SECTION 256-152-200
ISSUE 2, DECEMBER, 1972
GTE STANDARD

PROCEDURES FOR CROSS-CONNECTING (JUMPERING) QUICK-CONNECT DISTRIBUTING FRAMES

CONTENTS PAGE

1. GENERAL

1.01 This section covers the method of terminating and removing connections (jumpers) on single- and double-clip quick-connecting blocks. These blocks are used on distributing frames in electronic switching systems (EAX, TSPS, and XPT).

1.02 Due to the section title change as well as the extensive additions and rearrangement of the text, marginal arrows indicating changes, have **been omitted. Remove and** destroy all copies of Section 256-l 52-200, Issue 1.

1.03 The cross-connecting procedures and recommendations in this section are to be followed when installing and maintaining electronic type distribution frames equipped with quick-connect blocks.

2. DESCRIPTION

Single-Clip Quick-Connect Block (EC-10176-A)

2.01 The single-clip quick-connect terminal block, shown in Figure 1, is constructed of a molded plastic material. It is equipped with 100, removable, tin-plated, single-clip quick-connect type terminals (see Figure 2). The terminals are arranged in 10 rows with 10 clips in each row. The clips are designed for use with 22 gauge wire. A slotted fanning strip is provided on each side of the block to form solderless wrap terminals on the rear of the block. This block provides a cross-connection (jumpering) capacity of 50 pairs.

Double-Clip Quick-Connect Block (EC-10358-A)

2.02 This block (see Figure 3) is similar to the EC-10176-A except it is equipped with double-clip instead of single-clip quick-connect type terminals (see Figure 4). This block provides a cross-connection (jumpering) capacity of 50 pairs.

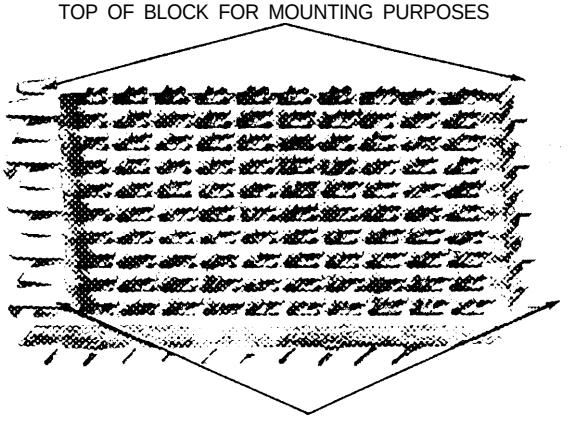

Figure 1. Single-Clip Quick-Connect Block (EC-10176-A).

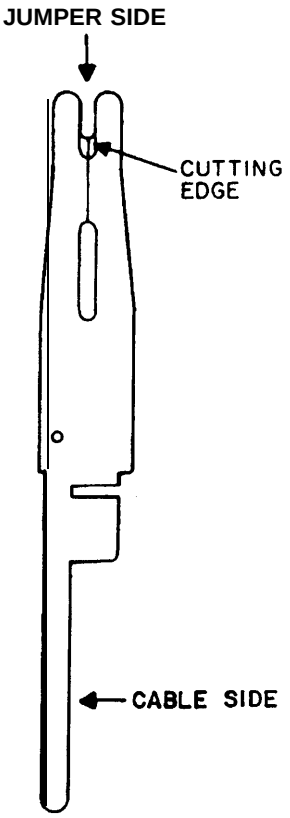

Figure 2. Single-Clip Quick-Connect Terminal (E F-50234-A).

Distributing Frames

2.03 The distributing frames are provided in modules, each of which consists of 3 verticals per module (see Figure 5). Each vertical will accommodate either 30 of the single-clip or 24 of the double-clip quick-connect type blocks.

2.04 Vertical jumper wire troughs and wire retainers are provided alongside each vertical. Upper and lower jumper wire troughs are prov ded for intervertical jumpers.

3. RECOMMENDED TOOLS AND MATERIALS

3.01 The following is alist of the recommended tools and materialsto be used when making terminations on quick-connect terminal blocks:

(a) Wire Insertion Tool, EC-10192-A.

(b) Wire Removai Tool, EC-l 0731 -A.

(c) Cable Sheathing Bag, Klein R-2726.

(d) Wire Cutters.

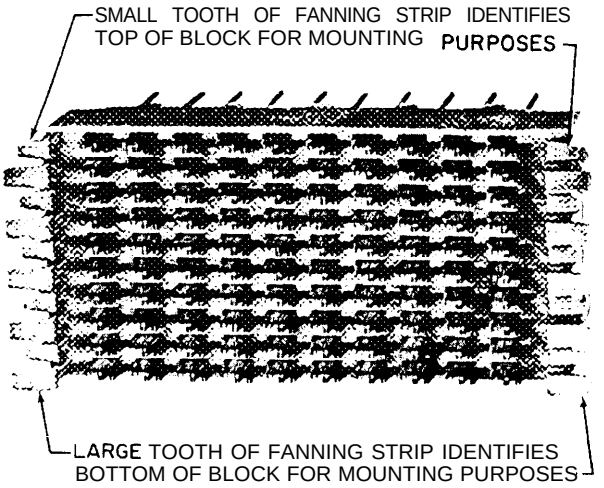

Figure 3. Double-Ciip Quick-Connect Block (EC- 10358-A).

