

# TEST EQUIPMENT, CORDS, PLUGS, WARNING MARKERS, GUARDS, INSULATORS, AND INDICATORS DESCRIPTION AND USE DISTRIBUTING AND PROTECTOR FRAMES

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**1. GENERAL**

**1.01** This practice describes the test equipment, cords, plugs, warning markers, guards, insulators, and indicators used with connecting apparatus for conventional distributing frames and *COSMIC*® distributing frames and associated protector frames.

**1.02** This practice is reissued as part of a general restructuring, updating, and combining of the 201-series of practices. This is a general revision and revision arrows are not used. The test equipment, cords, plugs, warning markers, guards, insulators, and indicators information from the following Practices is combined with this practice:

- 201-208-101

- 201-208-102

- 201-208-105

- 201-222-103

**2. TEST CONNECTORS**

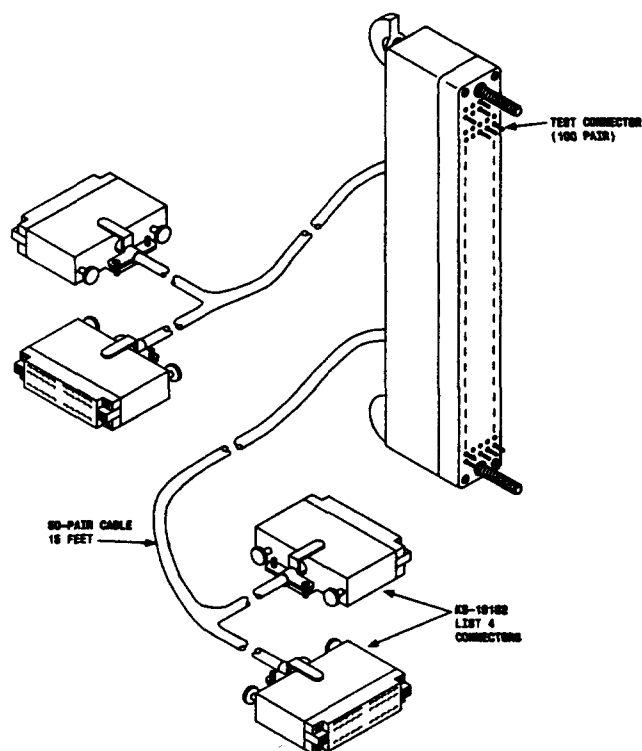
**2.01** Test connectors are portable test devices that connect to the test terminal fields of connectors to test outside plant cable pairs. Multiple pair testing or one-at-a-time testing is provided. Test cords must be provided separately. Table A is a test connector selection guide.

**TABLE A**  
**TEST CONNECTOR SELECTION GUIDE**

ASSOCIATED CONNECTORS	CABLE PAIR TESTING	QTY PAIRS IN TEST FIELD	TEST CONNECTOR CODE	AT SPEC	TEST CONNECTOR COMCODE
311,310M, 310	Multiple Pair or Single Pair Using Pick Test Panel.	100	T Test	AT-8987	402796841
309	Multiple Pair or Single Pair Using Pick Test Panel. Can Be Used With or Without Protector Units.	100	U Test	AT-9007	403031784
308	Multiple Pair	100	P Test	AT-8906	402222715
	Single Pair	100	R Test	AT-8916	402352579
307	Multiple Pair or Single Pair Using Pick Test Panel. Can Be Used With or Without Protector Units.	100	299A Test Adapter	None	103065819
	Multiple Pair or Single Pair Using Pick Test Panel. Used With Protector Units Fully Inserted or in Detent Position.	100	299B Test Adapter	None	105053862
305	Multiple Pair	100	M Test	AT-8823	401788807
	Single Pair	100	N Test	AT-8882	401927090
303	Single Pair	50	H Test	AT-8461	400359758
	Multiple Pair	50	C-4920 or C-4930	None	401887252 401489133
302, A1,B1,B3,E1	Single Pair	50	D Test	AT-8265	400129359
	Multiple Pair	50	C-4930	None	401489133
302, A4,B4,E3	Single Pair	50	G Test	AT-8353	400318689
301,444C	Multiple Pair	50	F Test	AT-8345	400318671
300	Multiple Pair	50	C Test (DA)	AT-8214	—
C50,C52, 1177	Multiple Pair	50	B Test (DA)	AT-8148	—

**T TEST CONNECTOR (AT-8987)**

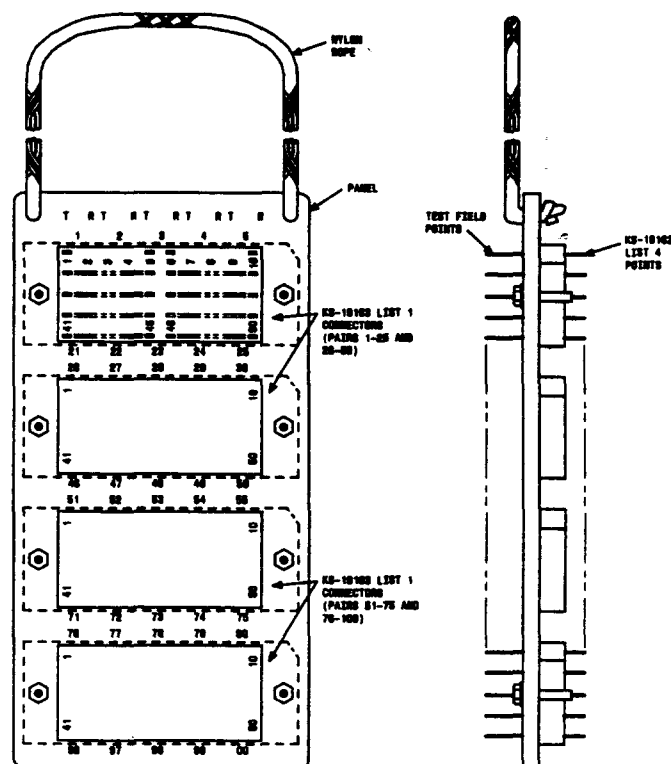
**2.02** The T test connector (Figure 1) is used to connect the 100-pair test terminal field of the 310-, 310M-, or 311-type connector to automatic pair identification equipment. The test connector contains 200 (100 pairs) spring-loaded contacts that are internally connected to two 50-pair, 15-foot long cables. Each cable terminates on two 25-pair KS-19162, L4 (or equivalent) connectors for attachment to automatic pair identification equipment. The four connectors are numbered 1-25, 26-50, 51-75, and 76-100 to identify the respective cable pair count. A separate pick test panel is furnished with the T test connector for single or pair-at-a-time testing. The test connector is also furnished with an F (AT-8854) carrying case.



**Figure 1—T Test Connector (AT-8987)—For 310-, 310M-, or 311-Type Connectors**

**PICK TEST PANEL ASSEMBLY**

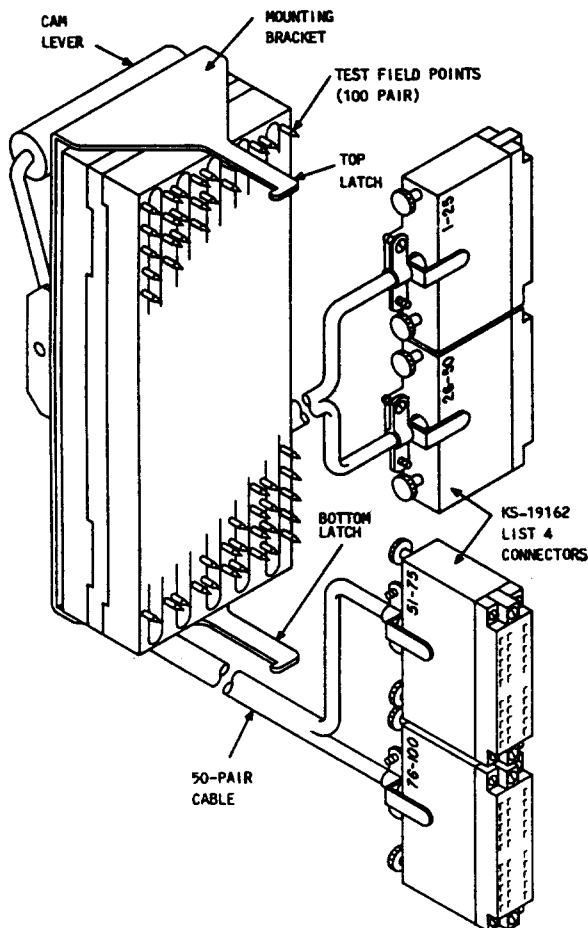
**2.03** The pick test panel assembly (Figure 2) is furnished with the T and U test connectors and the 299A and 299B test adapters to access the 100-pair field of the test connectors and adapters for single or pair-at-a-time testing. The four KS-19162, L4 connectors on the test connectors or adapters are attached to the pick test panel, tone is applied, and a B test point tester is used to identify individual pairs. The T test connector is used with the 310-, 310M-, and 311-type connectors. The U test connector is used with the 309-type connector, and the 299A and 299B test adapters are used with the 307-type connector. The pick test panel assembly is packed in the test connector and adapter carrying cases.



**Figure 2—Pick Test Panel—Used With T and U Test Connectors and 299A and 299B Test Adapters—For 307-, 309-, 310-, 310M-, or 311-Type Connectors**

**U TEST CONNECTOR (AT-9007)**

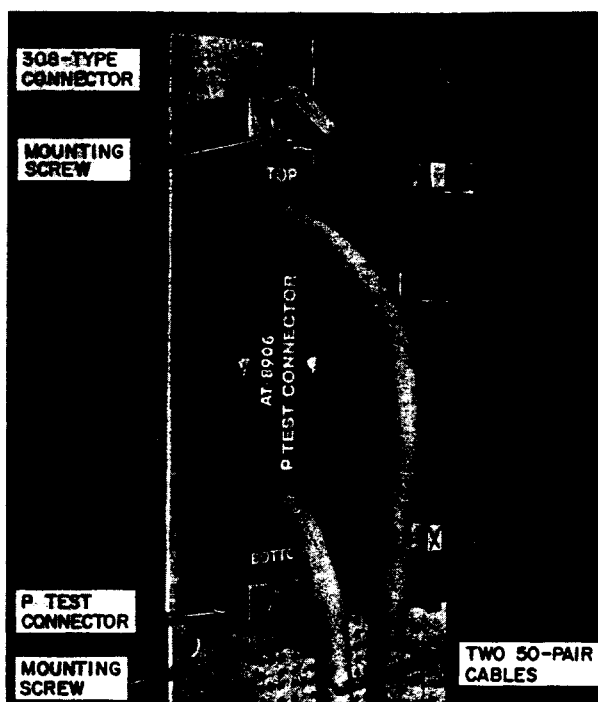
**2.04** The U test connector (Figure 3) is used to connect the 100-pair protector panel of the 309-type connector to automatic pair identification equipment. The test connector makes contact with the outside plant T and R conductors through the test points in the top of the 4C-type protector units. If the 309-type connector is not equipped with the protector units, the contacts in the test connector make contact with the outside plant T and R conductors through their respective jacks in the protector panel. The test connector contains 200 (100 pairs) spring-loaded contacts that are internally connected to two 50-pair, 15-foot long cables. Each cable terminates on two 25-pair KS-19162, L4 (or equivalent) connectors for attachment to automatic pair identification equipment. The four connectors are numbered 1-25, 26-50, 51-75, and 76-100 to identify the respective cable pair count. A separate pick test panel is furnished with the U test connector for single or pair-at-a-time testing. The test connector is also furnished with a KS-22396, L1 carrying case.



**Figure 3—U Test Connector (AT-9007)—For 309-Type Connectors**

**P TEST CONNECTOR (AT-8906)**

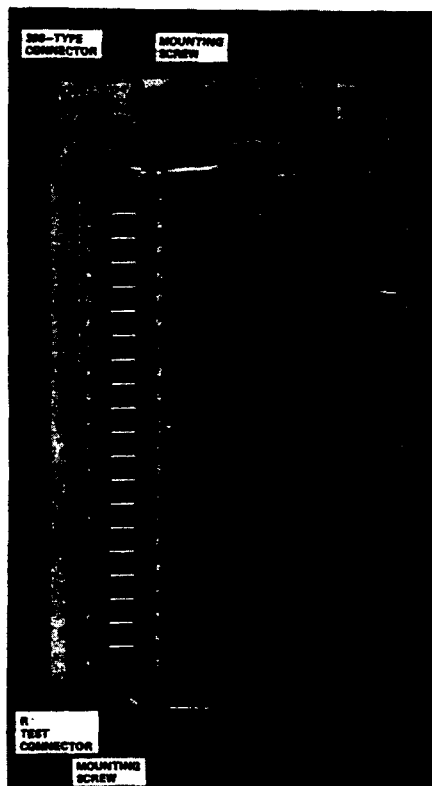
**2.05** The P test connector (Figure 4) is used to connect the 100-pair test terminal field of the 308-type connector to automatic pair identification equipment. The test connector contains 200 (100 pairs) spring-loaded contacts that are internally connected to two 50-pair, 15-foot long cables. Each cable terminates on two 25-pair KS-19162, L4 (or equivalent) connectors for attachment to automatic pair identification equipment. The four connectors are numbered 1-25, 26-50, 51-75, and 76-100 to identify the respective cable pair count. The test connector is furnished with an F (AT-8854) carrying case.



**Figure 4—P Test Connector (AT-8906)—Mounted on a 308-Type Connector**

**R TEST CONNECTOR (AT-8916)**

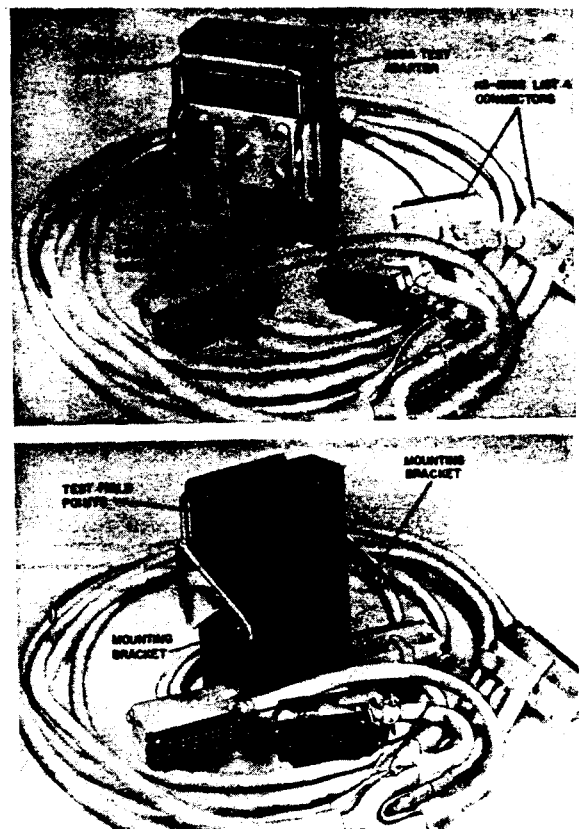
**2.06** The R test connector (Figure 5) is used to make test contacts with the 100-pair test terminal field of the 308-type connector. The test connector contains 200 (100 pairs) spring-loaded contacts that are internally connected to 200 (100 pairs) exposed test field spikes (contacts). The test field spikes are located on the front of the test connector. The test spikes permit the attachment of test cords to equipment and provide a means of testing one cable pair at a time.



**Figure 5—R Test Connector (AT-8916) Mounted on a 308-Type Connector**

**299A TEST ADAPTER**

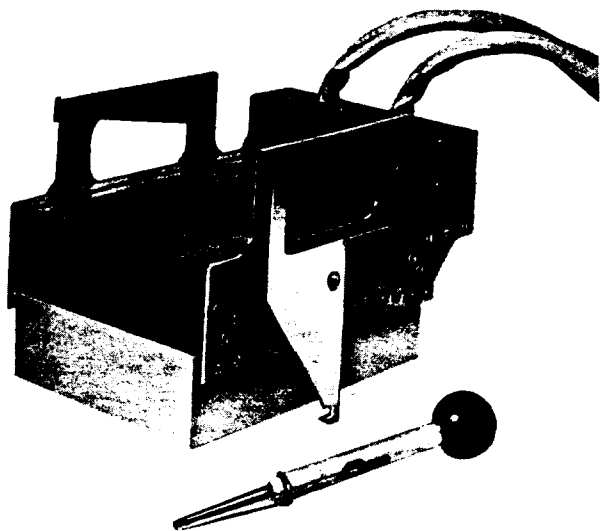
**2.07** The 299A test adapter (Figure 6) is used to connect the 100-pair protector panel of the 307-type connector to automatic pair identification equipment. The test adapter makes contact with the outside plant T and R conductors through the test points in the top of the 4C-type protector units. If the 307-type connector is not equipped with the protector units, the contacts in the test adapter make contact with the outside plant T and R conductors through their respective jacks in the protector panel. The test adapter contains 200 (100 pairs) spring-loaded contacts that are internally connected to two 50-pair, 15-foot long cables. Each cable terminates on two 25-pair KS-19162, L4 (or equivalent) connectors for attachment to automatic pair identification equipment. The four connectors are numbered 1-25, 26-50, 51-75, and 76-100 to identify the respective cable pair count. A separate pick test panel is furnished with the 299A test adapter for single or pair-at-a-time testing. The test adapter is also furnished with a KS-22396, L1 carrying case.



**Figure 6—299A Test Adapter—For 307-Type Connectors**

**299B TEST ADAPTER**

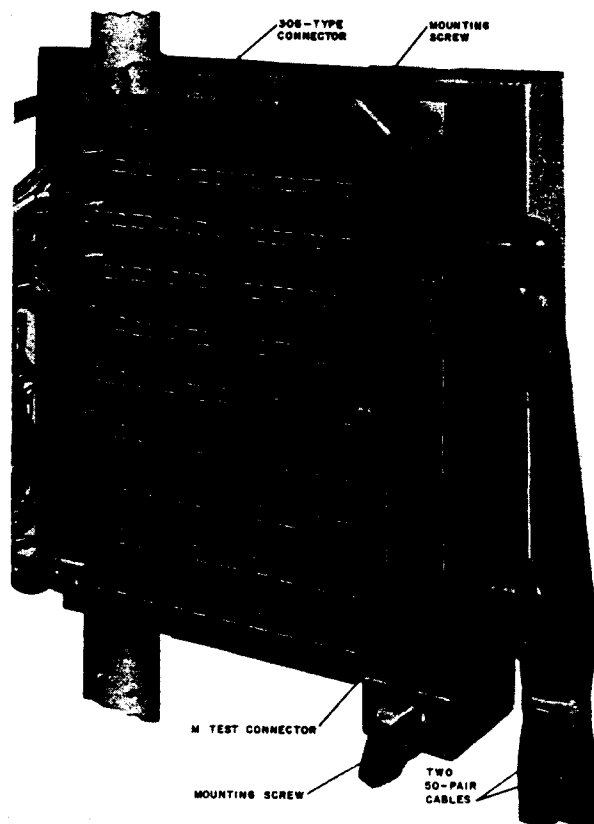
**2.08** The 299B test adapter (Figure 7) is used to connect the 100-pair protector panel of the 307-type connector to automatic pair identification equipment. The test adapter can be mounted onto a full complement of protector units without disturbing those protector units that are in a "detent" position. The protector units may be fully inserted or in the "detent" position. It also provides the capability (using the tool shown with the 299B test adapter in Figure 7) of manually placing any protector unit in the fully inserted or "detent" position while the test adapter is mounted in place on the 307-type connector. The test adapter makes contact with the outside plant T and R conductors through the test points in the top of the 4C-type protector units. The test adapter contains 200 (100 pairs) spring-loaded contacts that are internally connected to two 50-pair, 15-foot long cables. Each cable terminates on two 25-pair KS-19162, L4 (or equivalent) connectors for attachment to automatic pair identification equipment. The four connectors are numbered 1-25, 26-50, 51-75, and 76-100 to identify the respective cable pair count. A separate pick test panel is furnished with the 299B test adapter for single or pair-at-a-time testing. The test adapter is also furnished with a KS-22396, L1 carrying case.



**Figure 7—299B Test Adapter—For 307-Type Connectors**

**M TEST CONNECTOR (AT-8823)**

**2.09** The M test connector (Figure 8) is used to connect the 100-pair test terminal field of the 305-type connector to automatic pair identification equipment. The test connector contains 200 (100 pairs) spring-loaded contacts that are internally connected to two 50-pair, 15-foot long cables. Each cable terminates on two 25-pair KS-19162, L4 (or equivalent) connectors for attachment to automatic pair identification equipment. The four connectors are numbered 1-25, 26-50, 51-75, and 76-100 to identify the respective cable pair count. The test connector is furnished with an F (AT-8854) carrying case.

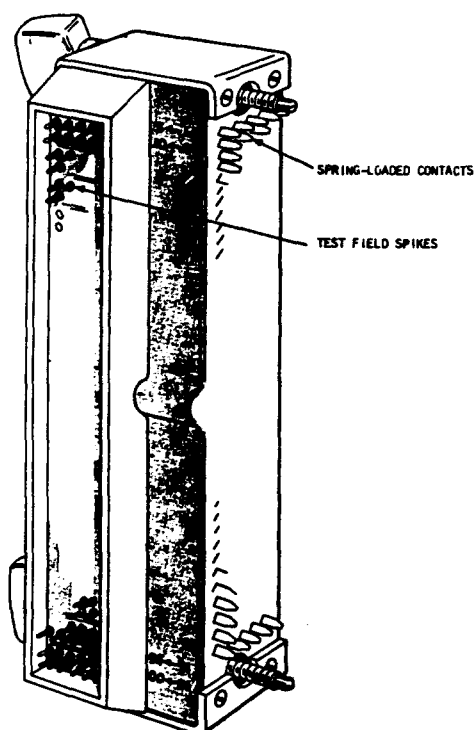


**Figure 8—M Test Connector (AT-8823) Mounted on a 305-Type Connector**



**N TEST CONNECTOR (AT-8882)**

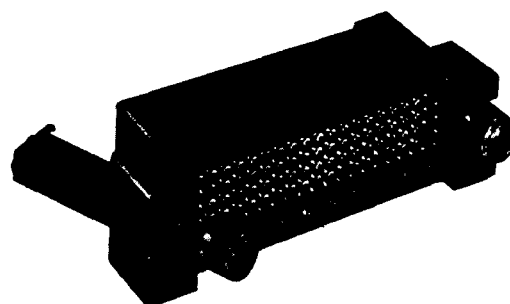
**2.10** The N test connector (Figure 9) is used to make test contacts with the 100-pair test terminal field of the 305-type connector. The test connector contains 200 (100 pairs) spring-loaded contacts that are internally connected to 200 (100 pairs) exposed test field spikes (contacts). The test field spikes are located on the side of the test connector. The test spikes permit the attachment of test cords to equipment and provide a means of testing one cable pair at a time.



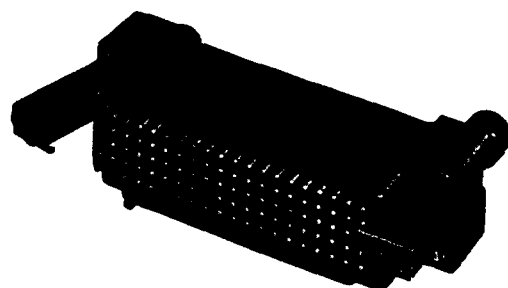
**Figure 9—N Test Connector (AT-8882)—For 305-Type Connectors**

**H TEST CONNECTOR (AT-8461)**

**2.11** The H test connector (Figure 10) is used to make test contacts with the 50 pairs of recessed, gold-plated test terminals on either one of the test terminal fields of the 303-type connector. The test connector contains 100 (50 pairs) spring-loaded contacts. It should not be inverted from one test terminal field to another. Both sets of pair numbering on the test connector have the same orientation.



