

# TYPE 880 SPEAKERPHONE



Technical  
bulletin 470-916

***AUTOMATIC ELECTRIC***

Subsidiary of

**GENERAL TELEPHONE & ELECTRONICS**



# SPEAKERPHONE

## EXECUTIVE MODEL

### TYPE 880

#### GENERAL

The Type 880 Speakerphone (figure 1) may be used as a regular telephone or as a loudspeaking telephone. Use of the loudspeaking feature allows the user to use both hands to take orders, check blueprints, etc; eliminates the fatigue of holding the handset for those who must make and receive many calls each day; and also makes group conference calls possible.

#### PHYSICAL DESCRIPTION

The Type 880 Speakerphone (main unit assembly, and speaker assembly combined) weighs 7 pounds. The main unit assembly measures 9-1/4" wide, 5" high, and 7-1/2" in depth. The associated speaker assembly measures 5-5/8" wide, 3-7/8" high, and 3-3/4" in depth. The lower housing of the main unit assembly and the speaker assembly housing are equipped with soft rubber impregnated cork pads to protect desk and table tops.

The dial, switch button, and speaker volume control wheel, all project through the brushed aluminum face plate at the front of the main unit assembly (figure 1). The switch button is located at the lower left of the face plate. Directly above the switch button are a number of small holes which indicate the position of the microphone. The speaker volume control wheel is placed just above the microphone holes. The dial is located at the right side of the face plate. The handset rests in wells at the rear of the upper housing. The hookswitch lever consists of two clear plastic bars, one in each of the handset wells (figure 1). The retractile handset cord extends from the left side of the main unit assembly and the line cord and speaker cord extend from the rear of the main unit assembly. The line and speaker cords are approximately 6 feet in length.

The type 880 Speakerphone is available in black and five colors (Jade Green, Sand Beige, Dawn Gray, Gardenia White, and Turquoise).

## 1. GENERAL

The Type 880 Speakerphone may be used as either a regular telephone or as a loudspeaking telephone. The OFF/ON switch button (figure 1), is used for switching from handset to loudspeaking operation (or loudspeaking to handset operation). A neon lamp is incorporated within the switch button and flashes when the switch button is in the ON position (indicating a seized line). The speaker volume control wheel (figure 1) controls the output of the speaker. Depending on service requirements Type 880 Speakerphone may be equipped with one of four dials.

The Type 880 Speakerphone is equipped with a self-compensating transmission network which minimizes sidetone and balances the impedance characteristics of the line.

The ringer for the Type 880 Speakerphone is an electronic type tone signal. The tone signal is a printed circuit board which mounts in the speaker assembly (see figure 16 for schematic diagram). The tone signal operates on a non-selective frequency range of 16.6 to 66.6 cycles. The frequency of the electronic ringing tone is reasonably constant regardless of ringing frequency. The Type 880 Speakerphone may be ordered less the electronic type tone signal. In this case, a type 33 ringer unit must be ordered separately and wired as stated in section 2.3.2. When the Speakerphone is ordered minus the electronic type tone signal, a blank circuit board is inserted in the space usually occupied by the tone signal and the four tone signal leads are taped.

The amplifier printed circuit board is located in the main unit assembly (figures 9 and 10). The speaker amplifier printed circuit board is located in the speaker assembly (figures 13 and 15). Schematic diagrams of both printed circuit boards are shown in figure 16.

## 2. INSTALLATION OF THE TYPE 880 SPEAKERPHONE

2.1 Line polarity is important at divided ringing party line stations, and in SATT

exchanges. Connection information, including the schematics presented throughout these instructions, assume that the interior wires between the protector (or PBX switchboard, etc.) and the telephone location in the subscriber's premises have their polarities identified by these standard tracers:

Red - negative (ring)  
Green - positive (tip)  
Yellow - ground

2.2 Figure 2 shows the correct position of the Type 880 Speakerphone for normal operation. To minimize feedback the main unit assembly of the Speakerphone must always be a sufficient distance from the loudspeaker. The microphone (in the main unit assembly) should never be faced directly at the loudspeaker.

2.3 The Type 880 Speakerphone (with electronic type tone signal) is shipped wired for bridged ringing. Table A supplies wiring information for the various types of ringing. The "Y" wiring is used with an external power supply. Move BLU lead from terminal 6 to 5 on block.

2.3.1 When the Type 880 Speakerphone is supplied without the electronic type tone signal, a type 33 ringer unit may be used for ringing. The type 33 ringer unit must be ordered separately. The ringer unit is connected to the Speakerphone terminal block as shown in figures 3, 4, and 5; these figures also show the connections (in the ringer unit) to be made for the various types of ringing.

The interior wires connect to the Speakerphone terminal block terminals as follows:

- a. The yellow (GRD) lead to terminal 4.
- b. The red (L1) lead to terminal 1.
- c. The green (L2) lead to terminal 6.

2.3.2 When the Type 880 Speakerphone is used with the Automatic Electric Company 10A1 Key Telephone System, connect terminal



*Figure 1. Type 880 Speakerphone.*

block terminals 1 and 6 to the appropriate R and T leads of the key system, respectively. Then connect terminal block terminals 2 (A) and 7 (A1) (See figure 16) to the appropriate A and A1 leads of the type 86A key adapter, respectively.

When the handset is removed (or the ON side of the switch button is pressed), the answer relay of the key system operates and connects the telephone with line equipment through relay equipment.

2.3.3 When the total loop resistance exceeds 1000 ohms or when certain low voltage switchboards such as W. E. Co. type 555 or Leich type L-55 are used, an external power supply is required.\* Two leads (designated "Y" in figure 16) connect to terminal block terminals 5 and 10, and a "Y" strap (figure 16) connects terminals 6 and 10 on the terminal block.

2.4 The electronic type tone signal is located in the speaker assembly (figure 13). To adjust the volume of the tone signal, insert a

\*This power supply may be ordered by reference to order number L-7038-AO.

small screwdriver into the hole in the base of the speaker housing, and turn the screwdriver until the desired volume is attained.

2.5 For handset operation use the Type 880 Speakerphone as though it were an ordinary telephone. The switch button should remain in the OFF position.

To answer a call press the ON side of the switch button (figure 1). The neon lamp (located in the switch button) will start flashing. Upon hearing the distant party, adjust the speaker volume by adjusting the speaker volume control wheel (shown in figure 1).

To make a call, press the ON side of the switch button. The neon lamp within the switch button will start flashing (indicating a seized line). When dial tone is heard, dial the desired number and listen for ringback tone or busy tone. Upon hearing the distant party, make speaker volume adjustment by adjusting the speaker volume control wheel (figure 1).

To hang up, simply press the OFF side of the switch button (figure 1). The neon lamp will cease flashing.

