

PLEASE NOTE:

FOREMAN 02... 660, 1660, AND 2660 SERIES TELEPHONE SETS

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FOREMAN 04...  
FOREMAN 05...  
FOREMAN 06...  
FOREMAN 07...  
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1. GENERAL

1.01 This section contains common installation and maintenance information for card dialer telephone sets.

1.02 This section is reissued to:

- Add information on modular telephone sets
- Revise buzzer information
- Add 4-type speakerphone information
- Revise Fig. 3
- Add Fig. 5
- Include new KS-21107 releaser

1.03 Refer to the appropriate Service section for connection information or Reference section for identification and piece part information.

2. INSTALLATION

2.01 Single line modular telephone sets equipped with D4BU-29 mounting cords are terminated at a 625A connecting block.

2.02 Single line card dialer telephone sets equipped with D3BN or D4BM mounting cord may be terminated on 42- or 44-type connecting blocks. When a multibutton telephone set is replaced by a single line set and a connector cable is in place, a 153-type adapter may be used.

2.03 Single line card dialer telephone sets except 2660A1M, used with 3- or 4-type speakerphone, or to provide exclusion or 2-line pickup feature, must be equipped with a D6AF or D10R mounting cord and terminates on a 44-type connecting block. Refer to Service section in Division 502 or connection section in Division 512 for the particular set involved.

2.04 Multibutton card dialer telephone sets are supplied with D50K or D50W mounting cord equipped with a KS-16689L1 plug which mates with the connector of connector cables. A cover or service fitting should be used to protect the multiconductor connector and plug. Refer to Division 461 for information on adapters, cover, and service fittings.

2.05 The 661-type (MD) card dialer telephone sets are equipped with 40A (MD) dials which draw power from line current and a spring motor. Sets equipped with these dials do not require an external power supply.



*Correct line polarity must be maintained on all lines for proper operation. Dialer will not operate properly if line is reversed.*

2.06 Current production rotary type card dialer telephone sets are equipped with 41-type dials which are driven by an AC synchronous motor and require an external power supply. Refer to appropriate dial section in Division 501 for power supply selection information.

**Note:** Sets manufactured before June, 1966 were equipped with the 41A dial. Sets marked with an asterisk following the set code or a manufacture date of 6-66 or later are equipped with the 41B dial. These dials have different power requirements.

Exclusion

2.07 To add exclusion to 660-, 1660-, and 2660-type telephone sets, order a kit of parts (refer to appropriate Reference section for ordering information) and install as follows:

- (1) Remove faceplate and housing.
- (2) Connect wire link (Fig. 1) to exclusion switch assembly. The wire link has two 90 degree

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Bell System except under written agreement

bends at both ends. Insert short end of wire link into hole provided at rear of switch assembly.

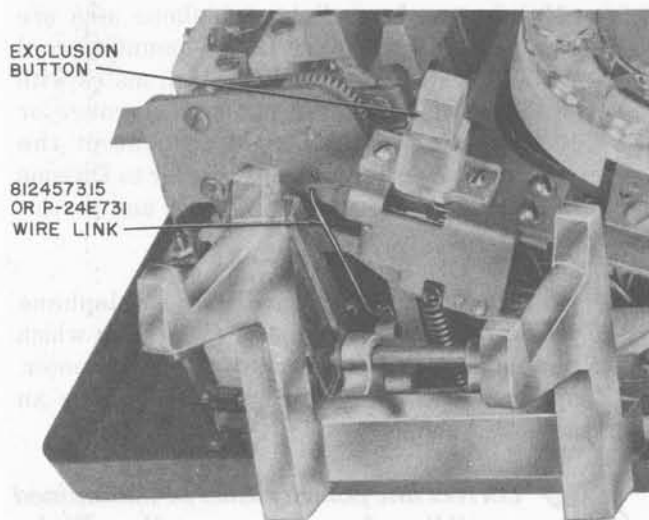


Fig. 1—Exclusion Switch Assembly

**Note:** If the wire link interferes with the operation of the exclusion switch plunger, straighten bottom bend of wire until interference is corrected.

