

UNATTACHED CORDS AND MAKE-BUSY PLUGS USING PATCHING CORD TEST SET TESTS AND INSPECTIONS

1. GENERAL

1.01 This section covers tests and inspections of miscellaneous unattached cord and plug assemblies and make-busy plugs in central offices.

1.02 This section is reissued to incorporate material from the addendum in its proper location. In this process marginal arrows have been omitted.

1.03 The cords and plugs covered in this section are: patching cords, uninstalled switchboard cords, and cords used in connection with distributing frames, service observing equipment, testing circuits, crossbar switches, and portable test sets. Make-busy plugs are also covered herein. The cords and plugs associated with operator's telephone sets, although tested by the patching cord test set, are not included herein as they are covered in a section applying to tests and inspections of operator's telephone sets. Nos. 347, 309, 310, and equivalent types of switchboard plugs are likewise covered in separate sections.

1.04 The test set SD-95665-01 (J94711B) is equipped to test the principal standard cords and associated plugs included in the classifications of Paragraph 1.03. A number of other test and miscellaneous cords may also be tested with this set, but, in order to connect them, auxiliary means are required. (See Paragraphs 4.09 to 4.12.)

1.05 There are earlier patching cord test sets such as SD-21338-01, SD-21502-01, and SD-90430-01. The SD-21338-01, SD-21502-01, and SD-90430-01 (without SO1 key) do not include all the features of SD-95665-01. However, the tests described in this section may be performed with the earlier circuits in all cases where the jack equipment of the test set is adaptable to

the plugs of the cords under test, with the exception of the test cords with lead connected to plug framework. The test circuit SD-90430-01 when equipped with the SO1 key includes all the features of SD-95665-01.

2. APPARATUS

2.01 Patching Cord Test Set J94711B (SD-95665-01), J94711 (SD-90430-01), SD-21502-01, or SD-21338-01 (see Paragraph 1.05).

2.02 Head Telephone Set.

2.03 Miscellaneous unmounted jacks as required. (See Paragraph 4.09.)

2.04 A maximum of four W1M Cords, when required. (See Paragraph 4.09.)

2.05 One W3M Cord equipped with a No. 310 Plug, and Nos. 360A, 360B, 360C Tools (3W4A), and three KS-6278 Tools, when required. (See Paragraph 4.10.)

3. PREPARATION

3.01 When testing the cords and plugs covered herein, the operator's telephone set should be connected to the jacks designated TEL and the locking key TR should remain operated to the position designated PAT.

4. METHOD

Visual Inspection

Cords and Plugs

4.01 Inspect for worn or frayed cords, and repair or replace them if required. Knots in cords should be untied.

4.02 Inspect for broken tie cords, and replace cords having this defect. Loose, improperly tied cords, and ties permitting a strain on the conductors of the cords should be retied.

4.03 Inspect for worn or bent plugs. Tighten all parts of the plug which are loose and replace missing or defective nuts, screws, shells, rubber tubings, etc. Plugs for which standard gauges are available should be gauged in accordance with the section which applies. Plugs should be cleaned in accordance with the section which applies. Tie rings, when provided, should be inspected to determine that the ring has not been opened so as to present a sharp point.

Electrical Tests

Connecting Cords to Test Set

4.04 *Patching Cords Having at Each End a No. 309 or No. 310 Plug:* Insert one plug of the cord into either jack PTCH-CD-A or PTCH-CD-A1 of the test set. Insert the plug at the opposite end of the cord into either jack PTCH-CD-B or PTCH-CD-B1. The choice of the proper jack is dependent upon the type of plug.

4.05 *Patching Cords Having at Each End a No. 289B, No. 327A, or Similar Plug:* Insert one plug into jacks CA and CB, and the other plug into jacks CA1 and CB1.

4.06 *Switchboard Cords:* To connect an unattached switchboard cord to the test set, insert the plug at one end of the cord into jack PTCH-CD-A or PTCH-CD-A1 depending upon whether the cord is equipped with a No. 310 or No. 309 plug. Fasten the cord tips of the tip, ring, and sleeve conductors to binding posts SWBD-CD-T, SWBD-CD-R, and SWBD-CD-S, respectively.

4.07 *Service Observing and Main Frame Cords:* Cords of these types are connected to the test set by inserting the 289-type plug into jacks CA and CB with the metal attachment for the stay cord underneath and connecting the plug at the opposite end of the cord to terminal strip E or jack FR-CD, depending upon the type of plug. 324-type plugs should be connected to the terminal strip. 252A plugs should be inserted into the left side and 252B plugs into the right side of jacks FR-CD. No. 301A plugs should be inserted into jack FR-CD1.

4.08 *Patching Cords Arranged to Connect to Crossbar Switch Vertical Units:* Insert the plug which connects to the crossbar switch vertical unit into jack CB-SW. If the plug is a No. 321 type, insert it into the upper part of the CB-SW jack; if the plug is a No. 325 or 351 type, insert it into the lower part of the same jack. The plugs at the opposite end of the cord are inserted in jacks as follows:

- (a) A single No. 310 plug is inserted into jack CT.
- (b) A No. 289 or No. 324-type plug is inserted into jacks CA and CB.
- (c) Cords with both No. 309 and No. 310 plugs are patched with the No. 309 plug inserted into jack M and the No. 310 plug into jack PTCH-CD-A.

