MISCELLANEOUS
93-TYPE CONNECTING BLOCKS

CONTENTS

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1. GENERAL

1.1 Scope of Section

1.11 This section covers the requirements and methods to be used for the installation of the various 93-Type Connecting Blocks.

1.12 This block was originally designed to provide the highest cable pair density possible for special service applications such as; (MFT) Metallic Facility Terminal, (AFT) Analog Facility Terminal, and (DFT) Digital Facility terminal.

1.121 The use of this block has been expanded to include applications in the (SMAS) Switched Maintenance Access System, (ESS) Electronic Switching System, Tie Cable Pairs, Outside Plant Cable Pairs, and Multi-Port Bridging and Conference Call Applications. Refer to Table A for Block Codes, Applications and COMCODE numbers.

1.2 Description

1.21 A typical model of a 93-Type Connecting Block is shown in Figure 1. Each block consists of a lightweight polycarbonate housing, a block assembly, an adhesive backed label kit, and (50) 109-Type Connectors.

1.22 A block assembly can easily be removed from the housing by depressing the locking bar, rotating it up, and lifting it up out of the two mounting slots (See Figure 2.) With the block assemblies removed, the housings can be randomly mounted at block locations on the Distributing Frame (DF) prior to the cable and fanning operations.

1.23 The 93-Type Block Housings have mounting holes spaced 3-3/4 inches apart which is conducive to mounting on most conventional type distributing frames. However, where the DF transverse arms are ended with a mounting flange (butterfly bracket) only, and do not have horizontal support bars, it will be necessary to mount a special adapter bar (H-400452) which should be furnished by the Line Engineering Organization.

> NOTE: The 93-Type Block Mounts either horizontal or vertically on conventional DF's. Space between shelves or verticals must be at least eight inches. Do not mount these blocks on six inch center spacing.

1.24 The block assembly consists of 24 segmented slices (rows), each of which can accommodate a maximum of 20 cable leads. Therefore, each block is capable of terminating 480 leads or 240 cable pairs.

CODE	COMCODE	APPLICATION
93A1A	103045621	MFT, A-Side Split Lead Application
93B1A	103045639	MFT, B-Side Split Lead Application
93C1A	103574679	MFT, A and B Side
93D1A	103045647	MFT-Common, (SMAS, and 4-W Maintenance Connector
93E1A	103045654	MFT-Common
93G1A	103045662	AFT - (Analog Facility Terminal)
93H1A	103045670	DFT - (Digital Facility Terminal)
93J1A	103058319	MFT, A-Side 2W Circuit
93K1A	103058335	MFT, B-Side 2W Circuit
93L1A	103245213	4-W Maintenance, SMAS 5A and 5B Facility Side and SMAS 5A Equipment Side
93L1B	103315396	6-W SMAS - Facility Side
93M1A	103245221	SMAS - 5B, Equipment Side (Low Density)
93M1B	103625067	6-W SMAS, Equipment Side
93M2A	103324901	SMAS - 5B, Equipment Side (High Density)
93MP2-6	103550653	2W - 6 Way Bridge for Multiport Bridge and Conference Circuits
93MP2-10	103550646	2W - 10 Way Bridge for Multiport Bridging and Conference Circuits
93MP4-4	103550661	4W - 4 Way Bridge for Multiport Bridging and Conference Circuits
93S1A	103574687	ESS Subscriber Circuits (96 Bifurcated Circuits)
93T1A	103316923	Subscriber Circuits, Tie Cable Pairs and Outside Plant Cable Pairs (100-Bifurcated Circuits)

TABLE A

93-BLOCK CODES AND APPLICATIONS
(PAR. 1.121)

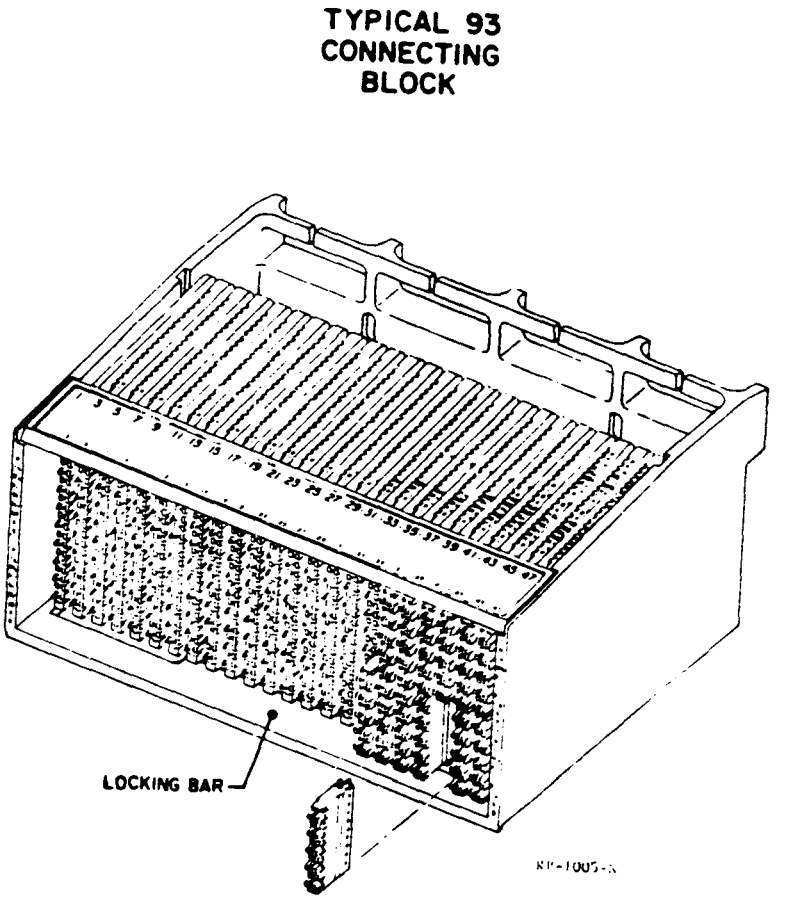

FIG. 1 TYPICAL 93 CONNECTING BLOCK (PAR. 1.21)

1.241 Each slice (row) has pre-identified concentric curved channels (slots) into which either 22, 24 or 26 gauge solid wire can be fed. These curved channels (slots) allow the cable leads to be fed into the bottom (wiring) side, through the block assembly, and out the front surface (cross-connect) side. The cable leads are then seated and cut off with an impact or non-impact type terminating tool.

1.242 22 gauge 1PVC wire (R-Type Cable) cannot be terminated on the 93-Type Blocks with the 834B (10-wire impact/cut-off) tool. These leads will have to be terminated individually with the 833A single wire non-impact tool (See Figure 3) or with the AT-8762D Single Wire Impact Tool.

1.243 Do not use "M" type cable or "P" wire which has a textile wrapping. The use of textile insulation will have an adverse affect on the quick-connect termination and may lead to conductor "open" conditions.

1.25 The 109-Type Quick-Clip Connector eliminates the need for soldering, wire wrapping and the measuring and skinning of wire ends. It does, however, require a certain level of skill in the correct procedure of application with the impact tool.