(3) Mount switch assembly to line switch mounting bracket (TOUCH-TONE sets) or dial adapter (rotary dial sets). Be sure wire link enters hole provided in arm of line switch. Secure assembly with screws provided.

(4) Dress wiring from exclusion switch so that terminal board is located at rear of set (Fig. 2 and 3).

(5) Fasten terminal board to base with screws and washers furnished with set. Place one washer between terminal board and base.

**Note:** If buzzer is provided on 660- and 662-type telephone sets make connections to the exclusion switch terminal board before fastening to base. Mount buzzer above terminal board with insulating spacers between buzzer and terminal board to prevent electrical interference (Fig. 2).

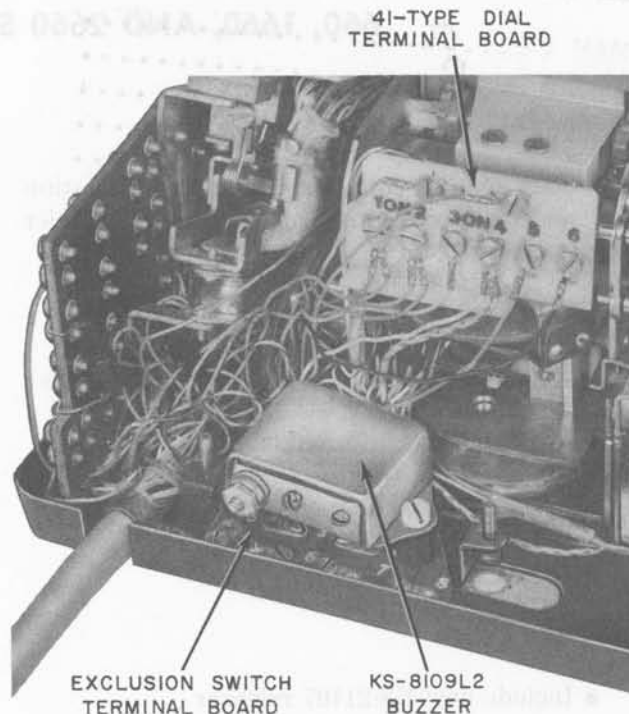


Fig. 2—Location of Buzzer and Terminal Boards in 660- and 662-Type Telephone Sets

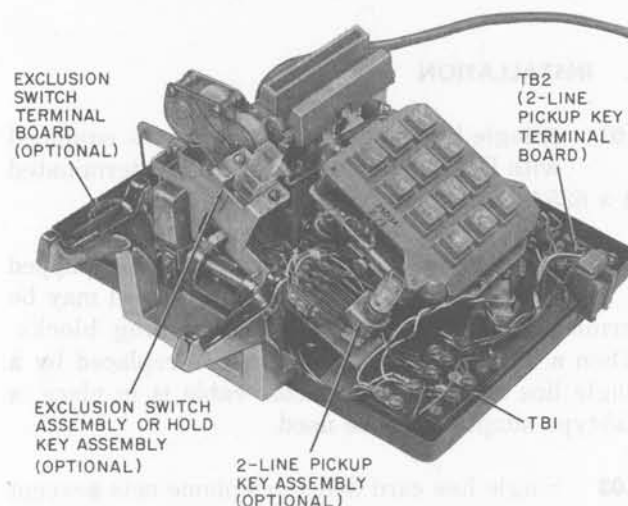


Fig. 3—Mounting Location for Optional Components in 1660- and 2660-Type Telephone Sets

(6) Make connections to exclusion terminal board as shown in appropriate telephone set Service section.

- (7) In nonkey sets, exclusion may be provided on the 2660A1M telephone set using the D4BU-29 mounting cord provided with the set. In nonkey application of 660A1, 660A1M, 1660A1, or 2660A1 sets, replace three or four conductor mounting cord on TOUCH-TONE telephone sets with D6AF mounting cord, and replace four or six conductor mounting cords on rotary dial telephone sets with D10R mounting cord.
- (8) Reinstall housing and replace faceplate with one supplied in kit of parts.
- (9) Check for proper operation of all features on excluding and excluded stations.

