

## KEY FEATURE TELEPHONE TYPE 85 — INSTALLATION AND ADJUSTMENTS —

### 1. DESCRIPTION

Type 85 key feature telephones are self-contained desk sets with internal ringer, which may be equipped to provide a number of special services.



*Figure 1.*

These services and combinations of them are provided by one or more of the three kinds of type 85 telephone—type 85A, type 85B, and type 85C, described in §1.1, 1.2, and 1.3:

Exclusion of one or more extensions from the line.

Two-line switching—permits access to two main subscriber lines from the same desk set.

Ringer cutoff—for locations requiring uninterrupted quiet.

Single line extension cutoff with ringer transfer—allows switching calls and/or ringing to and from an extension phone.

Headset control—permits secretarial monitoring of conversations at discretion of telephone user.

External ring control — provides switching to include an outside signaling device.

Exclusion with line shorting—for maximum privacy, provides shorting out all extensions and preventing line tapping from these lines.

1.1 **Type 85A** has a push-and-turn key below and to the left of the dial. The push feature (non-locking) may be used to operate an external signaling device. The turn feature (locking) is factory-wired for two-line pickup. The action of this switch is described in §16. The user switches from line 1 to line 2 by turning the key. Optional wiring described in §5 may supply the following other uses of the push-turn key:

**Single line ringer cutoff.** This feature is designed for use in an extension telephone when quiet is desired. By turning the button, the user can cut off the ringer, but leave the line open for use.

**Single line extension cutoff with ringer transfer.** With this wiring option, the turn key is used to connect an extension phone with its ringer to the line of the parent phone, and simultaneously disconnect the ringer of the parent phone. When the key is turned back to re-connect the ringer of the parent phone, the extension is cut off.

**Single line extension switching.** The turn key may be used to connect and disconnect an extension.

**External ringer control.** The turn key may be wired to allow the user to switch signaling to include an external lamp, buzzer, etc.

**Headset control.** The turn key can be used to connect a secretary's headset to the line to allow her to take notes on telephone conversation.

**Exclusion with line shorting.** The turn key feature may be wired to permit exclusion of all extensions which also shorts out the extension lines to prevent tapping these lines.

1.2 **Type 85B** telephones are factory-equipped with push-buttons near the handset: one red (non-locking) and one chrome-colored (locking). By pressing the chrome button, the user excludes all extensions from the line. The user may restore the extensions to the line during the same conversation by pressing the red button, which releases the chrome button. When the handset is replaced, the chrome button is automatically restored, returning all extensions to the line.

Optional wiring for type 85B can provide two-line pickup. (See §6.) The chrome button is used to switch to line 2, and the red button to return to line 1. Replacing the handset automatically restores to line 1. No holding or exclusion is possible.

1.3 **Type 85C** has both the chrome and red "exclusion" buttons, and the push-and-turn key. This telephone is wired at the factory so that the turn feature gives the subscriber access to either of two lines, and the push feature enables him to signal his secretary by means of a light or buzzer. The buttons near the handset can provide exclusion of all extensions on one of the lines. No variations are recommended for type 85C.

## 2. LINE POLARITY AND CONNECTIONS

**2.1 Line polarity.** Connection instructions in this bulletin assume the interior wires between the protector (or P.B.X. switchboard, etc.) and the telephone location in the subscriber's premises have their polarities identified by standard tracers shown in figure 2. Line polarity is important in divided-ring stations, etc.

The following "R alliteration"—ring (—), red, right, ridged,—may help you to remember these connections:

**RING** (negative line) connects, in this order, to:

**RED** (or 1-ridge) interior wire conductor,

**RIGHT-HAND** station protector terminal screw,

**RIDGED** ("tracer") drop-wire conductor,

**RIGHT-HAND** cable terminal stud.

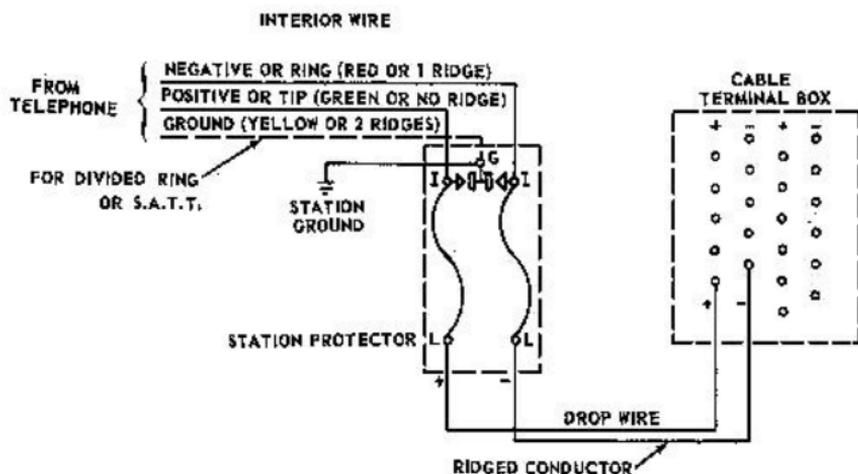
**EXCEPTION:** The "ring = right" rule applies at a strand-mounted or sheath-mounted cable terminal, or at an unprotected pole-mounted or wall-mounted cable terminal. At protected pole-mounted or wall-mounted cable terminal, connect the — line to the lower terminal stud of the pair.

If you are uncertain of the polarities of line conductors, use a hand test telephone such as A. E. Co. #L-965-A2. Clip one lead to the ground wire (which you have just installed), and touch the other clip to each line wire. The louder "click" identifies the — line.

**NOTE:** The + line will usually not sound completely dead, but will give a weak click due to earth-potential difference.

When making connections where no ground-connection is readily available, determine line polarity with a portable (d'Arsonval) voltmeter.

### 2.2 Connections to protector, etc.



*Figure 2. Typical connections to protector, etc.*

### 3. HOUSING REMOVAL

To remove the Monophone housing, first pull off the push-and-turn key to the left of the dial. Then locate the three captive screws on the baseplate of the set marked *BASE MTG SCREW*, and loosen these. Lift off the housing.

If telephone is connected to the line, push hookswitch actuating lever down to its locked-open position (figure 20). This holds the line open and the ringer connected, to receive incoming calls while you work inside the telephone.

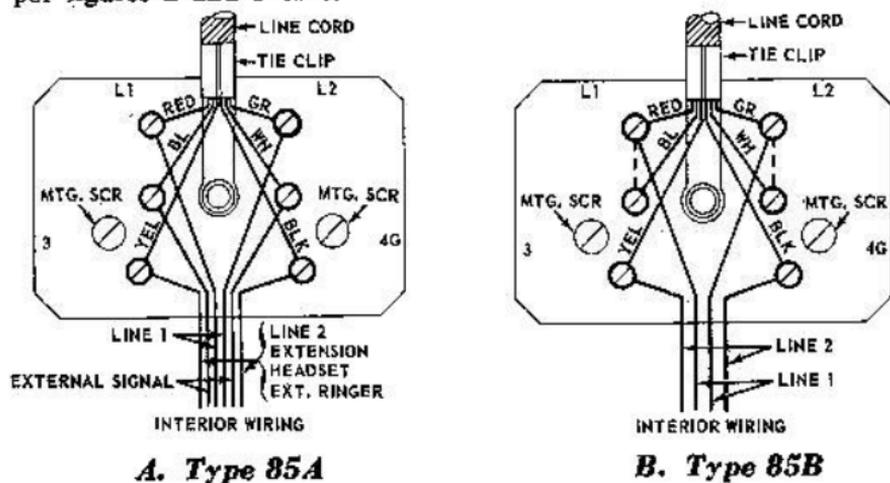
### 4. INSTALLATION—General for all type 85 telephones

Select a location for the telephone which will allow ample cord length, and where the connecting block (or two connecting blocks, for type 85C) will not be conspicuous.