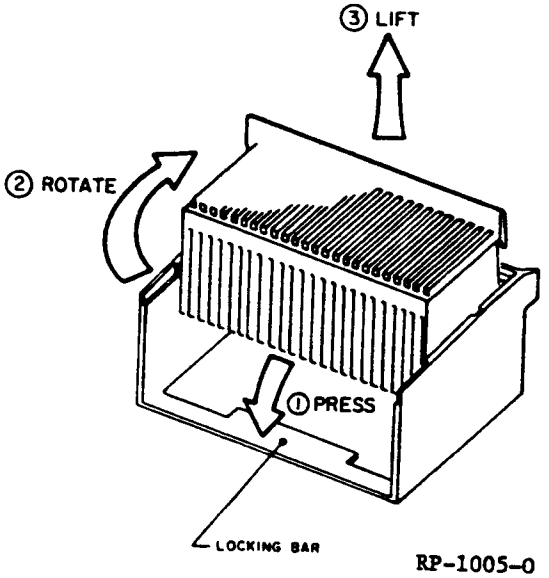

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FIG. 2 REMOVING THE BLOCK ASSEMBLY (PAR. 1.22)

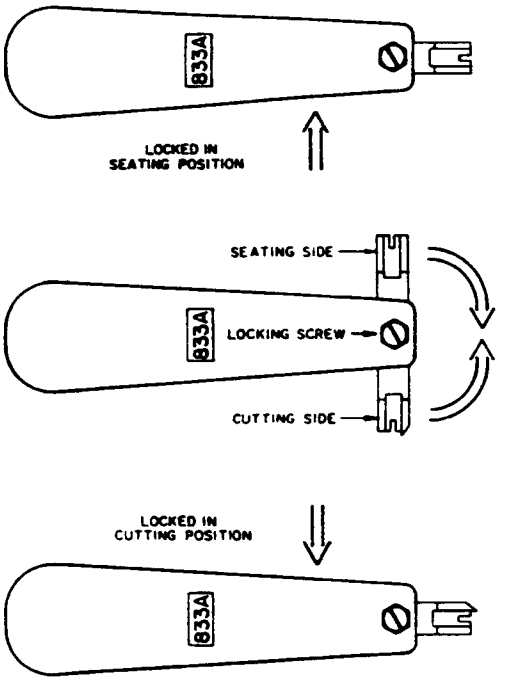
CAUTION:	THE 93-TYPE CONNECTING BLOCK AND THE 109-TYPE CONNECTORS ARE DESIGNED TO ACCOMMODATE ONLY ONE LEAD IN EACH POSITION. DO NOT PUT MORE THAN ONE LEAD IN EACH INDEX POSITION.

1.251 There are two codes of the 109-Type Quick Clip. The 109A (gray and white) features ten single element slotted beam clips, and the 109B (blue and white) features five bifurcated clips that may be used on subscriber blocks where bifurcation (dual termination) is required.

1.252 Although the 109-Type Connectors are similar to the 88-Type Connectors in appearance they are different in construction. DO NOT SUBSTITUTE 88-TYPE FOR 109-TYPE CONNECTORS.

1.3 Cautions and Precautions

1.31 Precautions to be taken against personal injury, equipment damage, and service interruptions are covered in Handbook 0 and they are to be observed at all times, as they apply to the operation being performed.



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833A TOOL

FIG. 3 (PAR. 1.242)

CAUTION:	DO NOT IMPACT THE 834B TOOL OR ANY OTHER CUT-OFF TYPE TOOL AGAINST THE HAND OR ANY OTHER PART OF THE BODY. THESE TOOLS CONTAIN RAZOR SHARP BLADES USED TO CUT OFF CABLE LEADS TERMINATING ON QUICK-CLIP TYPE CONNECTING BLOCKS, AND WILL THEREFORE INFLICT SERIOUS WOUNDS IF USED IMPROPERLY.

2. TOOLS AND SUPPLIES

2.1 The following is a list of tool and supplies required to install and terminate cable leads on the 93-Type Connecting Blocks. Tools normally found in the Installer's 168 Kit are not listed below.

2.2 Tools

833A	Single Wire (Non-Impact) Tool
834B	10 Wire Impact/Cut-Off Tool (834A Head)
AT-8762D	Single Wire Impact/Cut-Off Tool
R-4266	Cable Tie Cut-Off Tool
R-4131	8 Inch Cable Cutters
R-4366	Combination Butt and Strip Tool
R-4444	Head Shrink Tool
R-1102	Spudger
955A	Wire Stuffing Tool
AT-8662	"C" Test Cord

2.3 Supplies

R-2916	Twine
R-4265	Nylon Cable Ties
KS-21256	Solder Sleeves

3. CABLING

3.1 Distributing Frame Entry

3.11 Before securing the 93 connecting block cables to the distributing frame vertical transverse arms, check the cables to be sure they have been "dropped" in between the correct verticals. When assured the cables are in the correct vertical bay, secure them in the proper alignment to avoid cross-overs. If the blocks are horizontally mounted, pass the cables through to the horizontal side and secure them to the transverse arm.

3.111 Be sure to mount the P-449759 Fiber Protection Detail (or equivalent) and either the 14A or 15A fanning detail on the horizontal side of the transverse arm when a cable serves more than one 93-Type connecting block.

3.2 Butt and Strip

3.21 After being sure the cables are in the correct location behind the blocks, and that they reach their farthest termination points, add on an additional 20 inches (for lead handling) and cut off the excessive lengths with the R-4131 Cable Cutters.

3.22 Mark, butt and strip the cables with the R-4366 Tool at their proper locations. Secure them to the transverse arms on top of the P-449759 Fiber Protection Details. Where binder cables are involved, untwist and identify each binder, being sure not to lose cable/binder identity.

4. MOUNT AND STAMP

4.1 Mounting

4.11 As previously mentioned in Paragraph 1.23, the mounting holes in the housings are spaced 3-3/4 inches apart. This will accommodate mounting on most conventional distribution frames. Do not mount these blocks on verticals or horizontal shelves that are spaced less than eight inches apart. If minimum spacing requirement can be met, proceed to mount the housings according to the -140 series (or equivalent) drawings.

4.2 Stamping

4.21 The 93-Type blocks are furnished with hot stamped lead identification on the slices (rows) of the block assembly. However, each block must be individually identified with frame and circuit identification. Therefore, a set of adhesive backed labels are furnished with each and every block. (See Figure 4 for a typical label set of a coded block.)

4.211 Apply the adhesive backed labels according to the information shown on the -140 series (or equivalent) drawings. In many cases the labels may have to be cut and fit into the correct sequence to conform to the drawing information. In addition to the preprinted labels, blank adhesive labels are furnished with each connecting block and are to be used when preprinted information cannot be utilized. Refer to Handbook 39, Section 13B for additional stamping information.

4.212 The label application and stamping operation is an ideal "bench type" operation where the block assemblies can be separated from their housings and placed in a protective carton while the housings are being mounted at their Distributing Frame locations.

