

DIGITAL DATA SYSTEM
DSX-0 CROSS-CONNECT
MAINTENANCE

This section describes the procedures for maintenance of the DSX-0 cross-connect, which is accomplished by replacing damaged or defective quad terminal panel pin contacts or quad jumper plug sockets, quad terminal blocks, and quad jumper plugs; and for constructing new or long (12-1/2 feet through 30 feet) quad jumpers.

Seven charts are provided to describe the various replacement procedures; refer to the following lists of defective parts to determine the proper chart to use.

QUAD TERMINAL PANEL

DAMAGE	CHART		
	1A	1B	2
Terminal Block		✓	
Terminal Pins	✓		
Both of the Above			✓

QUAD JUMPER

DAMAGE	CHART		
	3A	3B	4
Jumper Plug		✓	
Plug Sockets	✓		
Both of the Above			✓

CHART

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CHART 1A

REPLACEMENT OF THE QUAD TERMINAL PANEL PIN CONTACTS

APPARATUS:

- 1—KS-21048, List 1, Quad Terminal Pin Contact (Fig. 1)
- 1—Part No. 305183, Pin and Socket Extraction Tool (Fig. 2)*
- 1—Part No. 91002-1, Pin and Socket Insertion Tool (Fig. 3)*
- 1—KS-20551, List 1, Wire Unwrapping Tool, or equivalent
- 1—KS-16363, Wire Wrapping Tool, or equivalent

*AMP Incorporated, Harrisburg, Pennsylvania 17105

STEP	PROCEDURE
1	Determine the defective pin or pins by inspection or other means.
2	At the back of the panel, insert an index card or folded paper between the sides of the terminal block and the adjacent terminal blocks to prevent shorting of other terminals during the pin extraction procedure. Use the pin and socket insertion tool to move the pin contact forward in the block, thus unseating the contact retaining tangs and allowing easy removal. <i>Caution: Do not bend adjacent pin contacts, protected by the index card or folded paper, during this entire procedure.</i>
3	At the front of the panel, insert the pin and socket extraction tool over the pin selected in Step 1 (Fig. 4) by placing the sleeve of the extraction tool over the pin to be removed and pushing the tool into the pin cavity until it is seated (approximately 1/2 inch). <i>Note:</i> The push rod button should be pulled back from the handle so that the retaining tangs are not reseated.
4	Rotate the handle several times.
5	With one hand, apply sufficient pressure to maintain the sleeve seat while depressing the push rod button with the other hand. The pin will be ejected at the back of the panel.
6	Replace the pin with a new one by grasping the new pin, by the wire-wrapped terminal, in the tweezer action of the insertion tool (Fig. 5 less wire). From the back of the panel, push the pin into the receptacle hole vacated in Step 5 until it locks into place.

CHART 1A (Cont)

STEP	PROCEDURE
	<i>Note:</i> The seam on the plug side of the contact pin should be facing inboard on the horizontal center line to ensure proper mating (use the adjacent contact pins as a guide). The flat portion of the wire side of the contact pin will be oriented vertically.
7	Remove the wire-wrapped connection from the defective pin and connect it to the new pin.
	<i>Note:</i> If more than one pin contact is to be replaced, perform Steps 3 through 7 for each pin.
8	Remove the index card or folded paper inserted in Step 2.

CHART 1B**REPLACEMENT OF THE QUAD TERMINAL BLOCK (ORIGINAL PINS UNDAMAGED)****APPARATUS:**

1—Part No. 206140-1 (white), Terminal Block Assembly without pin contacts (Fig. 6 less pin contacts)*

or

1—Part No. 206140-2 (blue), Terminal Block Assembly without pin contacts (Fig. 6 less pin contacts)*

1—Kedman Company No. 1736 Screw-Starter (Section 074-765-101), or equivalent

1—KS-2631, Screwdriver, or equivalent

1—Part No. 305183, Pin and Socket Extraction Tool (Fig. 2)*

1—Part No. 91002-1, Pin and Socket Insertion Tool (Fig. 3)*

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STEP	PROCEDURE
1	Determine the defective terminal block and ensure that its terminal pins are still in proper working order.

CHART 1B (Cont)