Loosen the connecting block cover screw and remove the cover.

Mount the connecting block, using the 2 screws supplied with it.

Connect the line cord and interior wire to connecting block(s) per figures 2 and 3 or 4.

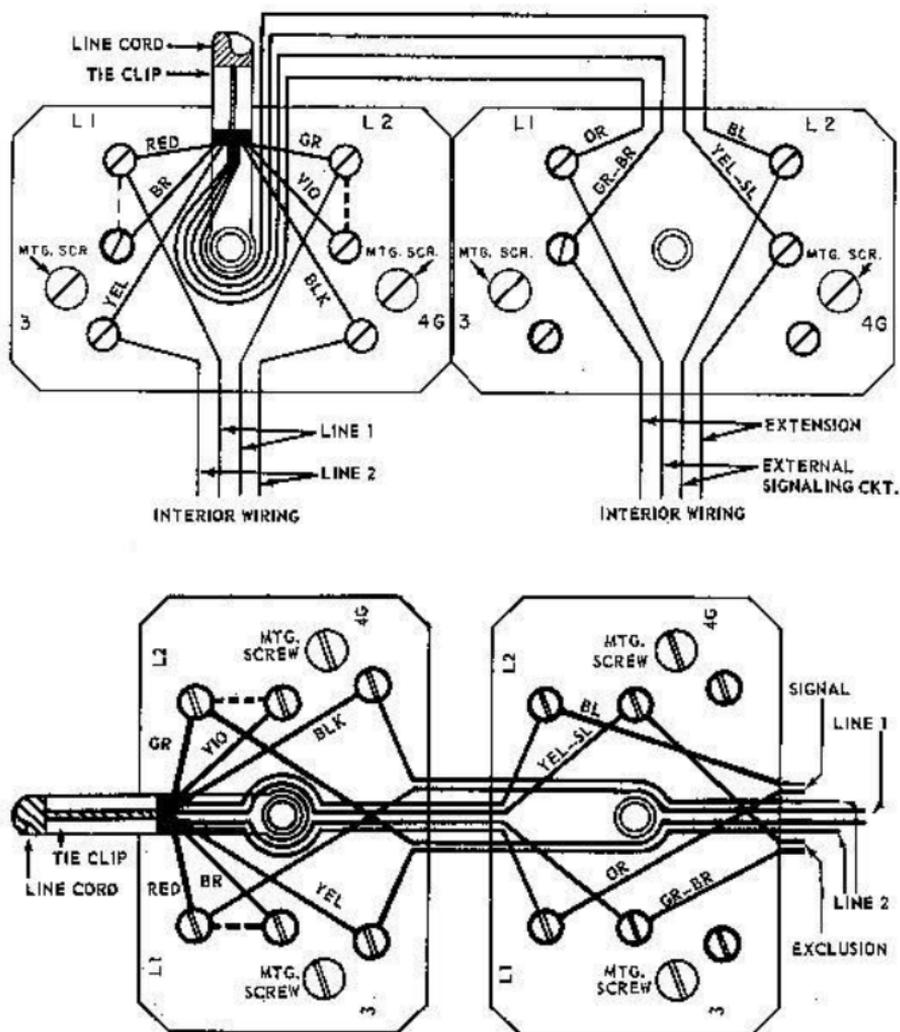


**Figure 3. Standard connecting block wiring for type 85A and type 85B.**

Slip the tie-cord ring over the connecting block cover-screw post.

Make connections from the protector to the connecting block and signaling and/or extension circuits per §2 and appropriate wiring diagram, figure 6, 7, or 8.

If the telephone is to provide variations from standard "factory-wired" services described in §1, make the necessary wiring changes per §5 (type 85A), or §6 (type 85B). No changes are recommended for type 85C.



**Figure 4. Connecting block wiring for type 85C.**

Make line cord connections on terminal strip B in the telephone per wiring diagram, figure 6, 7 or 8. (Or figures 9 or 10 for variations.)

Call central office to test the ringer and adjust the loudness control (if supplied) to the desired volume.

Check ringer wiring by dialing from another telephone on the line. If bells tap:

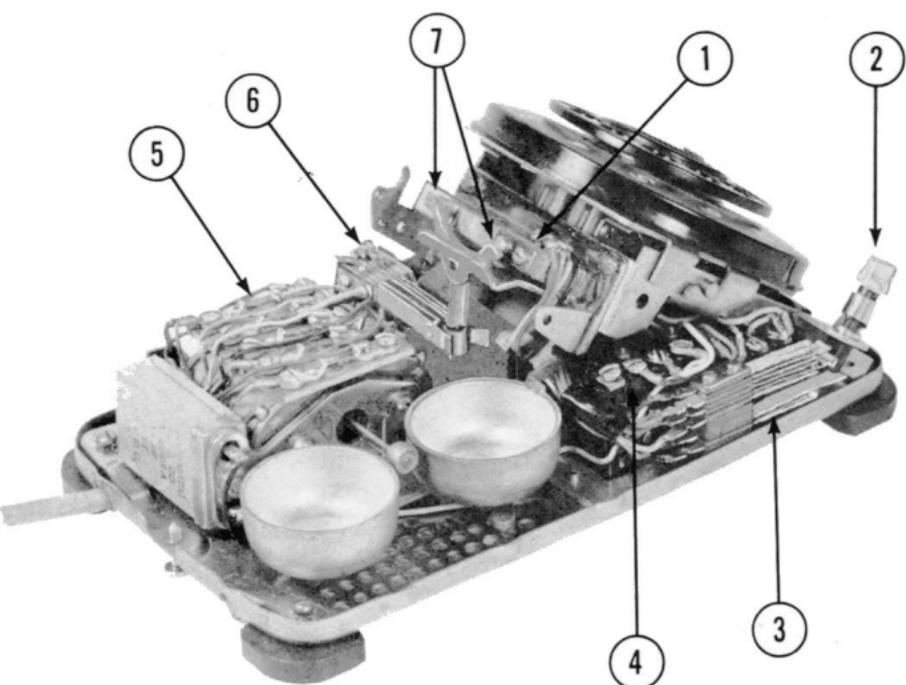
For type 85A—reverse ringer leads to terminals 1 and 2 on terminal strip B.

For type 85B or C—reverse ringer leads to terminals 5 and 6 on terminal strip B.

Set the loop compensator (figure 11): Check §7 and §8 for conditions requiring special settings of the loop compensator.