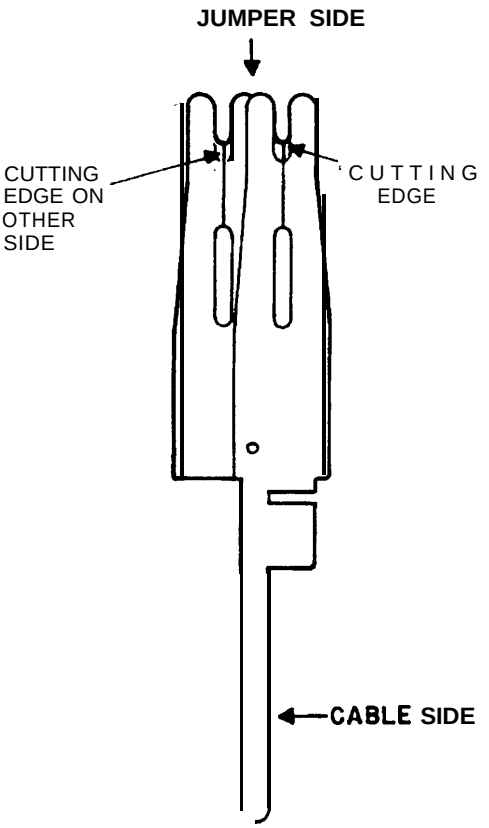

Figure 4. Double-Clip Quick-Connect Terminal (EC-l 0357-A).

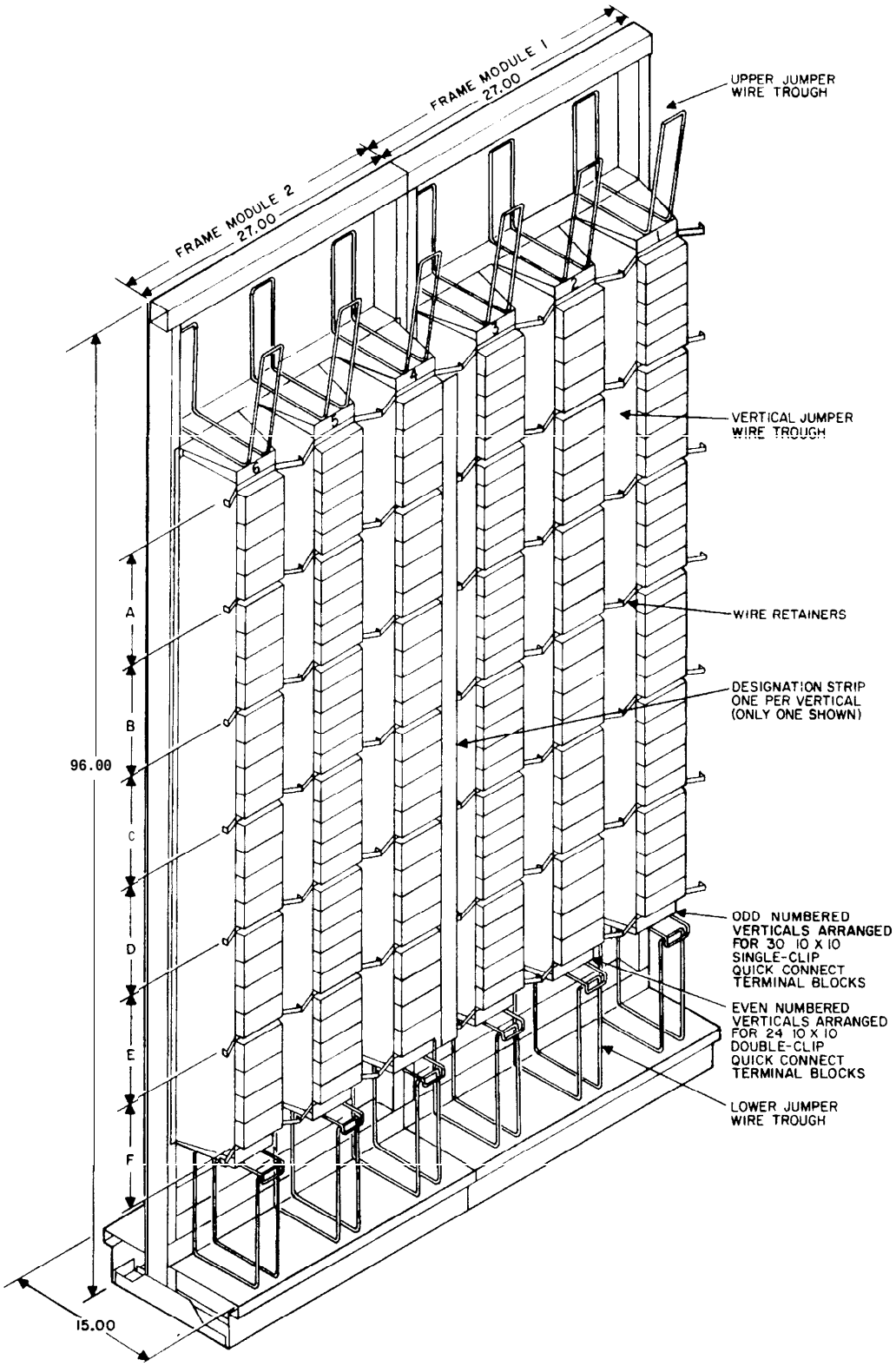

Figure 5. Typical Distributing Frame – Two Frame Modules.

