

219 CONNECTOR  
PREPARATION AND TERMINATION OF CABLE

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1. GENERAL

1.1 Scope of Section

1.11 This section covers requirements and methods that apply when preparing cables for, and connecting cables to a 219 Connector.

1.2 Precautions Against Personal Injury, Equipment Damage and Service Interruptions

1.21 The specific precautions to be taken against personal injury, equipment damage and service interruptions are covered in this section with the associated methods.

1.3 Arrangement of Tools

1.31 Prior to starting operations covered by this section, the tools and other items required should be arranged at the work location so as to minimize inconvenience when handling.

1.4 Verification

1.41 Specific verifications for operations covered in this section are covered in Section 749V of this handbook.

1.42 There are eight 219 type connectors (219A through 219H). The types used to connect 724 coaxial cable to KS19224, L1 or L2 miniature coax (cable installed in LMX 2 equipment) are the 219D and the 219H. There is no physical difference between these two connectors. Only the stamping on the sleeve is different. The 219D is designed to connect 724 coax to KS19224, L1 mini coax and the 219H is designed to connect 724 coax to KS19224, L2 mini coax. Each 219 type connector installed should meet the following requirements.

1. When joining 724 coax to List 1 mini, the 219D connector must be used.
2. When joining 724 coax to List 2 mini, the 219H connector must be used.
3. Each 219D connector must have a blue shield connector (GSC-128 or KS-15712, L-13) on the mini coax.
4. Each 219H connector must have a red shield connector (GSC-138 or KS-15712, L-38 (1/2" long) or equivalent) on the mini coax.
5. The end of the shield connector closest to the 219 type connector must have a distinct hexagon shape. This is evidence that the proper shield connectors & crimping tools were used. The hexagon shape is not necessarily evidence of a sound mechanical connection.
6. There must be a very firm mechanical connection between the coaxial cables and the connector.
7. The center conductor of the cables must be soldered. Outlines of two center conductor must be visible under solder. (Remove screw and slide sleeve back for inspection.)
8. The connector must be wrapped with electrical tape 1/4" beyond each end of the connector or use KS-21886L-1 sleeving.
9. The 724 cables should be secured as specified in Note 27 of ED-50127-15 for L-1860 Multiplex and in Note 21 of ED-50129-19 for L-600 Multiplex. See Fig. 6.

2. INSTALLING EQUIPMENT

2.1 In addition to the tools and supplies ordinarily required for connecting and soldering operations, the following is required for the operations covered in this section.

R-4121 Soldering Station Temp Controlled  
 R-4107 Pliers, Needlenose, Midget  
 R-4108 Cutters, Diagonal, Midget  
 R-2783 Fixture, Holding Coaxial Cable  
 RM-728226 Solder, Rosin Core, .040" Diameter (A rosin core solder containing 60% tin, 40% lead, 3% to 6% rosin by weight. Used on printed wiring boards and miniature components.

KS-21886L-1 Special Sleeving - Yellow, 2 inches long should be provided with 219 Type Connector.

2.2 Crimping Tool R-4081 dies should be kept clean of dirt and other foreign materials. Trichloroethane or equivalent solvent is suggested for this purpose.

2.3 The crimping tool ratchet should not release until the tool handle has been squeezed through its full travel. This is normally announced by a clicking noise. The dies should meet evenly when the tool is in the closed position. Replace any worn dies or defective handles.

### 3. DESCRIPTION OF 219 CONNECTOR

3.1 The 219 connector is a means of connecting two coaxial cables or terminating a coaxial cable end. It has a movable sleeve which has to be moved to the side so that the center conductor of the cable can be soldered to the conductor of the connector. It also has a terminal at each end to which, after careful preparation, the cable shield is fastened by means of a crimped outer shield connector. (The outer shield connectors are furnished with the 219 connector.) The general appearance of the connector is shown in Figure 1.