NOTE: Colored labels are being introduced with some block codes. The colors will be compatible with those on the "COSMIC" Distributing Frame which are: Yellow for ESS
Violet for SMAS
Blue for Outside Plant

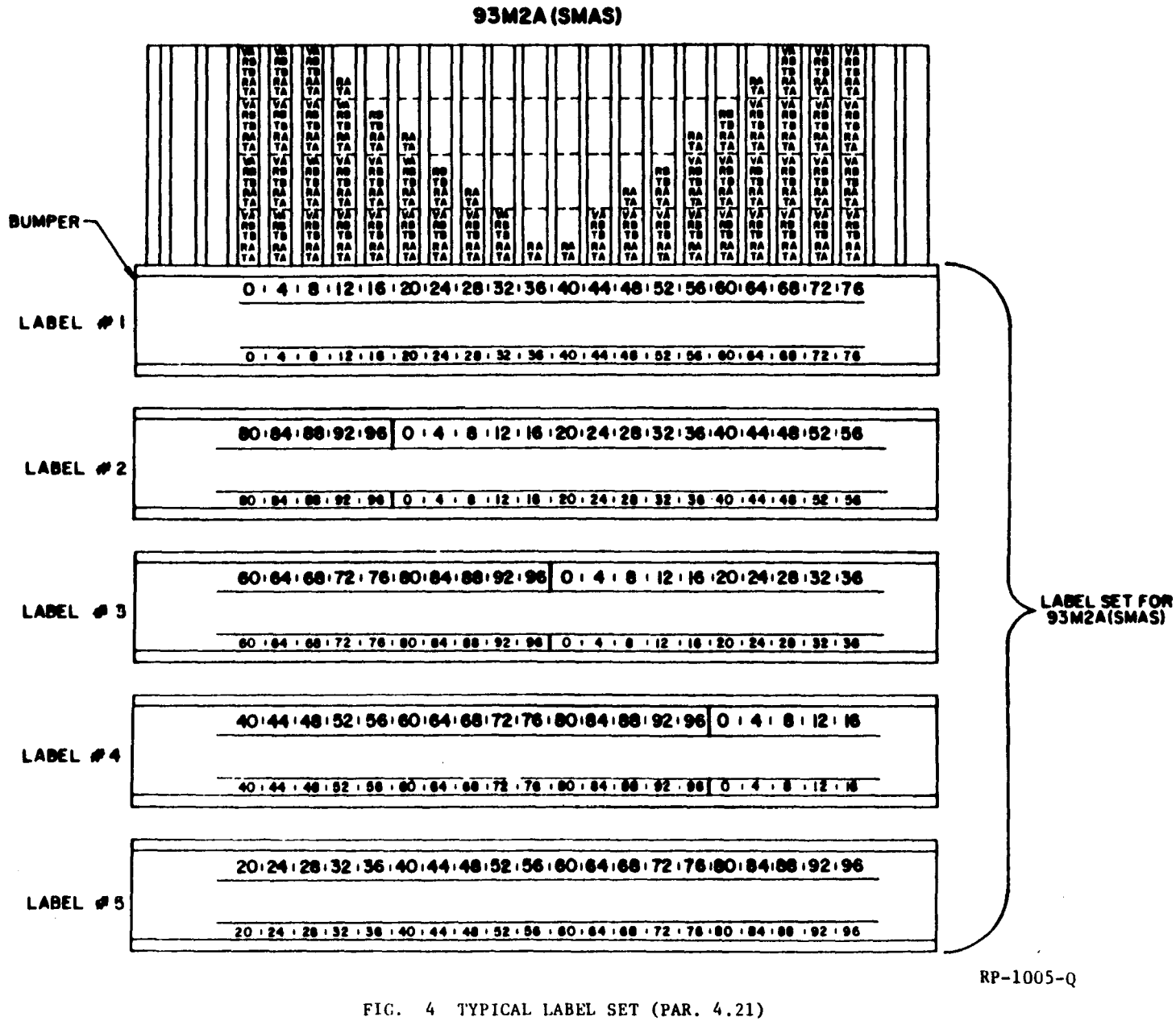


FIG. 4 TYPICAL LABEL SET (PAR. 4.21)

5. FANNING OPERATION

5.1 Cable Entry

5.11 After the cables have been butt and stripped according to Paragraph 3.2 and the housings mounted in place, obtain the cable connecting document (CCED, CCS or cut sheet) and prepare to fan the first cable. Prior to starting, obtain one of the 93-block boxes and review the procedures shown on the side of it. A study of these procedures will assist you in terminating cable leads on the 93-Type Block.

5.12 As you have probably noticed, there are 24 slices (rows) on the block assembly and only 12 ports (openings) in the housing. Therefore, the leads for the first two rows must fan through the housing port located directly behind them. Continue to observe the connecting document and fan leads for each two rows through consecutive housing ports until the binders/cable is exhausted. (See Figure 5.)

5.121 Where several cables terminate on any one block and color lead duplication becomes a factor, be sure to identify each cable after it has been fanned through the block housing. Color lead duplication usually occurs on the blocks where shop formed cables are furnished for the equipment being installed.

5.122 After all cable leads have been fanned through the housing ports, and properly identified, insert the block assembly in the housing as shown in Figure 6.

5.123 If labels and stamping were performed as a "bench-type" operation, and the block assemblies placed back into the boxes, be sure the labels and stamping on the blocks agree with the information shown on the -140 (or equivalent) drawing. Mount the blocks in their correct locations on the Distributing Frame.

5.2 Block-Lead Insertion

5.21 If the block assembly is turned down, rotate it up into the wiring position. Refer to the cable connecting document then select the first cable to be fanned, remove the identification tag and trim the leads back to about 12 inches beyond the bottom front edge of the housing. Trimming the leads back is necessary for convenience of handling.

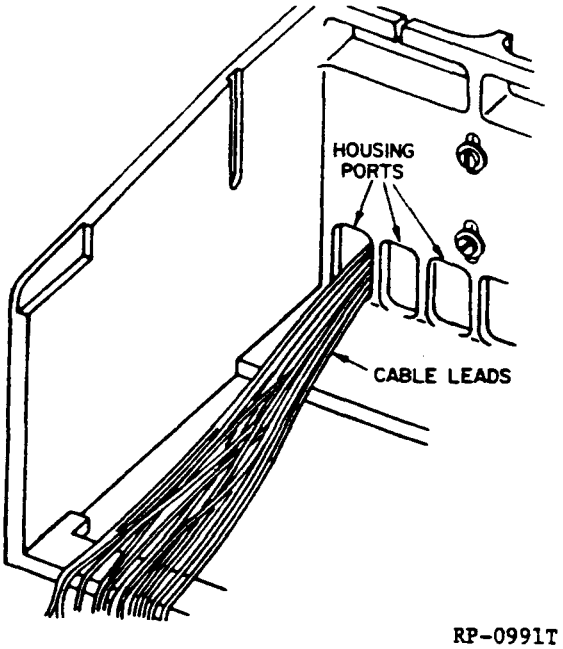


FIG. 5 FANNING LEADS FOR TWO ROWS (PAR. 5.12)

