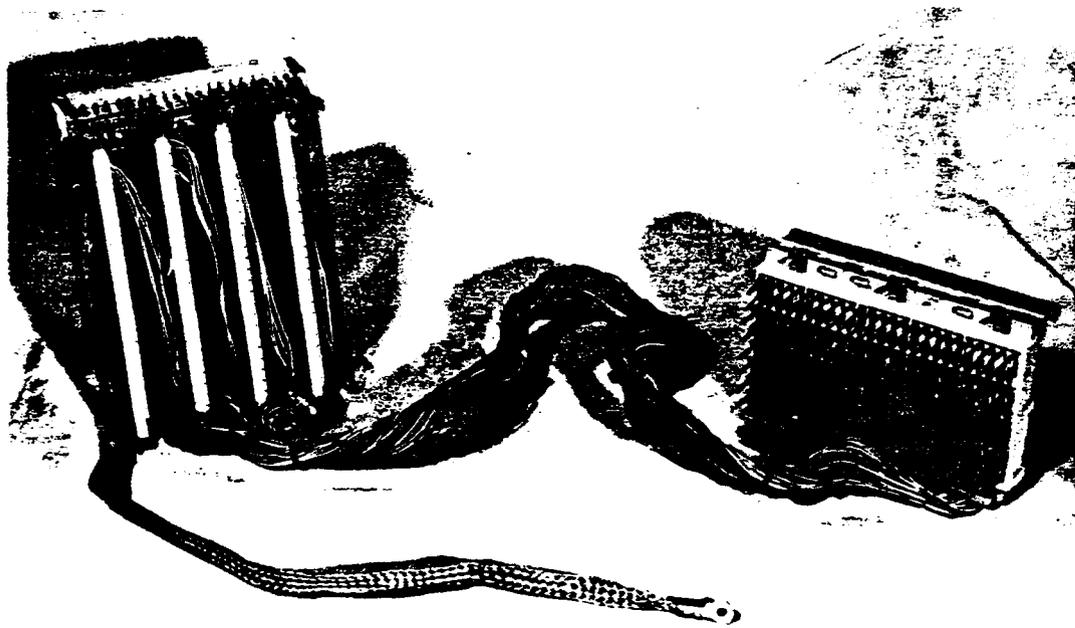
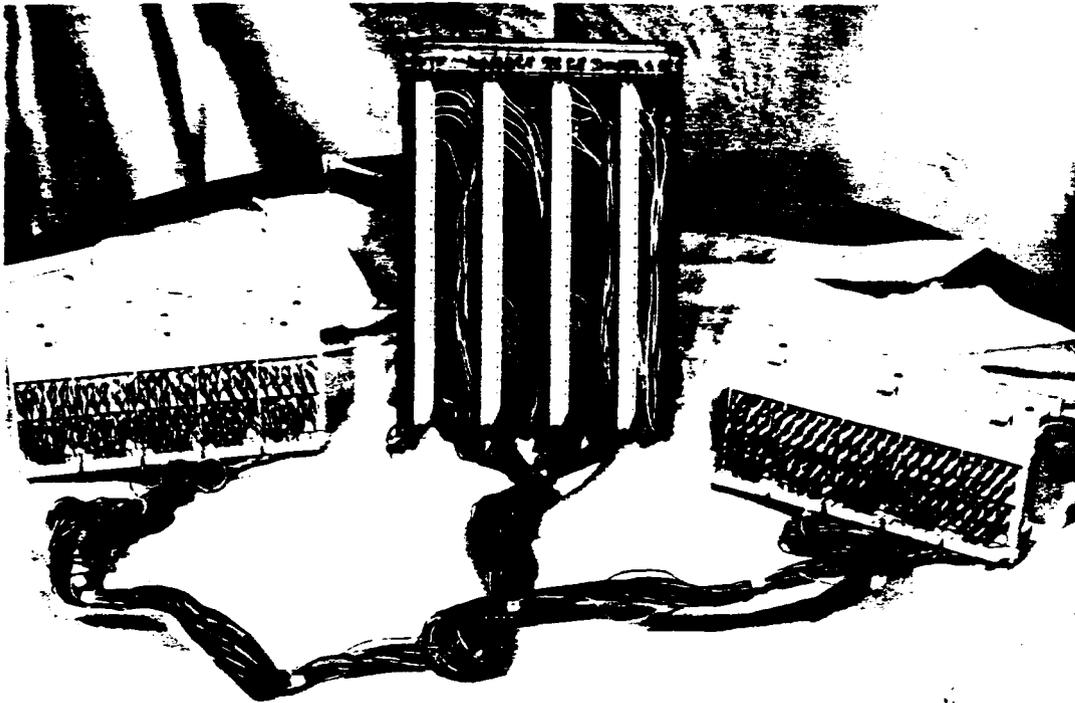


