PBX SYSTEMS NO. 557B FOR TELEPHONE ANSWERING SERVICE POSITION AND STATION CIRCUITS

CHANGES

B. Changes in Apparatus (Components)

B.1 Added

Transformer - 2012B - Fig. 29

B.2

Superceded	Superceded By
FA Lamp - K2 - ZP Option - Fig. 7	FA Lamp - C2 - ZQ Option - A2 - ZR Option - Fig. 7
PAN 1 and 2 Lamps - K2 - ZP Option - Fig. 14	PAN 1 and 2 Lamps C2 - ZQ Option - A2 - ZR Option - Fig. 14
Capacitor A - KS-14105, 125 µF - ZS Option - Fig. 8	Capacitor A - KS-19846, L6 - 1500 µF - ZT Option - Fig. 8
Varistors A, B - 33L - ZU Option - Fig. 1	Varistors A, B - 100A - ZV Option - Fig. 1
Resistors AA, AB - KS-13492, L1 - 3000 Ohms - Fig. 1	Resistors AA, AB- KS-20289, L6C- 3010 Ohms - Fig. 1
Resistor A - KS-13492, L1 1200 Ohms - Fig. B	Resistor A - KS-20289, L6C 1210 Ohms - Fig. B
Resistor IL - KS-16266,L38 -1000 Ohms - Fig. 27	Resistor IL - KS-20289, L6C 1000 Ohms - Fig. 27
Resistor B - KS-13492, L1 - 1800 Ohms - Option ZW - Fig. 27	Resistor B - KS-20289, L6C - 1820 Ohms - Option ZX - Fig. 27

D. Description of Changes

D.1 The lower voltage limit is changed from 16 to 20 volts to eliminate possible marginal conditions.

D.2 The use of the 41A dial, ZJ option, is rated Mfr Disc.

D.3 Fig. 29 is added to supply the power to the card dialer.

D.4 Option ZD for rotary dialing is rated Mfr Disc. since option ZE can be used for both rotary and TOUCH-TONE® dialing.

D.5 Circuit Notes 110, 111, 112, and 113 are added.

D.6 Equipment Note 208 is added.

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PLEASE NOTE:

PBX SYSTEMS
NO. 557B
FOR TELEPHONE ANSWERING SERVICE
POSITION AND STATION
CIRCUITS

FOREMAN 08 . . . 0 . . . .
FOREMAN 08 . . . 1 . . . .
FOREMAN 08 . . . 2 . . . .
FOREMAN 08 . . . 0 . . . .
FOREMAN 08 . . . 6 . . . .
FOREMAN 08 . . . 8 . . . .
FOREMAN 08 . . . 9 . . . .
FOREMAN 10 . . . 1 . . . .
FOREMAN 08 . . . 3 . . . .
DESTROY

TABLE OF CONTENTS

SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 These circuits provide a means by which the PBX attendant can answer central office trunk, secretarial lines, and cord-ended stations.

1.02 A cord-ended station line may be connected (a) to a central office trunk, (b) to a secretarial line, and (c) to another cord-ended station line by means of a conference circuit.

1.03 The position circuit is arranged to be split for operation by two attendants.

1.04 This circuit also provides for grouping two or more positions.

SECTION II - DETAILED DESCRIPTION

1. STATION LINE CIRCUIT

INCOMING CALLS - FIG. 4 AND 5

1.01 When the receiver is removed from the switchhook at the associated station, relay S operates in series with local battery and the station loop. This lights the line lamp (S) and operates the audible signal if the buzzer key is operated to the ON position. The attendant operates the station key associated with the calling station to the TALK position which (a) connects the station to the attendant telephone circuit, (b) opens the lamp lead to extinguish the line lamp, and (c) silences the audible signal.

OUTGOING CALLS - FIG. 4 AND 5

1.02 The attendant operates the ring key associated with the station to be called. Ringing current is connected to the station loop to ring the station ringer. The attendant, after ringing the station, operates the key to the TALK position which connects the station to the attendant telephone circuit.

STATION TO TRUNK CONNECTION - FIG. 4 AND 5

1.03 The station originates a call as in 1.01. The attendant plugs the station cord into the jack of the trunk circuit. Battery from the sleeve of the trunk jack operates relay SL which (a) connects the windings of relay S in series with the station and the tip and ring of the plug and (b) transfers

the lamp lead to the back contact of relay S for station supervision. Relay S operates from the central office battery and the station loop to extinguish lamp S and silence the audible signal. Relay S may follow the dial impulses as the station dials. When the station disconnects, relay S releases lighting supervisory lamp S and sounding the audible signal.

