ITT KELLOGG
Telephone & Transmission Department
RALEIGH, NORTH CAROLINA

SHOP MAINTENANCE MANUAL
K-500 DESK TELEPHONE
K-554 WALL TELEPHONE
and variants
Circa 1960

A manual to assist in the repair and maintenance of the K-500 series of telephones. Contains diagrams, circuit descriptions, operation narratives and parts lists.

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11 July 2009

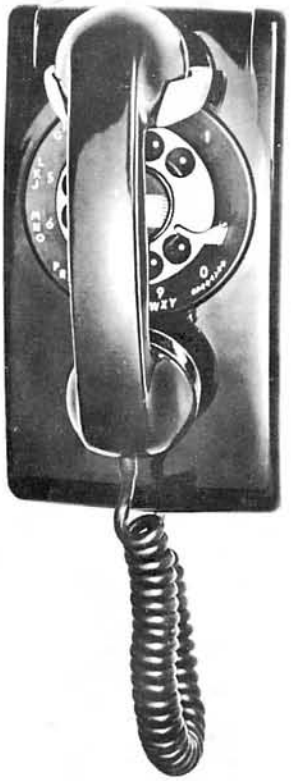
SHOP MAINTENANCE

OF THE

K-500
DESK TELEPHONE

and the

K-554
WALL TELEPHONE



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SHOP MAINTENANCE OF THE

K-500 TYPE DESK TELEPHONE

and the

K-554 TYPE WALL TELEPHONE

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INTRODUCTION

This manual contains instruction for the servicing and repair of the K-500 Type Desk Telephone and the K-554 Type Wall Telephone and provides complete maintenance information related to the major components therein, including the housing assembly, base assembly, cradle switch or hookswitch, dial, ringer and network.

Some of the adjust and test procedures require the use of special test apparatus such as a dial tester, ringer magnetizer, etc. Inquiries regarding recommended equipment to be used in conjunction with these procedures should be directed to the Sales Division of the Kellogg Switchboard and Supply Company.

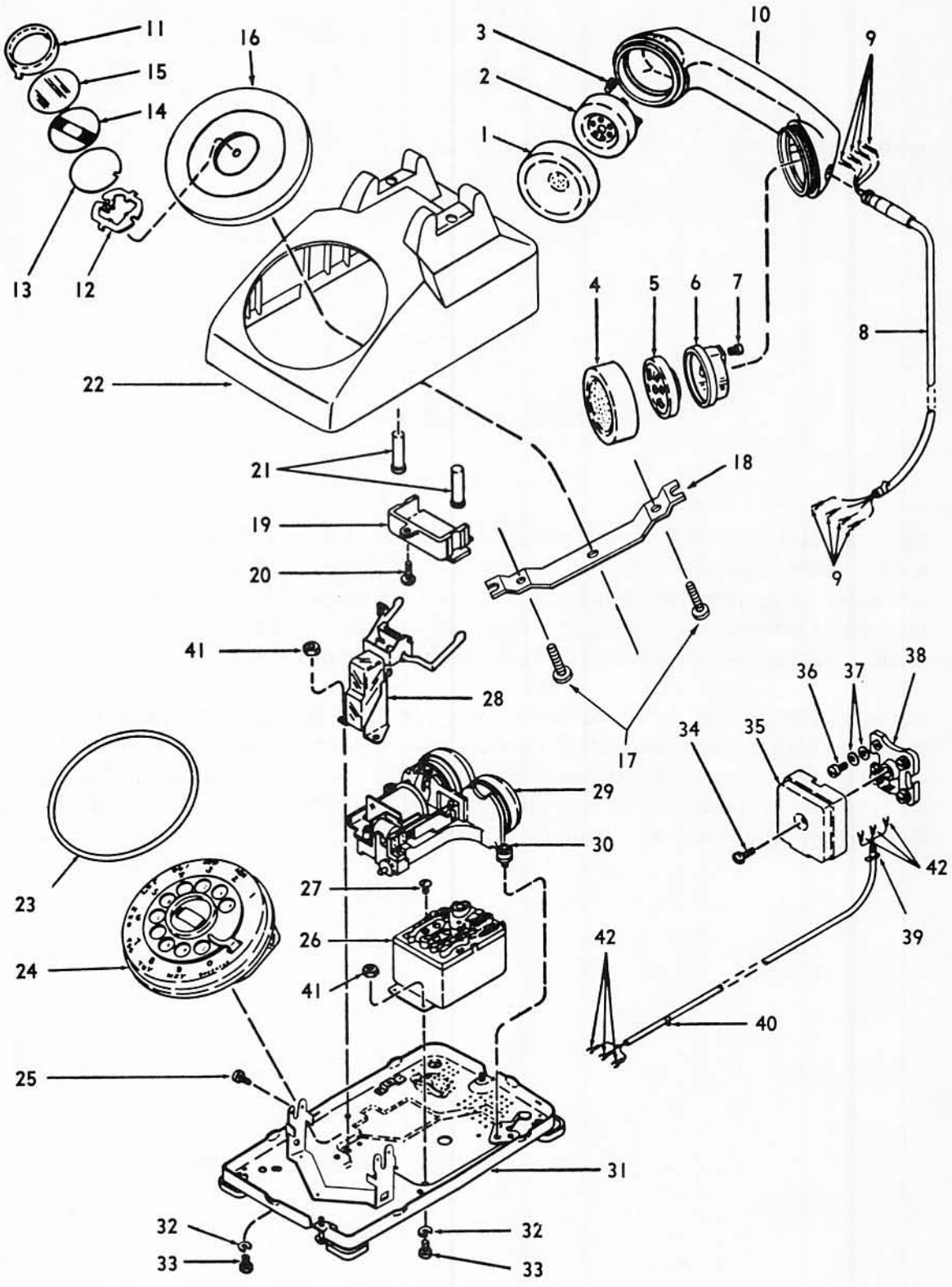


FIGURE 1
K-550 TYPE DESK TELEPHONE - EXPLODED VIEW

TABLE 1

LIST OF REPLACEMENT PARTS

(SEE FIGURE 1)

Index No.	Name of Part	Part Number	Quantity
1	Receiver Cap	75381 (Black Bakelite 79289 (*) (Tenite or Forticel)	1
2	Receiver Unit	75547	1
3	Terminal Screw	75386	2
4	Transmitter Cap	75380 (Black Bakelite) 79290 (*) (Tenite or Forticel)	1
5	Transmitter Unit	75555	1
6	Transmitter Holder	75384	1
7	Terminal Screw	75386	2
8	Handset Cord	3030 ( ) 650 (4 Cond. Blk. Straight Cord) 1005** (07) 650 (4 Cond. Coil Cord)	1
9	Terminal	75325	8
10	Handle	75383 (Black Bakelite) 79250 (*) (Tenite or Forticel)	1
11	Retaining Ring	75412 (Black Telephone Only) 75412-(2) (Colored Manual Telephone Only)	1
12	Retaining Spring	75417	1
13	Protector	75413	1
14	Number Card	75415	1
15	Retaining Disc.	75416	1
16	Dummy Plug	79455 (*)	1
17	R.H. Self Tapping Screw	75407 (4)	2
18	Clamping Plate	79443	1
19	Plunger Retainer	75405 (*) (Desk Telephone Only)	1

Table 1 Cont.

TABLE 1 Cont.
LIST OF REPLACEMENT PARTS

Index No.	Name of Part	Part Number	Quantity
20	R.H.Self Tapping Screw	75407 (2)	1
21	Plungers	75406 (2) (Desk Telephone Only)	2
22	Housing Assembly	75402 (*) (Desk Telephone) 75406 (*) (Wall Telephone)	1
23	Vinyl Gasket	75474 (Black Telephones) 75474 (2) (Colored Tele phones)	1
24	Dial	19**(D) 450 (Numeral Dial) 19**(G) 450 (Metropolitan Dial)	1
25	Mounting Screw	75487 (2)	3
26	Network	75335	1
27	Terminal Screws	75392 (2)	15
28	Cradle Switch Assembly	75300 (Desk Telephone)	1
	Hookswitch Assembly	79399 (Wall Telephone)	1
29	Ringer	130(BA)470 (Biased) 131, E131, 133, E133 (HA, HB, HC1 to 5) 470 (Frequency Selective) -SEE RINGER SECTION-	1
30	Ringer Mounting Screw	75366	2
31	Base Assembly	75338 (Desk Telephone) 79396 (Wall Telephone)	1
32	Spring Washer	54336 (5) (Desk Telephone) (Wall Telephone)	5 6
33	Bind Hd. Mach.Screw	69116 (3) (Desk Telephone) (Wall Telephone)	5 6
34	Cabinet Lock Screw	75545	1
35	Cover	75542 (Metal - Black) 83128 (8) (Plastic)	1
36	Bind Hd. Mach. Screw	75487 (2)	4

TABLE 1 Cont.
LIST OF REPLACEMENT PARTS

Index No.	Name of Part	Part Number	Quantity
37	Washer	75544	8
38	Base Assembly	75540	1
39	Cord Strain Relief	79087	1
40	Cord Clamp Hook	75421	1
41	Hex Nut	67093 (Desk Telephone) (Wall Telephone)	5 6
42	Terminal	75325	6
43	Desk Stand Cord	3031**(06) 650	1

TABLE II
COLOR DESIGNATION

* Color digit designation

Coded Items	Color	Piece Part Suffix
**		(*)
00	Black	1
02	Red	2
04	Yellow	4
05	Green	5
09	Ivory	9
11	Rose Pink	11
12	Aqua Blue	12
13	Light Beige	13
14	Light Gray	14
15	White	15
16	Sea Green	16

TABLE III
CIRCUIT REFERENCE

The following is a quick reference to drawings pertaining to specific telephone bodies, ringers and special features.

Body	Ringer	Special Feature	Drawing No.	Page No.
K500 & 554	BA & Freq.Selec.	None	21531	56
K500 & 554	BA with Gas Tube	None	21535	57
K500 & 554	BA	Push Button	21542	58
K510 & 558	BA	2 Line	21543	59
K554 (K-1A1)	BA	4 Button	21544	60
K564 (K-1A1)	BA	6 Button	21545	61
K502	BA	Exclusion Switch	21548	62
K500 & 554	BA with Gas Tube	Lift-to-talk	21549	63
K500	BA	Dial Light	21550	64
K565 (K-1A1)	BA	6 Button-Exclusion Sw.	21554	66
K500	BA & Freq.Selec.	Lift-to-talk	21551	65
K502	Freq.Selec.	Exclusion Switch	21563	68
K510 & 558	Freq.Selec.	2 Line	21564	69
K500 & 554	All	4 wire ring & talk crt.	21569	70
K575	Freq.Selec.	2 Line & Hold	21571	71
K575	BA	2 Line & Hold	21572	72
K500	Freq.Selec.	Night Light-Dial Light	21574	73
K500	BA	Night Light-Dial Light	21575	74
K554	BA & Freq.Selec.	Lift-to-talk	21576	75
K554	BA with Gas Tube	Lift-to-talk	21577	76

SECTION ONE
HOUSING ASSEMBLY

1. METHOD OF REMOVING HOUSINGS FROM THE TELEPHONE SETS

A. Desk Telephone (Dial and Manual)

Loosen the two cabinet lock screws at each end of the base and lift the housing from the telephone set.

B. Wall Telephone (Dial)

Remove the handset from the hookswitch. Then push the lower portion of the housing in toward the telephone base. With the housing in this position, push up on the catch, pull the lower part of the housing away from the base plate. With one hand depress the hookswitch, and with the other hand guide the housing so that the hookswitch clears the dial opening.

To replace the housing, place the dial opening over the hookswitch, depress the hookswitch, and hook the upper catch of the housing on the hook located on the base until the lower catch engages.

C. Wall Telephone (Manual)

The procedure for removing the housing is the same as that for the dial telephone, with the following exception:
First detach the number card assembly from the dummy plug with a slight downward pressure on the upper edge of the retainer ring. Next remove the dummy plug. (Do not remove the plug mounting bracket.) The housing now can be removed in the same manner as the dial telephone housing.

To replace the housing follow the procedure for the dial telephone, and then replace the dummy plug. Finally, insert the lower tab of the number card assembly into the lower plug slot; and using the end of a pencil, depress the upper tab and snap it into place.

D. Wall Telephone with Turn and Push Key

The procedure for removing this housing is the same as that required for the standard wall telephone. However, when replacing the housing, first align the turn and push key knob with the key hole in the housing, using the fingers of the hand placed under the housing. With the knob partially inserted into the hole provided, press in to engage the lower catch.

11. HOUSING AND PLUNGER ASSEMBLY MAINTENANCE

If the plungers bind or squeak, remove the housing from the base assembly and check the plungers, plunger holes, and the plunger retainer. Check for proper seating of the plunger retainer in the housing. Lubricate the plungers and the plunger holes with Molykote, and if the binding or squeaking continues, replace the plungers.

When either of the plungers is depressed to within 1/8 inch of the handset cradle supports on the housing, the line circuit should be open. When the handset is lifted from the plungers, the contacts should make before the plungers come to a positive stop.

SECTION TWO
TROUBLE SHOOTING

When trouble shooting, use the following data as a guide to facilitate locating and correcting the fault. Listed are the trouble symptoms, probable cause, and the suggested remedy.

TROUBLE SHOOTING CHART

TABLE IV

SYMPTOM	PROBABLE CAUSE	REMEDY
1. Bell does not ring.	a. Wrong ringer.	a. Check code number on ringer against required ringer on service order. Replace with correct ringer or telephone set.
	b. Ringer disconnected or wired wrong.	b. Check ringer connections.
	c. Control wheel in cut-off position.	c. Adjust to ring position.
	d. Open winding in coil assembly.	d. Replace coil assembly, or replace ringer.
	e. Foreign obstruction between magnet or gongs and clapper.	e. Remove obstruction.
	f. No ground (party lines).	f. Consult local Practices.
	g. Open ringing capacitor.	g. Replace network or capacitor.
	h. Ringer connected for silencing.	h. Rewire or adjust for operation.
2. Bell volume too loud.	a. Control wheel in wrong position.	a. Rotate control wheel to lower position.
	b. One or both gongs too loose.	b. Tighten mounting screws.
3. Bell volume too low.	a. Control wheel in wrong position.	a. Rotate control wheel to higher position.
	b. Foreign obstructions or wire between gong and weight on clapper rod.	b. Remove obstruction, or check cording.

SYMPTOM	PROBABLE CAUSE	REMEDY
	c. Telephone set on sound-absorbent material.	c. Relocate on hard surface in conjunction with subscribers wishes or consult local practices.
4. Bell taps while dialing or operating plungers.	a. Incorrect line or ringer connection.	a. Check connections.
	b. Biasing spring wire in low notch of spring wire bracket.	b. Check and adjust to high notch. If bell continues to tap, replace ringer or telephone set. (Biasing spring should be left in low notch position unless it becomes necessary to adjust to remedy dial tap).
5. Bell rings when other party is called. Cross ring or false ring.	a. Incorrect line or ringer connections.	a. Check line and ringer connections.
	b. Ringing frequency source wrong for frequency selective ringer.	b. Check ringer frequency in accordance with local practices.
	c. Frequency selective ringer not tuned to ringer frequency.	c. Replace with correct ringer or replace telephone set.
	d. Wrong capacitor or connection for frequency selective ringer.	d. Check ringer connections or replace with correct capacitor.
6. Bell continually rings when handset is lifted.	a. Open in handset cord, transmitter unit, or dial pulse contacts.	a. Replace handset cord, transmitter unit or dial.
	b. Open in induction coil or equalizer of network assembly.	b. Replace network assembly or telephone set.
	c. Open in telephone set wiring.	c. Replace telephone set.
	d. Line contacts do not close in spring nest assembly of cradle switch assembly.	d. Make sure ears of plastic cover are in notches on mounting frame. If trouble continues, replace cradle switch assembly or telephone set.

SYMPTON	PROBABLE CAUSE	REMEDY
7. Bell rings but no one on line.	a. Open handset cord or receiver unit.	a. Replace handset cord or receiver unit.
	b. Off-normal contacts of dial are closed.	b. Replace dial or telephone set.
	c. Open induction coil or transmission condenser in network assembly.	c. Replace net assembly or telephone set.
	d. Receiver contacts do not open in spring nest assembly of cradle switch assembly.	d. See remedy "d" of 6, above .
8. No dial tone.	a. Open in mounting or handset cord.	a. Replace cord.
	b. Defective receiver unit.	b. Replace receiver unit.
	c. Pulse contacts are open or off-normal contactsof dial are closed.	c. Replace dial or telephone set.
	d. Open induction coil in network assembly.	d. Replace network assembly or telephone set.
	e. Contacts do not open in spring nest assembly of cradle switch assembly.	e. See remedy "d" of 6 above.
9. Cannot break dial tone.	a. Pluse contacts do not open in dial.	a. Replace dial or telephone set.
	b. Dial filter or ringing condenser is short-circuited.	b. Replace network, telephone set, or the external ringing capacitor.
	c. Defective receiver varistor.	c. Replace receiver unit.
10. Loud clicks	a. Off-normal contacts do not close in dial.	a. Replace dial or telephone set.
	b. Loose connection.	b. Check connections.

SYMPTON	PROBABLE CAUSE	REMEDY
11. Cannot hear.	a. Open receiver unit or handset cord.	a. Replace receiver unit or handset cord.
	b. Off-normal contacts do not open in dial.	b. Replace dial or telephone set.
	c. Open induction coil in network assembly.	c. Replace network assembly or telephone set.
	d. Receiver contacts do not open in spring nest assembly of cradle switch assembly	d. See Remedy "d" of 6, above.
12. Other party cannot hear.	a. Open in transmitter unit.	a. Replace transmitter unit.
	b. Handset cord is open or connection loose.	b. Replace handset cord or check connections.
13. High sidetone.	a. Defective sidetone balancing network in network assembly.	a. Replace network assembly or telephone set.
14. Interference from radio transmitter station.	a. Telephone set located close to radio station.	a. Install a .02 mf. suppression condenser (75559) at network terminals as follows: Connect one condenser lead to terminal "F" and the other lead to terminal "L2".

SECTION THREE
CRADLE SWITCH
AND
HOOKSWITCH ASSEMBLIES
SWITCH ASSEMBLY

If lubrication is required, apply Molykote at the junction of the pivot pin with the operating arm and mounting frame.

CAUTION

Do not permit the lubricant
to fall on the contact springs
of the spring nest assembly.

1. SPRING ADJUSTMENT

The alignment of the spring assembly shall be such as to permit the operating and positioning bars to move freely through the springs without binding.

Both contacts of contact spring assemblies "b" and "d" should have a perciptible follow. Contact spring sets (ba) and (gf), with the operating arm depressed, and contact spring sets (ed) and (cb), with the operating arm in the upper position, shall have a contact pressure of 20 to 35 grams.

The contact clearance between open spring sets, in both the operated or the normal position shall measure .020" minimum.

11. SPRING SEQUENCE

When the operating arm is raised the sequence of spring operation shall be as follows:

A. The contacts of springs (b-a) shall "break" and contacts (d-e) shall "make" at approximately the same time (specific sequence of these springs is not required).

B. Contacts (b-c) shall "make" after contacts (d-e) are "made".

C. Then contacts (g-f) shall "break".

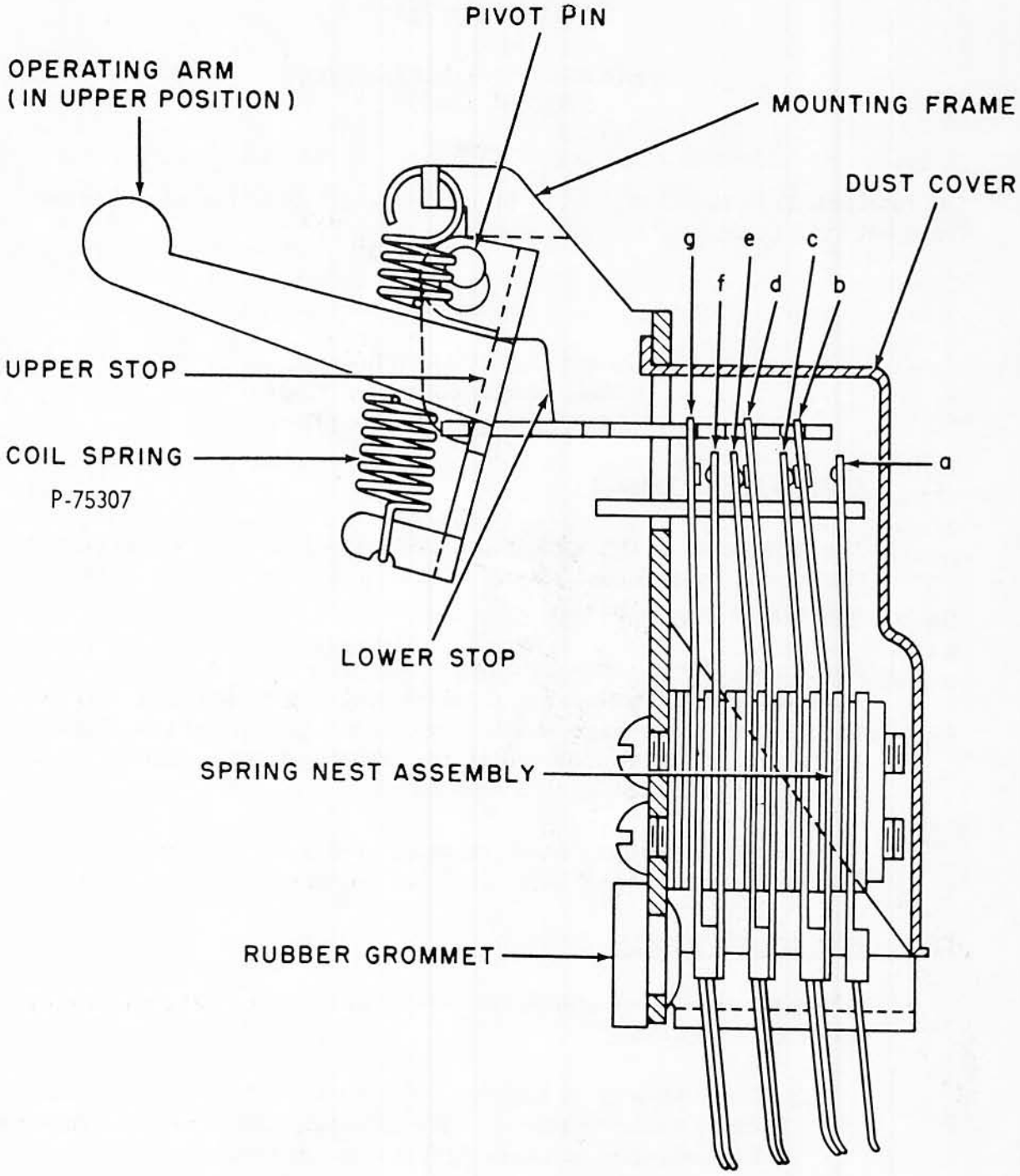


FIGURE 2
CRADLE SWITCH ASSEMBLY

SECTION FOUR
NETWORK ASSEMBLY

The network assembly consists of a terminal board mounted on a can assembly. The top side of the terminal board contains the points at which telephone internal wiring and mounting cord are terminated. A transformer, capacitors, resistors, and varistors are mounted inside the can. These components, which are potted inside the can, provide side-tone balancing, transmission, equalization, and suppression of radio frequency interference.

REMOVAL OF NETWORK FROM TELEPHONE

To remove the network assembly from the telephone set, disconnect and unsolder all conductors at the network assembly. Remove the two nuts, screws, and washers which secure the assembly to the base plate, and lift the network from the telephone set.

Upon replacement, reassemble in the reverse order, referring to Figures 4 and 5, Pages 17 and 18 for cording arrangement, and to the proper wiring diagram located at the end of the manual.

For Circuit Schematic see Figure 3, page 16.