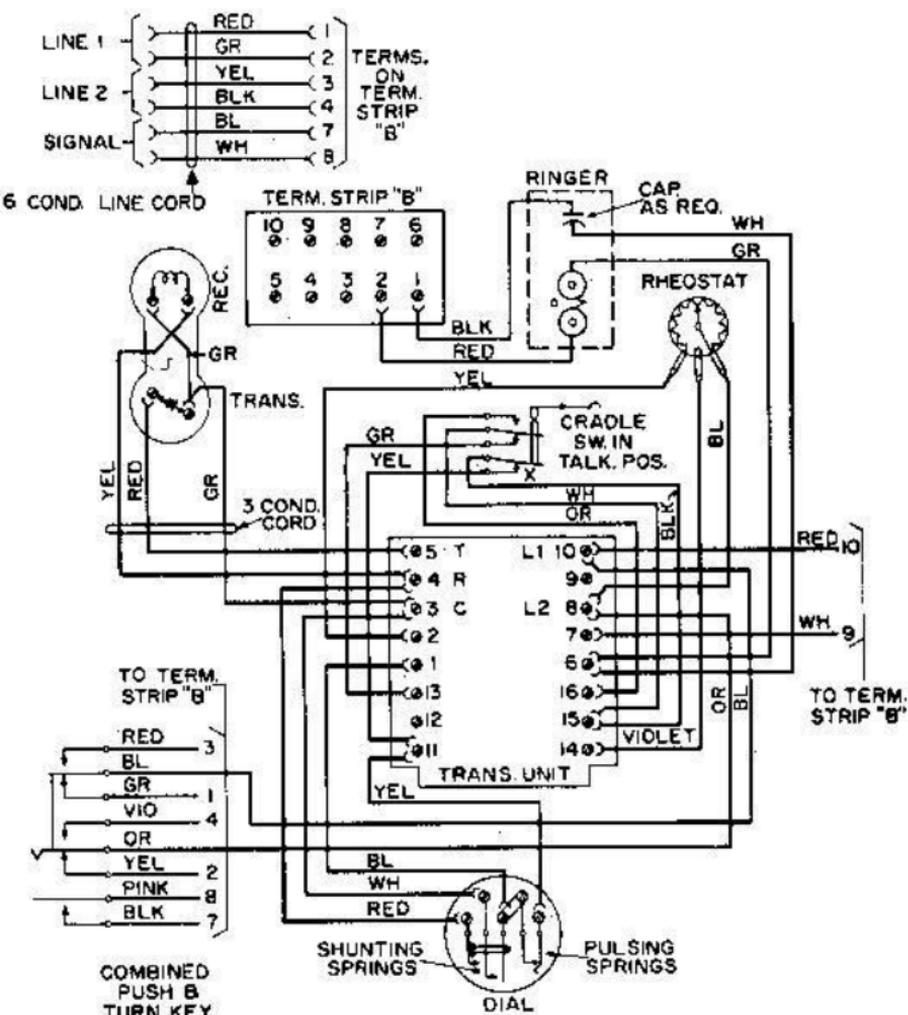
Stamp directory number on the dial number card and install the card per §12.

Make sure that the connecting-block tie cord clip ring is still in place, and replace the connecting block cover. Tighten the cover screw.



- |                                     |                              |
|-------------------------------------|------------------------------|
| 1. Hookswitch                       | 5. Terminal strip B          |
| 2. Push-turn key                    | 6. Exclusion key switch      |
| 3. Push-turn key switch             | 7. Exclusion switch actuator |
| 4. Transmission unit terminal strip |                              |

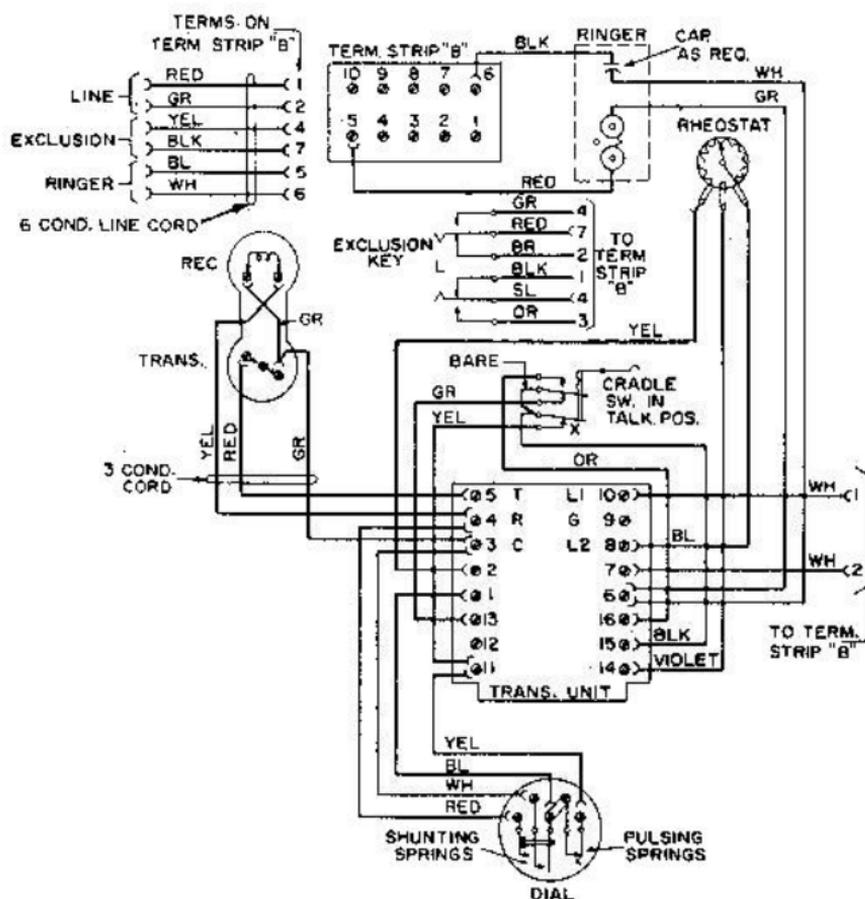
**Figure 5. Interior view with hookswitch actuator removed.**



NOTES:

- 1-"X" CONTACTS TO BREAK FIRST AND MAKE LAST
- 2-IF BELLS TAP WHEN DIALING FROM ANOTHER TELEPHONE ON THE LINE, REVERSE RINGER CONNECTIONS AT TERMINALS 1 & 2 OF TERM. STRIP "B".
- 3-IF NO DIAL IS USED, CONNECT BL AND YEL DIAL WIRES TO TERM. 2, WH TO TERM. 3 AND RED TO TERM. 4 OF DIAL BLANK.
- 4-TELEPHONE IS WIRED FOR TWO LINE PICK-UP.

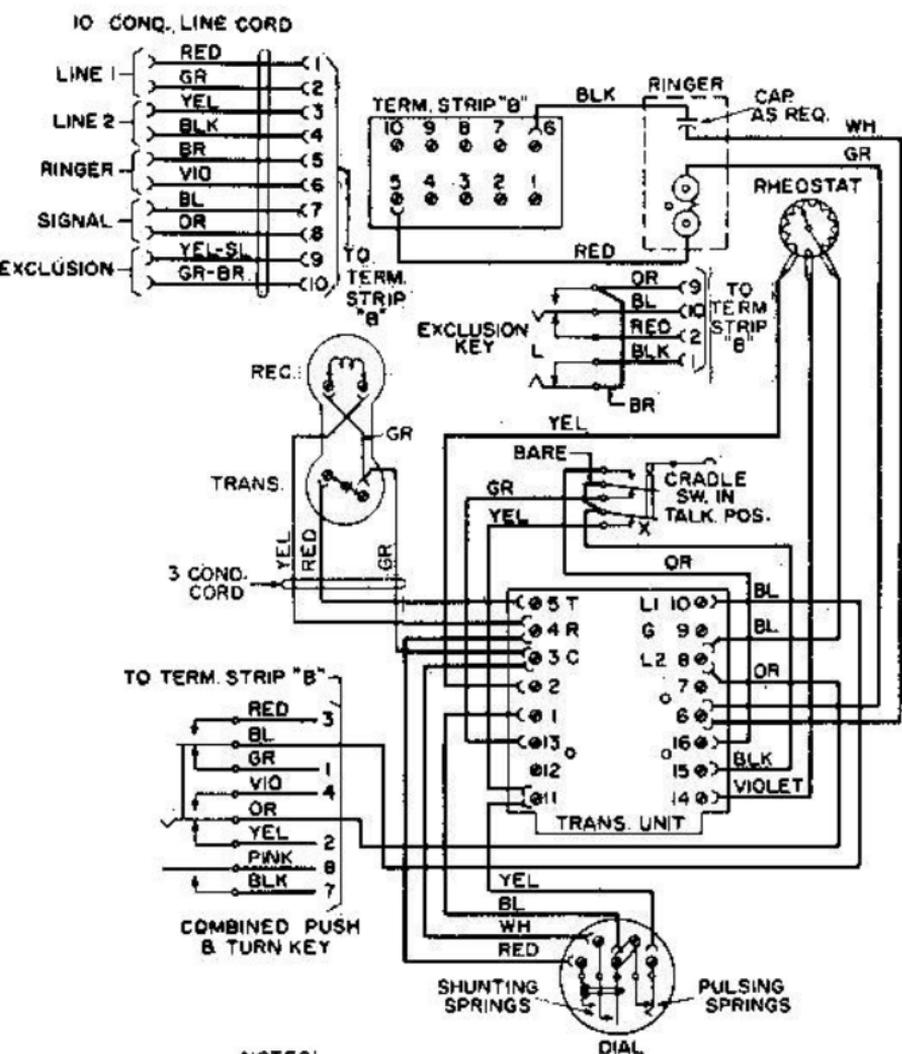
Figure 6. Type 85A wiring diagram.