STEP	PROCEDURE
2	<p>At the back of the panel, insert an index card or folded paper between the sides of the terminal block and the adjacent terminal blocks to prevent shorting of other terminals during the pin extraction procedure.</p> <p>Caution: <i>Do not bend adjacent pin contacts, protected by the index card or folded paper, during this entire procedure.</i></p>
3	<p>Select a white or blue quad terminal block assembly to match the one being replaced.</p>
4	<p>One at a time, extract each good pin from the defective terminal block and insert it into the corresponding position in the new terminal block without removing the wire-wrapped connections, as follows. At the back of the terminal panel, use the pin and socket insertion tool to move the pin contact forward in the block, thus unseating the contact retaining tangs and allowing easy removal. At the front of the terminal panel, insert the pin and socket extraction tool over the pin to be removed by placing the sleeve of the extraction tool over the pin and pushing the extraction tool into the pin cavity until it is seated (approximately 1/2 inch, Fig. 4).</p> <p>Note: The push rod button should be pulled back from the handle so that the retaining tangs are not reseated.</p>
5	<p>Rotate the handle several times. With one hand apply sufficient pressure to maintain the sleeve seat while depressing the push rod button with the other hand (Fig. 4). The pin will be ejected at the rear of the panel. Place this terminal pin with its wire-wrapped connection intact into the corresponding position in the new terminal block by using the pin and socket insertion tool to grasp it (Fig. 5), and push it into that position at the back of the terminal block until it locks into place. Repeat this step until all the pins of the defective terminal block (still in the panel) have been placed in the new terminal block.</p> <p>Note: The seam on the plug side of the contact pin should be facing inboard on the horizontal center line to ensure proper mating (use the adjacent contact pins as a guide). The flat portion of the wire side of the contact pin will be oriented vertically.</p>
6	<p>Remove the vertical file numbering strip from the back of the panel. Then remove the defective quad terminal block by removing the screws at the top and bottom of the terminal block back.</p> <p>Caution: <i>Ensure that the screws being removed are not dropped, thus shorting adjacent terminals (see screw-starter in apparatus list).</i></p>
7	<p>Insert the new terminal block in the vacancy produced in Step 6 by holding the new terminal block in place and replacing the screws and number strip removed.</p> <p>Caution: <i>Ensure that the screws being replaced are not dropped, thus shorting adjacent terminals (see screw-starter in apparatus list).</i></p>
8	<p>Remove the index card or folded paper inserted in Step 2.</p>

CHART 2
REPLACEMENT OF THE QUAD TERMINAL BLOCK (ONE OR MORE DEFECTIVE PIN CONTACTS)

APPARATUS:

1—KS-21048, List 2 (white), Quad Terminal Block Assembly (Fig. 6)

or

1—KS-21048, List 3 (blue), Quad Terminal Block Assembly (Fig. 6)

1—Kedman Company No. 1736 Screw-Starter (Section 074-765-101), or equivalent

1—KS-2631, Screwdriver, or equivalent

1—Part No. 305183, Pin and Socket Extraction Tool (Fig. 2)*

1—Part No. 91002-1, Pin and Socket Insertion Tool (Fig. 3)*

1—KS-20551, List 2, Wire Unwrapping Tool, or equivalent

1—KS-16863, Wire Wrapping Tool, or equivalent

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STEP	PROCEDURE
1	Determine the defective quad terminal block and pins.
2	At the back of the panel, insert an index card or folded paper between the sides of the terminal block and the adjacent terminal blocks to prevent shorting of other terminals during the pin extraction procedure.
3	Select a white or blue quad terminal block assembly to match the one being replaced.
4	Remove and replace each terminal pin from the new terminal block that can be replaced by good pins in the original block, as follows. If there are no good pins, proceed to Step 6. At the back of the new terminal block, use the pin and socket insertion tool to move

CHART 2 (Cont)

STEP	PROCEDURE
	<p>the pin contact forward in the block, thus unseating the contact retaining tangs and allowing easy removal. At the front of the new terminal block, insert the pin and socket extraction tool over the good pin to be removed from the new terminal block (Fig. 7) by placing the sleeve of the extraction tool over the pin and pushing the tool into the pin cavity until it is seated (approximately 1/2 inch, Fig. 7).</p> <p><i>Note:</i> The push rod button should be pulled back from the handle so that the retaining tangs are not reseated.</p>
5	<p>With one hand supply sufficient pressure to maintain the sleeve seat while depressing the push rod button with the other hand (Fig. 7). The pin will be ejected at the panel back. Place this terminal pin with its wire-wrapped connection intact into the corresponding position in the new terminal block by using the pin and socket insertion tool to grasp it (Fig. 5), and push it into that position at the back of the terminal block until it locks into place.</p> <p><i>Note:</i> The seam on the plug side of the contact pin should be facing inboard on the horizontal center line to ensure proper mating (use the adjacent contact pins as a guide). The flat portion of the wire side of the contact pin will be oriented vertically.</p>
6	<p>Remove the vertical file numbering strip from the back of the panel. Then remove the defective terminal block still containing the defective terminal pins and associated wire-wrapped connections by removing the screws at the top and bottom of the terminal block back.</p> <p><i>Caution: Ensure that the screws being removed are not dropped, thus shorting adjacent terminals (see screw-starter in apparatus list).</i></p>
7	<p>Insert the new terminal block in the vacancy produced in Step 6 by holding the new terminal block in place and replacing the screws and numbering strip removed.</p> <p><i>Caution: Ensure that the screws being replaced are not dropped, thus shorting adjacent terminals (see screw-starter in apparatus list).</i></p>
8	<p>Remove the wire-wrapped connections one at a time from the defective pins on the defective terminal block and connect them to the corresponding new pins of the new terminal block.</p>
9	<p>Remove the index card or folded paper inserted in Step 2.</p>