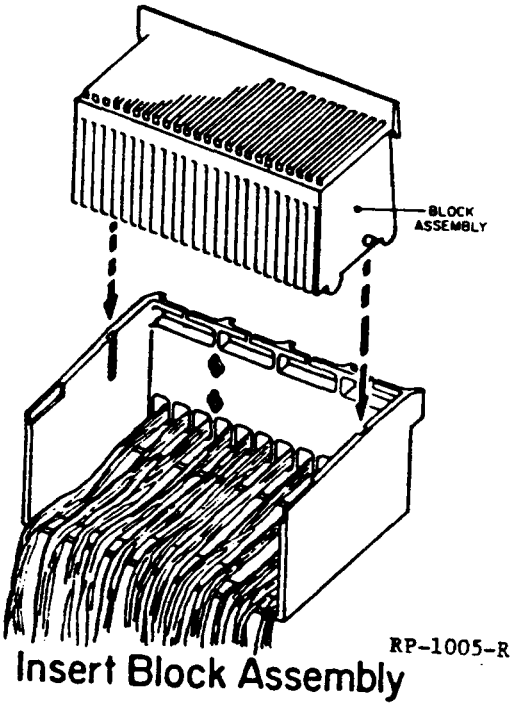


FIG. 6 (PAR. 5.122)

5.22 Select the first pair of wires (usually the blue-white pair), identify them on the cable connecting document, and then locate them (hot stamped) on the first circuit of the first slice (row). Slide the thumb and forefinger over the pair to remove the natural wire twist and any wire kinks. Be sure the ends of the wires have been cut clean.

5.221 Grasp the ends of the wires and gently pull all the slack out off them. Again, being sure the functional designations agree, insert the wire ends, one at a time, into the properly designated channel end (hole). (See Figure 7.) Push the wire ends into and through the block assembly. These wire ends will reappear on the cross-connect (top) side of the block assembly.

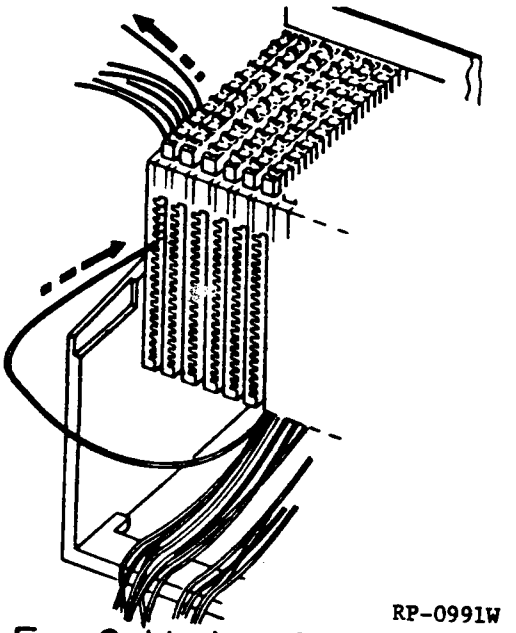
CAUTION:	THE WIRES REAPPEARING ON THE X-CONNECT (TOP) SIDE ARE USUALLY AT EYE LEVEL. BE SURE YOU ARE WEARING SAFETY GLASSES, AND AVOID ANY PERSONAL INJURY FROM THE WIRE ENDS.

5.222 As the wire end exits from the channel on the cross-connect side of the block assembly, grasp the end of the wire and gently pull out the excess slack. Dress the wire back into the wire retention area as shown in Figure 8. Continue pulling out the slack until the wire loop disappears.

5.223 Continue fanning the first cable until all leads in the binder and all binders in the cable have been fanned and dressed back into the retention areas. Be sure the cable and color code identity is not lost during the fanning operation. It appears best to fan only one cable/binder at a time to assure color code integrity is retained.

5.224 Continue to fan out the rest of the binders/cables until all the cable leads have been fanned in and dressed back into the retention areas. When completed, there should be very little slack left in the wires within the housing.

5.23 If you notice that some cable leads have been fanned in through the wrong housing port, you may cross the leads over one port (2 rows) to either the left or right side. Crossing leads over more than one housing port is not acceptable.



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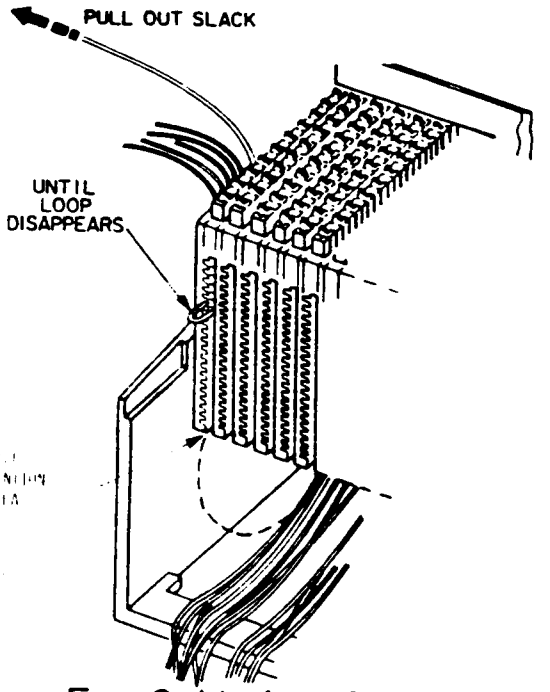
Fan Cable into Assembly

FIG. 7 (PAR. 5.221)



Fan Cable into Assembly

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FIG. 8 (PAR. 5.222)

5.24 If you discover that some of the leads have been fanned into the wrong channel (slot) of the block assembly, simply push them back through the channels and then reinsert them into the correct channels. The use of the R-1102 Spudger (wire hook end) will assist in pulling leads back out of the channels.

5.25 After all the cable leads have been fanned into the block assembly and the excess slack removed, rotate the block assembly down into the closed, locked position. (See Figure 9.) From this point on, do not remove any more slack from the block assembly. The slack that has been "built in" is required in the event that the block has to be reopened.

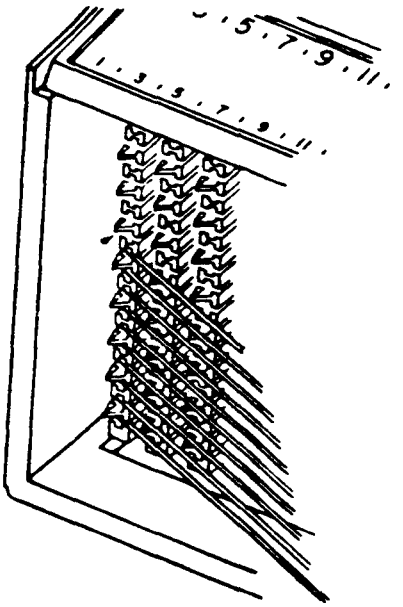

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FIG. 9 BLOCK CLOSED LEADS READY TO SEAT/CUT-OFF (PAR. 5.25)

6. TERMINATING OPERATION

6.1 Lead Seating

6.11 After the block has been rotated down and locked into the cross-connect position, the leads can be seated in the following manner:

NOTE: Lead termination can be performed by starting at either the left or right side of the block. Figure 10 shows working right to left, however, we feel it is more expedient to work left to right and is therefore reflected in the following instructions. Depending on whether you are left or right handed may determine your preference in working direction.