#### **KS-8109L2 Buzzer—14 to 30 Volts AC or DC**

**2.08** To add a KS-8109L2 buzzer to 660-series telephone sets:

- (1) Remove faceplate and housing.
- (2) Secure buzzer to base of set with nylon screws, placing insulating spacer and fiber washers between buzzer and base. If exclusion is provided see 2.07(5).
- (3) Make necessary buzzer connections.
- (4) Check buzzer operation and adjust volume.

**Note:** When using KS-8109L2 buzzer for DC operation the case becomes part of the circuit and should be insulated from any metal mounting surfaces.

- (5) Reinstall housing and faceplate.

**2.09** A KS-8109L2 buzzer can be mounted on the network in 1660 and 2660 series telephone sets. Use the spacer and screw provided with the telephone set (Fig. 4).

#### **KS-20419L1 Buzzer**

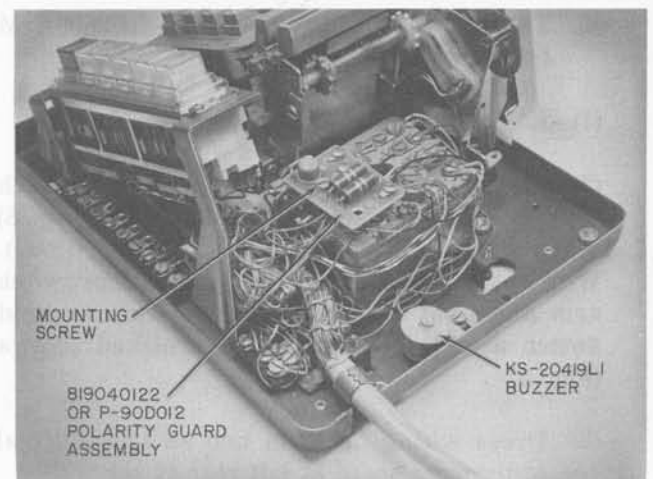
**2.10** Current multibutton card dialer telephone sets are factory-equipped with a KS-20419L1 buzzer (Fig. 5). If desired, an additional KS-20419L1 buzzer may be installed. The KS-20419L1 buzzer is equipped with a slotted mounting bracket which is 1-1/4 inch in length and can be attached to a single screw at any location in the telephone set



KS-8109L2 BUZZER

**Fig. 4—Location of KS-8109L2 Buzzer in 1660- and 2660-Series Telephone Sets**

where it will not interfere with the electrical or mechanical operation of the telephone set.



**Fig. 5—Location of Polarity Guard and Buzzer in 1660- and 2660-Series Telephone Sets**

**2.11** Leads are provided on the KS-20419L1 buzzer and connection is made on spare terminals or with D-161488 connectors.

### *Polarity Guard*

**2.12** The 1660B, 1662B, 1663B, 1664B, and 2660 series telephone sets have provisions for installing an 819040122 or P-90D012 guard assembly to provide for end-to-end signaling. The guard assembly mounts on the network, using the mounting screw and spacer provided with the set (Fig. 4).

**2.13** A D-180250 Kit of Parts is available for use in the 1660A, 1662A, 1663A, and 1664A telephone sets whenever a polarity guard is required. The D-180250 Kit of Parts consists of an 819040122 or P-90D012 guard assembly, an 812261931 or P-22F193 guard mounting strip, and an 814313920 or P-43A392 screw. The guard assembly is mounted on the guard mounting strip which is attached to the cord retainer.

**Note:** Polarity guards should be used when specified by local instruction for end-to-end signaling purposes when battery and ground reversals are encountered.

