

## KS-16605 TELETRAINER DESCRIPTION AND MAINTENANCE

### 1. GENERAL

**1.01** This section covers the description and maintenance of the KS-16605 teletrainer and the KS-16606 carrying cases.

**1.02** This section is reissued to cover the KS-16606, List 3 and 4 carrying cases. List 1 and 2 carrying cases are rated MD.

**1.03** The teletrainer is furnished by the telephone company for use in schools as an aid for training students in the proper use of rotary dial and TOUCH-TONE® telephones.

**1.04** The control unit provides for the following:

- Communication between two rotary dial or TOUCH-TONE subscriber telephone sets
- Individually ringing either telephone set
- Producing dial tone and busy tone in the telephone sets.

**1.05** The built-in loudspeaker provides the amplification for classroom use. An output jack is available for connecting to a public address system or recording device.

### 2. DESCRIPTION

#### KS-16605, List 1 Control Unit

**2.01** The KS-16605, List 1 control unit is shown in Fig. 1 and 2.

- Metal housing is a moss green color.
- Two 500 DR-51 or 2500 DR-51 telephone sets equipped with D3BN-51 cords (25 feet long) and 505A plugs are provided separately.
- All components are mounted on a gray metal base.

- Power for operation is obtained from a 115-volt 60-hertz ac power source.



Fig. 1—KS-16605, List 1 Control Unit—Front View

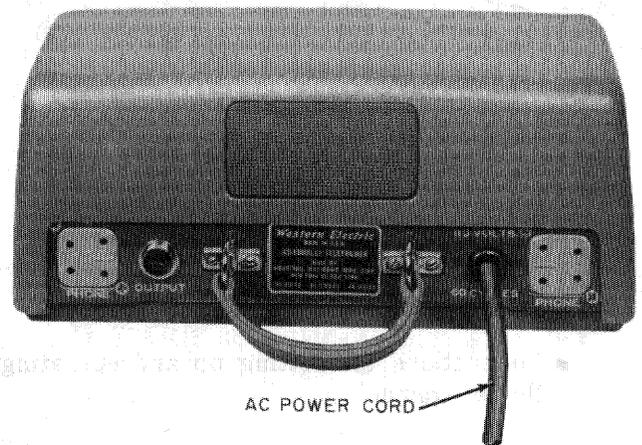


Fig. 2—KS-16605, List 1 Control Unit—Rear View

#### KS-16606 Carrying Cases

**2.02** The KS-16606 carrying cases are shown in Fig. 3, 4, and 5.

- Carrying cases are standard fiberglass luggage provided with special molded inserts.
- KS-16606, List 1 (MD) and 3 carrying cases are designed to carry the control unit.
- KS-16606, List 2 (MD) and 4 carrying cases are designed to carry two 500- or 2500-type telephone sets.



Fig. 3—KS-16606 Carrying Case

2.03 Instruction labels in the carrying cases show the following:

- Connections for setting up and operating the teletrainer
- Arrangement of teletrainer and telephones in appropriate carrying cases.

### 3. OPERATION

3.01 Arrange equipment as shown in Fig. 6 to prevent feedback between the two telephone sets and the loudspeaker in the control unit.



Fig. 4—KS-16606 Carrying Case With KS-16605 Control Unit

### 4. MAINTENANCE

**Warning:** Disconnect power before changing tubes or other parts to prevent accidental shock.

4.01 The location of control unit components is shown in Fig. 7 and 8; Fig. 9 is the schematic diagram, and Table A provides part information.

4.02 Troubles that develop are to be cleared locally unless the defect is such that it would be advisable to have the repairs made by the Western Electric Company. Be guided by local instructions. Telephone sets, cords, plugs, and jacks shall be maintained as covered in their respective sections.

#### Power

4.03 If power trouble is suspected, check the following:

- Power cord should be plugged into a 115-volt 60-hertz ac receptacle



Fig. 5—KS-16606 Carrying Case With Telephone Sets in Place



Fig. 6—KS-16605 Teletrainer Ready For Operation

- Power switch should be ON and the pilot lamp lighted
- If power is not present at receptacle, check with customer.