4. CONNECTING JUMPERS TO TERMINALS

4.01 The EC-10192-A wire insertion tool (see Figure 6), is used to insert wires into the terminals of the quick-connect type blocks. This tool is designed for use on the single- or double-clip quick-connect terminal blocks. Even though the insertion tool appears similar to other wire insertion tools, it is not. These tools cannot be interchanged as resultant damage to either the terminals or to the jumper wires is likely to occur.

Using the (EC-1 0192-A) Wire Insertion Tool

4.02 As shown in Figure 6, the wire insertion tool is equipped with a double sided insertion head. One side of the head is used for inserting wire into the single-clip quick-connect terminals and the other side is used for inserting wire into the double-clip quick-connect terminals. To change the insertion head, the head locking screw at the tip of the handle must be loosened. The head can then be rotated to the desired position. Tighten the head locking screw to secure the head.

4.03 When using the quick-connect type terminals on distributing frames, there is no wire stripping operation necessary. The quick-connect terminal is designed so that the insulating sheath of the wire is cut sufficiently at the exact point of entry into the terminal so that an electrical contact with the jumper is made when it is properly installed.

4.04 It is recommended that several trial connections be made with spare wire pieces on a spare or unused terminal block. This will serve to verify the condition of the insertion head of the tool and if necessary, to enable an installer to gain experience in the use of the insertion tool prior to making final jumper connections. To connect the jumper wires into the terminals, the following procedure must be used:

(1) Grasp the tool, as shown in Figure 7(a), so that pressure will be applied with the palm of the hand. Steady the tool with the thumb and fingers.

(2) Select the proper jumper wire and insert it into the appropriate hole in the insertion head. See Figure 7(b).

NOTE: The wire is to be inserted untii it bottoms in the hole in the insertion head. This will provide a secure hold on the wire while making the termination.

(3) Bend the wire down across the terminal opening in the insertion head. Pull the wire taut by bending it back under the insertion head, as shown in Figure 7(c).

(4) Hold the tool and jumper wire in this position, and place the tool over the terminal without applying pressure.

(5) Place the jumper wire into its correct position in the fanning strip of the block. See Figure 7(d).

(6) Apply pressure to the tool handle, allowing the terminal itself to guide the tool during the insertion of the wire.

NOTE: The tool has an internal stop to keep it from inserting the wire too deeply into the terminal.

(7) After the wire has been inserted, the tool must be withdrawn straight out. In case an unusual resistance is felt when withdrawing the tool, remove the wire, clip off the damaged end, and reconnect the wire.

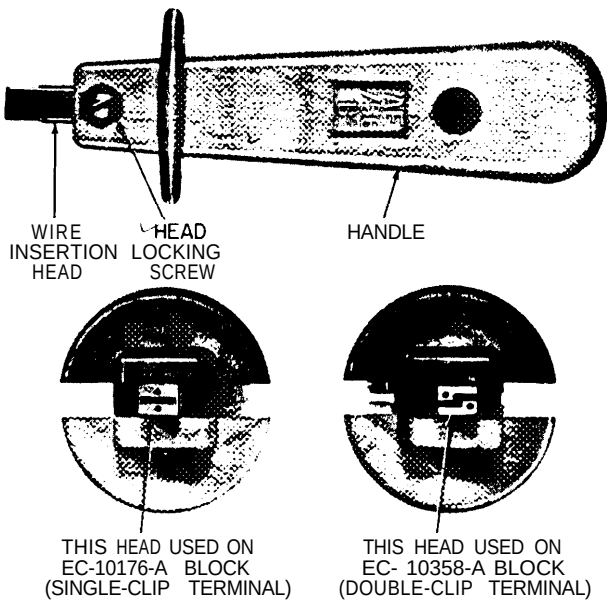

Figure 6. Wire insertion Toot (EC-10192-A).

(8) For "back-taps" (second connection on double-clip terminal) proceed as in steps (1) through (7) except bend the wire up across the opening as shown in Figure 7(e).

CAUTION: When inserting a wire into a terminal, do not strike, wiggle, or apply unnecessary pressure to the tool. This may weaken the connection and/or damage the terminal.

4.05 Each connection should be examined visually after completion to make certain that the termination is secure and that neither the terminal nor the wire has been damaged during connection. The final connection should appear as shown in Figure 8.