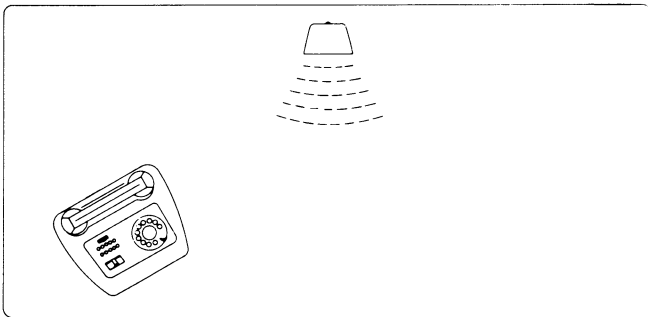
**CAUTION:** The switch button must be pressed in the OFF position at the end of conversation in order to receive or initiate other calls.

To recall (flash) the operator, alternately press the OFF and ON sides of the switch button until the operator answers. (To talk privately to the operator, transfer to handset operation and push one of the hookswitch bars in the usual way.) To change from loudspeaker to handset operation, lift the handset and push the OFF side of the switch button. The neon lamp in the switch button will cease flashing and the conversation may be continued via the handset. To switch from handset to loudspeaker operation, push the ON side of the switch button and replace the handset.

The Type 880 Speakerphone can be used for conferences. It is not necessary that the microphone be turned toward each person as he speaks.

As the person speaking moves away from the microphone, the sound in the distant receiver decreases. When the Type 880 Speakerphone is in a quiet room, the microphone will pick up words spoken several feet away. Under adverse conditions, such as a noisy room, a poor connection, or a long distance call, speak within two feet of the microphone. Keep the side of the Speakerphone at not more than a 90 degree angle (figure 2) to the nearest sound path from the loudspeaker.

Adjust the speaker volume, by adjusting the speaker volume control wheel, so that the distant speaker's voice can be heard distinctly and without effort. Do not set the speaker volume higher than necessary; to do so may let enough sound from the loudspeaker enter the microphone to cause a howl which will be heard at both stations. Increasing speaker volume higher than necessary will cause undesirable sidetone (echo) in the distant subscriber's receiver.



*Figure 2. Suggested arrangement.*

### 3. MAINTENANCE OF THE MAIN UNIT ASSEMBLY

3.1 To remove the upper housing remove the four Phillips-head screws located on the brushed aluminum face plate. Then lift off the face plate and remove the upper housing. To replace the upper housing just reverse the procedure.

3.2 To remove the lower housing of the main unit assembly, remove the three screws on the bottom.

3.3 To examine dial action, first remove the upper housing as described in section 3.1. When the upper housing is removed, the backing plate (with dial, switch button, microphone, and speaker volume control attached to it as in figure 6) is easily accessible. The three flat-head backing plate mounting screws (figure 6) must be removed. Then lift the backing plate from its mounting brackets (figure 7) and turn it over to examine the dial action. Do not disconnect the dial leads unless the dial must be replaced.

To replace the dial, just disconnect the dial leads, then remove the three dial mounting screws from the underside of the backing plate (figure 8). The complete dial assembly is now free and can be removed from the backing plate.

3.4 To remove the amplifier printed circuit board (figure 9) remove the lower housing of the main unit assembly as described in section 3.2. To release the printed circuit board from its mounting, press aside the two spring type mounting brackets (figure 9) and lift out the printed circuit board. Loosen the terminal screws (figure 10) and remove all the wires.

To connect a new printed circuit board, connect the proper cable wires to the printed circuit board terminals as shown in figures 10 and 16. After the cable wires have been connected, connect the transformer wire and speaker cord wires to the circuit board terminals as shown in figures 10 and 16.

When the connections have been completed, position the amplifier printed circuit board (with components side facing the interior) on the two small printed board brackets attached to the front mounting bracket (figure 11). Then pull aside the two spring type mounting brackets (figure 11) and allow the printed circuit board to fall into the "V" shaped sections of the two spring type mounting brackets. The circuit board is now clamped in place and the lower housing may be replaced.

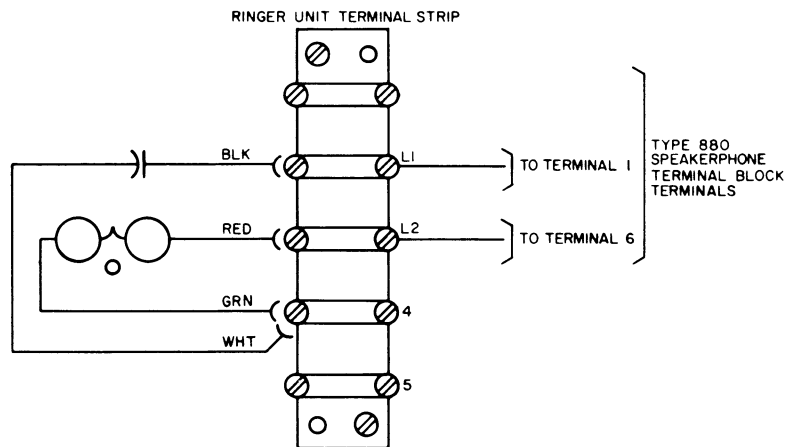


Figure 3. Type 33 ringer unit wired for bridged ringing.

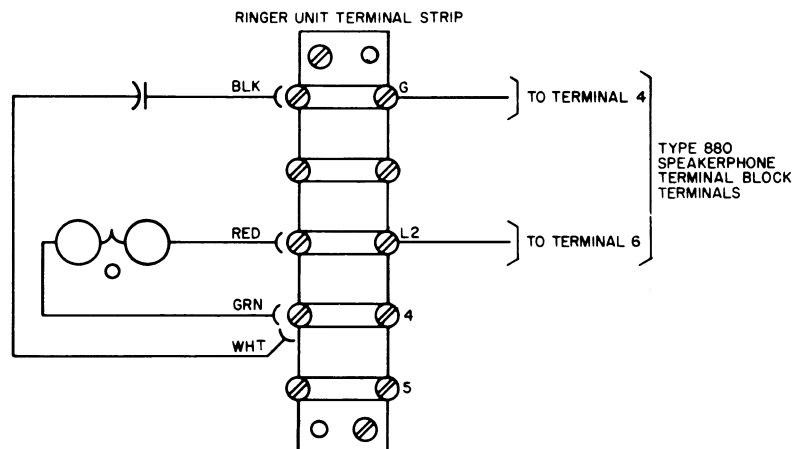


Figure 4. Type 33 ringer unit wired for +(tip) ringing.