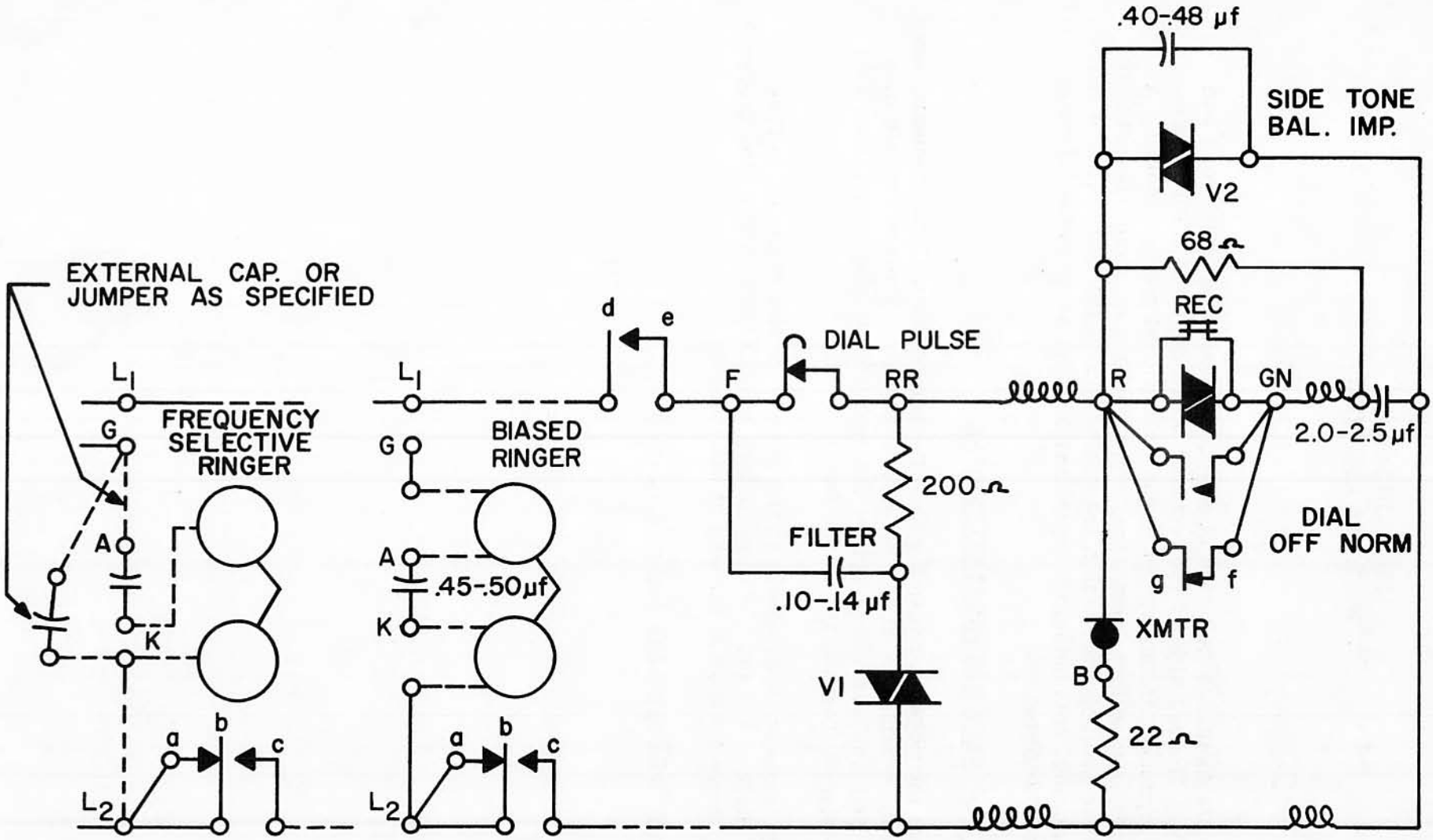
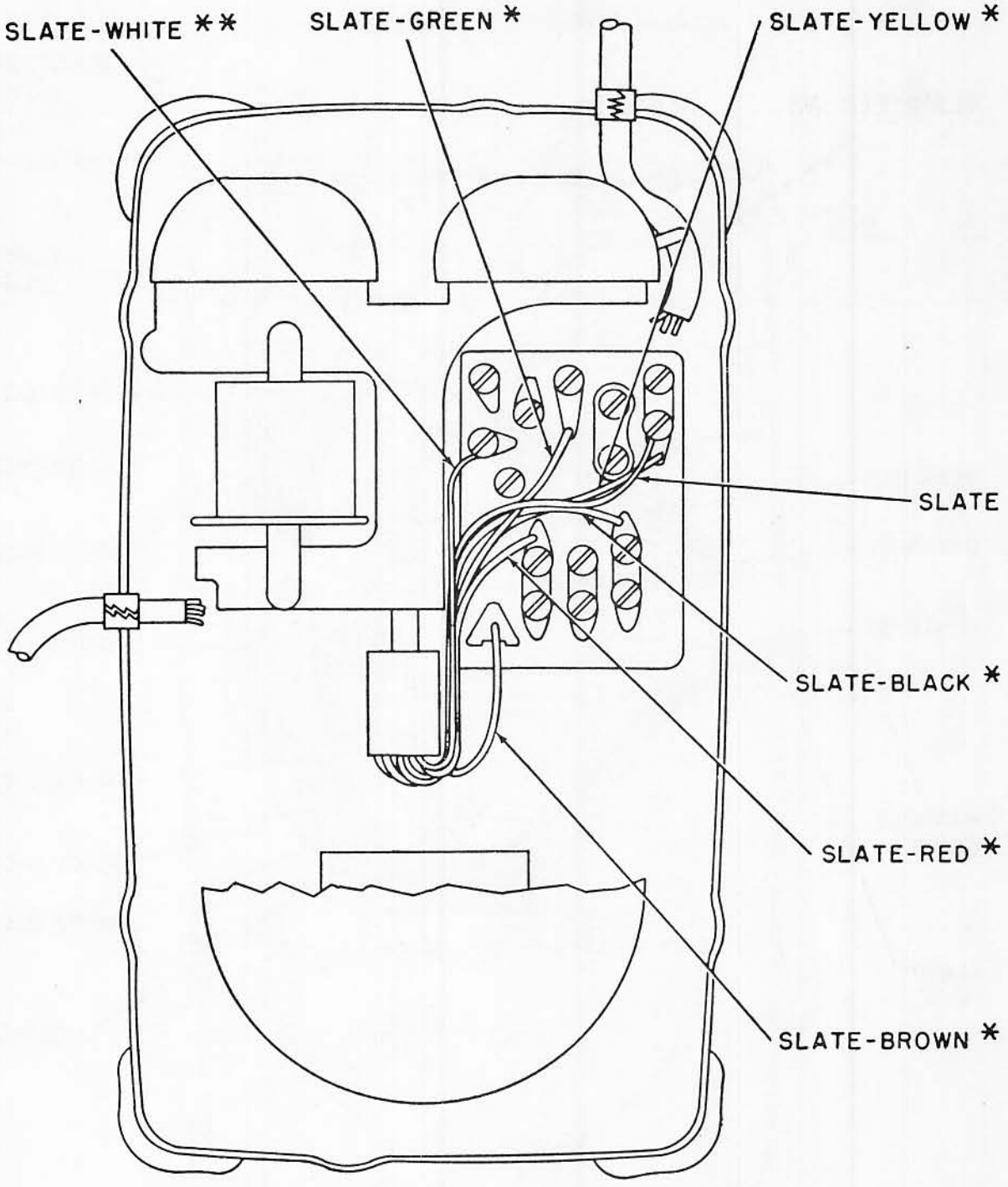


FIGURE 3
CIRCUIT SCHEMATIC

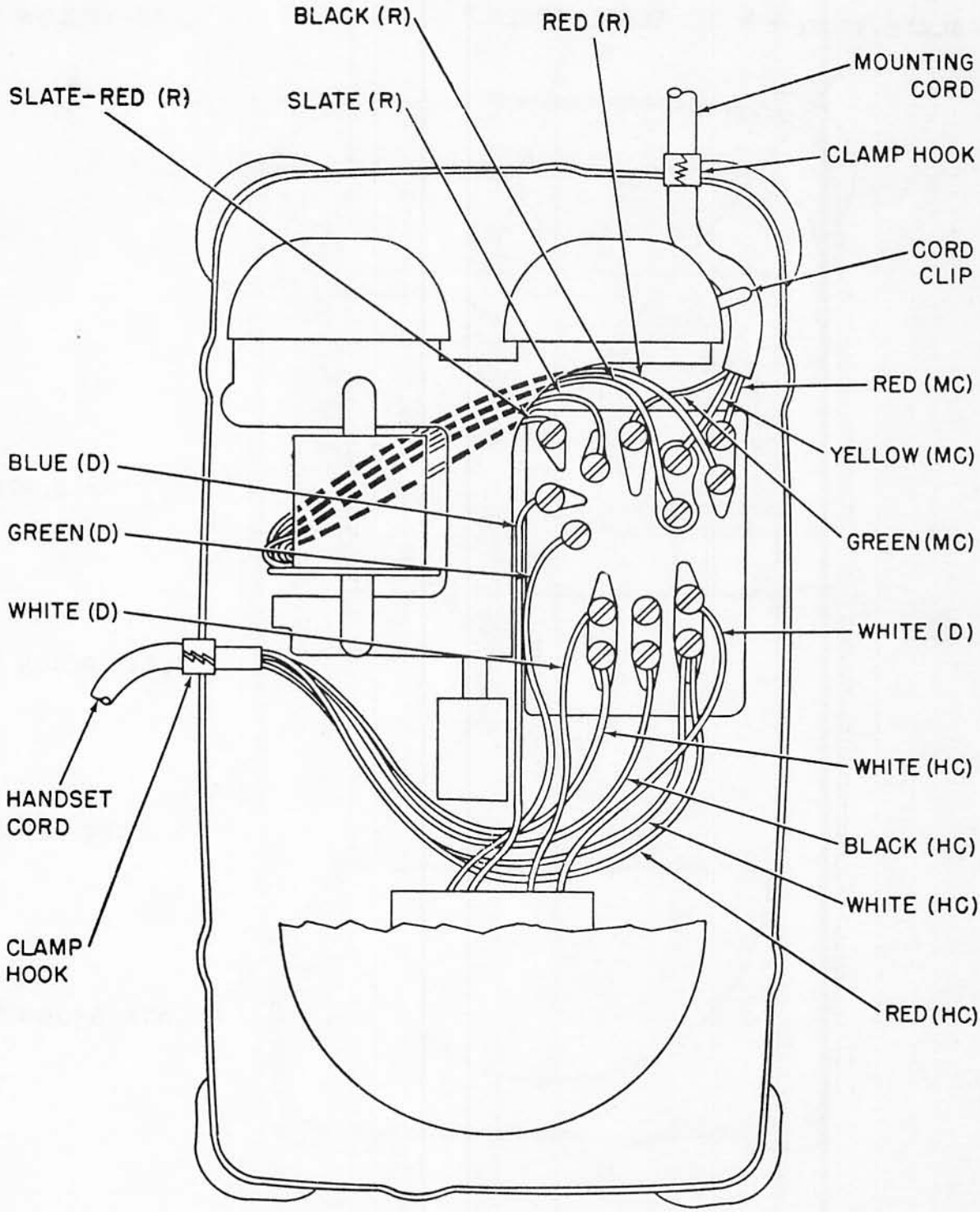


NOTE:

* SOLDERED CONNECTION

** FOR MANUAL SERVICE, TRANSFER SLATE-WHITE LEAD TO TERMINAL "RR"

FIGURE 4
CORDING DIAGRAM FOR CRADLE SWITCH ASSEMBLY



NOTE:

HC- HANDSET CORD
R- RINGER

MC- MOUNTING CORD
D- DIAL

FIGURE 5
CORDING DIAGRAM FOR BIASED RINGER, DIAL, HANDSET AND MOUNTING CORD

SECTION FIVE
DIAL

1. GENERAL DIAL DESCRIPTION

The dial consists of the number card assembly, finger plate, numeral ring, finger stop, and the dust-cover protected gear and contact spring assemblies.

To service the dial remove the housing and loosen the screws which mount the dial to the bracket. Disconnect the dial conductors from the network and lift the dial from the telephone set.

For smooth mechanical performance, remove the dust cover from the dial and lubricate the bearing surfaces of all the gear shafts and the clutch assembly with a light even film of an approved dial lubricant, such as Kellogg Dial Lubricant 79946. Lubricate the gear teeth surfaces of all five gears with one drop on each applied with an artists' brush.

CAUTION

Keep lubricant away from the internal parts of the governor drum; and remove all excess lubricant from any surface, as it tends to collect dust.

II. NARRATIVE OF OPERATION

During the dial windup, the shunt spring actuator is moved away from spring "D" (Figure 9, Page 24) allowing the shunt springs to close. The pulsing springs remain closed since the locking cam is revolved away from the space between the springs, allowing both pulsing springs to follow the eccentricity of the rotating pulsing cam without opening the contacts. When the finger plate is released, the locking cam returns to its original position between springs "A" and "B", thereby causing the pulsing springs to open once for each revolution of the pulsing cam (total number of pulses equal to the digit dialed). Just before the end of the finger plate return, the shunt spring actuator opens the shunt springs.

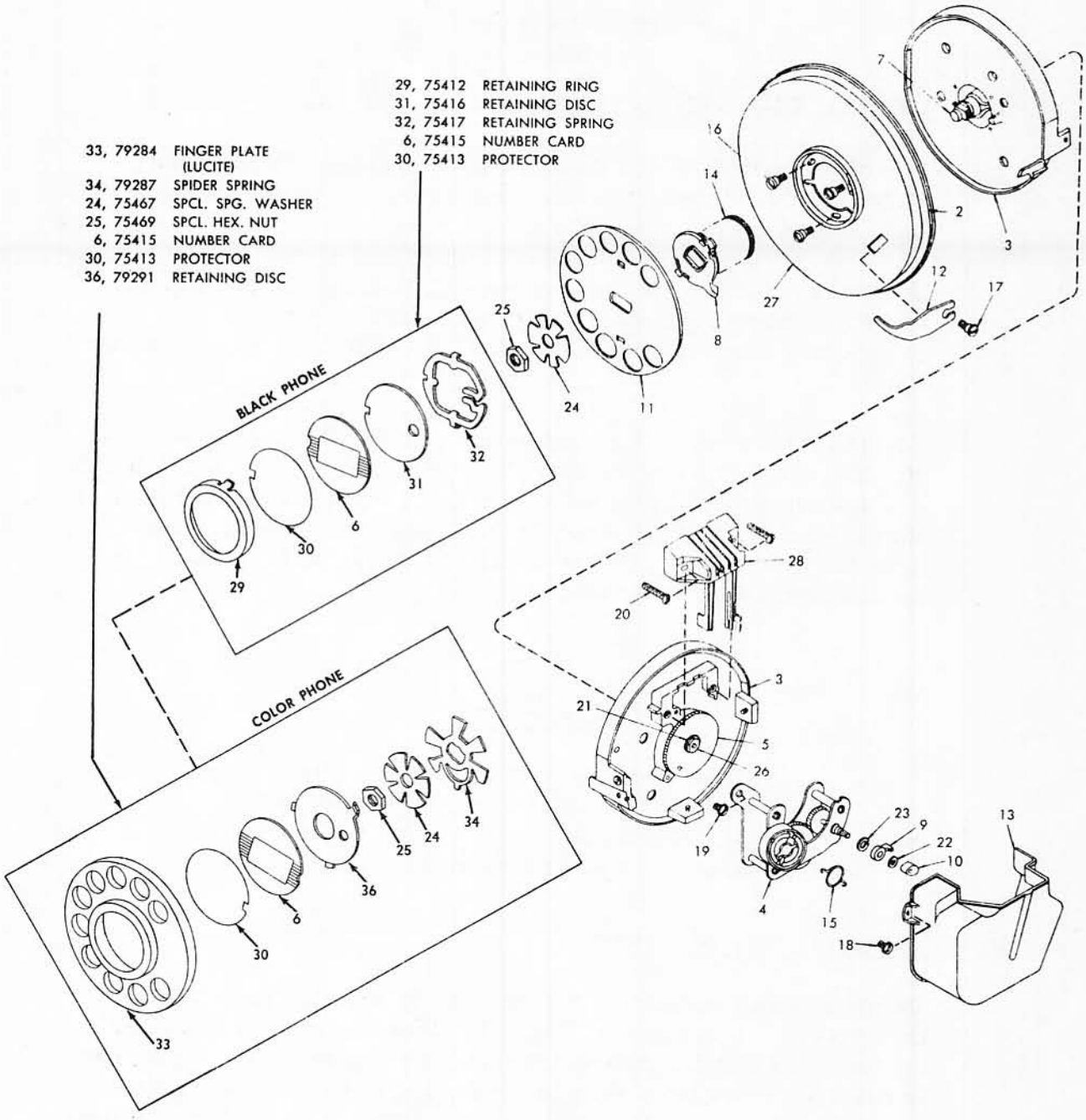


FIGURE 6
19 TYPE DIAL-EXPLODED VIEW

TABLE V
LIST OF REPLACEMENT PARTS
19 TYPE DIAL

Index No.	Name of Part	Part No.	Quantity
1	Dial Mounting Screw	75487 (2)	2
*2	Gasket (Black)	75474	1
3	Base Assembly	75485	1
4	Gear Train Assembly	75479	1
5	Main Gear Assembly	75475	1
6	Number Card	75415	1
7	Main Shaft	75460	1
8	Cam Casting	75449	1
9	Trigger Locking Cam	75452	1
10	Impulse Cam	75451	1
11	Finger Plate (Black)	75465	1
12	Finger Stop	75480	1
13	Dust Cover	75438	1
14	Main Spring	75466	1
15	Governor Spring	75461	1
16	Numeral Plate Screws	75468	3
17	Finger Stop Screw	75481	1
18	Dust Cover Screw	75576 (2)	2
19	Gear Train Screws	75576 (2)	2
20	Spring Assembly Screws	69378	2
21	Washer	60629	1
22	Washer	75453	1
23	Spring Washer	75454	1
24	Special Spring Washer	75467	1
25	Special Hex Nut	75469	1
26	Hex Nut	63986	1
27	Numbral Ring (Metropolitan) (Numerals Only)	75482 (*) 75482 (*)	1 1

Cont.

TABLE V Cont.
LIST OF REPLACEMENT PARTS

Index No.	Name of Part	Part No.	Quantity
28	Spring Assembly	75437	1
29	Retaining Ring	75412	1
30	Protector	75413	1
31	Retaining Disc	75416	1
32	Retaining Spring	75417	1
33	Finger Plate (Lucite)	79284	1
34	Spider Spring	79287	1
35	Retaining Disc	79291	1

* For Black dials with plastic finger plates, the following applies:

a. Replace (1) one 75418 Number Card Assembly with (1) one 80076-3Number Card Assembly.

b. Replace (1) one black 75465 Finger Plate with (1) one 79284 Finger Plate and (1) one 79287 Spider Spring Assembly.

* For colored dials with plastic finger plates, the following applies:

a. Replace (1) one 75474 Gasket with (1) one 75474 (2) Gasket.

b. Replace (1) one 75418 Number Card Assembly with (1) one 80076-3 Number Card Assembly.

c. Replace (1) one black 75465 Finger Plate with (1) one 79284 Finger Plate and (1) one 79287 Spider Spring Assembly.

d. Replace (1) one black Numeral Ring with the colored Numeral Ring required as follows:

METROPOLITAN

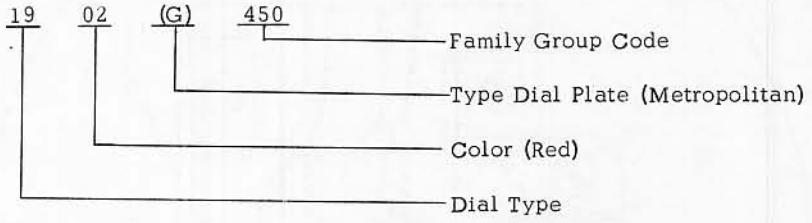
75482 (1) (Black)
75482 (2) (Red)
75482 (3) (Brown)
75482 (4) (Yellow)
75482 (5) (Green)
75482 (6) (Blue)
75482 (7) (Beige)
75482 (8) (Gray)
75482 (9) (Ivory)
75482 (10) (Turquoise)
75482 (11) (Rose Pink)
75482 (12) (Aqua Blue)
75482 (13) (Light Beige)
75482 (14) (Light Gray)
75482 (15) (White)
75482 (16) (Sea Green)

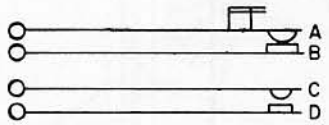
Cont.

NUMERALS ONLY

75482 (21) (Black)
75482 (22) (Red)
75482 (23) (Brown)
75482 (24)(Yellow)
75482 (25) (Green)
75482 (26) (Blue)
75482 (27) (Beige)
75482 (28) (Gray)
75482 (29) (Ivory)
75482 (30) (Turquoise)
75482 (31) (Rose Pink)
75482 (32) (Aqua Blue)
75482 (33) (Light Beige)
75482 (34) (Light Gray)
75482 (35) (White)
75482 (36) (Sea Green)

II DIAL CODING - Figure 7



Code No.	Spring Arrangement	Dial Plate Type	Remarks
19**(D)450		D	Numeral Dial
19**(G)450		G	Metropolitan Dial
1900 (1G) 450		G	Black Metropolitan Dial with lucite finger plate. Used on 500000 (BA) 11D Dial light Telephone.

COLOR CODING - Figure 8

Color Code	Colors Available	Color Code	Colors Available
**			
00	Black	09	Ivory
02	Red	10	Turquoise
03	Brown	11	Rose Pink
04	Yellow	12	Aqua Blue
05	Green	13	Light Beige
06	Blue	14	Light Gray
07	Beige	15	White
08	Gray	16	Sea Green

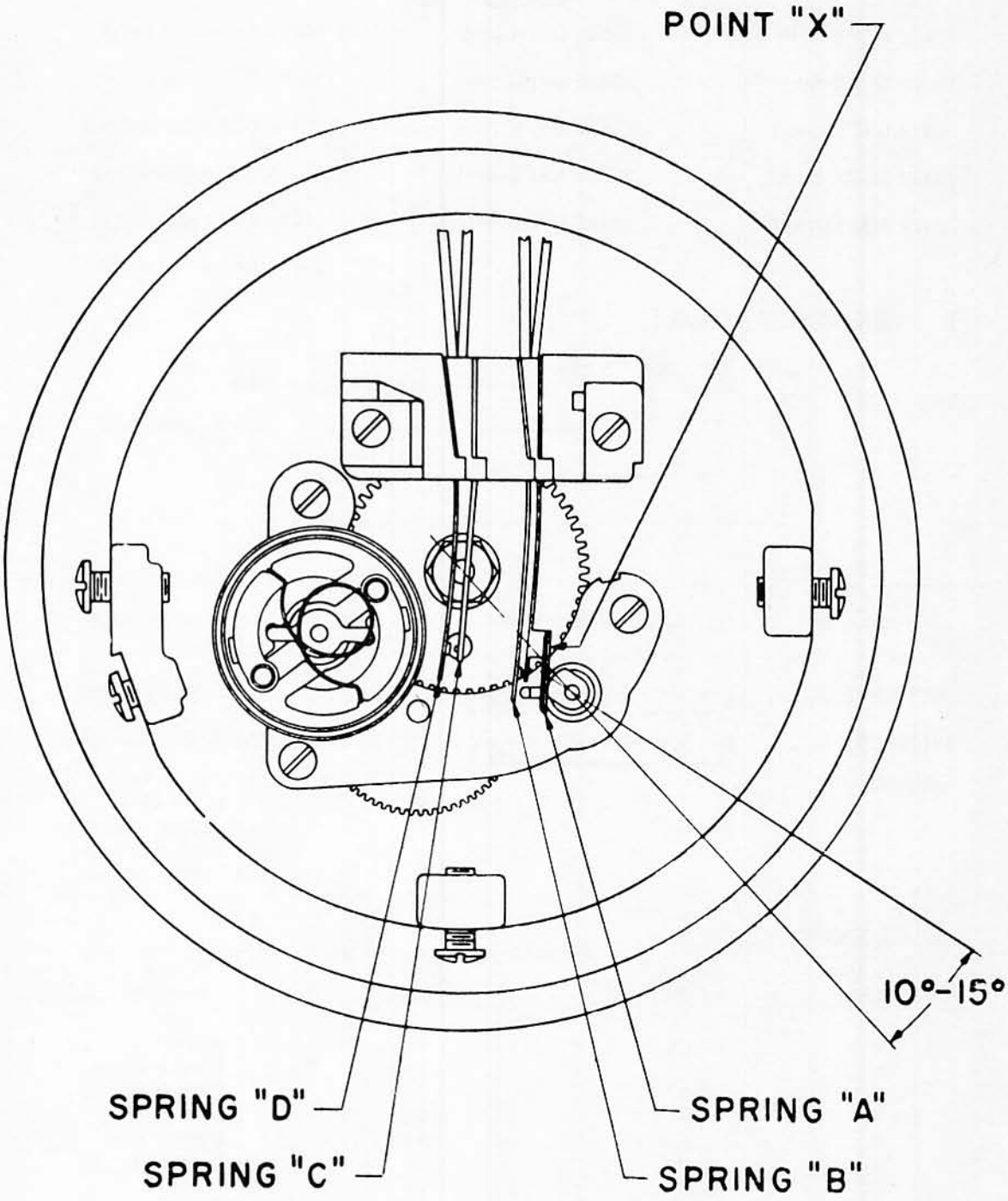


FIGURE 9
CONTACT SPRING ARRANGEMENT-19 TYPE DIAL

III. DIAL ADJUSTMENTS

A. Contact Spring Adjustments

1. Shunt Springs

The contact separation between the shunt springs in the normal dial position should be 0.015" minimum. In the operated position, adjust the contact pressure to a minimum of 20 grams.

2. Pulsing Springs

All contact spring adjustments, except the percent make adjustment, shall be made at the base of the springs. The contact pressure of the adjusted pulsing springs shall be 15 to 20 grams. With spring "B" held open manually, and with the dial in the normal position, spring "A" shall rest against the impulse cam with a force of 10 to 15 grams.

The position of the cam riding surface of the pulsing spring "A" determines the percentage make and break of the dial pulsed. These can be adjusted with a spring adjusting tool by bending at point "X". Bending this surface away from the impulse increases the pulse "break" time and vice versa.

B. Gear Train

The Gear Train Assembly is mounted to the dial base by two screws through enlarged holes in the bottom gear train bracket. These enlarged holes permit adjustment of the drive pinion with the main gear. Adjust for minimum gear noise. Check for a binding condition by slowly winding and unwinding the finger plate. If binding exists, gradually decrease the amount of mesh until the binding is eliminated. Tighten the gear mounting train screws securely.

C. Dial Speed

The dial speed is controlled by the "end to end" tension of the spring which straddles the governor weights. To increase the dial speed, increase the spring "end to end" tension, and to decrease the dial speed, decrease the

spring "end to end" tension. A pair of tweezers with jaws approximately 3/32" wide can be used for this purpose. This adjustment should be performed in a manner which will keep the spring in a plane parallel to the bottom of the governor drum. First, over-tension the spring, and then approach the desired dial speed by progressively taking the tension out of the spring.

1. For normal applications, dials which meet the following requirements need no readjustment.

Speed	%Break
9-11 P.P.S.	61.5± 4

2. When dials fall outside the above limits, they should be readjusted to the requirements below.

Speed	%Break
9.5 -10.5 P.P.S.	62± 2

3. In cases where the total circuit resistance exceeds 1000 ohms, dials which meet the requirements below need no adjustment.

Speed	%Break
9.5-10.5 P.P.S.	62 + 2 - 4

4. When dials for circuits exceeding 1000 ohms fall outside the limits of Par.3 above, they should be readjusted to meet the requirements of Par. 2.

In view of variances in trunk characteristics and system requirements, no single per cent break value can be considered as optimum.

In exceptional cases, where such may deviate radically from the above values, special adjustments may be required.

In general, the various dial pulse receivers, such as step-by-step selectors, dialing relays, and counters have capabilities broader than the requirements for the dial which provide a margin for satisfactory service.

IV. DISASSEMBLY OF DIAL FOR PART REPLACEMENT: (Refer to Fig.6 , Page 20 for Exploded View of the 19 Type Dial.)

A. Metal Number Card Assembly. (See Figure 1 0, Page 29 for Lucite Finger Plate and Number Card Assembly Replacement.)

Press the upper edge of the retaining ring toward the center of the dial and pull out to remove the number card assembly. To remove the retaining spring (32), retaining disc (31), number card (6), and protector (30), squeeze the finger tabs on the retaining spring together and lift out. Reassemble the parts to the retaining ring in the reverse order, aligning the notch in each with the tab on the ring. Replace the number card assembly on the dial by first inserting the lower tab of the retaining ring into the lower slot of the finger plate. Then press down on the upper tab (use the end of a pencil) and snap the assembly into place.

B. Main Spring (14).

Remove the number card assembly. Unscrew the hex nut (25) and remove spring washer (24), finger plate (11), and the cam and spring (8) and (14). Remove the spring from the cam by twisting to relieve tension. To reassemble, place the short formed end of the main spring into the retaining hole of the cam and loop one turn of the spring over the two cam projections. Then seat the other end of the spring into the slot in the dial base and pretension it two full turns in a clockwise direction before resetting the cam on the main shaft. Reassemble the remaining parts in the reverse order.

C. Numeral Ring (27).

Remove the main spring as above. Loosen the finger stop screw (17) and detach the finger stop (12). Unscrew the mounting screws (16) and remove the numeral ring. Upon replacement, reassemble in the reverse order.

D. Spring Assembly (28).

Unscrew the two dust cover mounting screws (18) and remove the dust cover (13). Then unscrew the two spring assembly mounting screws (20) and detach the spring assembly. Reassemble in the reverse order. But before tightening the spring assembly mounting screws, set the cam

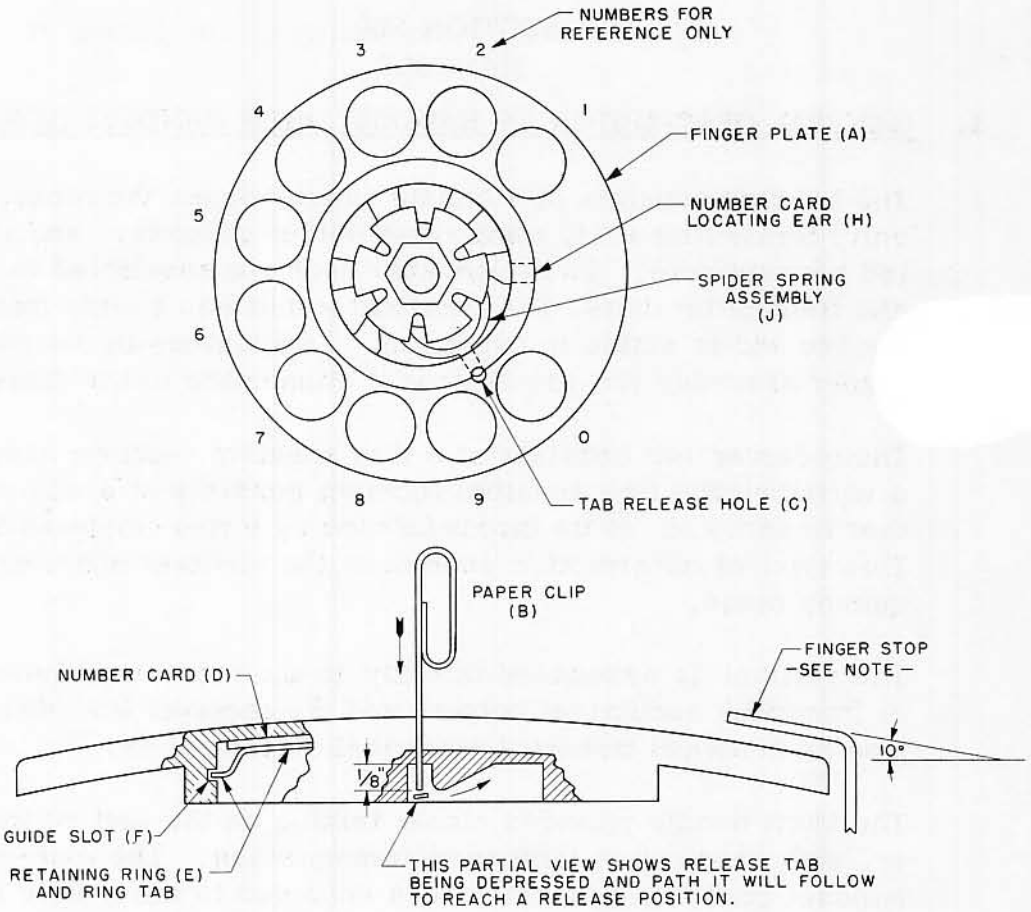
riding surface of the pulsing spring on the side of the pulsing cam.