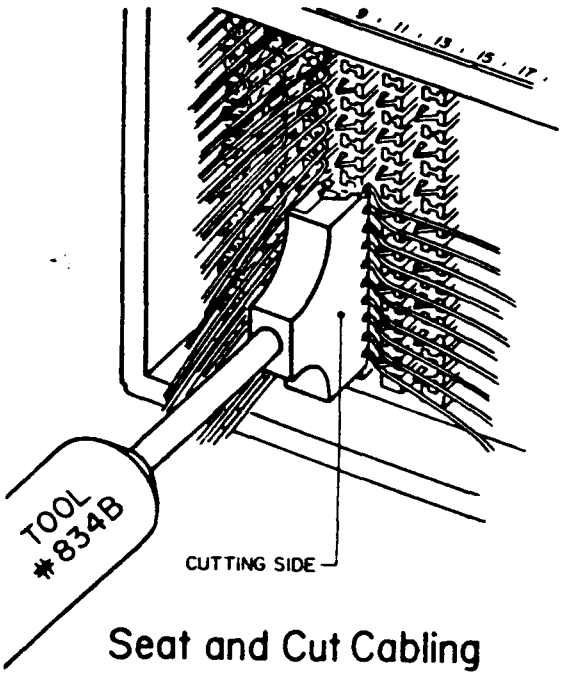
A. Gently push all cable leads protruding out of the cross-connect side of the block over to the right side.

B. Starting at the extreme left side (row 1), bend the top pair of leads over to the right and press them down into their index recess position with the thumb. (See Figure 10.)

C. Continue pressing leads down into the index strip, two leads at a time, until one row (slice) has been seated by hand.

D. Start at either the top or bottom of the row you just seated by hand, then using the 834B Impact Cut-Off Tool (See Figure 11), be sure cutting blades are to the right side, seat and cut off ten of the leads at one time.

CAUTION:	THE INDEX STRIPS ARE KEYED TO MATCH THE 834B TOOL. BE SURE TO CORRECTLY ALIGN THE TOOL ON THE INDEX STRIP BEFORE IMPACTING. IMPROPER ALIGNMENT MAY DAMAGE THE INDEX STRIP.



Seat and Cut Cabling

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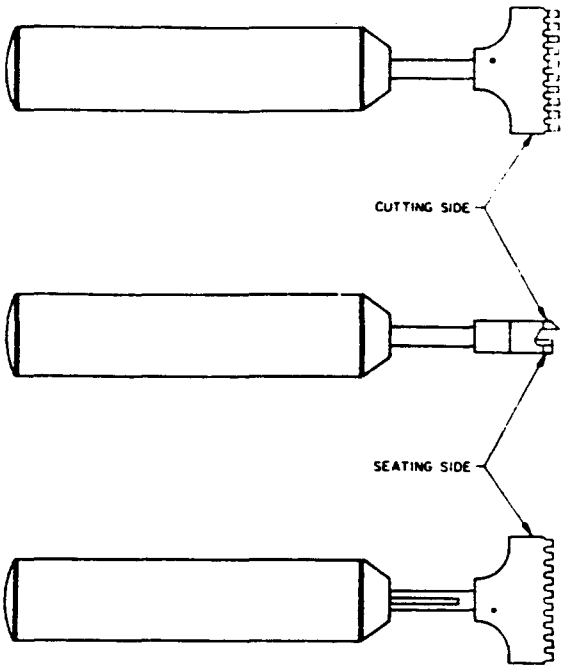
FIG. 10 (PAR. 6.11B, D)



834B TOOL RP-1005-T

FIG. 1 (PAR. 6.11D)

E. When an odd number of leads appear on the index strip, the 833A (non-impact) single wire Insert/Cut-Off Tool or the AT-8762 (impact) Tool equipped with the 8762D-88 Blade, can be used in place of the 834B Tool for terminating these individual leads.

NOTE: The 834B, 833A and AT-8762D Tools all cut the cable leads flush against the index strip. If for some reason the tools fail to cut-off the wire ends, Do not use any other type of cutting device on the wire ends. If the leads are not cut off close enough to the index strip, they will block the cross-connect jumper wire entry channels. Reseat and cut off the leads with one of the above tools.

F. After the cable leads for the first row have been seated and cut off, continue the above procedures for the rest of the block (row by row) until all cable leads have been terminated in the index strips.

NOTE: If cable lead reversals are discovered after the cut-off operation, push up the reversed leads involved from the wiring (bottom) side, and then using the "pick" end of the R-1102 Spudger, pull them out of the index recess positions. Rectify the errors and reterminate. Allow about 1/4 inch on the cable lead ends for a new cut off point.

C. If 22 gauge IPVC wire has been used, a Wire Stuffing Tool (955A) has been designed to assist in the seating, cut-off operation. After the leads have been seated into the index strip by hand, place the 955A Tool alongside of the right edge of the index strip and push down firmly on the cable leads. This will bend these rigid leads over and allow easier application of the 834B Tool for the seat - cutoff operation. (See Figure 12.)

6.2 109 Connector Application

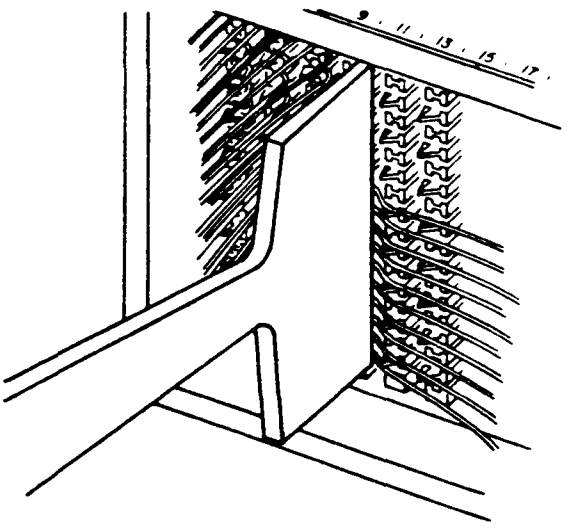
6.21 General: As previously stated, there are two versions of the 109 Connector. The 109A Connector is colored gray and white and features ten individual quick-connect elements within its plastic, sonic-welded housing. This connector is required when one cable lead cross-connects to only one jumper wire.

6.211 The 109B Connector is colored blue and white and features five bifurcated elements within its housing. This connector should only be used when one cable lead cross-connects to two jumper wires (common termination point).

6.22 After the cable leads for one block have been seated and cut off in the index strips, the 109-Type Connector must be impacted down into the index strip to establish a metallic contact so the jumper wire cross-connects can be applied.

CAUTION:	PRIOR TO APPLICATION OF THE 109 CONNECTOR BE ABSOLUTELY POSITIVE THE WHITE SIDE OF THE CONNECTOR IS ON THE RIGHT SIDE (HORIZONTALLY MOUNTED BLOCKS) - REMEMBER "WHITE TO THE RIGHT". IF BLOCKS ARE VERTICALLY MOUNTED, THE WHITE SIDE FACES THE BOTTOM.

6.23 As noted in the CAUTION above, white side must be to the right when applying the 109 connectors. Carefully observe one of the connectors and you will notice that the gray and blue sides have a projecting shelf on them and the white sides do not. When jumper leads appear on the right side and are indexed over to the left, this projecting shelf is required to provide a cut-off surface for terminating jumper leads.