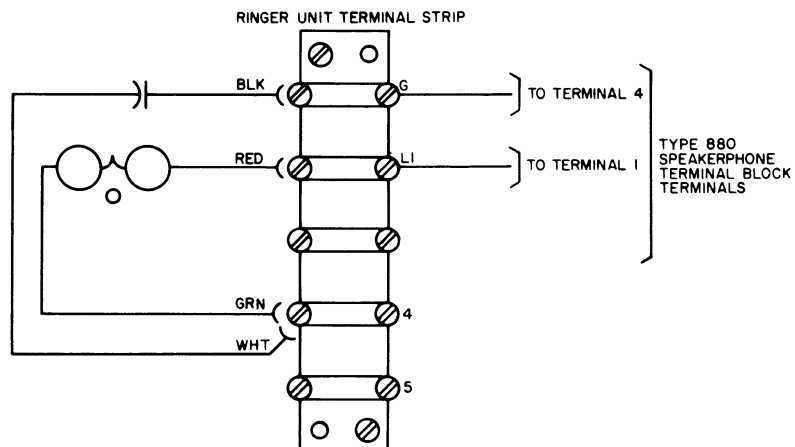


Figure 5. Type 33 ringer unit wired for -(ring) ringing.

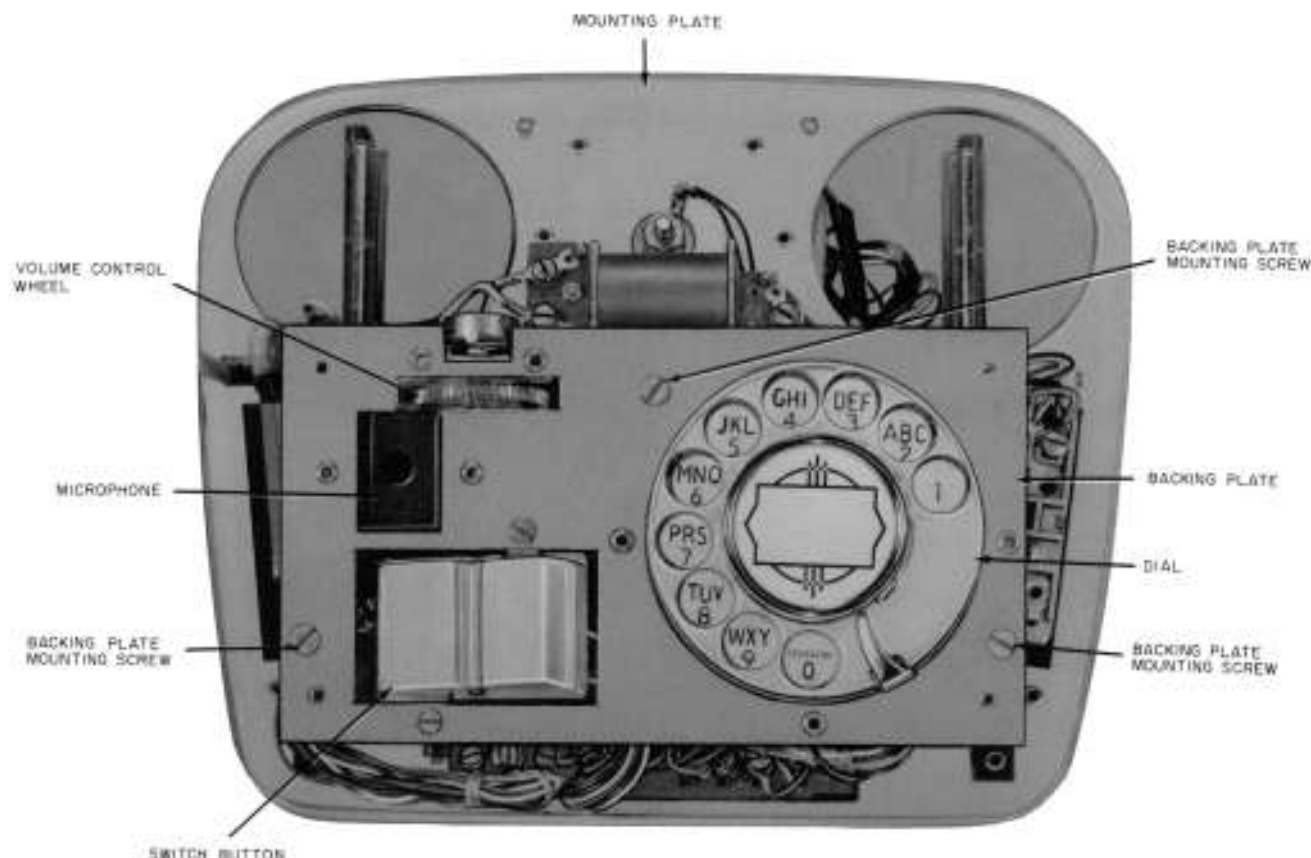


Figure 6. Main unit assembly with the upper housing removed.

3.5 A type 810 handset is used with the Type 880 Speakerphone. Piece numbers for the 810 receiver and transmitter capsules are D-51024-A and D-38379-A, respectively. Figure 12 shows the components of the type 810 handset.

3.6 To replace the line cord follow the procedure for removing the lower Speakerphone housing as stated in section 3.2. Then release the amplifier printed circuit board (figures 9 and 10) by pressing aside the two spring type mounting brackets (figure 9) clamping it in position. The printed circuit board may now be pulled out and set to the side. Disconnect the line-cord leads from the terminal strip (figure 11).

Then disconnect the line-cord holder (figure 11) and pull out the old line cord. Connect the new line-cord leads to the terminal strip. Then engage the cord holder and return the amplifier printed circuit board to its position. Replace the lower housing.

3.7 To replace the handset cord follow the instructions for removing the Speakerphone upper housing (section 3.1). Then disconnect the green and black wires from

transmission unit (figure 7) terminal No. 3. Then disconnect the yellow wire from induction coil (figure 7) terminal No. 4, and the red wire from induction coil terminal No. 5.

Release the handset cord holder from the Speakerphone mounting plate (figure 7) and pull out the old cord. The new cord can now be connected.

Remove the old cord from the handset and connect the new cord as shown in figure 12.

3.8 To remove the flasher assembly (figure 7) remove the upper housing of the main unit assembly as described in section 3.1. Then remove the backing plate assembly as described in section 3.3. With a 5/16" spin-tight wrench remove the flasher assembly mounting nut shown in figure 7. When the mounting nut and its associated washers have been removed, lift the flasher assembly from its mounting bracket. An insulator (figure 7) which separates the flasher assembly from the mounting bracket will come out with the flasher assembly. Unsolder all the wires attached to the terminals of the flasher assembly.