**(a) FRONT VIEW**

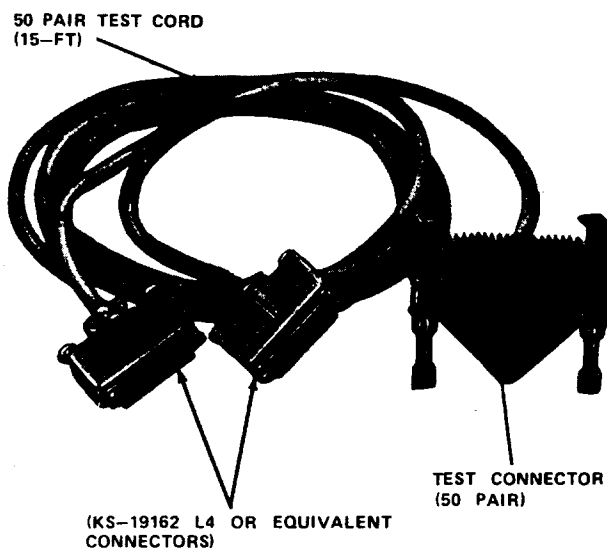


**(b) REAR VIEW**

**Figure 10—H Test Connector (AT-8461)—For 303-Type Connectors**

**C-4920 AND C-4930 MULTIPLE PAIR TEST CONNECTORS**

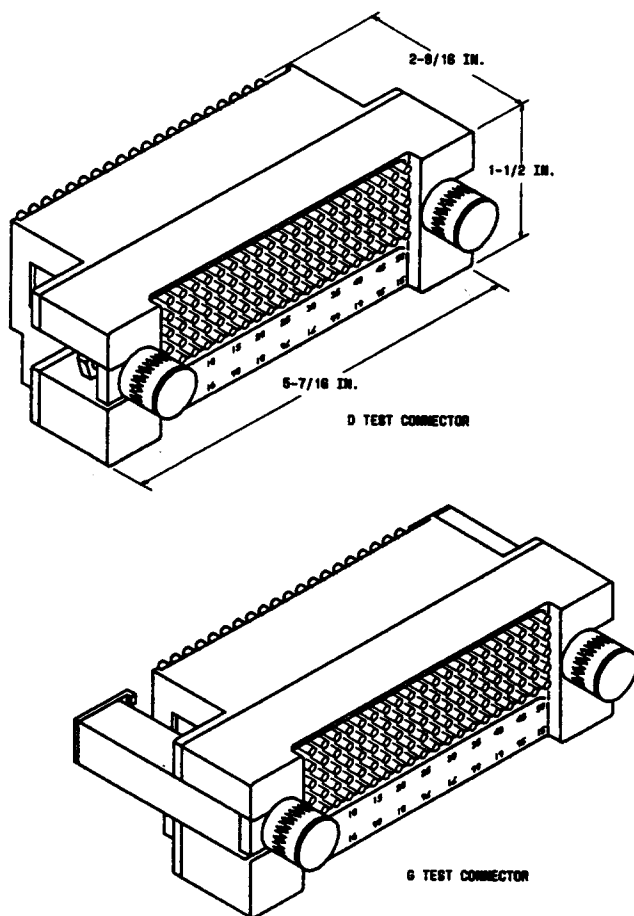
**2.12** The C-4920 multiple pair test connector is used on the 303-type connector and the 302-type 4 connector. The C-4930 multiple pair test connector is used on the 302-type 1 connector. The multiple pair test connectors (Figure 11) contain 100 (50 pairs) spring-loaded contacts that are internally connected to a 50-pair, 15-foot long cable. The cable terminates on two 25-pair KS-19162, L4 (or equivalent) connectors for attachment to automatic pair identification equipment. One of the KS-19162, L4 connectors is numbered 1-25 and 51-75 and the other is numbered 26-50 and 76-100 for use on either test field of the 303- or 302-type connectors to identify the respective cable pair count.



**Figure 11—C-4920 or C-4930 Multiple Pair Test Connectors—For 303- and 302-Type Connectors**

**D TEST CONNECTOR (AT-8265)**

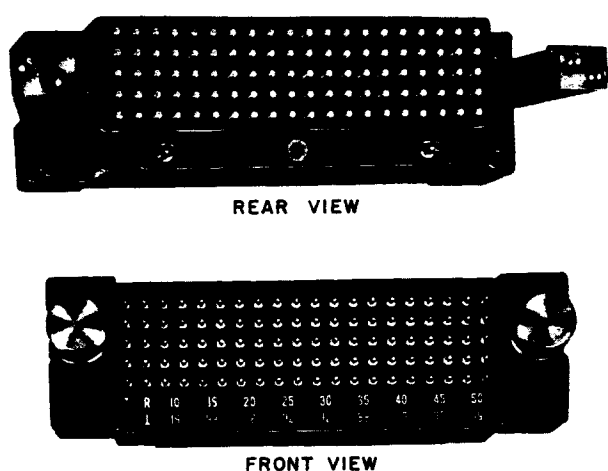
**2.13** The D test connector (Figure 12) is used to make test contacts with the 50 pairs of recessed, gold-plated test terminals on either of the two test terminal fields of the 302A1, 302B1, or 302E1 connector used on the modular protector frames. This test connector is used for one pair-at-a-time testing.



**Figure 12—D and G Test Connectors — Mounting Arrangements — For 302-Type Connectors**

**G TEST CONNECTOR (AT-8353)**

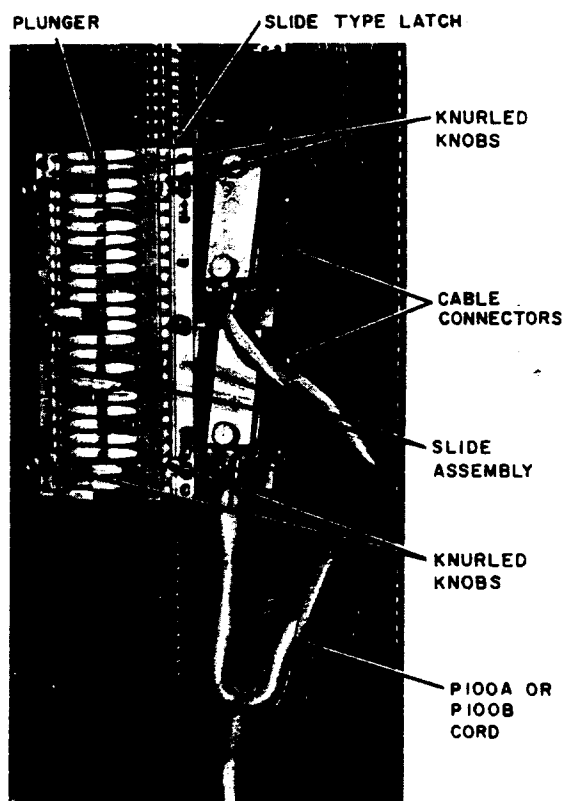
**2.14** The G test connector (Figure 13) is used to make test contacts with the 50 pairs of recessed, gold-plated test terminals on either of the two test terminal fields of the 302A4, 302B4, or 302E3 connector used on the double-sided protector frames. The test connector contains 100 (50 pairs) spring-loaded contacts. It has two sets of pair numbering, one inverted from the other for use on either test field of the connector.



**Figure 13—G Test Connector (AT-8353) — For 302-Type Connectors**

**F TEST CONNECTOR (AT-8345)**

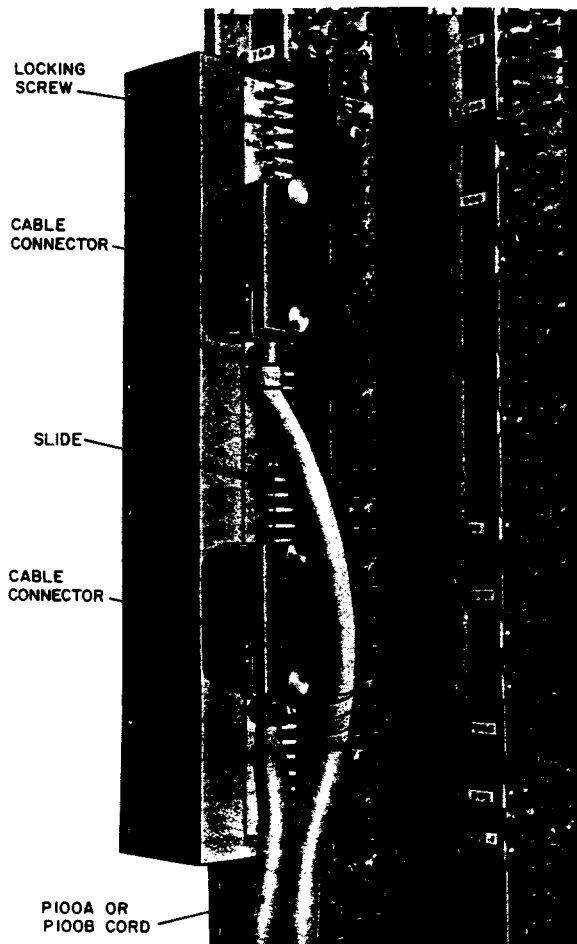
**2.15** The F test connector (Figure 14) is used to make test contacts with 50 consecutive pairs terminated on the 444-type jack or 301-type connector. The connector can be interconnected to automatic pair identification equipment through its two 25-pair connectors and by means of P100A or P100B cords, ordered separately. The test connector is equipped with a C connector case.



**Figure 14—F Test Connector (AT-8345) Mounted on a 444-Type Jack**

**C TEST CONNECTOR (AT-8214) DA (DISCONTINUED AVAILABILITY)**

**2.16** The C test connector (Figure 15) has two 25-pair connectors on the face for attaching a P100A or P100B cord.



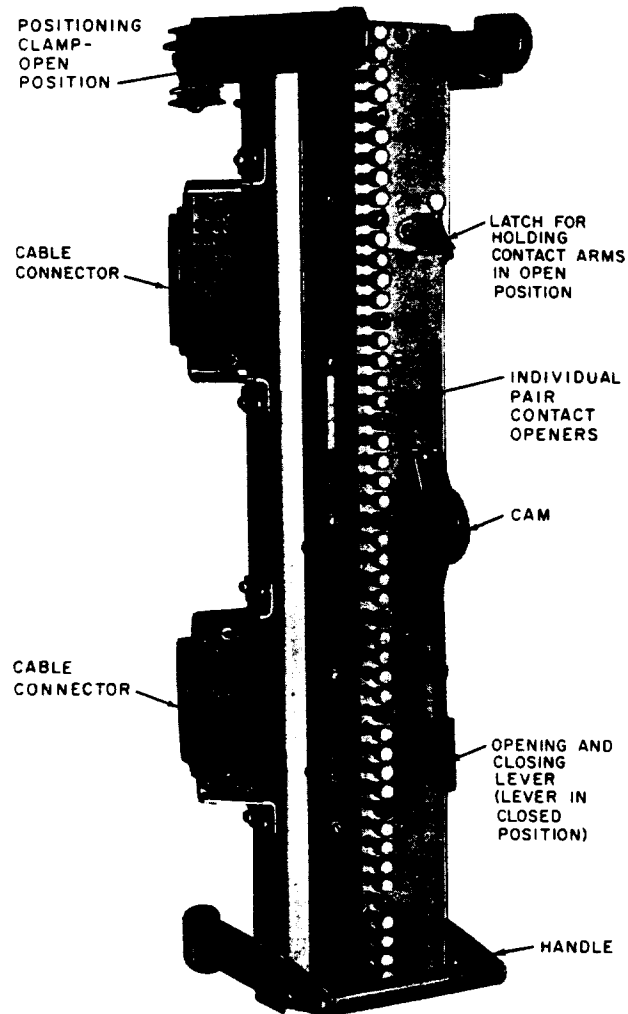
**Figure 15—C Test Connector (AT-8214) on 300-Type Connector**

**2.17** The plungers make or break contact with the cable pair test buttons by hand-operated plastic slides. The plungers ride on top of special circuit markers and thus avoid contact with pairs so equipped.

**2.18** The C test connector consists of a plastic baseplate containing an assembly of 100 spring-mounted plungers (50 pairs). The plungers are arranged to make positive contact with the cable pair test buttons located on the left side of 300-type connectors.

**B TEST CONNECTOR (AT-8148) DA (DISCONTINUED AVAILABILITY)**

**2.19** The B test connector (Figure 16) is designed to provide a quick and reliable means for making electrical contact, 50 pairs at a time, with the cable side of either the 1177-, C50-, or C52-type protectors. The P100A and P100B cords are required to interconnect the test connector to automatic pair identification equipment. Cords and connector case must be ordered separately.



**Figure 16—B Test Connector (AT-8148) — Front View**

### 3. TEST CORDS AND PLUGS

**3.01** Test cords and plugs are used with connectors/protectors and their associated test connectors for testing purposes. Tables B through I provide selection guides, usage information, illustrations, and schematics of the test cords and plugs.

TABLE B TEST CORDS AND PLUGS USED WITH 300 SERIES CONNECTORS — SELECTION GUIDE			
FUNCTION	CONNECTOR TYPE	TEST CORD	COMCODE
Individual pair test, short tip and/or ring	311, 310, 310M,	P2FM	103643987
	307, 309	P2FL	103105268
	308, 305, 303, 302	P2EF	102808581
Test OSP pair via a pick test panel	308, 305, 303, 302	W2FH	101616399
Access OSP pair via a vacant protector unit socket	311, 310, 310M, 309, 307, 305, 303	W2GL	101945590
	308, 302	W2GC	102959088
Connect KS-14103 breakdown test set via a vacant protector unit socket	311, 310, 310M, 309, 307, 305, 303	P2DB W2GM	101433852 102490935
	308, 302	W2GD	101636959
Access OSP/CO pairs for in and out test	311, 310, 310M, 309, 305, 303	W4CJ	101898633
	308, 302	W4BR	102530821
Bridge on OSP pair to various test equipment via a frame-mounted jack	308, 305, 303, 302	W2FM	101616449
Access OSP pair via a vacant protector unit socket for making Varley measurements.	311, 310, 310M, 309, 305, 303	W4CM	101981603
	302, 308	W4CL	101981611
Extensions for standard test connectors, except D, G, H, N, & R	311, 310, 310M, 309, 308, 307, 305, 303, 301, 300, 195, 444 C50, C52	P100A P100B	102268349 102268356

**TABLE C**  
**TEST CORDS AND PLUGS USED WITH 302-, 303-, 305-, 307-, 308-, 309-, 310-, 310M-, AND 311-TYPE CONNECTORS**

ITEM	ASSOCIATED CONNECTORS	USE	ILLUSTRATION AND SCHEMATIC
P2DB	303, 305, 307, 309, 310, 310M, 311	Used in series with a W2GM cord to connect a KS-14103 breakdown test set to a cable pair at a protector unit socket on a connector.	<p style="text-align: center;">P2DB</p>
P2EF	302, 303, 305, 308	Used to short the tip and ring, or to ground the tip and/or ring, of an individual cable pair by inserting the plug end into a pair of recessed test terminals on the connector. <b>This cord should not be used as an adapter for connecting longer cords.</b>	<p style="text-align: center;">CLIP END                      PLUG END</p>
P2FL	307, 309	Used to short the tip and ring or to ground the tip and/or ring, of an individual cable pair by inserting the plug end into the test points of a 4C-type protector unit.	<p style="text-align: center;">CLIP END                      PLUG END</p>

TABLE C (Contd)

## TEST CORDS AND PLUGS USED WITH 302-, 303-, 305-, 307-, 308-, 309-, 310-, 310M-, AND 311-TYPE CONNECTORS

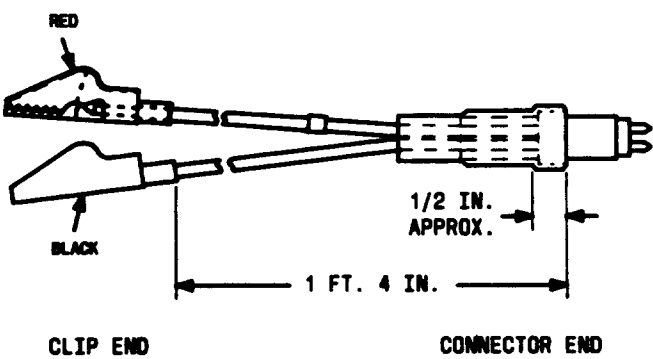
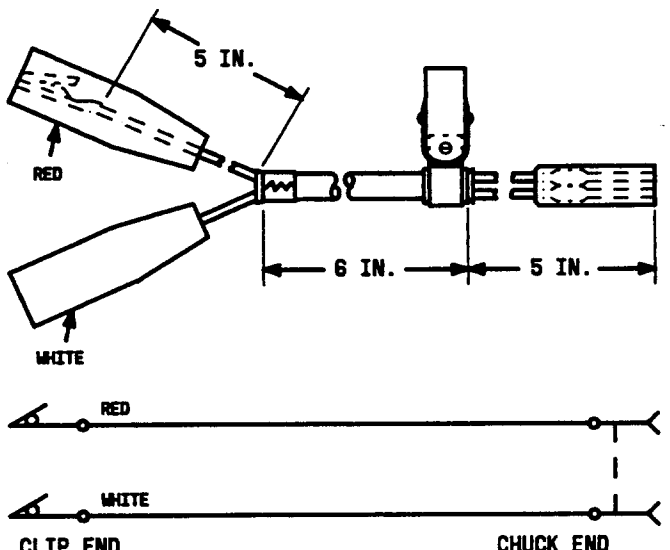
ITEM	ASSOCIATED CONNECTORS	USE	ILLUSTRATION AND SCHEMATIC
P2FM	310, 310M, 311	Used to short the tip and ring or to ground the tip and/or ring of an individual cable pair by inserting the plug end into a pair of recessed test terminals on the connector.	 <p>Diagram illustrating the P2FM test cord. The clip end is connected to the plug end. The plug end has two leads that are 1/2 IN. APPROX. apart. The total length of the cord is 1 FT. 4 IN.</p>
W2FH	302, 303, 305, 308	Used to connect an outside plant test set to a cable pair on the connectors (via the spiked terminals of the D, F, G, H, N, or R test connector).	 <p>Diagram illustrating the W2FH test cord. The clip end is connected to the plug end. The plug end has two leads that are 5 IN. apart. The plug end is connected to the chuck end. The chuck end has two leads that are 5 IN. apart. The total length of the cord is 6 IN.</p>



TABLE C (Contd)

## TEST CORDS AND PLUGS USED WITH 302-, 303-, 305-, 307-, 308-, 309-, 310-, 310M-, AND 311-TYPE CONNECTORS

ITEM	ASSOCIATED CONNECTORS	USE	ILLUSTRATION AND SCHEMATIC
W2FM	302, 303, 305, 308	Used to bridge a cable pair from a connector (via the spiked terminals of the D, F, G, H, N, or R test connector) to a test desk trunk through a frame mounted jack box.	<p>Diagram illustrating the W2FM test cord assembly. The assembly consists of a 464A connector, a 5 IN. section of cable, a 16 FT. section of cable, and a 5 IN. section of cable ending in a plug with WHITE and RED wires. The schematic shows the NOTCHED SIDE, PLUG END, and CHUCK END with WHITE and RED wires.</p>
W2GC	302, 308	Used to make a connection with a cable pair at a vacant protector unit socket on a connector. <i>Note:</i> The internal wiring (Tip and Ring) for 302- and 308-type connectors is reversed from other 300-series connectors. (See Fig 17)	<p>Diagram illustrating the W2GC test cord assembly. The assembly consists of a 5 IN. section of cable with WHITE and RED wires, a 3 FT. section of cable, and a 463A connector. The 463A connector has a FACE OF PLUG with W and R terminals. The schematic shows the CLIP END, PLUG END, and the internal wiring (WHITE and RED) connected to T and R terminals.</p>

TABLE C (Contd)

## TEST CORDS AND PLUGS USED WITH 302-, 303-, 305-, 307-, 308-, 309-, 310-, 310M-, AND 311-TYPE CONNECTORS

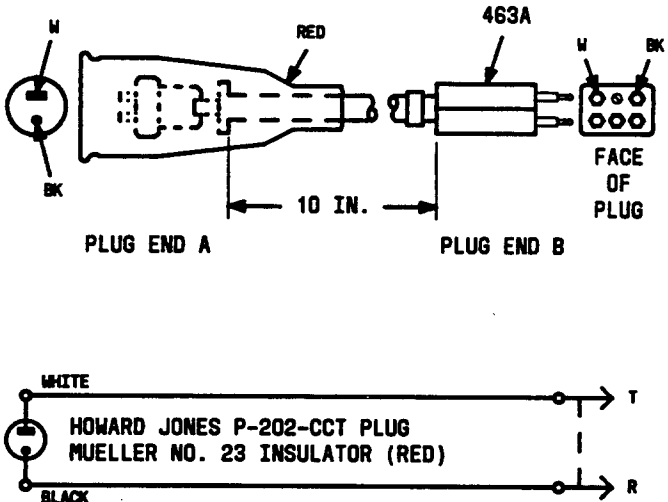
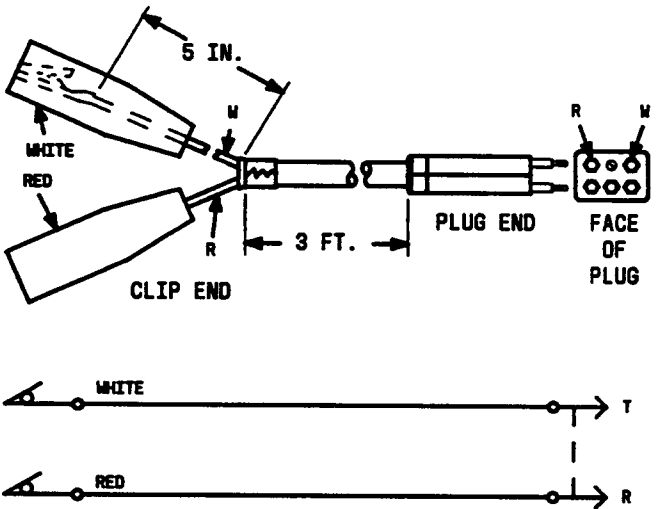
ITEM	ASSOCIATED CONNECTORS	USE	ILLUSTRATION AND SCHEMATIC
W2GD	302, 308	Used in series with a P2DB cord to connect a KS-14103 breakdown test set to a cable pair at a vacant protector unit socket on a connector. <i>Note:</i> The internal wiring (Tip and Ring) for 302- and 308-Type connectors is reversed from other 300-series connectors. (See Fig. 17)	 <p>WHITE</p> <p>HOWARD JONES P-202-CCT PLUG MUELLER NO. 23 INSULATOR (RED)</p> <p>BLACK</p>
W2GL	303, 305, 307, 309, 310, 310M, 311	Used to make a connection with a cable pair at a vacant protector unit socket on a connector or a 299A or 299B test adapter. (See Fig. 18)	 <p>WHITE</p> <p>RED</p>