### *2-Line Pickup Without Signaling*

**2.14** To add 2-line pickup and hold to the 2660A1M telephone set (nonkey system).

- (1) Remove faceplate and housing.
- (2) Mount hold switch assembly to line switch mounting bracket. The hold switch (Fig. 3) mounts similar to the exclusion switch (2.07). Wire link must be connected between line switch arm and hold switch assembly. Secure hold switch assembly using three furnished screws (Fig. 6).
- (3) Dress wiring between line switch and dial to terminal board at left rear of set.
- (4) Mount turnbutton-pushbutton key assembly on left side of set in front of line switch (Fig. 3). Use bracket and hardware furnished in kit.
- (5) Dress wiring across in front of dial.

(6) Make connections to the D4BU-29 mounting cord as shown in the Service section for the 2660A1M telephone set.

(7) Reinstall housing and replace faceplate with one furnished in kit of parts.

(8) Check set for proper operation.

### *2-Line Pickup and Signaling*

**2.15** To add 2-line pickup and signaling to the 2660A1 or 2660A1M telephone set.

- (1) Remove faceplate and housing.
- (2) Mount turnbutton-pushbutton switch assembly on left side of set in front of line switch (Fig. 3). Use two shouldered screws furnished in kit.
- (3) Dress wiring across in front of dial.
- (4) Replace three or four conductor mounting cord with D6AF mounting cord (ordered separately) and make proper connections.
- (5) Reinstall housing and replace faceplate with one furnished in kit of parts.
- (6) Check set for proper operation.

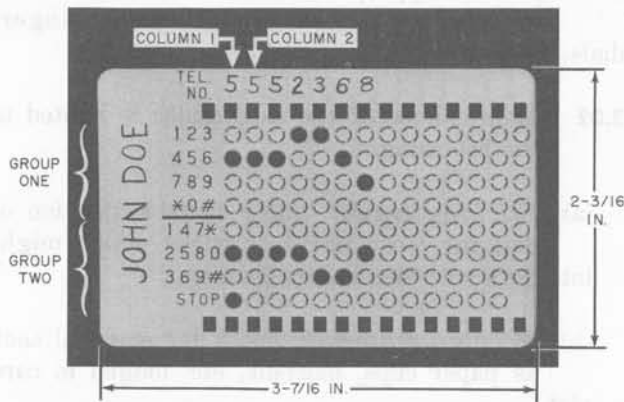
**2.16** To add 2-line pickup and exclusion to the 2660A1 or 2660A1M telephone set.

- (1) Follow 2.07 steps (1) through (7).
- (2) Follow 2.14 steps (2) through (6).

**2.17** To add 2-line pickup, signaling, and hold (nonkey system) to the 2660A1 or 2660A1M telephone set:

- (1) Remove faceplate and housing.
- (2) Mount hold switch assembly to line switch mounting bracket. The hold switch (Fig. 3) mounts similar to the exclusion switch 2.07. Wire link must be connected between line switch arm and hold switch assembly. Secure hold switch assembly using three furnished screws (Fig. 6).





**Fig. 6—Card Coded for 7-Digit Telephone Number**

- (3) Dress wiring between line switch and dial to terminal board at left rear of set.
- (4) Mount turnbutton-pushbutton key assembly on left side of set in front of line switch (Fig. 3). Use bracket and hardware furnished in kit.
- (5) Dress wiring across in front of dial.
- (6) Replace mounting cord with a D6AF mounting cord (ordered separately) and make the proper connections.
- (7) Reinstall housing and replace faceplate with one furnished in kit of parts.
- (8) Check set for proper operation.



*The following operating instructions for sets with 2-line pickup, signaling, and hold feature should be explained to the customer.*

**2.18** When a call is received on one line and it is desired to hold the call while transferring to the other line:

- (1) Lift the hold button and operate the line key to pickup the second line.
- (2) When the call on the second line is completed, operate the line key back to the first line position and depress the hold button.

**Note:** Failure to depress the hold button when a held line is reconnected will automatically place a hold on the unused line and prevent its use for either incoming or outgoing calls. Depressing the hold button before switching the line key back to the first line position will disconnect the first line.