4.09 *Cords Having at Either End a Plug for Which the Test Set Is Not Arranged:*

Cords, which can be connected to jacks PTCH-CD-A, PTCH-CD-A1, CA, or CB, but not to the opposite jacks or terminal strip, may usually have their opposite end connected to the test set by employing an appropriate separate jack temporarily wired to the proper SWBD-CD binding posts of the test set, or by using suitable test cords terminating in clips for making the necessary connections to the plug at the end of the cord. For connecting in this manner between a plug and the binding posts SWBD-CD-T, SWBD-CD-R, SWBD-CD-S, and SWBD-CD-L, the required number of W1M cords should be used.

4.10 When auxiliary means are required to connect a cord to jack PTCH-CD-A, PTCH-CD-A1, CA, or CB, a W3M cord equipped with a No. 310 plug should be used in conjunction with a No. 360A, a No. 360B, and a No. 360C tool in each of which is inserted a KS-6278 tool. Plug the W3M cord into jack PTCH-CD-A and connect the KS-6278 tools to the plug of the cord under test in such a way that the 360A tool (red), 360B tool (black), and 360C tool (white) are associated with the sleeve, ring, and tip conductors, respectively.

Caution: *Do not leave a W3M cord connected to the test set, since crosses between the 360-type tools may damage the repeating coil in the test set.*

4.11 The arrangement of Paragraph 4.10 provides facility for connecting cords having up to three conductors. For cords having a greater number of conductors, it will be necessary to test three conductors at a time. When testing cords having more than three conductors in this manner, the conductors not connected for the complete test should be bunched and connected to binding post SWBD-CD-L in order that possible crosses may be detected.

4.12 Cords terminating in a No. 347-type plug, a No. 1B or No. 1C plug, or in an equivalent one or two conductor plug may be connected to jack CA and the opposite end connected to the proper SWBD-CD binding posts. In this case a conductor associated with the plug tip should be connected to binding post SWBD-CD-T and a conductor associated with the plug sleeve should be connected to binding post SWBD-CD-R.

Caution: *If, in any case, a plug in which the tip and sleeve are not electrically separate should be inserted into jack CA, hold the T key or the R key operated until the plug has been removed, in order to avoid possibility of damage to the associated repeating coil.*

Test for Continuity and Absence of Crosses

4.13 When a cord has been connected as covered in Paragraphs 4.04 to 4.12, the T, R, S, L, and M2 lamps should light depending upon the number of conductors of the cord under test. After connecting a cord, note that the proper lamps are burning at normal brilliancy. If plugs fail to make contact or any conductor is open, the corresponding lamps will not light unless it is crossed with another conductor. If two or more of the conductors are crossed the brilliancy of the lamps may be affected. To insure the detection of any crosses in the cord, depress the T, R, S, L, and M2 keys, one at a time, and note that the corresponding lamp becomes extinguished and that the brilliancy of the remaining lamps is not changed.

4.14 When testing service observing patching cords having a 300-ohm resistor in the message register lead (*without* lead to plug framework), operate the SO and L keys, or the SO and M2 keys, depending on whether the message register lead is connected to the M1 or M2 terminals, respectively. The L lamp should be

extinguished unless the message register lead is crossed with another lead. Restore the L or M2 key to normal. Failure of the L lamp to light indicates an open message register lead. Restore the SO key to normal. If the L lamp lights to full intensity a short-circuited 300-ohm resistor is indicated. To test the T, R, and S leads proceed as in Paragraph 4.13.

4.15 When testing service observing patching cords having a 300-ohm resistor in the message register lead (*with* lead to plug framework), operate the SO, SO1, M2, and L keys. The L lamp should be extinguished unless the message register lead is crossed with another lead. The continuity of the M1 or M2 lead is tested by restoring the M2 key to normal, the L lamp should light. To test the continuity of the lead to the plug framework, operate the M2 and restore the L key to normal, the L lamp should light. Restore the SO key to normal. If the L lamp lights to full intensity a short-circuited 300-ohm resistor is indicated. Restore the SO1 key to normal. To test the T, R, and S leads proceed as in Paragraph 4.13.

4.16 To test cords with lead to plug framework (*without* 300-ohm resistor in message register lead), operate the SO1 and L keys. The L lamp should be extinguished unless the lead to the plug framework is crossed with another lead. Restore the L key to normal, the L lamp should light. If the L lamp fails to light, an open lead to the plug framework is indicated. Restore the SO1 key to normal. To test the T, R, and S leads proceed as in Paragraph 4.13.

Test for Cutouts and Noisy Cords

4.17 Listen in the receiver of the operator's telephone set during the following operations for any clicks or noise which will indicate a defect in the cord or plug.

4.18 Hold the plug in the jack with one hand and shake the cord with the other hand.

4.19 In the case of No. 309, No. 310, and similar plugs, turn the plug around in the jack so as to cause the jack springs to make contact at all possible points of the tip and ring of the plug.

Note: Scratchy noises heard while the plug is being rotated should be disregarded.

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4.20 Tap the plug lightly with the handle of a screwdriver in order to detect loose terminal screws therein.

4.21 The M2 conductor in a five conductor patching cord (of the type used to connect to crossbar switch vertical units, see Paragraph 4.08(c)) may be tested for noise by disconnecting the No. 310 plug and inserting the No. 309 plug into the PTCH-CD-A1 jack.

4.22 *Test of Make-busy Plugs:* A No. 184-type plug may be tested by inserting it into jack MB1 and a No. 322-type plug may be tested by inserting it into jack MB2. In either case the S lamp only should light. If the T lamp lights, it indicates that the tip is crossed with the ring or sleeve.

5. REPORTS

5.01 The required record of these inspections and tests should be entered on the proper form.