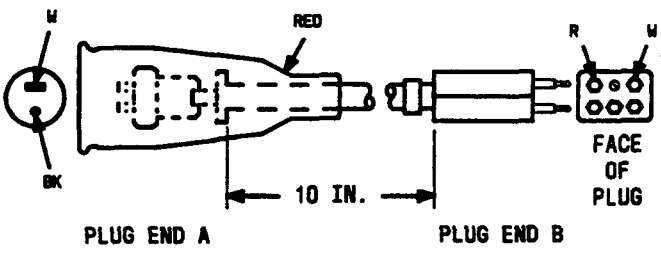
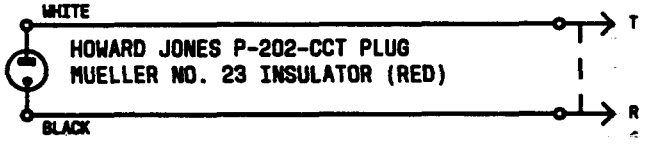
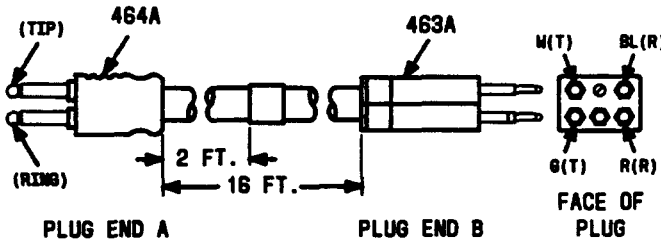
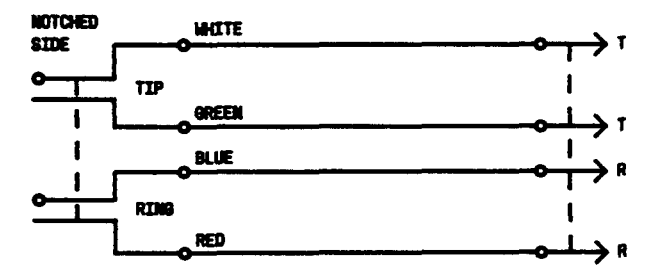
TABLE C (Contd)			
TEST CORDS AND PLUGS USED WITH 302-, 303-, 305-, 307-, 308-, 309-, 310-, 310M-, AND 311-TYPE CONNECTORS			
ITEM	ASSOCIATED CONNECTORS	USE	ILLUSTRATION AND SCHEMATIC
W2GM	303, 305, 307, 309, 310, 310M, 311	Used in series with a P2DB cord to connect a KS-14103 breakdown test set to a cable pair at a vacant protector unit socket on a connector. (See Fig. 18)	 <p>PLUG END A</p> <p>PLUG END B</p> <p>10 IN.</p> <p>RED</p> <p>W</p> <p>BK</p> <p>R</p> <p>W</p> <p>FACE OF PLUG</p>  <p>WHITE</p> <p>HOWARD JONES P-202-CCT PLUG MUELLER NO. 23 INSULATOR (RED)</p> <p>BLACK</p> <p>T</p> <p>R</p>
W4BR	302, 308	Used for making IN and OUT tests on connectors. <i>Note:</i> The internal wiring (Tip and Ring) for 302- and 308-type connectors is reversed from other 300-series connectors. (See Fig. 17)	 <p>PLUG END A</p> <p>PLUG END B</p> <p>2 FT.</p> <p>16 FT.</p> <p>(TIP)</p> <p>464A</p> <p>(RING)</p> <p>463A</p> <p>W(T)</p> <p>BL(R)</p> <p>G(T)</p> <p>R(R)</p> <p>FACE OF PLUG</p>  <p>NOTCHED SIDE</p> <p>WHITE</p> <p>TIP</p> <p>GREEN</p> <p>BLUE</p> <p>RING</p> <p>RED</p> <p>T</p> <p>T</p> <p>R</p> <p>R</p>

TABLE C (Contd)			
TEST CORDS AND PLUGS USED WITH 302-, 303-, 305-, 307-, 308-, 309-, 310-, 310M-, AND 311-TYPE CONNECTORS			
ITEM	ASSOCIATED CONNECTORS	USE	ILLUSTRATION AND SCHEMATIC
W4CJ	303, 305, 309, 310, 310M, 311	Used for making IN and OUT tests on connectors. (See Fig. 18)	<p>The diagram illustrates the physical components and wiring of test cord W4CJ. It consists of two plugs, 464A and 463A, connected by a 16 FT. 0 IN. cable. Plug 464A is labeled with (TIP) and (RING) contacts. Plug 463A is labeled with (R) W, (T) BL, (R) (R), and (T) (T) contacts. The wiring schematic shows four color-coded lines: BLUE, RED, WHITE, and GREEN. The BLUE line connects the (TIP) contact of Plug End A to the (R) W contact of Plug End B. The RED line connects the (RING) contact of Plug End A to the (T) BL contact of Plug End B. The WHITE line connects the (TIP) contact of Plug End A to the (R) (R) contact of Plug End B. The GREEN line connects the (RING) contact of Plug End A to the (T) (T) contact of Plug End B. The NOTCHED SIDE of the cable is indicated on the left.</p>

**TABLE C (Contd)**

### TEST CORDS AND PLUGS USED WITH 302-, 303-, 305-, 307-, 308-, 309-, 310-, 310M-, AND 311-TYPE CONNECTORS

ITEM	ASSOCIATED CONNECTORS	USE	ILLUSTRATION AND SCHEMATIC
W4CL	302, 308	<p>Used in making manual and automatic Varley measurements on connectors.</p> <p><i>Note:</i> The internal wiring (Tip and Ring) for 302- and 308-type connectors is reversed from other 300-series connectors. (See Fig. 17)</p>	<p>The diagram illustrates a 16-foot cable assembly used for manual and automatic Varley measurements. The assembly consists of three connectors: a 464A connector at one end, and two 463A connectors at the other end. The cable length is specified as 16 FT. - 0 IN. The 464A connector has a notched side and a face. The 463A connectors have faces. The wiring schematic shows the internal connections between the notched side of the 464A connector and the faces of the 463A connectors. The connections are as follows:</p> <ul style="list-style-type: none"> <li>Notched Side 464A (BL) connects to Face 463A Plug (R).</li> <li>Notched Side 464A (W) connects to Face 463A Plug (T).</li> <li>Notched Side 464A (R) connects to Face 463A Plug (R).</li> <li>Notched Side 464A (G) connects to Face 463A Plug (T).</li> </ul> <p>The schematic also shows the internal wiring of the 463A connectors, including the 141 Cord Tip and 3608 Tool connections.</p>

**TABLE C (Contd)**

### TEST CORDS AND PLUGS USED WITH 302-, 303-, 305-, 307-, 308-, 309-, 310-, 310M-, AND 311-TYPE CONNECTORS

ITEM	ASSOCIATED CONNECTORS	USE	ILLUSTRATION AND SCHEMATIC
W4CM	303, 305, 309, 310, 310M, 311	Used in making manual and automatic Varley measurements on a connector. (See Fig. 18)	<p>The diagram illustrates a 16-foot cable used for manual and automatic Varley measurements. The cable has a 464A connector at one end (labeled 'PLUG END A') and two 463A plugs at the other end (labeled 'PLUG END B' and 'PLUG END C'). The cable is marked with 'W' (white), 'BL' (black), 'G' (green), and 'R' (red) for the outer conductors. The length of the cable is 16 FT., with a 6 IN. section near the 464A connector. Below the cable diagram is a schematic diagram showing the wiring connections for the 463A plugs and the 464A connector. The schematic includes labels for 'NOTCHED SIDE 464A', 'FACE OF 463A PLUG', '141 CORD TIP', '360B TOOL', '360A TOOL', and 'BAD'.</p>

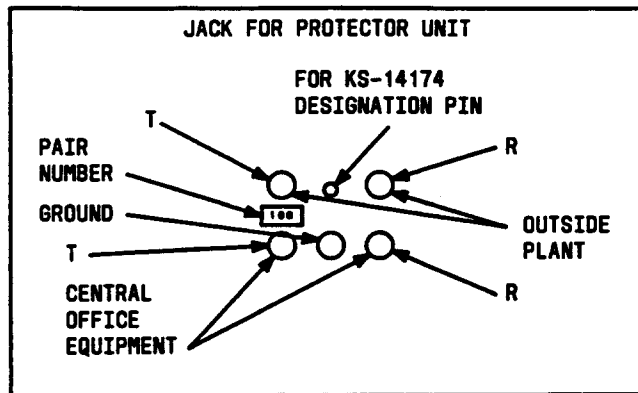


Figure 17—Jack For Protector Unit on 302- and 308-Type Connectors

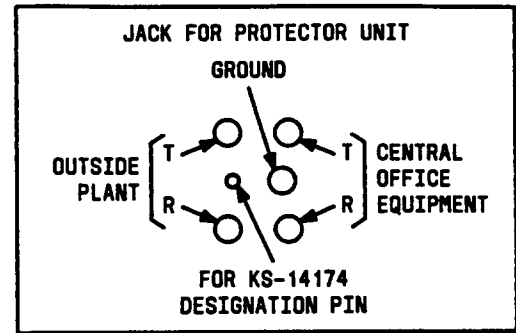


Figure 18—Jack For Protector Unit on 303-, 305-, 307-, 309-, 310-, 310M-, and 311-Type Connectors

TABLE D TEST CORDS AND PLUGS USED WITH C-TYPE PROTECTORS — SELECTION GUIDE			
FUNCTION	PROTECTOR TYPE	TEST CORD/PLUG	COMCODE
Connect KS-14103 breakdown test set to a cable pair from protectors	C50, C52, 1177, 1268	P2DB	101433852
		P2DC	101433860
Reverse cable pair tip and ring to provide temporary service	C50	356A	100396555
		352A	100396505
For Wheatstone Bridge tests	C50	4W3A	101428936
Test tip and ring	C50	4W6A	101428969
		252A	100395359
		252B	100395367
Connect groups of individual cable pairs to a 108A test set	C50, C52	P20G (DA)	—
		P40C (DA)	—
		P20M (DA)	—
		1B Cord Kit	—



**TABLE E**  
**TEST CORDS AND PLUGS USED WITH C-TYPE PROTECTORS**

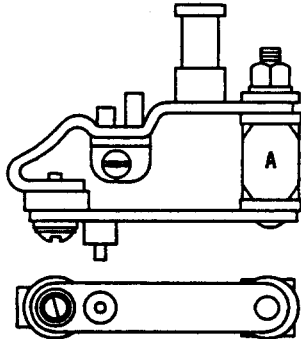
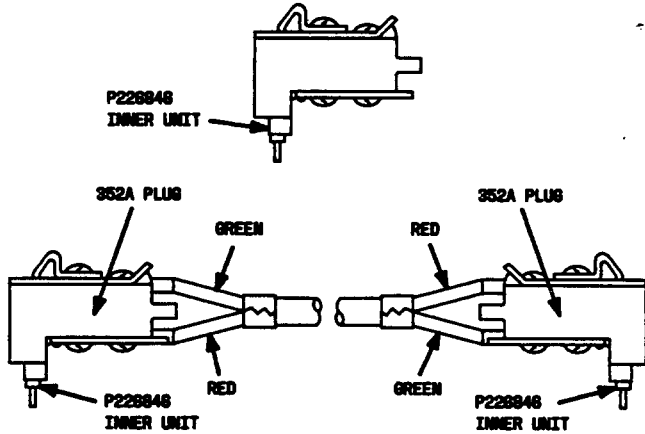
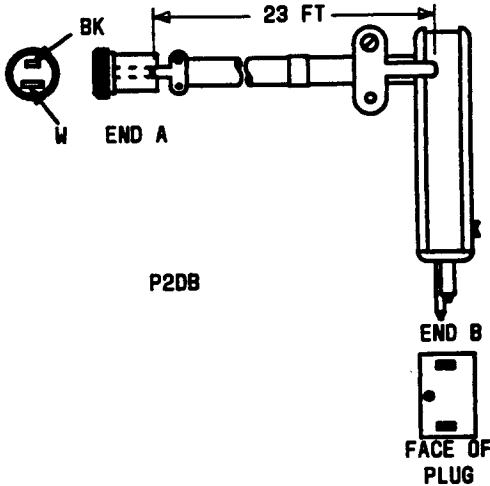
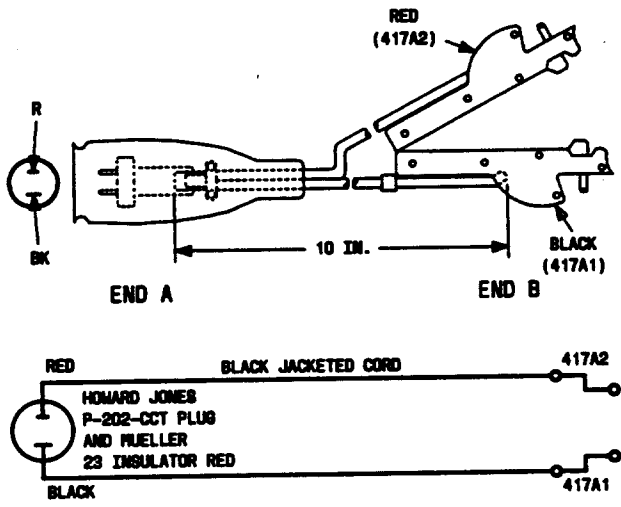
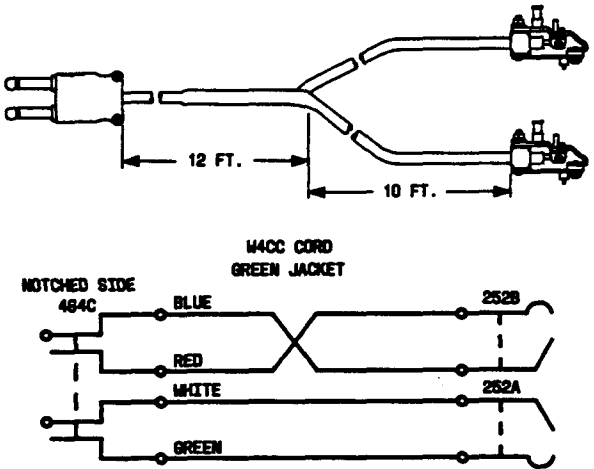
ITEM	ASSOCIATED CONNECTORS	USE	ILLUSTRATION AND SCHEMATIC
252A 252B	C50	Used with 4W6A cord. 252A has a T; 252B has an R stamped on both sides to indicate Tip and Ring A stamped on illustration.	
352A  356A	C50	<p>Forms part of 356A plug. Contains a heat coil and is arranged to make connections to protector block spring and heat coil spring of C50 and similar protector mountings.</p> <p>Consists of a P2AY cord equipped with a 352A plug at each end. Used on C50 and similar type of protectors to reverse a cable pair, to provide temporary service when ring side of the circuit has been grounded, or to temporarily correct tip and ring reverse until outside plant change can be made.</p>	

TABLE E (Contd)			
TEST CORDS AND PLUGS USED WITH C-TYPE PROTECTORS			
ITEM	ASSOCIATED CONNECTORS	USE	ILLUSTRATION AND SCHEMATIC
P2DB	C50, C52 1177, 1268	Used with P2DC to connect cable pairs from protectors to a KS-14103 test set.	
P2DC	C50, C52 1177, 1268	Used with P2DB to connect cable pairs from protectors to a KS-14103 test set.	

**TABLE E (Contd)**  
**TEST CORDS AND PLUGS USED WITH C-TYPE PROTECTORS**

ITEM	ASSOCIATED CONNECTORS	USE	ILLUSTRATION AND SCHEMATIC
P20G (DA)	C50, C52	Used to connect a group of 10 individual cable pairs on distributing frames equipped with C-type protectors to 108A test set. Part of 1B cord kit.	Refer to Practice 106-310-120 covering 108A test set (DA) for cable and plug arrangement.
P20M (DA)  P40C (DA)	C50, C52	P40C used with two P20M cords to connect 20 cable pairs on distributing frames equipped with C-type protectors to 108A test set. Part of 1B cord kit.  P40C cord along with two P20M cords replaces P40A cord.	Refer to Practice 106-310-120 covering 108A test set (DA) for cable and plug arrangement.
4W3A	C50	For Wheatstone bridge tests. Used as a test connector for engaging block ends of tip and ring C50 protector block springs on main frame protectors.	<p>Diagram illustrating the 4W3A test cord configuration. The cord is shown with a 484C connector on the left, a 6 FT. section, a junction box, and a 6 FT. section leading to a 4-wire bundle. The bundle has a 6 FT. section and an 8 IN. section. Below the diagram is a color-coded legend: NOTCHED SIDE 484C, GREEN, YELLOW, RED, BLUE, W48M CORD BLACK JACKET, 251B, 251D, 251C, 251E.</p>

TABLE E (Contd)			
TEST CORDS AND PLUGS USED WITH C-TYPE PROTECTORS			
ITEM	ASSOCIATED CONNECTORS	USE	ILLUSTRATION AND SCHEMATIC
4W6A	C50	Used as a test connector for C50 protectors on main distributing frames in manual and dial offices.	 <p>12 FT.</p> <p>10 FT.</p> <p>W4CC CORD GREEN JACKET</p> <p>NOTCHED SIDE 484C</p> <p>BLUE</p> <p>RED</p> <p>WHITE</p> <p>GREEN</p> <p>252B</p> <p>252A</p>
<b>1B CORD KIT</b> <p>The 1B cord kit is used in conjunction with the 108A test set (DA). The kit provides a set of all standard cords and contains the following components:</p> <p>KS-16362, L3 case M2EL cord (DA) P20F cord (DA) P20G cord (DA) P20M cords (10) (DA) P40C cords (5) (DA) W2J cord equipped with 310 plug W2EU cord equipped with 310 plug (DA) W2EW cord.</p>			

<b>TABLE F</b> <b>TEST CORDS AND PLUGS USED WITH 444-TYPE JACKS</b> <b>(301-TYPE CONNECTOR) — SELECTION GUIDE</b>		
<b>FUNCTION</b>	<b>TEST CORD/PLUG</b>	<b>COMCODE</b>
Connect KS-14103 breakdown test set to a cable pair from connectors	P2DB	101433852
	P2CY	102540077
Reverse cable pair tip and ring to provide temporary service	301A	100395714
	301B	100395722
Open contacts for 10 consecutive jacks on one side of a vertical	318A	100395920
Connect handset to a cable pair	387A	100396928
	387B	100396936
Plugging operations and routine testing	4W7A	101428977
Patching Varley test trunks to conductors	4P23A	101427391
Open single cable pair for testing	KS-20244 (DA)	—

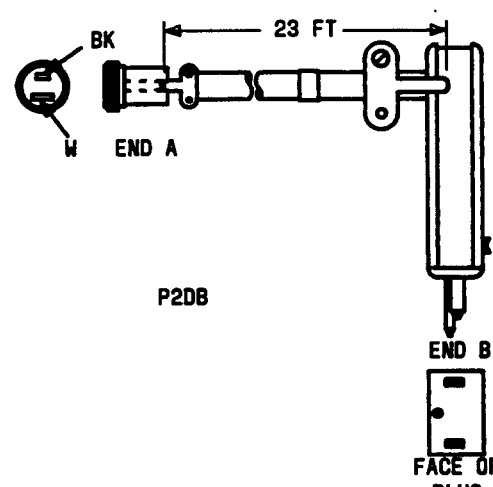
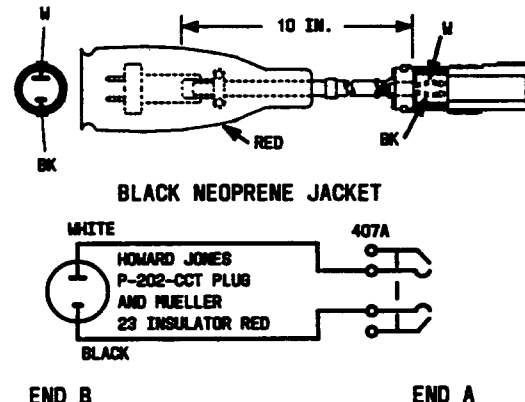
TABLE G TEST CORDS AND PLUGS USED WITH 444-TYPE JACKS (301-TYPE CONNECTOR)		
ITEM	USE	ILLUSTRATION AND SCHEMATIC
P2DB	Used with P2CY to connect cable pairs to KS-14103 test set when testing cable pairs connected to 301-type connectors in central offices.	 <p>P2DB</p>
P2CY	Used with P2DB cord to connect cable pairs to KS-14103 test set when testing cable pairs connected to 301-type connectors in central offices.	 <p>BLACK NEOPRENE JACKET</p> <p>WHITE HOWARD JONES P-202-CCT PLUG AND MUELLER 23 INSULATOR RED BLACK</p> <p>407A</p> <p>END B</p> <p>END A</p>

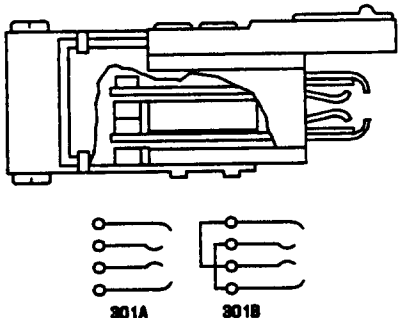
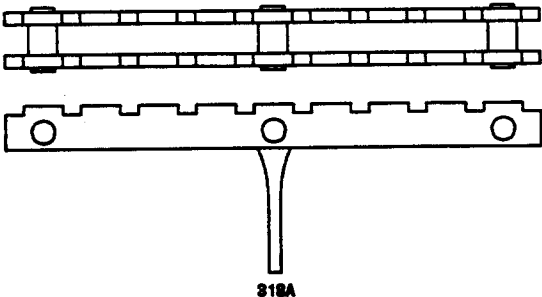
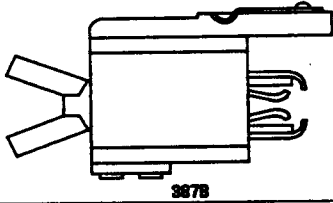
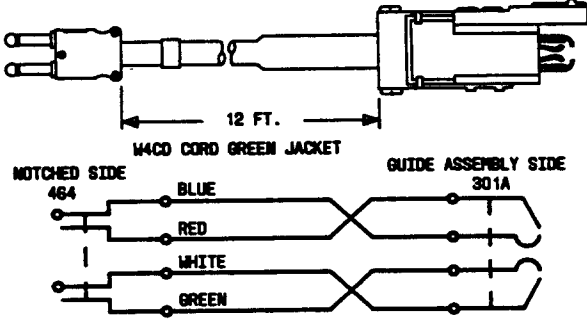
TABLE G (Contd)		
TEST CORDS AND PLUGS USED WITH 444-TYPE JACKS (301-TYPE CONNECTOR)		
ITEM	USE	ILLUSTRATION AND SCHEMATIC
301A 301B	301A plugs, as part of test cords, are used to make contact to cable pairs. 301B plug is the same as 301A except terminals are strapped internally to reverse tip and ring of the cable pair. Used for trouble caused by ground on ring side of cable pair or to temporarily correct tip and ring turnover until outside plant change can be made.	 <p>301A      301B</p>
318A	Used to open contacts for ten consecutive jacks on one side of a vertical. Consists of a dummy plug with two strips of insulating material and a handle.	 <p>318A</p>
387A 387B	Connects a handset to a cable pair. 387A plug has two lugs to solder handset leads. 387B (illustrated) has two lugs to which handset clips may be firmly attached.	 <p>387B</p>
4W7A	Used for plugging-up operations and routine testing.	 <p>12 FT.</p> <p>W4CD CORD GREEN JACKET</p> <p>NOTCHED SIDE 464</p> <p>GUIDE ASSEMBLY SIDE 301A</p> <p>BLUE</p> <p>RED</p> <p>WHITE</p> <p>GREEN</p>

TABLE G (Contd)		
TEST CORDS AND PLUGS USED WITH 444-TYPE JACKS (301-TYPE CONNECTOR)		
ITEM	USE	ILLUSTRATION AND SCHEMATIC
4P23A	Used for patching Varley test trunks to conductors terminated on 301-type connectors.	<p>404C NOTCHED SIDE 12 FT. P48F CORD BLACK TEXTILE JACKET BLACK ARM RED ARM GUIDE ASSEMBLY SIDE 301A GREEN WHITE RED BLUE</p>
KS-20244 (DA)  List 1 (White)	Used to open a single cable pair for testing.  Plug is a single piece of flame-retardant plastic with a snap-in spring retainer.	<p>KS 20244, L1</p>



<b>TABLE H</b> <b>TEST CORDS AND PLUGS USED WITH 300-TYPE CONNECTORS</b> <b>AND 121-TYPE PROTECTORS — SELECTION GUIDE</b>		
FUNCTION	TEST CORD/PLUG	COMCODE
Connect KS-14103 breakdown test set to a cable pair from connectors	P2DB	101433852
	2P34A	101426377
Reverse cable pair tip and ring to provide temporary service	412A	100397181
	412C	100397207
	418B	100397306
Plugging operations and routine testing	4W11A	101429017
Connect Varley test trunks to conductors	4W12A	101429025
Shunt protector units for inspecting carbon blocks	M2EM	102463098
	M2EN (DA)	—
	AT 7950B B Test Clip	400122495
Pair identification tests	AT-8039B B Pair Identifier (DA)	—

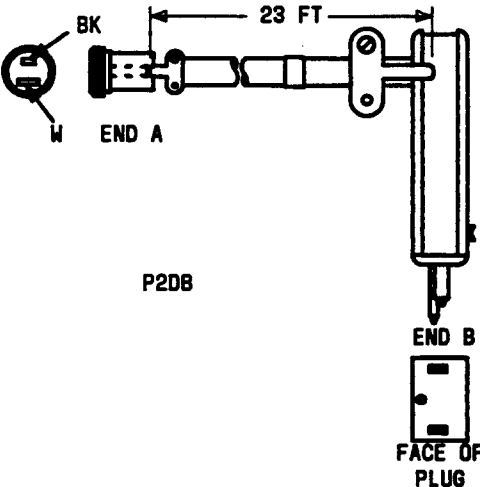
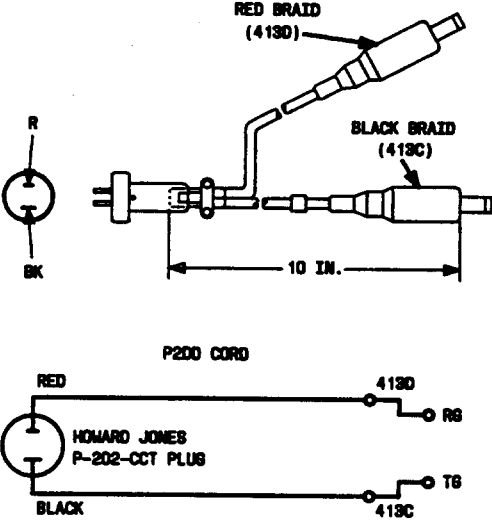
TABLE I		
TEST CORDS AND PLUGS USED WITH 300-TYPE CONNECTORS AND 121-TYPE PROTECTORS		
ITEM	USE	ILLUSTRATION AND SCHEMATIC
P2DB	Used with 2P34A cord to connect cable pairs from 300-type connectors to KS-14103 test set	
2P34A	Used with P2DB cord to connect cable pairs from 300-type connectors to KS-14103 test set.	