### Coding Cards

**2.19** Code cards as follows:

- (1) Enter name and telephone number in spaces provided as shown in Fig. 6 and 7.
- (2) Convert exchange letters to numbers. For example: Use 2 for A, B, or C; 7 for P, R, or S; etc.

**Note:** There are two groups of numbers 1 through 0 on the card (Fig. 6).

- (3) In Fig. 6 the first digit of the telephone number is 5. In column 1, locate digit 5 in the first group of numbers and punch out the perforation with a pencil or ballpoint pen. In the same column, locate digit 5 in the second group of numbers and again punch out the perforation.

**Note:** The STOP in column 1 is already punched.

- (4) Repeat this procedure for each digit in the telephone number. The digit 0 must be punched out in each group of numbers just as any other digit.



*Do not punch STOP following the last digit. (A stop is only used for certain operations requiring an interruption in the automatic dialing process.)*

- (5) For DDD calls, punch the access code.

**2.20** On a PBX extension where a code (such as 9) is required to reach a central office line, prepare a card for dialing an access code (Fig. 7) as follows:

- (1) Punch out the access code in column 1.
- (2) If a second dial tone is required, punch out the STOP in column 2.

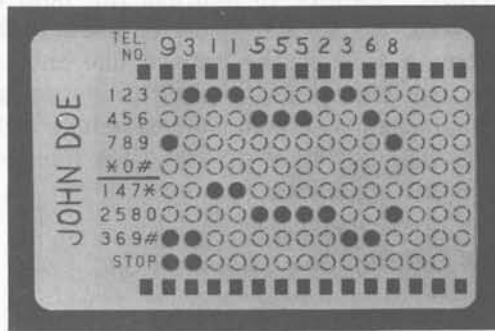


Fig. 7—Card Coded for Access Code (9), STOP, Area Code (311), and 7-Digit Telephone Number

- (3) Beginning in column 2, punch out in the regular manner the directing or area code, if any, and telephone number.

**2.21** Check card before using to be sure it is properly punched for the number desired. There should be at least two holes in each column, three if stop is needed. Punch holes out completely.

**2.22** An E-4646 designation strip is supplied, with each multibutton telephone set and is installed under the light shield of the 590 or 650 series key.

**2.23** Rotary dial telephone sets equipped with an 8R or 8RA dial must have the dial replaced by a 8C or 8CA dial when the set is modified for use with 3- or 4-type speakerphone system.

**2.24** To install station number card on TOUCH-TONE type telephone sets, remove faceplate (3.04) and slide number card behind number card retainer. Replace faceplate.

### 3. MAINTENANCE

**Caution:** Never connect 48-volt test battery across tip and ring of set without placing a current limiting resistor in series with the battery. Use a KS-13490, List 1 (1000 ohm 1/2 watt) resistor or equivalent. Failure to do so will result in damage to the pulsing switch or the start switch of the 40A or 41-type dials.

**3.01** Refer to appropriate sections for maintenance of components, such as handset, ringer, dials, keys, etc.

**3.02** Maintenance of the card dialer is limited to the following:

- (a) **Sticking cards:** make visual inspection of dial for loose parts or wires which might interfere with the dial mechanism.
- (b) **Foreign material:** check for material such as paper clips, hairpins, etc. lodged in card slot.
- (c) **Faulty cards:** check cards for proper size by comparing with a working card. Replace bent or mutilated cards.
- (d) **Inoperative dial:** check polarity of the line. The dial requires negative battery on the (O-BK) lead of the dial and ground or positive potential on the (G) lead.
- (e) **Wrong numbers:** verify coding of card. Check at least twice on line with a test code card. Check operation of TOUCH-TONE dial in the normal manner.

**3.03** Early production sets may not be equipped with a nonglare faceplate. When these sets are located where light reflection may cause improper dialing, replace the faceplate with the proper current production faceplate.

#### Faceplate Removal

**3.04** To remove faceplate:

- (1) Place point of KS-21107 type releaser or equivalent at edge of faceplate catch.
- (2) Push catch toward rear of set until releaser enters notched portion of faceplate.
- (3) Turn point of releaser under faceplate and raise.