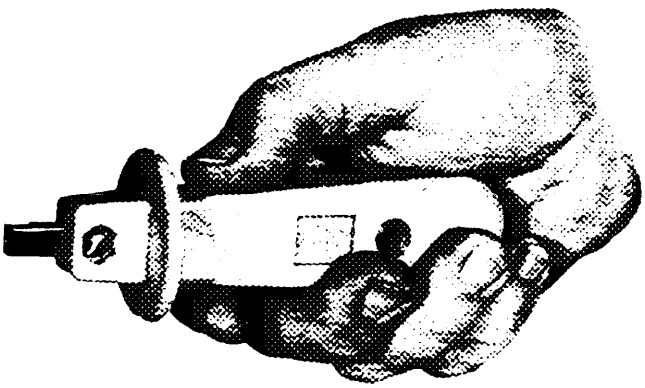

Figure 7a. Proper Method of Holding the Insertion Tool.

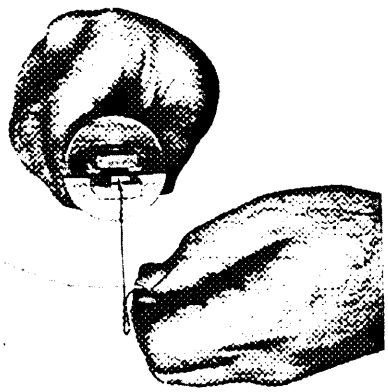

Figure 7b. Wire Insertion for Single-Clip Terminal Block (Bottom Feed Only).

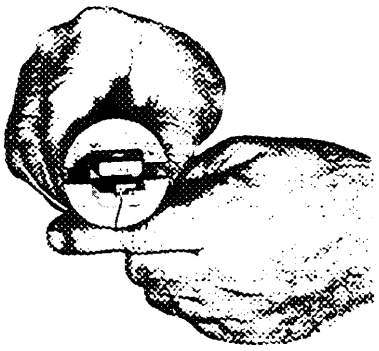

Figure 7c. Wire Insertion for Bottom Feed of Double-Clip Terminal Block.

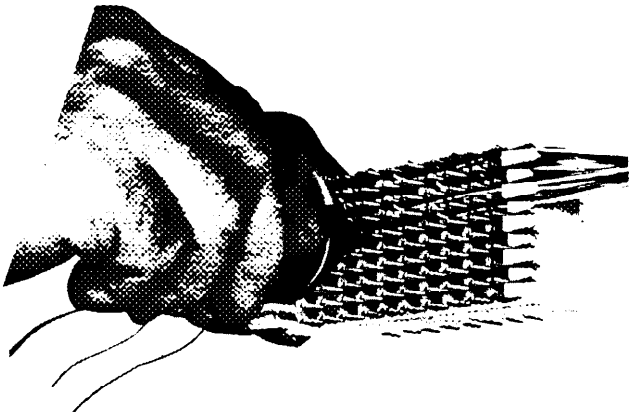

Figure 7d. Inserting Jumpers into Terminals.

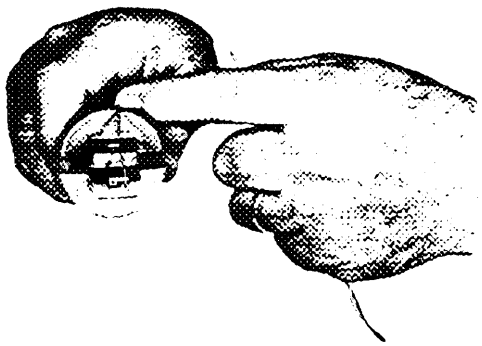

Figure 7e. Wire Insertion for Top Feed of Double-Clip Terminal Block.

Figure 7. Methods of Using EC-10192-A Tool to Insert Jumpers.

5. REMOVING AND CHANGING JUMPER CONNECTIONS

5.01 On quick-connect type distributing frames, jumper connections may easily be removed and/or relocated from one terminal to another if a change is required.

Using the (EC-10731-A) Wire Removal Tool

5.02 The wire removal tool, (see Figure 9), is designed for exclusive use on the quick-connect terminal blocks. No other type of wire removal tool is to be used on these blocks.

5.03 The wire removal tool, (see Figure 10), is designed with two fingers that are used for removing the wire from the quick-connect terminals. The wire removal procedure is as follows:

(1) Grasp the tool as shown in Figure 10(a).

(2) Insert the tool fingers around the terminal and under the wire to be removed. See Figure 10(b).

NOTE: Do not press the tool against the terminal. This may damage the terminal when extracting the wire. Make certain that only the jumper to be removed is on top of the tool fingers.

(3) Extract the wire straight up and out of the terminal. Be careful not to damage adjacent terminals or the terminal that you are extracting the wire from.

(4) Remove any remaining pieces of insulation or wire shavings from the terminal block with an insulated tool or nylon brush.

(5) Cut the extracted jumper wire off at the cut portion of the insulation and reterminate in the new location by the procedures provided in Part 4 of this section.