## NOTES:

- 1- "X" CONTACTS TO BREAK FIRST AND MAKE LAST.
- 2- IF BELLS TAP WHEN DIALING FROM ANOTHER TELEPHONE ON THE LINE, REVERSE RINGER CONNECTIONS AT TERMINALS 5 & 6 OF TERM. STRIP "B"
- 3- IF NO DIAL IS USED, CONNECT BL AND YEL DIAL WIRES TO TERM. 2, WH TO TERM. 3 AND RED TO TERM. 4 OF DIAL BLANK.
- 4- TELEPHONE IS WIRED FOR EXCLUSION FEATURE.

**Figure 7. Type 85B wiring diagram.**



NOTES:

- 1—"X" CONTACTS TO BREAK FIRST AND MAKE LAST.
- 2-IF BELLS TAP WHEN DIALING FROM ANOTHER TELEPHONE ON THE LINE, REVERSE RINGER CONNECTIONS AT TERMINALS 5 & 6 OF TERM. STRIP "B"
- 3-IF NO DIAL IS USED, CONNECT BL AND YEL DIAL WIRES TO TERM. 2, WH TO TERM. 3 & RED TO TERM. 4 OF DIAL BLANK.
- 4-TELEPHONE IS WIRED FOR TWO LINE PICK-UP AND EXCLUSION FEATURE.

Figure 8. Type 85C wiring diagram.

## 5. VARIATIONS FOR TYPE 85A MONOPHONES

FEATURE	LINE CORD CONNECTIONS								SET WIRING			
	TO LINE 1		TO LINE 2		TO EXT. STA. OR EXT. RINGER DR HEADSET		TO SIG. CKT.		RINGER LEADS		TURN KEY LEADS	
	RED	GR	YEL	BLK	YEL	BLK	BL	WH	BLK	RED	BL	OR
TWO LINE PICKUP	1	2	3	4			7	8	1	2	10	8
SINGLE LINE RINGER CUTOFF (RINGER IN SET)	9	10	3*	4*			7	8	1	2	10	8
SINGLE LINE EXTENSION CUTOFF WITH RINGER TRANSFER	9	10			3	4	7	8	1	2	10	8
SINGLE LINE EXTENSION CUTOFF OR EXTERNAL RINGER CONTROL OR HEADSET CONTROL	9	10			3	4	7	8	9	10	10	8
EXCLUSION OF EXTENSION WITH LINE SHORTING	1	2			4	5	7	8	9	10	4	5

STRAP TERM. 1 TO TERM. 7  
STRAP TERM. 2 TO TERM. 10  
 TERMINALS ON TRANSMISSION UNIT  
\* NOT USED

Figure 9. Type 85A variations and wiring changes.

Figure 9 shows changes in factory wiring (two line pickup) required to convert type 85A to provide:

Single line service with ringer cutoff (ringer in set),

Single line service with extension cutoff and ringer transfer,

Single line service with extension cutoff, extension ringer control, or headset control,

Exclusion of extensions with line shorting.

Note that in all cases but one, line cord BL and OR leads connect directly to terminals on the *transmission unit* terminal strip.

## 6. VARIATIONS FOR TYPE 85B MONOPHONE

FEATURE	LINE CORD CONNECTIONS								SET WIRING					
	TO LINE 1		TO LINE 2		TO EXCLUDED STATION		RINGER LEADS		RINGER LEADS		SET LEADS		EXCLUSION KEY LEADS	
	RED	GR	YEL	DLK	YEL	DLK	BL	WH	BLK	RED	WH	WH	SL	RED
EXCLUSION (STANDARD)	1	2			4	7	5	6	6	5	1	2	4	7
TWO LINE PICKUP	1	2	3	4			7*	8*	1	2	9	10	9	10

\* NOT USED

Figure 10. Type 85B variations and wiring changes.

Changes in wiring necessary to convert the standard ("exclusion-wired") type 85B for two line switching are shown in figure 10. Numbers within the chart refer to terminal strip B inside the telephone set.

## 7. LOOP COMPENSATOR—Description

Automatic Electric Company defines "conductor-loop resistance" as the total of resistances of the line *conductors*, heat coils, and central-office cabling. Resistances of telephone instrument and central-office relays are not included.

The "loop compensator" is a *rheostat-and-switch* accessible from the bottom of the telephone (figure 11). By turning the slotted arrow counterclockwise with a small screwdriver from 0 to 4, the *rheostat* inserts 0 to 400 ohms in series with the loop.

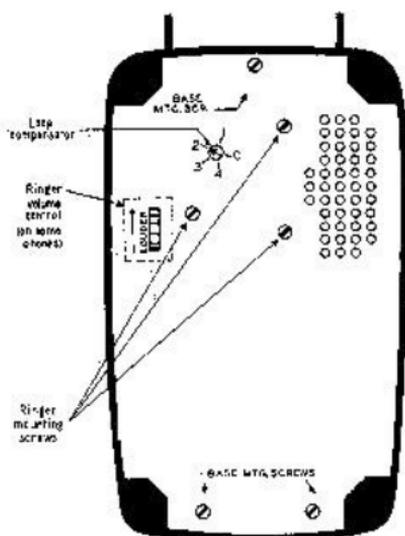


Figure 11. Baseplate.

When the rheostat is at 0 (as it should be for long cable loops), the *switch* element adds a capacitor and a resistor into the sidetone-balancing impedance to match more nearly the capacitive impedance of a long cable loop.

Thus, the loop compensator *minimizes sidetone*—

(a) on a short loop by limiting transmitter current,

(b) on a long loop by improving the balance between the sidetone-balancing impedance and impedance characteristics of the line.

Loop compensation lessens current diverted by a party-line subscriber near the central office listening in on conversation of a subscriber on that line more distant from the central office.

On a reverting call, loop compensation tends to equalize the currents available to the two conversing parties.

## 8. LOOP COMPENSATOR—Adjustment rules

The type 85 Monophone operates satisfactorily with the loop compensator adjusted per this section, except in marginal or unusual locations. For such locations, adjust per §9.

### 8.1 Usual lines in a 48- or 50-volt exchange:

- { If conductor-loop resistance is 200 ohms or less, set loop compensator at 2.
- { If conductor-loop resistance is over 200 ohms, set loop compensator at 0.

#### EXCEPTIONS:

**OPEN-WIRE LINE:** If the station is connected directly to an open-wire section of over 200 ohms resistance, set loop compensator midway between 0 and 1.

**NEAR LOADING COIL:** If the station is on a loaded subscriber loop and is less than one loading section (for type H loading, less than 6000') from the nearest loading coil, set loop compensator midway between 0 and 1.