TRUNK TO STATION CONNECTION - FIG. 4 AND 5

1.04 The attendant answers a trunk call with an intercept cord, as described in 2., and calls the station as in 1.02. After the station has answered, the attendant removes the intercept cord and plugs the station cord into the trunk jack. The station circuit operates as in 1.03.

1.05 If Fig. B is furnished with the intercept cord, the station plug may be plugged into jack A. The station circuit operates as in 1.03 using battery from the sleeve of jack A. Resistor A is bridged across the top and ring of the jack to prohibit the station from dialing out.

STATION CONFERENCE CIRCUIT - FIG. 4, 5, 9, AND 10

1.06 The calling station originates a call as in 1.01. The attendant calls the called station as in 1.02. Connection is made by the attendant to the station conference circuit by plugging the two station plugs into conference jacks B and D. The battery on the sleeve of the conference jacks operates the SL relays of the station circuits. The operation of the SL relays connects the windings of the S relays in series with inductors A and B and the station loops, and transfers the lamp lead to the back contact of the S relay. Talking battery is furnished to each station through the inductor and the winding of the S relay. Relay S operates extinguishing lamp S and silencing the audible signal. The transmission path between the two stations is through capacitors T and R. When either station hangs up, the S relay releases lighting lamp S and starting the audible signal.

2. INTERCEPT CORD, DIAL, AND ATTENDANT TELEPHONE CIRCUIT

ANSWERING A SECRETARIAL LINE

2.01 The attendant answers the secretarial line by plugging the intercept cord plug into the answering jack. Battery is supplied through resistor B to the sleeve to hold the secretarial line relay operated once the ringing current has operated the relay. Inductor A is bridged across the tip and ring of the cord to trip the ringing or act as a holding coil until the TALK key is operated.

2.02 When the attendant operates the key to the TALK position (a) the tip and ring of the cord is extended to the attendant telephone circuit, (b) the bridge of the A inductor is removed, (c) the sleeve lead is extended to operate relay SA, and (d) the talking path is cut off to the higher-numbered cord.

2.03 Relay SA operated (a) short circuits the pulsing contacts of the rotary dial or short circuits part of the output of the TOUCH-TONE® dial to prevent the attendant from dialing out on secretarial lines, and (b) extends the tone leads through to the ATA relay.

2.04 Relay AA operates on the central office battery in series with one winding of inductor AA and the tip and ring of the line. Relay AA operated (a) connects ground to inductor AR to energize the transmitter, and (b) connects ground to AA1 relay through thermistor 8B.

2.05 Relay AA1 operated (a) initiates the action of the zip tone (ZA option) or removes the steady tone (ZB), in either case indicating a completed talking path to the attendant, (b) closes through the receiver lead when ZA option is used and (c) connects ground to the ATA relay.

2.06 Relay ATA operated (a) removes zip tone, (b) closes through the talking path, and (c) short circuits the 8B thermistor.

2.07 Capacitor AA blocks the dc path through induction coil AA causing all the line current to flow through relay AA.

2.08 Fig. B provides a jack termination of the intercept cord for connection to a cord-ended station line. The A resistor and A inductor, in series across the tip and ring, prevent the station from rotary dialing out over the secretarial line. The tip and ring reversal (ZE option) prevents the station from TOUCH-TONE dialing out over the secretarial because the TOUCH-TONE enabling relay TT will not operate.

2.09 The telephone circuit containing induction coil AB functions as described, but has no provision for dialing.

2.10 In Fig. 2, 21, and 27, ZF option properly terminates E-type repeaters in the idle line conditions so as to eliminate objectionable oscillations.

ANSWERING A TRUNK

2.11 These circuits function on trunk connections as in 2.01 through 2.10 with the following exception. Relay SA does not operate due to battery standing on the sleeve of the trunk jack which (a) does not prevent the attendant from dialing out, and (b) does not extend the tone lead through to the ATA relay.

3. POSITION SPLITTING

3.01 Operation of the position splitting key operates relay S1 in turn operating relay S2 in turn operating relay S3. The operation of these relays (a) splits the first group of intercept cords from the telephone circuit containing induction coil AA and connects them to the telephone circuit containing induction coil AB, and (b) disconnects telephone set jacks LA and LB from a parallel connection with jacks RA and RB associated with the telephone circuit with induction coil AA and connects them to the telephone circuit associated with inducation coil AB.