FIG. 6 CLIPPING (OSP) CABLE GROUPS



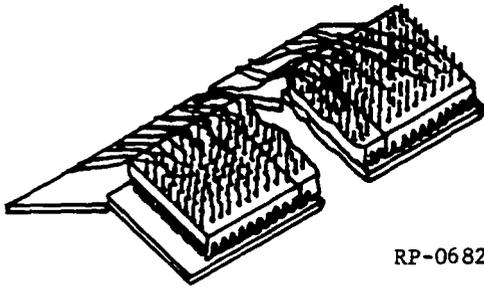
RP-0997V

FIG. 7 307A1-100 OR 307D1-100
CONNECTING BLOCK ASSEMBLY



RP-0997W

FIG. 8 307B1-100 OR 307E1-100
CONNECTING BLCOK ASSEMBLY



RP-0682 J

NOTES: 1. MOUNT WIRING FIXTURE ON BOTTOM EDGE OF SHELF TO BE CONNECTED.

TEMPORARILY FASTEN ALL BLOCKS AS THEY WILL FINALLY APPEAR ON SHELF (WIRE WRAP TERMINALS TO THE FRONT).

REMEMBER WHEN CONNECTING THESE BLOCKS ARE IN AN UPSIDE DOWN POSITION.

FIG. 9 CONNECTING AT FRONT SIDE OF FRAME (PAR. 8.2.2)

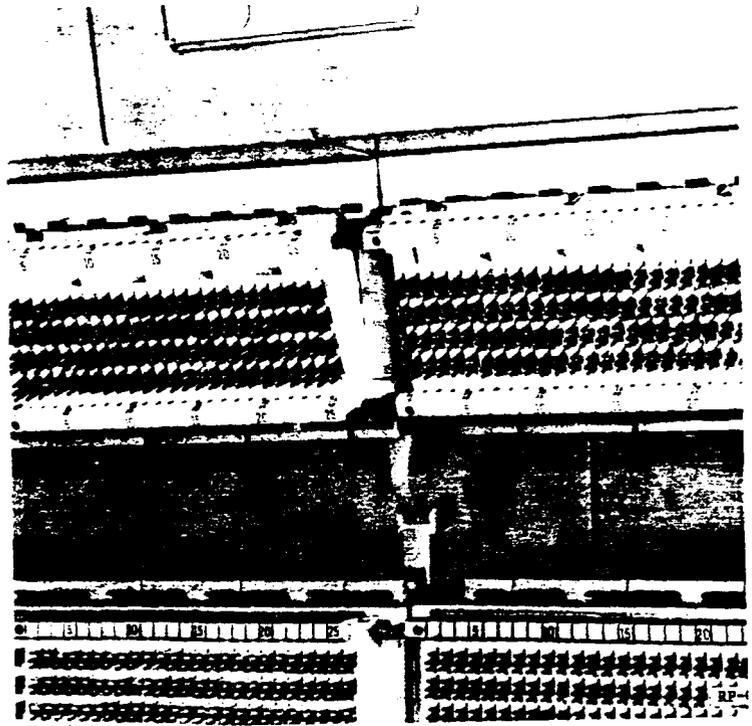
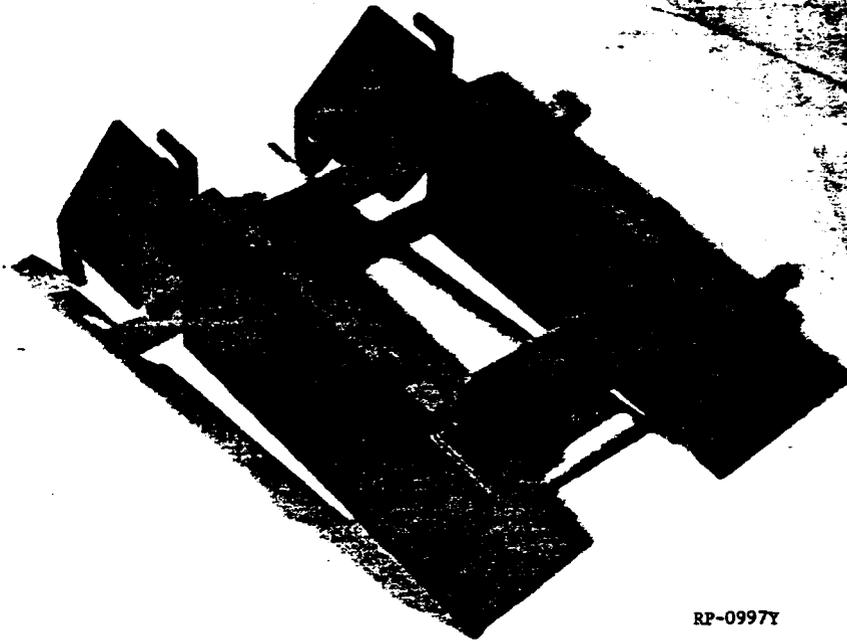