CHART 3A

REPLACEMENT OF THE FEMALE QUAD JUMPER PLUG SOCKETS

APPARATUS:

- 4—KS-21049, List 1, Quad Jumper Plug Sockets (Fig. 8)
- 1—Part No. 305183, Pin and Socket Extraction Tool (Fig. 2)*
- 1—Part No. 91002-1, Pin and Socket Insertion Tool (Fig. 3)*
- 1—Part No. 90066, Socket Hand Crimp Tool (Fig. 9)*
- 1—KS-20620, Wire Stripper, or equivalent

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STEP	PROCEDURE
1	Determine the defective quad plug socket or sockets.
2	At the wire face (Fig. 10), use the pin and socket insertion tool to move the socket contact toward the mating face, thus unseating the contact retaining tangs and allowing easy removal.
3	Insert the extraction tool over the end of the socket to be removed (at the mating face, Fig. 10) by aligning the socket and extraction tool sleeve; then, with slight pressure and rotation of the tool, insert the sleeve over the socket and into the quad plug until it is firmly seated (approximately 1/2 inch). <i>Note:</i> The push rod button should be pulled back from the handle so that the retaining tangs are not reseated.
4	Extract the socket from the quad plug by holding the quad plug firmly in one hand while grasping the handle of the extraction tool between the thumb and index finger of the other hand. Hold the tool so that the push rod button (extended) rests against the palm of the hand at the base of the index finger (Fig. 11). Apply pressure to the tool against the plug (to maintain seating). While maintaining the seating of the tool against the plug, apply pressure to the push rod button (Fig. 12), thus ejecting the socket. <i>Caution: Do not cover the wire face of the quad plug with the hand or fingers during the extraction operation, since the socket could be stabbed into the hand or fingers.</i> <i>Note 1:</i> Remove and replace all four of the quad plug sockets, even if only one is defective. All four sockets are removed and replaced to eliminate bending the quad wire

CHART 3A (Cont)

STEP	PROCEDURE
	<p>at its entrance to the quad plug wire face and to eliminate the possibility of excess strain on any one wire or socket of the quad jumper plug.</p> <p><i>Note 2:</i> For ease in performing Step 8, use the wire color code, Fig. 13, to make note of the relative positions of the sockets in the plug.</p>
5	<p>Ensure that sufficient wire remains for proper routing and fanning. If the length is insufficient, replace the entire jumper. If there is enough wire, cut the sockets off the quad wire.</p>
6	<p>Strip off approximately 3/16 inch of insulation from each wire of the quad, taking care not to cut or nick the strands of the wire.</p>
7	<p>Crimp a new socket onto each wire of the quad as follows.</p> <p><i>Note:</i> Observe the color code on the socket (Fig. 8); crimp the socket in the proper die of the crimping tool (brown, 26 to 30 gauge).</p> <ul style="list-style-type: none">(a) Open the tool. <p><i>Note:</i> This tool is equipped with a special ratchet system so that once the ratchet is engaged, the handles of the tool cannot be opened without completing the closure (Fig. 9).</p> <ul style="list-style-type: none">(b) Insert a socket, insulation barrel first, into the front of the tool (Fig. 14).(c) Position the socket locator in the slot between the insulation barrel and the wire barrel.(d) While holding the socket in place, squeeze the tool handles until the crimping dies close just enough to hold the socket in place. <p><i>Caution: Do NOT deform the insulation or wire barrel.</i></p> <ul style="list-style-type: none">(e) Insert the stripped wire through the contact locator until it rests against the wire stop.(f) Hold the wire in place and continue to squeeze the handles until the ratchet releases.(g) Remove the crimped contact. <p><i>Note:</i> When not in use, the handles of this tool should be kept closed to protect the crimping dies.</p>
8	<p>Replace each socket in its proper position in the quad plug as follows. (See Step 4, Note 2 or Fig. 13. Since the jumper is no longer a standard length, use a violet quad plug). Select the correct hole for a specific socket. Grasp the quad plug with the wire face</p>

CHART 3A (Cont)

STEP**PROCEDURE**

(Fig. 10) accessible. With the insertion tool, grasp the socket at the crimp (so that the wire and crimp rest in the groove in the tool and are aligned with it; similar to Fig. 5 with socket replacing pin). Insert the socket into the proper hole and push it into that hole from the wire face end until it is locked into position.

Note: The color code dot on the quad jumper plug socket should be facing inboard on the horizontal center line in the quad plug to ensure proper mating.

