SECTION 514-230-101
Issue 1, October 1967
AT&TCo Standard

1A TELEPHONE REPORTING SET
DETAILED DESCRIPTION

CONTENTS PAGE

FIGURES

1. GENERAL

1.01 The 1A Telephone Reporting Set, when given the correct electrical input signal by customer equipment, automatically dials a preset number to call a remotely located control point telephone, identifies itself, and transmits a recorded message over the telephone connection.

1.02 The 1A Telephone Reporting Set can act as a guard in any situation where the condition to be monitored can be defined and measured. The prerecorded warning or alerting message will tell anyone who answers what has happened and what to do about it.

2. OPERATING MODES

2.01 The 1A Telephone Reporting Set has two operating modes: ALARM, in which it calls the preset number; and INQUIRY, in which the customer calls the set. The sequence of operation in both modes is indicated in Fig. 1.

2.02 The closure of a pair of dry contacts in the customer's alarm sensing device provides the input to initiate the alarm reporting action. After about 1.3 seconds the unit seizes and holds the line for approximately 4.8 seconds. This is the dial tone wait (DTW) interval which allows time for the central office to supply dial tone. A dialing and message period of approximately 22.4 seconds follows. This includes time for the dialing of telephone numbers having as many as 14 digits. Any portion of the period not used for dialing is used for message transmission. The message time is 11.8 seconds.

2.03 After the dialing and first message period there is a 30-second holding time during which a 2125Hz identifying tone is transmitted over the telephone connection. Subsequent to this holding time a message transmission period of 23.2 seconds begins. This allows approximately two repeats of the recorded message before the set hangs up. The 1A Telephone Reporting Set then waits 30 seconds and makes another call. After it has made nine calling attempts, it will reset to its standby status. If the control point telephone is answered during any calling attempt and the control tone of 1475Hz is sent from the control point during the holding time when the 2125Hz identifying tone is on the line, the reporting set will advance directly to the message transmission period. If the control tone is sent during the message transmission period the unit will hang up and reset itself for the next alarm condition.

2.04 After the unit is reset, the input contacts must open for approximately 20 seconds before closing again to initiate another alarm report. If the input contacts of the customer's alarm device remain closed during the message transmission period, tone bursts of 2125Hz will be superimposed on the voice message. This will indicate to the person answering the control point telephone that the condition which initiated the alarm continues to exist.

2.05 The 1475Hz control tone may be sent from a 62A control unit or a J1A handset installed on the control point telephone.

2.06 The INQUIRY mode allows the customer to call the telephone reporting set and initiate the reporting action. In this way the operation of the unit may be tested and the status of the input contacts checked.

2.07 After three or four rings the set is activated and the motor starts. Ringing will continue for another 28.5 seconds before the unit seizes

the line and transmits a 2125Hz identifying tone for 10 seconds. If the 1475Hz control signal is not sent during this 10-second period, the 1A Telephone Reporting Set will drop the line and return to its standby condition. This minimizes the possibility of transmitting the alarm message to an unauthorized station. If the control signal is transmitted during the 10-second identifying tone period, the unit will shift to the alarm mode and proceed as previously explained. If the 1475Hz control tone is not sent during the message transmission period, the unit will hang up, wait 30 seconds, and place another call. This will repeat until eight calls have been placed or it is reset by the control tone.