TABLE I (Contd)		
TEST CORDS AND PLUGS USED WITH 300-TYPE CONNECTORS AND 121-TYPE PROTECTORS		
ITEM	USE	ILLUSTRATION AND SCHEMATIC
412A 412C  418B	<p>Forms part of 418B plug. Test plugs arranged to plug into receptacles for 1A1-type protector units.</p> <p>Reversing plug consisting of two 1A1C protector units in a metal housing and connected to 412A and 412C plugs. Arranged to reverse tip and ring of a cable pair with respect to central office circuits or to temporarily correct tip and ring turnover until outside plant change can be made. This plug will not ground the line when protector units are removed.</p>	
4W11A	Used at distributing frames for plugging up and connecting test trunk circuits to circuits terminated on 300-type connectors.	

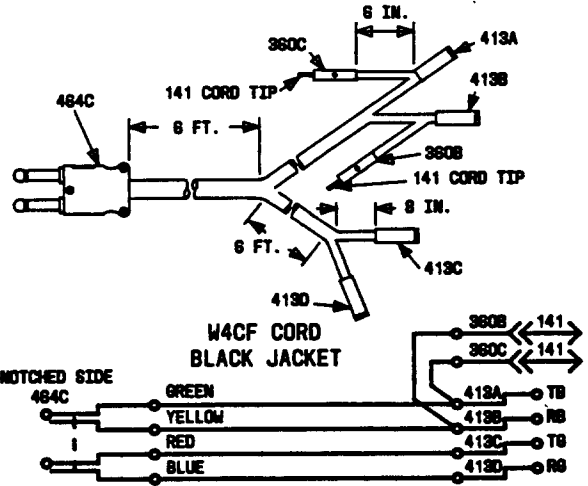
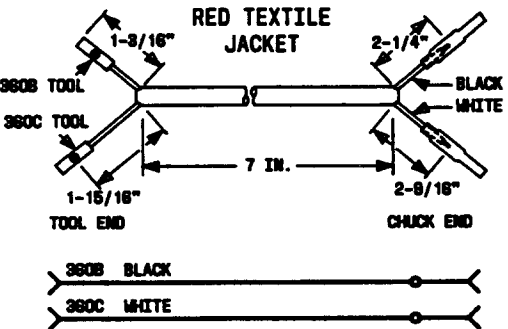
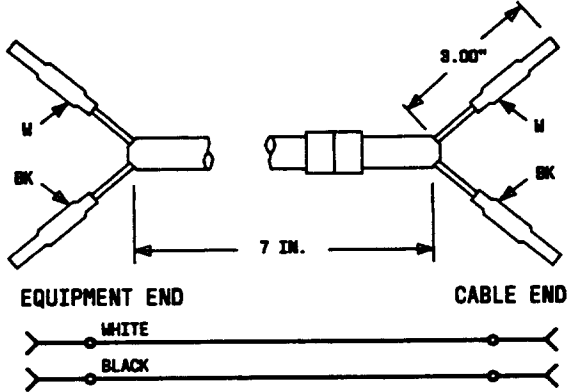
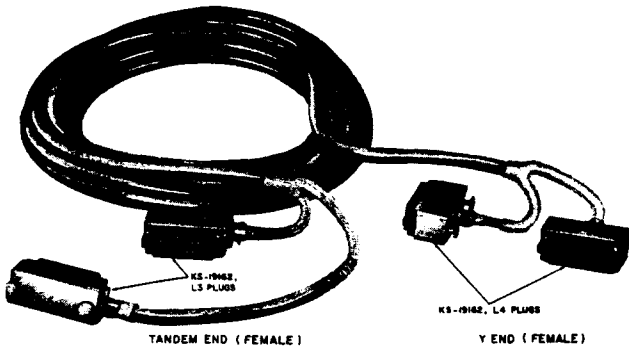
ITEM	USE	ILLUSTRATION AND SCHEMATIC
4W12A	Used at distributing frames for connecting Varley test trunks to conductors terminated on 300-type connectors.	 <p>The diagram shows a 4W12A test cord assembly. It features a central 6 FT. section of W4CF CORD with a BLACK JACKET. At each end, there are 6 IN. sections of 360C and 360B conductors. The 360C conductors are connected to 413A and 413B, while the 360B conductors are connected to 413C and 413D. The 413A and 413B conductors are terminated with 141 CORD TIPS. The 413C and 413D conductors are terminated with 484C connectors. A legend indicates the color coding: GREEN, YELLOW, RED, and BLUE.</p>
M2EM	<p>Used with B test clip for shunting protector units on 300-type connectors when necessary to inspect carbon blocks without opening the circuit.</p> <p><i>Note:</i> B test clip not recommended for use with 121-type protectors. Refer to Practice 106-315-101.</p>	 <p>The diagram shows an M2EM test cord assembly. It features a central 7 IN. section of RED TEXTILE JACKET. At each end, there are 1-3/16" sections of 360B and 360C conductors. The 360B conductors are connected to 413A and 413B, while the 360C conductors are connected to 413C and 413D. The 413A and 413B conductors are terminated with 141 CORD TIPS. The 413C and 413D conductors are terminated with 484C connectors. A legend indicates the color coding: BLACK and WHITE.</p>
M2EN (DA)	Used with B test clip for shunting protector units on 300-type connectors when necessary to inspect carbon blocks without opening the circuit.	 <p>The diagram shows an M2EN (DA) test cord assembly. It features a central 7 IN. section of RED TEXTILE JACKET. At each end, there are 3.00" sections of 360B and 360C conductors. The 360B conductors are connected to 413A and 413B, while the 360C conductors are connected to 413C and 413D. The 413A and 413B conductors are terminated with 141 CORD TIPS. The 413C and 413D conductors are terminated with 484C connectors. A legend indicates the color coding: WHITE and BLACK.</p>

TABLE I (Contd)		
TEST CORDS AND PLUGS USED WITH 300-TYPE CONNECTORS AND 121-TYPE PROTECTORS		
ITEM	USE	ILLUSTRATION AND SCHEMATIC
AT-7950B B Test Clip	Connects to test points on the test panel of 300-type connectors.  Used with M2EM and M2EN (DA) cords for shunting protector units on 300-type connectors when necessary to inspect carbon blocks without opening the circuit.	Refer to Practice 106-315-101
AT-8039A B Pair Identifier (DA)	Used for identification tests by contacting test points on 300- or 121-type connectors.	Refer to Practice 106-315-103

**EXTENSION CORDS (P100A AND P100B)**

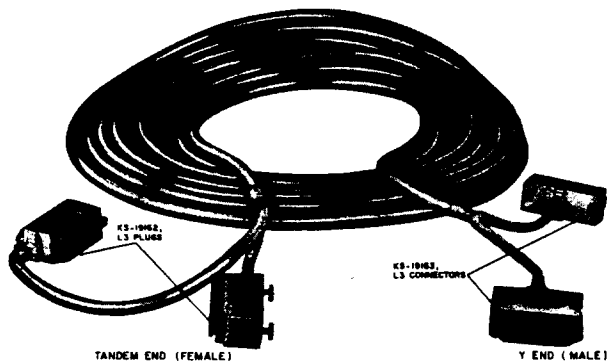
**3.02** The P100A (Figure 19) and P100B (Figure 20) cords are used to extend all AT&T test connector cords except the D, G, H, N, and R. The cords are not supplied with the test connectors and must be ordered separately.



**Figure 19—P100A Cord**

**3.03** The P100A cord, which is 30 feet long, connects test equipment to the test connectors. The plugs on the Y end of the cord are engaged with mating connectors on test equipment. Plugs and connectors with similar numbers on the hoods of the cord plugs and on the test equipment should be mated. The jack screws are engaged and turned simultaneously so the plugs and connectors mate squarely. The P100A cord is removed from the test equipment by reversing the jack screws simultaneously. The cord is equipped with female plugs on both ends.

**3.04** The P100B cord is a 50-foot extension cord. One or more P100B cords and a P100A cord are required to bridge between the test equipment and test connectors. Jack screws of the plugs on the Y end of the P100A cord mate with the connectors on the Y end of the P100B cord. Plugs on the tandem end of the P100B cord connect to a test connector or to connectors on the Y end of another P100B cord or test equipment. The cord is equipped with male plugs on one end and female plugs on the other end.



**Figure 20—P100B Cord**

#### 4. TEST/TALK SYSTEMS

##### MINIATURE TEST/TALK SYSTEMS

**4.01** The ED-6C110-10 miniature test/talk hardware is intended to be the standard test/talk system for the following types of distributing frames:

1. *COSMIC*® main distributing frame
2. Modular protector frames
3. Double-sided protector frames
4. Low profile conventional distributing frames
5. Existing conventional distributing frames

6. 309-type connector on the low profile conventional distributing frames.

##### Description

**4.02** The system provides transmitter and loud-speaker apparatus for public address between the frame area and the Repair Service Bureau. In addition, jack appearances are provided for individual talk circuits and test circuits for customer lines. When used on existing conventional distributing frames, the system can be retrofitted, utilizing the existing loud-speaker and test jack equipment.

**4.03** Typical applications of miniature test/talk systems are shown in Figure 21 through 31 and Table J.

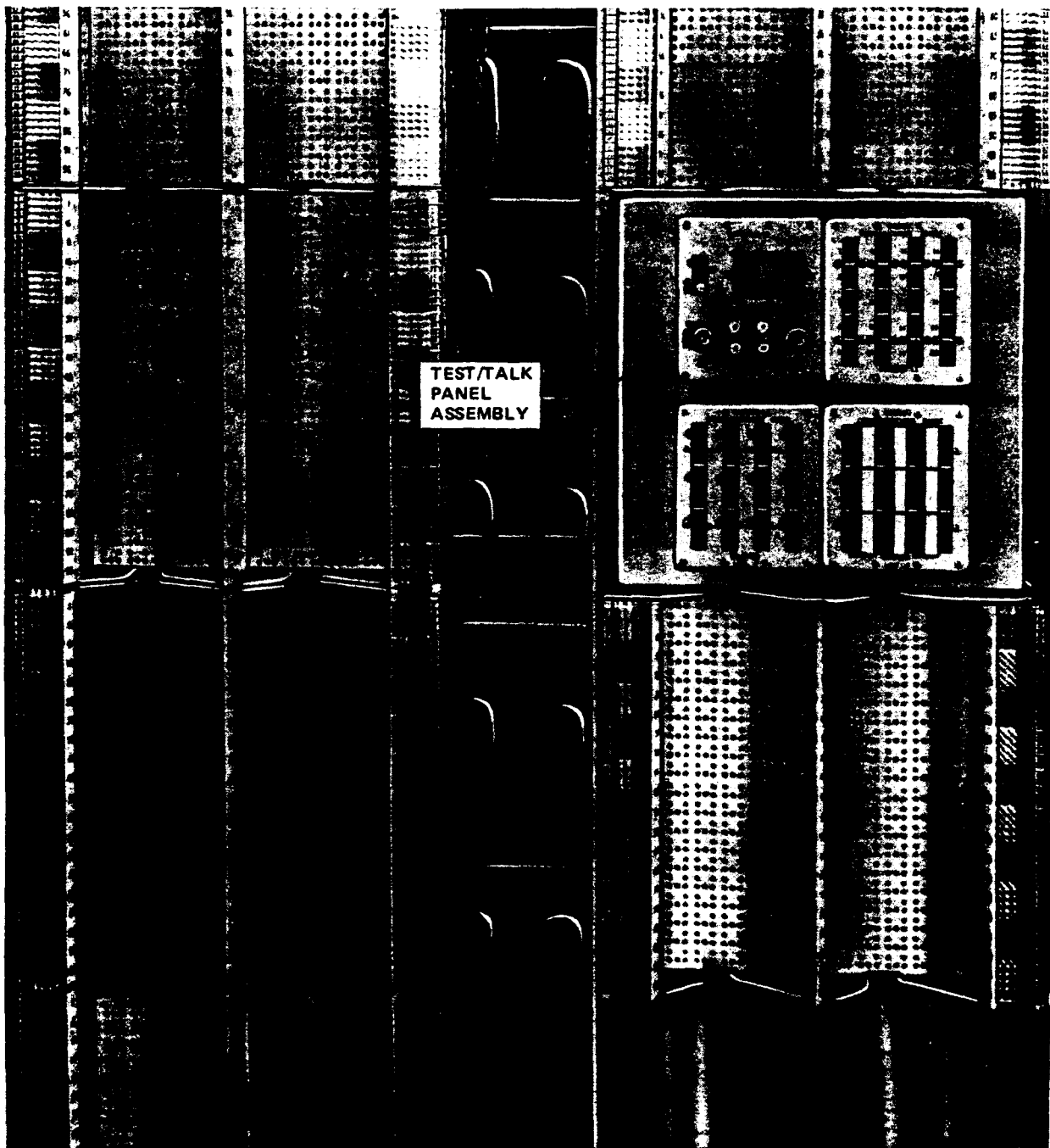
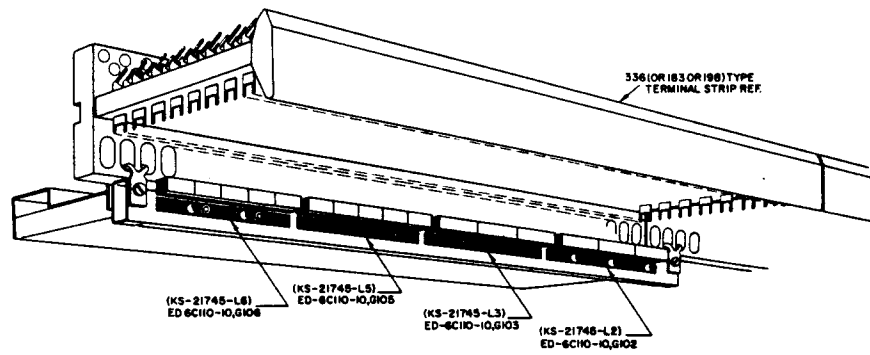
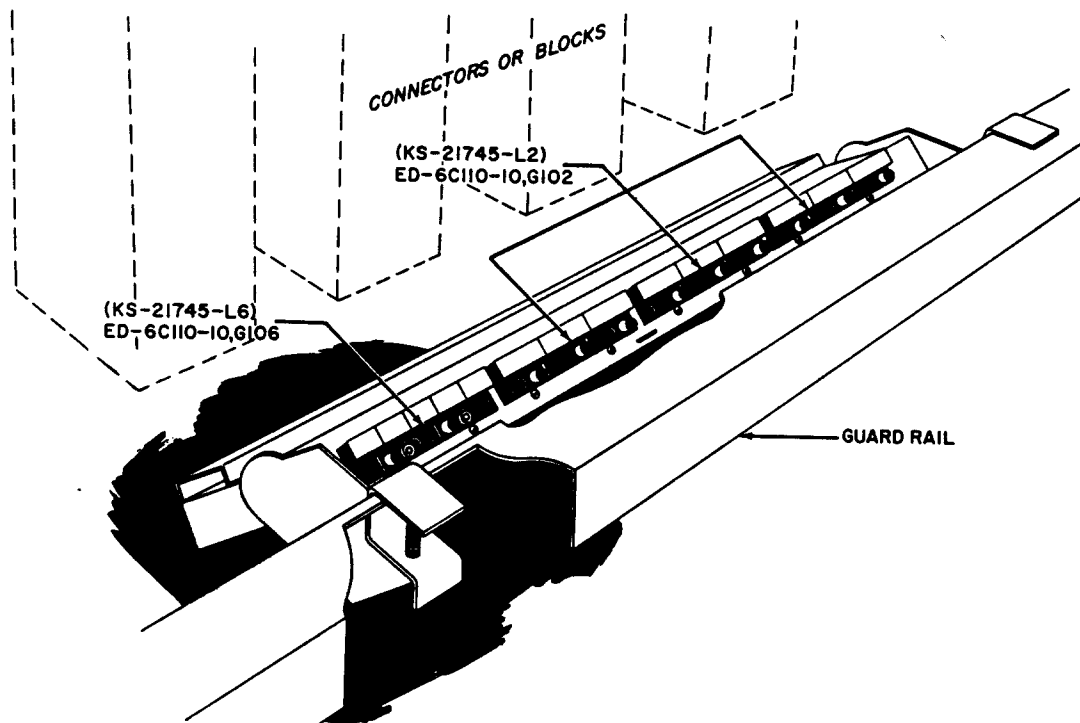


Figure 21—Mounted Miniature Test/Talk System For the 309 Connector





**Figure 22—ED-6C110-10, G63 Test/Talk Panel For Existing Conventional Distributing Frame**



**Figure 23—ED-6C110-10, G64 Test/Talk Panel For Existing Conventional Distributing Frame (Guardrail Mounting)**

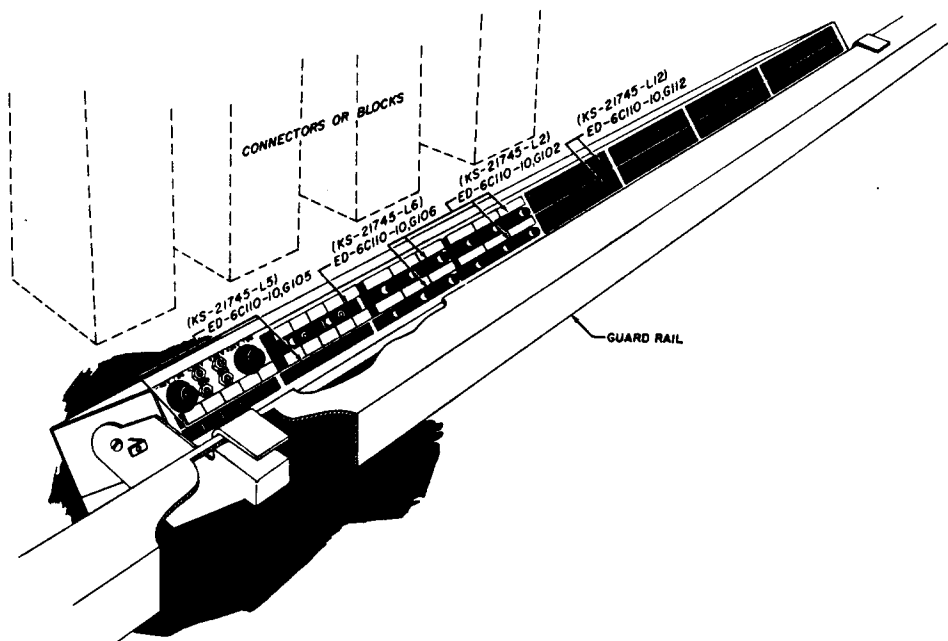


Figure 24—ED-6C110-10, G65 Test/Talk Panel For Existing Conventional Distributing Frames (Guardrail Mounting)

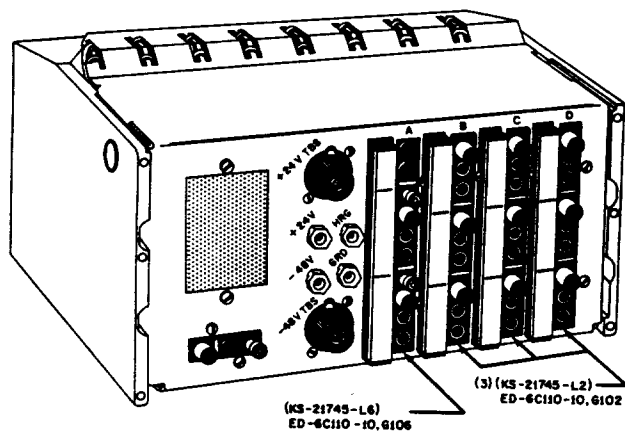


Figure 25—ED-6C110-10, G25 Test/Talk Panel For Conventional Distributing Frames

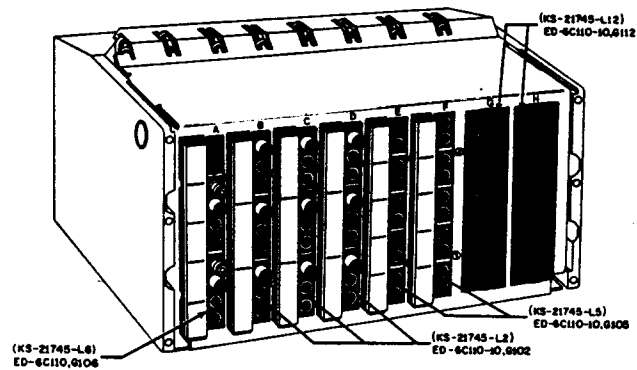


Figure 26—ED-6C110-10, G26 Test/Talk Panel For Conventional Distributing Frames (Back View)