CHART 3B**REPLACEMENT OF THE QUAD JUMPER PLUG (SOCKETS UNDAMAGED)****APPARATUS:**

1—KS-21049, List 2 through 12, Quad Jumper Plug of proper color (see Table A)

1—Part No. 305183, Pin and Socket Extraction Tool (Fig. 2)*

1—Part No. 91002-1, Pin and Socket Insertion Tool (Fig. 3)*

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STEP**PROCEDURE**

- 1 Determine the defective quad jumper plug.
- 2 Remove the four good sockets as follows. At the wire face (Fig. 10), use the pin and socket insertion tool to move the socket contact toward the mating face, thus unseating the retaining tangs and allowing easy removal. Insert the extraction tool over the end of the socket to be removed (at the mating face, Fig. 10) by aligning the socket and extraction tool sleeve; then, with slight pressure and rotation of the tool, insert the sleeve over the socket and into the quad plug until it is firmly seated (approximately 1/2 inch, Fig. 11).

Note: The push rod button should be pulled back from the handle so that the retaining tangs are not reseated.

- 3 Extract the socket from the defective quad plug by holding the quad plug firmly in one hand while grasping the handle of the extraction tool between the thumb and index finger of the other hand. Hold the tool so that the push rod button (extended) rests against the palm of the hand at the base of the index finger (Fig. 11). Apply pressure to the

CHART 3B (Cont)

STEP	PROCEDURE
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tool against the plug (to maintain seating). While maintaining the seating of the tool against the plug, apply pressure to the push rod button (Fig. 12), thus ejecting the socket.

Caution: *Do not cover the wire face of the quad plug with the hand or fingers during the extraction operation, since the socket could be stabbed into the hand or fingers.*

Using the wire color code (Fig. 13), make note of the relative position of each socket.

- | | |
|---|--|
| 4 | Select a new quad plug to match the color of the one being replaced. |
| 5 | Replace each socket in its proper position in the quad plug (Step 3 or Fig. 13) by selecting the correct hole for a specific socket. Grasp the quad plug with the wire face (Fig. 10) accessible. With the insertion tool, grasp the socket at the crimp (so that the wire and crimp rest in the groove in the tool and are aligned with it; similar to Fig. 5 with socket replacing pin). Insert the socket into the proper hole and push it into that hole from the wire face side until it locks into position. |

Note: The color code dot on the quad jumper plug socket should be facing inboard on the horizontal center line in the quad plug to ensure proper mating.

CHART 4
REPLACEMENT OF THE QUAD JUMPER PLUG AND SOCKETS

APPARATUS:

- 4—KS-21049, List 1, Quad Jumper Plug Sockets (Fig. 8)
- 1—KS-21049, List 2 through 12, Quad Jumper Plug of proper color (see Table A)
- 1—Part No. 305183, Pin and Socket Extraction Tool (Fig. 2)*
- 1—Part No. 91002-1, Pin and Socket Insertion Tool (Fig. 3)*
- 1—Part No. 90066, Socket Hand Crimp Tool (Fig. 9)*
- 1—KS-20620, Wire Stripper, or equivalent

*AMP Incorporated, Harrisburg, Pennsylvania 17105

CHART 4 (Cont)

STEP	PROCEDURE
1	Determine that the quad plug and socket are both damaged.
2	Replace the entire quad jumper and repair it for future use.
3	Cut the damaged quad plug from the quad wire.
4	Select four new sockets and a violet quad plug to replace the defective one (color indicates nonstandard quad jumper length).
5	Strip the four wire ends of approximately 3/16 inch of insulation. Do not nick or cut the strands of the wire.
6	Crimp a new socket onto each wire of the quad as follows. <p data-bbox="355 879 1490 940">Note: Observe the color code on the socket (Fig. 8); crimp the socket in the proper die of the crimping tool (brown, 26 to 30 gauge).</p> <p data-bbox="371 974 597 1001">(a) Open the tool.</p> <p data-bbox="355 1035 1490 1096">Note: This tool is equipped with a special ratchet system so that once the ratchet is engaged, the handles of the tool cannot be opened without completing the closure (Fig. 9).</p> <p data-bbox="371 1129 1317 1157">(b) Insert a socket, insulation barrel first, into the front of the tool (Fig. 14).</p> <p data-bbox="371 1190 1490 1251">(c) Position the socket locator in the slot between the insulation barrel and the wire barrel.</p> <p data-bbox="371 1285 1490 1346">(d) While holding the socket in place, squeeze the tool handles until the crimping dies close just enough to hold the socket in place.</p> <p data-bbox="355 1379 1109 1407">Caution: Do NOT deform the insulation or wire barrel.</p> <p data-bbox="371 1440 1490 1501">(e) Insert the stripped wire through the contact locator until it rests against the wire stop.</p> <p data-bbox="371 1535 1466 1562">(f) Hold the wire in place and continue to squeeze the handles until the ratchet releases.</p>
7	Place each socket in its proper position in the quad plug (Fig. 13) by selecting the correct hole for a specific socket. Grasp the quad plug with the wire face (Fig. 10) accessible. With the insertion tool, grasp the socket at the crimp (so that the wire and crimp rest in the groove in the tool and are aligned with it; similar to Fig. 5 with socket replacing pin). Insert the socket into the proper hole and push it into that hole at the wire face until it locks into position.