3. CIRCUIT GROUPS

CONTROL

3.01 The operating sequence, in either mode, is controlled by printed circuit switching patterns

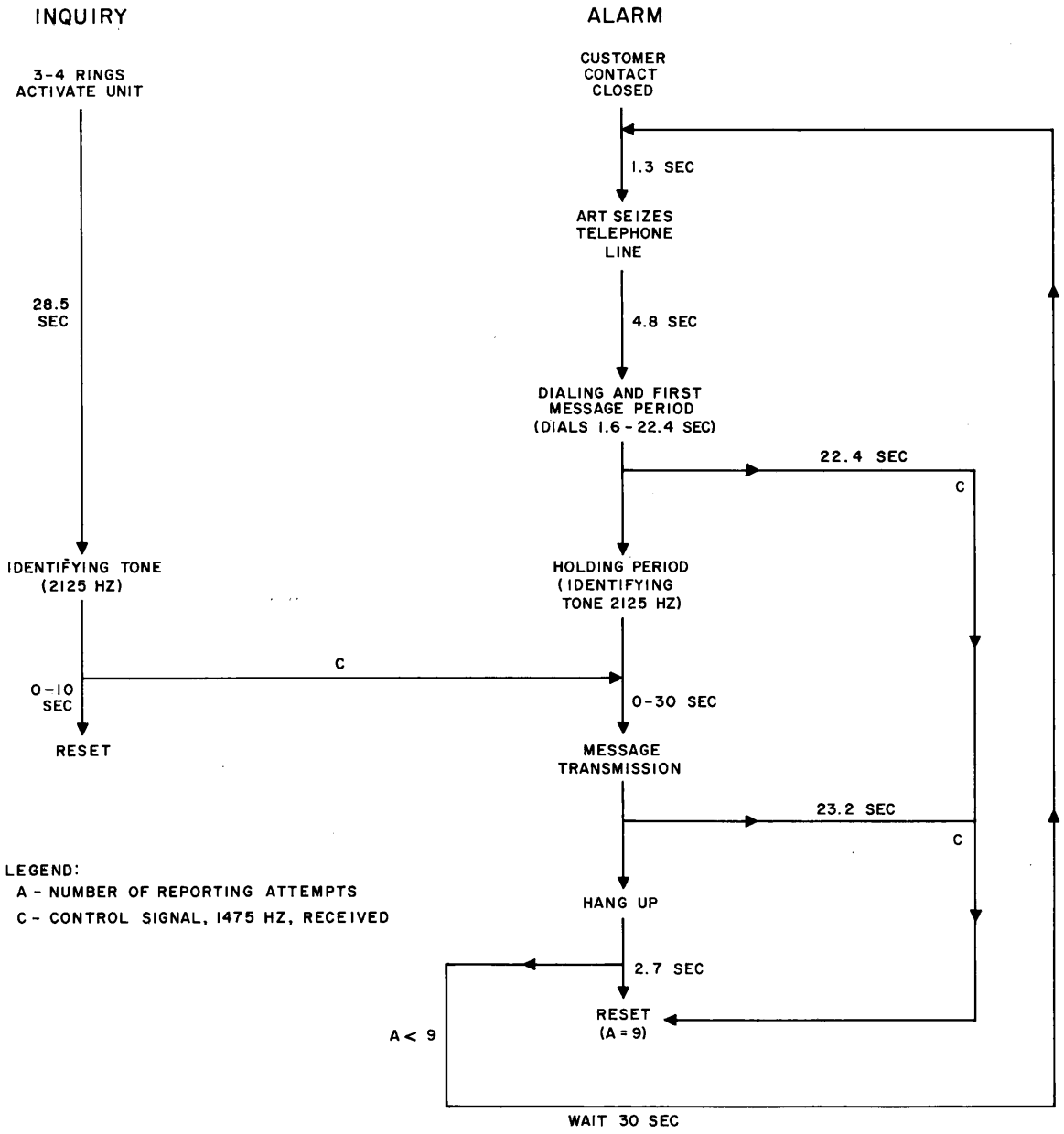


Fig. 1—Logic Flow chart for the 1A Telephone Reporting Set

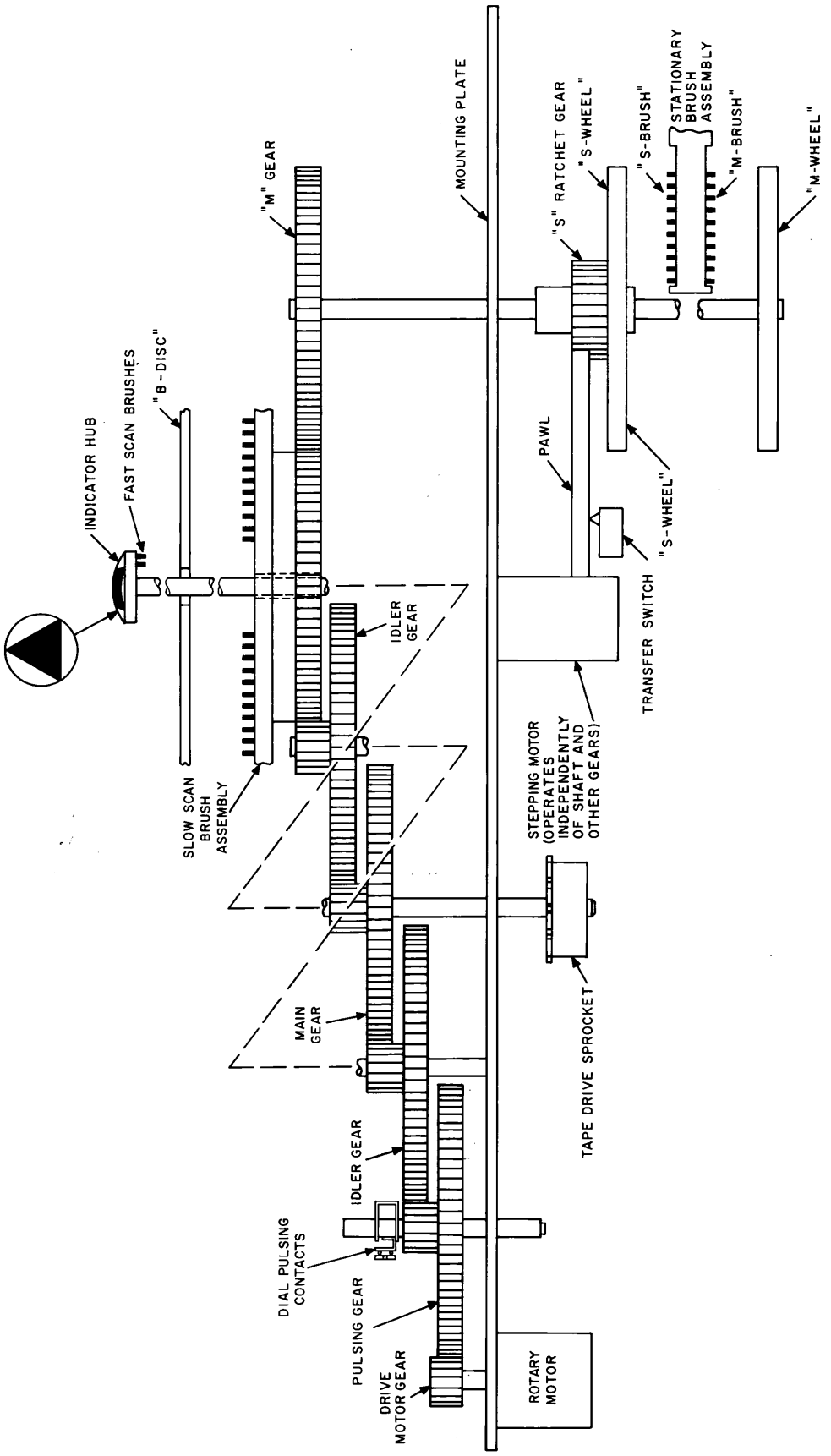


Fig. 2—Mechanical Drive Schematic

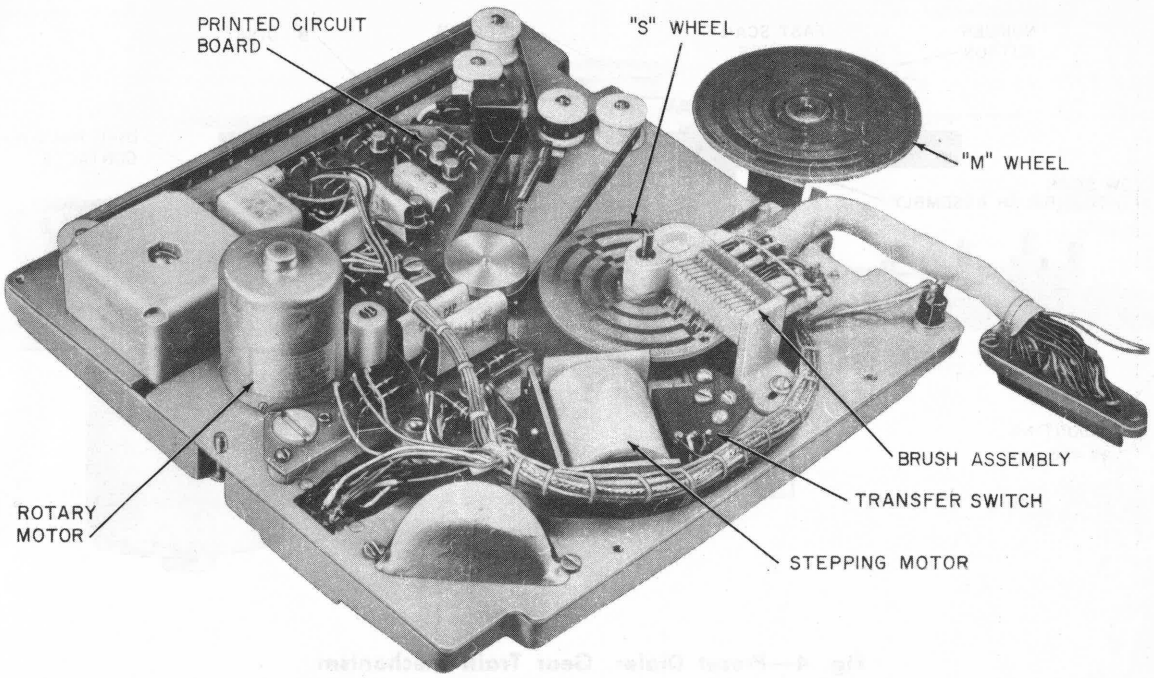


Fig. 3—Electromechanical Unit Partially Disassembled

on two motor driven commutator wheels: These are the "M-wheel", driven through a gear train by a DC rotary motor, and the "S-wheel", driven by a stepping motor (Fig. 2). As each wheel rotates, brushes in contact with its surface make and break various circuit paths to control the switching of power to electrical circuit groups in the unit, to accomplish certain functions at certain times (Fig. 2 and 3).

3.02 The positions of the M- and S-wheels determine the operating state of the 1A Telephone Reporting Set. If both wheels are at their "home" position, the unit is in standby status. In the INQUIRY mode the S-wheel is in a "home" position and the M-wheel is out of its "home" position. If the S-wheel is out of a "home" position the unit is operating in the ALARM mode.

DIALING

3.03 The dialing function is accomplished with pulsing contacts (similar to those used in the 9-type dial) and commutator logic. The commutator (B-disk) is a stationary, double-sided, printed circuit board, with plated-through connections (Fig. 4, 5, and 6). Rotating brushes in contact with printed wiring patterns on both sides of the commutator board perform several switching operations. These, in conjunction with preset number button brush pairs which contact paths on one side of the board, control the number and sequence of dial pulses transmitted over the telephone line.

MOTOR CONTROL

3.04 The motor control circuit controls two motors; a rotary motor and a stepping motor. The control elements are silicon controlled switches arranged to operate the motors from any one of several control sources. Control sources for the rotary motor include the stepping motor switch, detector, timer, and record circuit. The stepping motor silicon controlled switch may be turned on from two sources; the control oscillator and the detector (Fig. 7, 7A, 7B, and 8).