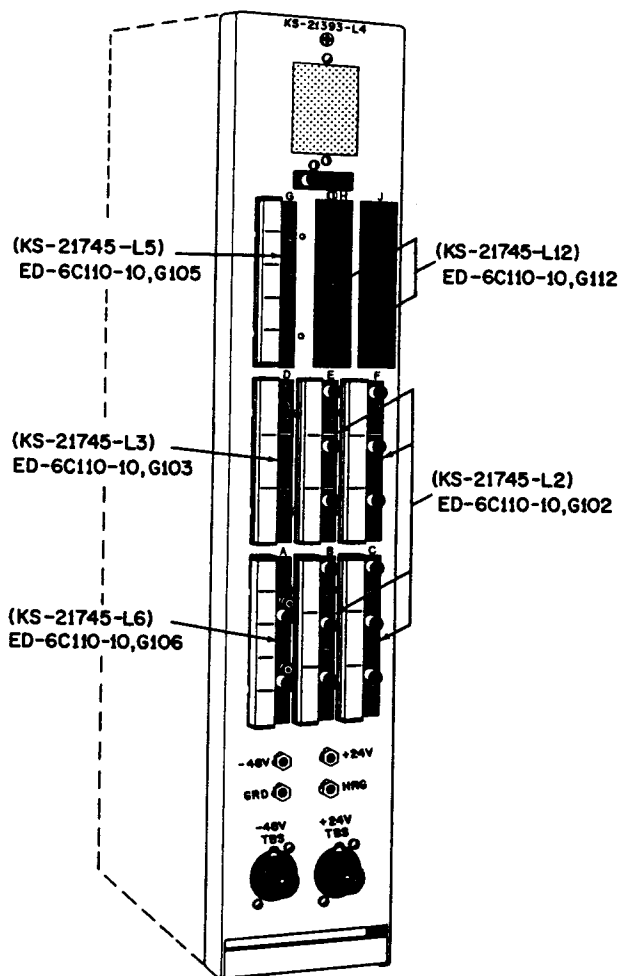


Figure 27—ED-6C110-10, G44 Test/Talk Panel For Double-Sided Protector Frames

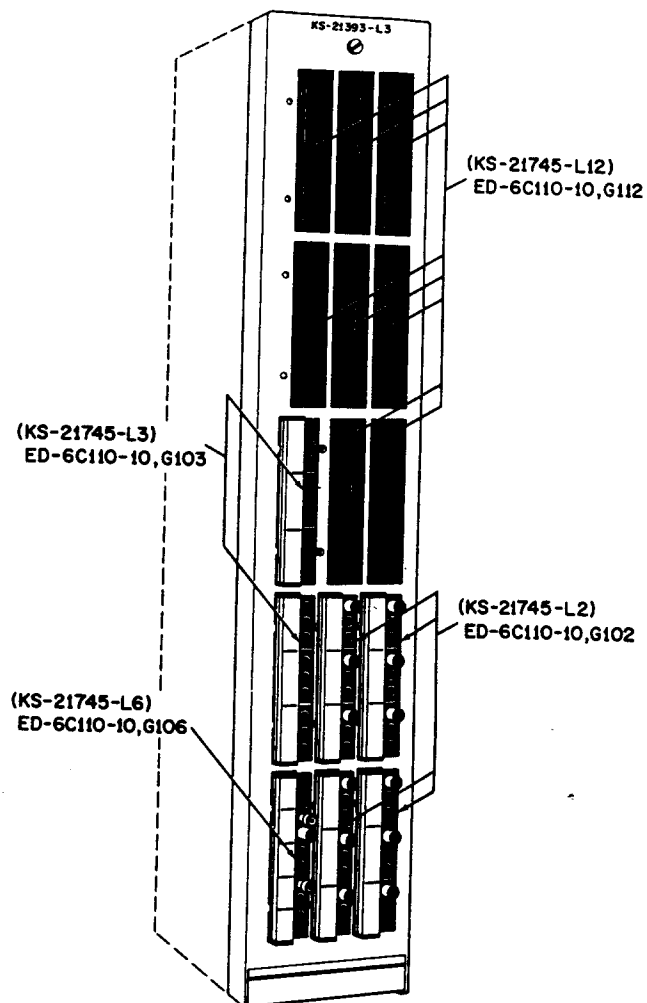


Figure 28—ED-6C110-10, G43 Test/Talk Panel For Double-Sided Protector Frames (Back View)

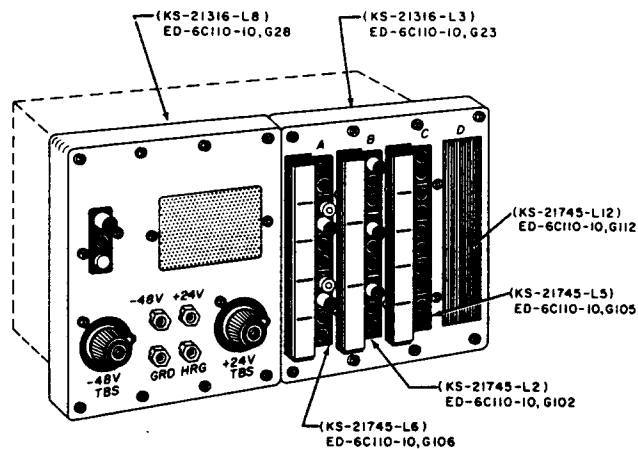


Figure 29—ED-6C110-10, G23 Test/Talk Panel For  
COSMIC-Type Frames (Front Face)

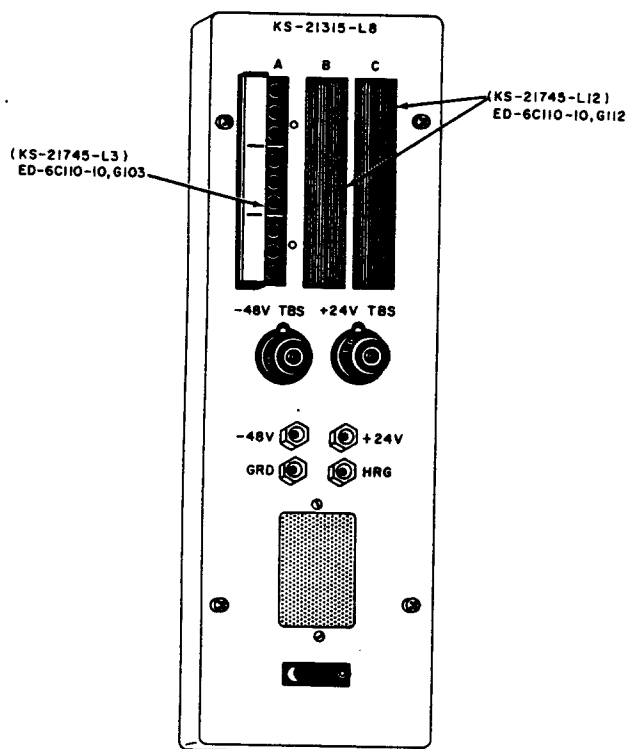


Figure 30—ED-6C110-10, G8 Test/Talk Panel For  
Modular Protector Frames (Front View)

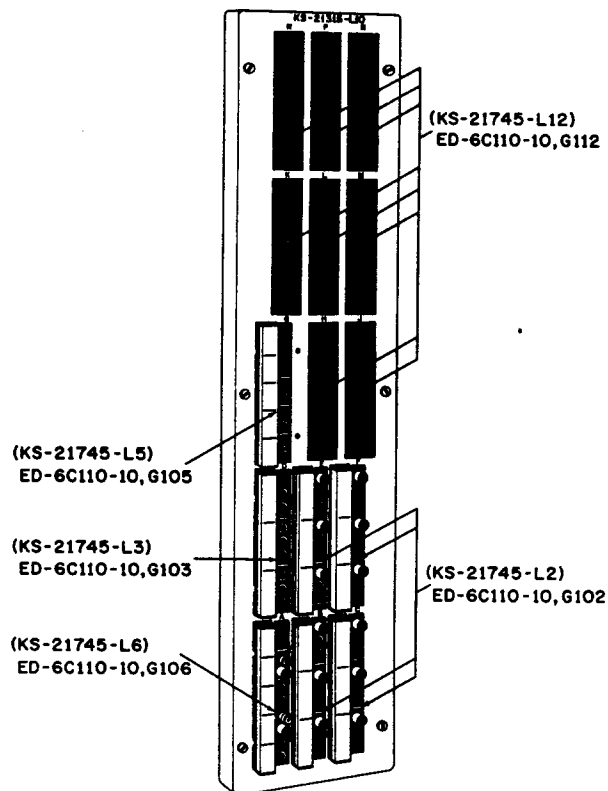


Figure 31—ED-6C110-10, G10 Test/Talk Panel For  
Modular Protector Frames (Back View)

**TABLE J**  
**TYPICAL APPLICATIONS OF MINIATURE TEST/TALK SYSTEM**

Frame	ED-6C111-10	ED-6C110-10		Maximum No. of Jack Modules
	Mounting Arrangement	Basic Grps	Jack Modules (Note)	
<i>COSMIC</i>	Alternate line equipment modules	G23	G-102, 103, 105, 106, 112	4
		KS-21316, L8		0
<i>COSMIC II</i>	Each facility module	G26	G-102, 106, 112	8
		G25	G-102, 105, 106, 112	4
Protector frame modular	Each even module	G-8	G-103, 112	3
	Each odd and even module	G-10	G-102, 103, 105, 106, 112	15
Double-sided protector frame	Vertical 8, 22, 36, etc.	G-44	G-102, 103, 105, 106, 112	9
		G-43	G-102, 103, 105, 106, 112	15
Double-sided protector frame (mounting 308-type connectors)	Horizontal or vertical side 8, 22, 36, etc.*	G-26	G-102, 106, 112	8
		G-25	G-102, 105, 106, 112	4
New conventional distributing frames	Horizontal or vertical side 8, 22, 36, etc.*	G-26	G-102, 106, 112	8
		G-25	G-102, 105, 106, 112	4
Existing conventional distributing frames	Fanning strip of terminal strips vertical or horizontal side 8, 22, 34, etc.	G-63†	G-102, 103, 105, 106, 112	4
	Guardrail of horizontal or vertical side 10, 22, 34, etc.	G-64	G-102, 106, 112	4
		G-65	G-102, 105, 106, 112	15

*Note:* Jack module arrangements are typical.

\* Requires adapter per KS-21316, L7 when mounted on vertical arranged for connectors.

† Cannot be mounted on existing 89-type connecting blocks.

**4.04** Basic groups on ED-6C110-10 (Table K) provide various combinations of communication panels and test/talk panels to satisfy individual office and specific distributing frame applications. Provisions are also made to supply 24- and 48-volt test battery and high-resistance ground.

TABLE K BASIC TEST/TALK PANELS				
ED-6C110-10	AC-1 Trans	Bat. & Grd Tst	Arranged for No. of Jack Modules	Used With
G-8	X	X	3	Modular protector frame
G-9		X	3	Modular protector frame
G-10			15	G-8 and G-9
G-23			4	KS-21316, L8 for <i>COSMIC</i> frame mounting
G-25	X		4	New conventional distributing frames
G-26			8	G-25
G-43			15	G-44
G-44	X	X	9	Protector frame (double-sided)
G-63			4	Existing conventional distributing frames strip mounting
G-64			4	G-65
G-65		X	15	Existing conventional distributing frame guardrail mounted
KS-21316, L8	X	X	—	<i>COSMIC</i> frame

**4.05** The panels are arranged to mount miniature jacks. The jacks, provided in supplementary groups on ED-6C110-10 are equipped in a 3-, 9-, or 10-hole module. The jack modules are installed in designated lettered positions of the basic panel assemblies.

**4.06** Some jack module groups are equipped with, or arranged for, combinations of jacks, pushbutton switches, or lamp sockets for light-emitting diodes to satisfy specific circuit requirements for tests and talk (see Tables L, M, and N).

**TABLE L**  
**KS-21745 JACK MODULES**

ED-8C110-10	Equipped With Qty						Arranged for Jacks or Lamps	Used With
	Jack KS-21463, L1	Jack KS-21463, L3	Jack KS-21001, L1	Switch KS-21748, L1	534A Diode	Plugs		
G-101							9	Test/talk circuits not requiring KS-21463, L1
G-102	6				3			1 to 3 test/talk circuits
G-103	6		3					1 to 3 telephone and spare jack circuits
G-104							10	1 to 5 test/talk circuits not requiring KS-21463, L1 jacks or lamps
G-105	10							Test/talk circuits not requiring lamps
G-106	4			2	2	2		1 or 2 key telephone lines with "hold" feature
G-108				1	1	1		Panels equipped with AC1 transmitter
G-110	10							Service observing other than COSMIC frame
G-111	100							Service observing other than COSMIC frame
G-112								Blank panel for 9- and 10-position modules
G-113								Blank panel for G-108 (3-position modules)
G-114								Designation card assembly part of G-101 to 106, G-110, 111, 115, 116
G-115	6		1		2			Telephone and spare jack with 2 test/talk circuits requiring lamps
G-116	2	4	2		1			Isolated contact jacks for SD-3H520-01 (3 ESS™ switch)



TABLE M MINIATURE/"WE" FULL-SIZE JACK COMPATIBILITY		
Miniature Jack	"WE" Full- Size Jack	Remarks
KS-21463, L1	223	2 conductors
L2	218	2 conductors
L3	215	2 conductors
L4	225	2 conductors
L5	297	2 conductors
KS-21001, L1	238	3 conductors
L2	248	3 conductors

TABLE N CONNECTING CIRCUITS FOR JACK MODULES (NOTE)	
Title	Schematic
Test Talk	SD-2P016-01
Talk Line	SD-2P011-01
Talk Line	SD-2P013-01
Amp Cont	SD-2P012-01
Telephone Line	SD-2P014-01
Plugging Up Line No. 5 XBAR	SD-25741-01
Plugging Up Line	SD-95597-01
Intermittent Trouble No. 5 XBAR	SD-26113-01
Intermittent Trouble No. 1 XBAR	SD-25505-01
Intermittent Trouble SXS	SD-32038-01
In and Out MDF	SD-90070-01
Bridging Trunk MDF	SD-90071-01
Wheat Bridge Manual Varley	SD-90403-01
Wheat Bridge Auto Varley	SD-95545-01
Tel Ckt No. 14 LTD	SD-95754-01
Tel Ckt No. 16 LTD	SD-1C380-01
Loudspeaker Telephone	SD-96471-01
Remote Test	SD-97559-01
Miscellaneous 1 ESS Switch	SD-1A129-01
Miscellaneous No. 1 XBAR	SD-25204-01
Miscellaneous No. 5 XBAR	SD-25574-01
Switchman's Talk SXS	SD-32021-01
Miscellaneous SXS	SD-32153-01
Talk Trunk MDF	SD-96074-01
Frame Line	SD-96379-01
Universal Trunk	SD-99434-01
<p><i>Note:</i> The following abbreviations are used in this table:</p> <p>XBAR = Crossbar  SXS = Step-by-Step  MDF = Main Distributing Frame  LTD = Local Test Desk.</p>	

**4.07** ED-6C111-10, a companion drawing to ED-6C110-10, provides typical equipment layouts, method of installation, and cabling requirements for the miniature test/talk system.

**4.08** Transmitters and cords must be ordered separately. The cord requirements for the miniature jacks are shown in Tables O and P.

TABLE O				
ADAPTER CORDS FOR MINIATURE TEST/TALK SYSTEMS — FOR USE WITH FULL-SIZE CORDS				
Old Cord With Full Size Plug Code	Cord Use	Used With Apparatus	New Cord With Miniature Plug Code	New Cord Comcode
4W3A	Wheatstone bridge test	C-50 protector (DA)	W4CY	102657350
4W6A	In-out test cord		W4CY	102697679
4W7A	In-out test cord	444 Jack (DA), 301 connector	W4DC	102730678
4W11A	In-out test cord	300-type connector (DA)	W4DA	102696531
4W12A	Auto-Varley		W4DB	102731908
W4BS	Auto-Varley	302 and 308-type connector	W4CR	102567302
W4BR (W4BK)	In-out test cord		W4CP	102564002
W2GC	Access vacant protector unit position (CO disconnected from OSP)		—	—
W2GD	Used with P2DB cord and KS-14103 breakdown test set		—	—
W4CJ	In-out test cord	303-, 305-, 307-, 309-, 310-, 310M-, and 311-type connector	W4CT	102653508
W4CM (W4CK)	Auto-Varley		W4CU	102655305
W2GL	Access vacant protector unit position (CO disconnected from OSP)		—	—
W2GM	Used with P2DB cord and KS-14103 breakdown test set	78C1A-64 and 78C2A-64 connecting blocks <i>COSMIC</i>	—	—
W2FL	Service observing on 78C1A-64 and 78C2A-64 connecting blocks or <i>COSMIC</i> I and II frame systems	78C1A-64 and 78C2A-64 connecting blocks <i>COSMIC</i>	W2GY	102563988
W2FM	Bridging cord	D-, G-, H-, N-, and R-Type test connectors, 302, 303, 305, and 308 connectors	W2HA	102567286
W2FH	Has alligator clips		—	—
—	Replaces P2EF and 2W7A/2W7B combination	Circuit ID tone test (SD-95689-01) may also be used for service observing and single pair cable throws.	W2HJ	102867165
—	Adapter cord, 4 conductors	Old full-size plug and miniature 3 cond jacks (KS-21463 type)	KS-21386 L1	401272646
—	Test set patch cord, 3 conductors	Old full-size plug and miniature 3 cond jacks (KS-21001 type)	KS-21387	401272794
60B	Head set	Talking circuits miniature jack appearances	60D	—
—	Used for shorting or grounding a single T and R pair	302, 303, 305 and 308 connectors	P2EF	102808581
—	Used for shorting or grounding a single T and R pair	307 and 309 connectors	P2FL	103105268 103850913
—	Same as P2FL except has KS-22044 min. plug	307 and 309 connectors	W2HN	

**TABLE P**  
**MINIATURE TEST/TALK CORDS**

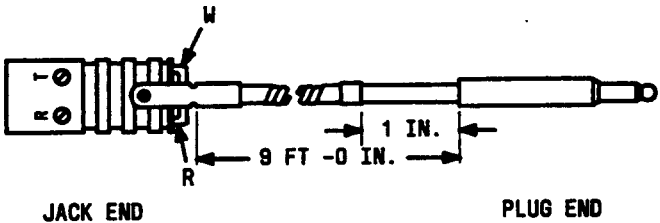
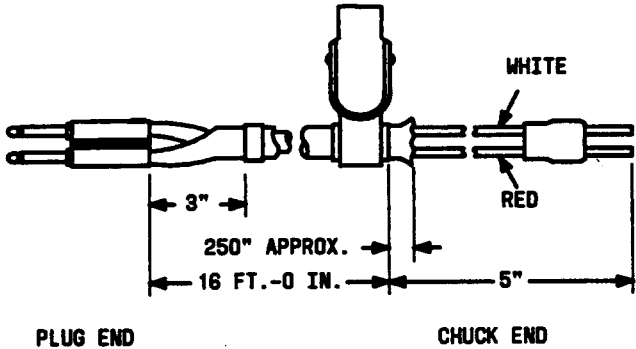
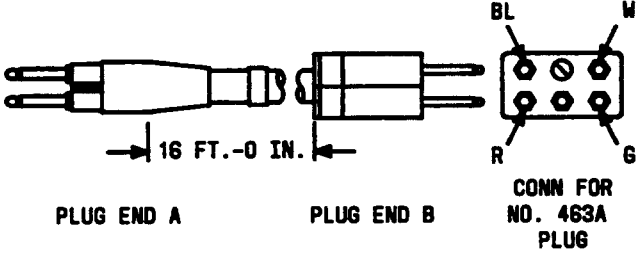
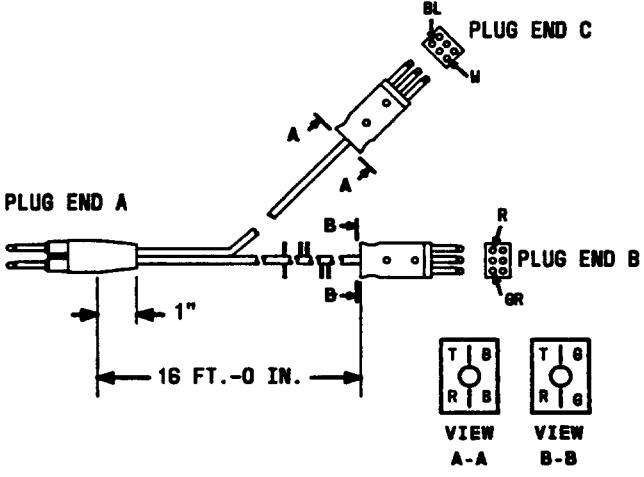
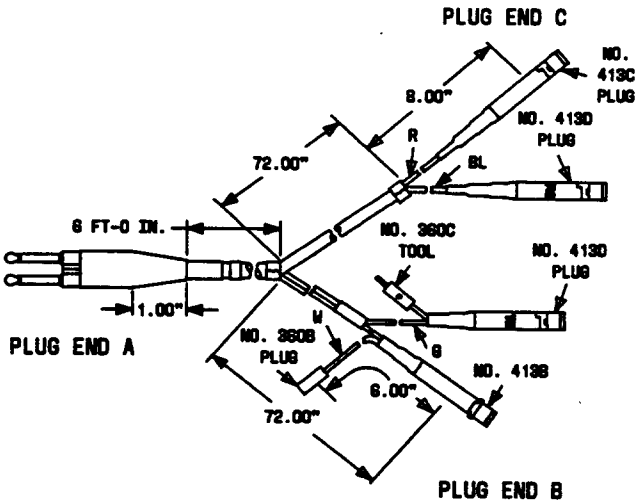
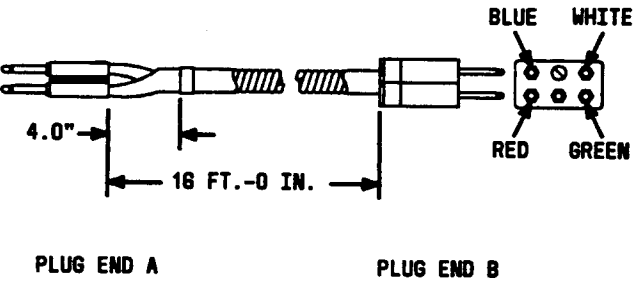
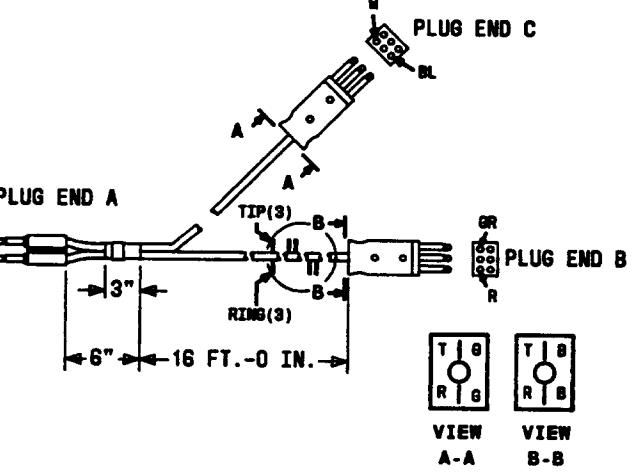
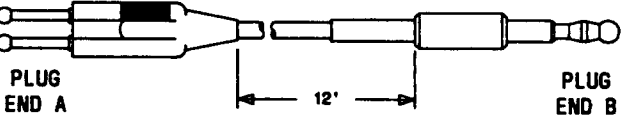
Cord	Use	Illustration
W2GY	Used for service observing on 78C4-64 and 78C2A-64 connecting blocks on <i>COSMIC</i> I and II frame systems.	 <p style="text-align: center;">JACK END <span style="float: right;">PLUG END</span></p>
W2HA	A bridging cord used in conjunction with D, G, H, N, and R test connectors for the 302-, 303-, 305-, and 308-type connectors.	 <p style="text-align: center;">PLUG END <span style="float: right;">CHUCK END</span></p>
W4CT	Used for making input and output tests on the 303-, 305-, 307-, 309-, 310-/310M-, and 311-type connectors.	 <p style="text-align: center;">PLUG END A <span style="float: right;">PLUG END B</span></p> <p style="text-align: right;">CONN FOR NO. 463A PLUG</p>
W4CU	Used in making manual and automatic Varley measurements on the 303-, 305-, 307-, 309-, 310-/310M-, and 311-type connectors.	 <p style="text-align: center;">PLUG END A <span style="float: right;">PLUG END C</span></p> <p style="text-align: right;">PLUG END B</p> <p style="text-align: center;">VIEW A-A <span style="float: right;">VIEW B-B</span></p>

TABLE P (Contd)		
MINIATURE TEST/TALK CORDS		
Cord	Use	Illustration
W4CW	Used in making wheatstone bridge tests on the C-50 protector.	<p>Diagram of W4CW cord showing Plug End A, Plug End B, and Plug End C. Plug End A is a standard 300-type connector. Plug End B is a No. 251C plug with dimensions 8.00" and 72.00". Plug End C is a No. 251D plug with dimensions 72.00" and 1.00". The cord length is 6 FT-0 IN.</p>
W4CY	Used in making input and output tests on the C-50 protector.	<p>Diagram of W4CY cord showing Plug End A and Plug End B. Plug End A is a standard 300-type connector. Plug End B is a No. 252A plug with dimensions 1.00", 7.00", and 10.00". The cord length is 12 FEET STANDARD - 19 FEET 6 INCHES AVAILABLE.</p>
W4DA	Used in making input and output tests on the 300-type connector.	<p>Diagram of W4DA cord showing Plug End A and Plug End B. Plug End A is a standard 300-type connector. Plug End B is a No. 412A plug with dimensions 1.00", 7.00", and 10.00". The cord length is 12 FEET STANDARD - 19 FEET 6 INCHES AVAILABLE.</p>

TABLE P (Contd)  
MINIATURE TEST/TALK CORDS

Cord	Use	Illustration
W4DB	Used in making manual and automatic Varley measurements on the 300-type connector.	 <p>Diagram of W4DB cord showing three plug ends (A, B, C) with dimensions and component labels. Plug End A is a 300-type connector with a 6 FT.-0 IN. length and a 1.00" diameter. Plug End B is a 300-type connector with a 72.00" length and a 6.00" diameter. Plug End C is a 300-type connector with a 72.00" length and a 6.00" diameter. The cord is labeled with NO. 360C TOOL, NO. 360B PLUG, NO. 413B, NO. 413C PLUG, and NO. 413D PLUG. Dimensions include 8.00", 72.00", 6.00", and 1.00".</p>
W4CP	Used in making input and output tests on the 302- and 308-type connectors only.	 <p>Diagram of W4CP cord showing Plug End A and Plug End B. Plug End A is a 302-type connector with a 4.0" length. Plug End B is a 308-type connector with a 16 FT.-0 IN. length. The cord is labeled with BLUE, WHITE, RED, and GREEN. Dimensions include 4.0" and 16 FT.-0 IN.</p>
W4CR	Used in making manual and automatic Varley tests on the 302- and 308-type connectors only.	 <p>Diagram of W4CR cord showing Plug End A, Plug End B, and Plug End C. Plug End A is a 302-type connector with a 3" length. Plug End B is a 308-type connector with a 16 FT.-0 IN. length. Plug End C is a 308-type connector with a 6" length. The cord is labeled with TIP(3), RING(3), and B. Dimensions include 3", 6", and 16 FT.-0 IN. Cross-section views A-A and B-B are shown, labeled VIEW A-A and VIEW B-B.</p>
W4DC	Used for input and output tests on the 444 jack (301 connector).	 <p>Diagram of W4DC cord showing Plug End A and Plug End B. Plug End A is a 444 jack (301 connector) with a 12' length. Plug End B is a 444 jack (301 connector) with a 12' length. Dimensions include 12'.</p>

**4.09** The miniature test/talk system can be arranged with the 309-type connector on the new frame-works (Figure 21). An 844690982 panel assembly, which accommodates four test/talk panels, is available for mounting in the frame vertical space devoted for one 309-type connector. The bracket is intended to contain one transmitter assembly, KS-21316, L8, and, depending upon the options desired by the individual central office, up to three jack panels, KS-21316, L3. The test/talk assembly is mounted on the frame vertical between the sixth and seventh horizontal shelves (from the floor) of the ED-97754-74 LPCDF (low profile conventional distributing frames) and between the fifth and sixth horizontal members of the ED-97755-72 LPDPF (low profile double-sided protector frames). Drawing ED-6C111-10 will show the location and mounting of the miniature test/talk assembly on the LPCDF and LPDPF with 309-type connectors.