**Note:** When replacing faceplate, use releaser to hold catch until faceplate is in position.

**Housing Removal****3.05** To remove housing:

- (1) Loosen four captive screws through access holes in base of set.
- (2) Lift housing straight off.

**3.06** If tests indicate trouble in 26-, 36-, 40-, or 41-type dials replace the dial.

**Note:** *Do not attempt to make any adjustments on the automatic dials.*

**3.07** To replace 26-, 36-, 40-, or 41-type dials:

- (1) Remove faceplate and housing.
- (2) Temporarily disconnect 18-volt AC power supply to dial. 661-type (MD) telephone sets equipped with 40-type (MD) dials do not have an external power supply.



*If dial receives its power from a common source such as 101G power supply, take care that other services are not affected.*

- (3) Disconnect spade-tipped dial leads from network and terminal board.
- (4) Turn set on its side, remove dial mounting screws [all dials are held in place by three screws except the 26B (MD) dial which is held by two screws]. Dial can now be removed.
- (5) Place new dial in position taking care not to pinch any wiring between dial and baseplate.
- (6) Fasten dial to baseplate with mounting screws.
- (7) Terminate dial leads.
- (8) Reinstall housing and faceplate.
- (9) Check manual dial operation.
- (10) Use properly coded card to check card dialer operation.

**3.08** To replace an 8-type dial:

- (1) Loosen three screws holding dial adapter.
- (2) Shift dial to left until adapter clears screws.
- (3) Lift dial straight up and out. On sets with exclusion, disengage wire link from line switch assembly.
- (4) Disconnect spade-tipped dial leads.
- (5) Loosen two screws holding dial to adapter and remove dial.
- (6) Secure replacement dial on adapter making sure that dial is properly positioned.
- (7) Connect dial leads.
- (8) On sets with exclusion, start wire link from exclusion switch into hole on line switch assembly (Fig. 1).
- (9) Slide slots of dial adapter under dial mounting screws.
- (10) Move dial to right as far as possible and tighten screws.
- (11) Check operation of dial and exclusion switch, if provided.

**3.09** To replace the ringers:

- (1) Remove faceplate and housing.
- (2) Disconnect ringer leads from terminal board.
- (3) Remove screws holding dial adapter on rotary dial sets and dial mounting screws on TOUCH-TONE telephone sets and move the dial to gain access to the ringer (dial leads need not be disconnected).
- (4) Remove screws holding ringer to base and remove ringer.
- (5) Disconnect ringer leads.
- (6) Secure replacement ringer to base.
- (7) Connect ringer leads.

(8) Refasten dial or dial adapter.

(9) Replace housing and faceplate.

**3.10** For additional information on the modular concept, refer to Section 503-100-100.

**3.11** If a 10-button TOUCH-TONE dial is converted to a 12-button dial the faceplate must be ordered and replaced (Table A).

**THINK**

*Telephone sets should not be carried by the line switch. Line switch failure may be caused by applying excessive strain to the line switch and the line switch mounting arrangement.*

**TABLE A**

**REPLACEMENT FACEPLATES FOR 1660-SERIES  
TELEPHONE SETS WITH TOUCH-TONE DIAL  
CONVERTED FROM 10 TO 12 BUTTONS**

SET CODE	DESCRIPTION	12-BUTTON DIAL FACEPLATE CODE*
1660B1	Basic Telephone Set	P-86D8-
1660B2	Basic Set e/w Exc.	P-86D9-
1660B3	2-Line Pickup	P-87D1-
1660B4	2-Line Pickup e/w Exc.	P-87D0-
1662B1-B3	6-Button Key Set	P-87D3-
1662B4-B6	6-Button Key Set e/w Exc.	P-87D4-
1663B1	Basic Set e/w Headset Jacks	P-87D2-
1664B1-B3	6-Button Key Set e/w Headset Jacks	P-87D5-

\*Add color suffix.