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955A TOOL
WIRE STUFFER

FIG. 12 (PAR. 6.11G)

6.3 Alignment and Insertion

6.31 Apply the 109 Connectors in the following manner:

A. Remember "white to right" or "white to bottom".

B. Begin at either end of the 93 block, left side preferable, and at the top or bottom of the first row. Set the first 109 connector in the 834B Tool as shown in Figure 13.

C. Place the tool and connector directly over the first ten or last ten leads seated in the index strip.

D. Be sure the 109 connector is aligned properly and squarely on top of the index strip positions before considering impact of the 834B Tool.

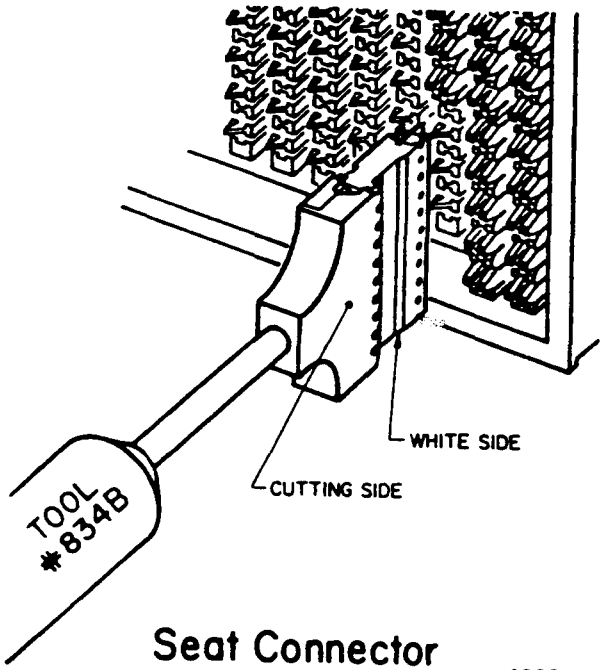


FIG. 13 (PAR. 6.31B)

E. After the connector and tool have been aligned properly, apply a firm steady forward pressure against the index strip until the spring loaded tool impacts (releases). This should correctly seat the 109 Connector.

F. View the side of the 109A Connector to be sure the plastic knobs of the index strip have mated into the detents (holes) of the connector. (See Figure 14.)

CAUTION:	DO NOT ROCK OR WOBBLE THE 834B TOOL WHEN IMPACTING THE CONNECTOR, THIS TYPE OF MOTION MAY CUT THE WIRES OR DAMAGE THE SLOTTED BEAM CONTACTS OF THE 109 CONNECTOR.

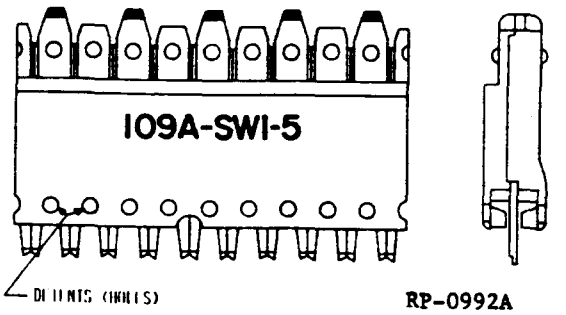


FIG. 14 109-CONNECTOR WITH MATING DETENTS (PAR. 6.31F)

7. MULTIPLYING OPERATION

7.1 General

7.11 Where circuits terminating on a 93-Type Block require a common lead to be multiplied across several rows (slices), such as a common -48 volt bus lead, all other cable leads terminating on that block must be seated and cutoff first. The common lead(s) must be handled last.

7.2 Procedure

7.21 After all cable leads, with the exception of the common bus leads, have been seated and cut-off, and before the 109 Connectors are applied, depress the locking bar and rotate the block assembly back up into the wiring position.

7.211 As an example of the multiplying operation, refer to the bussing requirements of the 93M1A Block (See Figure 15). This code uses a special slice, (row 4) designed for voltage bus applications. This special row is hot stamped with red characters (-48) in positions 1 and 20 with a red arrow extending from positions 2 through 19.

7.212 Note that rows (slices) 1-3 and 22-24 are not used (no stamping), however, seventeen rows (5-21) each have identification for three circuits/row. These seventeen rows have -48 voltage requirements in positions 1, 7 and 13. Starting at the special slice (row 4), run these three leads through the channels for positions 1, 7 and 13. The leads must extend through the front side of the block assembly at least (12) twelve inches.

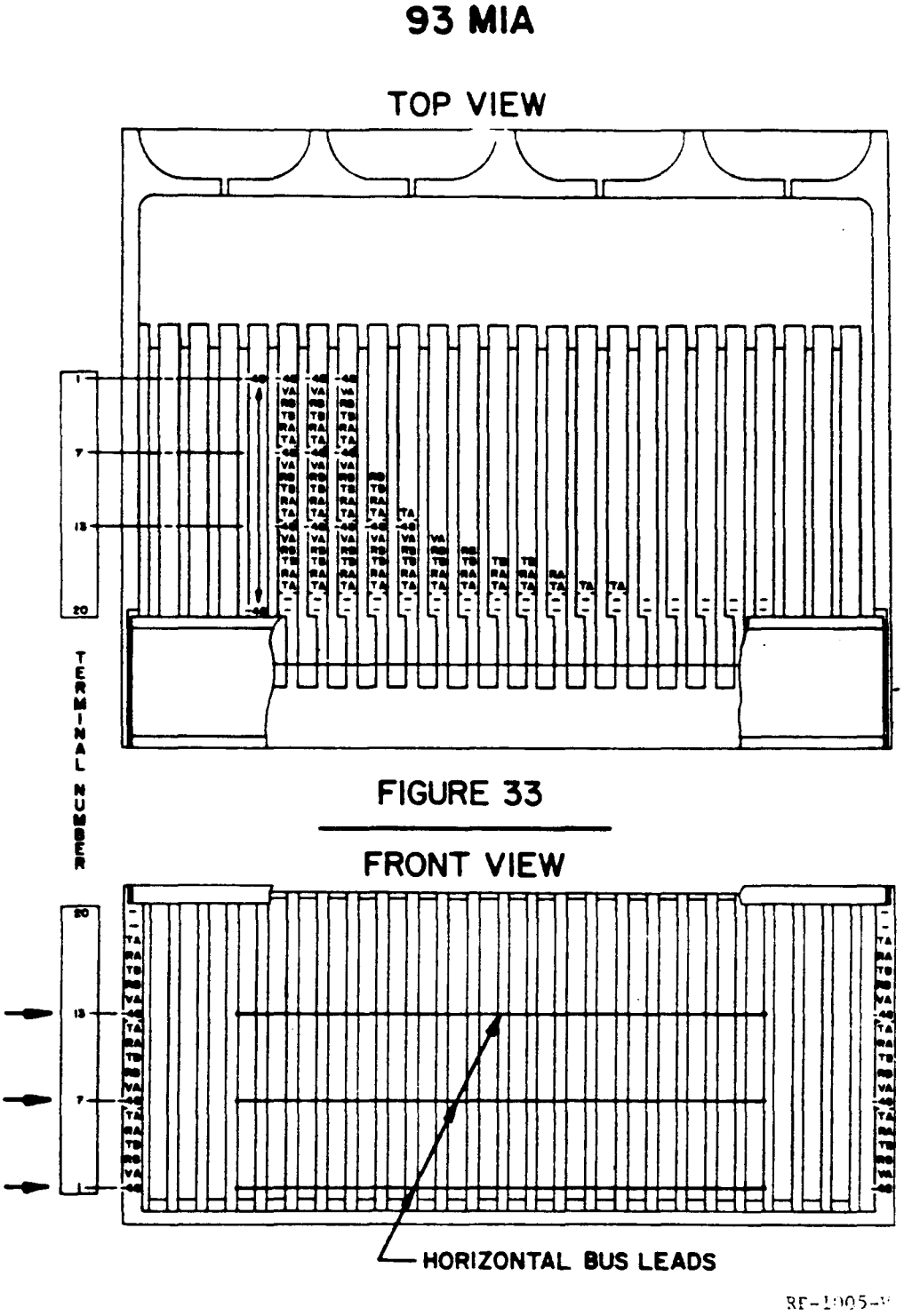


FIGURE 33

FIG. 15 TYPICAL MULTIPLYING OPERATION (PAR. 7.211)