#### **4.10 Ordering example**

- (Qty) ED-6C110-10, G-8 Protector Frame Modular Test/Talk Panel E/W
- (Qty) G-103, Jack Module, Position A
- (Qty) G-102, Jack Module, Position B

- (Qty) G-112, Blank Panel, Position C

The above ordering example would be for each even-numbered frame module. If additional jack capacity was required, companion panel G-10 would be specified, equipped with jack modules as required.

#### **4.11 The following additional equipment may be required:**

- (Qty) Adapter, KS-21316, L7  
Used for mounting of ED-6C110-10, G-25 and -26 on verticals arranged for conventional Loudspeaker Equipment (see ED-6C111-10)
- (Qty) Loudspeaker, KS-21347, L( )  
L1 without volume control for test desk communication; L2 with volume control for test desk communication
- (Qty) Loudspeaker, Paging WP91812, L1 (Comcode 405771122)
- (Qty) Bracket, Swivel (Comcode 405774167)
- (Qty) Unit, Loudspeaker Paging (Comcode 405771239)

## MINIATURE PLUG ADAPTERS

- 4.12 Miniature plug adapters are available to utilize test cords that have a standard size and finish.

KS-21386, L1 Miniature Plug Adapter (401272646) (Figure 32) — Permits use of standard plugs to be used with miniature jacks.

KS-21387 Test Set Patch Cord (401272794) (Figure 33) — Permits use of standard three conductor plugs to be used with miniature jacks.

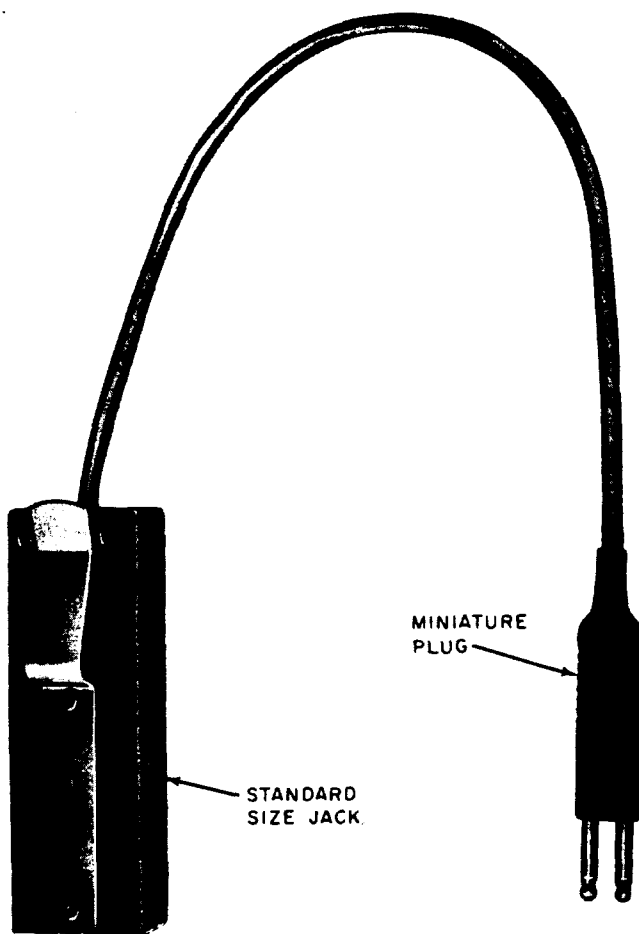


Figure 32—KS-21386, L1 Miniature Plug Adapter

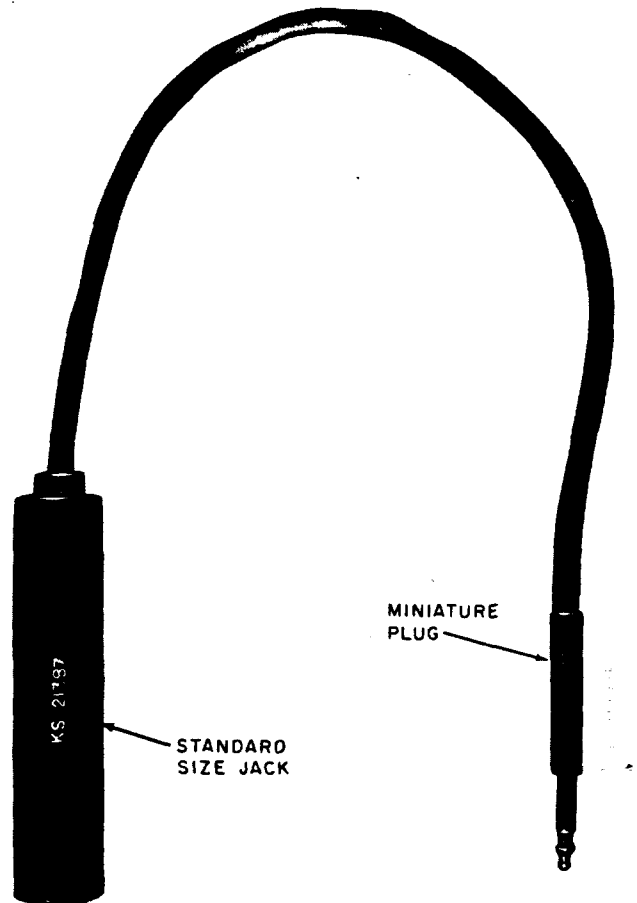


Figure 33—KS-21387 Test Set Patch Cord



## ESS SWITCH MODULAR DISTRIBUTING FRAME TEST/TALK PANELS

### 589A Panel

4.13 The 589A panel (100987270) (Figure 34) is required for battery test and head telephone set access. The panel is required on the *ESS* Switch MDF (modular distributing frame) when the frame is remotely located from the protector frame. The panel consists of jacks, connectors, fuse blocks, and fuses mounted on a metal panel.

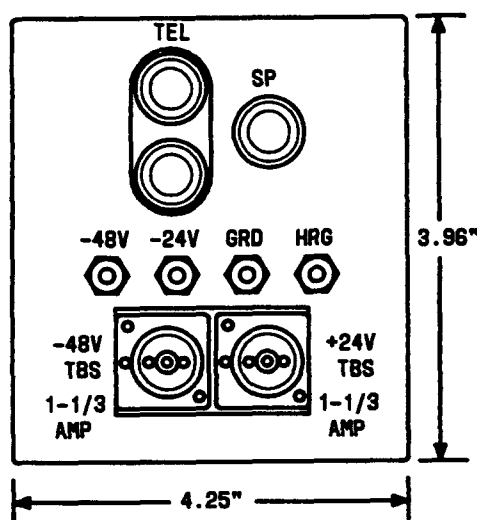


Figure 34—589A Panel

### 677A TRANSMITTER

4.14 The 677A transmitter (101418234) (Figure 35) is required for interframe communication. The transmitter is required on the *ESS* Switch MDF when the frame is remotely located from the protector frame. The unit consists of an AC1 transmitter, 67A lamp socket, K2 lamp, and a pushbutton switch mounted on a metal panel.

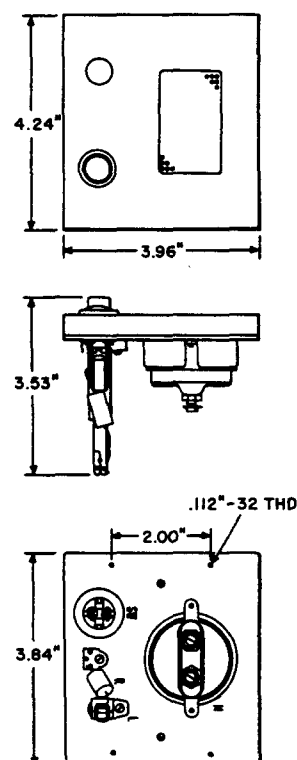


Figure 35—677A  
Transmitter

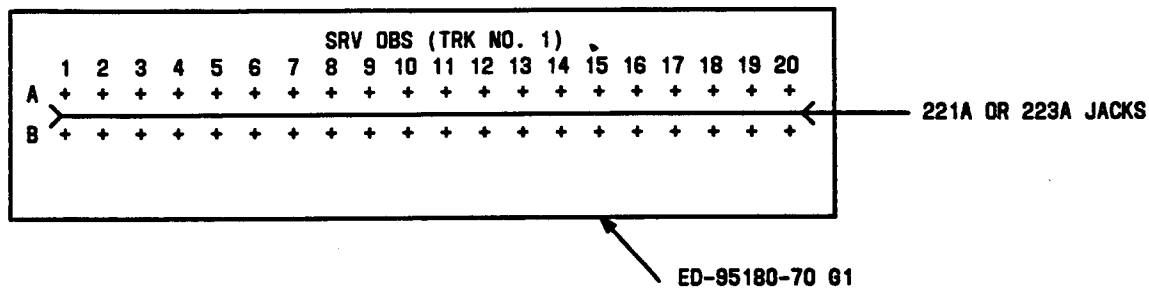
**EARLIER TEST/TALK PANELS AND BLOCKS****Earlier Test/Talk Systems**

**4.15** When existing conventional distributing frame verticals are extended, the test/talk system in the office will require extension through the new verticals. If the miniature test/talk system is not utilized, existing office test/talk facilities can be used.

**4.16** The test/talk system provides loudspeakers, transmitters, and associated switches at the

distributing frame for communications with the Repair Service Bureau, the frame area, and other frames. In addition, a variety of jacks are available for testing and talking purposes. These jacks may be installed in jack boxes or individual jack mountings.

**4.17** Because of the many combinations of test/talk jacks available, all possible arrangements cannot be illustrated. Generally, existing jack arrangements shown on the office base distributing frame drawing will provide adequate guidelines (see Figure 36 through 42 and Table Q).



**Figure 36—Service Observing Jacks in 40-Capacity Jack Box**

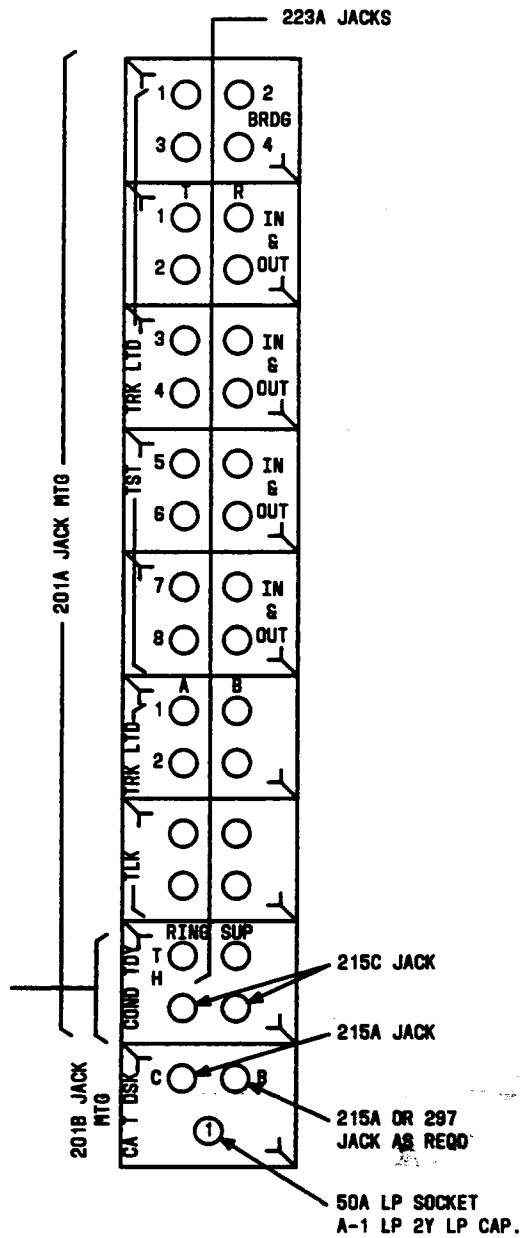


Figure 37—Miscellaneous Jacks

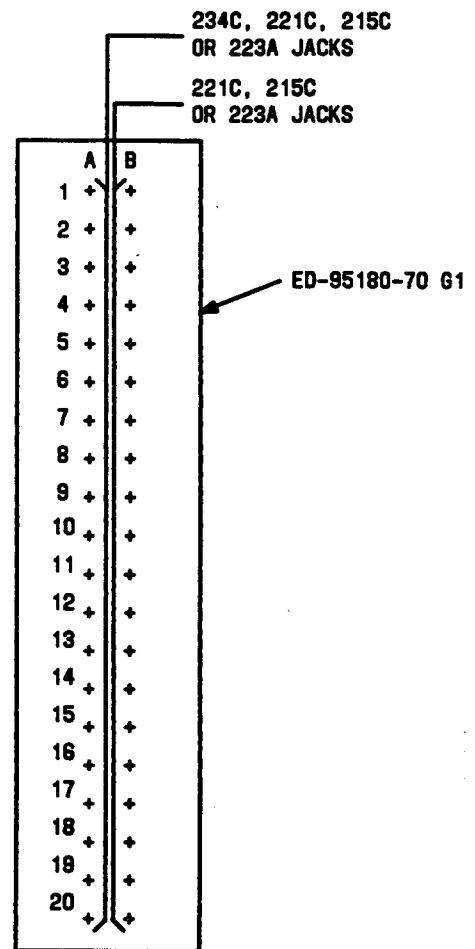


Figure 38—Plugging Up Line Jacks

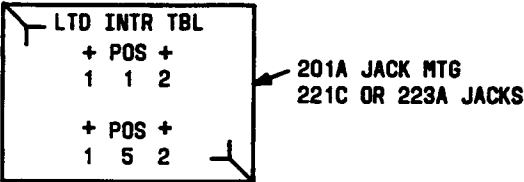


Figure 39—Intermittent Trouble Jacks

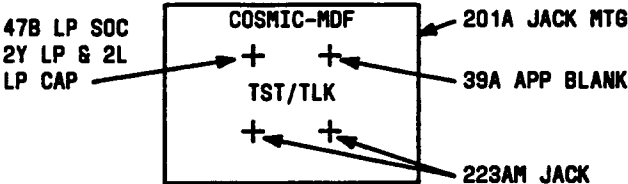


Figure 40—COSMIC MDF Test/Talk Jacks

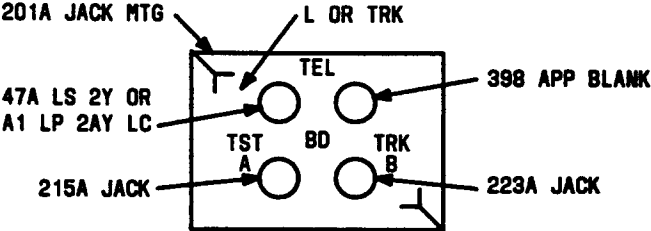


Figure 41—2-Way Test Jacks

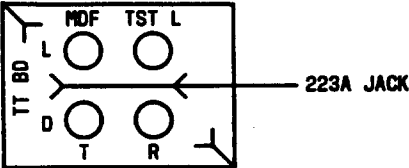


Figure 42—Toll Test Board Test Line Jacks

TABLE Q TYPICAL CONNECTING DRAWINGS	
TITLE	SCHEMATIC
Noncentralized Dial SO Lines	SD-90050-01
Centralized Dial SO Lines	SD-21424-01 SD-31347-01
Manual Single Line SO Lines	SD-90243-01
Manual Multiline SO Lines	SD-12776-01 SD-12876-01 SD-90266-01
Manual Multiline PBX SO Lines	SD-96030-01 SD-96162-01
Manual Single Line PBX SO Lines	SD-96111-01
SO Desk No. 10	SD-90580-01
SO Desk No. 6	SD-90410-01
Observing Entry Control	SD-32247-01
Traffic & Maintenance Desk OBS	SD-90263-01 SD-90266-01
SO Desk No. 12	SD-95563-01
SO Trk Conn	SD-32251-01
Conductor Identification Tone	SD-95689-01
Plugging Up Line (No. 5 XB)	SD-25741-01
Plugging Up Line	SD-95597-01
Ringing Supply	SD-90048-01
Cable Test Desk	SD-95545-01
Local Test Desk	SD-90403-01
LTD Talking Trunk	SD-95734-01 SD-96074-01
Toll Test Board MDF Test Line	SD-60392-01
Bridging Trunk MDF	SD-90071-01
In and Out MDF	SD-90070-01

4.18 The drawings listed under references will provide the necessary information and additional support equipment requirements for the test/talk system.

#### Ordering example

- (Qty) 201A Mounting, Jack E/W
- (Qty) 223A Jack Portion 1 to 4
- (Qty) 39B Apparatus Blanks Position As Required
- (Qty) ED-95180-70 — G-1, 40 Capacity, Jack Box Support
- (Qty) ED-95180-70 — G-2, 52 Capacity
- (Qty) ED-95180-70 — G-3, 80 Capacity
- (Qty) ED-95180-G70 — G-2, 52 Capacity
- (Qty) ED-95180-G70 — G-3, 80 Capacity Equipped With Jacks As Required.

#### 33-Type Connecting Blocks

4.19 The 33-type connecting block (Figure 43) is required to provide 24 V and/or 48 V battery and ground supplies when distributing frames are extended. The 33-type provides central office testing supply. One connecting block is required for each supply. The 33-type mounts on a terminal strip. Wooden blocks are required when mounting the 33-type in unequipped terminal strip positions. The 33-type connecting block is not required on new distributing frame systems. Test/talk system ED-6C110-10 will be provided on new systems.

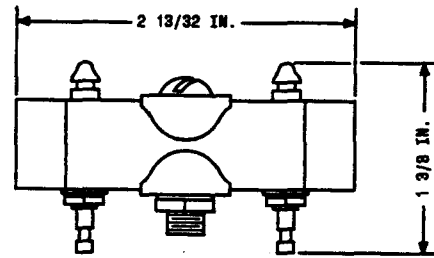


Figure 43—33-Type Connecting Block

#### Ordering Information

- (Qty) Block, Connecting 33C (Comcode 101801199)
- (Qty) Block, Connecting 33D (Comcode 101800894)
- (Qty) ED-90046-70, G-3 (for 6-1/2 inch terminal strip space)
- (Qty) ED-90046-70, G-4 (for 8-inch terminal strip space)
- (Qty) ED-90046-70, G-5 (for 13-1/2 inch terminal strip space)
- (Qty) ED-90046-70, G-6 (for MDF or LPCDF)

## 5. TEST SETS

## KS-20100 TEST SET FOR 3-TYPE AND 4-TYPE PROTECTOR UNITS

5.01 The KS-20100 test set (Figure 44, 45, and Table R) is used for testing 3- and 4-type

protector units. The protector units may be tested without disassembly for tip and ring continuity and shorted or grounded protector blocks. The test set also provides a burnout feature to clear carbon-type protector blocks that become shorted by carbon or dust particles. Two mounting arrangements are available: List 1 as an integral part of the modular protector frame, List 2 and List 5 as conduit-type mountings.