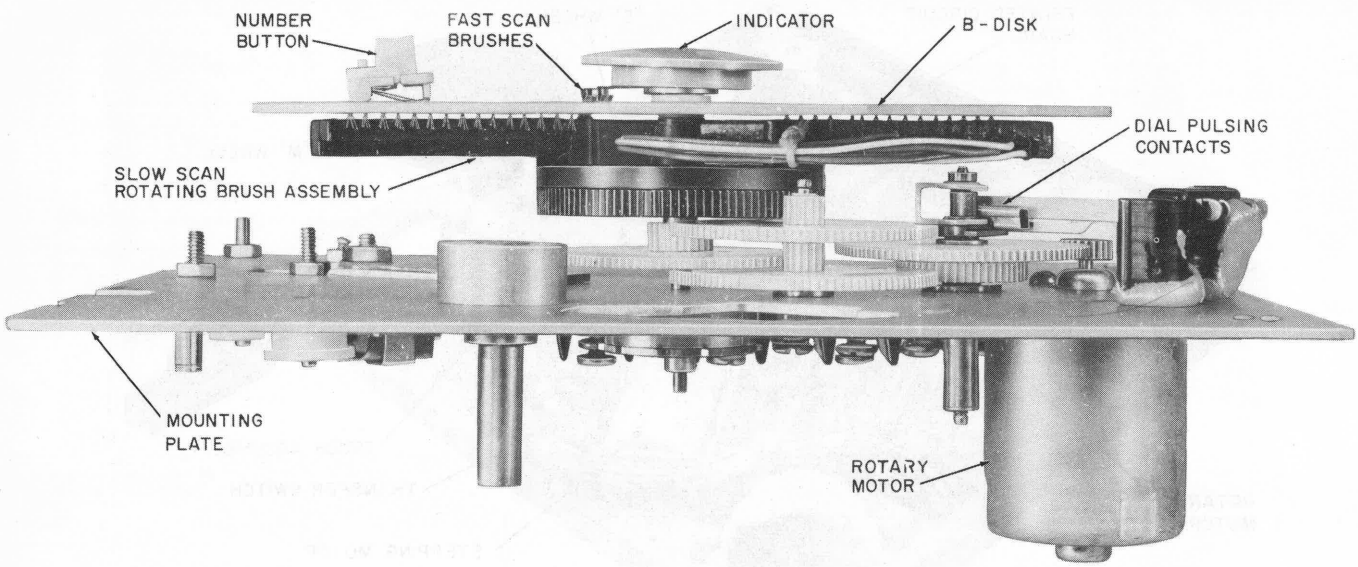


Fig. 4—Preset Dialer, Gear Train Mechanism

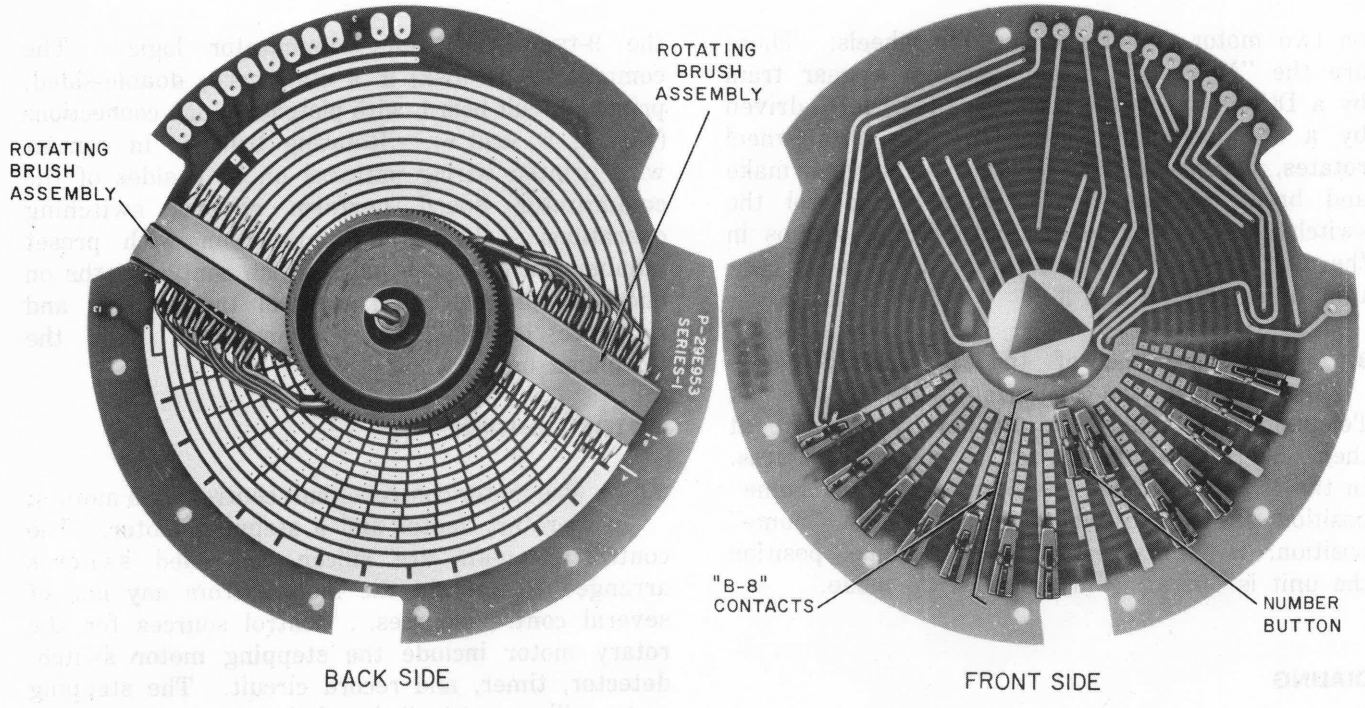


Fig. 5—Preset Dialer, B-Disk

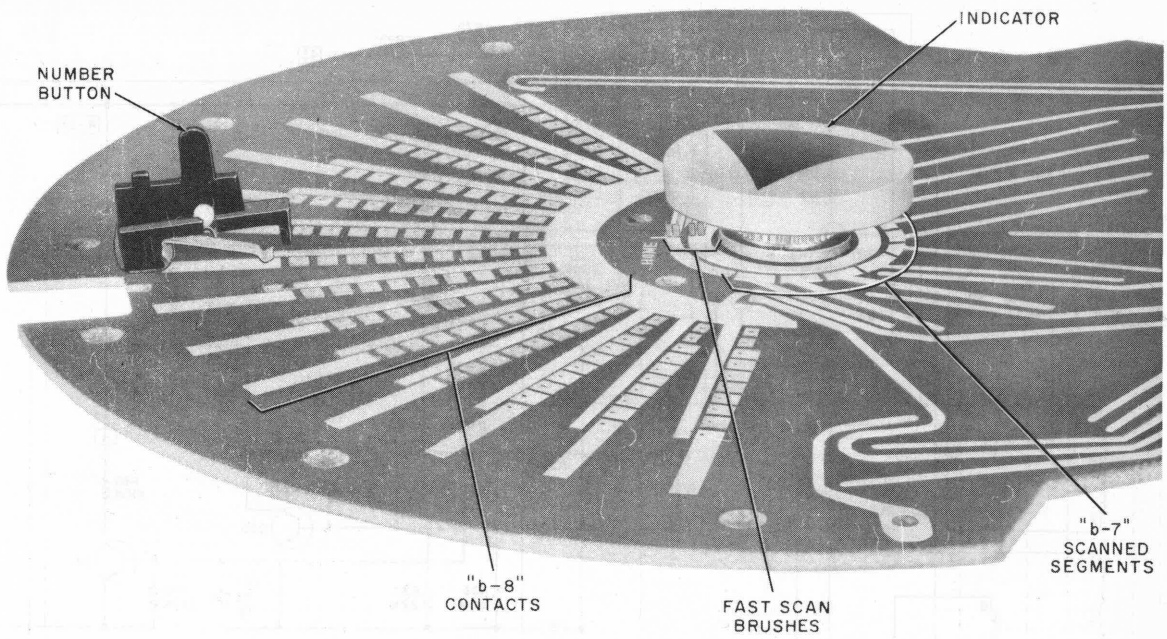


Fig. 6—Preset Dialer, Coding and Scanned Contacts

CONTROL OSCILLATOR

3.05 The control oscillator meets the requirement that the telephone line must be electrically isolated from the customer-owned alarm sensing equipment. Inductive coupling between the input contacts and the 1A Telephone Reporting Set provides this isolation. When the input contacts close, a low resistance shunt is placed across a winding coupled to the resonant circuit of the oscillator, causing it to stop. When the control oscillator stops, a transistor switch is biased on and energizes the motor control circuit and the tone oscillator/message amplifier circuit. When energized, the tone oscillator/message amplifier generates the 2125Hz tone bursts, which indicate the status of the input contacts. The motor control circuit energizes the stepping motor and the rotary motor (Fig. 7, 7A, and 8).

TERMINATION AND SIGNAL SEPARATION NETWORK

3.06 The termination and signal separation network connects the telephone reporting set to the telephone line and provides the dc path necessary for holding the line. It provides separate signal paths for the detector (incoming) and the tone oscillator/message amplifier (outgoing). In addition, it provides dial pulse surge and lightning surge protection for the detector and the tone oscillator/message amplifier (Fig. 7, 7C, and 8).

TONE OSCILLATOR/MESSAGE AMPLIFIER

3.07 The tone oscillator/message amplifier generates the 2125Hz status and identification tone and operates in conjunction with a tape transport to transmit a recorded message. The output is connected to the telephone line through the termination and signal separation network (Fig. 7, 7D, and 8).