**NOTE:** Because the open-wire line or line section, or the loaded cable, has less effective capacitance than has unloaded cable, the aim here is merely *not* to close the switch mentioned in §7.

**8.2 Party-line or extension telephone.** If two or more Automatic Electric Company telephones with loop compensators—type 80, 88, 90, etc.—are used on one line (e.g., party line or extension telephone), set the loop compensator of each as if it were the only telephone on the line. If the type 85 Monophone is used on the same line with an entirely different make or model of telephone, set the type 85 loop compensator at 0 (or midway between 0 and 1 if one of the §8.1 exceptions applies).

**8.3 48-volt P-A-B-X, P.B.X., etc.** In a key system, P.B.X., or P-A-B-X, a type 85 Monophone may receive its transmitter current from either of two different 48- or 50-volt sources. Adjust the loop compensator for the current received on a trunk (outside) call:

- { If station-loop + trunk resistance is 200 ohms or less, set at 2.
- { If station-loop + trunk resistance is over 200 ohms, set at 0.

If long-line equipment or a pulse repeater at the P.B.X. or P-A-B-X supplies transmitter current on trunk calls, set the loop compensator at 2.

#### EXCEPTION:

If the P.B.X. switchboard uses *non-relay* series-lamp line circuits, set loop compensator at 0 in all the above cases.

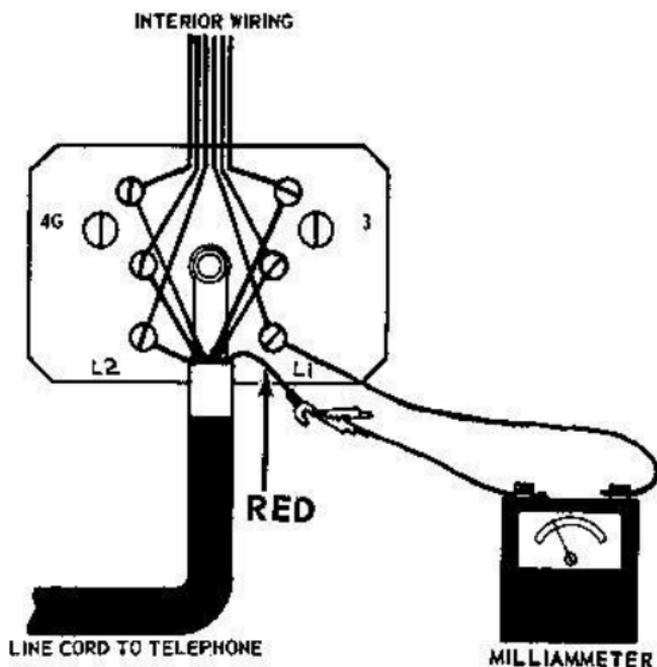
**8.4 24-volt switchboard.** If the central-office or P.B.X. switchboard operates from 24 volts and has 100 ohms + 100 ohms battery-feed coils or uses *non-relay* series-lamp line circuits, set loop compensator at 0; otherwise use one of the methods in §9.

## 9. LOOP COMPENSATOR—Accurate adjustment

Although the rules of §8 are adequate for most installations, occasionally it is desirable to have current in the line adjusted accurately to 60 milliamperes. Examples are: where there has been a transmission complaint, or where the subscriber does not hear well over the telephone and this seems to be due to noise in his room. (The sidetone from extreme room noise can be reduced further by setting the loop compensator to limit the line current to 55 or even to 50 milliamperes.)

Use one of the methods below:

**9.1 Without assistance from the central office.** Loosen the connecting block cover screw, remove the connecting block cover, and disconnect the telephone RED lead. Connect a milliammeter between the RED lead and the connecting block terminal L1 so that the milliammeter is in series with the line (see figure 12). Take the handset off the cradle and vary the loop compensator until the milliammeter reads 60 milliamperes.

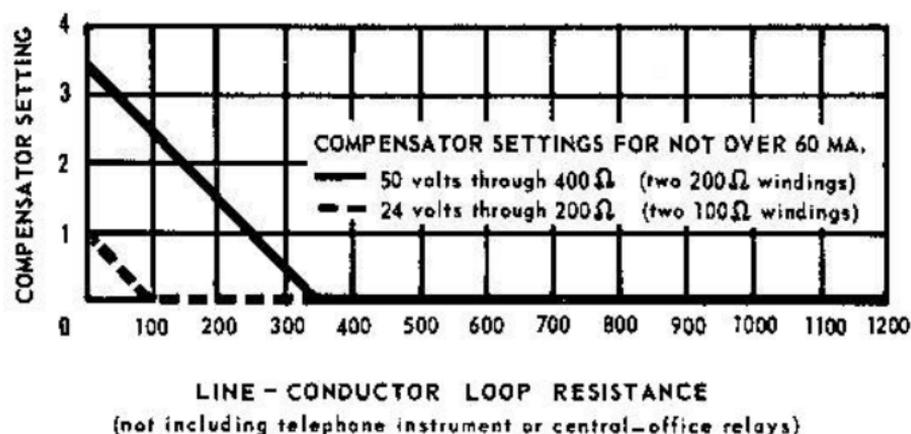


**Figure 12. Line current testing at subscriber's premises.**

Disconnect the milliammeter and reconnect the telephone RED lead to the connecting block terminal L1. Make sure that the tie-cord clip ring is still in place, replace the connecting block cover, and test transmission.

9.2 **Test board equipped for line-current measurement through usual 200 ohms + 200 ohms battery feed.** Dial the test board. Request the line-current measurements. The testboardman will give you readings. Vary the loop compensator until the current is 60 milliamperes.

9.3 **Test board equipped for line-resistance measurement.** Dial the test board. Request line-resistance measurements. Short-circuit the line a few moments while the testboard measures loop resistance. Set compensator per the following chart:



*Figure 13.*

9.4 **Test board equipped for line-voltage measurement.** Dial the test board. Request line-voltage measurement, and stay on the line. Through a test distributor or distributing-frame test shoe, the testboardman will connect to the line from which you are calling, and will connect his voltmeter across the line.

**BATTERY FED THROUGH 200 OHMS + 200 OHMS** (usual in 48- or 50-volt exchange): Vary the loop compensator until the test-board voltmeter reads 24 volts less than the central-office battery voltage. (That is, when 60 milliamperes flow in the line, there will be 24 volts "drop" in the usual 200 ohms + 200 ohms battery feed to the calling line.)

**BATTERY FED THROUGH 100 OHMS + 100 OHMS** (used in many 24-volt exchanges): Vary the loop compensator until the test-board voltmeter reads 12 volts less than the central-office battery voltage.

## 10. RINGER ADJUSTMENT

10.1 **Loudness adjustment.** When so ordered, type 85 Monophone equipped with straight-line ringers may have a ringer volume control (figure 1). The installer either requests the test board to ring back or dials a reverting-call switch. Then, while the telephone rings, he adjusts the control for loudness to suit the subscriber.

10.2 **Tinkling of straight-line ringers.** Occasionally the bells of a straight-line ringer will tap when another party on the same line dials. This is due to charging and discharging of the ringing capacitor during interruptions. To connect this, reverse the connections of the tapping ringer at the transmission unit terminal strip (figure 6, 7, or 8). The ringer bias spring should then prevent tapping.

## 11. RINGER FREQUENCY CHANGE

Normally, telephones are drawn from the local storeroom, already assembled, as required. If you have to change a ringer-frequency on the job, it is preferable to work in your truck rather than in the subscriber's premises — unless, of course, the telephone is already installed.

Remove the telephone housing (§3). At the transmission unit disconnect ringer RED and GREEN leads and capacitor WHITE and BLACK leads. At the bottom of the baseplate (figure 11) remove the 3 ringer-mounting screws. Remove ringer and capacitor.