Solder the orange, black, and green wires to the



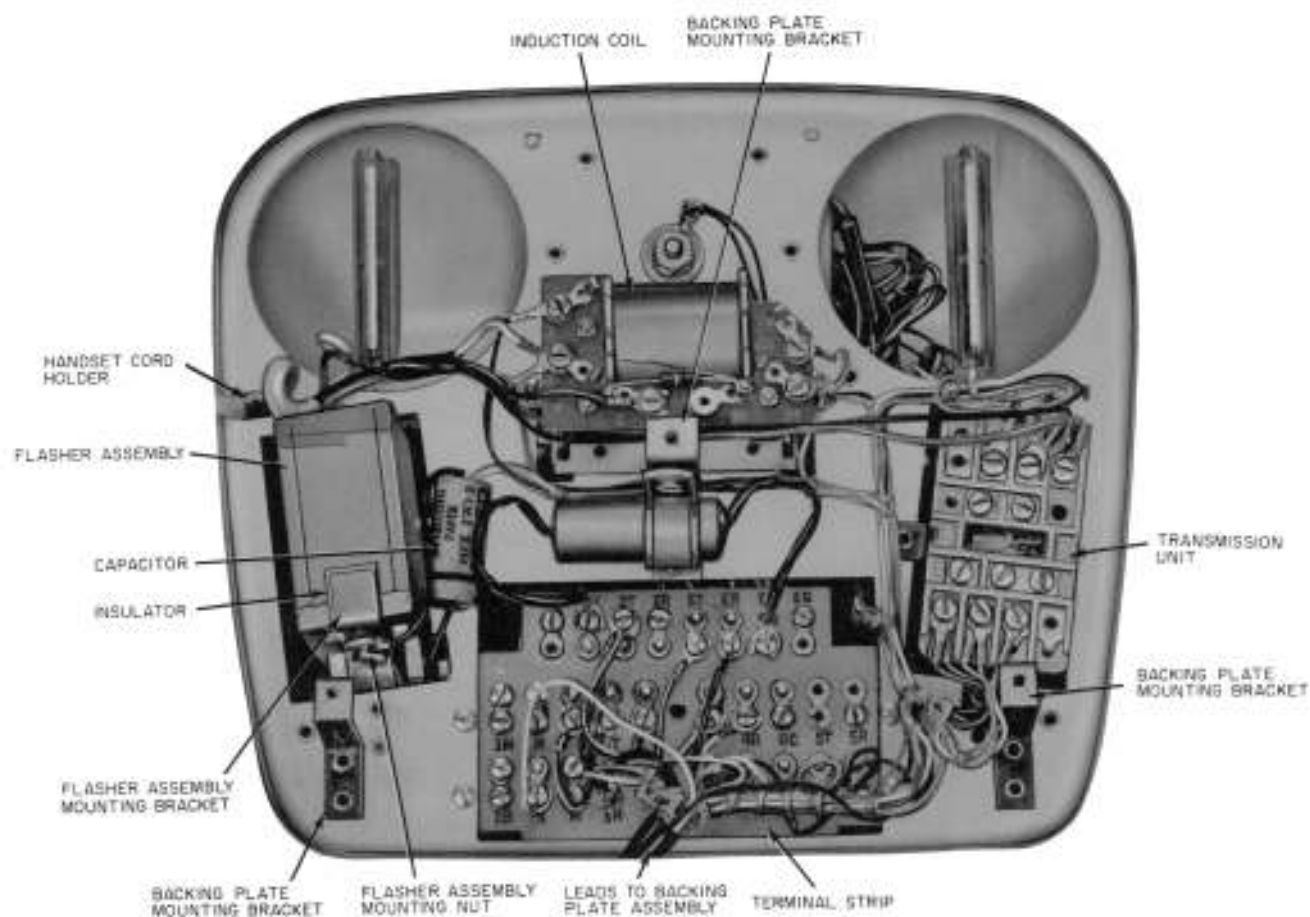


Figure 7. Main unit assembly with the upper housing and backing plate removed.

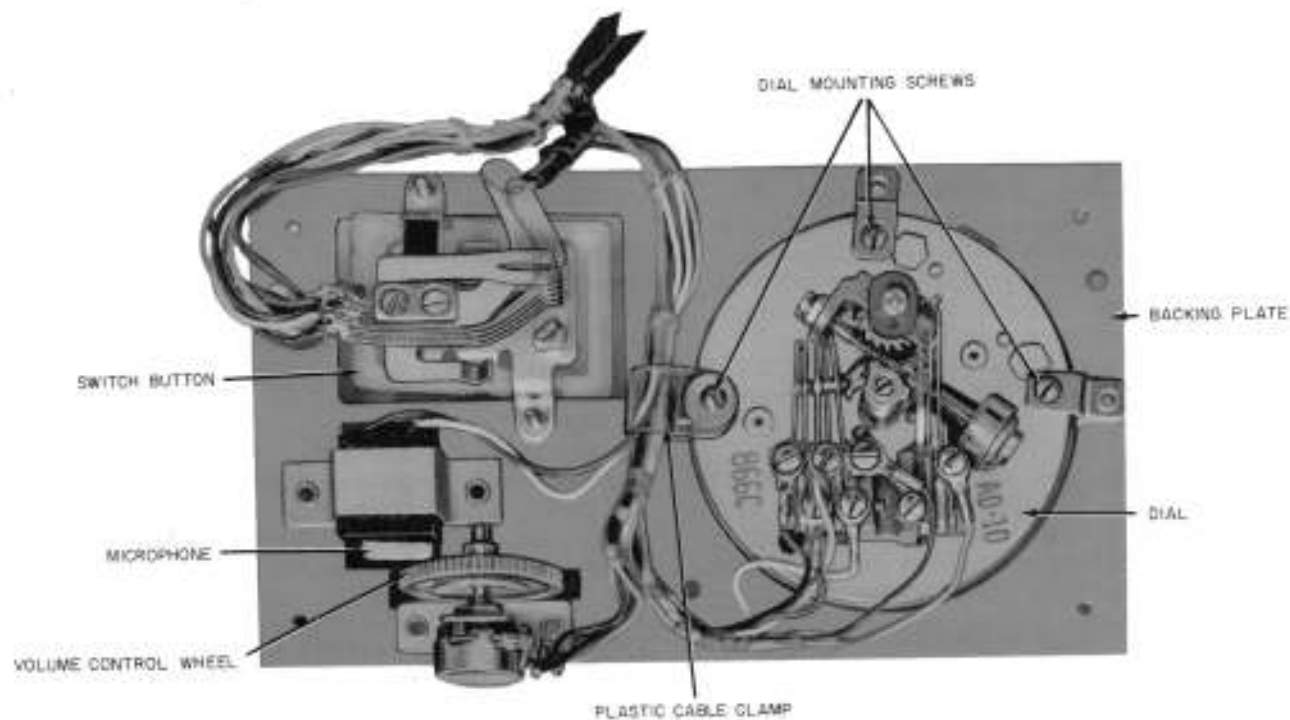


Figure 8. Rear of backing plate assembly.



new flasher assembly terminals as follows:

- a. Solder the orange wire to terminal 1.
- b. Solder the green wire to terminal 3.
- c. Solder the black wire to terminal 2.