**Dial and Busy Tone**

- 4.04** Check for dirty contacts, loose connections, and defective electron tubes.

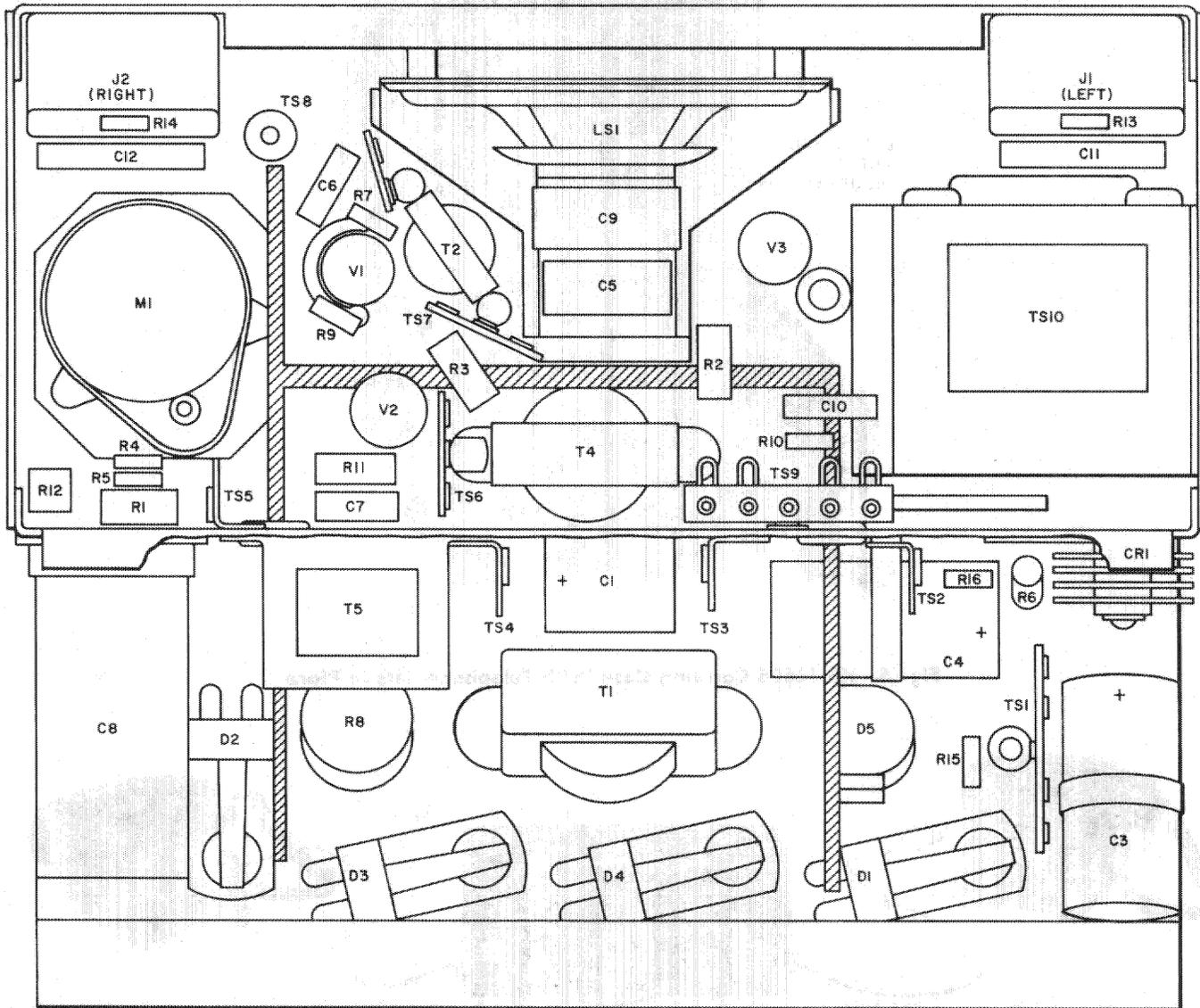


Fig. 7—Control Unit Parts Location—Underside of Chassis

**4.05** If TOUCH-TONE signaling is used, mounting cord connections will have to be reversed at the plug, red lead to G and green lead to R.