### 4. DRAWINGS

4.1 For reference see ED-92524-20, Sheet 1 Figure 113, ED-50127-15 Note 27 and ED-50127-19 Note 21.

### 5. PREPARATION OF CABLE

5.1 Cables should be prepared in accordance with Figure 2 with dimensions taken from Table A.

**NOTE:** The dimensions used for preparing the cables are critical and should not be gauged by eye.

5.11 Exercise care when preparing cable ends for termination. The braid (dimension "A") must be cut so that there are no ragged ends, which would effectively reduce the thickness of the braid at the cut end. Avoid any circumferential groove in the cable dielectric while cutting the shielding.

It is desirable that no damage be done to the dielectric, but a very slight scoring is permissible. However, for 724 coaxial cable it should not exceed 1/64 of an inch in depth, gauged by eye.

**NOTE:** No cut in the dielectric is permitted when using miniature coaxial cable KS-19224 L-1 or L-2.

5.12 Use extra care when removing and trimming shields to avoid puncturing fingers on the ends of the small shield wires.

5.13 Wire ends and clippings from the shields of wires or cables are a potential source of service interruptions if allowed to drop among apparatus or equipment in the vicinity of the work area.

5.14 The copper center conductor of the 724, 730 and KS-19906 coaxial cable must be scraped, abraded and pre-tinned with a thin coat of solder before it is inserted into the 219 connector. Solder type, 60% tin and 40% lead, RM-728226, must be used. The silver coated, copper-covered steel center conductor of KS-19224 miniature coaxial cable must not be tinned, scraped or abraded.

### 6. CONNECTING CABLE TO 219 CONNECTOR

6.1 Proceed as follows:

- (a) Prepare cable in accordance with Paragraph 6.
- (b) Remove screw which holds connector sleeve to connector body. Slide sleeve along cable, replace screw on connector body so as not to lose it.
- (c) Slide appropriate Special Sleeving KS-21886L-1, yellow, two inches long and outer shield connector (furnished with 219 connector) over cable. See Figure 3.
- (d) Fan braid slightly to allow terminal of connector to slide under more easily. Connector terminal should slide over cable dielectric until it stops. When connector is positioned properly the center conductor of the cable should be visible in the opening of the connector conductor. See Figure 4. The cut end of the braid should butt against the 219 connector.

- (e) Slide outer shield connector over braid until it butts against the 219 connector. Check to see if center conductor of cable is still visible. Table B will give the crimping tool required. Position crimping tool so that edge of dies are adjacent to but not touching 219 connector body. Crimp connection bay squeezing tool handle through its full travel. A shield connector that has been crimped properly will be hexagonally shaped with each side being flat, connection should show no lines. The outer sleeve should be 1/32 of an inch or less from the connector body. See Figure 5. The 219 type connector should not turn within the crimped connection when a moderate twist is applied with the fingers. No portion of the outer covering of a cable shall be crimped under the outer sleeve. The outer sleeve shall show no evidence of double crimping and shall be free of fractures or cracks.

**NOTE:** It is essential that the proper shield connector is used. Table B not only gives the proper crimping tool required but also the number code and the color code of the appropriate shield connectors required for specific 219 connectors.

- (f) The crimped portion of the outer sleeve shall be a minimum 1/4 inch measured along the axial dimension of the sleeve.
- (g) Before soldering the 219 connector make sure the center conductor of both cables is visible in the barrel of 219 connector. When soldering the 219 type connector the soldering iron shall be placed on bottom side of barrel (opposite side of solder slug) until solder flows. Do not add any additional solder the solder slug normally is all that is required. After soldering has been completed the outline of the center conductors must be visible in the barrel of 219 connector.

Under adverse working conditions it is possible that the solder, while it is still in a molten state, may flow from the conductor to the outer shell of the 219 connector creating a possible grounding problem. Check to see if this condition exists and if it does remove the excess solder. Droplets of solder that may have been formed while soldering should not be allowed to remain within the body of the connector. Verify that the shop made center conductor connection is still a good connection (not damaged by our installation work).

It is not recommended that additional solder be added, however, if it is necessary use RM-728266 Rosin Core (60% tin, 40% lead). Verify that center condition outlines are visible under added solder.