#### 4. SPEAKER ASSEMBLY MAINTENANCE

4.1 To remove the speaker housing, remove the Phillips-head screw from the rear of

4.2 To remove the tone signal printed circuit board, first remove the speaker housing as described in section 4.1. The tone signal printed circuit board is located at the bottom of the component assembly as shown in figure 13. Grasp the sides of the printed circuit board and pull back against the two spring type mounting brackets (figure 13) until the front edge of the circuit board is free of the grooves in the face plate studs. Lift out the circuit board. Unsolder the four wires from the component side of the printed circuit board (figure 14).

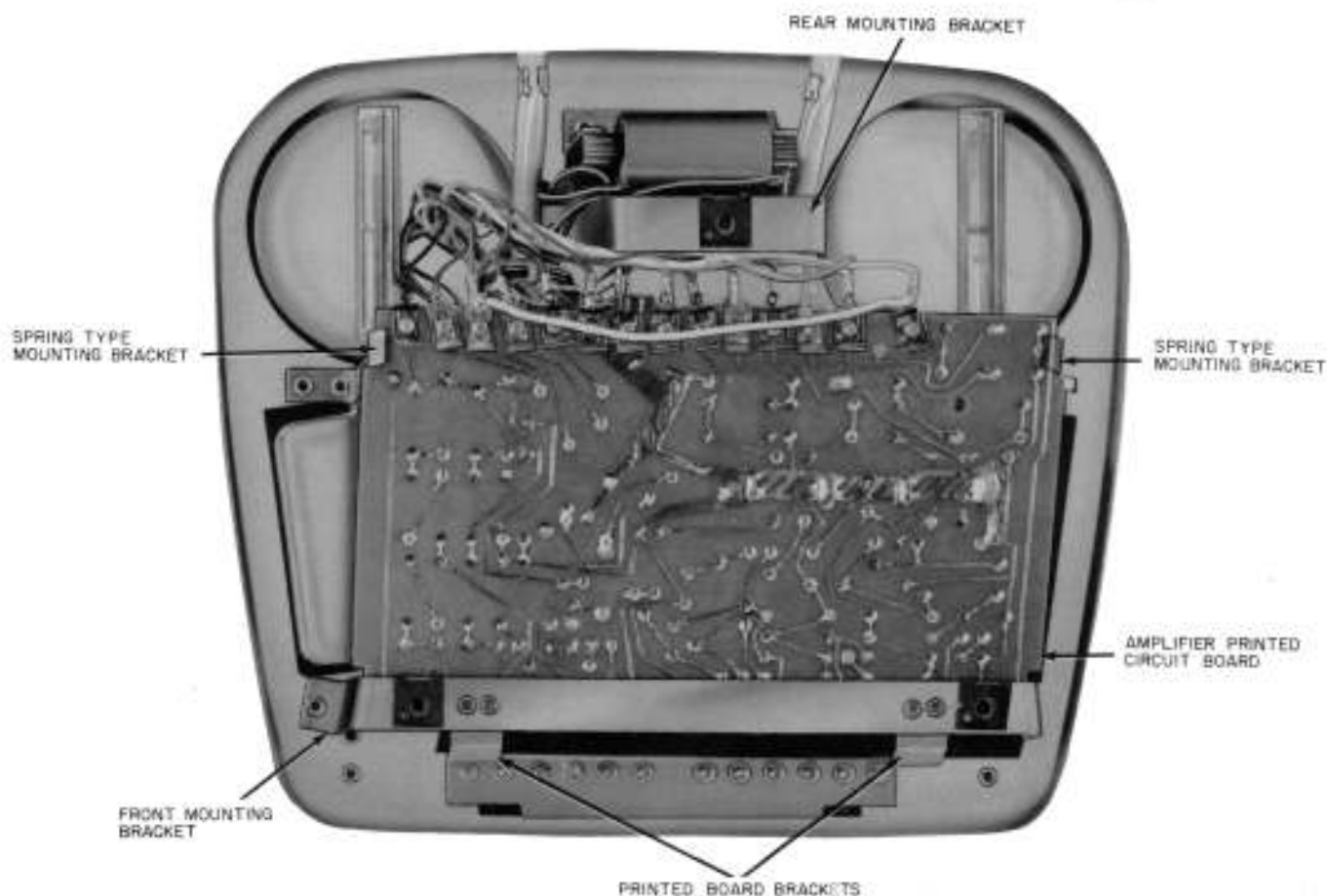


Figure 9. Main unit assembly with lower housing removed.

the speaker assembly. Removal of this screw frees the housing from the speaker components. The speaker cord passes through a hole in the rear of the speaker housing, making it necessary to slide the housing back along the speaker cord to expose the speaker components. Figure 13 shows the components free of the housing.

To replace the speaker housing, slide the housing forward on the speaker cord until it covers the components. Then replace and tighten the screw at the rear of the assembly.

To connect a new tone signal printed circuit board, solder the proper wires to the terminals on the circuit board as shown in figures 14 and 16.

4.3 To remove the speaker amplifier printed circuit board, remove the speaker housing as described in section 4.1. Grasp the sides of the printed circuit board and pull against the two spring type mounting brackets (figure 13) until the front edge of the circuit board is free of the grooves in the face plate studs. Lift out