FIG. 10 SNAPPING 78 BLOCKS INTO POSITION



RP-0997Y

FIG. 11 KS-22325 SERVICE BRACKET



FIG. 12 PLACING 307 CONNECTOR
BLOCK FOR 710 CONNECTIONS

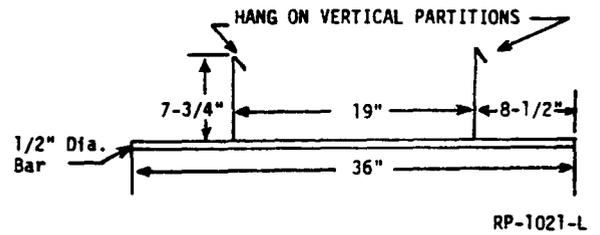


FIG. 13 MOUNTING BRACKET FOR
307 BLOCK

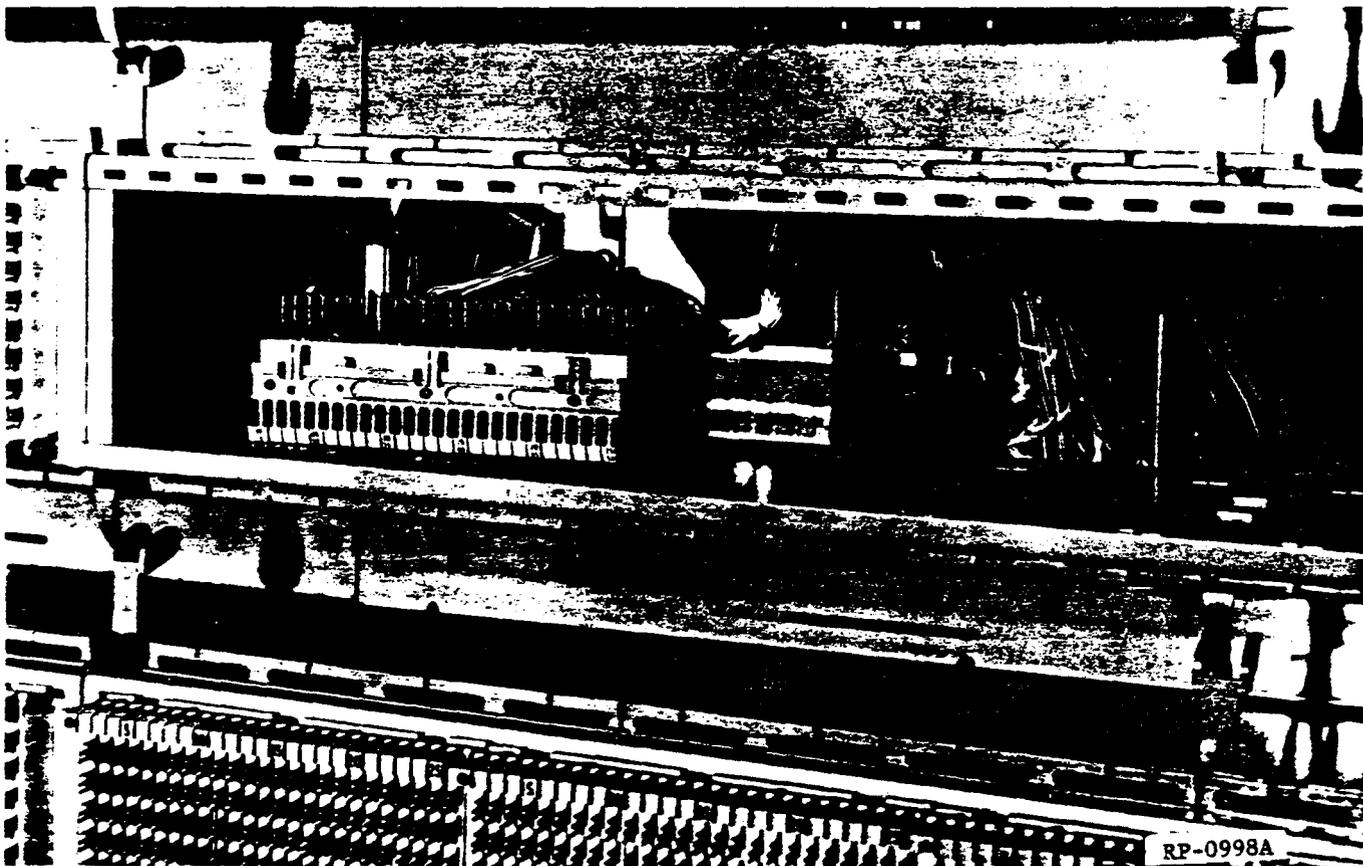