**NOTE:** Avoid excessive heat on conductor because the shop soldered side of the conductor may be come unsoldered.

**CAUTION:** Be aware that the soldering copper is extremely hot and careless handling of the copper could result in a severe burn.

- (h) The connector sleeve can now be slid into position and fastened with screw removed in Step (b).
- (i) New 219 Type Connectors now being shipped are provided with Special Slewing KS-21886 L-1, which is 2 inches long and yellow. This slewing should be placed over 219 type connector after outer sleeve is closed. When slewing KS-21886 L-1 is not provided tape the completed connection with over-lapping turns of tape extending 1/4 inch beyond each end of the connection. Apply tape carefully to insure the least possible amount of wrinkling and gapping. Refer to Section 700 Paragraph 6.5.

**7. TERMINATING UNEQUIPPED END OF 219 CONNECTOR**

- 7.1 Upon completion of work in the duct area if there are any 219

connectors with unequipped ends, slide shield connector over terminal and tape in place.

**8. SUPPORTING CABLE TO ELIMINATE STRAIN ON 219 CONNECTOR AND KS-19224 MINI CABLE**

8.1 When the 219 connector is used to connect a KS-19224 miniature coaxial cable to a larger cable, the connector should be positioned so that it and the mini cable will be supported entirely by the larger cable. See Figure 6.

8.11 When a connection is made within a cable duct and cable requirements are such that an excessive amount of slack is left within the duct, the slack should be fed back into the cable rack. Do not feed slack mini coax cable into the cable rack. The portion of cable left in the duct should be tied to the cable straps or to shop cables to insure protection for the 219 connector in congested cable ducts or in ducts where future work will take place.

**9. INSTALLATION TRAINING AID**

9.1 Chart coaxial cable skinning and crimping, R-4269, has been standardized as an aid to the installer while making coaxial connections.

9.2 This is a double sided plastic card 3 1/4" X 4 7/8" in size with skinning information on one side.

9.3 This card can be ordered from Installation Stockkeeping, Order No. 83426900, Chart R-4269. This chart is meant to be a give-away that the installer doing this work can carry in his pocket for ready reference. It is meant to supplement this handbook section, not replace it.

**10. VERIFICATION**

10.1 Refer to Section 749V for verification items for this section.

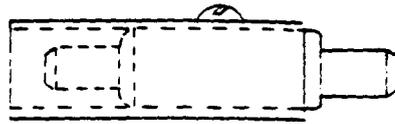
TABLE A

CABLE	CONNECTOR	DIMENSION			
		A	B	C	D
730	219A, 219B, 219E	1/2	1/16	3/16	3/4
724	219A, 219C, 219D, 219G, 219H	1/2	1/16	3/16	3/4
KS-19224, L-2	219B, 219F, 219H	1/2	1/8	3/16	13/16
KS-19224, L-1	219D	1/2	1/8	3/16	13/16
KS-19906	219G	1/2	1/16	3/16	3/4

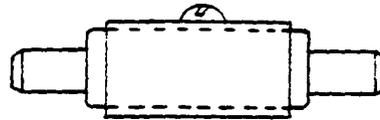
TABLE B

CONNECTOR	CONNECTS CABLES:	OUTER SHIELD CONNECTOR KS-15712,L-	OUTER SHIELD CONNECTOR COLOR CODE	CRIMPING TOOL	
				KS-15710,L-	R-4081 DET. NO.
219A	730 to	20	YELLOW (O.D. .297)	6	6 -11
(SEE NOTE)	724	22	(TIN (O.D. .372)	2 or 3	3 -16
219B	730 to	20	YELLOW (O.D. .297)	6	6 -11
(SEE NOTE)	KS-19224,L-2	38	RED (O.D. .179)	4 or 5	7 -01
219C	724 to	22	TIN (O.D. .372)	2 or 3	3 -16
(SEE NOTE)	724	22	TIN (O.D. .372)	2 or 3	3 -16
219D	724 to	22	TIN (O.D. .372)	2 or 3	3 -16
(SEE NOTE)	KS-19224,L-1	36	BLUE (O.D. .152)	4 or 5	7 -00
219E	730 to	20	YELLOW (O.D. .297)	6	6 -11
(SEE NOTE)	730	20	YELLOW (O.D. .297)	6	6 -11
219F	KS-19224,L-2 to	38	RED (O.D. .179)	4 or 5	7 -01
	KS-19224,L-2	38	RED (O.D. .179)	4 or 5	7 -01
219G	724 to	22	TIN (O.D. .372)	2 or 3	3 -16
(SEE NOTE)	KS-19906	1	BLUE (O.D. .215)	1	7 -03
219H	724 to	22	TIN (O.D. .372)	2 or 3	3 -16
(SEE NOTE)	KS-19224,L-2	38	RED (O.D. .179)	4 or 5	7 -01