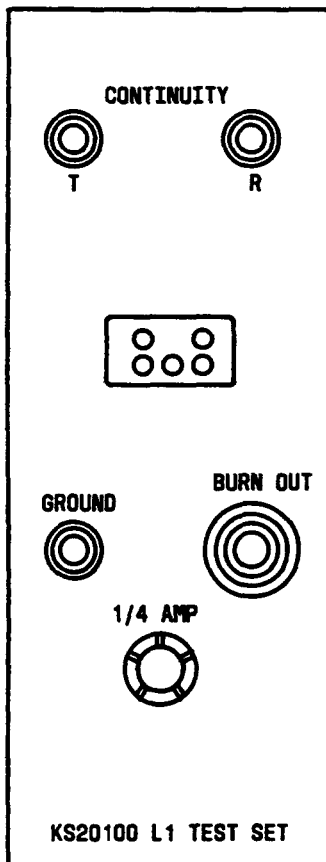


Figure 44—KS-20100, L1 Test Set

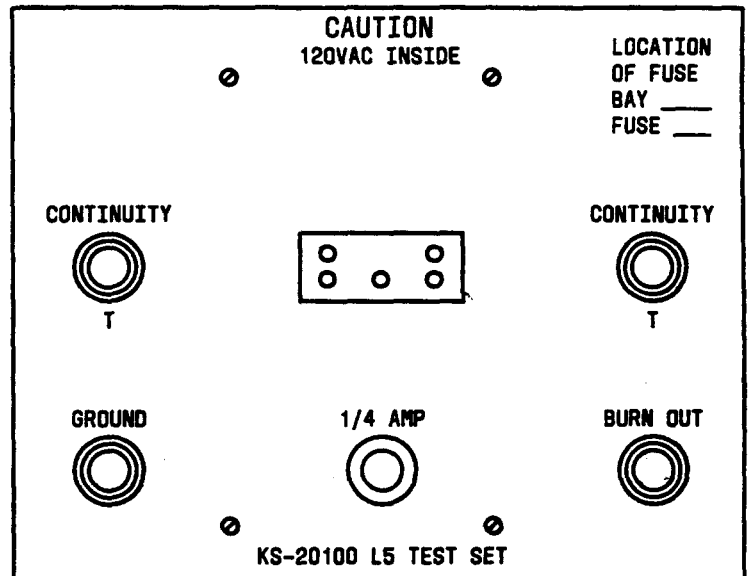


Figure 45—KS-20100, L5 Test Set

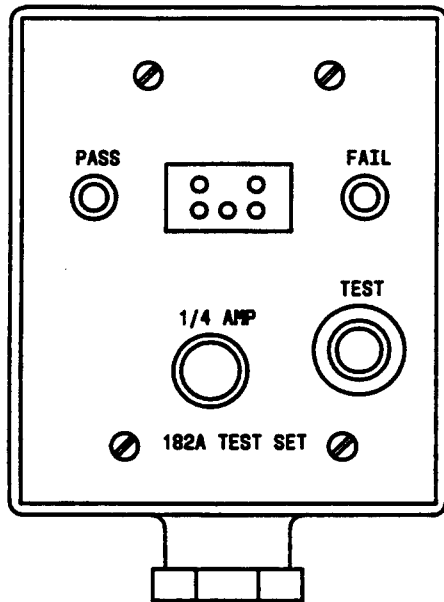
**TABLE R**  
**KS-20100 TEST SET SPECIFICATIONS**

Application	KS-20100, List ( )	Height (in.)	Width (in.)	Comcode
Testing 3- and 4-type protector units	L1	8-3/4	3-3/4	997850334
Caution label	L3			402365761
Test adapter used with List 5 to test 1-type protector unit	L4			402635890
Wall-mounted one per distributing frame or protector frame lineup	L5	4-1/2	4-1/2	402632590
Conduit box for wall mounting List 5	L6			402635908
Wall-mounted, one per distributing frame or protector frame lineup	L2 (DA)	4-3/4	4-1/2	—

**182A TEST SET FOR TESTING MINIBRIDGE LIFTERS**

**5.02** The 182A test set (103016549) (Figure 46) is used to test the minibridge lifter protector units for tip and ring continuity and for shorted protector blocks. It also tests the function of the 410A switch contained in the protector unit. The 182A test set is housed in a conduit box for wall mounting.

**5.03** For short-term testing or service denial, protector units may be partially withdrawn to the "detent" position. When the protector unit is pulled out to the detent position, the **central office or customer premises equipment** is disconnected to isolate outside plant cable pairs for testing purposes. In this position, voltage protection is still provided on the outside plant cable pair. Removing the protector unit from the connector opens the circuit and removes all protection.



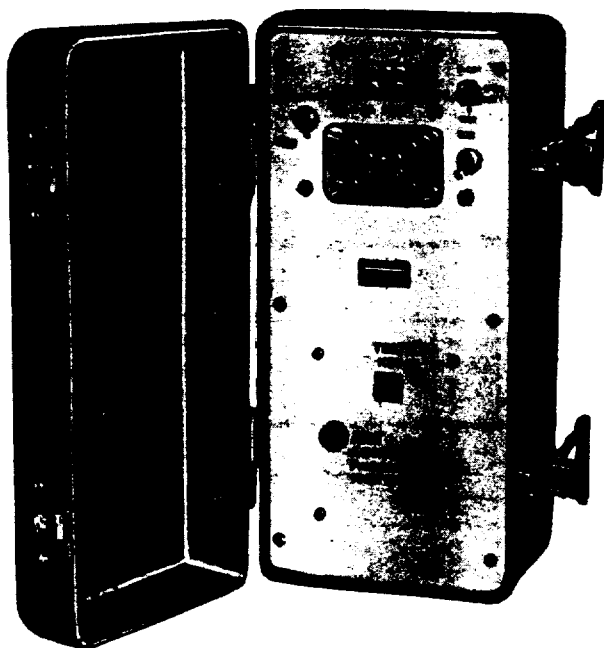
**182A Test Set**

**Figure 46—182A Test Set**



**A4H402, L1 PROTECTOR BREAKDOWN TEST SET**

**5.04** The protector breakdown test set (Figure 47) is an accurate, direct reading digital tester for measuring breakdown voltage of both gas tube and carbon surge arresters. This test set has been approved by Bell Laboratories and is modified to include testing capabilities for 4CF-type and 3D1F-type protectors used with 5ESS® switch offices.



**Figure 47—A4H402, L1 Protector Breakdown Test Set**

**5.05** The testing procedure using the A4H402 test set is directed at verifying the voltage limiting capability of each protector. It is important that all protectors are checked to ensure the safety of telephone plant personnel and to reduce the possibility

and extent of equipment damage in the event that foreign potentials come in contact with outside plant.

**5.06** The A4H402, L1 protector breakdown test set provides a reading that is a true representation of "cold tube" breakdown voltage compared to repetitive firing testers that read only average breakdown value. Accuracy is unaffected by physical abuse, unlike testers using moving coil meters, since the A4H402, L1 has no delicate moving parts. The case is lightweight and rugged.

**5.07** Associated with the -48 volt version is a kit of parts to make the test set adaptable for either wall-mount or rack-mount.

**Ordering Information**

(Qty) Test Set, A4H402, L1 (Comcode 104271911)

(Qty) Unit, Marker A4H402, L2 (Comcode 104271929)

(Qty) Adapter, A4H402, L4 (Comcode 105019194)

(Qty) Adapter, A4H402, L5 (Comcode 104292354)

(Qty) Test Set, -48V A4H402, L7 (Comcode 105534788)

(Qty) Plate, Flat Wall Mounting A4H402, L8 (Comcode 105534796)

(Qty) Bracket, 90° A4H402, L9 (Comcode 105534325)

The test set may be ordered from:

AT&T Network Systems  
6701A North Park Boulevard  
Charlotte, NC 28216  
Telephone: (704) 597-3026

## 6. WARNING MARKERS, GUARDS, INDICATORS, AND INSULATORS FOR CO CONNECTORS

**6.01 Warning markers** are used on protector mountings and connectors as personnel safety devices. Their use indicates that abnormally high voltages are present on terminated pairs, such as in breakdown tests.

**6.02 Guards** are provided to prevent service interruptions, equipment damage, and personal

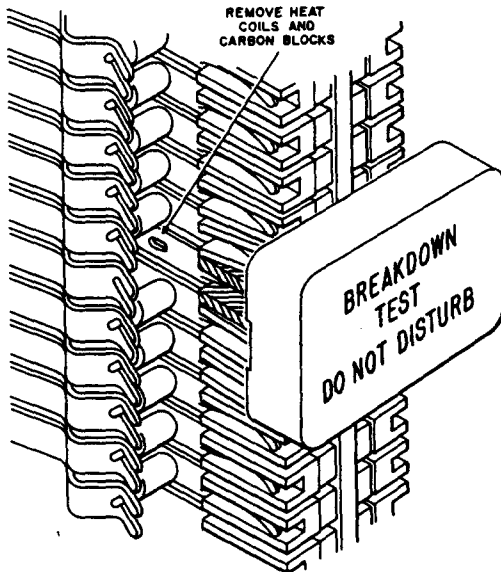
injury. Guards with associated indicators and insulators also serve to designate circuits assigned to special services and special safeguard measures.

**6.03 Indicators and insulators** provide additional visibility and protection for circuits assigned to special services. Indicators are used on cross-connecting wires, and insulators are placed on apparatus terminations for additional protection. Indicators and insulators should be provided in addition to the warning markers, signs, and guards (see Table S).

TABLE S SELECTION GUIDE — WARNING MARKERS, GUARDS, INDICATORS, AND INSULATORS										
ITEM	ASSOCIATED CONNECTORS									PROTECTOR MOUNTINGS
	311 310M 310	309	308	307	305	303	302	301 444	300	C E 1177 1268
<b>Warning Markers</b>										
B										X
C									X	
E Warning	X	X	X	X	X	X	X			
E Sign	X	X	X	X	X	X	X			
<b>Guards</b>										
KS-14539										X
KS-19478			X		X	X	X			
KS-20353								X		
KS-21369									X	
KS-22596	X									
<b>Indicators</b>										
KS-6660	X	X			X	X		X	X	X
KS-16847	X	X		X	X	X		X	X	X
<b>Insulators</b>										
AT-6798								X		X
KS-16604	X	X			X	X			X	
KS-21168	X	X	X		X	X	X			

**B WARNING MARKER (AT-7259) — DA (DISCONTINUED AVAILABILITY) (COMCODE 400159810)**

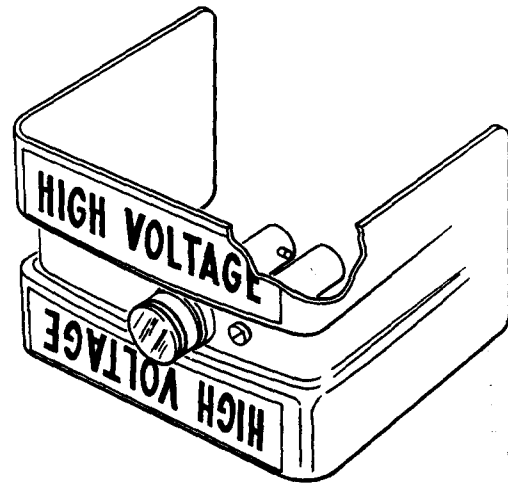
**6.04** The B warning marker (Figure 48) is a 1-piece, opaque, red thermoplastic unit with white lettering on the base. It is used on C-, E-, 1177-, and 1268-type protector terminals.



**Figure 48—B Warning Marker**

**C WARNING MARKER (AT-7818) — DA (DISCONTINUED AVAILABILITY) (COMCODE 400159828)**

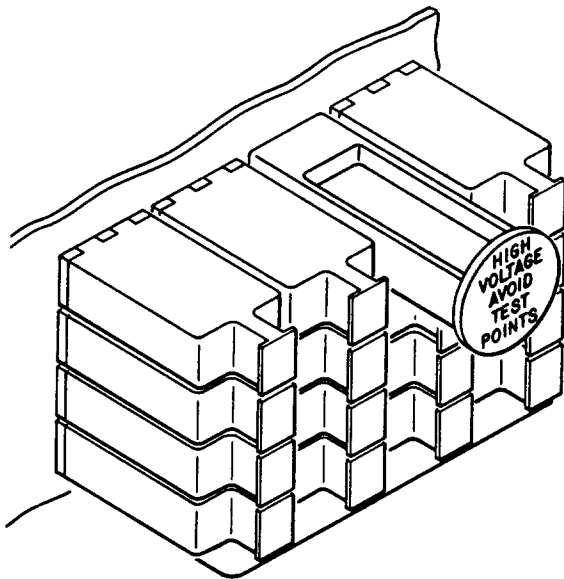
**6.05** The C warning marker (Figure 49) is placed over the 1A protector unit on the 300-type connector. It consists of a formed red plastic saddle having a fixed spring depressor and a locking depressor. The marking consists of red characters on a white field.



**Figure 49—C Warning Marker**

**E WARNING MARKER (AT-8590) — DA (DISCONTINUED AVAILABILITY) (COMCODE 400614202)**

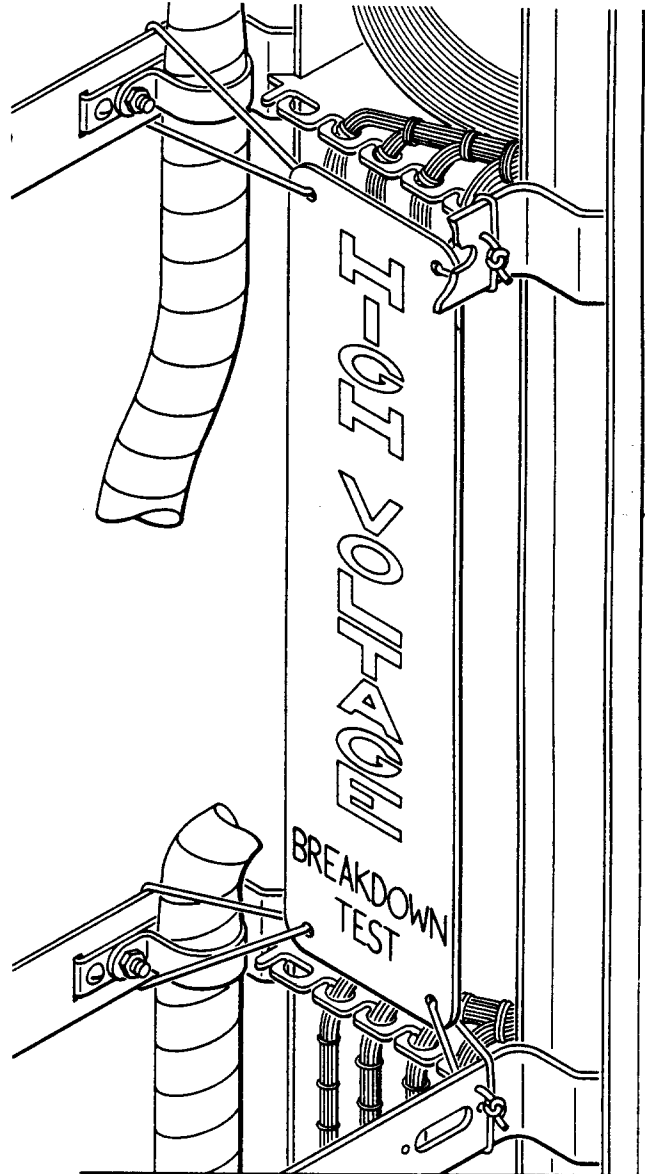
6.06 The E warning markers (Figure 50) are substituted for the protector units on connectors for pairs subjected to abnormally high voltages (such as breakdown test). The E warning markers disconnect outside plant cable pairs from central office equipment, with no protection on cable pairs. The marker is a red plastic device with three mounting prongs on one end and a warning marked in white on the opposite end.



**Figure 50—E Warning Marker**

**E WARNING SIGN (AT-8325) (COMCODE 400359196)**

6.07 The E warning sign (Figure 51) is used in conjunction with the E warning marker. It provides additional visible warning for the connector being tested.



**Figure 51—E Warning Sign**

**6.08** The sign, 16-1/4 by 4 inches, is a red plate with white warning lettering. The sign comes with cords for attachment to connectors. The 303-type requires two signs, mounted on the left and right side.

#### KS-14539 GUARD

**6.09** The KS-14539 guard (Figure 52 and 53) is a red plastic hood designed to cover the heat coils and springs on the following protectors:

Application	KS-14539 List Number	Comcode
1177 mounting	L5	400146999
1268, 1269 mountings	L7	400147013
C50 (pre-1946)	L8	400147021
E type	L9	400147039
C50	L10	401441050
C50	L11	401441068

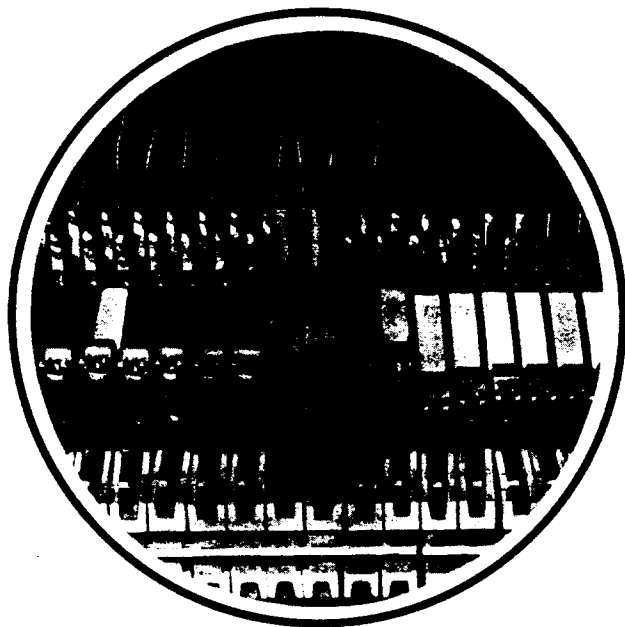


Figure 52—KS-14539, L5 Guard



Figure 53—KS-14539, L10 and L11 Guard

**6.10** The KS-14539, L10 guard is required for special service indication only. The KS-14539, L11 consists of a guard and a beaded tie for fastening the guard in place. This guard is required for special safeguard measures.

#### KS-19478 GUARD (COMCODE 997161617)

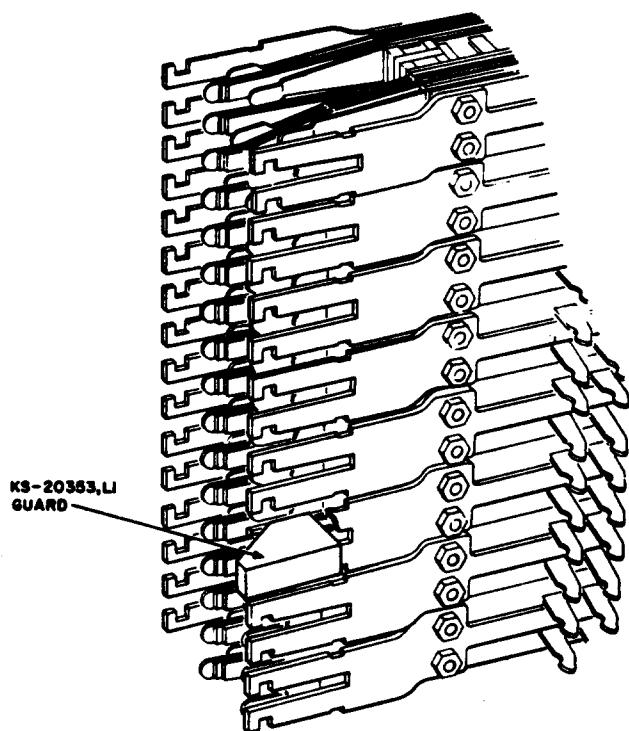
**6.11** The KS-19478, L1 guard (Figure 54) is a red molded plastic insert and is used to cover two recessed tip and ring terminals associated with the special service circuits on the test terminal fields of the connectors. The guard prevents accidental contact with the test terminals and acts as an obstruction to circuit interference from the contacts of a test terminal.



Figure 54—KS-19478, L1 Guard

**KS-20353 GUARD (COMCODE 400358818)**

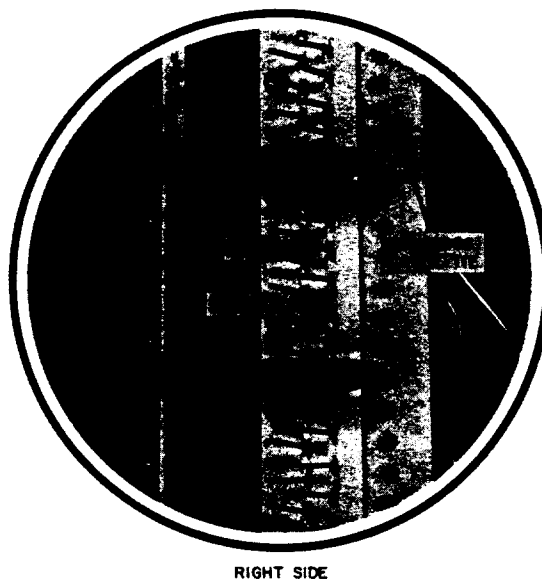
**6.12** The KS-20353, L1 guard (Figure 55) mounts on 444-type jacks (301 connector) to protect terminals against accidental contact. It consists of a molded, red thermoplastic material having a cavity on one side and a rectangular hole through the opposite side.



**Figure 55—KS-20353, L1 Guard Mounted on 444-Type Jack (301 Connector)**

**KS-21369 GUARD (COMCODE 401391826)**

**6.13** The KS-21369, L1 guard (Figure 56) is a molded plastic warning marker guard made of red flame-retardant polypropylene. It is a snap-on design which wraps around the 300-type connector, covering the test contacts, protector units, and wire-wrap terminals for SSP (Special Service Protection). When the guard is used for SSM (Special Safeguard Measures), a KS-20986 (Comcode 401675152) cable tie is used to secure the guard to the fanning strip on the connector.



**Figure 56—KS-21369, L1 Guard Installed With or Without SSM**

**KS-22596 GUARD (COMCODE 402800627)**

6.14 The KS-22596, L1 guard (Figure 57) is a molded plastic insert made of red flame-retardant polypropylene and is used to cover two recessed tip and ring terminals associated with the special service circuits on the test terminal fields of the connectors. The guard prevents accidental contact with the test terminals and acts as an obstruction to circuit interference from the contacts of a test terminal.



Figure 57—KS-22596, L1 Guard

**KS-6660 INDICATOR (COMCODE 996698239)**

6.15 Indicator KS-6660 (Figure 58) is a red plastic ring 1/2 inch in diameter. This indicator must be placed on cross-connect wires to protector mountings, connectors, connecting blocks, or terminal strips before they are terminated.



Figure 58—KS-6660 Indicator

**KS-16847 INDICATOR (COMCODE 997726088)**

6.16 Indicator KS-16847, L1 (Figure 59) is a red cellulose-acetate spiral ring 3/8 inch in diameter. The split-ring feature permits placing or removing the indicator on terminated cross-connection wires to protector mountings, connectors, connecting blocks, or terminal strips.



Figure 59—KS-16847, L1 Indicator

**BINDING POST INSULATORS/TERMINAL PUNCHING INSULATORS AT-6798 — DA (DISCONTINUED AVAILABILITY)**

6.17 Binding post and terminal punching insulators (Figure 60) consist of cylindrical, rigid PVC tubes having a longitudinal slot the length of the tube. They are red in color.

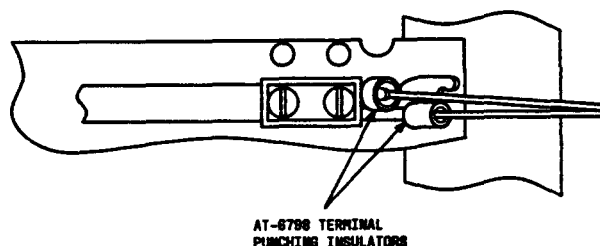


Figure 60—AT-6798 Terminal Punching Insulators on Protector Mounting

6.18 Binding post insulators are designated 1, 2, 3, and 6. Terminal punching insulators are designated 4, 5, 7, 8, and 9 (Table T).

TABLE T				
AT-6798 BINDING POST INSULATORS/TERMINAL PUNCHING INSULATORS				
APPLICATION	SIZE (INCHES)		AT-6798 LIST NO.	COMCODE
	DIAMETER	LENGTH		
7T fuse	35/64	5/8	1	400151874
7A fuse	39/64	5/8	2	400151882
BD, BE, BF, BG Cable Terminals	13/32	7/8	3	400151892
Terminal Strips — 444 (301) Connector	17/64	1/2	4	400151916
Terminal Strips — 444 (301) Connector	17/64	5/8	5	400151924
T Pressure Contractor Terminals and 3-Pair Gastight Terminals	35/64	13/32	6	400151908
C, E Protector Mountings	17/64	3/4	7	400151932
Terminal Strips — for Spacing and Wire Buildup Problems	17/64	1/2	8	400472494
Terminal Strips — for Spacing and Wire Buildup Problems	17/64	5/8	9	400472502



**KS-16604 INSULATOR**

6.19 Insulator KS-16604 (Figure 61) is designed to insulate and protect circuits with wire-wrapped terminals. The insulator is made of fire-retardant red plastic, slotted to allow clearance for bridged terminations. It is available in three sizes to cover all lengths of terminals (Table U).