4. POSITION GROUPING

4.01 Operation of the position grouping key operates relay G1 which (a) disconnects the intercept cords from the telephone circuit and (b) connects the intercept cords to the intercept cords of the succeeding position when Fig. 16 is provided.

5. BATTERY SUPPLY

5.01 Battery may be supplied to this PBX from the central office PBX battery feeder circuit, building battery or local battery at the PBX.

6. AUDIBLE SIGNALS

AUXILIARY SIGNAL CIRCUIT

6.01 When a lamp of a cord-ended station is lighted, the current through this lamp flows over lead A through the winding of relay A to operate this relay. Relay A operated (a) connects ringing current to the audible signal circuit and (b) opens lead CC of the charge control circuit. Relay A releases when the lamp is extinguished removing ringing current from the audible signal circuit and closing lead CC. Ground is applied to lead A1 or A2 when a lamp is lighted in a secretarial line (panel 1), secretarial line or central office trunk (panel 2). Battery is applied to lead C or C2 when a lamp is lighted on lines connected to a concentrator-identifier (panel 1 or panel 2). Relay A1 or A2 operates, operating relay A3. Relay A3 operated (a) connects ringing current to the audible signal circuit, (b) opens lead K of the charge control circuit, and (c) completes the lamp circuit to light either lamp (panel 1 or panel 2).

6.02 Relay A1 or A2 releases when ground is removed from lead A1 or A2 or battery is removed from lead C1 or C2 releasing relay A3. Relay A3 released (a) removes ringing current from the audible signal circuit, (b) closes lead K of the charge control circuit, and (c) opens the lamp lead to either panel 1 or panel 2.

BUZZER AND AUXILIARY RINGER

6.03 The adjustable volume control buzzer operates on ringing current when relay A or A3 operates. The buzzer may be silenced by operating the BUZ key to the OFF position. The auxiliary ringer operates on ringing current and rings at any time the buzzer operates.

RINGING

6.04 Ringing current may be supplied from the central office or a local ringing supply. In either case, a resistance lamp is provided in the PBX to prevent a trouble from overloading the supply. A GEN key is provided to transfer from the main to the emergency ringing supply.

7. FUSE ALARM - FIG. 7, 8, AND 13

7.01 When fuse blows, battery is connected to the alarm bar, through fuse FA, to operate relay FA. Relay FA operated (a) connects battery to light lamp FA, and (b) connects ringing current to ring fuse alarm bell FA. Key FA may be operated to the OFF position to silence the fuse alarm bell. When the blown fuse is removed, relay FA releases, extinguishing lamp FA and silencing ringer FA, if the FA key is in the ON position. If the FA key is in the OFF position, the fuse alarm bell rings indicating that the FA key should be restored to the ON position.

8. POSITION CLOCK - FIG. 19 AND 20

8.01 Fig. 19 provides for a 22-volt ac position clock which is connected through the line cable for trunks and miscellaneous circuits to a small bell ringing transformer (Fig. 20).

9. AUTOMATIC ANSWER - FIG. 4, 5, AND 8

9.01 When an automatic answer is required, a telephone answering set is connected to the station line circuit in the usual manner. The attendant (a) inserts the intercept cord plug into the secretarial line jack of the line to be answered, (b) inserts the plug of a station line into the intercept transfer jack associated with the intercept cord, and (c) rings on the station line to start the telephone answering set.

9.02 The supervisory lamp of the station line will be lighted until the telephone answering set starts; then the lamp is extinguished until the telephone answering set stops, at which time the lamp is again lighted indicating the end of message.

10. MISCELLANEOUS

10.01 One of the results in designing this PBX to operate on a wide range of voltage has been that the attendant transmitter current and efficiency was roughly proportional to the PBX voltage. Thus when the voltage was low, the attendant speech transmission was down about 6 db because of the low transmitter current. This is materially improved by replacing the AB and AR 200/200 ohm inductors with 12/12 ohm inductors, and adding a 13N ballast lamp in parallel with a 3000-ohm resistor, in series with the battery lead.