E. Gear Train Assembly (4).

Remove the dust cover (13) and the spring assembly (28). Unscrew the two gear train mounting screws (19). Loosen the main gear mounting nut (26) and raise the main gear (5) enough to allow the gear train assembly to clear the mounting bosses. Locking cam (9) and impulse cam (10) can be removed with a slight upward pressure beneath the cams. When replacing the cams and the gear train, set the impulse cam so that its normal position is as shown in Figure 9, Page 24. Be sure to tighten the main gear mounting nut before replacing the mounting screws.

F. Main Shaft (7).

Remove the finger plate and the main spring, the dust cover, the spring assembly, the gear train, and the main gear. Then slide the main shaft out the front side of the dial. Upon replacement, reassemble in the reverse order. Replace the main gear in the position shown in Figure 9.



NUMBER CARD ASSEMBLY INSTRUCTIONS

A. REMOVAL OF FINGER PLATE

REVOLVE THE FINGER PLATE (A) IN A CLOCKWISE DIRECTION AS FAR AS IT WILL GO. THEN INSERT ONE END OF AN OPENED PAPER CLIP (B) INTO THE TAB RELEASE HOLE (C) AND DEPRESS THE TAB APPROXIMATELY 1/8". WITH THE LOCKING TAB DEPRESSED, CONTINUE TO TURN THE FINGER PLATE IN A CLOCKWISE DIRECTION UNTIL A SECOND STOP IS REACHED. REMOVE THE PAPER CLIP (B) AND LIFT THE FINGER PLATE FROM THE DIAL.

B. REMOVAL OF NUMBER CARD

TO REMOVE THE NUMBER CARD, THE FINGER PLATE MUST FIRST BE REMOVED AS OUTLINED UNDER "A". THEN TURN THE FINGER PLATE ASSEMBLY OVER, AND REVOLVE THE RETAINING RING (E) UNTIL THE THREE TABS OF THE RING ARE CLEAR OF THE GUIDE SLOTS (F). THEN SIMPLY LIFT THE RING (E) AND CARD (D) OUT OF THE FINGER PLATE.

C. ASSEMBLY OF NUMBER CARD AND RETAINING RING

PLACE THE NUMBER CARD (D) IN THE FINGER PLATE (A). NOTE THAT THE NOTCH OF CARD FITS INTO A LOCATING EAR (H) OF THE FINGER PLATE. THEN PLACE THE RING TABS (E) IN THE GUIDE SLOTS (F) OF THE FINGER PLATE (A) & TURN UNTIL THE RING (E) IS PROPERLY SEATED.

D. ASSEMBLY OF FINGER PLATE

PLACE THE FINGER PLATE (A) SQUARELY OVER THE SPIDER SPRING ASSEMBLY (J) ON THE DIAL WITH THE NO. 10 HOLE OF THE FINGER PLATE (A) DIRECTLY OVER THE CENTER OF THE NO. 9 DOT ON THE NUMERAL RING. TURN THE FINGER PLATE (A) FIRMLY IN A COUNTER-CLOCKWISE DIRECTION UNTIL THE FINGER PLATE (A) LOCKS IN PLACE.

NOTE: WHEN REPLACING FLAT FINGER PLATE WITH CURVED TOP FINGER PLATE, BEND FINGER STOP APPROXIMATELY 10° AS SHOWN, OR REPLACE WITH BENT UP FINGER STOP.

FIGURE 10
LUCITE FINGER PLATE AND NUMBER CARD ASSEMBLY INSTRUCTIONS

SECTION SIX
HANDSET

I. GENERAL DESCRIPTION OF HANDSET WITH HANDSET CORD

The handset consists of a handle which houses the receiver unit, transmitter unit, transmitter holder assembly, and the assembled handset cord. Two removable caps are assembled to the receiver and transmitter units. The transmitter unit has a wide frequency response and is stable in operation. Two springs in the transmitter holder assembly provide electrical connection to the transmitter.

The receiver unit consists of a ring armature receiver assembly and a varistor. The ring armature receiver consists of a domed diaphragm that is actuated at its circumference by a ring-shaped armature. This type of construction increases the receiver efficiency and frequency range.

The varistor is assembled directly to the receiver to protect the user from peak acoustical outputs and the receiver from demagnetization by abnormal transient electrical disturbances.

The short handle provides closer talking on the part of the subscriber, with consequent increased transmission. The four-conductor handset cord has a jacket that is anchored to the handle by a cord strain relief. At the base end of the cord, a clamp hook anchors the card to the base plate.

II. REMOVAL AND DISASSEMBLY FOR REPLACEMENT

A. To remove the Receiver Unit, turn the receiver cap (1) in a counter-clockwise direction. Carefully tilt the handle (10) until the receiver unit (2) slides out. Loosen the two terminal screws (3) of the receiver unit to disconnect the two terminals (9) of the Handset Cord. Upon replacement, reassemble in the reverse order.

B. To remove the Transmitter Unit turn the transmitter cap in a counter-clockwise direction. Carefully tilt the handle (10) until the transmitter unit slides out. Upon replacement, reassemble in the reverse order.

C. To remove the Transmitter Holder Assembly, remove the transmitter unit. Lift the transmitter holder assembly out of the handle (10). Disconnect the transmitter holder assembly from the two terminals (9) of the Handset Cord, by loosening the two terminal screws. Upon replacement, reassemble in the reverse order. When replacing the transmitter holder assembly in the handle (10), be sure to align the key on the rim of the assembly with the key slot in the handle.

D. To remove the handset cord, perform the disassembly procedures as explained in paragraphs A through C above. Then, with thumb and forefinger, free the cord strain relief from the anchor post at the bottom of the handle (transmitter end). Perform this operation carefully to avoid damaging the cord strain relief or anchor post. Do not use longnose pliers or a screwdriver. After freeing the cord strain relief, carefully pull the cord through the hole at the transmitter end of the handle (10). Be careful not to damage the two receiver terminals as they are pulled through the core of the handle.

To remove the handset cord from the base, remove the base assembly from the housing-plunger assembly by loosening the two cabinet lock screws at each end of the base plate. Release the cord clamp hook from the anchor hole in the rim of the base plate. Disconnect the four terminals from the network assembly by loosening the four terminal screws. Carefully pull the conductors through the space between the cradle switch assembly and the dial. Upon replacement, reassemble in the reverse order. When replacing the handset cord at the handset, pull the receiver terminals through the core of the handle.

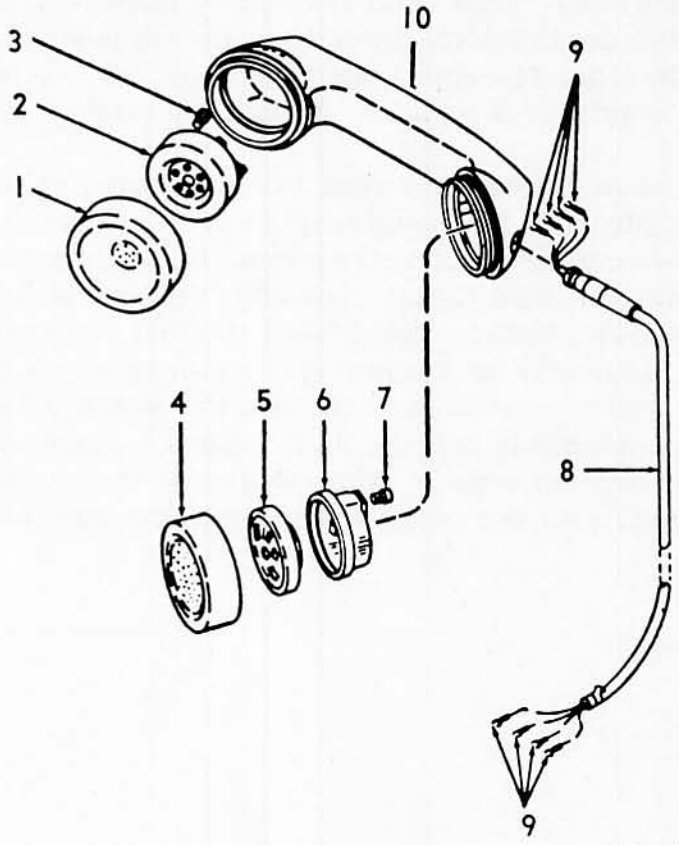


FIGURE 11
HANDSET-EXPLODED VIEW

TABLE VI
LIST OF REPLACEMENT PARTS
6500 (C) 410 Handset (Black Straight Cord)
and
65** (C2) 410 Handset (Colored Coiled Cord)

Index No.	Name of Part	Part Number	Quantity
1	Receiver Cap	75381 (Black Bakelite) 79289 (*) (Tenite or Forticel)	1
2	Receiver Unit	75547	1
3	Terminal Screw	75386	2
4	Transmitter Cap	75380 (Black Bakelite) 79290 (*)(Tenite or Forticel)	1
5	Transmitter Unit	75555	1
6	Transmitter Holder	75384	1
7	Terminal Screw	75386	2
8	Handset Cord	3030()650 (4-cond.black, straight) 1005**(07)650 (4-cond. coiled Cord)	1
9	Terminal	75325	8
10	Handle	75383 (Black Bakelite) 79250 (*) (Tenite or Forticel)	1

* Denotes color digit designation.

COLOR DESIGNATION

Coded Items	Color	Piece Part Suffix
**		(*)
01	Black	1
02	Red	2
03	Brown	3
04	Yellow	4
05	Green	5
06	Blue	6
07	Beige	7
08	Gray	8
09	Ivory	9
10	Turquoise	10
11	Rose Pink	11
12	Aqua Blue	12
13	Light Beige	13
14	Light Gray	14
15	White	15
16	Sea Green	16

SECTION SEVEN
RINGER

1. GENERAL RINGER DESCRIPTION

A. High Impedance Ringers

The ringer used in the Code 500 telephone is a single coil design with a high impedance, allowing more ringers to be placed on a line with no increase in bridging loss, nor increase of unbalance on divided ringing circuits, With volume control, the subscriber may adjust the sound output over a range of approximately 4db with the highest value of about 2db above previous ringers. The two gongs have harmonically related frequencies whose fundamentals are reinforced by resonant air chambers below the gongs, which equals about 15 db gain in sound output.

The magnetic circuits include a laminated coil core, pole pieces, armature, permanent magnet and magnetic shunt. These provide adequate sensitivity to ringing signals and low sensitivity to transients or other operating surges. The structure design includes the magnetic circuit saturation feature, to limit the effects of high surge currents which might otherwise weaken the permanent magnet.

1. Biased Ringer

The Code 130(BA)470 ringer consists of a coil with a laminated core, magnetic circuit assembly (or support pole piece assembly), a permanent magnet, clapper assembly, and two brass gongs and their resonators. The entire assembly is mounted on a frame which is secured to the base plate by two removable screws. The clapper assembly consists of an adjustable spring wire, a damper rod, and a rod and weight that strikes the two gongs. An adjustable control wheel extends through the base plate. When the control wheel is rotated, the distance between the gongs and clapper weight is varied, permitting adjustment of the ringer volume. In addition, a detent spring, mounted on the same shaft with the wheel, provides controlled adjustment of the volume level. However, a stop on the detent spring prevents reducing the volume below a minimum level. The stop may be disabled to provide ringer cutoff service. For bias adjustment, the bias spring on the clapper assembly can be shifted to a high or low position. Normally the spring is in the low position.

2. Frequency Selective Ringers

Frequency selective ringers may be installed to provide frequency selective ringing service. The frequency selective ringer consists of a coil with a laminated core which is mounted on a core-slide assembly, a shunt bar, magnet, armature, clapper assembly, reed and two brass gongs and their resonators. The entire assembly is mounted on a frame which is secured to the base plate by two removable screws. Ringer gaps, if necessary, may be controled by means of an adjustment screw.

3. The ringer may be supplied with or without a volume control. (See Tables IX and X, Pages 43 and 44.)

B. Ringing Services

The Code 500 type telephone is an anti-sidetone set that may be used for all classes of common battery manual or dial subscribers' services. Since the types and methods of ringing are variable in common battery systems, facilities are provided in the telephone set for the following ringing services:

1. Biased Ringers (non-polarized)

   a. Individual lines.
   b. Two-party selective divided lines.
   c. Two-party selective message rate lines.
   d. Two-party selective automatic ticketing lines.
   e. Four-party semi-selective divided lines.
   f. Code ringing non-selective bridge or divided party lines.

2. Frequency Selective Ringers

   a. One to five selective bridged party lines.
   b. One to ten selective divided party lines.
   c. Six to ten semi-selective bridged party lines.
   d. Eleven to twenty semi-selective divided party lines.

C. Ringer Connections

The connections at the connecting block and terminal board of the network assembly will depend upon the type of ringing (biased or frequency selective) and ringing

service. Circuit labels, pages 56 - 76, as listed in Table III, page 6 [Code 130 (BA) 470 Biased Ringers], [Codes 131, E131, 133 and E133 type Frequency Selective Ringers], specify ringer connections and ringing service information for specific telephones.

III. MAINTENANCE

A. Ringer Removal

Remove the housing from the base assembly. To remove the ringer from the base assembly, first disconnect the coil conductors from the terminals on the network. Unscrew the two screws which fasten the ringer to the base, and lift the ringer until the control assembly clears the indentation in the base plate. Pull the ringer forward and up from the base, disengaging the locating pin on the frame assembly from the rubber grommet in the cradle switch assembly. Upon replacement, reassemble in the reverse order.

B. Disassembly for Piece Part Replacement

1. Biased Ringer [Code 130(BA) 470](See Fig.12, Page 38.)

CAUTION

It is necessary to remagnetize and artifically age the magnet to an optimum operating value and to readjust bias tension after disassembly of either the support pole piece assembly, the magnet, the clapper assembly, or the frame assembly.

a. Coil Assembly and Core Laminations (1 and 3)

Remove the two screws which fasten the coil assembly to the support pole piece assembly (4), and lift the coil from the ringer. Next slide the laminations out from the coil. Upon replacement, reassemble in the reverse order.

b. Clapper Assembly (6).

Remove the screw (9) from the clapper assembly (6). Pull the clapper assembly back to

disengage the biasing spring wire from the spring wire bracket, and lift the clapper assembly from the ringer. Upon replacement, engage the biasing spring wire in the wire bracket before securing the assembly to the ringer. See CAUTION note above.

c. Support Pole Piece Assembly (4).

Remove the coil and lamination assembly and the clapper assembly. Then lift the support pole piece assembly from the ringer frame. Reassemble in the reverse order. See CAUTION note above.

d. Magnet (5).

Remove the coil and lamination assembly, the clapper assembly, and support pole piece assembly. Slide the magnet out of the holder in the frame. Upon replacement, reassemble in the reverse order. See CAUTION note above.

e. Gongs (7 and 8).

Remove the lockwasher screws (9) from each gong and remove the gongs. Do not attempt to disassemble the resonators. Upon replacement, place gong "A" on the right and gong "B" on the left (facing the gong end of the ringer).

f. Frame Assembly (10).

Remove the coil and lamination assembly, the clapper assembly, support pole piece assembly, magnet, and gong. Do not attempt to remove the Control Wheel, the Detent Spring, and the two Resonators. Reassemble parts in the reverse order. See CAUTION note above.

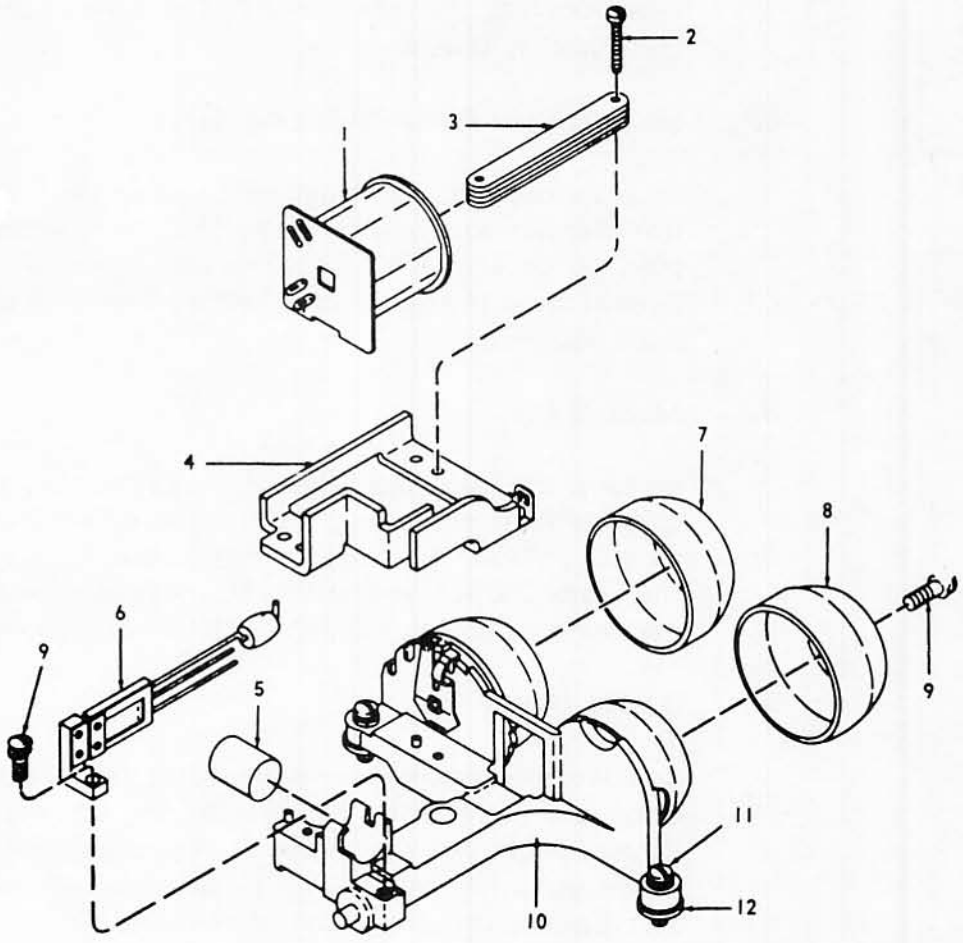


FIGURE 12
CODE 130 BA RINGER-EXPLODED VIEW

TABLE VII

LIST OF REPLACEMENT PARTS

FOR

CODE 130(BA) 470 RINGER
(See Figure 12)

INDEX NO.	NAME OF PART	PART NO.	QUANTITY
1	Coil Assembly	75422	1
2	Flat.Fil.Hd.Machine Screw	75409(2)	2
3	Core Lamination	75395	1
4	Support Pole Piece Assem.	75398	1
5	Magnet	75369	1
6	Clapper Assembly	75393	1
7	Gong (Movable) (A)	75396	1
8	Gong (Fixed) (B)	75397	1
9	RH Lockwasher Screw	75408(2)	3
10	Frame Assembly	75388	1
11	Mounting Screw Assembly	75366	1
12	Rubber Foot	75371	1

2. Frequency Selective Ringer

CAUTION

It is necessary to remagnetize the magnet after disassembly of the armature, the magnet, or the shunt bar.

a. Coil Assembly (15).

Remove the screw (20) and washer (26), which fasten the slide plate (6) to the ringer frame. Loosen the two screws (20) which fasten the shunt bar (10) to the ringer frame so that the slide plate with the coil assembly can be lifted clear of the eccentric stud (22). Slide the assembly away from the shunt bar and lift free. Now slide the coil assembly free of the laminations. Upon replacement, reassemble in the reverse order.

b. Shunt Bar (10) and Magnet (7).

Remove the two screws (20) which mount the shunt bar to the frame, and the two screws (21) which mount the magnet clamping plate (8). Lift the shunt bar and the magnet free of the ringer. Upon replacement, place the unfinished face of the magnet against the magnet clamping plate. See CAUTION note above.

c. Armature and Weight Assembly (14).

Remove the two screws (18) and lift the armature assembly free of the ringer. See CAUTION note above.

d. Mounting Frame (5).

Remove the coil, slide plate, and lamination assembly, eccentric stud, shunt bar, magnet, and armature assembly. Remove the control wheel mounting screws (19), and detach the gong and resonator assemblies, and the control spring assembly (when furnished). Upon replacement, reassemble in reverse order. See CAUTION note above.

(See Figure 13 Page 41)

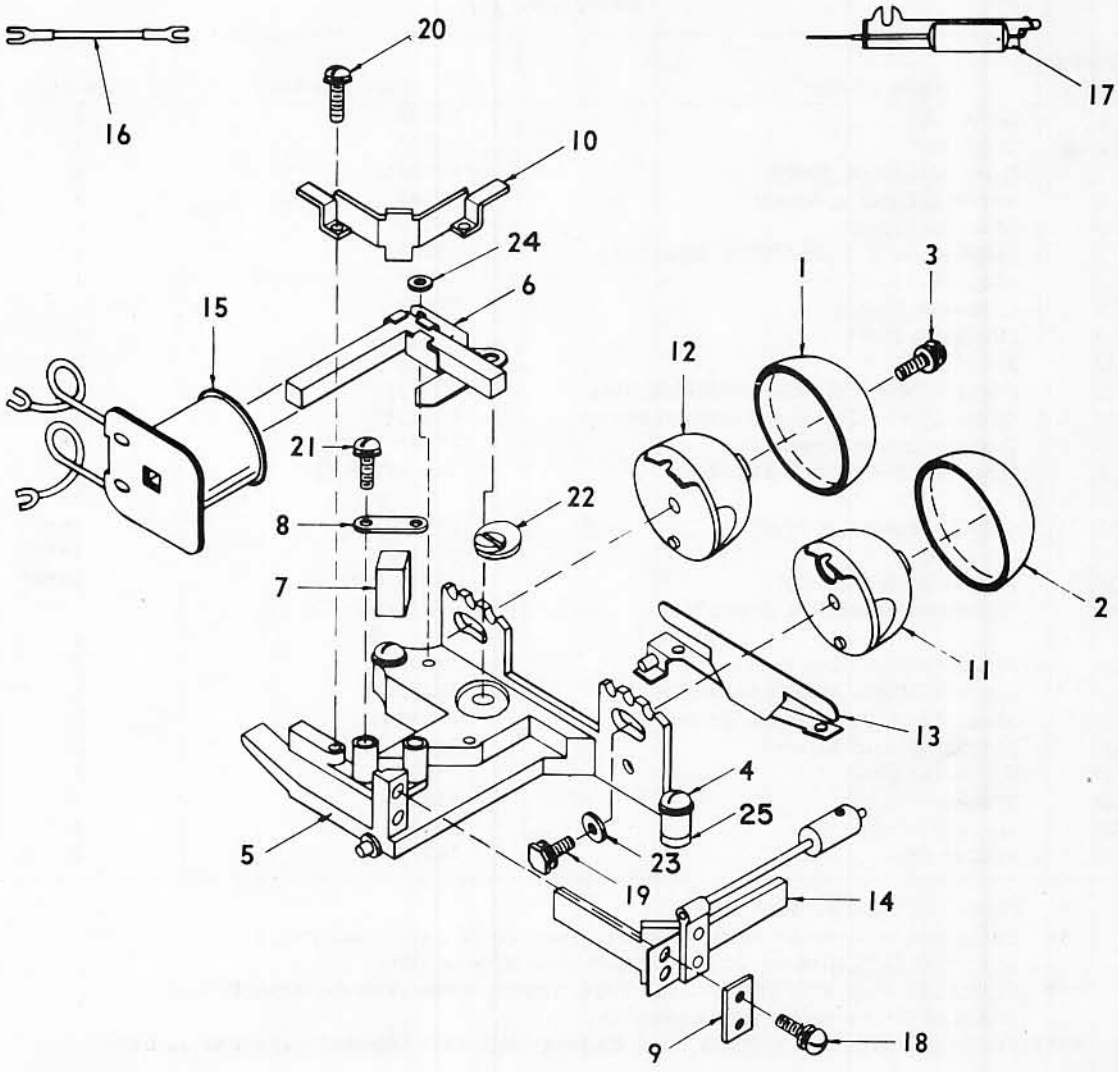


FIGURE 13
CODES 131 & 133 RINGERS-EXPLODED VIEW

TABLE VIII
LIST OF REPLACEMENT PARTS FOR
CODES 131 AND 133 TYPE RINGERS
(See Figure 13)

Index No.	Name of Part	Part Number	Quantity
1	Gong "A"	75396	1
2	Gong "B"	75397	1
3	Gong Mounting Screw	75408(2)	2
4	Ringer Mounting Screw	75366	2
5	Mounting Frame	75577	1
6	Slide Plate & Lamination Assembly	75578	1
7	Magnet	75562	1
8	Clamping Plate	75563	1
9	Clamping Plate	75564	1
10	Shunt Bar	75566	1
11	Control Wheel & Resonator Assembly	75581(1)	1
12	Control Wheel & Resonator Assembly	75581(2)	1
13	Damper Spring Assembly	75580	1*
14	Armature & Weight Assembly	See Table IX X	1
15	Coil Assembly 1700 Ω	75582	1**
		83335(1)	1***
16	Jumper Wire Assembly	75326 (38)	1****
17	Capacitor & Bracket Assembly	See Table IX X	1
18	Armature Mounting Screw	79260(2)	2
19	Control Wheel Mounting Screw	79258(2)	2
20	Shunt Bar & Slide Plate Screw	79259 (2)	3
21	Magnet Clamp Screw	79260(3)	2
22	Eccentric Stud	75560	1
23	Washer	63990	2
24	Washer	64197	1
25	Rubber Foot	75371	2

* Code 131 Type Ringers only.

** Furnished with ringer when internal capacitor is used, and only on E131 and E133 Ringers when external capacitor is used.