DETECTOR

3.08 The detector responds to a tone signal of 1475Hz transmitted to it for control purposes. The input is connected to the telephone line through the termination and signal separation network. The output is connected to one of the transistor switches in the motor control circuit by means of commutator wheel contacts. Also, when the control signal is received, the detector causes the message amplifier to be disabled (Fig. 7, 7E, and 8).

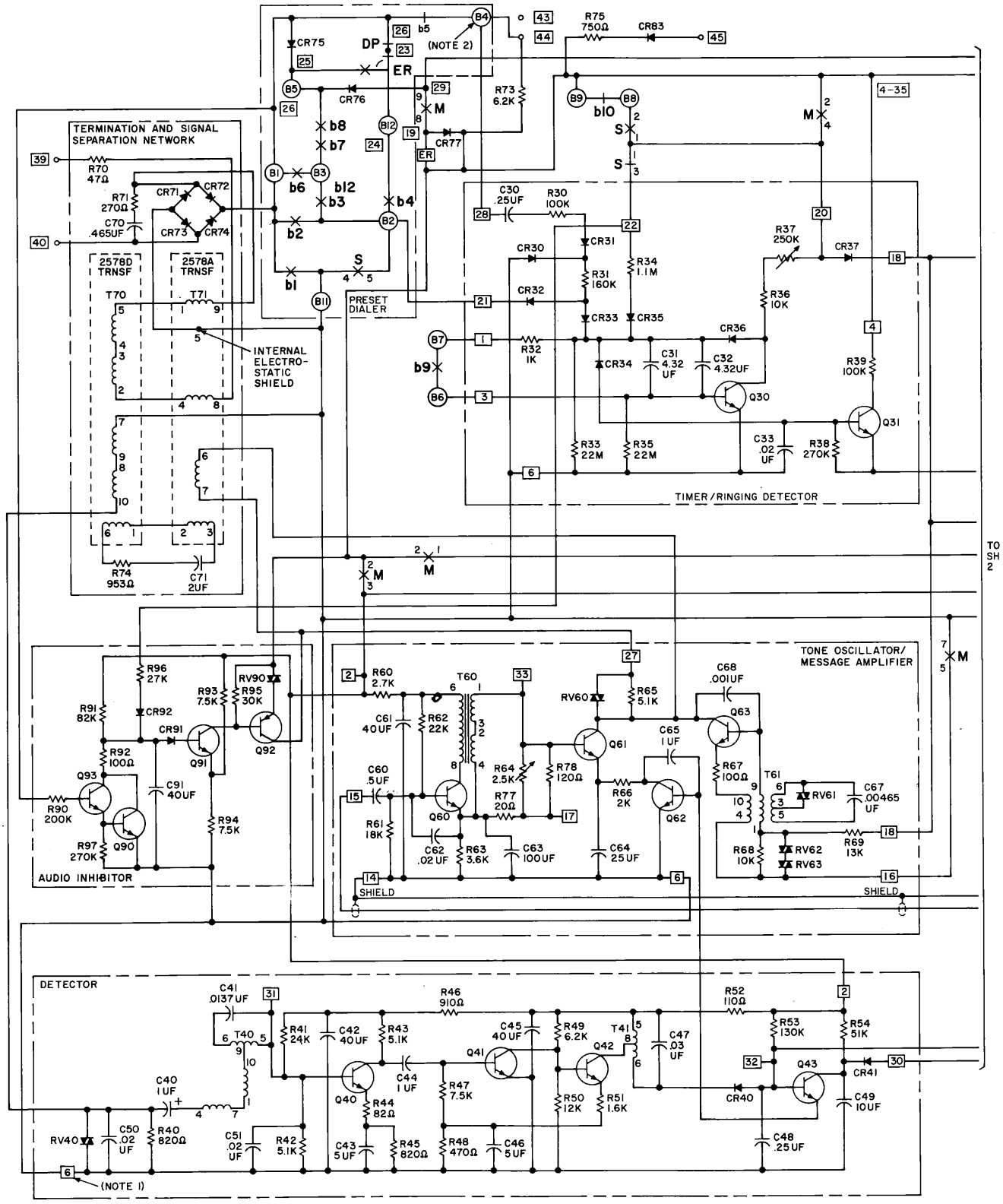
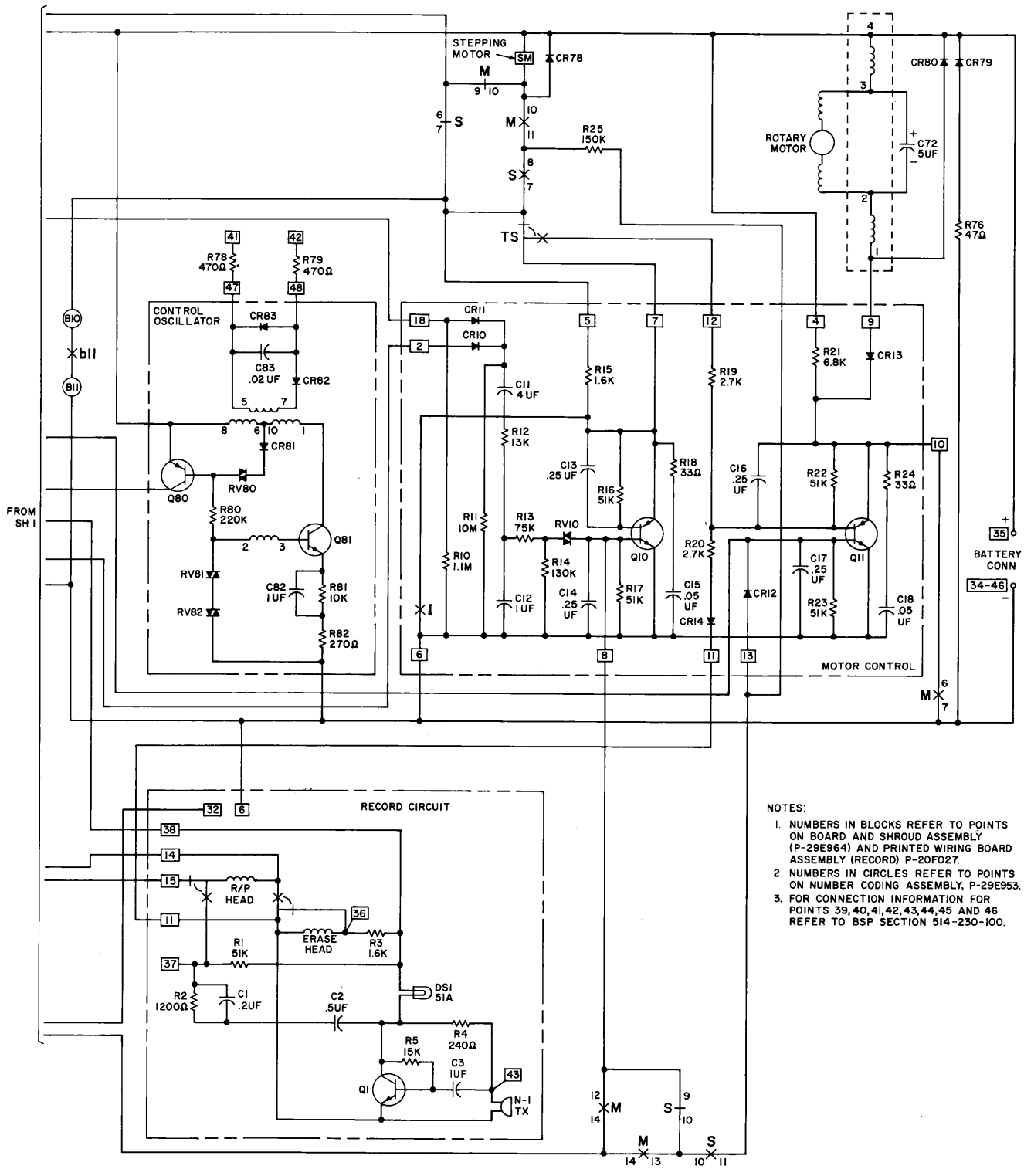