Attached to the new ringer are wires and a suitable ringing capacitor: Use mounting screws left from old ringer.

Automatic Electric Company  
piece number\*

Automatic Electric Company piece number*	Ringer (Straight-line with volume control) (Straight-line without volume control)	Capacitor
D-56548-ASA		0.4 $\mu$ f
D-56548-ASL		0.4 $\mu$ f
D-56548-A16	16.6 $\sim$	0.7 $\mu$ f
D-56548-A20	20 $\sim$	0.7 $\mu$ f
D-56548-A25	25 $\sim$	0.3 $\mu$ f
D-56548-A30	30 $\sim$	0.2 $\mu$ f
D-56548-A33	33.3 $\sim$	0.2 $\mu$ f
D-56548-A40	40 $\sim$	0.08 $\mu$ f
D-56548-A42	42 $\sim$	0.08 $\mu$ f
D-56548-A50	50 $\sim$ **	0.08 $\mu$ f
D-56548-A51	50 $\sim$ ***	0.08 $\mu$ f
D-56548-A54	54 $\sim$	0.08 $\mu$ f
D-56548-A60	60 $\sim$	0.08 $\mu$ f
D-56548-A66	66 $\sim$	0.08 $\mu$ f
D-56548-A67	66.6 $\sim$	0.08 $\mu$ f

\*Piece numbers in table are for standard ringer (first suffix letter "A"). The piece number for humid-climate impregnated ringer uses first suffix letter "B". (Piece number for impregnated straight-line ringer with volume control would be D-56548-BSA.)

\*\*For use in exchanges with harmonic (or synchronic) ringers.

\*\*\*For use in exchanges with "decimonic" ringers.

## 12. NUMBER CARD—for dial with *metal* fingerplate

Insert dial escutcheon tool H-26917 (or small screwdriver) between escutcheon ring and transparent cover, opposite finger hole 5 (figure 14). Press the tool downward until it engages the locking lever underneath. Then move tool counterclockwise toward finger hole 6. This unlocks the escutcheon ring. With the tool, lift ring from dial.

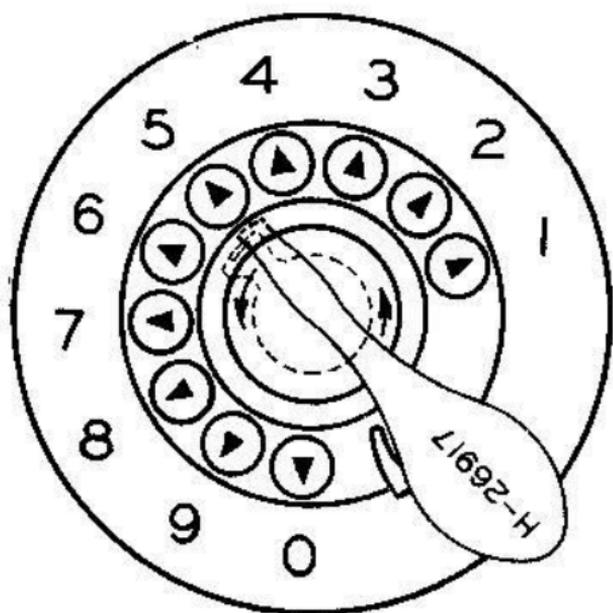


Figure 14. Unlocking escutcheon ring.

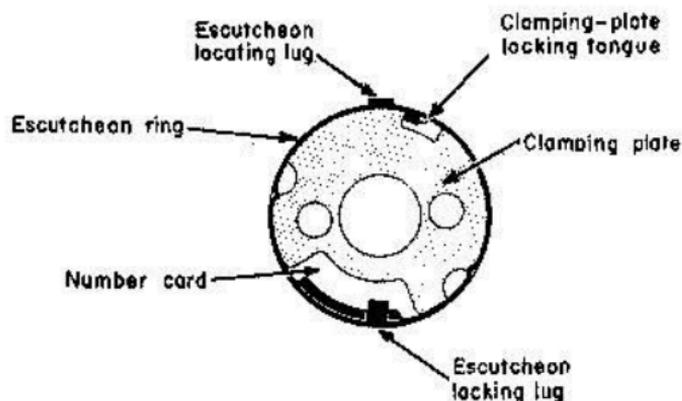
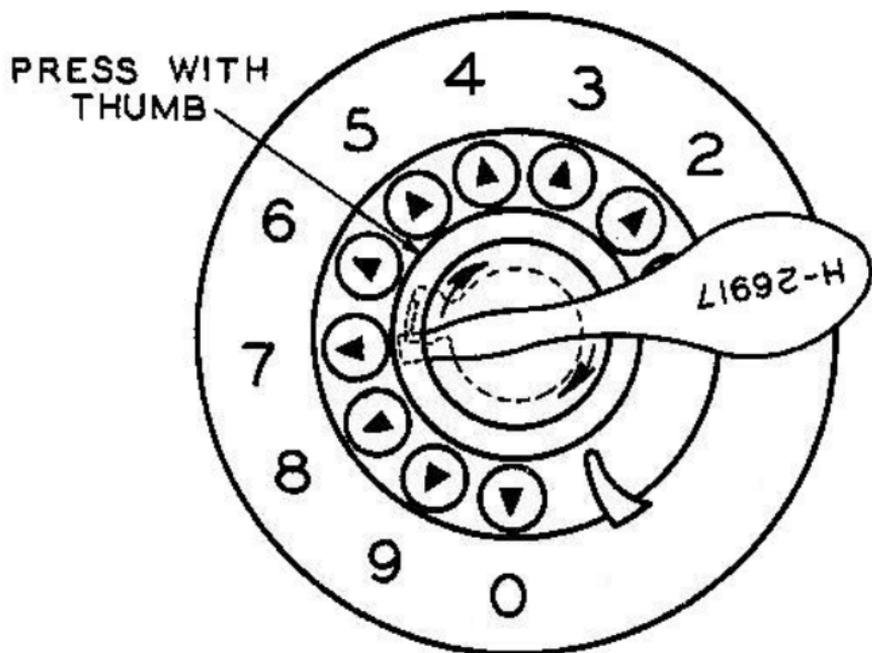


Figure 15. Number card in escutcheon ring.

A clamping plate holds the transparent cover and number card to the ring (figure 15). To disassemble, rotate the notched clamping plate counterclockwise.

Print or stamp the number clearly on the card.

To reassemble, first place the transparent cover in escutcheon ring. Insert the number card and clamping plate. Turn the clamping plate clockwise to engage its tongue, locking the assembly.

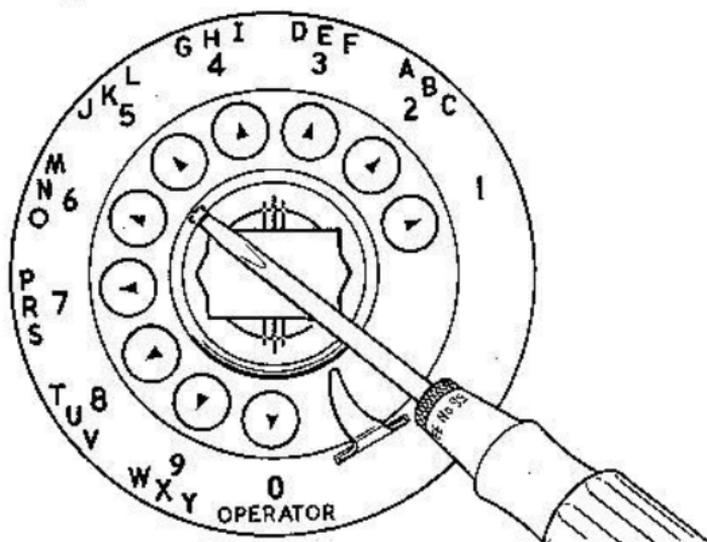


**Figure 16. Locking escutcheon ring.**

To mount on dial, check that the locking lever on the finger plate is midway between finger holes 6 and 7. Insert small lug of escutcheon ring into slot near finger stop. Press assembly into finger plate. Insert dial tool under escutcheon ring opposite 7. Press tool down against locking lever underneath card and move tool clockwise to 6. Assembly is now locked in place.