#### Ringing

**4.06** Determine if trouble is in the control unit or in the telephone sets by testing for 20-hertz ringing current with a test receiver at station jacks. Hold ring key depressed while testing.

## 5. CIRCUIT DESCRIPTION

### Power

**5.01** Operation of power switch D5 to the ON position establishes a circuit through primary winding of transformer T3 to the other side of the power cord.

- Low-voltage secondary winding of transformer T3 supplies the tube filaments, pilot lamp, and full-wave selenium rectifier CR1.

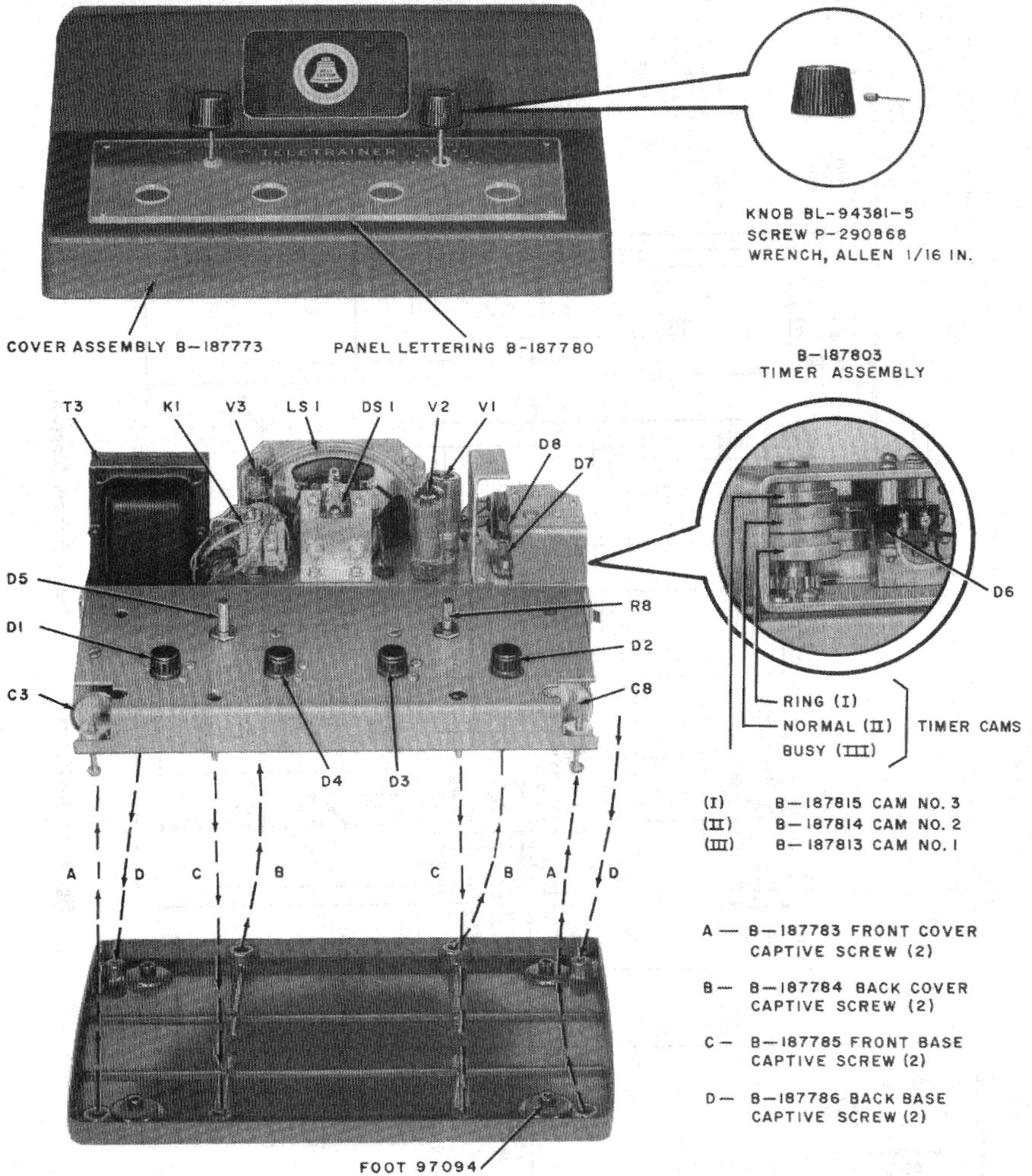
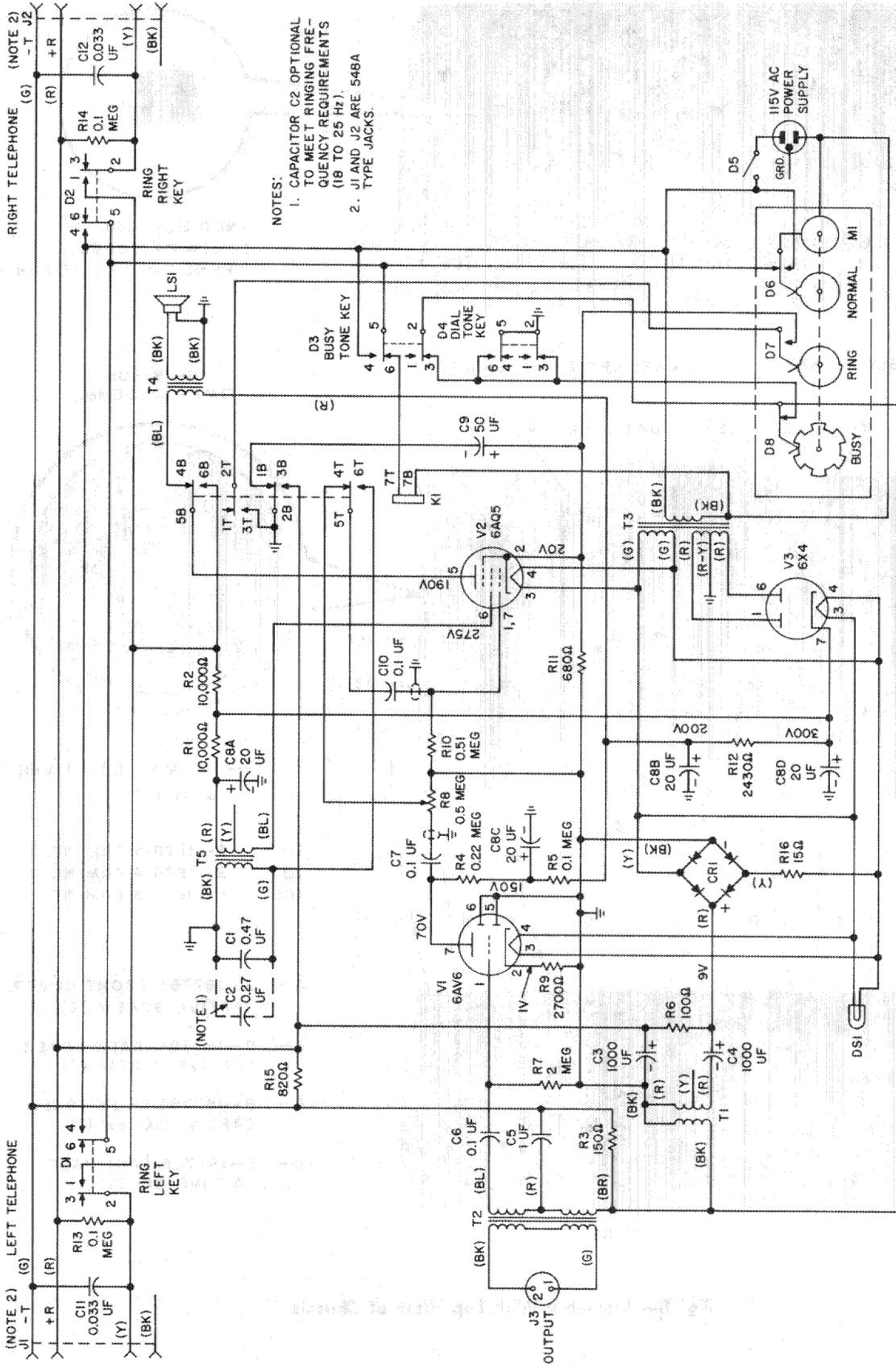


Fig. 8—Assembly With Top View of Chassis



NOTES:  
 1. CAPACITOR C2 OPTIONAL TO MEET RINGING FREQUENCY REQUIREMENTS (18 TO 25 Hz).  
 2. J1 AND J2 ARE 548A TYPE JACKS.