Fig. 7—1A Telephone Reporting Set Schematic (Sheet 1 of 2)



NOTES:

1. NUMBERS IN BLOCKS REFER TO POINTS ON BOARD AND SHROUD ASSEMBLY (P-29E964) AND PRINTED WIRING BOARD ASSEMBLY (RECORD) P-20F027.
2. NUMBERS IN CIRCLES REFER TO POINTS ON NUMBER CODING ASSEMBLY, P-29E953.
3. FOR CONNECTION INFORMATION FOR POINTS 39, 40, 41, 42, 43, 44, 45 AND 46 REFER TO BSP SECTION 514-230-100.

Fig. 7—1A Telephone Reporting Set Schematic (Sheet 2 of 2)

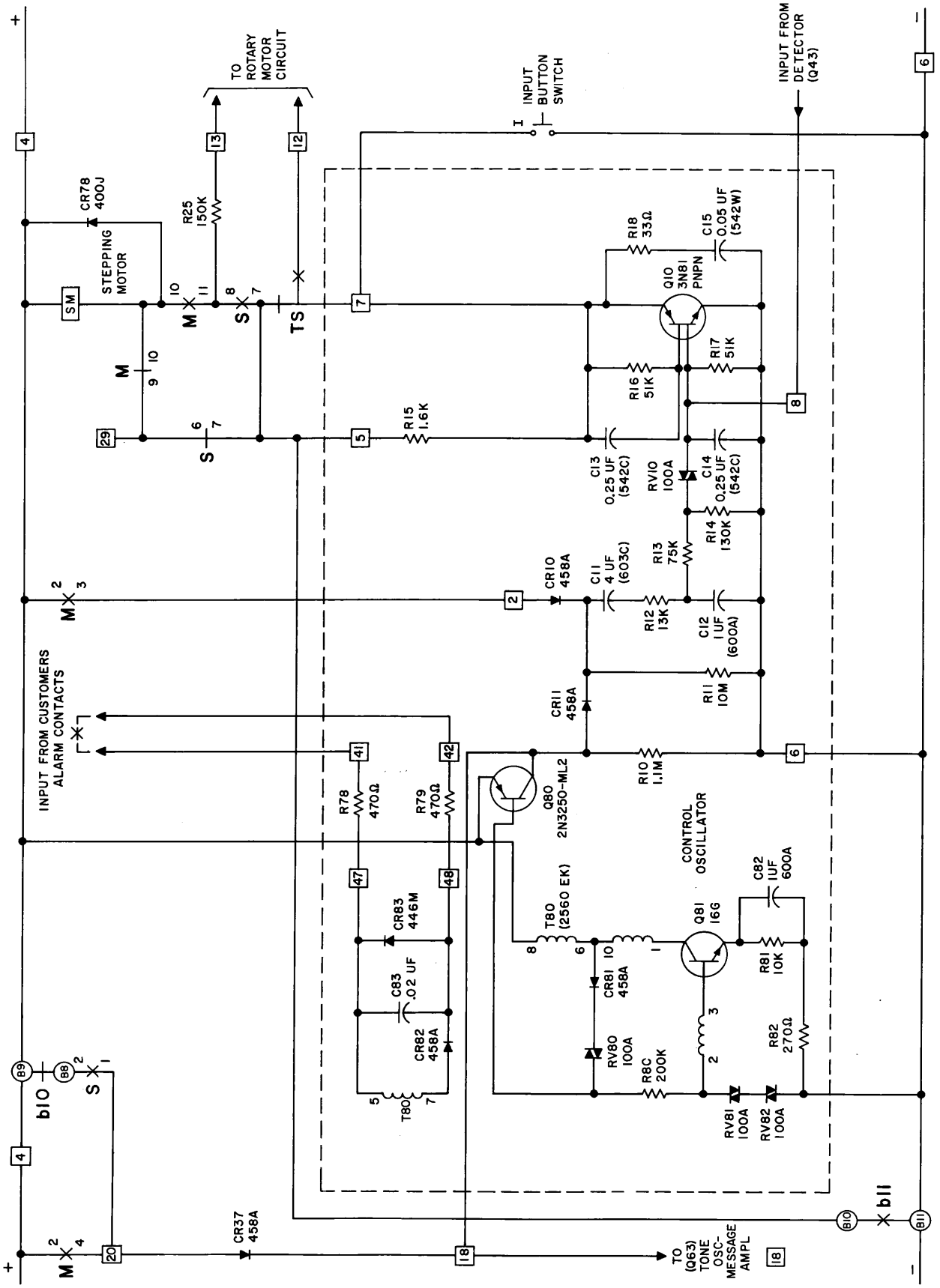


Fig. 7a—Motor Control Circuit, Functional Diagram