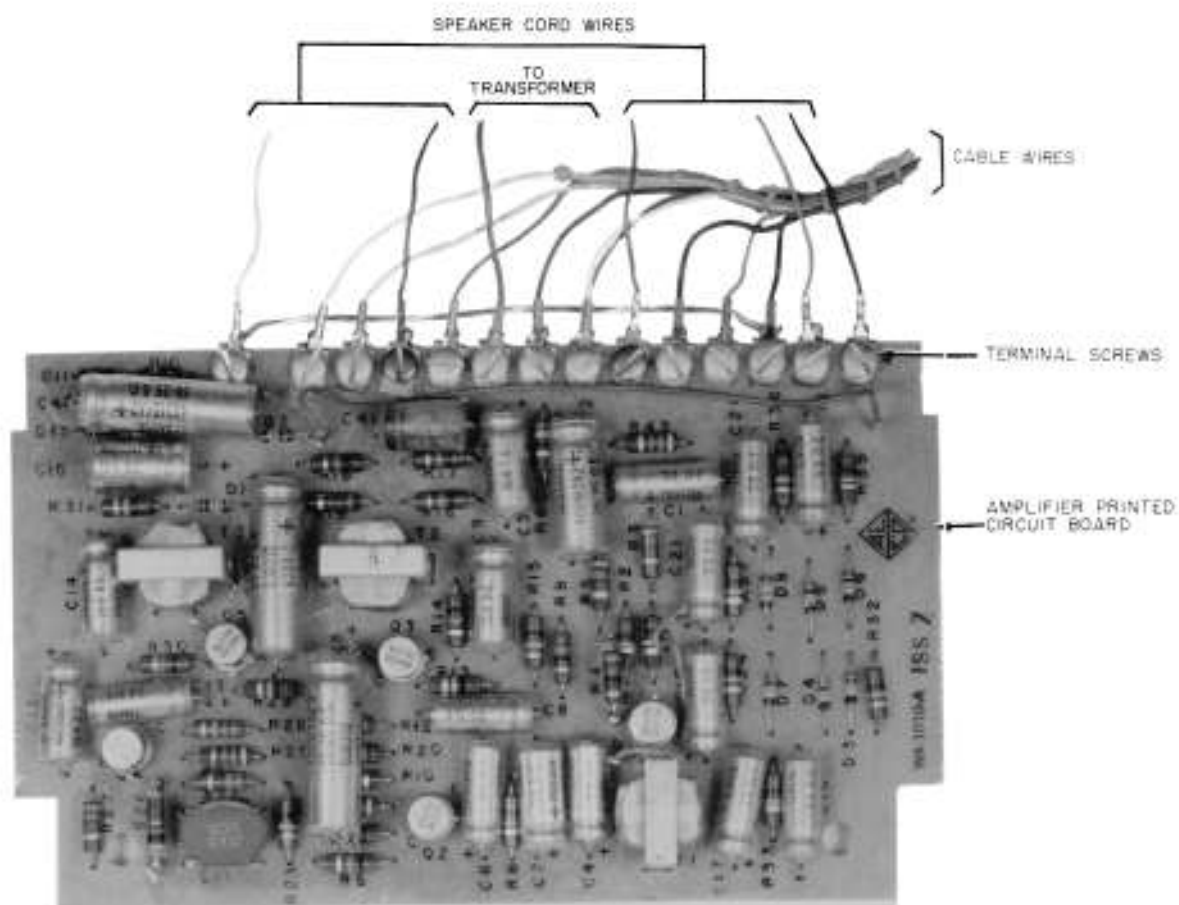


Figure 10. Amplifier printed circuit board.

the circuit board. Unsolder the nine wires from the component side of the circuit board (figure 15).

To connect a new speaker amplifier printed circuit board, solder the proper wires to the following circuit board terminals as shown in figures 15 and 16.

4.4 To replace the speaker cord remove the lower housing of the main unit assembly as described in section 3.2. Release the amplifier printed circuit board (figure 9) by pressing aside the two spring type mounting brackets (figure 9). Disconnect the five speaker cord wires from the amplifier printed circuit board terminals.

After disconnecting the five speaker cord wires from the printed circuit board, disconnect the remaining two speaker cord wires from the terminal strip assembly terminals (figure 11).

After these wires have been disconnected release the speaker cord holder (figure 11) and pull out the old cord. Connect the new speaker

cord green, red, white, black, and blue leads to the amplifier printed circuit board terminals as shown in figure 16. Connect the new speaker cord brown-red and yellow leads to terminal strip assembly terminals EH and 2R, respectively.

To remove the speaker cord from the speaker assembly remove the speaker housing as described in section 4.1. Release the speaker amplifier and tone signal printed circuit board (when supplied) from their respective mountings as described in sections 4.2 and 4.3. Remove the plastic-cord clamp (figure 13). Then unsolder the speaker cord wires from the component sides of the two printed circuit boards. Also unsolder the two leads which terminate at the speaker.

When the speaker cord wires have all been unsoldered, pull out the old speaker cord. Insert the new speaker cord through the hole in the rear of the speaker housing. Then solder the new speaker cord wires to the speaker amplifier and tone signal printed circuit boards and speaker as shown in figure 16.

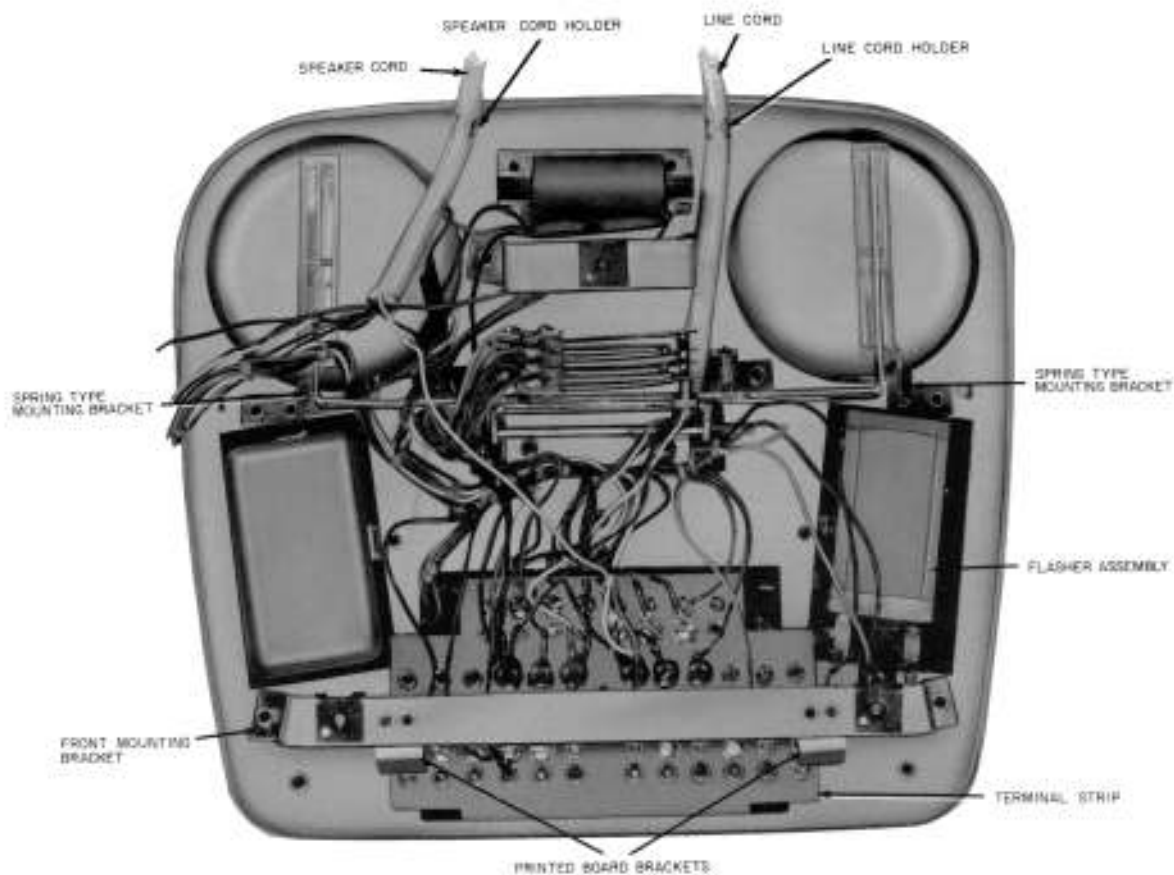


Figure 11. Main unit assembly with lower housing and amplifier printed circuit board removed.