*** Furnished only with 131 and 133 Type ringers when external capacitor is mounted on the ringer coil assembly.

**** Furnished with 131 and 133 Type Ringers only when internal capacitor is used.

TABLE IX
131 & E131 TYPE RINGERS

Code No. **	Frequency	Capacitor Size	Capacitor Assem. No.	Armature & Wt.Assem.No.	Remarks
131(HA1)470	33-1/3	.35 mfd	75593 (3)	75579 (1)	With volume control. "Harmonic"
131(HA2)470	50	.10 "	75593(1)	75579(2)	
131(HA3)470	66-2/3	.10 "	75593(1)	75579(3)	
131(HA4)470	16-2/3	*	*	75579(4)	
131(HA5)470	25	*	*	75579(5)	
131(HB1)470	30	*	*	75579(6)	With Volume Control. "Synchromonic" With volume control. "Decimonic"
131(HB2)470	42	.25 mfd	75593(2)	75579(7)	
131(HB3)470	54	.10 "	75593(1)	75579(8)	
131(HB4)470	66	.10 "	75593(1)	75579(9)	
131(HB5)470	16	*	*	75579(10)	
131(HC1)470	20	*	*	75579(11)	
131(HC2)470	60	.10 mfd	75593(1)	75579(12)	
131(HC3)470	30	*	*	75579(13)	
131(HC4)470	40	.25 "	75593(2)	75579(14)	
131(HC5)470	50	.10 "	75593(1)	75579(15)	
E131(HA1)470	33-1/3	.35 "	79742(3)	75579(1)	With volume control. Used on tel. with "Lift to Talk Switch" "Harmonic"
E131(HA2)470	50	.10 "	79743(1)	75579(2)	
E131(HA3)470	66-2/3	.10 "	79742(1)	75579(3)	
E131(HB2)470	42	.25 "	79742(7)	75579(7)	With volume control. Used on Tel. with "Lift to Talk Switch. "Synchromonic"
E131(HB3)470	54	.10 "	79742(1)	75579(8)	
E131(HB4)470	66	.10 "	79742(1)	75579(9)	
E131(HC2)470	60	.10 "	79742(1)	75579(12)	With volume control. Used on tel. with "Lift to Talk Switch". "Decimonic"
E131(HC4)470	40	.25 "	79742(2)	75579(14)	
E131(HC5)470	60	.10 "	79742(1)	75579(15)	

* Denotes .47 mfg Internal Capacitor Provided in the Network.

** Frequency selective codes of ringers manufactured after Nov.1, 1960 will have "H" replaced with "W" or "L" to denote with or without volume control.

TABLE X
133 & E133 TYPE RINGERS

Code No. **	Frequency	Capacitor Size	Capacitor Assem. No.	Armature & Wt. Assem. No.	Remarks
133(HA1)470	33-1/3	.35 mfd	75593 (3)	75579 (1)	Less volume control. "Harmonic"
133(HA2)470	50	.10 "	75593 (1)	75579 (2)	
133(HA3)470	66-2/3	.10 "	75593 (1)	75579 (3)	
133(HA4)470	16-2/3	*	*	75579 (4)	
133(HA5)470	25	*	*	75579 (5)	
133(HB1)470	30	*	*	75579 (6)	Less volume control. "Synchronomic"
133(HB2)470	42	.25 mfd	75593 (2)	75579 (7)	
133(HB3)470	54	.10 "	75593 (1)	75579 (8)	
133(HB4)470	66	.10 "	75593 (1)	75579 (9)	
133(HB5)470	16	*	*	75579 (10)	
133(HC1)470	20	*	*	75579 (11)	Less volume control. "Decimonic"
133(HC2)470	60	.10 mfd	75593 (1)	75579 (12)	
133(HC3)470	30	*	*	75579 (13)	
133(HC4)470	40	.25 mfd	75593 (2)	75579 (14)	
133(HC5)470	50	.10 "	75593 (1)	75579 (15)	
E133(HA1)470	33-1/3	.35 "	79742 (3)	75579 (1)	Less volume control. For Tel. with "Lift to Talk Switch" "Harmonic"
E133(HA2)470	50	.10 "	79742 (1)	75579 (2)	
E133(HA3)470	66-2/3	.10 "	79742 (1)	75579 (3)	
E133(HB2)470	42	.25 "	79742 (2)	75579 (7)	Less volume control. For tel. with "Lift to Talk Switch". "Synchronomic"
E133(HB3)470	54	.10 "	79742 (1)	75579 (8)	
E133(HB4)470	66	.10 "	79742 (1)	75579 (9)	
E133(HC2)470	66	.10 "	79742 (1)	75579 (12)	Less volume control. For "Lift to Talk Switch". "Decimonic"
E133(HC4)470	40	.25 "	79742 (2)	75579 (14)	
E133(HC5)470	50	.10 "	79742 (1)	75579 (15)	

* Denotes .47 mfd Internal Capacitor Provided in the Network.

** Frequency selective codes of ringers manufactured after No. 1, 1960 will have "H" replaced with "W" or "L" to denote with or without volume control.

C. Ringer Adjustments

1. Biased Ringer 130(BA)470. See Figure 14 and 15

NOTE

The following adjustments shall be made with the ringer positioned so that Gong "A" is to the right, when facing the gong end of the ringer.

a. Gong Adjustment: With Gong "A" to the right rotate it clockwise to the last detent notch for the entire adjustment procedure.

Gong "B" is adjusted also, by rotating, to vary the distance between Gong "B" and the clapper. Adjust to provide a clearance of 1/16" to 1/8" and retighten gong screw. It may be necessary to correct this setting after subsequent adjustments and tests to get a uniform striking of both gongs. Generally, the clapper stem will be aligned with the notch located in the upper part of the frame.

b. Stop-Rod Adjustment: Align the Stop Rod with the reference mark provided on the last position of the eccentric cam. With the armature in the non-operate position against the left pole piece, the stop-rod should not rest against the bias spring bracket; nor should it contact Gong "A" when the armature is in the operate position and when Gong "A" is rotated. With the armature in the operate position, the stop-rod should strike the eccentric cam in all detent positions, with the clapper in all instances approximately 1/16" away from Gong "A" when in the first three loudness positions.

c. Bias Spring Adjustment: The bias spring in the low tension position (farthest from gong "B") must be bent for maximum tension; that is, the central curvation portion of the spring shall be nearest the coil. This is accomplished with an adjusting tool provided. The adjustment should allow the armature to remain in the operate position. This will occur provided the spring force is not excessive and the magnet is not weak.

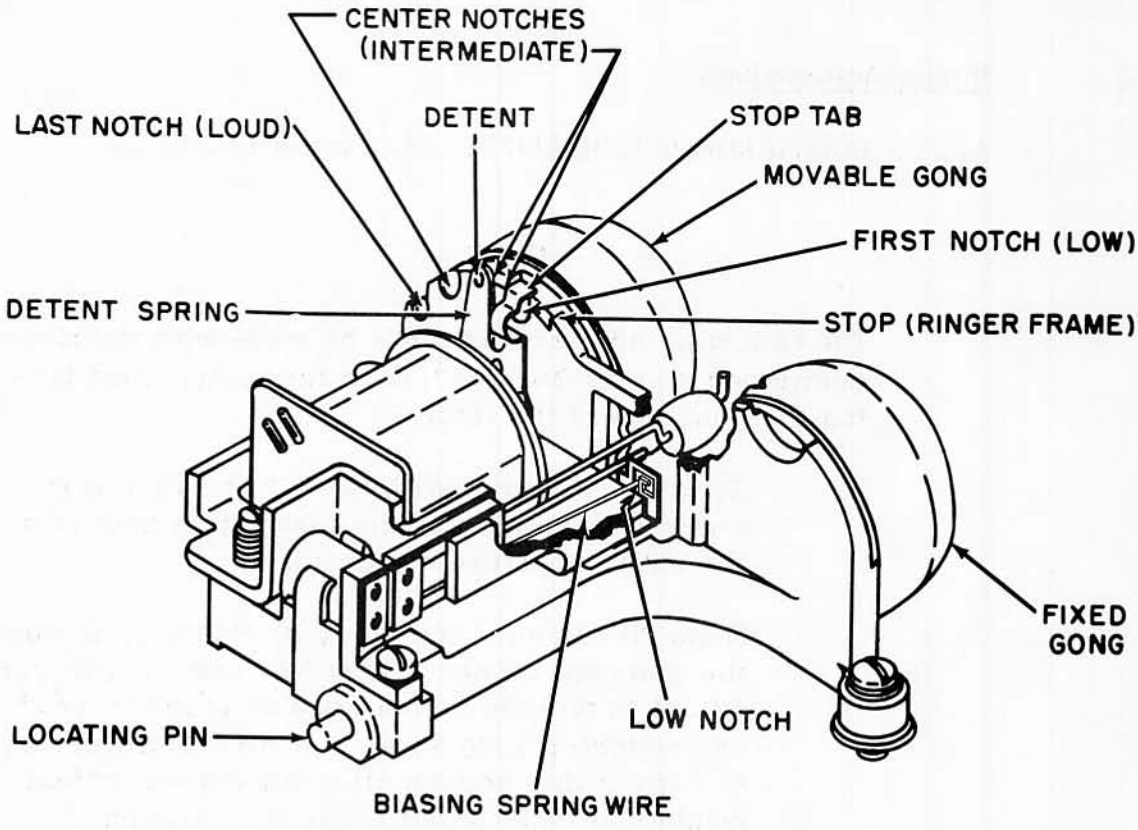


FIGURE 14
CODE 130 BA RINGER

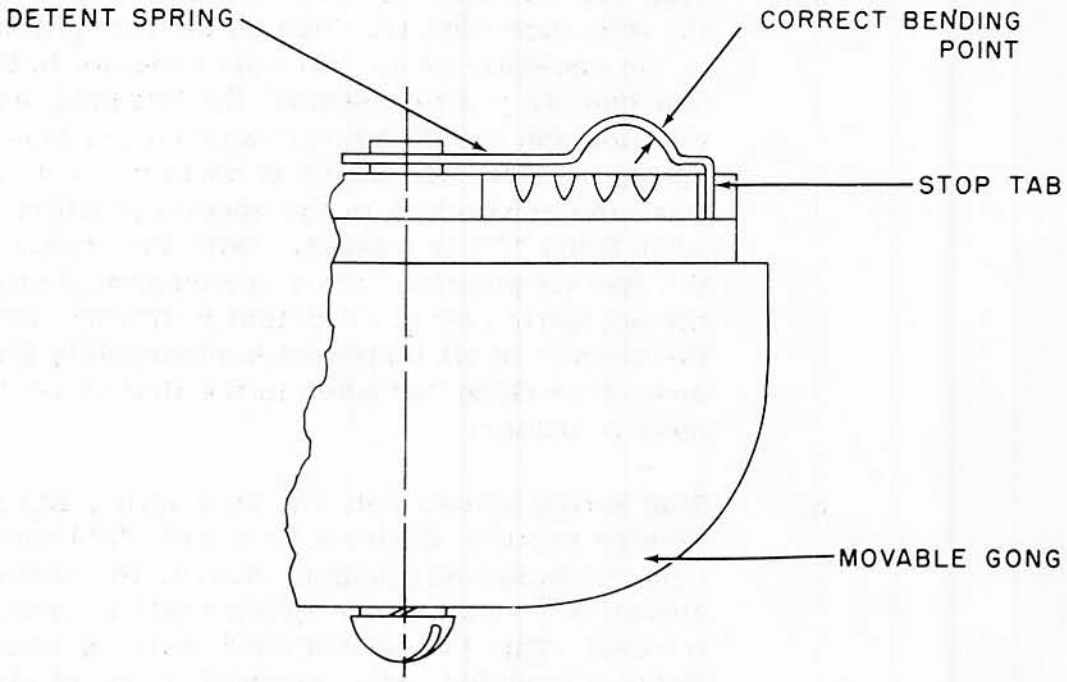


FIGURE 15
ADJUSTMENT OF STOP TAB ON DETENT
SPRING OF CODE 130 BA RINGER

d. Final Adjustments & Test Procedures:

(1) Place the ringer in the test fixture and connect the ringer leads to respective terminals on test equipment. Switch to "Charge" (to charge de-magnetization capacitor). Set voltmeter of de-magnetizer to 60 volts and momentarily apply ringing voltage - 16, 20, and 30 CPS.

(2) Switch to "Demagnetize". In most instances the armature will move to the non-operate position. Failure to do so is an indication that more bias spring tension may be needed. If maximum tension already has been introduced, then greater demagnetization is required.

If the armature has released, the required sensitivity (under low bias setting) shall be obtained by carefully reducing the magnetic strength and adjusting the bias spring tension. A Commercial Ring should be obtained with ringing voltage at 16 CPS and at 20 CPS through a resistance of 21,000 to 30,000 ohms, and with ringing voltage at 30 CPS through a resistance of 21,000 to 40,000 ohms.

A "Commercial Ring" may be defined as follows: Both gongs shall be struck vigorously and uniformly, producing a pleasing tone quality, with each gong being equally audible in the first three detents through which the adjustable gong (A) is rotated (in a counter-clockwise direction) for loudness control. This is desirable in the fourth detent also, but is not necessary.

Check for dial pulse rejection. If the gongs tingle when dial pulse is introduced, the adjustment should be corrected by increasing the bias tension.

Recheck sensitivity. Normally ringing should operate through 30,000 to 40,000 ohms at this stage.

Check sensitivity under high bias setting. A Commercial Ring should be obtained with ringing voltage at 16, at 20, and at 30 CPS through a resistance of 11,000 to 15,000 ohms.

NOTE:

Minor adjustments of eccentric gong "B" and clapper stem may be required in order to provide uniform striking of both gongs.

If necessary, repeat adjustments and raise voltage for additional demagnetization to obtain the performance set forth above.

Demagnetization up to 70 volts may be required. The demagnetizing voltages indicated are given as guides only, and may be modified to meet performance requirements.

2. Frequency Selective Ringers 131 ( )470 & 133 ( )470 Type Ringers.

a. Test Load: The test load shall be composed of five Code 131(HB) 470 Ringers in parallel across the line, less gongs and gong posts, but with rigid armatures. Each ringer of the test load shall be connected in series with the appropriate capacitor as follows:

HB-1 - .47 mf
HB-2 - .25 "
HB-3 - .10 "
HB-4 - .10 "
HB-5 - .47 "

On ringers to be tested, which are not furnished with a capacitor, switch in the specified capacitor on the test panel as indicated below.

HA-1	33-1/3 cycles - .35 mf		HB-1	30 cycles - .47 mf		HC-1	20 cycles - .47 mf	
HA-2	50 " - .10 "		HB-2	42 " - .25 "		HC-2	60 " - .10 "	
HA-3	66 2/3 " - .10 "		HB-3	54 " - .10 "		HC-3	30 " - .47 "	
HA-4	16 2/3 " - .47 "		HB-4	66 " - .10 "		HC-4	40 " - .25 "	
HA-5	25 " - .47 "		HB-5	16 " - .47 "		HC-5	50 " - .10 "	

b. Sensitivity: The required commercial ring sensitivity, wherein the clapper strikes both gongs vigorously and uniformly producing a good tone quality, is achieved by proper air gap adjustment and mechanical tuning. A commercial code ring (produced when the ringer is energized several times in succession at intervals of 1/2 second on and 1/2 second off) shall be obtained without cross-ring interference from any other frequency in the code series and with the 131(HB) load in series with the following resistances:

HA-1	HA-4	HA-5, Each	8000 ohms
HB-1	HB-2	HB-5, Each	8000 ohms
HC-1	HC-3	HC-4, HC-5, Each	8000 ohms
HA-2			7000 ohms
HB-3			7000 ohms
HB-6			6000 ohms
HA-3			5000 ohms
HC-2			5000 ohms decreased to 4500 ohms

NOTE: Since the ringers with reeds without notches (16 & 16 2/3 cycles) are subject to a strong magnetic pull on one of the poles, partially demagnetize the magnet by removing it from the ringer mount.

c. Tuning and Adjusting: To obtain proper sensitivity, set the air gap as small as possible without cross-ring, interference by rotating the adjustment screw in the slide plate.

There are no specific gap measurements; however, the low frequencies should be adjusted for a maximum gap, with the intermediate frequency ringers proportionately between the setting for low frequencies and high frequencies. Any fine adjustment can be made by means of the adjusting stud.

After setting the approximate air gap according to the frequency of the ringer under test, apply ringing voltage to the ringer and check for ultimate sensitivity (the point at which the clapper will just strike both gongs with the ringers in series with the respective resistance as indicated below).

HA-1	11,000 ohms	HB-1	10,000 ohms	HC-1	12,000 ohms
HA-2	9,000 "	HB-2	10,000 "	HC-2	6,000 "
HA-3	8,000 "	HB-3	10,000 "	HC-3	10,000 "
HA-4	15,000 "	HB-4	8,000 "	HC-4	12,000 "
HA-5	12,000 "	HB-5	15,000 "	HC-5	10,000 "

The n adjust the gongs for proper striking of the clapper. Adjust the clapper weight for the ringing voltage applied.

Adjust the air gap for maximum sensitivity, and switch in the resistance and check for commercial code ring. Repeat the adjustment procedure as required.

Check for cross-ring without the 131(HB) load and no resistance. Decrease the sensitivity by increasing the air gap if necessary.

Reposition the gongs for best commercial ring and ultimate sensitivity, and then tighten all screws left loose for adjustment purposes.

d. Volume Control Adjustment: On ringers with a volume control, following the final setting of gong spacing, check the volume control setting as follows:

(1) Loud Position: Both snubbers shall be clear of the gongs.

(2) Medium Position: One of the snubbers should rest on gong "B".

(3) Low Position: Both snubbers should rest on their respective gongs, and the stud on the snubber assembly must be at a level which will keep it clear of the telephone base in subsequent assembly to the desk type telephone. It may be necessary to bend the snubber to obtain this adjustment.

SECTION EIGHT
SPRING ASSEMBLIES

1. TURN AND PUSH KEYS P-79453(2), P-79453(3) AND TURN KEY 82870

The Turn and Push Keys have two spring assemblies, both actuated by a single combination turn and push button. One spring assembly is operated by turning the key button and the other by depressing the key button.

A. Spring Adjustment

All springs shall be tensioned to 35 to 60 grams contact pressure between contacts.

B. Contact Follow

All contact springs shall have a perceptable follow of approximately .010".

C. Spring Tension

Both lever springs of the turn button assembly, when in the normal position shall each be tensioned to 100 to 200 grams against the plunger cam.

D. Plunger

The plunger shall operate freely in both the turn and the push position of the key. The key shall lock reliably when fully rotated, and shall return to the normal position when released slowly from the operate position. Also, the key shall return fully to the normal position after being depressed to the limit of its stroke and then released slowly.

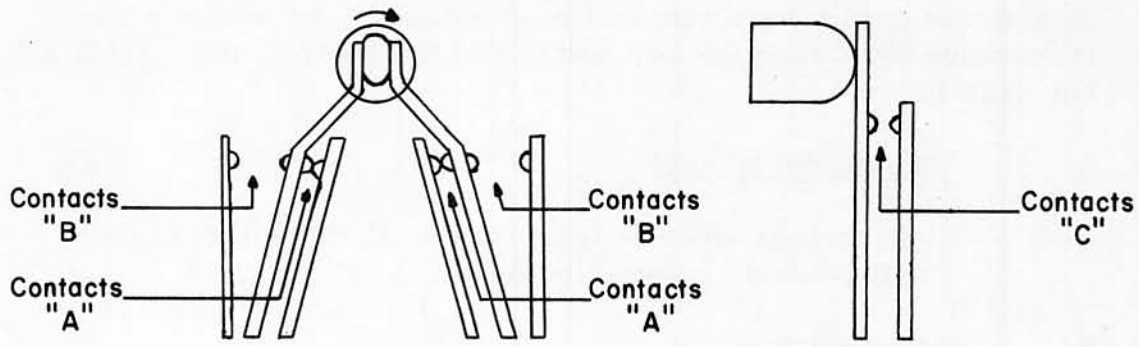


FIGURE 16

E. Contact Sequence

When the turn button is operated, the normally closed contacts (A) shall break before the normally open contracts (B) make. The "A" and "B" sets of contacts in either the normal or the operated positions shall not be affected by depressing the push button for the operation of the normally open "C" contacts.

F. Contact Separation

Contacts "A" in the operated position and contacts "B" in the normal position shall have a separation of not less than .020". The push button contacts "C" in the normal position shall have a separation of not less than .035".

Turn and Push Key P-79453(3)

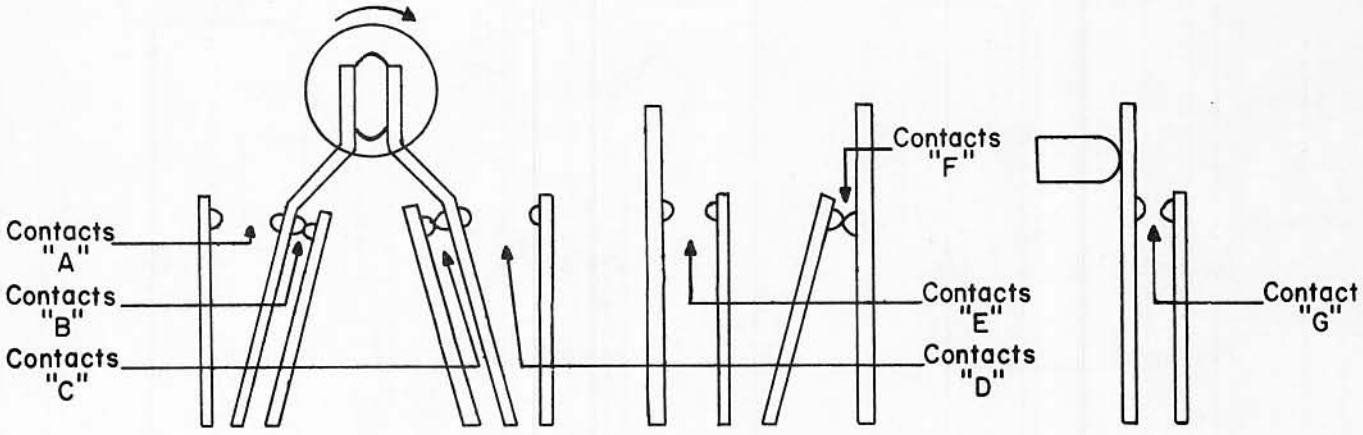


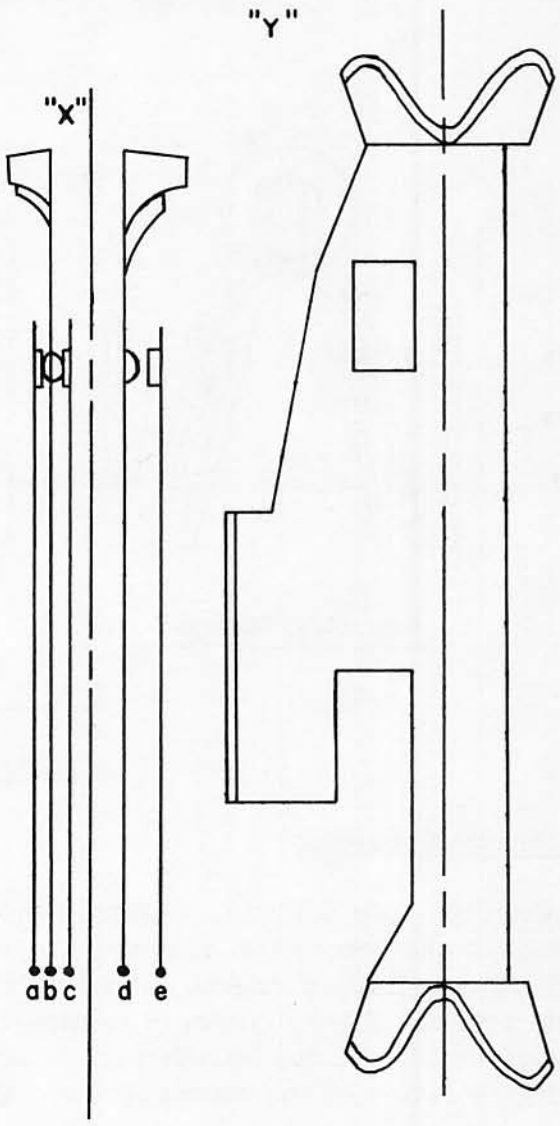
FIGURE 17

G. Contact Sequence

When the turn button is operated the normally open contacts (E) shall make before the normally closed contacts (B) and (C) break. Following this, contacts (A) and (D) shall make before contacts (F) break. These contacts in either the normal or the operated positions shall not be affected by depressing the pushbutton for the operation of the normally open (G) contacts.

H. Contact Separation

Contacts (A), (D), and (E) in the normal position and contacts (B), (C), and (F) in the operated position shall have a separation of not less than .020". The pushbutton contacts (G) in the normal position shall have a separation of not less than .035".



SPRING
ARRANGEMENT
(Normal Position)

FIGURE 18

II. EXCLUSION SWITCHES P-79614(1), P-79614(2), P-79970 and LIFT-TO-TALK SWITCH 82581

NOTE: All the above switches operate by lifting a plunger in the telephone housing on telephones which require these features. The switches differ only in the number and arrangement of contact spring assemblies.

A. Spring Contact Alignment

The alignment of the springs in the spring assembly shall be such that the bar contacts are mated on approximate centers and the long axis of the springs are parallel with the base of the bracket.

B. Spring Adjustment

With the springs in the normal position, each set of made springs shall be adjusted so that a pressure of 30 to 60 grams is required to open each set of contacts. When adjusted to these values, the "X" dimension shall be .218" .020", and the "Y" dimension shall be .765" .020" when measured to the center line of a guage placed in the position of the "X" dimension.

With the springs in the operated position, each set of made springs shall be adjusted so that 30 to 60 grams is required to open the contacts. When adjusted to this value, the springs at the "X" position shall spread equally until the "X" dimension is .430" .005".

C. Contact Follow

All contact springs shall have a perceptible follow of approximately .010".