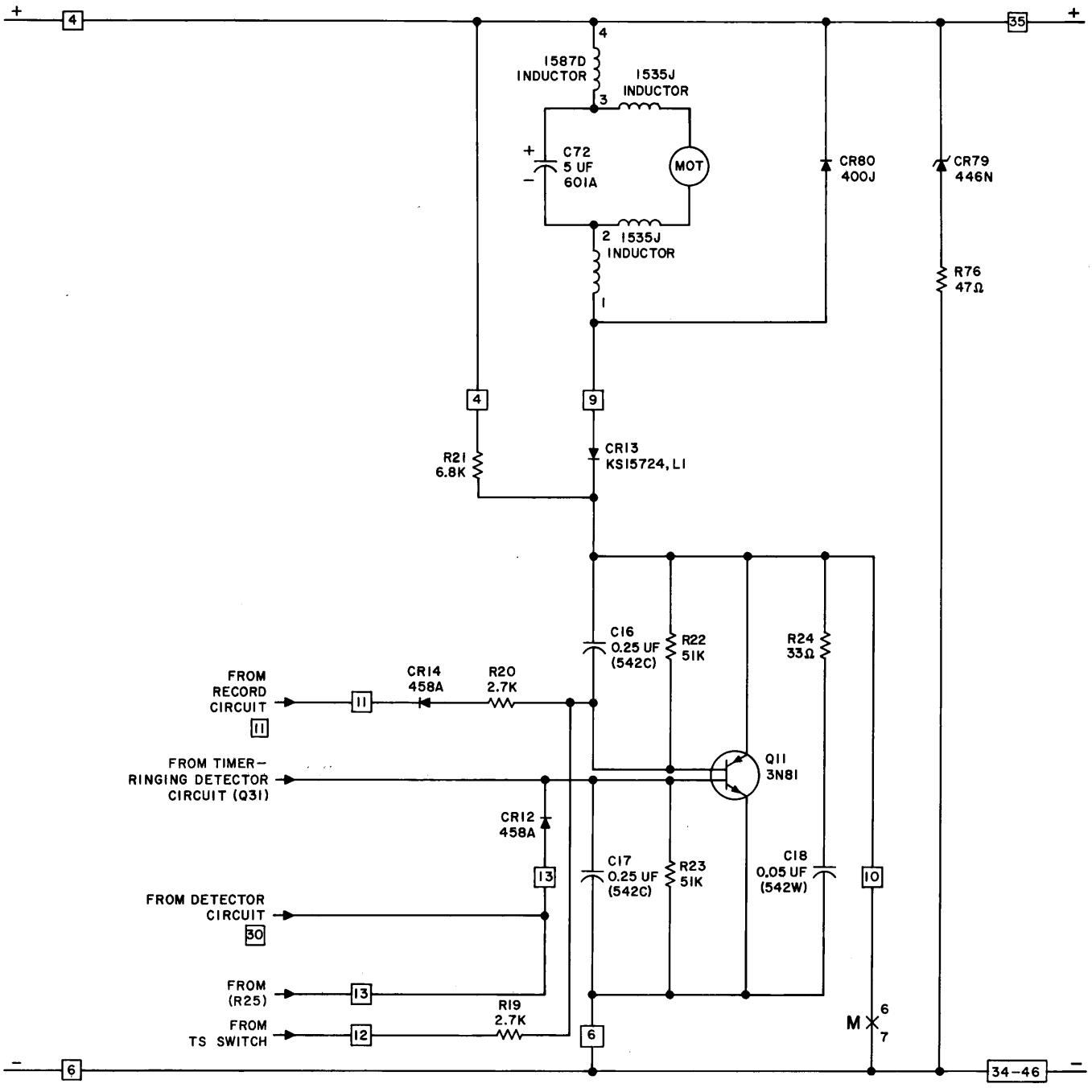


Fig. 7b—Rotary Motor Control Circuit Functional Diagram

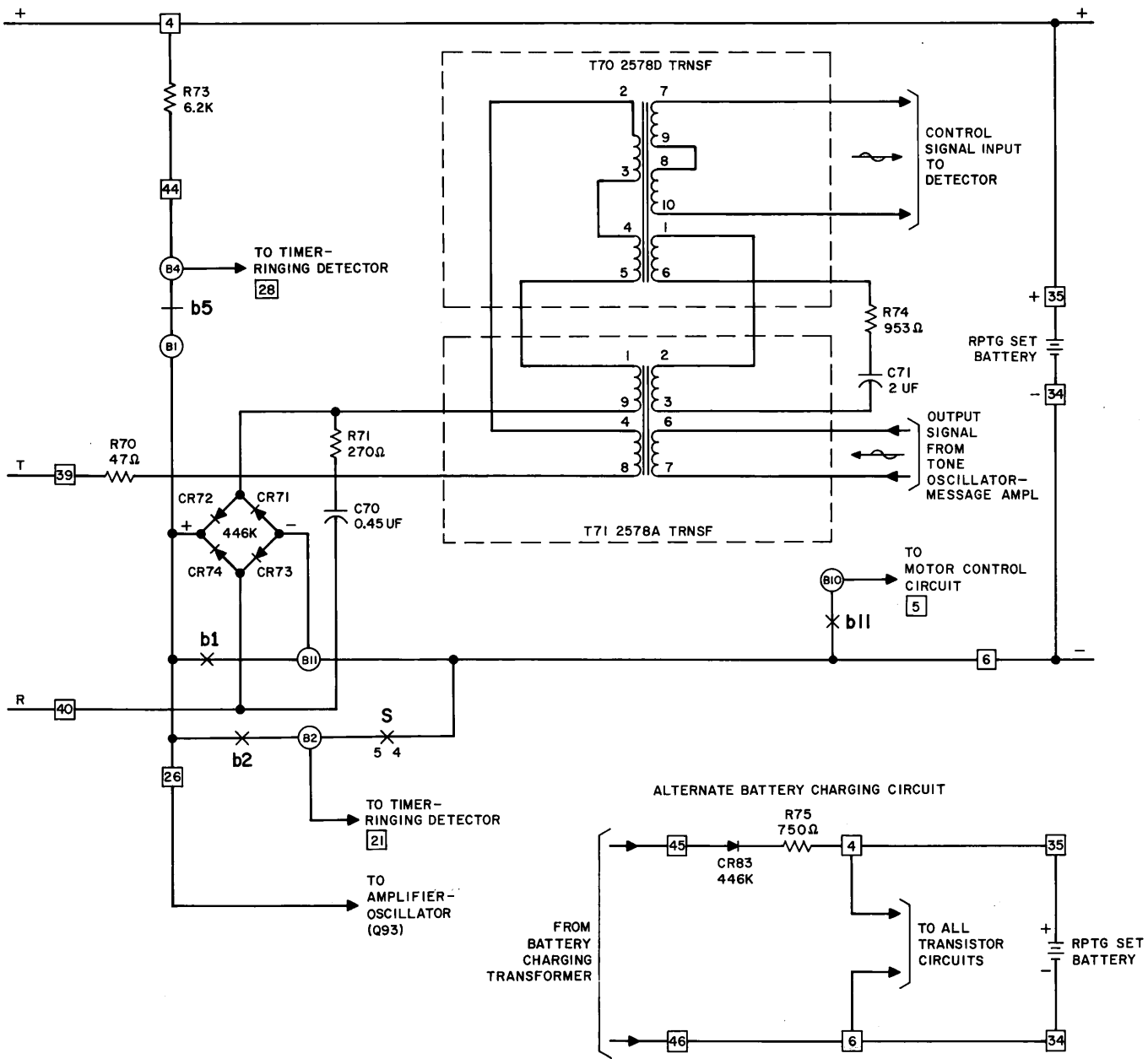


Fig. 7c—Termination and Signal Separation Network and Battery Charging Circuit, Functional Diagram

TIMER/RINGING DETECTOR

3.09 The timer/ringing detector provides two timing periods of 10 and 30 seconds and delayed ringing detection. The short timing period of 10 seconds is used during the INQUIRY mode when a call is made to the 1A Telephone Reporting Set. The long