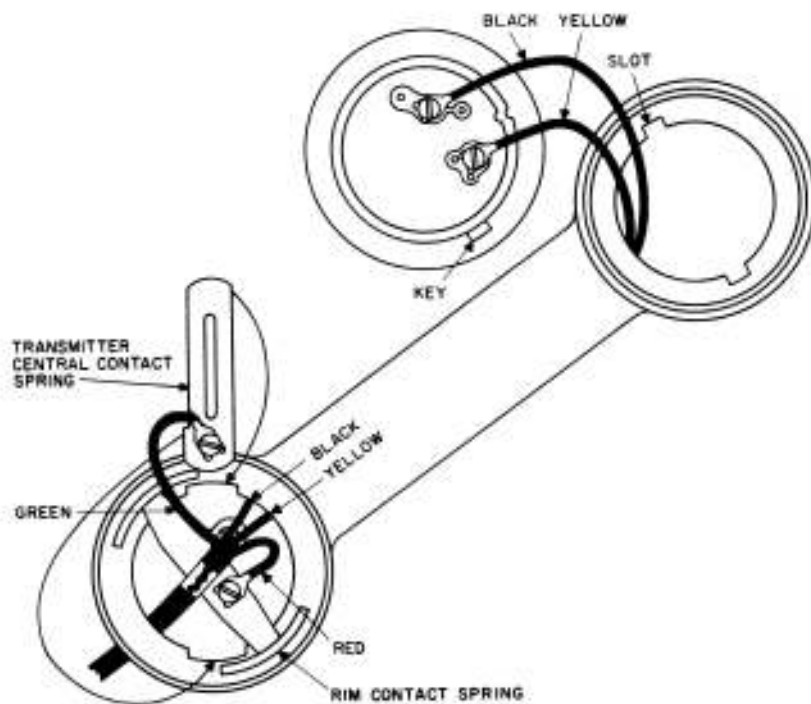


Figure 12. Type 810 handset.

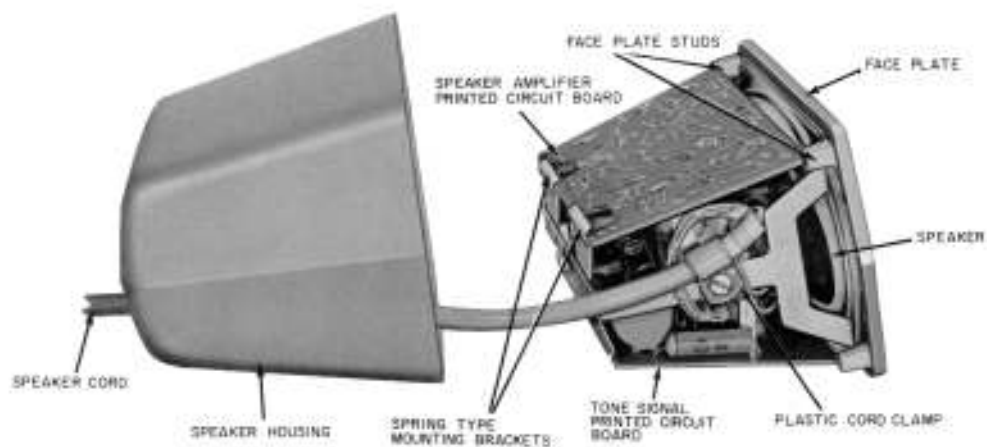


Figure 13. Speaker assembly.

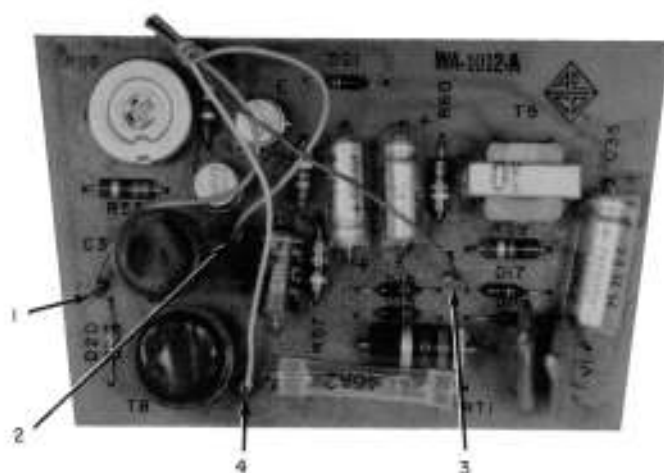


Figure 14. Electronic type tone signal printed circuit board with terminals called out.

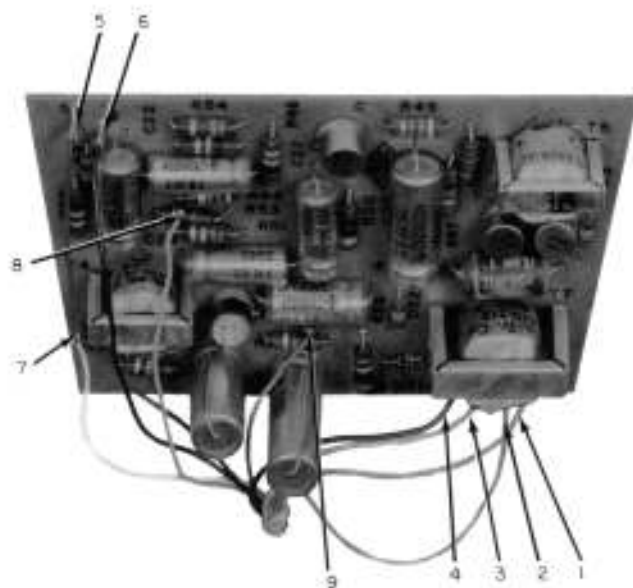


Figure 15. Speaker amplifier printed circuit board with terminals called out.