10.02 The 12/12 ohm inductor has considerably less inductance than the 200/200 ohm inductor, and there is consequently more tendency for the attendant speech to be audible as crosstalk in the battery supply to the PBX. This is remedied by provision of a 125-uF capacitor connected across the power supply leads at the PBX.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 Station Signaling and Supervision

	16V	20V	24V
Max Cond Loop Res	900Ω	1300Ω	1700Ω
Min Insulation	20,000Ω	20,000Ω	20,000Ω

2. FUNCTIONAL DESIGNATIONS

None.

3. FUNCTIONS

3.01 To provide the station with an individual visual signal for signaling supervision and recall.

3.02 To provide manual ringing by the attendant to the station.

3.03 To provide a connection between any two stations by a conference circuit.

3.04 To provide local battery for the station to signal and talk locally.

3.05 To provide central office talking battery for the station on a connection to a trunk or a secretarial line.

3.06 To provide dialing from the stations to a dial central office.

3.07 To provide for connecting the attendant to any one cord or station line.

3.08 To provide for the attendant dialing to a dial central office.

3.09 To provide for the attendant to establish a connection to a manual central office.

3.10 To hold the central office connection when the attendant disconnects from the cord circuit.

3.11 To provide for transferring one or more cords to the auxiliary attendant telephone circuit, when the splitting key is operated.

3.12 To provide for adjusting the volume of cutting off the audible siganl.

3.13 To provide for disconnecting the battery to the position when not in use.

3.14 To connect the attendant to only one cord circuit or cord-ended station line circuit if more than one TALK key is operated.

3.15 To prevent the attendant from transmitting rotary dial or TOUCH-TONE dial pulses on secretarial line circuit.

3.16 To connect a secretarial line or central office trunk to a cord-ended station line via an intercept cord jack circuit.

3.17 To provide a fuse alarm.

3.18 To provide panel pilot lamp signals.

3.19 To provide for switching from regular ringing supply to emergency ringing supply.

3.20 To provide a zip tone to the attendant indicating when a talking path is complete to the central office, either direct or through a concentrator-identifier (ZA option) or to provide a steady tone to the attendant when a talking path is not complete to the central office on the direct line condition (ZB option).

3.21 To provide for answering a call from a station, secretarial line, or central office trunk.

3.22 To provide an optional head telephone set or handset.

3.23 To provide for supplying battery to the PBX from a 24- or 48-volt central office battery tap, building battery, or local PBX battery.

3.24 To provide for starting the charge control feature when local battery is provided.

3.25 To provide rotary-type dial, rotary card dialer, or both, TOUCH-TONE type dial, TOUCH-TONE card dialer, or both.

3.26 To provide TOUCH-TONE calling as an alternative to rotary dialing.

4. CONNECTING CIRCUITS

4.01 When this circuit is listed on a keysheet, the connecting information thereon is to be followed. The following circuits are typical.

(a) Standard Subscribers Line Circuit in Manual, Panel, Step-by-Step or Crossbar Central Offices - SD-11560-01, SD-21721-01, SD-31531-01, SD-25003-01.

(b) Standard PBX Battery and Ringing Supply Circuits - SD-90230-01, SD-90232-01, SD-80740-01.

(c) Standard Common Battery Signaling Telephones.

(d) TOUCH-TONE Calling, Dial Auxiliary Circuit - SD-66916-01.

(e) 102B Frequency Generator.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 This circuit shall perform in accordance with the requirements specified in 3. FUNCTIONS and the Circuit Requirements Table.

SECTION IV - REASONS FOR REISSUE

B. Changes in Apparatus (Components)

B.1 Added

Relay TT - 316AG - Fig. 28

Plug K - KS-8585,L17 - Fig. 28

Socket KK - KS-8586,L12 - Fig. 28

D. Description of Changes

D.1 Wiring options ZD and ZE are expanded in Fig. B to connect the holding bridge across the tip and ring leads.

D.2 If the make-contact (3 and 4, bottom of relay SA) develops a resistance greater than 2 ohms the TOUCH-TONE dial is enabled. To correct this, options ZO and ZN are provided to connect a break-contact (1 and 2, bottom SA) in series with the ground supply to the dial.

D.3 The drawing has been redrawn to present the figures in a better overall circuit flow.

D.4 The Circuit Notes have been renumbered. Circuit Notes 104, 105, and 107 have been removed and are now shown in Equipment and Information Notes 206, 302, and 303.

D.5 Circuit Note 109 is added.

D.6 The circuit title is changed.

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