6. DRESSING JUMPERS IN TERMINAL BLOCKS

6.01 Jumpers associated with single-wire circuits must be dressed as shown in Figure 11. To balance the jumper load as evenly as possible on both sides of each terminal block, the wires must enter the fanning strip nearest the terminal where each jumper is connected. This necessitates a theoretical dividing of the terminal block by the installer, so that the jumpers that are connected to

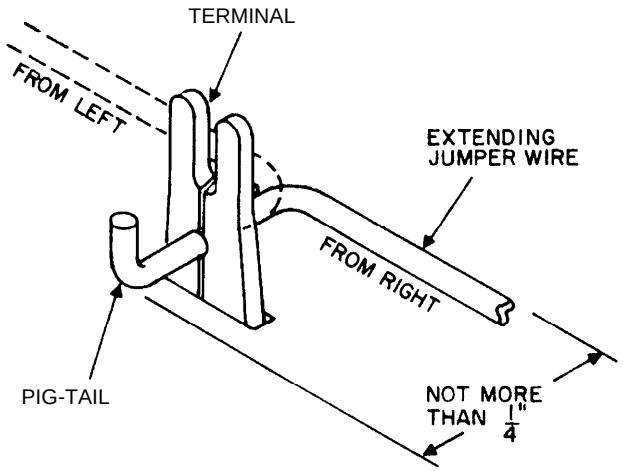

Figure 8. Example of a Properly Terminated Jumper.

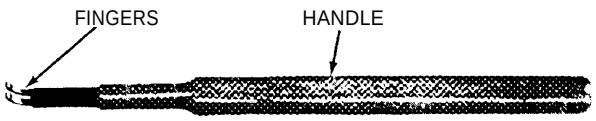

Figure 9. Wire Removal Tool (EC-10731-A).

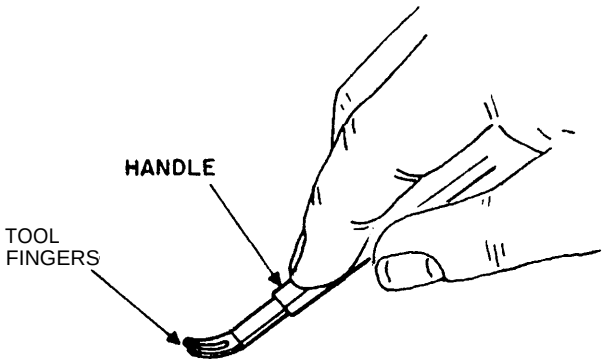

Figure 10a. Holding the Wire Removal Tool.

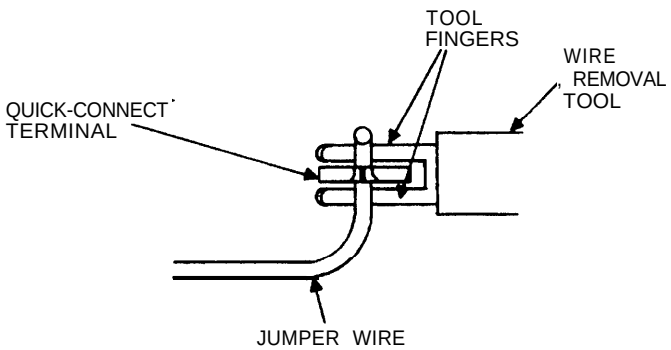

Figure 1 Ob. Inserting the Wire Removal Tool Around Terminal.

Figure 10. Using the Wire Removal Tool (EC-10731-A).

the first five terminals (left to right) from the left side of the terminal block, will exit the block by the fanning strip on the left hand side of the block. Thus, the first five jumpers, connected to the first five terminals (right to left) from the right side of the terminal block, will exit the block by the fanning strip on the right hand side of the block.

6.02 When jumpers are connected to terminals associated with two-wire circuits, the principle of balanced exit of the jumpers is the same as Paragraph 6.01. However, in two-wire circuits, the jumpers (tip and ring, for example) must be run together and cannot be separated. Therefore, in two-wire circuits, the jumpers must be alternated, row to row, six leads (three pairs) to the right, in the first row, the opposite in the second row. Figure 12 shows an example of jumper dressing for two-wire circuits on a single-clip quick-connect block. Figure 13, shows an example of jumper dressing for two-wire circuits on a double-clip quick-connect block.

NOTE: If multiple wiring is required (from one terminal block, through another and still onto another), the dressing for final termination should be the same as shown in Figure 13, assuming the block illustrated is the middle block and contains single-clip terminals.

6.03 When the jumper wires have been terminated and dressed, they should not be removed from the fanning strip slots for identification or tracing purposes. A wire being traced may be identified by gently jiggling it in the fanning strip. This will impart movement to the terminal to which the specific wire is attached. The terminal can then be marked by slipping a piece of sleeving or tape on it.

7. RUNNING JUMPER WIRES

7.01 There are two different methods of running jumpers on the quick-connect distributing frames; the "short jumpering" method and the "long jumpering" method. The two methods and their applications are explained in the following paragraphs.

NOTE: When running "short or long jumpers", the standard procedures for dressing jumper wires in terminal blocks, (as outlined in Section 6), must be followed; otherwise a pile-up of jumpers is likely to occur.