Note: The color code dot on the quad jumper plug socket should be facing inboard on the horizontal center line in the quad plug to ensure proper mating.

CHART 5
CONSTRUCTION OF A QUAD JUMPER

APPARATUS:

- 8—KS-21049, List 1, Quad Jumper Sockets (Fig. 8)
- 2—KS-21049, List 2 through 12, Quad Jumper Plugs (Fig. 10)
- Quad Wire No. YR13845*
- 1—Part No. 91002-1, Pin and Socket Insertion Tool (Fig. 3)†
- 1—KS-20620, Wire Stripper, or equivalent
- 1—Part No. 90066, Socket Hand Crimp Tool (Fig. 9)†

*Belden Corporation, Richmond, Indiana

†AMP Incorporated, Harrisburg, Pennsylvania 17105

STEP	PROCEDURE
1	Determine the length of quad jumper needed (see Section 314-914-400).
2	Measure and cut the quad wire according to Step 1, not to exceed 30 feet.
3	Strip the eight wire ends of approximately 3/16 inch of insulation. Do not nick or cut the strands of the wire.
4	Select two new quad jumper plugs according to the color code in Table A.
5	Crimp a new socket onto each wire of the quad as follows.
	Note: Observe the color code on the socket (Fig. 8); crimp the socket in the proper die of the crimping tool (brown, 26 to 30 gauge).
	(a) Open the tool.
	Note: This tool is equipped with a special ratchet system so that once the ratchet is engaged, the handles of the tool cannot be opened without completing the closure (Fig. 9).
	(b) Insert a socket, insulation barrel first, into the front of the tool (Fig. 14).
	(c) Position the socket locator in the slot between the insulation barrel and the wire barrel.

CHART 5 (Cont)

STEP**PROCEDURE**

- (d) While holding the socket in place, squeeze the tool handles until the crimping dies close just enough to hold the socket in place.

Caution: *Do NOT deform the insulation or wire barrel.*

- (e) Insert the stripped wire through the contact locator until it rests against the wire stop.
- (f) Hold the wire in place and continue to squeeze the handles until the ratchet releases.

- 6 Place each socket in its proper position in the quad plug (Fig. 13) by selecting the correct hole for a specific socket. Grasp the quad plug with the wire face (Fig. 10) accessible. With the insertion tool, grasp the socket at the crimp (so that the wire and crimp rest in the groove in the tool and are aligned with it; similar to Fig. 5 with socket replacing pin). Insert the socket into the proper hole and push it into that hole at the wire face until it locks into position.

Note: The color code dot on the quad jumper plug socket should be facing inboard on the horizontal center line in the quad plug to ensure proper mating.

TABLE A
 QUAD JUMPER LENGTH – COLOR CODE

LENGTH IN FEET						COLOR OF QUAD PLUG
2.0	7.5	13.0	18.5	24.0	29.5	Red
2.5	8.0	13.5	19.0	24.5	30.0	White
3.0	8.5	14.0	19.5	25.0		Light Blue
3.5	9.0	14.5	20.0	25.5		Black
4.0	9.5	15.0	20.5	26.0		Yellow
4.5	10.0	15.5	21.0	26.5		Maroon
5.0	10.5	16.0	21.5	27.0		Green
5.5	11.0	16.5	22.0	27.5		Blue
6.0	11.5	17.0	22.5	28.0		Tan
6.5	12.0	17.5	23.0	28.5		Light Grey
7.0	12.5	18.0	23.5	29.0		Moss Green
Nonstandard						Violet