K-500 TYPE TELEPHONE CIRCUIT

WIRING DIAGRAM

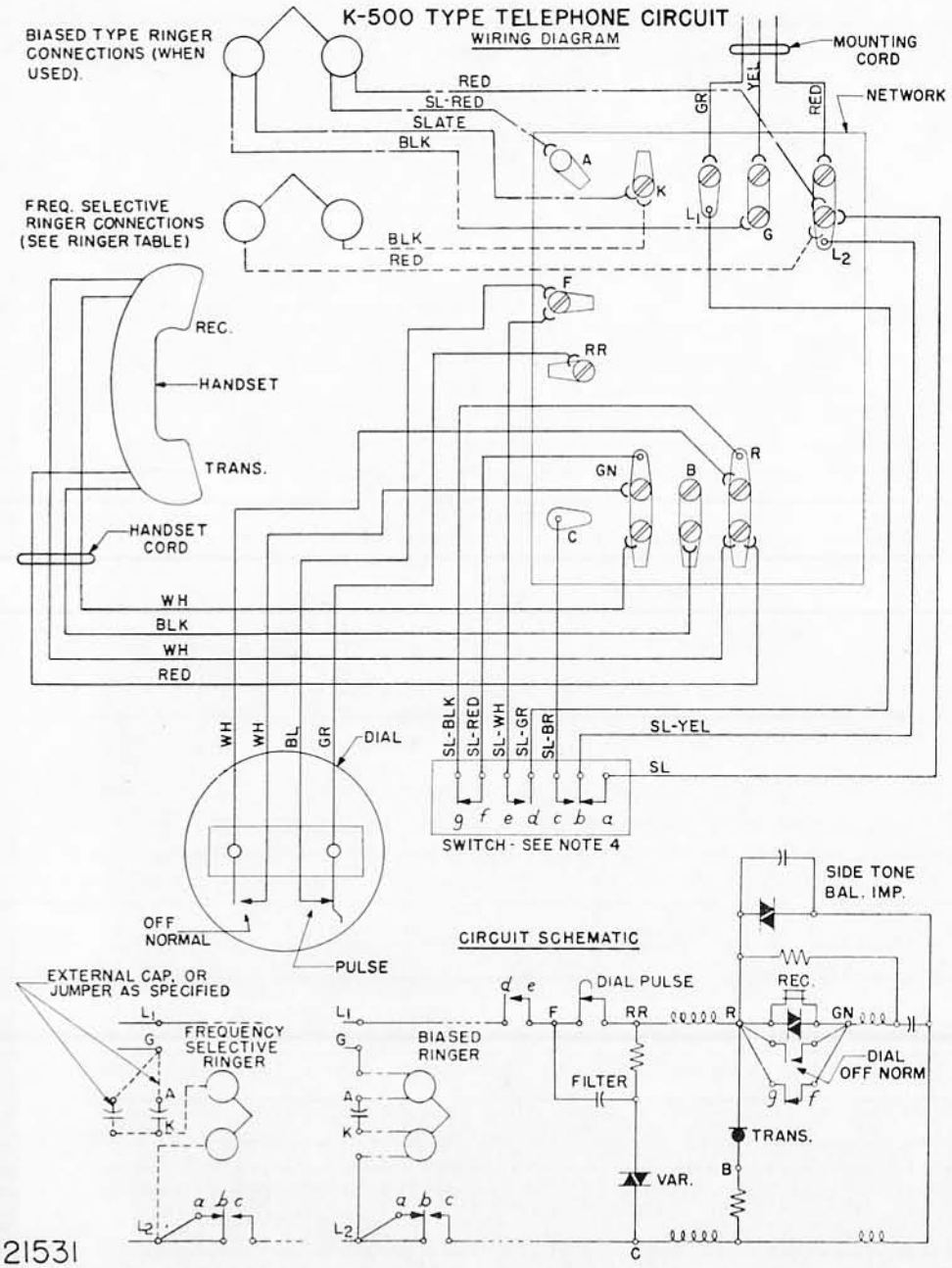


TABLE OF CONNECTIONS (BIASED RINGERS) (SEE NOTES 1 TO 4)													
CLASS OF SERVICE	CONNECTIONS AT CONNECTING BLOCK						CONNECTIONS AT NETWORK						
	LINE			MTG. CORD			MTG. CORD			RINGER LEADS			
	RING	TIP	GND.	RED	GR	YEL	RED	GR	YEL	RED	BLK	SL	SL-RED
BRIDGED △	R	G	Y	R	G	G	L_2	L_1	G	L_2	G	K	A
RING PARTY △	R	G	Y	R	G	Y	L_2	L_1	G	L_2	G	K	A
TIP PARTY EXCEPT DIAL MESSAGE RATE	R	G	Y	G	R	Y	L_2	L_1	G	L_2	G	K	A
TIP PARTY DIAL MESSAGE RATE *	R	G	Y	G	R	Y	L_2	L_1	G	K	G	B	B
AUTOMATIC TICKETING *	R	G	Y	G	R	Y	L_2	L_1	G	B	B	K	G

△ CONNECTIONS FOR BRIDGED AND RING PARTIES ARE FOR FLAT AND MESSAGE RATE SERVICE.

* TRANSFER SLATE SWITCH LEAD FROM (L_2) TO (A) TERMINAL ON NETWORK.

NOTES:

1. FOR MANUAL SERVICE:
   REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER SLATE-WHITE SWITCH LEAD TO (RR) TERMINAL ON NETWORK.

2. TO PERMANENTLY SILENCE RINGER:
   FOR BRIDGED, RING PARTY AND TIP PARTY EXCEPT DIAL MESSAGE RATE SERVICES, TRANSFER BLACK RINGER LEAD TO (A) TERMINAL ON NETWORK.

   FOR TIP PARTY DIAL MESSAGE RATE SERVICE, TRANSFER SLATE-RED RINGER LEAD TO THE (K) TERMINAL. BLACK LEAD TO (G) AND SLATE LEAD TO (B) MUST REMAIN CONNECTED FOR PARTY IDENTIFICATION.

   FOR AUTOMATIC TICKETING, TRANSFER BLACK RINGER LEAD TO THE (K) TERMINAL.

3. RINGER CUT-OFF CONTROL BY CUSTOMER:
   BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.

4. WHEN THE HANDSET IS REMOVED CONTACT *gf* BREAKS LAST.

TABLE OF RINGERS				
FREQUENCY SELECTIVE (HARMONIC) TYPES			EXTERNAL CAPACITOR	CONNECTIONS IN SET.
	CY.	PTY.	UF	
HA 1	33⅓	1	.35	SEE NOTE 5
HA 2	50	2	.1	5
HA 3	66⅔	3	.1	5
HA 4	162⅔	4	–	6
HA 5	25	5	–	6
HB 1	30	1	–	6
HB 2	42	2	.25	5
HB 3	54	3	.1	5
HB 4	66	4	.1	5
HB 5	16	5	–	6
HC 1	20	1	–	6
HC 2	60	2	.1	5
HC 3	30	3	–	6
HC 4	40	4	.25	5
HC 5	50	5	.1	5

NOTES:

5. MOUNT THE CONDENSER FURNISHED ON THE "K" TERMINAL OF THE NETWORK. CONNECT THE LOOSE CONDENSER LEAD TO THE "G" TERMINAL.

6. CONNECT JUMPER FROM "A" TO "G" ON THE NETWORK.

CONNECTIONS FOR FREQUENCY SELECTIVE RINGERS								
RINGING SERVICE	CONNECTIONS AT CONNECTING BLOCK						CONN. IN SET (ALSO SEE TABLE OF RINGERS)	
	LINE			MTG. CORD			RINGER LEADS	
	RING	TIP	GND	RED	GR	YEL	RED	BLACK
BRIDGED	R	G	Y*	R	G	G	L_2	K
RING PARTY	R	G	Y	R	G	Y	L_2	K
TIP PARTY	R	G	Y	G	R	Y	L_2	K

* IF GROUND WIRE IS BROUGHT TO CONNECTING BLOCK

3
2
1
ISSUE NO.

K-500 TYPE TELEPHONE CIRCUIT

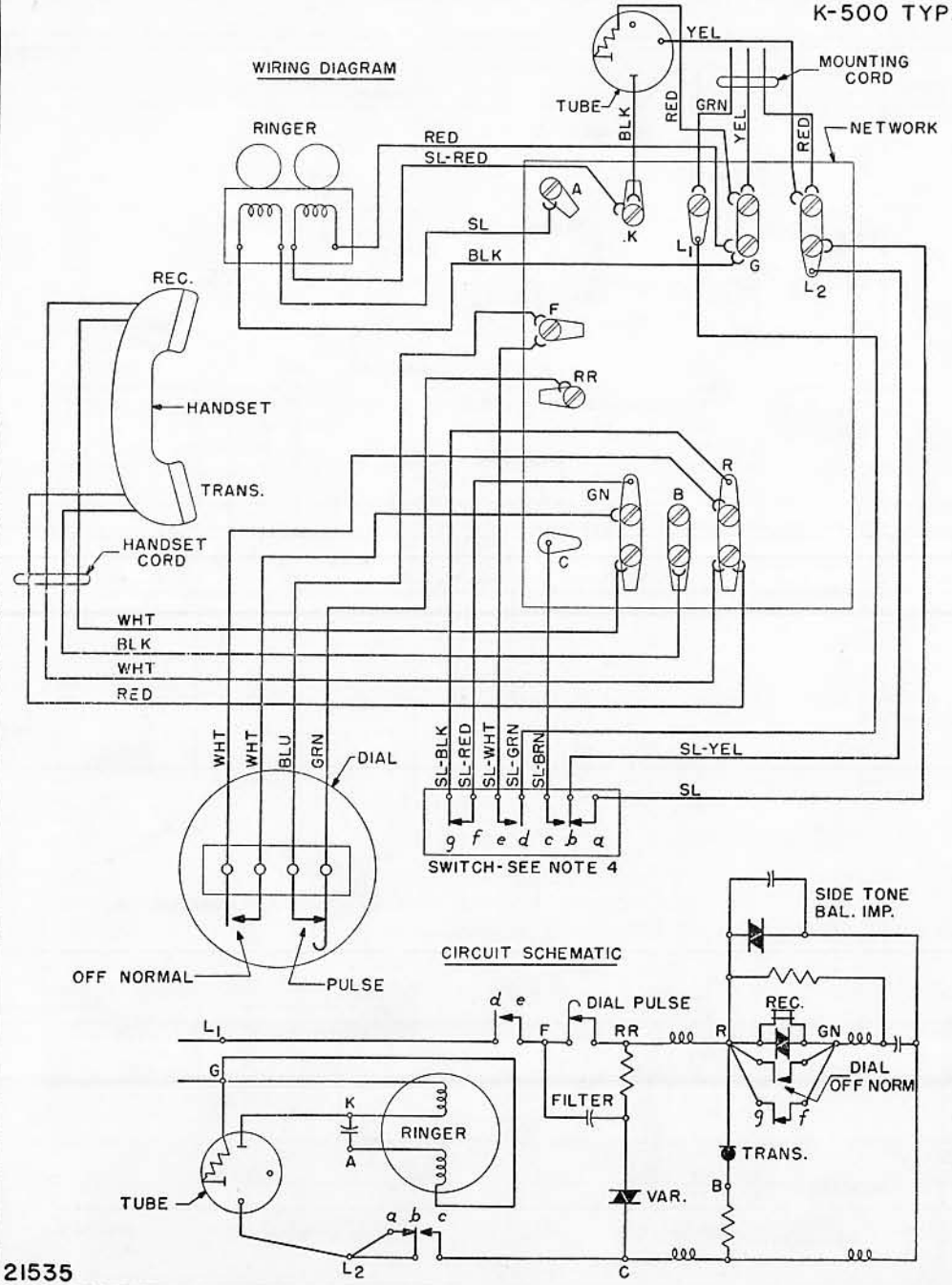


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TABLE OF CONNECTIONS (POLARIZED. RINGING)													
CLASS OF SERVICE	CONNECTIONS AT CONNECTING BLOCK						CONNECTIONS AT NETWORK						
	LINE			MTG. CORD			TUBE LEADS			RINGER LEADS			
	RING	TIP	GRD.	RED	GRN	YEL	YEL	BLK	RED	RED	BLK	SL	SL-RED
(−) RING	R	G	Y	R	G	Y	L_2	K	G	G	G	A	K
(+) RING	R	G	Y	R	G	Y	G	K	L_2	L_2	L_2	A	K
(−) TIP	R	G	Y	G	R	Y	L_2	K	G	G	G	A	K
(+) TIP	R	G	Y	G	R	Y	G	K	L_2	L_2	L_2	A	K

NOTES:

1. FOR MANUAL SERVICE:
   REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER SLATE-WHITE SWITCH LEAD TO (RR) TERMINAL ON NETWORK.

2. TO PERMANENTLY SILENCE RINGER:
   FOR RING PARTY, CONNECT THE YELLOW MOUNTING CORD CONDUCTOR TO THE (R) TERMINAL OF THE CONNECTING BLOCK. FOR TIP PARTY, CONNECT THE YELLOW MOUNTING CORD CONDUCTOR TO THE (G) TERMINAL OF THE CONNECTING BLOCK.

3. RINGER CUT-OFF CONTROL BY CUSTOMER:
   BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.

4. WHEN THE HANDSET IS REMOVED CONTACT *gf* BREAKS LAST.

2
1
ISSUE NO.

K-500 TYPE TELEPHONE CIRCUIT

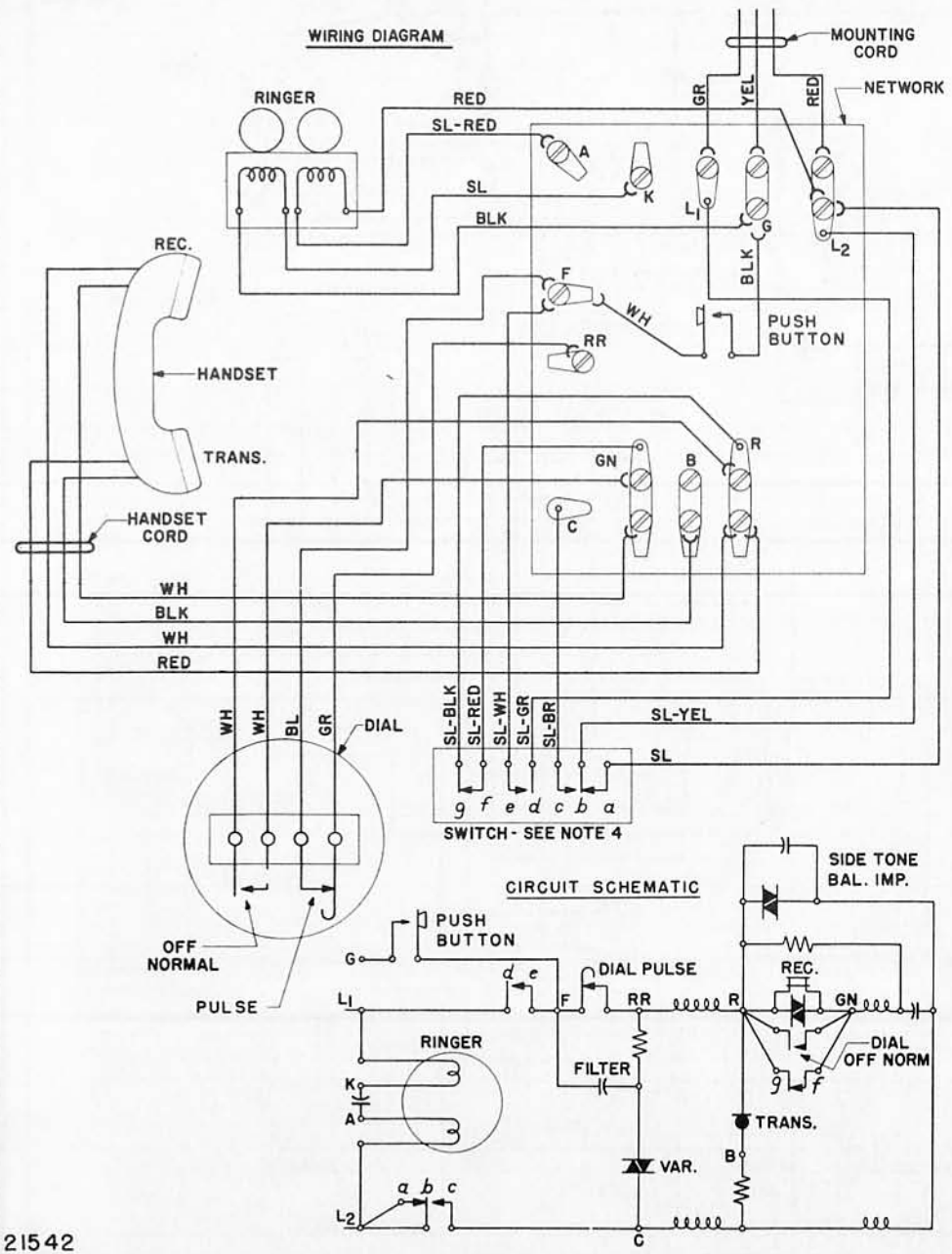


TABLE OF CONNECTIONS (BIASED RINGERS) (SEE NOTES 1 TO 4)													
CLASS OF SERVICE	CONNECTIONS AT CONNECTING BLOCK						CONNECTIONS AT NETWORK						
	LINE			MTG. CORD			MTG. CORD			RINGER LEADS			
	RING	TIP	GND.	RED	GR	YEL	RED	GR	YEL	RED	BLK	SL	SL-RED
BRIDGED △	R	G	Y	R	G	Y	L_2	L_1	G	L_2	L_1	K	A
RING PARTY △	R	G	Y	R	G	Y	L_2	L_1	G	L_2	G	K	A
TIP PARTY EXCEPT DIAL MESSAGE RATE	R	G	Y	G	R	Y	L_2	L_1	G	L_2	G	K	A
TIP PARTY DIAL MESSAGE RATE *	R	G	Y	G	R	Y	L_2	L_1	G	K	G	B	B
AUTOMATIC TICKETING *	R	G	Y	G	R	Y	L_2	L_1	G	B	B	K	G

△ CONNECTIONS FOR BRIDGED AND RING PARTIES ARE FOR FLAT AND MESSAGE RATE SERVICE.

* TRANSFER SLATE SWITCH LEAD FROM (L_2) TO (A) TERMINAL ON NETWORK.

NOTES:

1. FOR MANUAL SERVICE:
   REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER SLATE-WHITE SWITCH LEAD TO (RR) TERMINAL ON NETWORK.

2. TO PERMANENTLY SILENCE RINGER:
   FOR BRIDGED, RING PARTY AND TIP PARTY EXCEPT DIAL MESSAGE RATE SERVICES, TRANSFER BLACK RINGER LEAD TO (A) TERMINAL ON NETWORK.

   FOR TIP PARTY DIAL MESSAGE RATE SERVICE, TRANSFER SLATE-RED RINGER LEAD TO THE (K) TERMINAL. BLACK LEAD TO (G) AND SLATE LEAD TO (B) MUST REMAIN CONNECTED FOR PARTY IDENTIFICATION.

   FOR AUTOMATIC TICKETING, TRANSFER BLACK RINGER LEAD TO THE (K) TERMINAL.

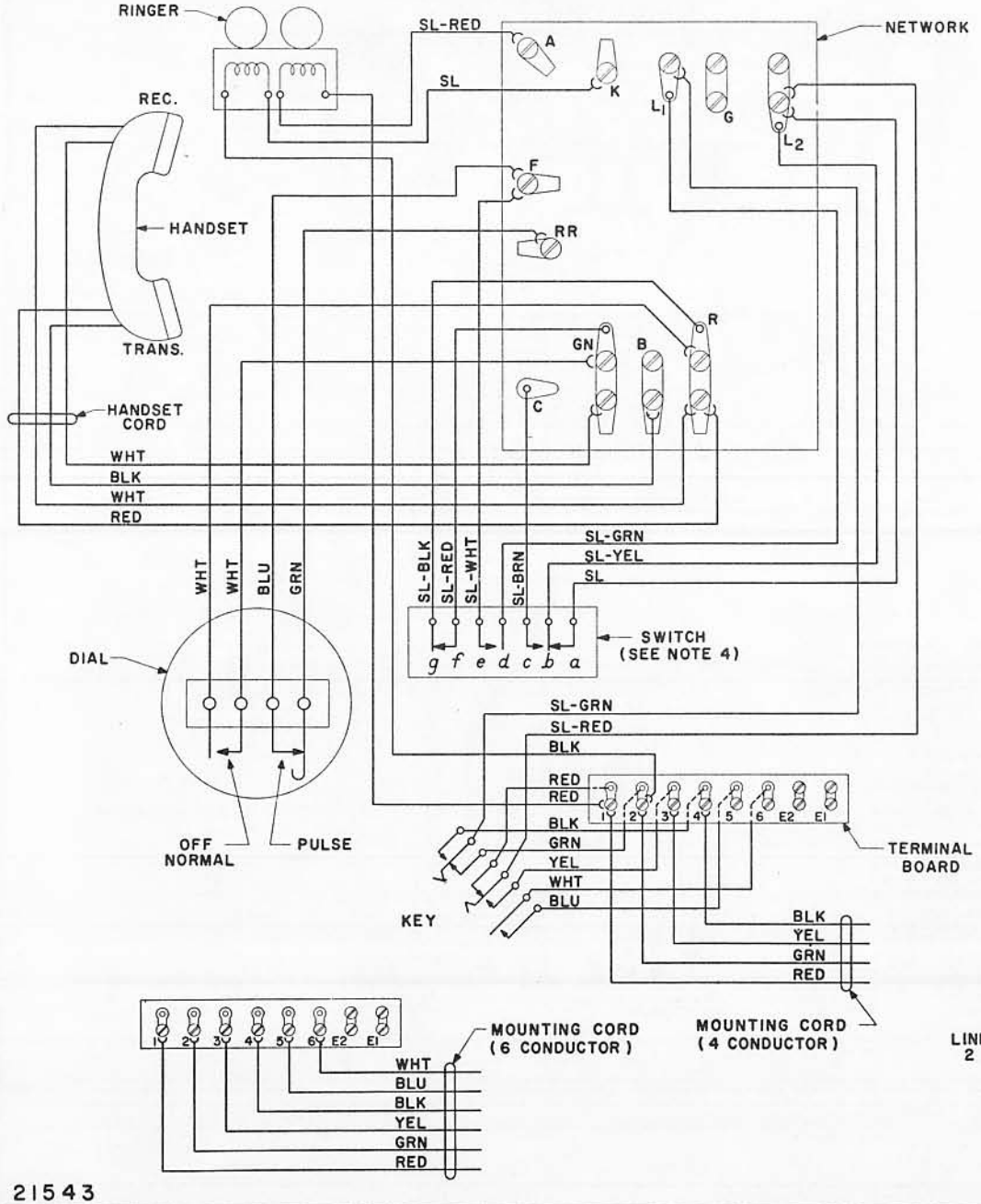
3. RINGER CUT-OFF CONTROL BY CUSTOMER:
   BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.

4. WHEN THE HANDSET IS REMOVED CONTACT gf BREAKS LAST.

21542

K-510 TYPE TELEPHONE CIRCUIT

WIRING DIAGRAM



NOTES:

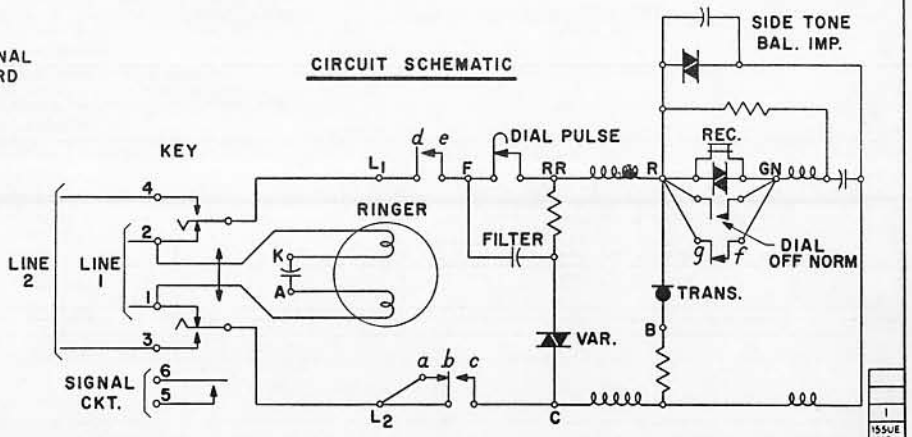
1-FOR MANUAL SERVICE:
REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER SLATE-WHITE SWITCH LEAD TO (RR) TERMINAL ON NETWORK.

2-TO PERMANENTLY SILENCE RINGER:
TRANSFER BLACK RINGER LEAD TO (K) TERMINAL ON NETWORK.

3-RINGER CUT-OFF CONTROL BY CUSTOMER:,
BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.

4-WHEN THE HANDSET IS REMOVED FROM CRADLE CONTACT *gf* BREAKS LAST.

CIRCUIT SCHEMATIC



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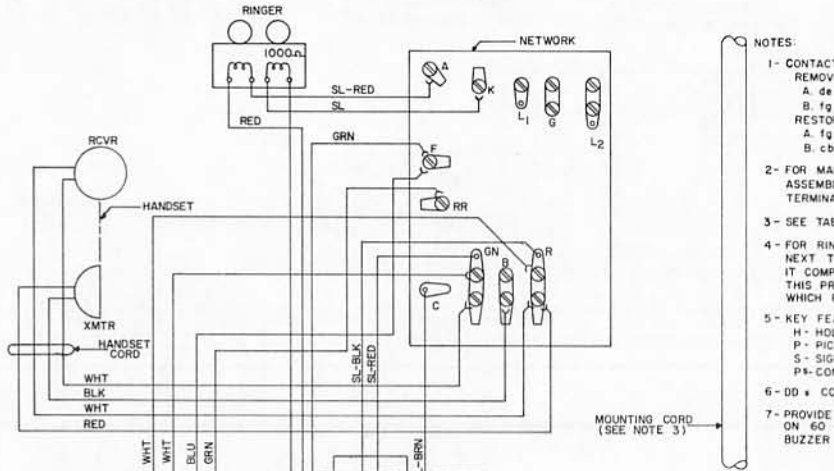


NOTES:

1- CONTACT SEQUENCE
REMOVING HANDSET
A. de CLOSES BEFORE cb
B. fg OPENS
RESTORING HANDSET
A. fg CLOSES
B. cb OPENS BEFORE de

2- FOR MANUAL SERVICE REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER GREEN KEY LEAD FROM (F) TERMINAL TO (RR) TERMINAL ON NETWORK.

3- SEE TABLE FOR CONNECTIONS.

4- FOR RINGER CUT-OFF CONTROL BY CUSTOMER BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.

5- KEY FEATURE DESIGNATIONS:
H- HOLD
P- PICK-UP
S- SIGNAL
Ps- CONVERTIBLE, PICK UP OR SIGNAL

6- DD s CONDUCTORS ARE TAPED AND STORED IN TELEPHONE.

7- PROVIDE "M" WIRING WHEN THE BUZZER IS TO OPERATE ON 60 CYCLES AC, AND PROVIDE "N" WIRING WHEN THE BUZZER IS TO OPERATE ON DC.