Fig. 9—KS-16605, List 1 Control Unit—Schematic Diagram

TABLE A  
PARTS LIST

PART	TYPE	PART	TYPE
C1	0.47- $\mu$ f, 200-volt Capacitor	R4	0.22-megohm, 1/2-watt, 5% Resistor
C2	0.27- $\mu$ f, 200-volt Capacitor	R5	0.1-megohm, 1/2-watt, 10% Resistor
C3, 4	1000- $\mu$ f, 12-volt Capacitor	R6	100-ohm, 2-watt, 10% Resistor
C5	1- $\mu$ f, 200-volt Capacitor	R7	2-megohm, 1/2-watt, 5% Resistor
C6, 7	0.01- $\mu$ f, 300-volt Capacitor	R8	B-187826, 1/2 megohm, 20% Potentiometer
C8 A, B, C, D	20- $\mu$ f, 450-volt Capacitor	R9	2700-ohm, 1/2-watt, 5% Resistor
C9	50- $\mu$ f, 25-volt Capacitor	R10	0.51-megohm, 1/2-watt, 5% Resistor
C10	0.1- $\mu$ f, 200-volt Capacitor	R11	680-ohm, 2-watt, 5% Resistor
C11, 12	0.033- $\mu$ f, 300-volt Capacitor	R12	2430-ohm, 5-watt, 5% Resistor
CR1	B-185581 Rectifier	R13, 14	0.1-megohm, 1/2-watt, 5% Resistor
D1-4	B-187824 Switch	R15	820-ohm, 1/2-watt, 10% Resistor
D5	B-187825 SPST, Rotary Switch	R16	15-ohm, 1/2-watt, 10% Resistor
DS1	No. 1847 G.E. Co Pilot Lamp	T1	Stancor P6134 Transformer
J1, 2	548A-49 Jack	T2	26954 Transformer
J3	No. 80PC2F Connector	T3	Stancor PC8418 Transformer
K1	KS-16343, L1 Relay	T4	Stancor A-3877 Transformer
LS1	B-187820 Loudspeaker	T5	Stancor A-4705 Transformer
M1	B-187806 Motor	V1	6AV6 Electron Tube
R1, 2	10,000-ohm, 2-watt, 5% Resistor	V2	6AQ5 Electron Tube
R3	150-ohm, 2-watt, 10% Resistor	V3	6X4 Electron Tube

- High-voltage secondary winding of transformer T3 supplies the full-wave electron tube rectifier V3.

**5.02** Rectifier CR1 supplies the pulsating direct current for generating tones and for the dc talking battery. Rectifier V3 supplies the plate voltage to tubes V1 and V2.

#### Ringing

**5.03** Operation of either the LEFT or RIGHT ring key, D1 and D2 respectively, establishes a circuit from the ac power source through switch D5 through the operated ring key, and through switch D6 contacts, to the other side of the ac power source.

- Timer motor M1 is energized. Rotation of the timer cams closes switch D6 make contacts, connecting the motor directly to the ac power supply.

**5.04** Operation of the ring key operates the K1 relay. The operating path is from switch D5 through the operated ring key, through switch D3 contacts 5 and 6, and through K1 relay winding, to the other side of ac power supply.