Method of Connecting "Short Jumpers"

7.02 A "short jumper" is any jumper that does not pass through either the upper or lower

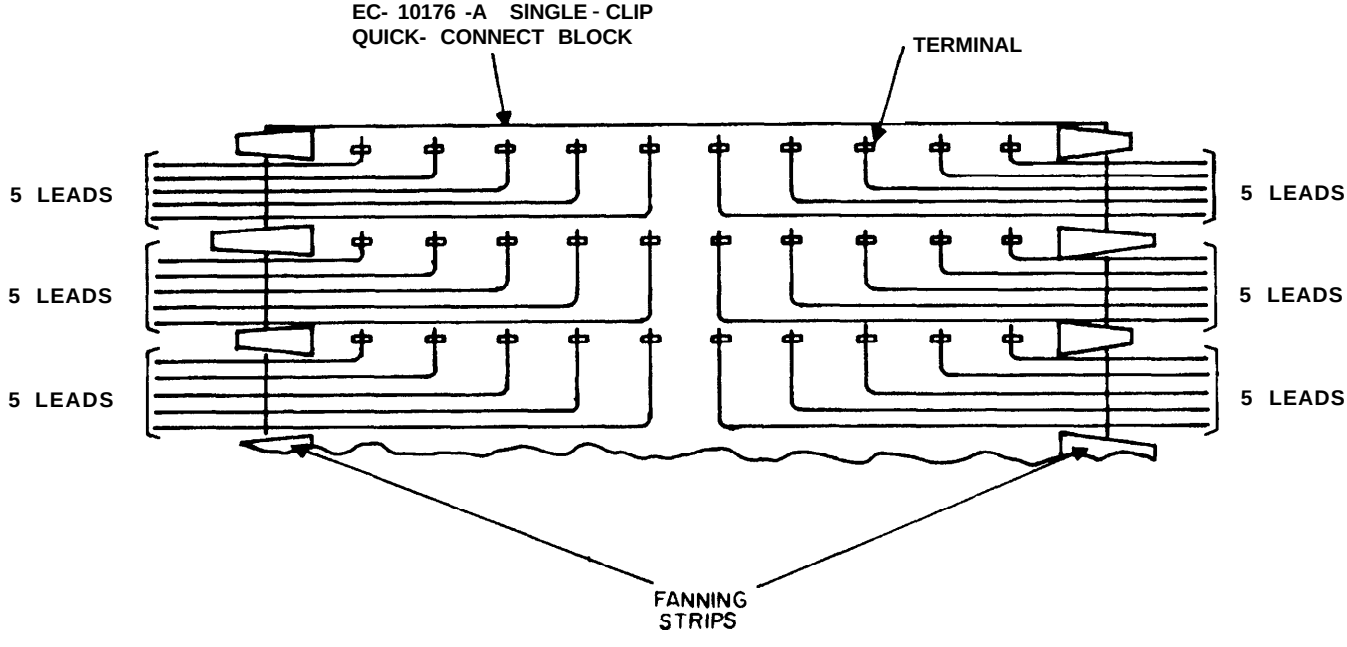

Figure 11 Dress of Jumpers on Single-Clip Quick-Connect Blocks – For Single-Wire Circuits Only.

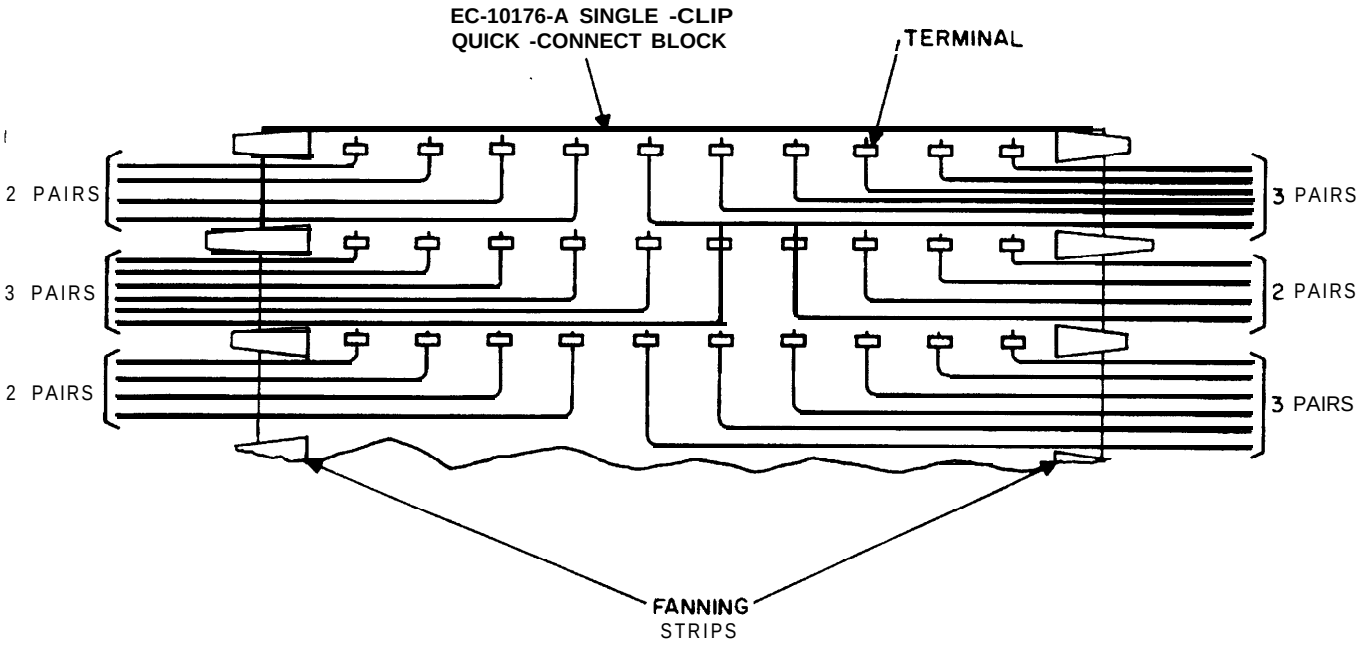

Figure 12. Dress of Jumpers on Single-Clip Quick-Connect Blocks – For Two-Wire Circuits Only.