TABLE A

UNIVERSAL-KIAI SYSTEM CONVERSION-STATION BUSY SIGNAL CONNECTIONS
CONNECTION OF HOLD KEY AND SWITCH LEADS

	KEY TEL. SYS.	HOLD KEY & SWITCH LEADS				
		SL-WHT	SL-GRN	SL-YEL	YEL	YEL-BLK
NO STATION BUSY LAMP	UNIV.	IB	IB	N	R	M
	KIAI	IB	N	R	M	N

TABLE B

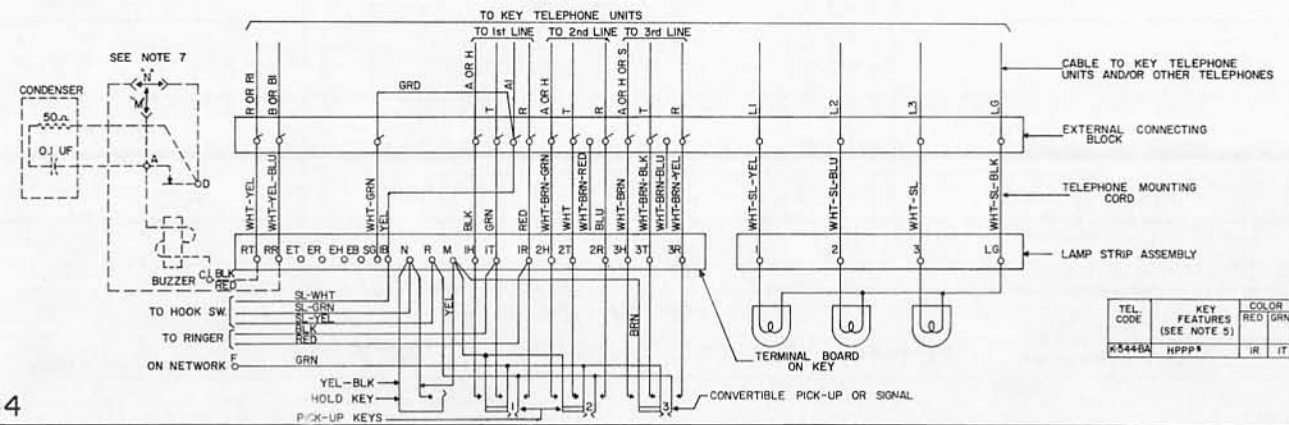
RINGER CONNECTIONS

			RINGER OR BUZZER LEAD			
			SL-RED	SL	BLK	RED
SET RINGER OR BUZZER NOT TO BE CUT OFF IN SET	WHEN USED AS BRIDGED RINGER ON ANY LINE		A	K	T	R
	WHEN USED AS PRIVATE LINE COMMON SIG. OR OTHER USE	WITH COND.	A	K	RT	RR
		WITHOUT COND.	A	A		

TABLE C

PICKUP-SIGNALLING CONVERSION
CONVERT FROM LOCKING TO NON-LOCKING OR VICE-VERSA AND CHANGE LEADS AS FOLLOWS:

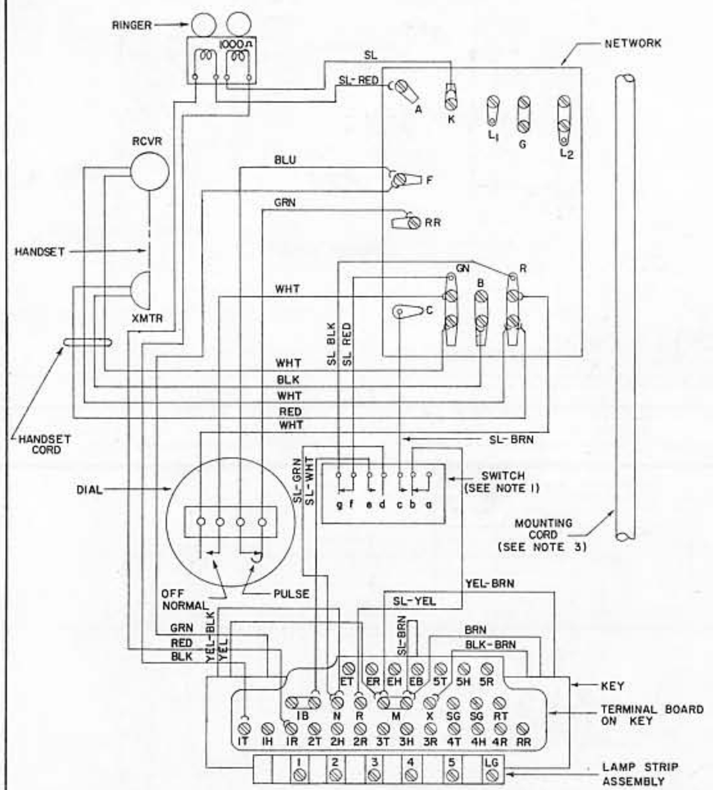
	NO. OF PICKUP KEYS	NO. OF SIG. KEYS CONVERTED FROM P.U. KEYS	NO. OF PRIVATE AND INTERCOMMUNICATING LINES WITH COMMON SIG. KEY	KEY LEADS			
				YEL-BRN	BRN	SL-BRN	BLK-BRN
4 BUTTON SET							
	3				M		
	2	1			SG		



TEL. CODE	KEY FEATURES (SEE NOTE 5)	COLOR OF MOUNTING CORD CONDUCTORS TO TERMINALS ON KEY AND LAMP TERMINAL STRIP																		
		RED	GRN	YEL	BLK	BLU	WHT	WHT-BRN-RED	WHT-BRN-GRN	WHT-BRN-YEL	WHT-BRN-BLK	WHT-BRN-BLU	WHT-BRN	WHT-YEL-BLU	WHT-YEL	WHT-GRN	WHT-SL-BLK	WHT-SL-YEL	WHT-SL-BLU	WHT-SL
K544BA	HPPPs	IR	IT	IB	IH	2R	2T	DD	2H	3R	3T	DD	3H	RR	RT	SG	LG	1	2	3

ISSUE NO.
1

21544



NOTES:

1- CONTACT SEQUENCE
REMOVING HANDSET
A. de CLOSES BEFORE cb
B. fg OPENS
RESTORING HANDSET
A. fg CLOSES
B. cb OPENS BEFORE de

2- FOR MANUAL SERVICE REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER GREEN KEY LEAD FROM (F) TERMINAL TO (RR) TERMINAL ON NETWORK.

3- SEE TABLE FOR CONNECTIONS.

4- FOR RINGER CUT-OFF CONTROL BY CUSTOMER BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.

5- KEY FEATURE DESIGNATIONS:
H - HOLD
P - PICK-UP
S - SIGNAL
Ps - CONVERTIBLE, PICK UP OR SIGNAL

6- DD * CONDUCTORS ARE TAPED AND STORED IN TELEPHONE.

7- PROVIDE "M" WIRING WHEN THE BUZZER IS TO OPERATE ON 60 CYCLES AC, AND PROVIDE "N" WIRING WHEN THE BUZZER IS TO OPERATE ON DC.

TABLE A

UNIVERSAL-KIAI SYSTEM CONVERSION-STATION BUSY SIGNAL CONNECTIONS
CONNECTION OF HOLD KEY AND SWITCH LEADS

	KEY TEL. SYS.	HOLD KEY & SWITCH LEADS					MIW CORD
		SL-WHT	SL-GRN	SL-YEL	YEL	YEL-BLK	
NO STATION BUSY LAMP	UNIV.	IB	IB	N	R	M	
	KIAI	IB	N	R	M	N	
WITH STATION BUSY LAMP	UNIV.	SG	L2 #	N	R	M	
	KIAI	IB	L2 #	R	M	N	G # TO N

TERMINAL ON NETWORK

TABLE B

RINGER CONNECTIONS

			RINGER OR BUZZER LEAD			
			SL-RED	SL	BLK	RED
SET RINGER OR BUZZER NOT TO BE CUT OFF IN SET	WHEN USED AS BRIDGED RINGER ON ANY LINE		A	K	T	R
	WHEN USED AS PRIVATE LINE COMMON SIG. OR OTHER USE	WITH COND.	A	K	RT	RR
		WITHOUT COND.	A	A		

TABLE C

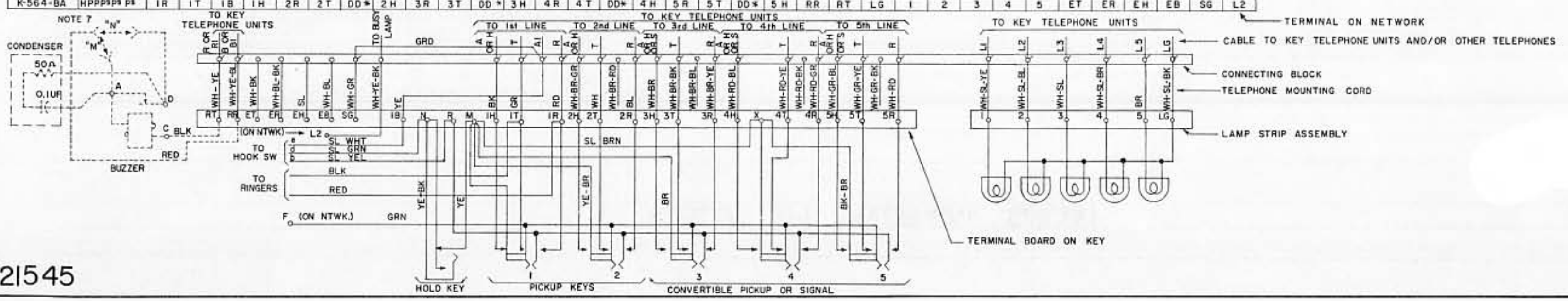
PICKUP-SIGNALLING CONVERSION
CONVERT FROM LOCKING TO NON-LOCKING OR VICE-VERSA
AND CHANGE LEADS AS FOLLOWS:

	NO. OF PICKUP KEYS	NO. OF SIG. KEYS CONVERTED FROM P.U. KEYS	NO. OF PRIVATE AND INTERCOMMUNICATING LINES WITH COMMON SIG. KEY	KEY LEADS			
				YEL-BRN	BRN	SL-BRN	BLK-BRN
6 BUTTON SET	5			M	M	M	X
	4	1		M	M	M	SG
	3	2		M	M	SG	X
	2	3		M	X	SG	X
	4	1	2	M	X	5H	SG
	4	1	3	X	X	5H	SG

COLOR OF MOUNTING CORD CONDUCTORS TO TERMINALS ON KEY AND LAMP TERMINAL STRIP

TEL CODE	KEY FEATURES (SEE NOTE 5)	RED	GRN	YEL	BLK	BLU	WHT	WHT-BRN-RED	WHT-BRN-GRN	WHT-BRN-YEL	WHT-BRN-BLK	WHT-BRN-BLU	WHT-BRN	WHT-RED-GRN	WHT-RED-YEL	WHT-RED-BLK	WHT-RED-BLU	WHT-RED
K-564-BA	HPPPsPs Ps	1R	1T	1B	1H	2R	2T	DD*	2H	3R	3T	DD*	3H	4R	4T	DD*	4H	5R

TEL CODE	WHT-GRN-YEL	WHT-GRN-BLK	WHT-GRN-BLU	WHT-YEL-BLU	WHT-YEL	WHT-SL-BLK	WHT-SL-YEL	WHT-SL-BLU	WHT-SL	WHT-SL-BRN	BRN	WHT-BLK	WHT-BLK-BLU	SL	WHT-BLU	WHT-GRN	WHT-YEL-BLK
K-564-BA	5T	DD*	5H	RR	RT	LG	1	2	3	4	5	ET	ER	EH	EB	SG	L2

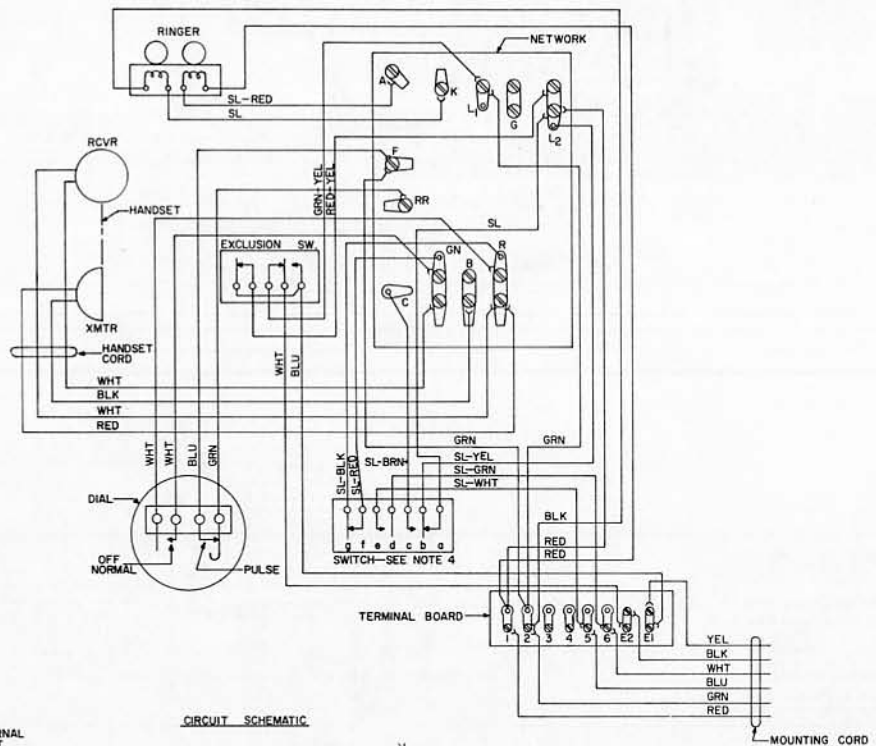


21545

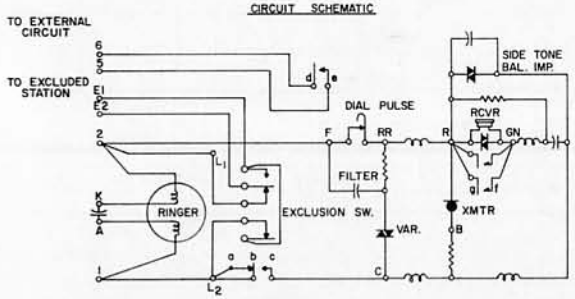
ISSUE NO.
1

K-502 TYPE TELEPHONE CIRCUIT

WIRING DIAGRAM



CIRCUIT SCHEMATIC



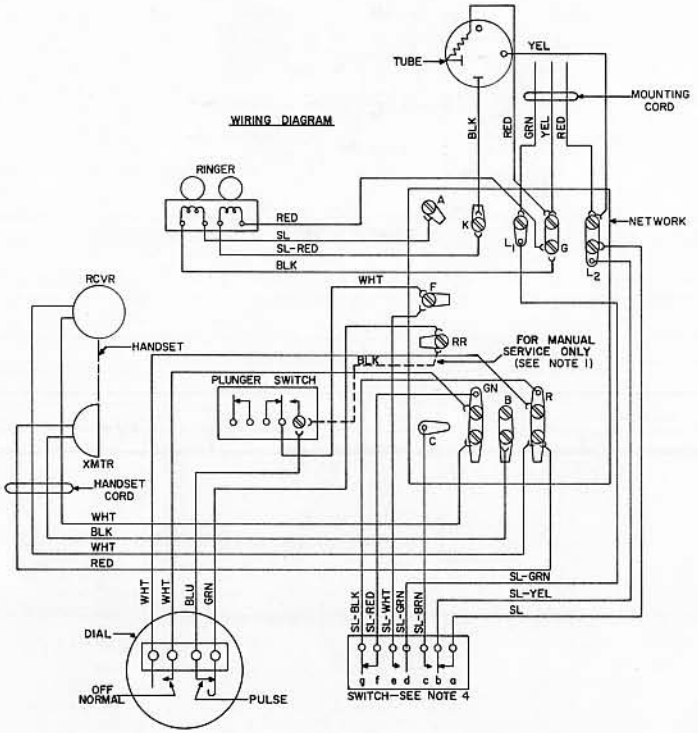
NOTES:

1. FOR MANUAL SERVICE: REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANFER GREEN LEAD FROM (F) TO (RR) ON THE NETWORK.
2. TO PERMANENTLY SILENCE RINGER: TRANSFER BLACK RINGER LEAD TO (K) TERMINAL ON NETWORK.
3. RINGER CUT-OFF CONTROL BY CUSTOMER: BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.
4. CONTACT SEQUENCE:
   REMOVING HANDSET:
   A. de CLOSES BEFORE cb
   B. fg OPENS
   RESTORING HANDSET:
   A. fg CLOSES
   B. cb OPENS BEFORE de

21548

ISSUE NO.
1

K-501 TYPE TELEPHONE CIRCUIT



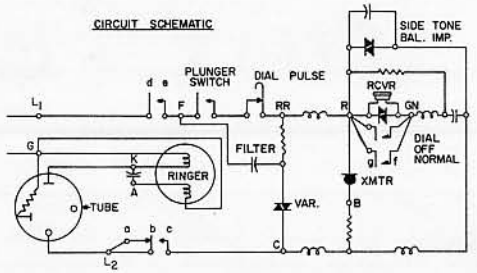


TABLE OF CONNECTIONS (POLARIZED RINGING)													
CLASS OF SERVICE	CONNECTIONS AT CONNECTING BLOCK						CONNECTIONS AT NETWORK						
	LINE			MTG. CORD			TUBE LEADS			RINGER LEADS			
	RING	TIP	GRD	RED	GRN	YEL	YEL	BLK	RED	RED	BLK	SL	SL-RED
(—) RING	R	G	Y	R	G	Y	L_2	K	G	G	G	A	K
(+) RING	R	G	Y	R	G	Y	G	K	L_2	L_2	L_2	A	K
(—) TIP	R	G	Y	G	R	Y	L_2	K	G	G	G	A	K
(+) TIP	R	G	Y	G	R	Y	G	K	L_2	L_2	L_2	A	K

NOTES:

1. FOR MANUAL SERVICE: REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND CONNECT PLUNGER SWITCH TO (RR) TERMINAL ON NETWORK WITH BLK LEAD AS SHOWN.
2. TO PERMANENTLY SILENCE RINGER: FOR RING PARTY, CONNECT THE YELLOW MOUNTING CORD CONDUCTOR TO THE (R) TERMINAL OF THE CONNECTING BLOCK. FOR TIP PARTY, CONNECT THE YELLOW MOUNTING CORD CONDUCTOR TO THE (G) TERMINAL OF THE CONNECTING BLOCK.
3. RINGER CUT-OFF CONTROL BY CUSTOMER: BEND STOP NEXT TO DETENT ON VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.
4. WHEN THE HANDSET IS REMOVED CONTACT gf BREAKS LAST.

21549

1
ISSUE NO.

K-500 TYPE TELEPHONE CIRCUIT

WIRING DIAGRAM

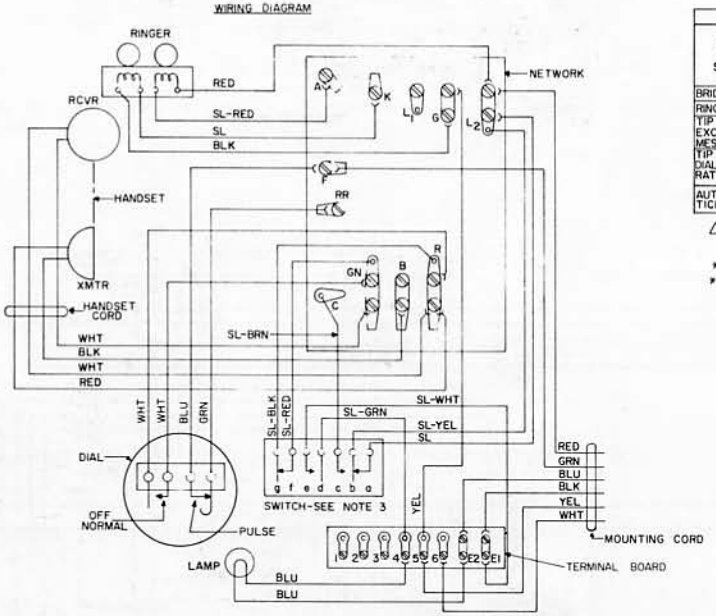


TABLE OF CONNECTIONS (BIASED RINGERS) (SEE NOTES 1 TO 3)													
CLASS OF SERVICE	CONNECTIONS AT CONNECTING BLOCK						CONNECTIONS AT NETWORK						
	LINE			MTG. CORD			MTG. CORD			RINGER LEADS			
	RING	TIP	GRD	RED	GRN	YEL	RED	GRN	YEL	RED	BLK	SL	SL-RED
BRIDGED △	1	2	3	1	2	2	L_2	F	5 *	L_2	G	K	A
RING PARTY △	1	2	3	1	2	3	L_2	F	5 *	L_2	G	K	A
TIP PARTY EXCEPT DIAL MESSAGE RATE	1	2	3	2	1	3	L_2	F	5 *	L_2	G	K	A
TIP PARTY DIAL MESSAGE RATE * *	1	2	3	2	1	3	L_2	F	5 *	K	G	B	B
AUTOMATIC TICKETING * *	1	2	3	2	1	3	L_2	F	5 *	B	B	K	G

△ CONNECTIONS FOR BRIDGED AND RING PARTIES ARE FOR FLAT AND MESSAGE RATE SERVICE.

* TERMINAL "5" IS ON TERMINAL BOARD.

* * TRANSFER SLATE SWITCH LEAD FROM (L_2) TO (A) TERMINAL ON NETWORK.

NOTES:

1. TO PERMANENTLY SILENCE RINGER:
   FOR BRIDGED, RING PARTY AND TIP PARTY EXCEPT DIAL MESSAGE RATE SERVICE, TRANSFER BLACK RINGER LEAD TO (K) TERMINAL ON NETWORK. (SEE NOTE 8)
2. RINGER CUT-OFF CONTROL BY CUSTOMER:
   BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.
3. WHEN THE HANDSET IS REMOVED CONTACT gf BREAKS LAST.
4. MOUNT THE CAPACITOR FURNISHED ON THE "K" TERMINAL OF THE NETWORK. CONNECT THE LOOSE CAPACITOR LEAD TO THE "G" TERMINAL.
5. CONNECT JUMPER FROM "A" TO "G" ON THE NETWORK.
6. CONNECT 6 OR 8 VOLT AC OR DC FOR DIAL LIGHT TO TERMINALS 7 & 8 ON CONNECTING BLOCK.
7. CONNECT MOUNTING CORD WHT, BLU AND BLK TO TERMINALS 6, 7 & 8 ON CONNECTING BLOCK RESPECTIVELY.
8. TO PERMANENTLY SILENCE RINGER:
   FOR TIP PARTY DIAL MESSAGE RATE SERVICE, TRANSFER SLATE-RED RINGER LEAD TO THE (K) TERMINAL. BLACK LEAD TO (G) AND SLATE LEAD TO (B) MUST REMAIN CONNECTED FOR PARTY IDENTIFICATION.
   FOR AUTOMATIC TICKETING, TRANSFER BLACK RINGER LEAD TO THE (K) TERMINAL.

CIRCUIT SCHEMATIC

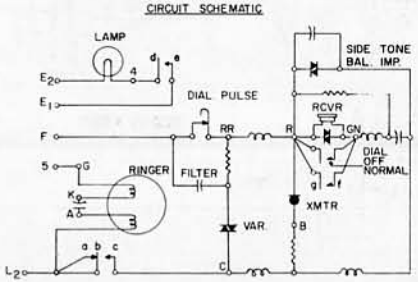


TABLE OF RINGERS			
FREQUENCY SELECTIVE (HARMONIC) TYPES			CONNECTIONS IN SET
	CY.	PTY	
HA 1	33 1/3	1	SEE NOTE 4
HA 2	50	2	4
HA 3	66 2/3	3	4
HA 4	16 2/3	4	5
HA 5	25	5	5
HB 1	30	1	5
HB 2	42	2	4
HB 3	54	3	4
HB 4	66	4	4
HB 5	16	5	5
HC 1	20	1	5
HC 2	60	2	4
HC 3	30	3	5
HC 4	40	4	4
HC 5	50	5	4

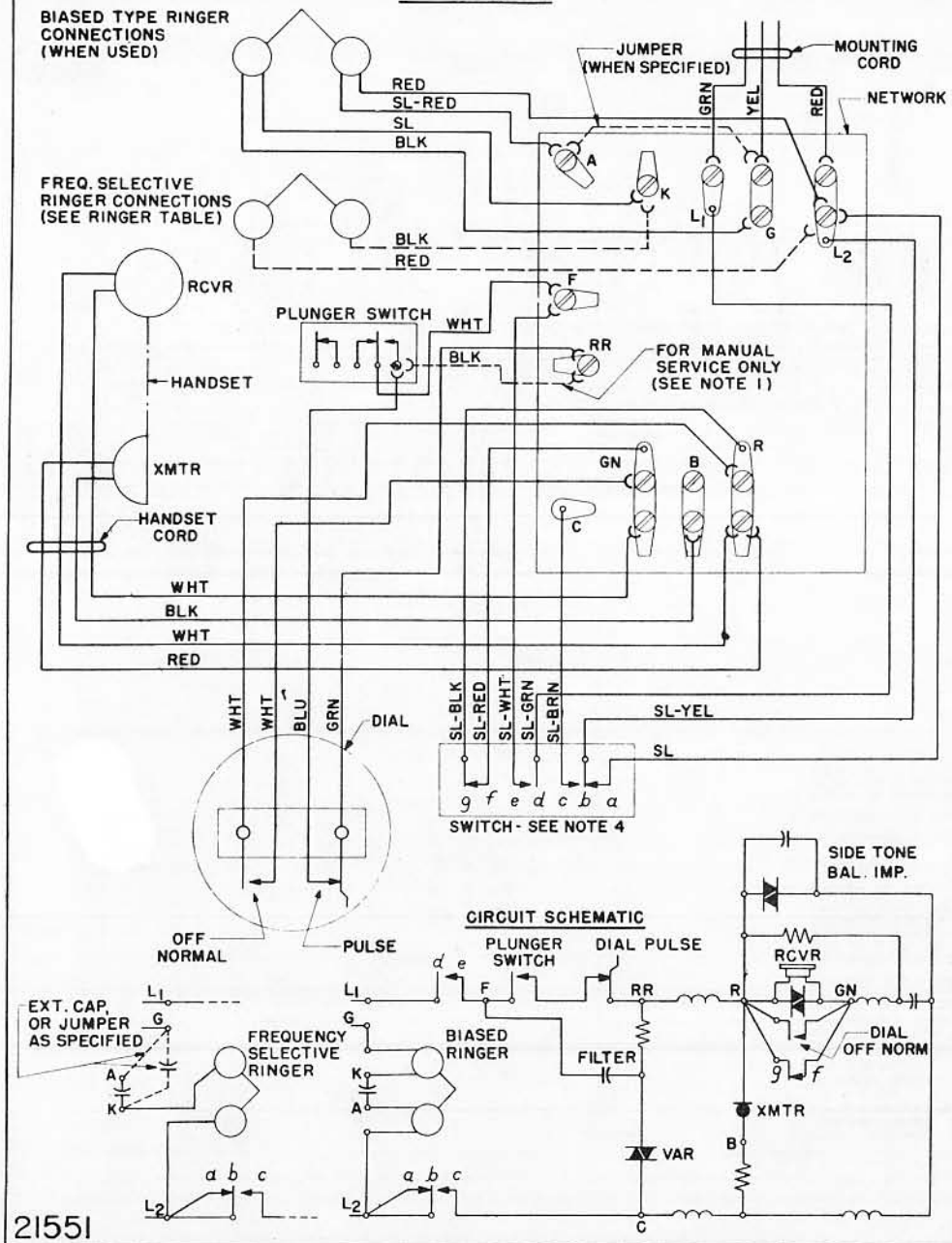
CONNECTIONS FOR FREQUENCY SELECTIVE RINGERS									
RINGING SERVICE	CONNECTIONS AT CONNECTING BLOCK						CONN. IN SET (ALSO SEE TABLE OF RINGERS)	
	LINE			MTG. CORD			RINGER LEADS	
	RING	TIP	GRD	RED	GR	YEL	RED	BLACK
BRIDGED	1	2	3 †	1	2	2	L_2	K
RING PARTY	1	2	3	1	2	3	L_2	K
TIP PARTY	1	2	3	2	1	3	L_2	K

† IF GROUND WIRE IS BROUGHT TO CONNECTING BLOCK.

2
1
ISSUE NO.

K-500 TYPE TELEPHONE CIRCUIT

WIRING DIAGRAM



CIRCUIT SCHEMATIC

21551

TABLE OF CONNECTIONS (BIASED RINGERS) (SEE NOTES 1 TO 4)

CLASS OF SERVICE	CONNECTIONS AT CONNECTING BLOCK						CONNECTIONS AT NETWORK						
	LINE			MTG. CORD			MTG. CORD			RINGER LEADS			
	RING	TIP	GRD.	RED	GRN	YEL	RED	GRN	YEL	RED	BLK	SL	SL-RED
BRIDGED △	R	G	Y	R	G	G	L_2	L_1	G	L_2	G	K	A
RING PARTY △	R	G	Y	R	G	Y	L_2	L_1	G	L_2	G	K	A
TIP PARTY EXCEPT DIAL MESSAGE RATE	R	G	Y	G	R	Y	L_2	L_1	G	L_2	G	K	A
TIP PARTY DIAL MESSAGE RATE *	R	G	Y	G	R	Y	L_2	L_1	G	K	G	B	B
AUTOMATIC TICKETING *	R	G	Y	G	R	Y	L_2	L_1	G	B	B	K	G

△ CONNECTIONS FOR BRIDGED AND RING PARTIES ARE FOR FLAT AND MESSAGE RATE SERVICE.

* TRANSFER SLATE SWITCH LEAD FROM (L_2) TO (A) TERMINAL ON NETWORK.

NOTES:

1. FOR MANUAL SERVICE:
   REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND CONNECT PLUNGER SWITCH TO (RR) TERMINAL ON NETWORK WITH BLK LEAD AS SHOWN.