7.213 After the leads have been run through the channels, and the slack dressed back into the retention area, bend each lead to the right over the index strip and rotate the block assembly down into the locked position. Dress each lead across the entire block (rows 5-21).

NOTE: The Single Wire Insertion Tools (833A, and AT-8762) have two functional ends, one end for seating only and the other end for the seat/cut-off operation.

7.214 Set the 833A or AT-8762 Tool in the seat only position and seat the lead in position 1 for rows (slice) 4 through 20. Repeat this operation for positions 7 and 13. Rotate the tool to the seat/cut-off position and cutoff the leads at row 21. Each lead has now formed a common bus lead for seventeen circuits.

7.22 The above information is a typical example of how to run a common lead across several adjacent circuits. Remember, bring the lead in from the extreme left side (horizontally mounted), dress it across the adjacent (slices) rows (circuits), seat it in all positions except the last, and cut it off at the last position. Proceed to apply the 109 Connectors as previously described.

NOTE: Common leads cannot be multiplied vertically down a row (horizontally mounted). This will block the channels of the cross-connect wires.

8. CONTINUITY TESTING

8.1 After all the 109-Type Connectors have been applied into their proper positions on the 93 blocks, a continuity test shall be run on all terminated cable leads. The AT-8662 "C" Test Cord can be snapped-on to the 109-Type Connector to test one pair of cable leads at a time. The "C" Test Cords can also be stacked to test up to ten cable pair at a time. The ITE-4137A/B/C Continuity Test Set can be used for continuity testing.

8.11 When the "C" test cords are not used, it is possible to grind down the tip end of the ITE-4137 Test Probe Cord to a fine point. This fine point will fit oetween the plastic housing of the 109-Type Connector and make contact with the metal portion on the slotted beam terminal.

CAUTION: WHEN THE TIP END OF THE TEST PROBE HAS BEEN GROUND DOWN TO A FINE POINT, IT BECOMES VERY SHARP AND DANGEROUS. TAKE CARE TO PROTECT THE SHARP END BY PLACING PROTECTION OVER IT WHEN THE PROBE IS NOT BEING USED. ALSO ALERT THE USER TO TAKE ALL NECESSARY PRECAUTIONS POSSIBLE TO ELIMINATE ANY PERSONAL INJURY.

9. DEFECTS

9.1 Repair Procedure

While running the continuity test operation, a lead or several leads are found to be open within the confines of the 109-Type Connector(s), or the connector itself is found to be defective, the following repair procedure should be followed:

A. If the jumper wires have already been run, remove and identify them one pair at a time.

B. Using a pair of long nose pliers or side cutting pliers, grasp the 109-Type Connector firmly at one end and then with a short quick pull, remove the device.

PRECAUTION: DO NOT REUSE ANY PREVIOUSLY APPLIED 109-TYPE CONNECTORS, DISCARD THEM IMMEDIATELY AND REPLACE WITH NEW ONES.

C. When the 109-Type Connector is removed, some or possibly all of the leads may pull out of the wire index slots of the 93 block. Remove all the leads from the block by using the pick end of the R-1102 Spudger.

D. Correct the wiring error(s) and then using the long nose pliers, re-seat the leads in the wire index slots of the block. Move all leads over approximately 1/4 inch to provide a new point of incision for the slotted beam terminals of the 109-Type Connector.

E. Using either the connector 833A (single wire) or 834B (ten wire) Tool, re-seat and cut-off the cable leads that were previously removed.

F. Visually inspect the ends of the cable leads to be sure they have been cut-off clean and that small pieces of wire or insulation are not lodged in the block and hinder the entry of the cross-connect leads.

PRECAUTION: THE CABLE LEAD ENDS MUST BE CUT OFF FLUSH AGAINST THE INDEX STRIP. ENDS THAT ARE LONGER THAN 1/32 INCH MAY SHORT OUT TO ONE ANOTHER AND CREATE "CROSSES". BE SURE TO USE ONE OF THE APPROVED CUT-OFF TOOLS, DO NOT USE DIAGONAL OR OTHER FLUSH CUTTING TOOLS.

G. After leads have been cleared of opens, crosses or shorts, reseat a new 109-Type Connector with the 834B Impact Tool.

NOTE: Never reuse a 109-Type Connector. Discard it and use a new one. (Two spares provided with each block.)

H. Reconnect jumper wires if they were previously run.

10. CROSS-CONNECTING

10.1 General

10.11 The housings of the 93-Type Blocks have four fanning ports (cutouts) which are used to spread the cross-connect pairs across the block assembly, therefore, each port will serve six of the 24 rows or a maximum of 60 pair (120 leads) in each port.

10.111 Viewing the top (X-C side) of the block assembly, note that each row also has twenty (20) wire entry ports which match the wiring side. To the right side of these ports are the alpha-numeric designations, to the left side of these ports are the wire storage regions.

10.2 Jumper Running

10.21 After the 109-Type Connectors have been seated in place on the 93-Type Blocks and continuity of the cable leads has been completed, preparations should be made to run the jumper wires, providing they are not to be run by the Operating Company.

10.211 Since the 93-Type Connector Blocks are mounted on conventional type distributing frames, they will, unless otherwise directed by the Bell Operating Company (BOC), utilize DT22P (PVC) Jumper Wire. These jumpers shall be run in the standard manner and 4 to 7 inches of slack shall be left in each jumper run.

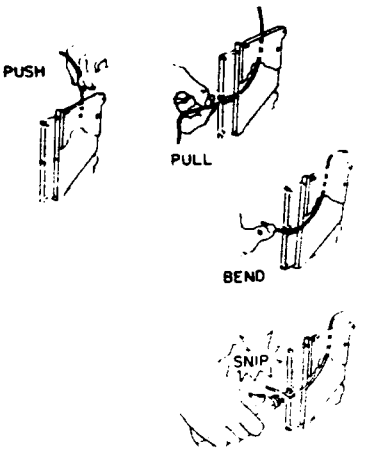
10.3 Terminating

10.31 To terminate a jumper wire pair of leads the following method is recommended:

A. Remove the spiral twist from the end of the jumper wire pair for about 12 to 14 inches.

B. Straighten out any twists or kinks in the jumper wire pair and fan it through the correct fan port located at the rear of the block housing.