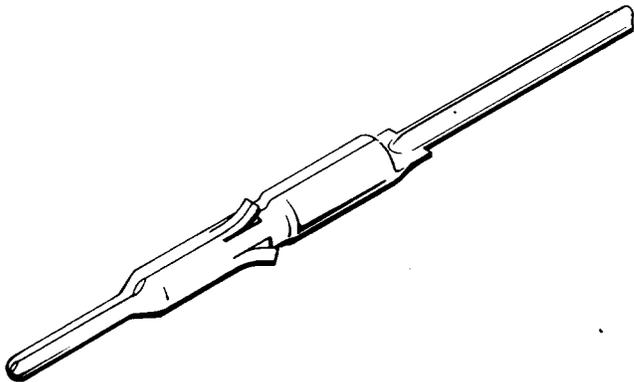


Fig. 1—Male Quad Terminal Panel Pin

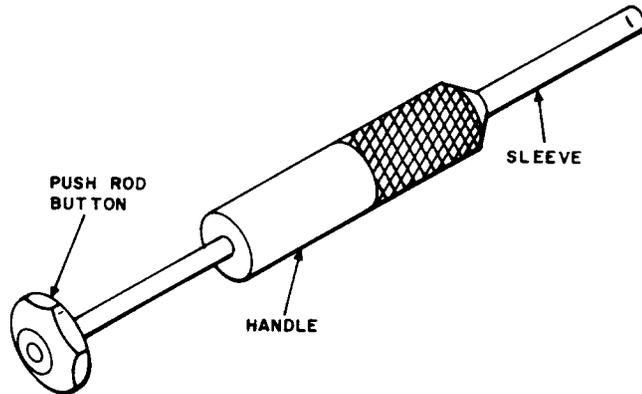


Fig. 2—Pin and Socket Extraction Tool

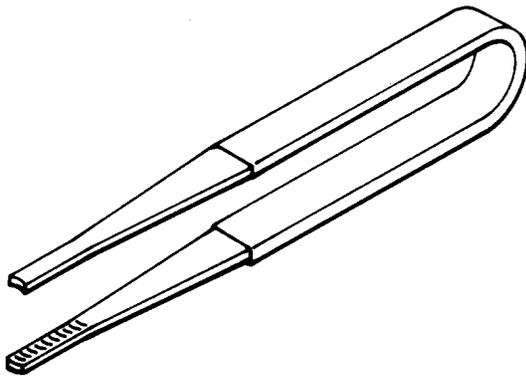


Fig. 3—Pin and Socket Insertion Tool

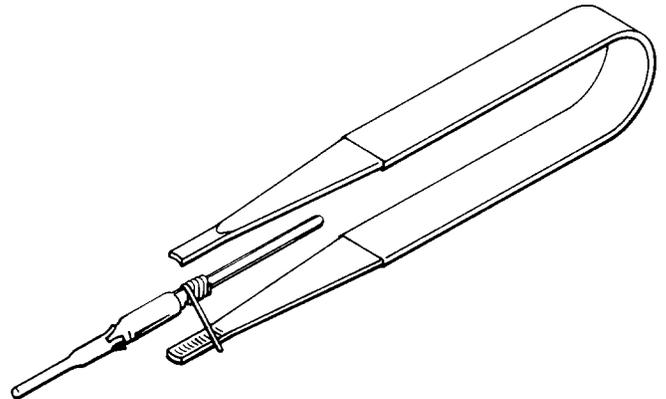


Fig. 5—Terminal Pin and Wire With Insertion Tool