FIG. 14 PLACING 78 OR 112 BLOCK UPON SHELF

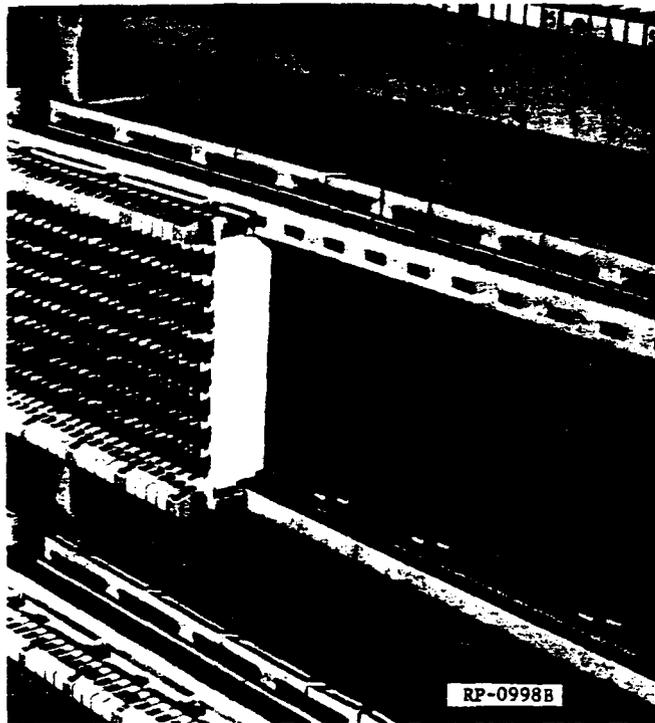


FIG. 15 78 OR 112 BLOCK IN FINAL POSITION

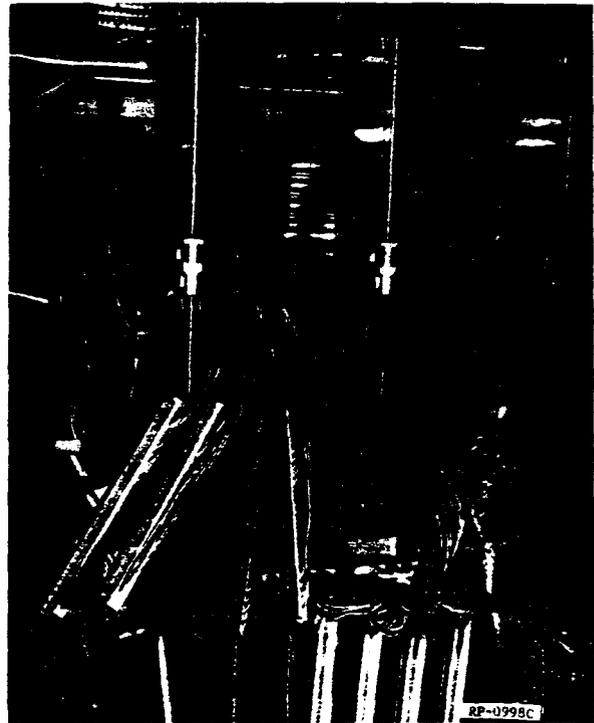


FIG. 16 PREPARING TO PRESS 710 CONNECTORS TOGETHER