**NOTE:** Information shown in the above tables for the 724 cable may also be used for the 728A cable and information shown for the 730 Cable may be used for the 731 Cable.



219A CONNECTOR



219B THRU 219H CONNECTOR

FIG. 1 GENERAL APPEARANCE OF 219 CONNECTOR

MVI-1570A

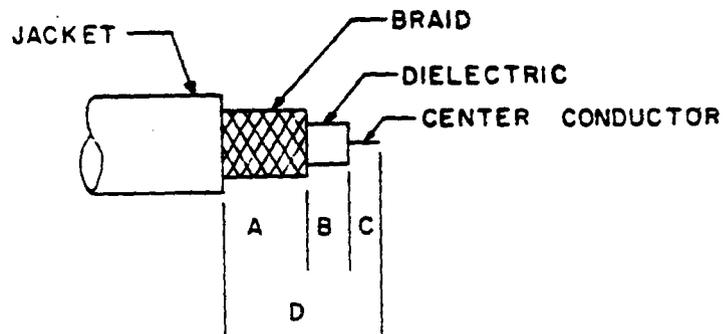


FIG 2 METHOD OF PREPARING CABLE

MVI-1570B

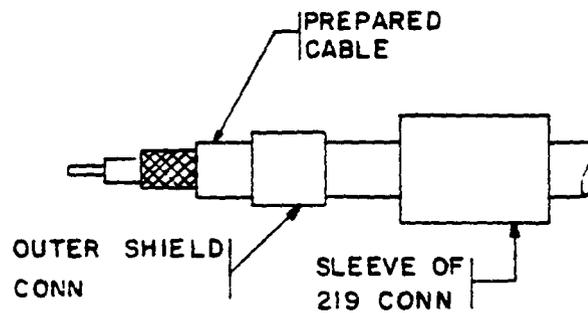


FIG 3 SLIDE OUTER SHIELD CONNECTOR AND SLEEVE OF 219 CONNECTOR OVER CABLE

MVI-1570C

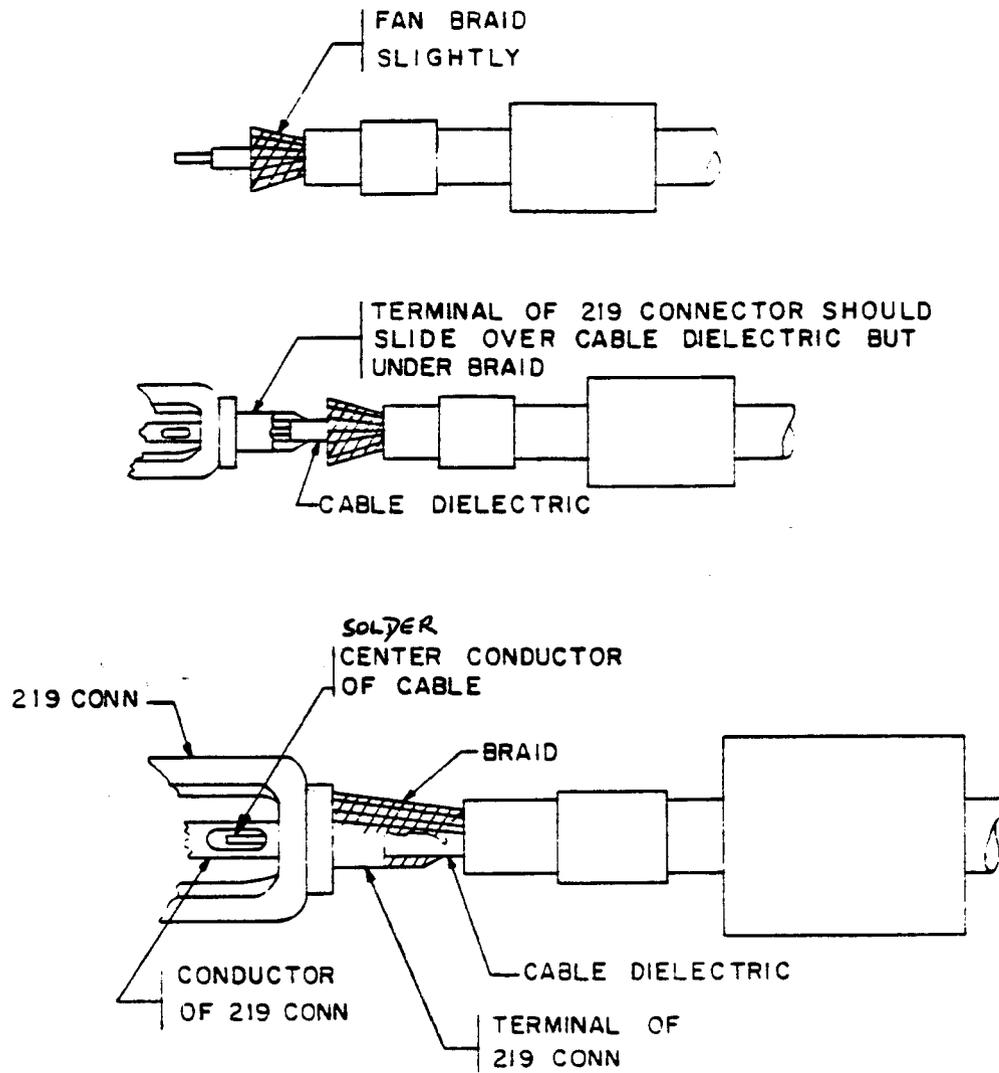
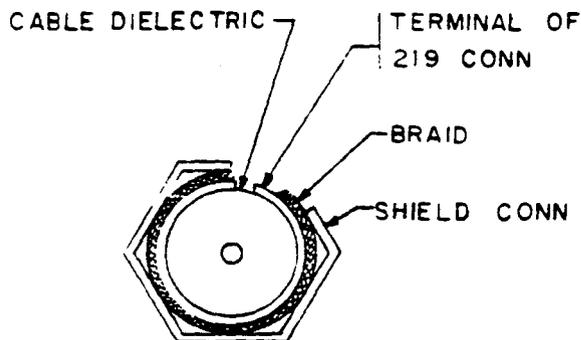


FIG 4 SEQUENCE OF MATING 219 CONNECTOR TO CABLE

MVI-1570D



PROPERLY CRIMPED

FIG. 5A

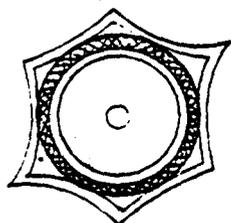


FIG. 5B

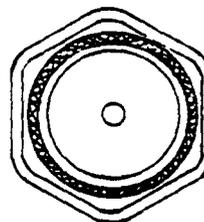


FIG. 5C

IMPROPERLY CRIMPED

EXAMPLES OF CRIMPED  
OUTER SHIELD CONNECTORS  
CROSS SECTIONAL VIEW

MVI-1570E

11. Fig. 5A illustrates an ideally proper crimp connection. A very slight concavity of the flat surface does not necessarily indicate a bad connection.

Fig. 5B illustrates an improperly crimped connection, possibly caused by oversize shield connector, use of defective or wrong crimping tool or die (undersize).

Fig. 5C illustrates an improperly crimped connection, possibly caused by defective or wrong crimping tool or die (oversize) or incomplete closure of crimping tool.