Table A: Ringing Connections at the Terminal Block

Terminal Block Terminals	Bridged Ringing		Divided Ringing		Divided Ringing	
			ON +TIP (Non-SATT & SATT)		ON - RING (Non-SATT & SATT)	
	Line Cord	Interior Wire	Line Cord	Interior Wire	Line Cord	Interior Wire
- RING 1	BRN-GRN RED	RED	RED	RED	BRN-GRN RED	RED
2	BLACK	-	BLACK	-	BLACK	-
3	-	-	-	-	-	-
GRD 4	BRN-YEL (SATT ONLY)	YELLOW (SATT ONLY)	BRN-GRN BRN-YEL (SATT ONLY)	YELLOW	YELLOW BRN-YEL (SATT ONLY)	YELLOW
5	-	-	-	-	-	-
+TIP 6	YELLOW GREEN BLUE	GREEN	YELLOW GREEN BLUE	GREEN	GREEN BLUE	GREEN
7	WHITE	-	WHITE	-	WHITE	-
8	-	-	-	-	-	-
9	BRN-BLK	-	-	-	-	-
10	BRN-RED	-	BRN-RED	-	BRN-RED	-

## 5. NUMBER CARD

Insert a screwdriver (such as A. E. Co. H-880622-1) inside the edge of the escutcheon ring and (between finger holes 5 and 6) between the escutcheon ring and the transparent cover. The escutcheon ring will unlatch.

Rotate the clamping plate counterclockwise. Remove the number card, and print or stamp the number clearly on the card. With the transparent cover in the escutcheon ring, add the number card and then the clamping plate. With the left thumb pressing lightly near one circular

hole, use the other circular hole to turn the clamping plate clockwise and lock it. Hook the escutcheon ring locating lug into the dial near the finger stop. Insert the screwdriver (between finger holes 5 and 6) between the escutcheon ring and the transparent cover. Press the screwdriver tip until you hear or feel the clamping plate latch in.

## 6. ORDERING INFORMATION

The following tables give the ordering information for handset cords, line cords, or speaker cords for the Type 880 Speakerphone:

Handset-Cord Replacement

Order No.	Color
D-543336-A	Black
D-543336-B	Sand Beige
D-543336-C	Dawn Gray
D-543336-D	Jade Green
D-543336-G	Turquoise
D-543336-M	Gardenia White

Line-Cord Replacement

Order No.	Color
D-543339-A	Black
D-543339-B	Sand Beige
D-543339-C	Dawn Gray
D-543339-D	Jade Green
D-543339-G	Turquoise
D-543339-M	Gardenia White

Speaker-Cord Replacement

Order No.	Color
D-543341-A	Black
D-543341-B	Sand Beige
D-543341-C	Dawn Gray
D-543341-D	Jade Green
D-543341-G	Turquoise
D-543341-M	Gardenia White

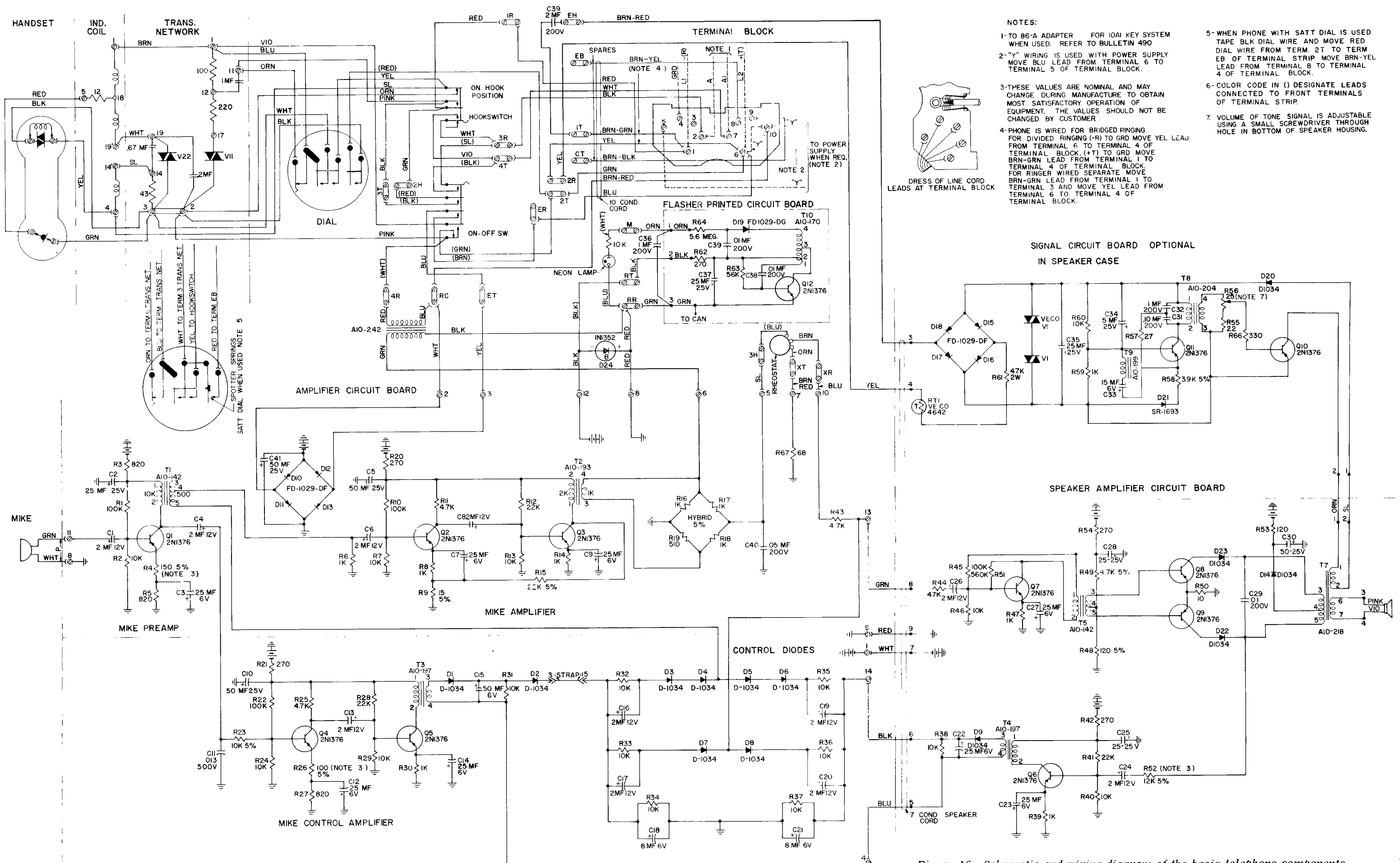


Figure 16. Schematic and wiring diagram of the basic telephone components. 13



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