FIG. 17 ALIGNING FIRST 710 CONNECTOR BY HAND



FIG. 18 PRESSING FIRST 710 CONNECTOR WITH AT-8948 TOOL



FIG. 19 FOUR 710 CONNECTORS PRESSED INTO POSITION



FIG. 20 SECURING THE FORMS WITH CABLE TIES

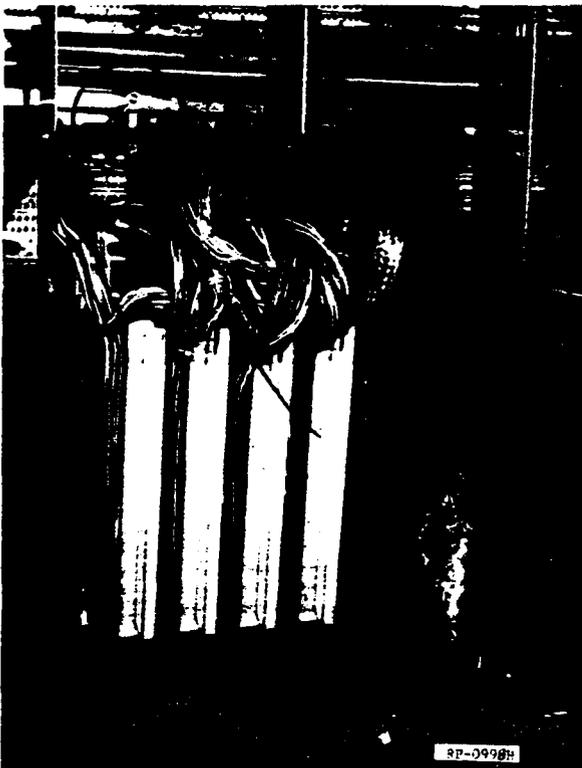


FIG. 21 SECURING CABLE STUB AND CONNECTOR GROUND LEADS