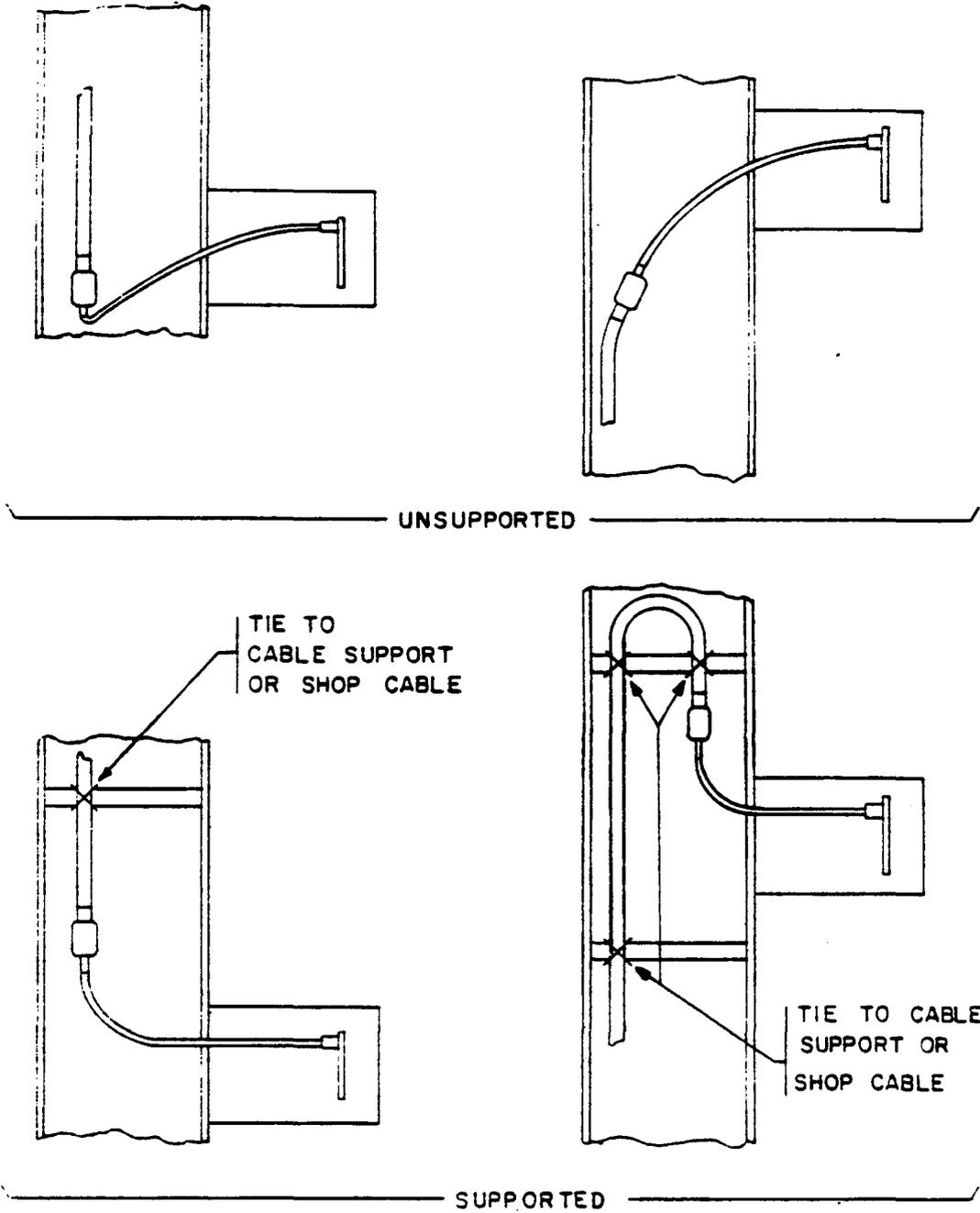


FIG 6 EXAMPLES OF SUPPORTING MINI-CABLE.

MVI-1570F

Arrowed lines indicate new or changed information

REASON FOR REISSUE:  
To remove reference to obsolete outer sleeves from Table B.

Manager, Engineering Transmission Products