2. TO PERMANENTLY SILENCE RINGER:
   FOR BRIDGED, RING PARTY AND TIP PARTY EXCEPT DIAL MESSAGE RATE SERVICES, TRANSFER BLACK RINGER LEAD TO (A) TERMINAL ON NETWORK.

   FOR TIP PARTY DIAL MESSAGE RATE SERVICE, TRANSFER SLATE-RED RINGER LEAD TO THE (K) TERMINAL. BLACK LEAD TO (G) AND SLATE LEAD TO (B) MUST REMAIN CONNECTED FOR PARTY IDENTIFICATION.

   FOR AUTOMATIC TICKETING, TRANSFER BLACK RINGER LEAD TO THE (K) TERMINAL.
   (CONTINUED ON NOTE 7)

3. RINGER CUT-OFF CONTROL BY CUSTOMER:
   BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.

4. WHEN THE HANDSET IS REMOVED CONTACT *g f* BREAKS LAST.

TABLE OF RINGERS

FREQUENCY SELECTIVE (HARMONIC) TYPES			VALUES OF EXTERNAL CAPACITOR	CONNECTIONS IN SET
	CY.	PTY.	MFD.	
HA 1	33 1/3	1	.35	SEE NOTE 5
HA 2	50	2	.1	5
HA 3	66 2/3	3	.1	5
HA 4	162/3	4	—	6
HA 5	25	5	—	6
HB 1	30	1	—	6
HB 2	42	2	.25	5
HB 3	54	3	.1	5
HB 4	66	4	.1	5
HB 5	16	5	—	6
HC 1	20	1	—	6
HC 2	60	2	.1	5
HC 3	30	3	—	6
HC 4	40	4	.25	5
HC 5	50	5	.1	5

5. MOUNT THE CAPACITOR FURNISHED WITH RINGER ON THE LEFT SIDE OF THE DIAL BRACKET CONNECT THE LEADS OF CAPACITOR TO THE "K" AND "G" TERMINALS ON NETWORK.

6. CONNECT JUMPER FROM "A" TO "G" ON THE NETWORK.

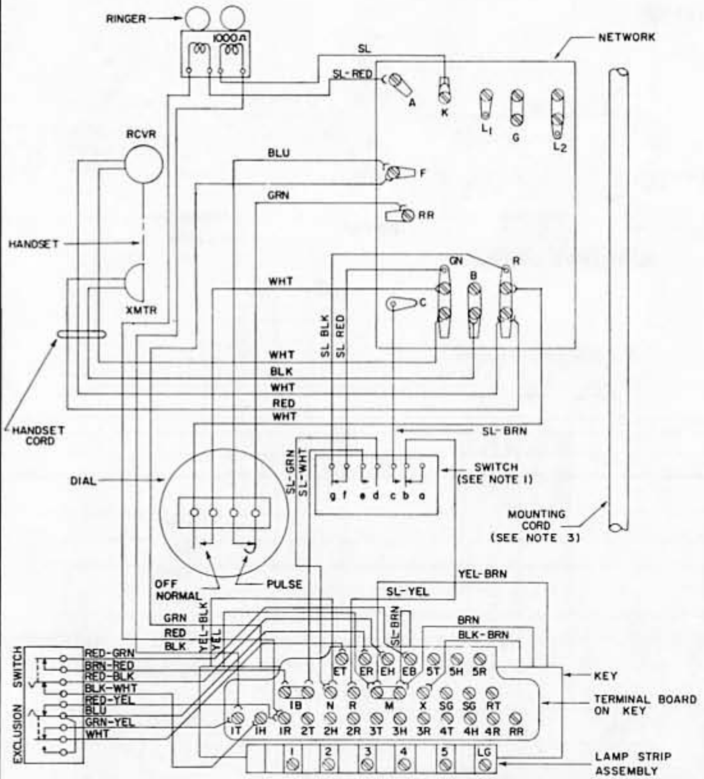
7. FOR FREQUENCY SELECTIVE RINGERS, TRANSFER RED RINGER LEAD FROM (L_2) TO (K) ON NETWORK.

CONNECTIONS FOR FREQUENCY SELECTIVE RINGERS

RINGING SERVICE	CONNECTIONS AT CONNECTING BLOCK							
	LINE			MTG. CORD				
	RING	TIP	GRD	RED	GRN	YEL		
BRIDGED	R	G	Y*	R	G	G		
RING PARTY	R	G	Y	R	G	Y		
TIP PARTY	R	G	Y	G	R	Y		

* IF GROUND WIRE IS BROUGHT TO CONNECTING BLOCK

ISSUE NO 3 2 1



NOTES:

1- CONTACT SEQUENCE
   REMOVING HANDSET
   A. de CLOSES BEFORE cb
   B. fg OPENS
   RESTORING HANDSET
   A. fg CLOSES
   B. cb OPENS BEFORE de

2- FOR MANUAL SERVICE REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER GREEN KEY LEAD FROM (F) TERMINAL TO (RR) TERMINAL ON NETWORK.

3- SEE TABLE FOR CONNECTIONS.

4- FOR RINGER CUT-OFF CONTROL BY CUSTOMER BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.

5- KEY FEATURE DESIGNATIONS:
   H - HOLD
   P - PICK-UP

   PS - CONVERTIBLE, PICK UP OR SIGNAL

6- DD* CONDUCTORS ARE TAPED AND STORED IN TELEPHONE.

7- PROVIDE "M" WIRING WHEN THE BUZZER IS TO OPERATE ON 60 CYCLES AC, AND PROVIDE "N" WIRING WHEN THE BUZZER IS TO OPERATE ON DC.

TABLE A

UNIVERSAL-KIAI SYSTEM CONVERSION-STATION BUSY SIGNAL CONNECTIONS
CONNECTION OF HOLD KEY AND SWITCH LEADS

	KEY TEL. SYS.	HOLD KEY & SWITCH LEADS SL WHT	SL GRN	SL YEL	YEL	YEL BLK	MIW CORD
NO STATION BUSY LAMP	UNIV.	1B	1B	N	R	M	
	KIAI	1B	N	R	M	N	
WITH STATION BUSY LAMP	UNIV.	SG	L2 #	N	R	M	
	KIAI	1B	L2 #	R	M	N	G# TO N

TERMINAL ON NETWORK

TABLE B

RINGER CONNECTIONS

			RINGER OR BUZZER LEAD SL-RED	SL	BLK	RED
SET RINGER OR BUZZER NOT TO BE CUT OFF IN SET	WHEN USED AS BRIDGED RINGER ON ANY LINE		A	K	T	R
	WHEN USED AS PRIVATE LINE COMMON SIG. OR OTHER USE	WITH COND.	A	K	RT	RR
		WITHOUT COND.	A	A		

TABLE C

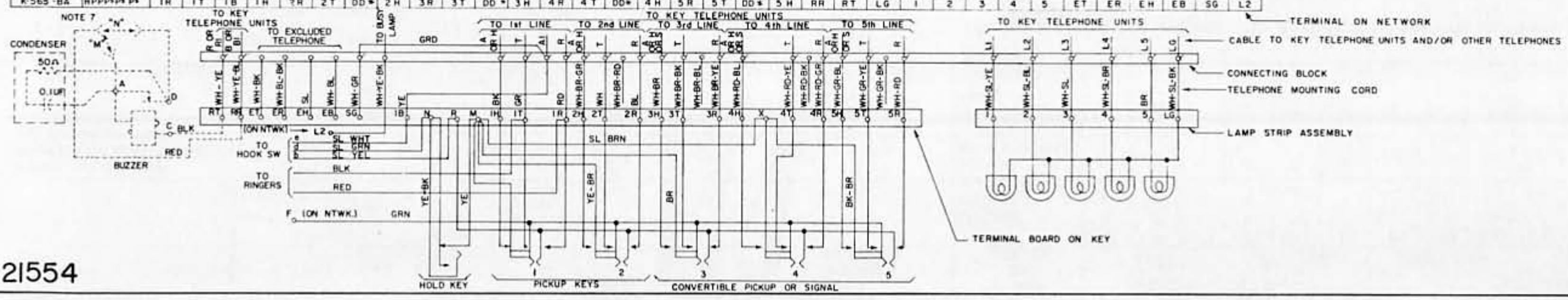
PICKUP-SIGNALLING CONVERSION
CONVERT FROM LOCKING TO NON-LOCKING OR VICE-VERSA
AND CHANGE LEADS AS FOLLOWS:

	NO. OF PICKUP KEYS	NO. OF SIG. KEYS CONVERTED FROM P.U. KEYS	NO. OF PRIVATE AND INTERCOMMUNICATING LINES WITH COMMON SIG. KEY	KEY LEADS YEL-BRN	BRN	SL-BRN	BLK-BRN
6 BUTTON SET	5			M	M	M	X
	4	1		M	M	M	SG
	3	2		M	M	SG	X
	2	3		M	X	SG	X
	4	1	2	M	X	5H	SG
	4	1	3	X	X	5H	SG

COLOR OF MOUNTING CORD CONDUCTORS TO TERMINALS ON KEY AND LAMP TERMINAL STRIP

TEL CODE	KEY FEATURES (SEE NOTE 5)	RED	GRN	YEL	BLK	BLU	WHT	WHT-BRN-RED	WHT-BRN-GRN	WHT-BRN-YEL	WHT-BRN-BLK	WHT-BRN-BLU	WHT-BRN	WHT-RED-GRN	WHT-RED-YEL	WHT-RED-BLK	WHT-RED-BLU
K-565-BA	HPPPPSPS PS	1R	1T	1B	1H	2R	2T	DD*	2H	3R	3T	DD*	3H	4R	4T	DD*	4H

TEL CODE	WHT-RED	WHT-GRN-YEL	WHT-GRN-BLK	WHT-GRN-BLU	WHT-YEL-BLU	WHT-YEL	WHT-SL-BLK	WHT-SL-YEL	WHT-SL-BLU	WHT-SL	WHT-SL-BRN	BRN	WHT-BLK	WHT-BLK-BLU	SL	WHT-BLU	WHT-GRN	WHT-YEL-BLK
K-565-BA	5R	5T	DD*	5H	RR	RT	LG	1	2	3	4	5	ET	ER	EH	EB	SG	L2



21554

2
ISSUE NO.

K-500 TYPE TELEPHONE CIRCUIT

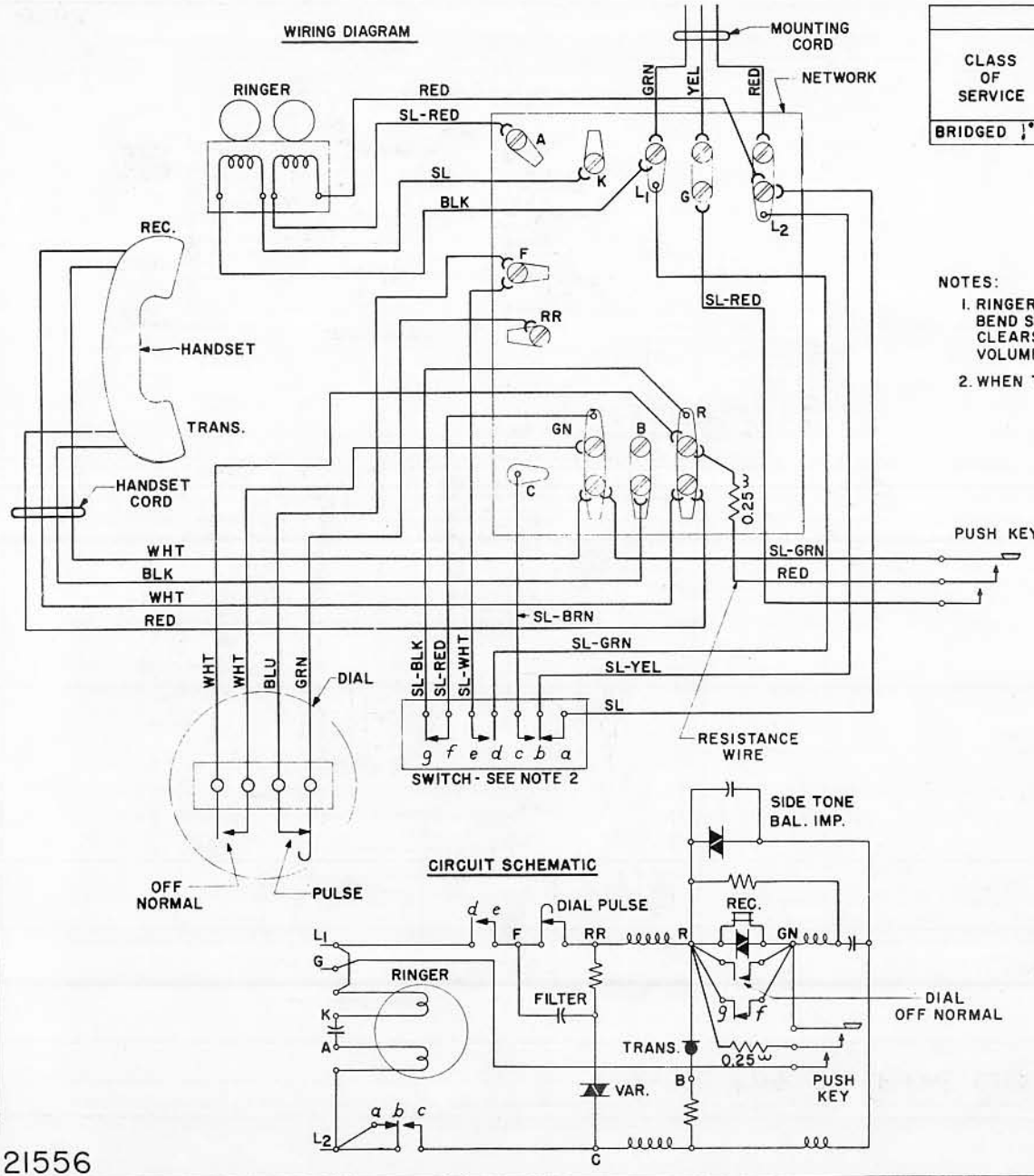


TABLE OF CONNECTIONS													
CLASS OF SERVICE	CONNECTIONS AT CONNECTING BLOCK						CONNECTIONS AT NETWORK						
	I-14 REPEATER			MTG. CORD			MTG. CORD			RINGER LEADS			
	8	7	9	RED	GRN	YEL	RED	GRN	YEL	RED	BLK	SL	SL-RED
BRIDGED	R	G	Y	R	G	Y	L_2	L_1	G	L_2	L_1	K	A

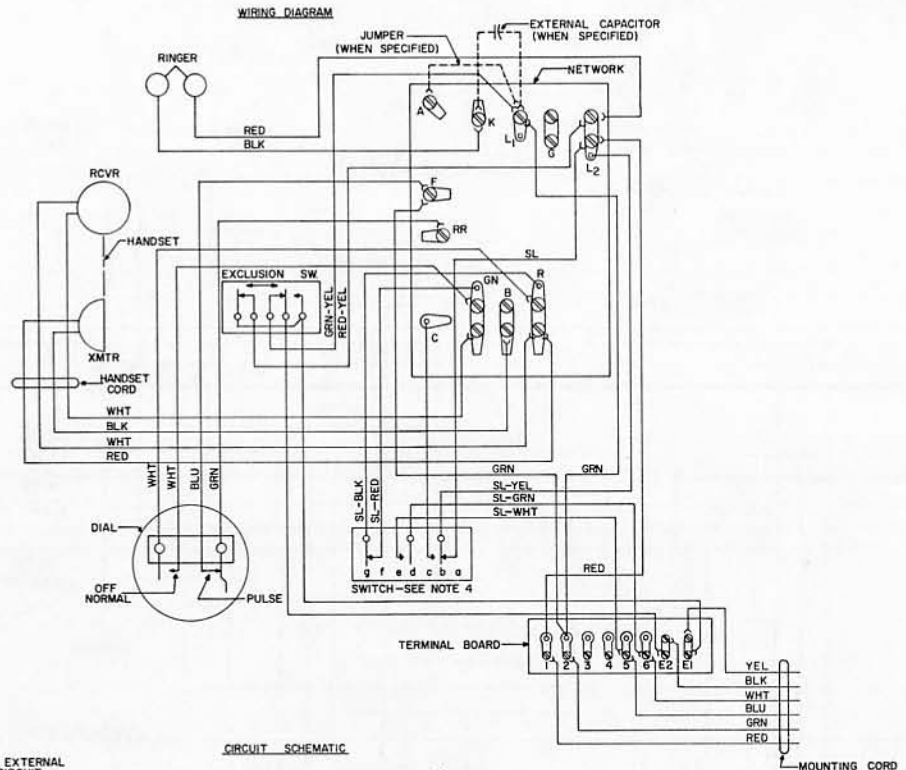
NOTES:

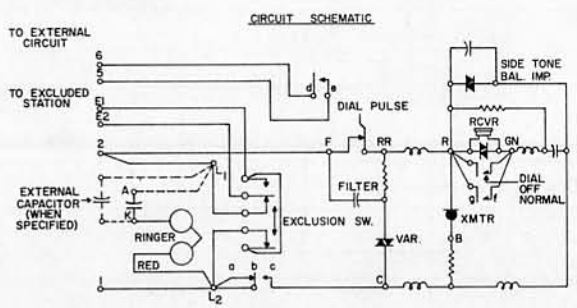
1. RINGER CUT-OFF CONTROL BY CUSTOMER:
   BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.
2. WHEN THE HANDSET IS REMOVED CONTACT *gf* BREAKS LAST.

21556

ISSUE NO 1

K-502 TYPE TELEPHONE CIRCUIT





NOTES:

1. FOR MANUAL SERVICE: REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER GREEN LEAD FROM (F) TO (RR) ON THE NETWORK.
2. TO PERMANENTLY SILENCE RINGER: TRANSFER RED RINGER LEAD TO (K) TERMINAL ON NETWORK.
3. CONTACT SEQUENCE:
   REMOVING HANDSET:
   A. de CLOSES BEFORE cb
   B. fg OPENS
   RESTORING HANDSET:
   A. fg CLOSES
   B. cb OPENS BEFORE de
4. MOUNT THE CAPACITOR FURNISHED WITH RINGER ON THE LEFT SIDE OF THE DIAL BRACKET. CONNECT THE LEADS OF THE CAPACITOR TO THE (K) AND (L_1) TERMINALS ON THE NETWORK.
5. CONNECT JUMPER FROM (A) TO (L_1) TERMINALS ON THE NETWORK.

TABLE OF RINGERS

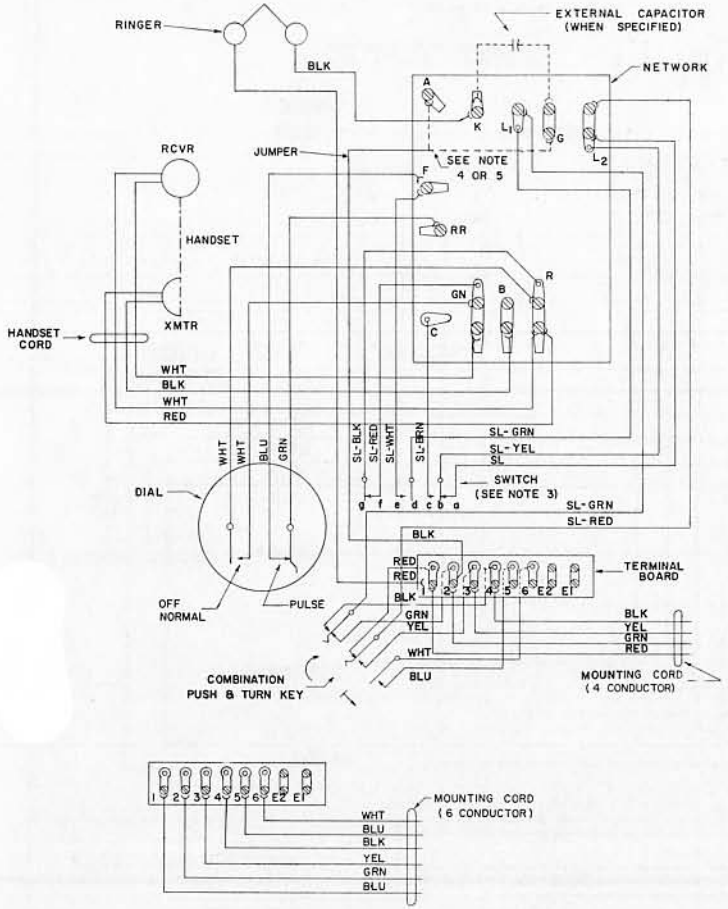
FREQUENCY SELECTIVE (HARMONIC) TYPES		EXTERNAL CAPACITOR	CONNECTIONS IN SET
PTY.	CYCLES	μF	
HA1	33-1/3	.35	SEE NOTE 4
HA2	50	.1	4
HA3	66-2/3	.1	4
HA4	16-2/3	—	5
HA5	25	—	5
HB1	30	—	5
HB2	42	.25	4
HB3	54	.1	4
HB4	66	.1	4
HB5	16	—	5
HC1	20	—	5
HC2	60	.1	4
HC3	30	—	5
HC4	40	.25	4
HC5	50	.1	4

21563

ISSUE NO. 1

K-510 TYPE TELEPHONE CIRCUIT

WIRING DIAGRAM



NOTES:

1- FOR MANUAL SERVICE:
REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER SLATE-WHITE SWITCH LEAD TO (RR) TERMINAL ON NETWORK.

2- TO PERMANENTLY SILENCE RINGER:
TRANSFER RED RINGER LEAD TO (K) TERMINAL ON NETWORK.

3- WHEN THE HANDSET IS REMOVED FROM CRADLE CONTACT gf BREAKS LAST.

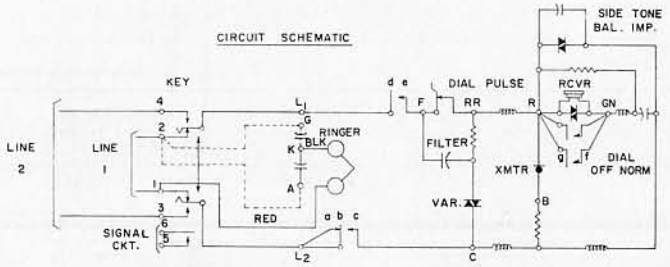
4- MOUNT THE CONDENSER FURNISHED ON THE "K" TERMINAL ON THE NETWORK. CONNECT THE LOOSE CONDENSER LEAD TO THE "G" TERMINAL, AND CONNECT JUMPER FROM "G" TERMINAL ON THE NETWORK TO # 2 ON THE TERMINAL BOARD.

5- CONNECT JUMPER FROM "A" TERMINAL ON THE NETWORK TO # 2 ON THE TERMINAL BOARD.

TABLE OF RINGERS

FREQUENCY SELECTIVE (HARMONIC) TYPES		EXTERNAL CAPACITOR	CONNECTIONS IN SET
PTY	CYCLES	µF	
HA1	33-1/3	.35	SEE NOTE 4
HA2	50	.1	4
HA3	66-2/3	.1	4
HA4	16-2/3	—	5
HA5	25	—	5
HB1	30	—	5
HB2	42	.25	4
HB3	54	.1	4
HB4	66	.1	4
HB5	16	—	5
HC1	20	—	5
HC2	60	.1	4
HC3	30	—	5
HC4	40	.25	4
HC5	50	.1	4

CIRCUIT SCHEMATIC

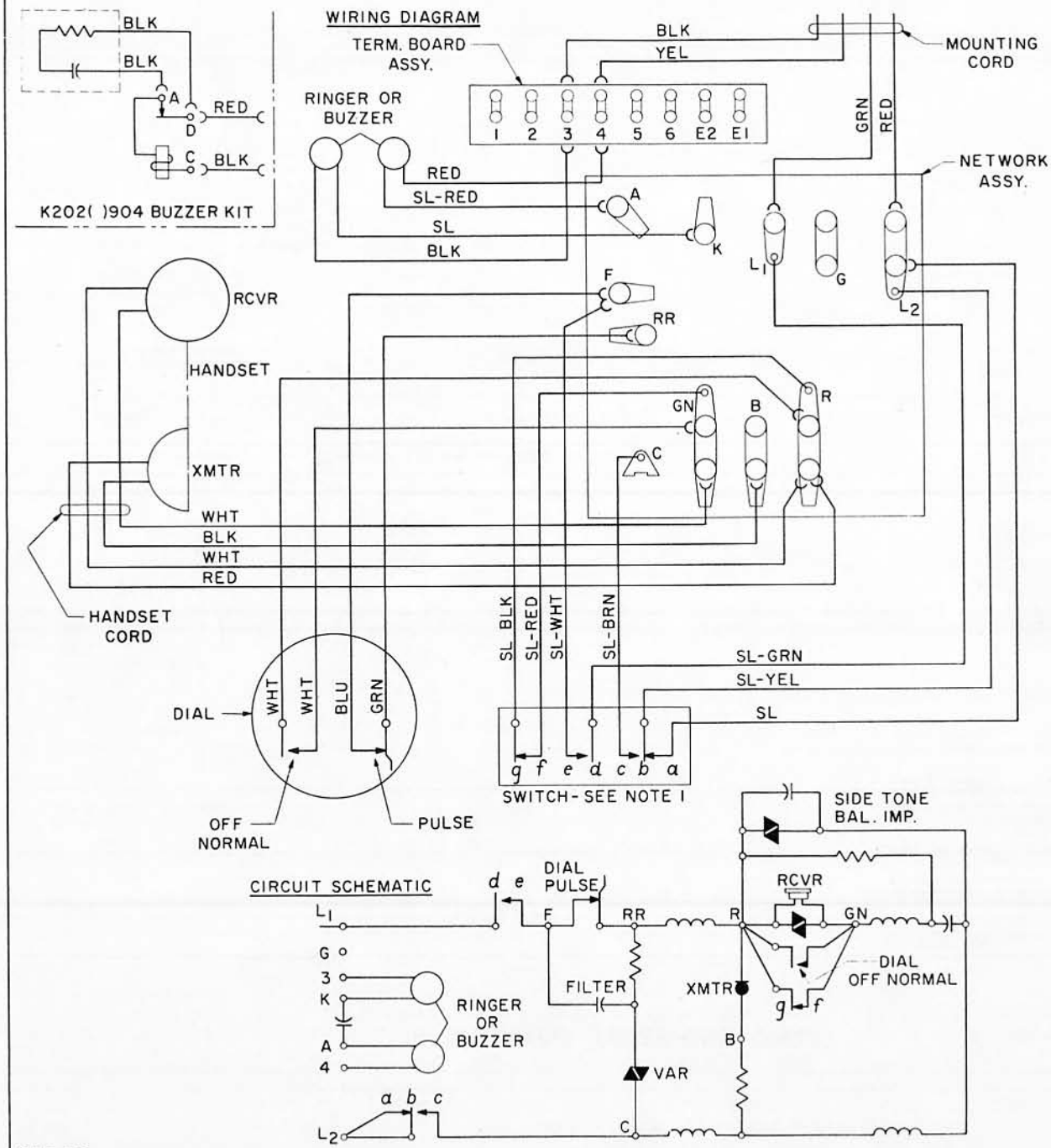


21564

3
2
1
ISSUE NO.