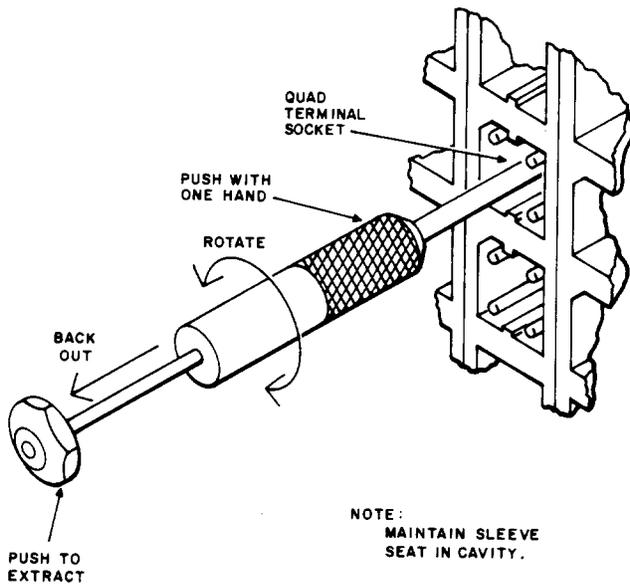


Fig. 4—Quad Terminal Pin Extraction

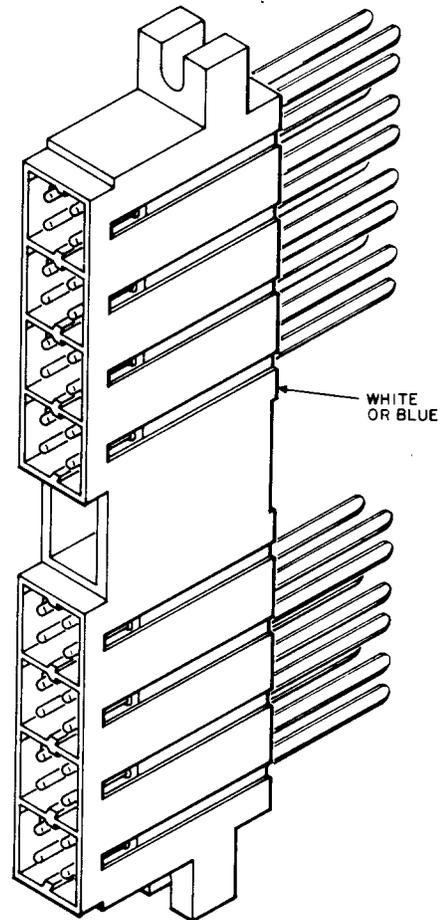


Fig. 6—Quad Terminal Block Assembly

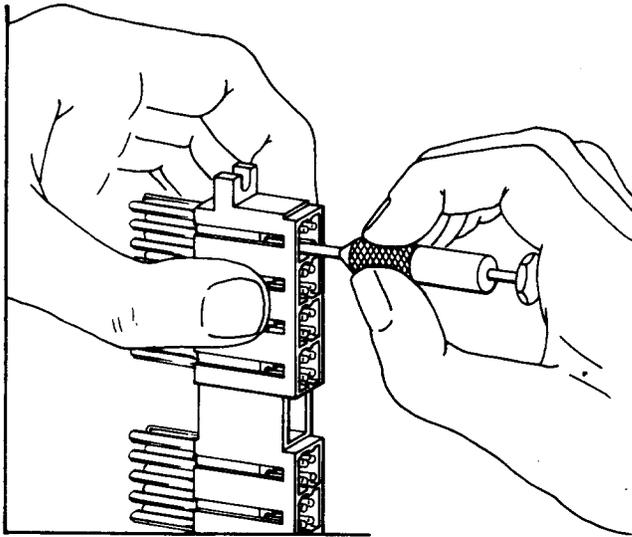


Fig. 7—Terminal Pin Extraction

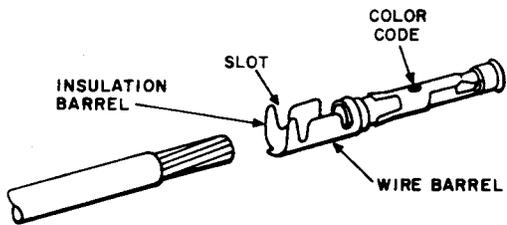
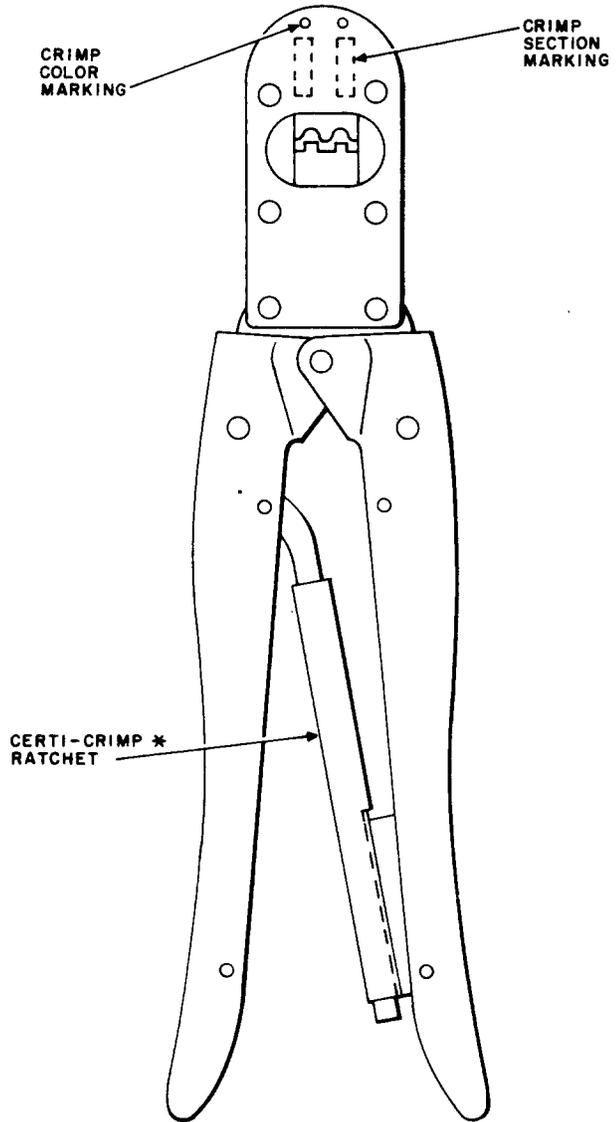