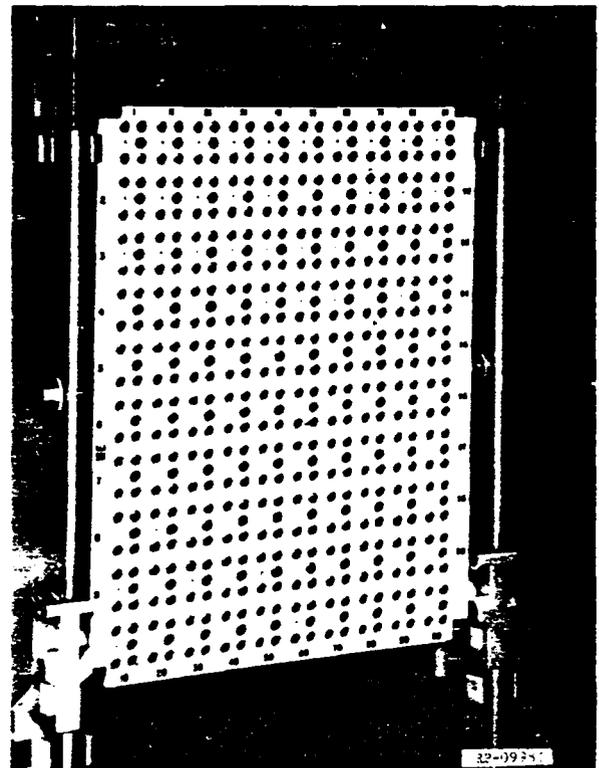


FIG. 22 307 BLOCK CONNECTORIZED AND IN FINAL POSITION

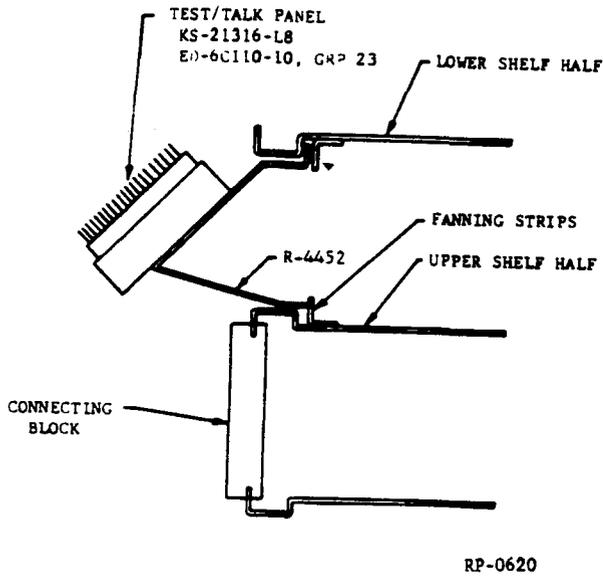


FIG. 23 TEMPORARY MOUNTING OF TEST TALK PANEL FOR WIRING

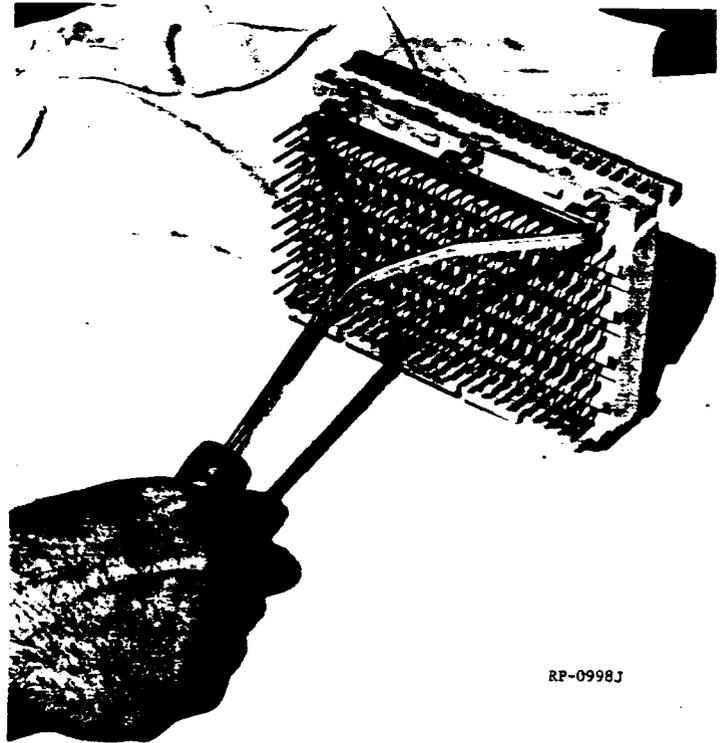