Figure 61—KS-16604 Insulator

**KS-21168 INSULATOR (COMCODE 401206180)**

6.20 The KS-21168, L1 insulator (Figure 62) is a dual, open-ended, red, flame-retardant plastic insulator used on the wire-wrap terminals of the connectors. The insulator covers two wire-wrap cross-connections to prevent accidental contact.

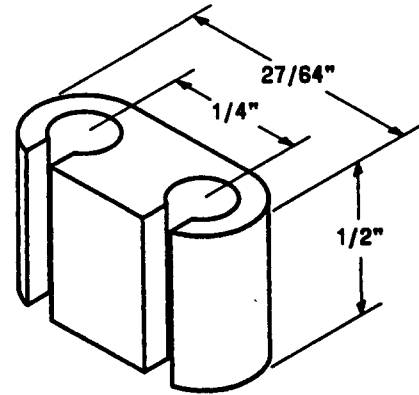


Figure 62—KS-21168 Insulator

TABLE U				
KS-16604 INSULATOR				
APPLICATION	SIZE (INCHES)		KS-16604 LIST NO.	COMCODE
	DIAMETER	LENGTH		
300-Type Connectors	7/64	1/2	1	400151825
303-, 305-, 309-, 310-, 310M-, and 311-Type Connectors; and 89- and 112-Type Blocks With Wire-Wrap Terminals	7/64	5/8	2	400809042
Terminal Strips	7/64	7/8	3	401299474

## 7. INSULATORS AND INDICATORS FOR CO CONNECTING BLOCKS

**7.01** Indicators and insulators (Table V) provide visibility and protection for circuits assigned to special services. Indicators are used on cross-connecting wires, and insulators are placed on apparatus terminations for additional protection. Indicators and insulators should be provided in addition to the warning markers, signs, and guards.

TABLE V						
SELECTION GUIDE — INDICATORS AND INSULATORS						
ITEM	CONNECTING BLOCKS					TERMINAL STRIP
	112	89	78	66	93	
Indicators						
KS-6660		X	X	X	X	X
KS-16847		X	X	X	X	X
Insulators						
AT-6798*						X
KS-16604*	X	X				X
KS-21168, L1*	X	X				
C Clip (AT-8300)†		X	X	X		
D Clip (AT-8301)†		X	X	X		
F Clip (AT-8660)†					X	
G Clip (AT-8919)†		X				
J Clip (AT-8993)†	X	X				
* For Wire-Wrap Terminals. † For Quick-Clip Terminals.						

**7.02** Binding post and terminal punching insulators consist of cylindrical, rigid PVC tubes having a longitudinal slot the length of the tube. They are red in color.

**7.03** Clip terminal insulators are designed to protect and designate terminals on connecting blocks assigned to special services. The insulators are red molded plastic snap-on design.

### KS-6660 INDICATOR (COMCODE 996698239)

**7.04** The KS-6660 (Figure 63) indicator is a red plastic ring 1/2-inch in diameter. This indicator must be placed on cross-connecting wires before they are terminated.

### KS-16847 INDICATOR (COMCODE 997726088)

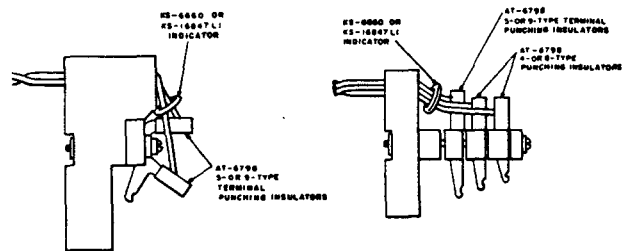
**7.05** The KS-16847, L1 indicator (Figure 63) is a red cellulose-acetate spiral ring 3/8-inch in diameter. The split-ring feature permits placing or removing the indicator on terminated cross-connecting wires.



Figure 63—KS-6660 and KS-16847 Indicators

# **AT-6798 BINDING POST AND TERMINAL PUNCHING INSULATOR (DA)**

**7.06** The AT-6798 binding post and terminal punching insulators (Figure 64) consist of cylindrical, rigid PVC tubes having a longitudinal slot the length of the tube. They are red in color.



**Figure 64—AT-6798 Binding Post and Terminal Punching Insulators**

7.07 Binding post insulators are designated 1, 2, 3, and 6. Terminal punching insulators are designated 4, 5, 7, 8, and 9 (see Table W).

TABLE W				
AT-6798 BINDING POST AND TERMINAL PUNCHING INSULATOR (DA) SPECIFICATIONS AND ORDERING INFORMATION				
APPLICATION	SIZE (INCHES)		AT-6798 LIST NO.	COMCODE
	DIAMETER	LENGTH		
7T fuse	35/64	5/8	1	400151874
7A fuse	39/64	5/8	2	400151882
BD, BE, BF, BG Cable Terminals	13/32	7/8	3	400151892
Terminal Strips — 444 (301) Connector	17/64	1/2	4	400151916
Terminal Strips — 444 (301) Connector	17/64	5/8	5	400151924
T Pressure Contactor Terminals and 3-Pair Gastight Terminals	35/64	13/32	6	400151908
C, E Protector Mountings	17/64	3/4	7	400151932
Terminal Strips — for Spacing and Wire Buildup Problems	17/64	1/2	8	400472494
Terminal Strips — for Spacing and Wire Buildup Problems	17/64	5/8	9	400472502

**KS-16604 INSULATOR**

**7.08** The KS-16604 insulator (Figure 65) is a red fire-retardant plastic and is used on wire-wrap terminals. It is slotted to allow clearance for bridged terminations.



**7.09** The KS-16604 insulator is available in three sizes to cover all lengths of terminals (see Table X):

**Figure 65—KS-16604 Insulator**

<b>TABLE X</b>				
<b>KS-16604 INSULATOR — SPECIFICATIONS AND ORDERING INFORMATION</b>				
<b>APPLICATION</b>	<b>SIZE (INCHES)</b>		<b>KS-16604 LIST NO.</b>	<b>COMCODE</b>
	<b>DIAMETER</b>	<b>LENGTH</b>		
300-Type Connectors	7/64	1/2	1 (DA)	400151825
303-, 305-, 309-, 310-, 310M-, and 311-Type Connectors; and 89- and 112-Type Blocks With Wire-Wrap Terminals	7/64	5/8	2	400809042
Terminal strips	7/64	7/8	3 (DA)	401299474

**KS-21168 INSULATOR (COMCODE 401206180)**

7.10 The KS-21168, L1 insulator (Figure 66) is a dual, open-ended, red, flame-retardant plastic insulator used on the wire-wrap terminals of the connecting blocks. The insulator covers two wire-wrap cross-connections to prevent accidental contact.

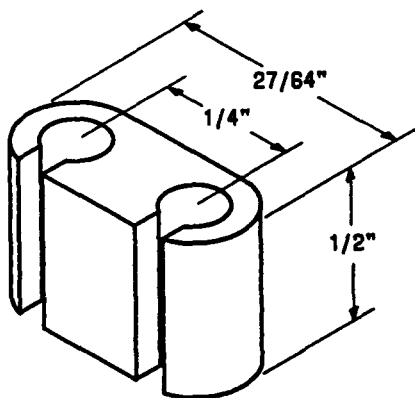
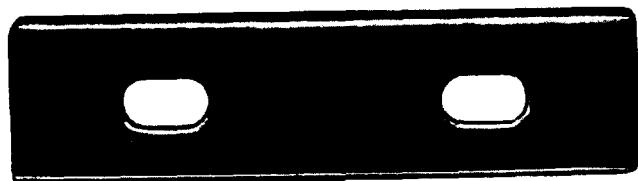


Figure 66—KS-21168 Insulator

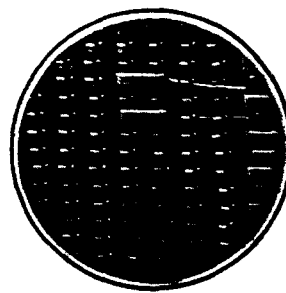
**CLIP TERMINAL INSULATORS**

7.11 Clip terminal insulators (Figure 67 and 68) are designed to protect and designate terminals on connecting blocks assigned to special services. The insulators are red molded plastic snap-on design (see Table Y).

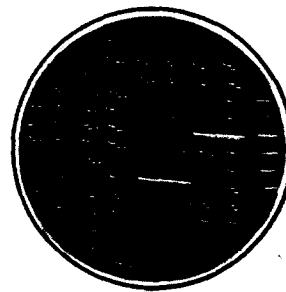


J CLIP

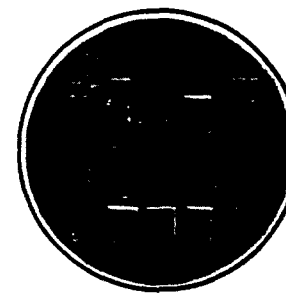
Figure 67—J Clip Terminal Insulator



C CLIP



D CLIP



F CLIP

Figure 68—C, D, and F Clip Terminal Insulators

TABLE Y		
CLIP TERMINAL INSULATORS — APPLICATION AND ORDERING INFORMATION		
APPLICATION	TERMINAL INSULATOR	COMCODE
66G, 78A, 89B, 89C, 89D series connecting blocks	C Clip (AT-8300)	400152005
66H, 78B, 78C, 89E, 89F, 89G series connecting blocks	D Clip (AT-8301)	400152013
93 series connecting blocks	F Clip (AT-8660)	401149802
89TB series connecting blocks	G Clip (AT-8919)	401887592
112 and 89TB series connecting blocks	J Clip (AT-8993)	402946313

## 8. TERMINAL STRIP GUARDS AND SHIELDS

**8.01** Guards and shields (covers) provide protection for terminal strips with a high concentration of special circuits or exposed to solder and wire clippings.

### KS-20107 AND KS-20108 GUARDS FOR 336-TYPE TERMINAL STRIPS

#### KS-20107 Terminal Strip Guard (Cross-Connect Side)

**8.02** The KS-20107 guard (Figure 69 and Table Z) is a flame-resistant, rectangular clear plastic cover used to protect wire-wrap terminations on the cross-connect side of horizontally mounted 336-type terminal strips. The guard is furnished with two KS-20309 L1 hinges that fasten to the terminal strip front barrier guard with screws provided.

#### KS-20108 Terminal Strip Guard (Cable Side)

**8.03** The KS-20108 guard (Figure 69 and Table Z) is a flame-resistant, rectangular clear plastic cover used to protect the bottom (cable side) of horizontally mounted 336-type terminal strips. The guard provides

protection for wire-wrap terminals and personnel during maintenance activities. Each guard is mounted by two molded tabs and two furnished cable ties.

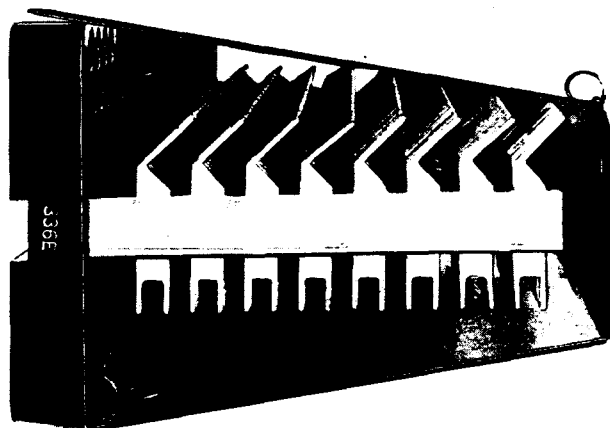


Figure 69—KS-20107 and KS-20108 Terminal Strip Guards

TABLE Z				
KS-20107 AND KS-20108 TERMINAL STRIP GUARD SPECIFICATIONS AND ORDERING INFORMATION				
TERMINAL STRIP APPLICATION	LENGTH (INCHES)	WIDTH (INCHES)	ORDERING CODE	COMCODE
336A, 336B, and 336G cross-connection side	15.87	4.25	KS-20107, L4 (DA)	401829528
336E, 336F, 336H, and 336J cross-connection side	15.87	5.00	KS-20107, L5	401829536
336K cross-connection side	15.87	5.88	KS-20107, L6 (DA)	401897723
336A, 336B, and 336G cable side	15.87	4.12	KS-20108, L4 (DA)	401829544
336E, 336F, 336H, and 336J cable side	15.87	4.75	KS-20108, L5	401829551
336K cable side	15.87	5.72	KS-20108, L6 (DA)	401897731



### 37-Type Shield for Cross-Connect Side of Selected Terminal Strips

**8.04** The 37-type shield (Figure 70) is a rectangular plastic-insulating sheet equipped with wire hinges designed to clip in holes molded in designated terminal strips. Shields may be used on other terminal strips that are physically similar to the codes listed (see Table AA).

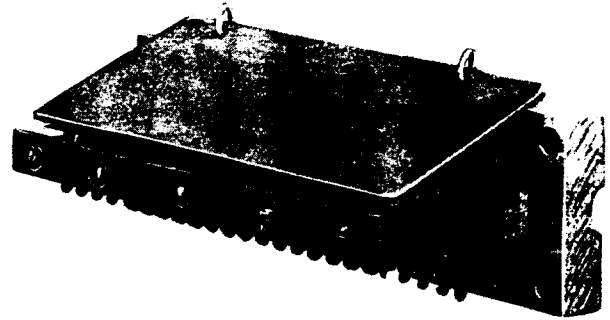


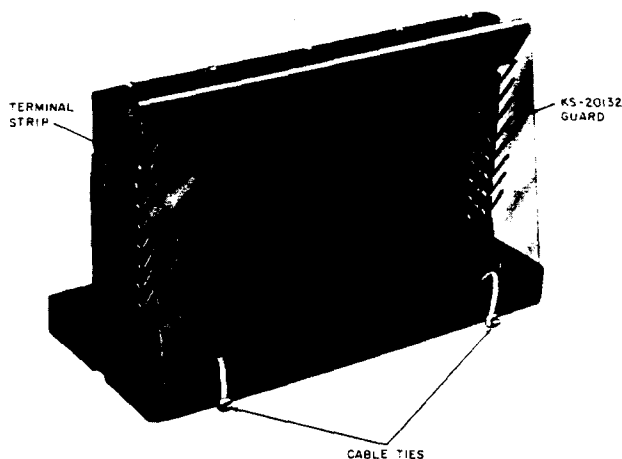
Figure 70—37-Type Shield

TABLE AA 37-TYPE TERMINAL STRIP SHIELD SPECIFICATIONS AND ORDERING			
TERMINAL APPLICATION STRIP	SHIELD LENGTH (INCHES)	SHIELD WIDTH (INCHES)	SHIELD ORDERING CODE
39C	5.875	2.500	37A
39D	5.875	2.500	37A
150AD	7.500	2.000	37N
150AG	7.500	2.500	37G
150AJ	7.500	3.000	37F
150AK	7.500	3.000	37F
150AL	7.500	3.000	37F
150BB	7.500	3.750	37J
150BC	7.500	3.250	37E
150BD	7.500	3.250	37E
150BE	7.500	3.250	37E
178AA	5.875	2.000	37M
178AC	5.875	2.875	37B
178AD	5.875	2.875	37B
178AE	5.875	3.250	37C
178AF	5.875	3.250	37C
178AG	5.875	3.250	37C
178AH	5.875	3.250	37C
178AJ	5.875	3.250	37C

TABLE AA (Contd) 37-TYPE TERMINAL STRIP SHIELD SPECIFICATIONS AND ORDERING			
TERMINAL APPLICATION STRIP	SHIELD LENGTH (INCHES)	SHIELD WIDTH (INCHES)	SHIELD ORDERING CODE
178AK	5.875	3.750	37D
178AL	5.875	3.750	37D
178AM	5.875	3.750	37D
178AN	5.875	3.750	37D
178AP	5.875	3.750	37D
178AR	5.875	3.750	37D
183AA	15.688	4.313	37L
183AB	15.688	4.313	37L
183AE	15.688	3.313	37K
183AF	15.688	4.313	37L
183AG	15.688	4.313	37L
183R	15.688	2.625	37H
183T	15.688	3.313	37K
183U	15.688	2.625	37H
183W	15.688	2.000	37P
268A	7.500	2.000	37N
268B	7.500	2.500	37G
268C	7.500	3.000	37F
268D	7.500	3.750	37J

# **KS-20132 Terminal Strip Guard for Cable Side of Selected Terminal Strips**

**8.05** The KS-20132 guard (Figure 71) is a flame-resistant, rectangular transparent plastic sheet. The guard is mounted by molded flanges that clamp the guard clips onto the lip of the terminal strip barrier guard and is secured to the base with two furnished plastic cable ties (see Table AB).



**Figure 71—KS-20132 Terminal Guard**

<b>TABLE AB</b> <b>KS-20132 TERMINAL STRIP GUARD</b> <b>SPECIFICATIONS AND ORDERING</b>			
TERMINAL STRIP APPLICATION	GUARD LENGTH (INCHES)	GUARD WIDTH (INCHES)	GUARD ORDERING CODE KS-20132
150AD	6.688	3.156	L1
150AE	6.688	3.500	L2
150AF	6.688	3.500	L2
150AG	6.688	3.500	L2
150AJ	6.688	3.875	L3
150AK	6.688	3.875	L3
150AL	6.688	3.875	L3
150AN	6.688	4.219	L4
150AP	6.688	4.219	L4
150AR	6.688	4.219	L4
150AS	6.688	4.219	L4
150AT	6.688	4.219	L4
150AU	6.688	4.219	L4
150AW	6.688	4.219	L4
150AY	6.688	4.219	L4
150BB	6.688	4.219	L4
150BC	6.688	4.562	L5
150BD	6.688	4.562	L5
150BE	6.688	4.562	L5
150BG	6.688	4.938	L6
150BH	6.688	4.938	L6
150BJ	6.688	4.938	L6
150BL	6.688	5.281	L7
150BM	6.688	5.281	L7
183AA	15.562	5.468	L14
183AB	15.562	4.937	L15
183AC	15.562	3.875	L9
183AD	15.562	4.562	L13
183AE	15.562	4.156	L16

<b>TABLE AB (Contd)</b> <b>KS-20132 TERMINAL STRIP GUARD</b> <b>SPECIFICATIONS AND ORDERING</b>			
TERMINAL STRIP APPLICATION	GUARD LENGTH (INCHES)	GUARD WIDTH (INCHES)	GUARD ORDERING CODE KS-20132
183AF	15.562	4.468	L14
183AG	15.562	5.281	L17
183R	15.562	3.718	L8
183S	15.562	3.875	L9
183T	15.562	4.219	L10
183U	15.562	3.500	L11
183W	15.562	3.156	L12
183Y	15.562	4.562	L13
198F	15.562	3.500	L11
198G	15.562	4.219	L10
198H	15.562	4.937	L15
198J	15.562	4.562	L13
198K	15.562	5.281	L17
198L	15.562	4.562	L13
268A	7.562	3.125	L18
268B	7.562	3.500	L19
268C	7.562	3.875	L20
268D	7.562	4.250	L21
268E	7.562	5.000	

**TERMINAL STRIP FILLER INSERTS**

- 8.06 Filler inserts (Figure 72 and 73) are used to fill guard hinge slots on terminal strips not equipped

with guards. Use of the inserts will prevent snagging cross-connect wires in the hinge slots. Four inserts are used for each terminal strip. Material is white, flame-retardant plastic molding (see Table AC).

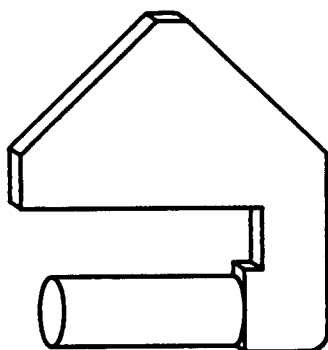


Figure 72—B Filler Insert (AT-8807)

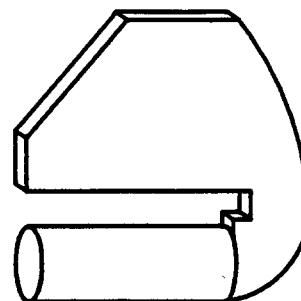


Figure 73—C Filler Insert (AT-8808)

TABLE AC			
TERMINAL STRIP FILLER INSERT SPECIFICATIONS AND ORDERING			
TERMINAL STRIP APPLICATION	INSERT DIMENSIONS (INCHES)	INSERT ORDERING CODE	COMCODE
336	.375 x .406 x .105	C (AT-8808)	401817689
328	.500 x .375 x .105	B (AT-8807)	401817671

## 9. REFERENCES

		PRACTICE	TITLE
PRACTICE	TITLE		
106-310-120	108A and 109A Test Set	201-208-110	307-Type Connectors — Description, Use, Installation, and Repair Procedures
106-315-101	B Test Clip	201-208-111	308-Type Connectors — Description, Use, Installation, and Repair Procedures
106-315-103	B Pair Identifier		
106-315-119	Multiple Pair Test Connectors for 302- and 303-Type Connectors	201-208-112	309-Type Connectors — Description, Use, Installation, and Repair Procedures
201-206-050	Cable Terminating Apparatus — Selection — Distributing and Protector Frames	201-208-113	310- and 310M-Type Connectors — Description, Use, Installation, and Repair Procedures
201-206-101	C-, E-, and Similar Type Protectors, Including 444-Type Jacks (301-Type Connectors) — Description	201-208-114	311-Type Connectors — Description, Use, Installation, and Repair Procedures
201-206-102	C-, E-, and Similar Type Protectors, Including 444-Type Jacks (301-Type Connectors) — Associated Cords and Plugs	201-216-101	Miniature Test/Talk System — Description — Distributing and Protector Frames
201-207-102	Cords, Plugs, and C Test Connector Used With 300-Type Connectors and 121-Type Protectors — Description	201-216-102	Cords and Plugs — Description — Miniature Test/Talk System
201-208-100	3-, 4-, and 5-Type Protector Units — Description, Use, Maintenance, and Test Procedures	201-216-801	Miniature Test/Talk System — Piece Parts and Replacement Procedures — Distributing and Protector Frames
201-208-103	Tools and Aids — Distributing and Protector Frames	201-219-101	Protector Frames — Description
201-208-107	302-Type Connectors — Description, Use, Installation, and Repair Procedures	201-220-101	Conventional Distributing Frames — Description
201-208-108	303-Type Connectors — Description, Use, Installation, and Repair Procedures	201-220-302	93-Type Connecting Blocks — Description, Methods of Cross-Connecting, and Repair Procedures
201-208-109	305-Type Connectors — Description, Use, Installation, and Repair Procedures	201-220-303	89-Type Connecting Blocks — Description, Methods of Cross Connecting, and Repair Procedures
		201-221-301	Method of Cross Connecting — 66G-, 66H-, 78A1-, and 78B1-Type Connecting Blocks — 1 and 2 ESS Switches

PRACTICE	TITLE	PRACTICE	TITLE
201-222-101	<i>COSMIC</i> I, IA, II, and IIA Distributing Frame Systems — Description	801-801-150	(J1A044) Main, Intermediate, and Trunk Distributing Frames
201-222-105	78- and 112-Type Connecting Blocks — Description and Use — <i>COSMIC</i> Distributing Frames	ED-6C111-10	Miniature Test/Talk Application
201-222-120	<i>COSMIC</i> II Mini Combined Distributing Frame System — Description	ED-6C111-11	Miniature Test/Talk Application
460-110-100	SSM (Special Safeguard Measures) and Special Service Protection	ED-90048-12, ED-90048-13	Common Systems Typical Layout for Jack Boxes and Jack Mountings at Distributing Frames
631-460-118	195-Type Protector — Description and Installation	ED-95180-70	Jack Box Assembly for 40-, 52-, or 80-Jack Capacity
636-300-100	300-Type Connectors — Description, Installation, Marking, and Testing Protector Blocks	ED-91441-70	Common Systems Supports for Jack Boxes and Jack Mountings at Distributing Frames
636-310-100	301-Type Connectors — Description, Installation, and Marking	ED-92915-10	Common Systems Transmitter and Loudspeaker Typical Mounting Arrangements at Distributing Frames
		ED-91319-70	Common Systems Cord Hooks and Mountings.