wire trough rings. See Figure 14 for an illustration of "short jumpering". A short jumper is used when connecting terminals on adjacent verticals or between terminal blocks on the same vertical.

7.03 The "short jumpers" are to be dressed back into the vertical jumper wire troughs and approximately 10 to 12 inches of slack is to be left in the trough before making the final connection. This slack may be used later as required, but some slack must be left in the trough each time the jumper is reconnected.

NOTE: Jumpers, when being initially terminated or when being moved from one termination to another, must not be allowed to catch or become twisted around other jumpers in the wire trough.

Methods of Connecting "Long Jumpers"

7.04 A "long jumper" is a connection where the jumper wire passes through either the upper or lower jumper wire trough rings. See Figure 14 for an illustration of "long jumpering". Because of the wire savings involved and the ease with which jumpers can be traced, "short jumpers" are preferred over "long jumpers".

7.05 Quick-connect distributing frames are divided into six vertical terminal block divisions per vertical. Jumpers originating from the top three divisions are to use the upper wire trough rings. Jumpers originating from the bottom three divisions are to use the lower wire trough rings.

7.06 Approximately 10 to 12 inches of slack is to be left in each "long jumper". Distribute this slack evenly with approximately 6 inches of slack being left in the vertical trough prior to each termination (see Figure 14).

7.07 Jumpers are to be run in the most direct way, and dressed as neatly as possible. They should be placed behind the wire retainer straps and dressed *to* the rear of the vertical trough. When "long jumpers" are run through the lower trough rings, the jumpers should be seated on the bottom of the lower trough or as close to the bottom as existing jumpers will permit.