Fig. 8—Quad Jumper Plug Socket



* TRADEMARK OF AMP INC, HARRISBURG, PA

Fig. 9—Quad Jumper Plug Socket Hand Crimp Tool

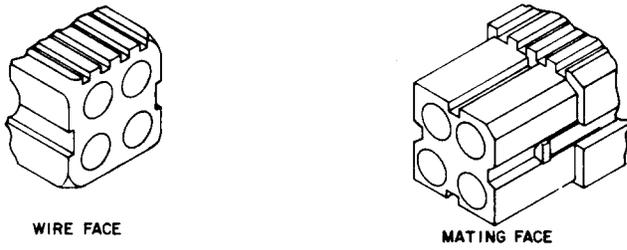


Fig. 10—Quad Jumper Plug

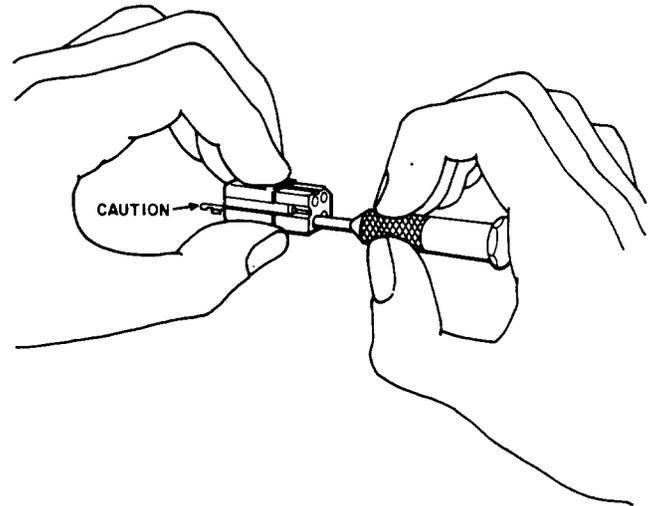


Fig. 12—Final Position in Socket Extraction

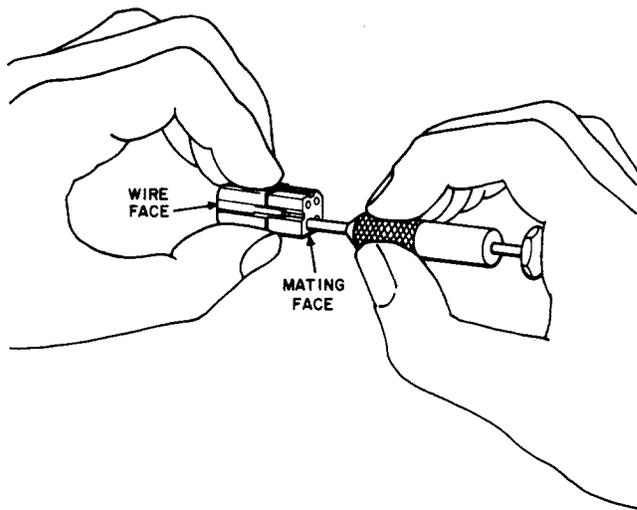
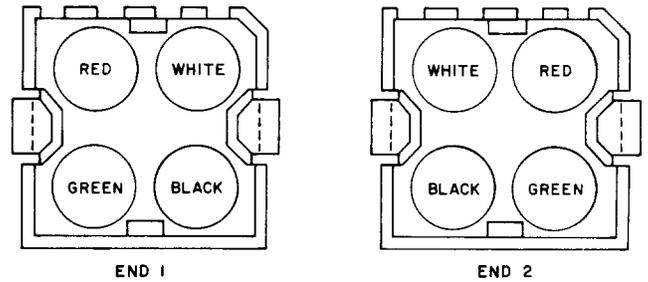


Fig. 11—Starting Position in Socket Extraction



NOTE WIRE REVERSAL

Fig. 13—Quad Jumper Plug Mating Face

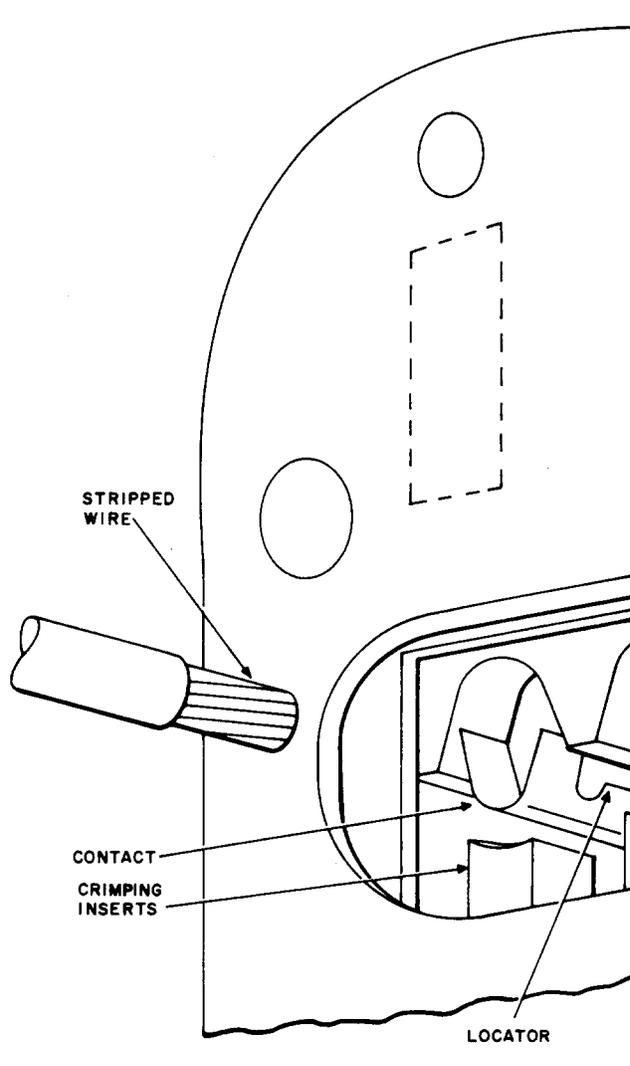


Fig. 14—Socket Hand Crimp Tool