FIG. 24 REMOVING 78 OR 112 TYPE BLOCK FROM POSITION WITH KS-21345 TOOL

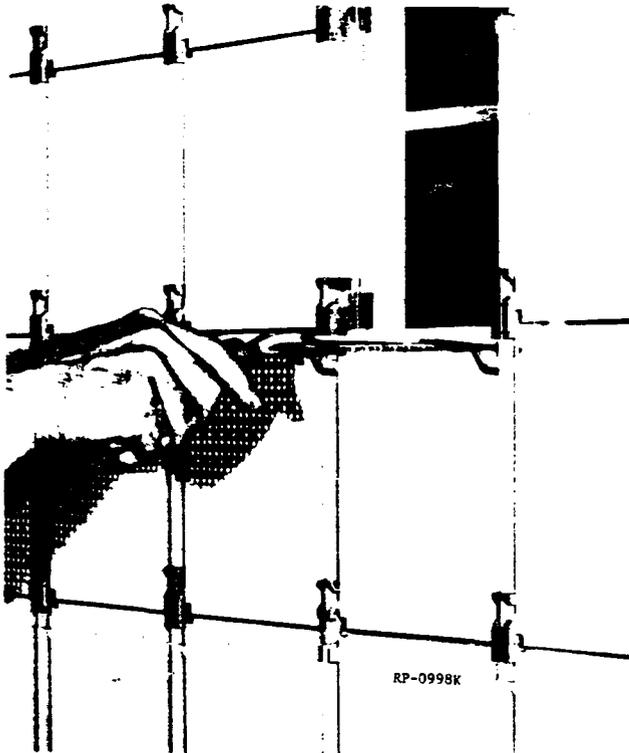


FIG. 25 RELEASING 307 BLOCK FROM POSITION WITH KS-22271 TOOL

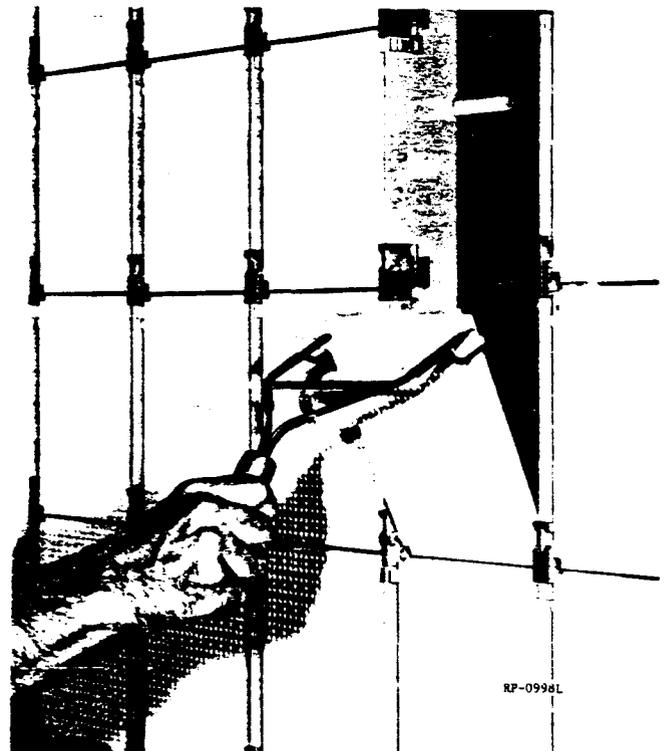
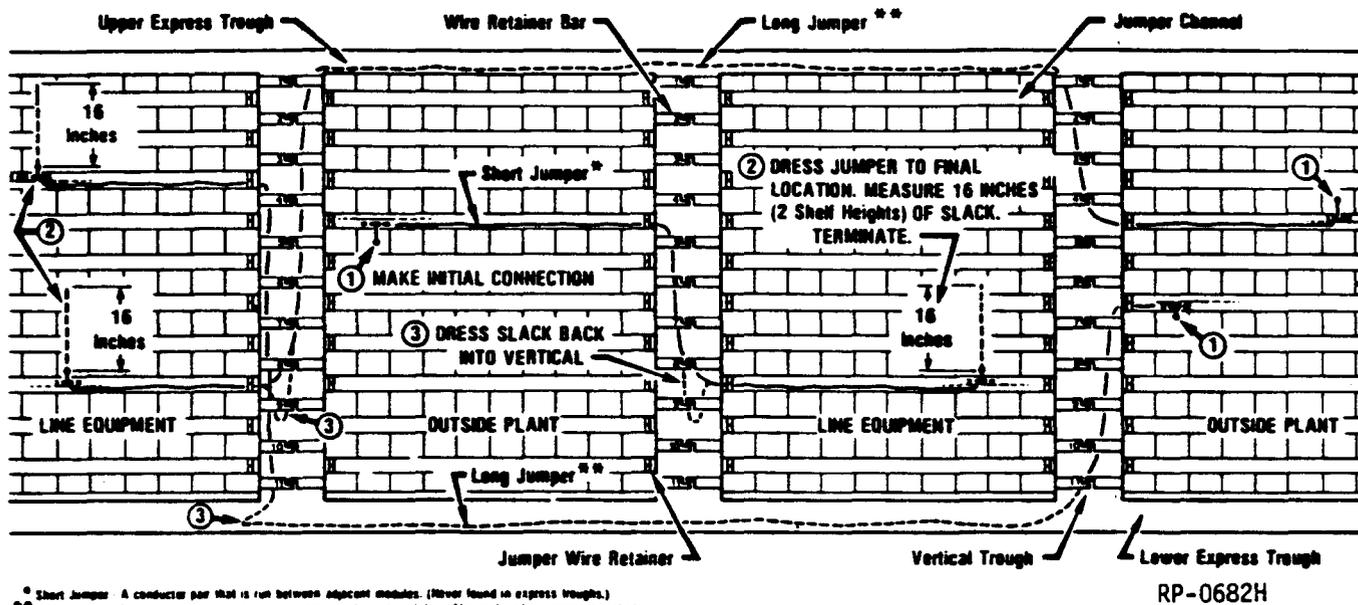