**5.05** The K1 relay contact functions are as follows:

- 1-2B connects ground through bypass capacitor C9 to cathode of tube V2
- 2-3B transfers ground to station jacks, lead R
- 4-5B connects plate of tube V2 to primary winding of output transformer T4
- 5-6B transfers plate of tube V2 to station jacks, lead Y, through D1 or D2 ring key
- 2-3T connects ground to cathode of tube V2 through switch D7 contacts when timer

motor has advanced cam sufficiently for switch D7 contacts to make

- 4-5T connects control grid of tube V2 to VOLUME CONTROL potentiometer R8 through capacitor C10
- 5-6T transfer control grid of tube V2 to primary winding of transformer T5.

**5.06** A 20-hertz resonant circuit is formed by primary winding of transformer T5 and capacitor C1.

**5.07** The screen grid voltage for tube V2 is obtained from the cathode of rectifier tube V3 through resistor R1 and secondary winding of transformer T5.

- A 20-hertz oscillator is formed by transformer T5, capacitor C1, and control grid and screen grid of tube V2.
- The plate voltage of tube V2 will vary at a 20-hertz rate.
- The operation of K1 relay connects this plate supply to the ringer in the telephone set.
- Audible ringing signal is coupled to the other telephone set receiver through capacitor C11 or C12.

**5.08** The ringing interval is maintained for 2 seconds by the timer motor rotating the cams which open and close contacts of switch D7.

**5.09** Release of ring key releases K1 relay terminating the ringing signal.

- Timer motor returns to normal under control of switch D6.

#### Dial Tone

**5.10** When DIAL TONE key, switch D4, is depressed, steady tone is impressed on the talking circuit of the telephone sets and the amplifier loudspeaker.

- Transformer T3 supplies 6.3 volts to full-wave rectifier CR1 through R16.

- Rectifier CR1 produces 120 impulses per second, the ac component of which flows through capacitor C4 to the primary winding of T1. This current is similar to regular dial tone.

**5.11** The circuit path for dial tone is as follows:

- From secondary winding of T1 to transformer T2, through half of T2's primary winding to capacitor C5.
- From capacitor C5 to station jacks, lead G, through telephone sets and back to station jacks, lead R, through capacitor C3 to secondary winding of T1.
- Another parallel path exists from capacitor C5 through R15, to capacitor C3, then to secondary winding of T1.

**5.12** Dial tone is not present in the talking circuit until the DIAL TONE key is depressed. This is accomplished by a shunt placed across the secondary winding of T1.

- The shunt path is from ground on switch D4, contacts 2 and 3, through switch D8 contacts, to secondary winding of T1, to ground.

#### Busy Signal

**5.13** The same current used for dial tone is applied for busy tone with the busy cam of timer varying the interval of application.

- Operation of BUSY TONE key, switch D3, activates the timer motor. The motor start path is from switch D5 in the ON position, through switch D3 contacts 4 and 5, through switch D6 contacts, to timer motor which connects to other side of ac power supply.
- While the BUSY TONE key is held depressed, the operation of busy cam switch D8 will vary the interval that dial tone is applied to telephone sets. This will sound similar to regular busy tone.
- Busy tone is cut off immediately upon release of the key by a shunt placed across switch D8. This shunt is through switch D3, contacts 2 and 3.

- Timer motor returns to normal under control of switch D6 contacts.

### Talking

**5.14** With both handsets off-hook, talk battery is supplied through a filter network by rectifier CR1.

- The battery path is from CR1 through R6 to station jacks J1 and J2, lead R.
- It continues through telephone sets to station jacks, lead G, through R3 to switch D8 contacts, to switch D4, contacts 2 and 3 and ground.
- The common ground to CR1, lead BK, completes the circuit.
- The shunt across the secondary winding of T1 removes dial tone during the talking period.

### Loudspeaker

**5.15** The amplifier is a conventional two-stage, resistance-coupled-type, feeding a permanent magnet loudspeaker, LS1.

- Tubes V1 and V2 make up the amplifier.
- Primary winding of transformer T2 acts as a step-up autotransformer, feeding the control grid circuit of tube V1.
- Output level is controlled by volume potentiometer R8.
- Loudspeaker is disconnected by operation of K1 relay, contacts 4 and 5B.

**5.16** Output jack J3 provides for coupling a public address system or recorder (hi-impedance) to the secondary winding of T2.

- Volume is controlled by the amplifier of any external equipment which is coupled through output jack J3.