C. Insert each lead into its proper position (channel) at the top of the block. Push down on the leads until they appear out the front of the block (See Figure 16.)



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TO CROSS-CONNECT A JUMPER WIRE

FIG. 16 (PAR. 10.31C)

D. Pull the jumper wire pair through the block assembly, be sure that 4-7 inches of slack is left up on the shelf.

E. Terminate one lead at a time; fold the lead over to the left and seat it into the proper index recess of the "109" Connector with the thumb or finger.

F. Then using the AT-8762 Impact Tool with the 8762D-88 Blade, or the 833A Single Wire Non-Impact Tool, seat and cutoff each lead.

CAUTION:	BE SURE THE TOOL IS APPLIED CORRECTLY. THE CUT-OFF EDGE MUST BE ON THE LEFT SIDE OF THE 109 CONNECTOR OR ELSE YOU WILL SHEAR OFF THE LEAD BEFORE ENTERING THE CONNECTOR.

G. After the leads (pair) have been terminated on the 109-Type Connector, dress (tuck) the wires down into the storage region (See Figure 17.)

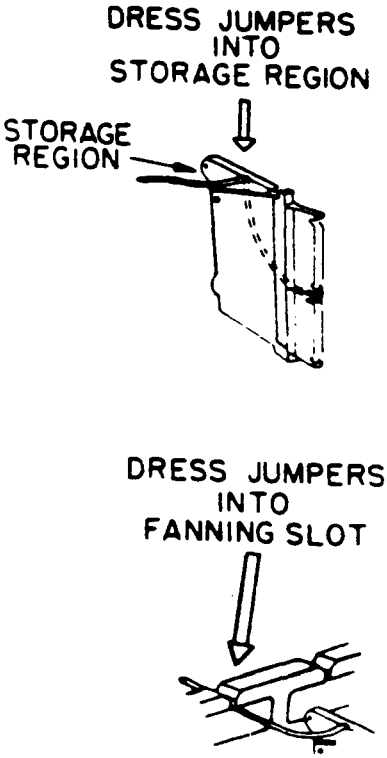

FIG. 17 DRESS JUMPER INTO STORAGE AREA (PAR. 10.31G)

10.4 Retermination

10.41 If a cross-connect pair of wires has to be removed, gently pull them out of the slotted beams with a pair of long nose pliers or the "hook" end of the R-1102 Spudger. After the wire ends are dislodged from the 109 Connector, do not pull them out any further. Simply push the leads back into the block assembly and notice a loop of wire forms on the top surface. Remove the leads from the block by pulling up on the loops (See Figure 18.)

10.42 If the removed leads are to be reterminated, and providing they are still long enough, cut off at least 1/4 inch from the ends of the wires. This will provide a new point of insertion into the slotted beams of the 109 Connector, reterminate the leads with a single wire insertion tool.

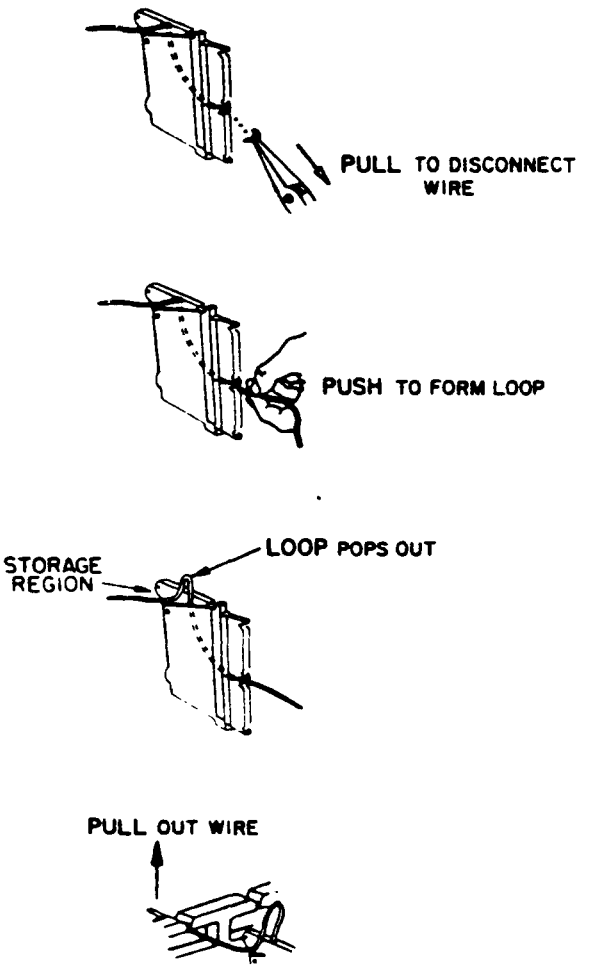

FIG. 18 TO REMOVE A JUMPER WIRE (PAR. 10.41)

11. VERIFICATION

PAR.	VERIFICATION ITEMS AND BRIEF STATEMENT OF REQUIREMENT	REFERENCE PAR. NO.	FIG. NO.
11.001	Mount only on shelves or verticals spaced minimum eight inches apart.	1.23 (NOTE) 4.1	
11.002	Use only 22, 24 or 26 gauge Solid Wire	1.241	2
11.003	22 gauge 1PVC Wire terminated only with a single wire (833A or AT-8762) Tool.	1.242	3
11.004	Do not terminate textile insulated wire	1.243	
11.005	Only one wire/position on 93 block index strip and 109 connector.	1.25 (CAUTION)	
11.006	Do not substitute 88-type clips.	1.252	
11.007	Dress lead slack back into retention area.	5.222	8
11.008	Fanned leads may cross over only one port to the left or right.	5.23	
11.009	Do not remove additional slack after leads.		
11.010	Have been fanned and block is closed.	5.25	9
11.011	To reterminate leads in the index strip, allow 1/4 inch for new cut-off point.	6.11F (NOTE)	
11.012	109-Connector applied "white side-right" (horiz.) or "white side-bottom" (vert.).	6.22, 6.31A (CAUTION)	
11.013	Be positive the 109-Connector has been properly mated on index strip.	6.31F	13
11.014	When common leads are involved, they must be terminated last.	7.11	
11.015	Common leads cannot be multiplied vertically (horizontally mounted) down a row.	7.22 (NOTE)	
11.016	Continuity test on all cable leads.	8.1	
11.017	Do not reuse a 109-Type Connector, replace it with a new one.	9.1B (CAUTION)	
11.018	If 109 Connector has been removed due to a continuity failure, move all leads over 1/4 inch and reterminate.	9.1D	
11.019	Wire ends cut off clean with no loose insulation to hinder entry of cross-connect leads.	9.1F	
11.020	DT22P (1PVC) Jumper Wire to be used unless (BOC) otherwise directs.	10.211	
11.021	Jumper leads to have 4-7 inches of slack.	10.211	
11.022	Dress jumper leads into storage region.	10.31G	16
11.023	Reterminated jumper leads to be cut off 1/4 inch to provide new termination point.	10.42	

No arrows due to extensive changes.

[Vertical lines at side of paragraphs
[indicates requirements.

Engineering Planning Manager
(Installation)

Reason for Reissue:
Complete revision of section.