K-500 TYPE TELEPHONE CIRCUIT

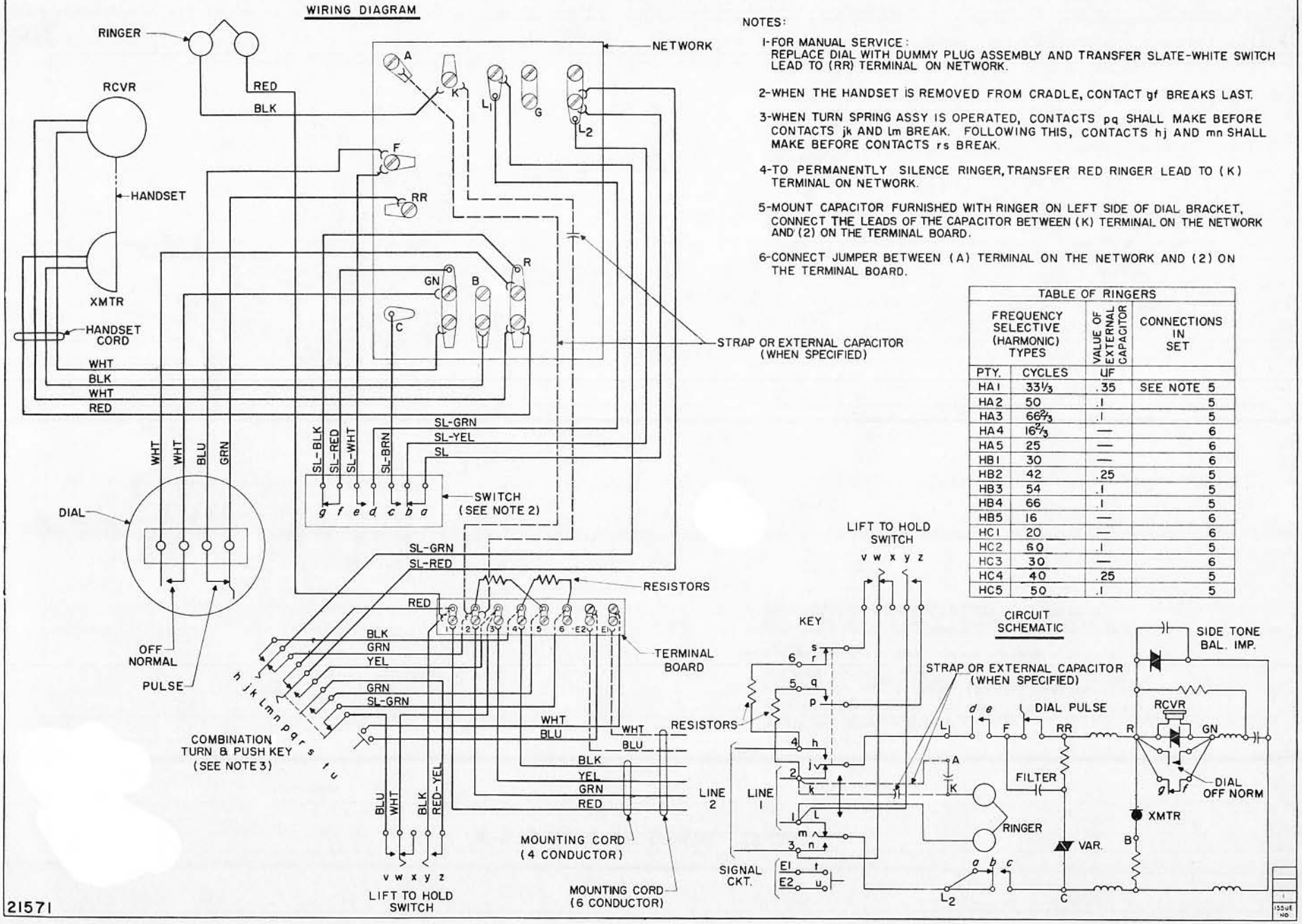
NOTES:
1-WHEN THE HANDSET IS REMOVED CONTACT g f BREAKS LAST.



21569

1
ISSUE NO.

K-575 TYPE TELEPHONE CIRCUIT



NOTES:

1-FOR MANUAL SERVICE: REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER SLATE-WHITE SWITCH LEAD TO (RR) TERMINAL ON NETWORK.

2-WHEN THE HANDSET IS REMOVED FROM CRADLE, CONTACT gf BREAKS LAST.

3-WHEN TURN SPRING ASSY IS OPERATED, CONTACTS pq SHALL MAKE BEFORE CONTACTS jk AND lm BREAK. FOLLOWING THIS, CONTACTS hj AND mn SHALL MAKE BEFORE CONTACTS rs BREAK.

4-TO PERMANENTLY SILENCE RINGER, TRANSFER RED RINGER LEAD TO (K) TERMINAL ON NETWORK.

5-MOUNT CAPACITOR FURNISHED WITH RINGER ON LEFT SIDE OF DIAL BRACKET, CONNECT THE LEADS OF THE CAPACITOR BETWEEN (K) TERMINAL ON THE NETWORK AND (2) ON THE TERMINAL BOARD.

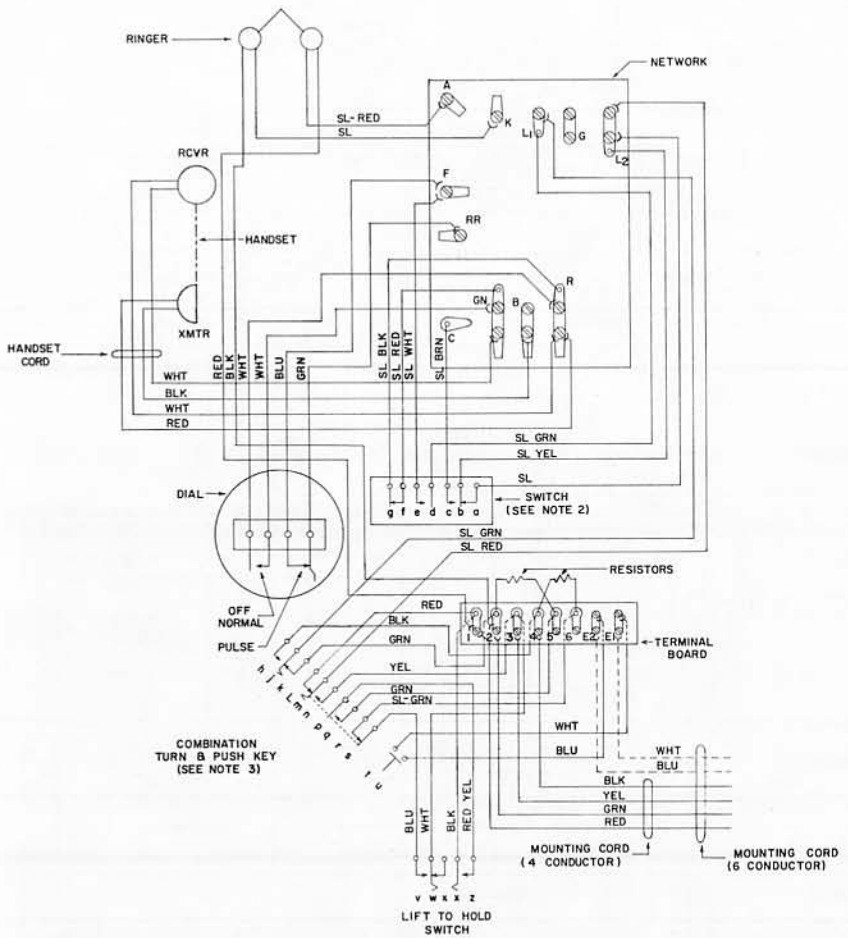
6-CONNECT JUMPER BETWEEN (A) TERMINAL ON THE NETWORK AND (2) ON THE TERMINAL BOARD.

TABLE OF RINGERS

FREQUENCY SELECTIVE (HARMONIC) TYPES		VALUE OF EXTERNAL CAPACITOR	CONNECTIONS IN SET
PTY.	CYCLES	UF	
HA1	33 1/3	.35	SEE NOTE 5
HA2	50	.1	5
HA3	66 2/3	.1	5
HA4	16 2/3	—	6
HA5	25	—	6
HB1	30	—	6
HB2	42	.25	5
HB3	54	.1	5
HB4	66	.1	5
HB5	16	—	6
HC1	20	—	6
HC2	60	.1	5
HC3	30	—	6
HC4	40	.25	5
HC5	50	.1	5

K-575 TYPE TELEPHONE CIRCUIT

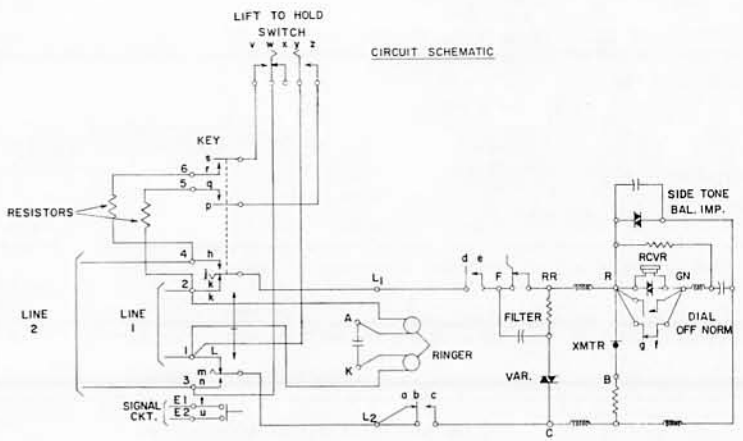
WIRING DIAGRAM



NOTES:

1. FOR MANUAL SERVICE: REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER SLATE-WHITE SWITCH LEAD TO (RR) TERMINAL ON NETWORK.
2. WHEN THE HANDSET IS REMOVED FROM CRADLE CONTACT gf BREAKS LAST.
3. WHEN TURN SPRING ASSY. IS OPERATED, CONTACTS pq SHALL MAKE BEFORE CONTACTS jk AND lm BREAK. FOLLOWING THIS, CONTACTS hj AND mn SHALL MAKE BEFORE CONTACTS rs BREAK.
4. TO PERMANENTLY SILENCE RINGER: TRANSFER RED RINGER LEAD TO (K) TERMINAL ON NETWORK.
5. RINGER CUT-OFF CONTROL BY CUSTOMER: BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON THE VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.

CIRCUIT SCHEMATIC



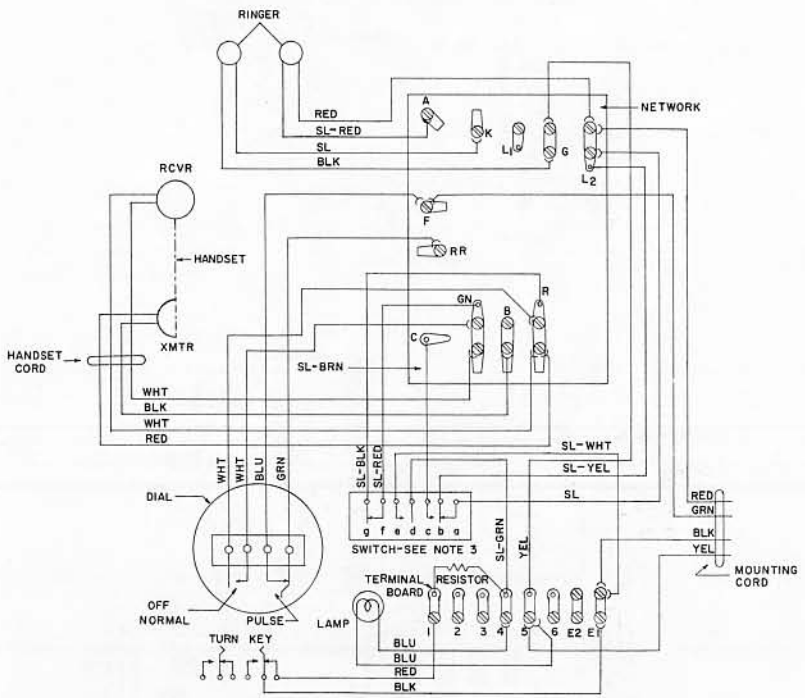
21572

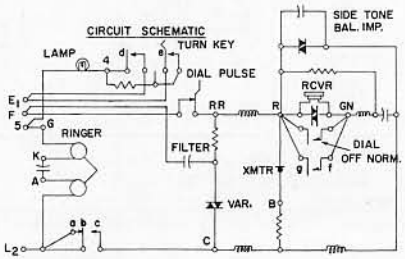
ISSUE NO. 1

K-500 TYPE TELEPHONE CIRCUIT

(DIAL LIGHT - NIGHT LIGHT)

WIRING DIAGRAM





NOTES:

1- TO PERMANENTLY SILENCE RINGER:
FOR BRIDGED, RING PARTY AND TIP PARTY TRANSFER BLACK RINGER LEAD TO (K) TERMINAL ON NETWORK.

2- RINGER CUT-OFF CONTROL BY CUSTOMER:
BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHIOH PREVENTS ARMATURE MOVEMENT.

3- WHEN THE HANDSET IS REMOVED CONTACT gf BREAKS LAST.

4- FOR MANUAL SERVICE:
REPLACE DIAL WITH DUMMY PLUG ASSEMBLY, AND TRANSFER GREEN LEAD FROM (F) TO (RR) ON THE NETWORK.

TABLE OF CONNECTIONS FOR BIASED RINGERS

CLASS OF SERVICE	CONNECTIONS AT CONNECTION BLOCK									CONNECTIONS AT NETWORK						
	LINE			MTG. CORD			DIAL LIGHT			MTG. CORD				RINGER LEADS		
	RING	TIP	GND	RED	GRN	YEL	BLK	POWER	6-8V DC-AC	RED	GRN	YEL	BLK	RED	BLK	SL	SL-RED
BRIDGED △	R	G	Y	R	G	G	B	G	B	L2	F	5*	E1*	L2	G	K	A
RING PARTY △	R	G	Y	R	G	Y	B	Y	B	L2	F	5*	E1*	L2	G	K	A
TIP PARTY EXCEPT DIAL MESSAGE RATE	R	G	Y	G	R	Y	B	Y	B	L2	F	5*	E1*	L2	G	K	A

△ CONNECTIONS FOR BRIDGED AND RING PARTIES ARE FOR FLAT AND MESSAGE RATE SERVICE:

* TERMINAL "5" & "E1" ARE ON TERMINAL BOARD.

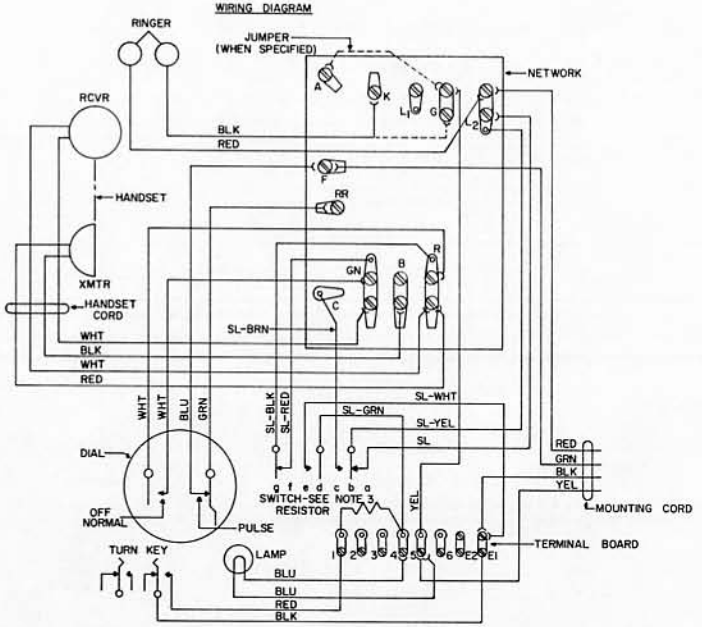
21574

1
ISSUE NO.

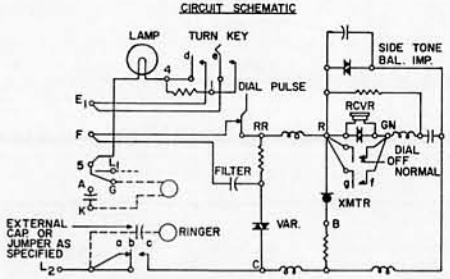
K-500 TYPE TELEPHONE CIRCUIT

(DIAL LIGHT - NIGHT LIGHT)

WIRING DIAGRAM



CIRCUIT SCHEMATIC



NOTES:

1. FOR MANUAL SERVICE: REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER GREEN LEAD FROM (F) TO (RR) ON THE NETWORK.
2. TO PERMANENTLY SILENCE RINGER: TRANSFER RED RINGER LEAD TO (K) TERMINAL ON NETWORK.
3. WHEN HANDSET IS REMOVED CONTACT gf BREAKS LAST.
4. CONNECT BLACK RINGER LEAD TO TERMINAL (G) ON THE NETWORK.
5. CONNECT BLACK RINGER LEAD TO TERMINAL (K) ON THE NETWORK, AND CONNECT JUMPER FROM (A) TO (G).

TABLE OF CONNECTIONS FOR FREQUENCY SELECTIVE RINGERS

CLASS OF SERVICE	CONNECTIONS AT CONNECTING BLOCK									CONNECTIONS AT NETWORK					
	LINE			MTG. CORD				DIAL LIGHT POWER 6-8V AC OR DC		MTG. CORD					
	RING	TIP	GRD	RED	GRN	YEL	BLK			RED	GRN	YEL	BLK		
BRIDGED	R	G	Y	R	G	G	B	G	B	L_2	F	5*	E_1*		
RING PARTY	R	G	Y	R	G	Y	B	Y	B	L_2	F	5*	E_1*		
TIP PARTY	R	G	Y	G	R	Y	B	Y	B	L_2	F	5*	E_1*		

*- TERMINALS "5" AND "E_1" ARE ON TERMINAL BOARD.

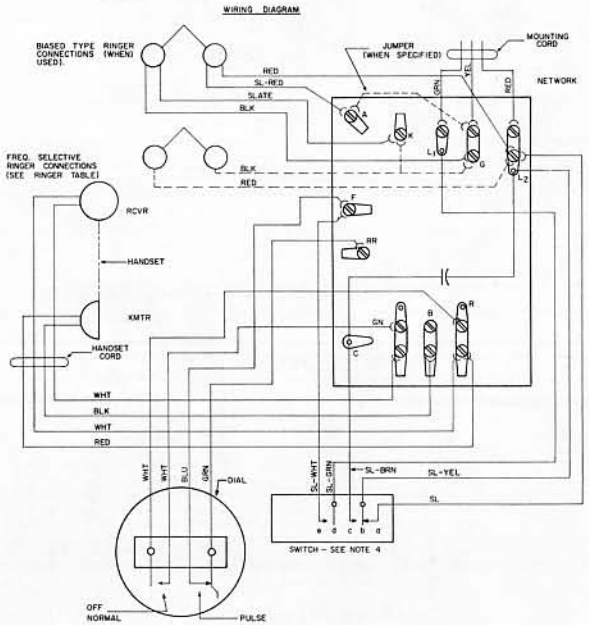
TABLE OF RINGERS

FREQUENCY SELECTIVE (HARMONIC) TYPES		EXTERNAL CAPACITOR	CONNECTIONS IN SET
PTY.	CYCLES	μF	
HA1	33-1/3	.35	SEE NOTE 4
HA2	50	.1	4
HA3	66-2/3	.1	4
HA4	16-2/3	—	5
HA5	25	—	5
HB1	30	—	5
HB2	42	.25	4
HB3	54	.1	4
HB4	66	.1	4
HB5	16	—	5
HC1	20	—	5
HC2	60	.1	4
HC3	30	—	5
HC4	40	.25	4
HC5	50	.1	4

2
1
ISSUE NO.

K-500 TYPE TELEPHONE CIRCUIT

WIRING DIAGRAM



CIRCUIT SCHEMATIC

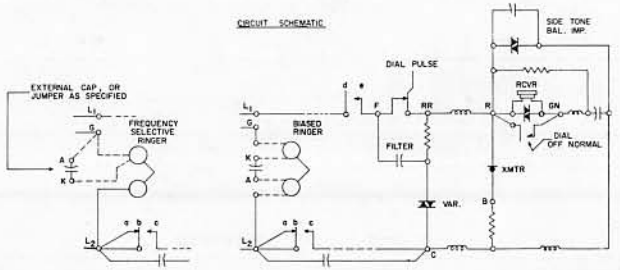


TABLE OF CONNECTIONS (BIASED RINGER) (SEE NOTES 1 TO 4)													
CLASS OF SERVICE	CONNECTIONS AT CONNECTION BLOCK						CONNECTIONS AT NETWORK						
	LINE			MTG. CORD			MTG. CORD			RINGER LEADS			
	RING	TIP	GND	RED	GR	YEL	RED	GR	YEL	RED	BLK	SL	SL-RED
BRIDGED △	R	G	Y	R	G	G	L_2	L_1	G	L_2	G	K	A
RING PARTY △	R	G	Y	R	G	Y	L_2	L_1	G	L_2	G	K	A
TIP PARTY EXCEPT DIAL MESSAGE RATE	R	G	Y	G	R	Y	L_2	L_1	G	L_2	G	K	A
TIP PARTY DIAL MESSAGE RATE *	R	G	Y	G	R	Y	L_2	L_1	G	K	G	B	B
AUTOMATIC TICKETING *	R	G	Y	G	R	Y	L_2	L_1	G	B	B	K	G

△ CONNECTIONS FOR BRIDGED AND RING PARTIES ARE FOR FLAT AND MESSAGE RATE SERVICE.

* TRANSFER SLATE SWITCH LEAD FROM (L_2) TO (A) TERMINAL ON NETWORK.

NOTES:

1. FOR MANUAL SERVICE:
   REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER SLATE-WHITE SWITCH LEAD TO (RR) TERMINAL ON NETWORK.
2. TO PERMANENTLY SILENCE RINGER:
   FOR BRIDGED, RING PARTY AND TIP PARTY EXCEPT DIAL MESSAGE RATE SERVICES TRANSFER BLACK RINGER LEAD TO (A) TERMINAL ON NETWORK.

   FOR TIP PARTY DIAL MESSAGE RATE SERVICE, TRANSFER SLATE-RED RINGER LEAD TO THE (K) TERMINAL. BLACK LEAD TO (G) AND SLATE LEAD TO (B) MUST REMAIN CONNECTED FOR PARTY IDENTIFICATION.

   FOR AUTOMATIC TICKETING TRANSFER BLACK RINGER LEAD TO THE (K) TERMINAL. (CONTINUED ON NOTE 7).
3. RINGER CUT-OFF CONTROL BY CUSTOMER:
   BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.
4. WHEN THE HANDSET IS REMOVED CONTACTS de CLOSE AND CONTACTS bc REMAIN OPEN. WHEN HOOKSWITCH IS MOVED TO THE "TALK" POSITION CONTACTS bc CLOSE.
5. CONNECT BLACK RINGER LEAD TO THE (G) TERMINAL ON THE NETWORK.
6. CONNECT BLACK RINGER LEAD TO THE (K) TERMINAL ON THE NETWORK AND CONNECT JUMPER FROM (A) TO (G).
7. FOR FREQUENCY SELECTIVE RINGERS TRANSFER RED RINGER LEAD FROM (L_2) TO (K) ON NETWORK.

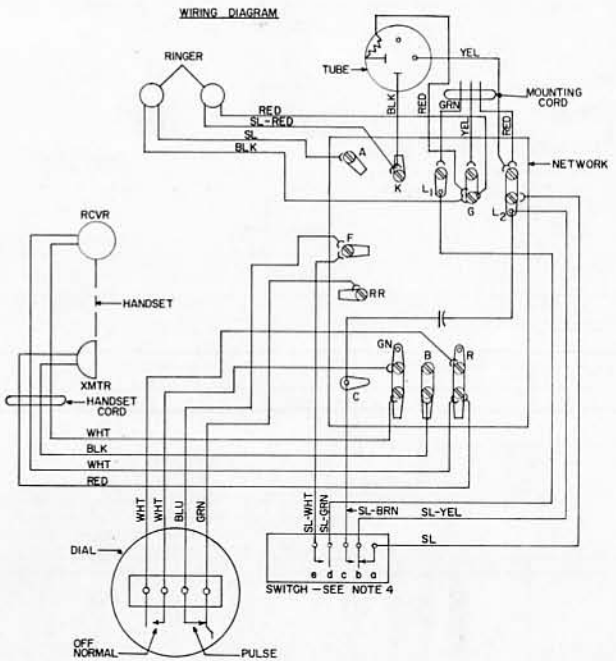
TABLE OF RINGERS						
FREQUENCY SELECTIVE (HARMONIC) TYPES				CAP. MFD.	CONNECTIONS IN SET	
	CY.	PTY.	UF			
HA1	33 1/3	1	.35		SEE NOTE 5	
HA2	50	2	.1			5
HA3	66 2/3	3	.1			5
HA4	16 2/3	4	–			6
HA5	25	5	–			6
HB1	30	1	–			6
HB2	42	2	.25			5
HB3	54	3	.1			5
HB4	66	4	.1			5
HB5	16	5	–			6
HC1	20	1	–			6
HC2	40	2	.1			5
HC3	30	3	–			6
HC4	40	4	.25			5
HC5	50	5	.1		†	5

CONNECTIONS FOR FREQUENCY SELECTIVE RINGERS								
RINGING SERVICE	CONNECTIONS AT CONNECTION BLOCK							
	LINE			MTG. CORD				
	RING	TIP	GND	RED	OR	YEL		
BRIDGED	R	G	Y*	R	G	G		
RING PARTY	R	G	Y	R	G	Y		
TIP PARTY	R	G	Y	G	R	Y		

* IF GROUND WIRE IS BROUGHT TO CONNECTING BLOCK

K-500 TYPE TELEPHONE CIRCUIT

WIRING DIAGRAM



CIRCUIT SCHEMATIC

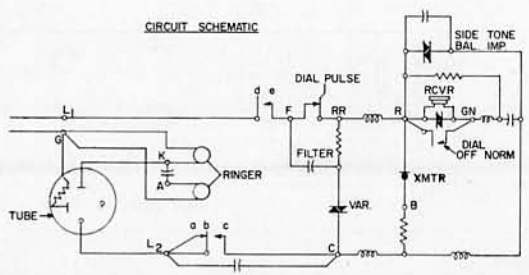


TABLE OF CONNECTIONS (POLARIZED RINGING)													
CLASS OF SERVICE	CONNECTIONS AT CONNECTING BLOCK						CONNECTIONS AT NETWORK						
	LINE			MTG. CORD			TUBE LEADS			RINGER LEADS			
	RING	TIP	GRD	RED	GRN	YEL	YEL	BLK	RED	RED	BLK	SL	SL-RED
(−) RING	R	G	Y	R	G	Y	L_2	K	G	G	G	A	K
(+) RING	R	G	Y	R	G	Y	G	K	L_2	L_2	L_2	A	K
(−) TIP	R	G	Y	G	R	Y	L_2	K	G	G	G	A	K
(+) TIP	R	G	Y	G	R	Y	G	K	L_2	L_2	L_2	A	K

1. FOR MANUAL SERVICE:
   REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER SLATE-WHITE SWITCH LEAD TO (RR) TERMINAL ON NETWORK.

2. TO PERMANENTLY SILENCE RINGER.
   FOR RING PARTY, CONNECT THE YELLOW MOUNTING CORD CONDUCTOR TO THE (R) TERMINAL OF THE CONNECTING BLOCK. FOR TIP PARTY, CONNECT THE YELLOW MOUNTING CORD CONDUCTOR TO THE (G) TERMINAL OF THE CONNECTING BLOCK.

3. RINGER CUT-OFF CONTROL BY CUSTOMER.
   BEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT IT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARMATURE MOVEMENT.

4. WHEN THE HANDSET IS REMOVED CONTACTS de CLOSE AND CONTACTS bc REMAIN OPEN. WHEN HOOKSWITCH IS MOVED TO THE "TALK" POSITION, CONTACTS bc CLOSE.

21577

I
ISSUE NO.