FIG. 26 REMOVING 307 BLOCK FROM POSITION



* 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 shell location of the outside plant pair determines the express trough used for long jumpers.
 Shell 1 thru center shell 6 use upper express trough. Center shell 8 thru shell 11 use lower express trough.

FIG. 27 METHOD OF RUNNING JUMPERS

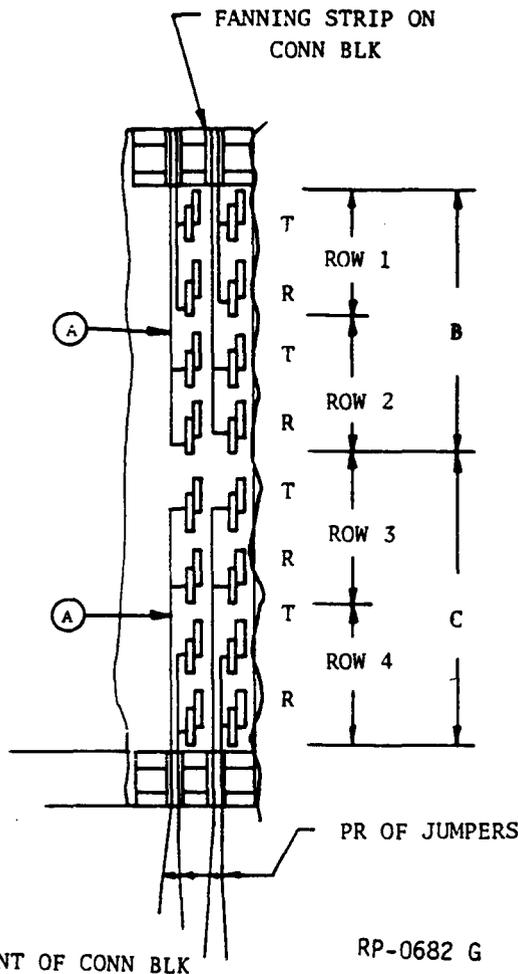


FIG. 28 METHOD OF DRESSING JUMPERS