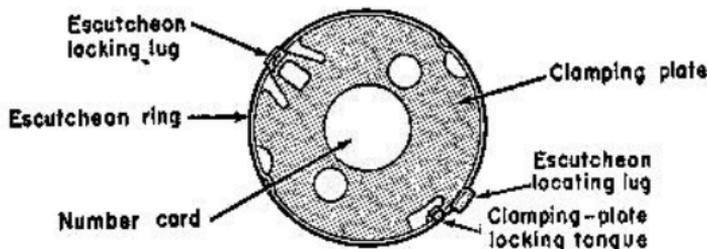
### 13. NUMBER CARD—for dial with *plastic* fingerplate

Insert a screwdriver (such as A.E.Co. H-880622-1) inside the edge of the escutcheon ring between the ring and the transparent cover, midway between finger holes 5 and 6. This unlatches the escutcheon ring. Lift off ring with screwdriver.



**Figure 17.** Use of screwdriver on escutcheon ring.

Rotate the clamping plate (figure 18) counterclockwise and remove the number card. Print or stamp number neatly on card.



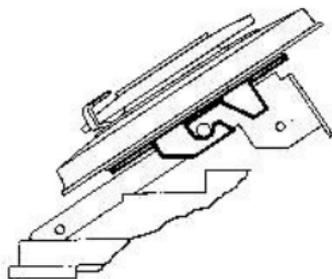
**Figure 18.** Number card in escutcheon ring.

With transparent cover in the escutcheon ring, add number card and clamping plate. Pressing slightly near one circular hole (figure 18, lower left) with the left thumb, lock the clamping plate by inserting the right thumbnail in the other circular hole and turning the clamping plate clockwise.

Hook the escutcheon locating lug into the dial near the finger stop. Between finger holes 5 and 6, insert screwdriver between escutcheon ring and transparent cover. Press screwdriver tip in until the clamping plate latches.

## 14. DIAL REMOVAL

Type 85 Monophone dials employ a "snap-on" bayonet-lug pin mounting, figure 19. To check dial action, first remove the telephone housing per §3. Do not disconnect dial leads to transmission unit terminals unless you must replace the dial.

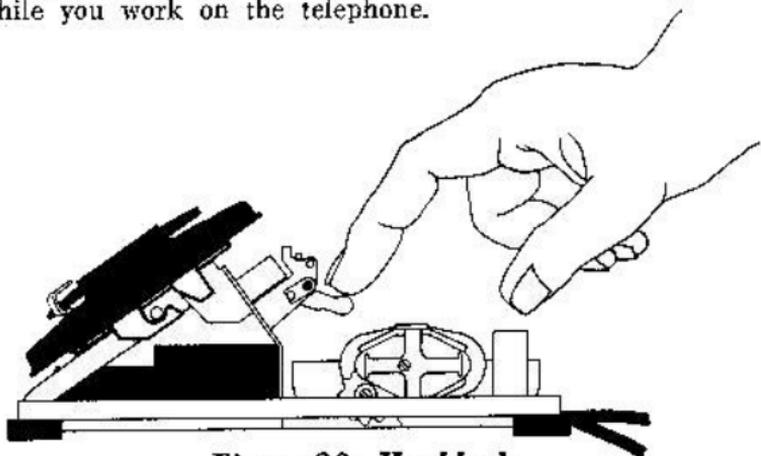


*Figure 19. Dial mounting.*

To remove the dial, press down on dial and mounting plate. At the same time, slide them down the frame until lugs are disengaged from pins. Tip the bottom of the dial up vertically, exposing wiring and transparent dust cover over springs.

## 15. HOOKLOCK

When working inside the telephone press the hookswitch-actuating lever down until it catches and remains there (figure 20). This keeps the telephone transmission circuit off the line and the ringer on the line while you work on the telephone.



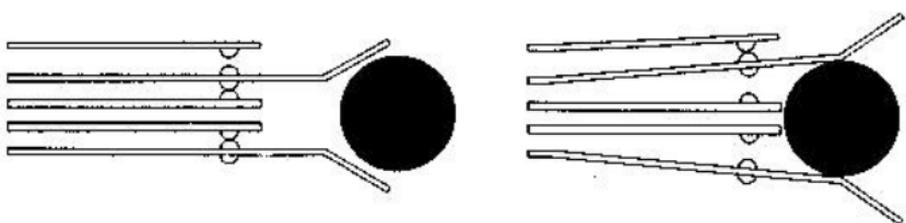
*Figure 20. Hooklock.*

When you replace the housing onto the base, contours inside the housing unlock the actuating lever automatically, restoring it to normal position under control of the handset-operated cradle plungers.

## 16. KEY FEATURES—mechanical operation

The following diagrams are intended to help the installer or trouble-shooter to check that key feature switches are operating properly, and aid in minor readjustments if the switches have been jarred during installation enough to make them inoperative.

Figure 21A shows the positions of exclusion switch and buffer with the red and chrome buttons unoperated. Figure 21B shows the switch when the chrome button is operated, with the handset off hook.

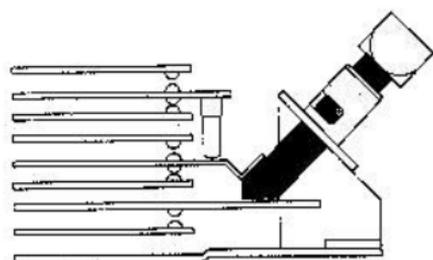


*A. Normal.*

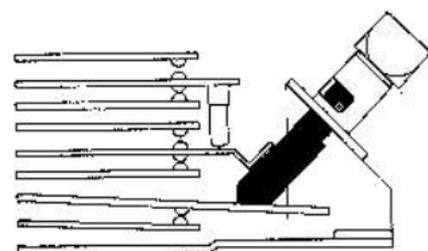
*B. Chrome button pressed.*

**Figure 21. Exclusion key switch operation.**

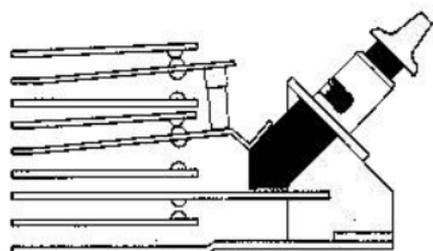
Figure 22A shows the push-and-turn key switch at normal. Pressing the key should close the lower set of contacts only (figure 22B), and turning the key should close the upper set, figure 22C. The operations in B and C can be combined.



*A. Normal.*



*B. Key pressed.*

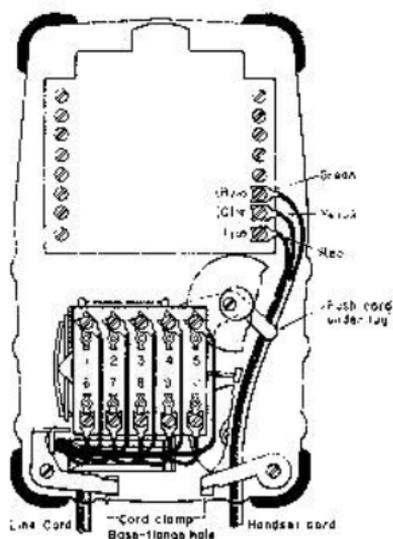


*C. Key turned.*

**Figure 22. Push-turn key switch operation.**

## 17. LINE-CORD REPLACEMENT

Remove the telephone housing per §3. Note whether the line cord connections are standard for this type of telephone, or whether one of the variations of §5 or §6 has been previously installed.