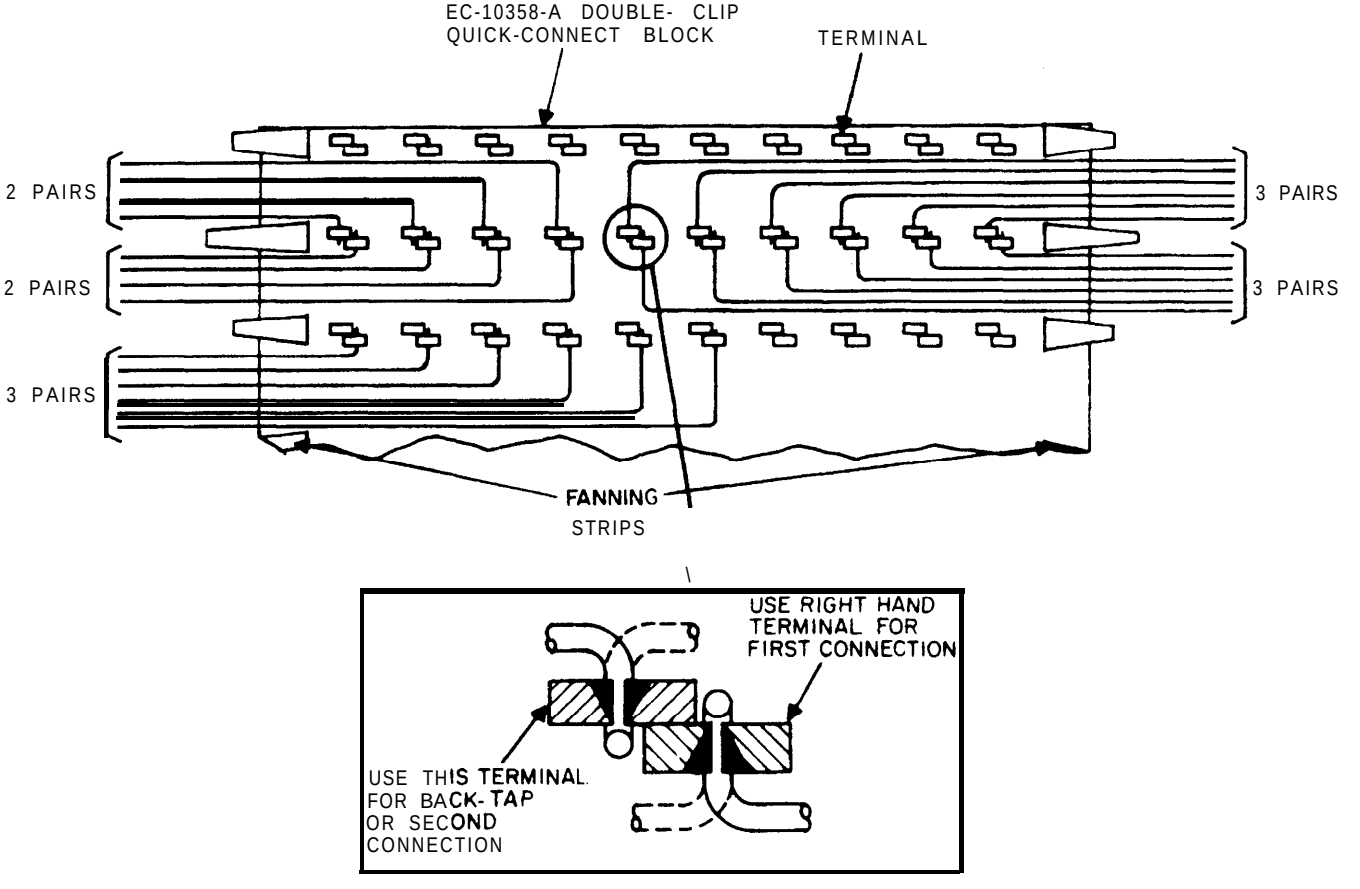

Figure 13. Dress of Jumpers on Double-Clip Quick-Connect Blocks – For Two-Wire Circuits Only.

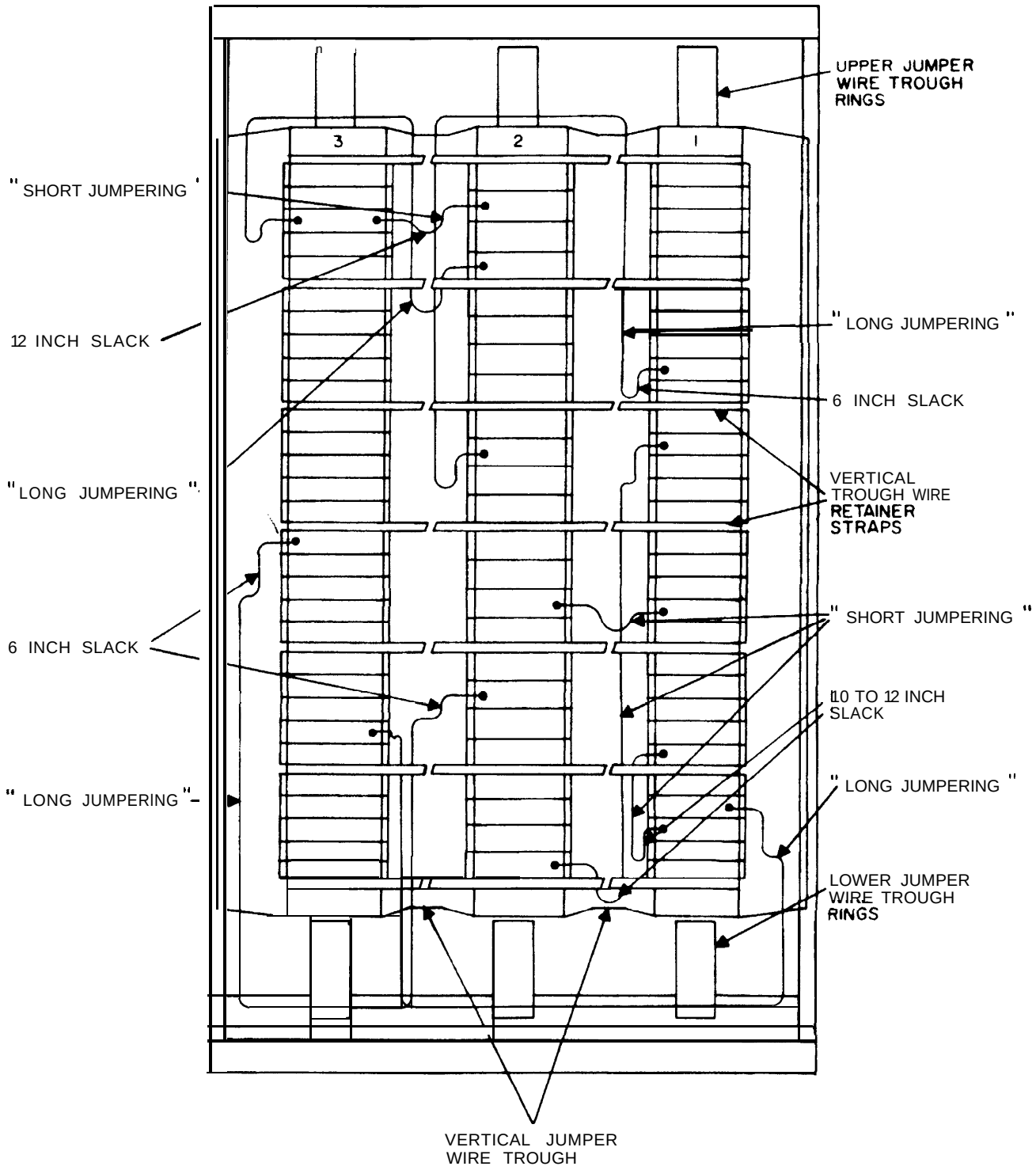

Figure 14. Typical Methods of Running Jumpers – "Long" and "Short".