**Figure 23. Line- and handset-cord connections inside telephone.**

Disconnect the 6- or 10-conductor line cord leads from terminal strip B. Loosen the cord-clamping screw in the corner of the baseplate and unlock the clamp-lug from its hole in the baseplate. Withdraw the old cord.

Pass the end of the new cord through the baseplate hole, until the covered portion extends just over 2" into the base. Insert the cord-clamp lug into its baseplate hole, and adjust the cord in the clamping bracket until the covered cord end fits securely between the ringer capacitor and the upright portion of the cord-clamping bracket. Tighten the cord-clamping screw.

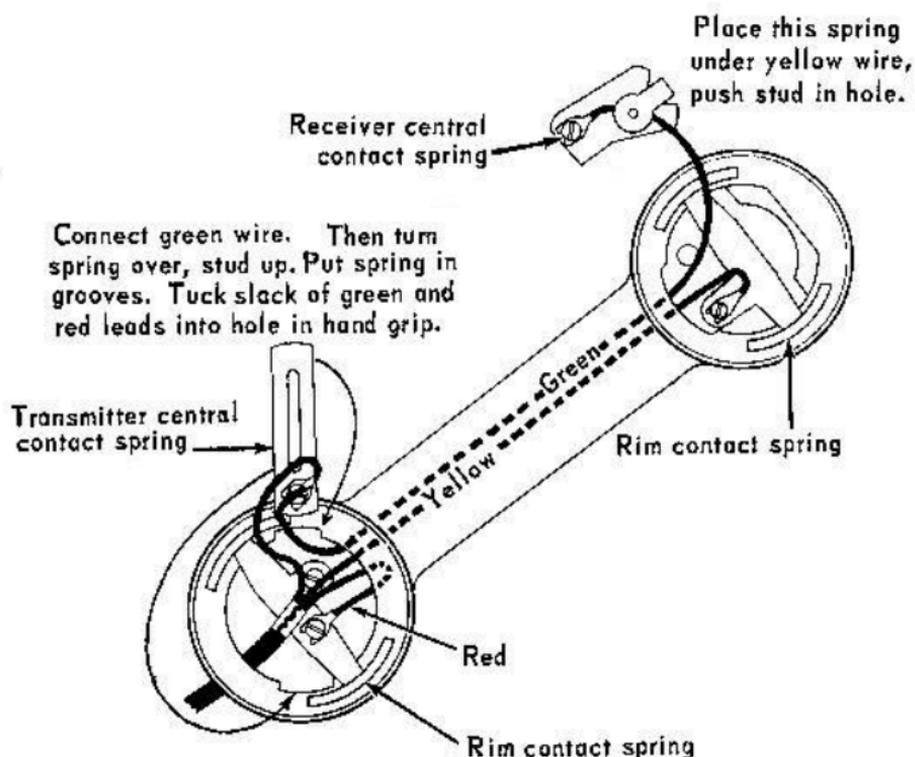
Connect the new line-cord per the appropriate wiring diagram (figure 6, 7, or 8) for standard wiring, or §5 or §6 for variations. Make sure you follow the color coding indicated. Replace the housing.

Remove the connecting-block cover screw(s) and slip off the cover(s). Disconnect the old line cord from connecting-block terminals, free the tie cord clip ring, and discard the old line cord. Reconnect the new line cord per figure 3 or 4. Slip the tie-cord clip ring over the connecting-block center post, and replace the cover.

## 18. HANDSET CORD REPLACEMENT

Remove the housing (§3). Push the hookswitch actuating lever down (figure 20), if the telephone is connected to the line. Disconnect the 3 handset cord leads from the transmission unit terminal strip (figure 23). Loosen the cord-clamping screw and pull out the old cord.

Insert new cord through the hole in the baseplate. Work the covered portion of the cord under the retaining lug beneath the ringer (figure 23). Re-connect the 3 leads to the proper transmission unit terminals per figure 23. Pull any slack out through the back of the telephone, and tighten the cord-clamping bracket screw. Replace the housing.



**Figure 24. Handset-cord replacement.**

Remove receiver and transmitter caps and capsules per §20. Lift out central contact springs from both receiver and transmitter cavi-

ties (figure 24). Loosen the screw and disconnect the leads from the central contact springs. Loosen the screws and disconnect the leads to the rim contact springs in both cavities. Pull out the old cord.

Insert the leads of the new cord thru the cord entrance hole in the transmitter end of the handset and thru the hollow hand grip until the YELLOW and GREEN leads reappear in the receiver cavity. Connect the YELLOW lead to the receiver rim contact spring and the GREEN lead to the receiver central contact spring as in figure 24. Place the receiver central contact spring in its proper position in the cavity and replace the capsule and cap.

In transmitter cavity at the rim contact spring, attach stay cord to the screw which is on a projecting lug. Position the RED lead lug under the rim-contact-spring *other* screw as in figure 23, and tighten the screw.

Attach GREEN lead to transmitter central contact spring as in figure 24. Then turn the stud over so that the wires are beneath the spring, and the stud faces up and is near the cord entrance hole. Insert the spring into the grooves of the transmitter cavity.

Loop the slack in the RED and GREEN leads and tuck the loop into the mouth of the hand-grip hole. Put the transmitter capsule back in, and screw on its cap. Replace the telephone housing, and make a test call.

## 19. TRANSMISSION UNIT

The transmission unit wiring diagram, figure 25, is for information for continuity tests ohmmeter measurements, etc. The transmission unit is sealed during manufacture; do not attempt field repairs. If it becomes damaged, replace the entire unit with a new one.

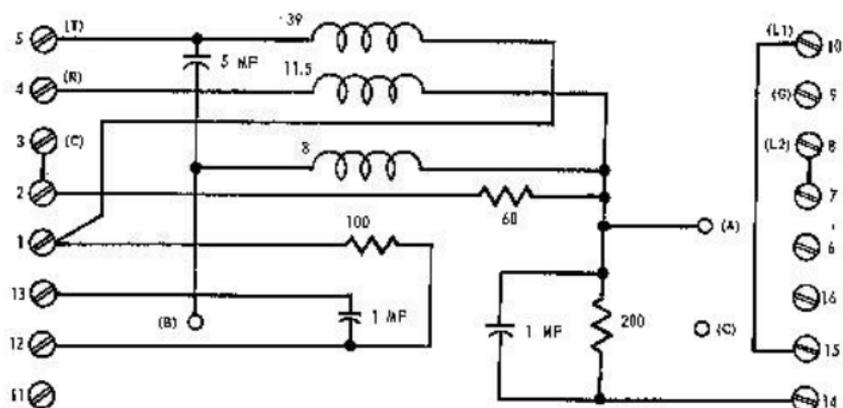


Figure 25. Transmission unit schematic.

## **20. TRANSMITTER AND RECEIVER REMOVAL**

The transmitter (at the cord end of the handset) and receiver are capsule units, removed by unscrewing the earpiece and mouthpiece caps. *Hold the handset horizontally with the caps up*, so that the capsule will not fall out. (Transmitter and receiver capsules are so designed that they cannot be accidentally interchanged.)

Do not attempt to repair capsules at subscriber's premises; it is impossible to open them without damaging them. Remove a defective capsule and replace it with a new one. Defective units may be repaired at the factory.

## **21. REPLACEMENT PARTS**

Telephone catalog #4055-G lists replacement parts for all type 85 telephones.