timing period of 30 seconds provides the holding time for the identifying tone following the dialing and first message period, and the wait time between successive calls. The output of the timer turns on the rotary motor transistor switch in the motor control circuit.

3.10 The ringing detector portion of the circuit integrates the rectified ringing voltage. After 6 to 8 seconds (3 to 4 rings) the circuit starts the rotary motor (Fig. 7, 7F, and 8).

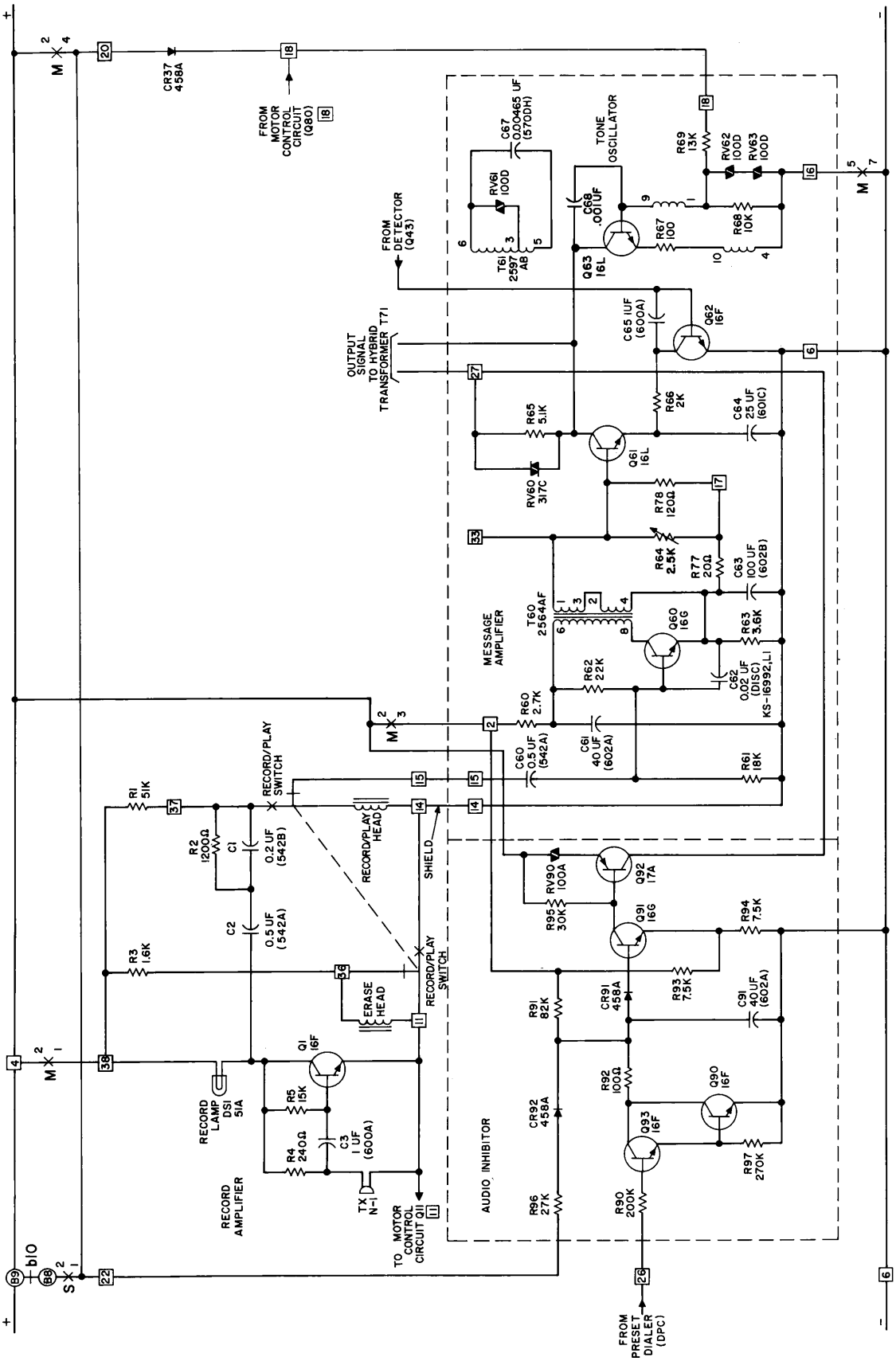


Fig. 7d—Tone Oscillator/Message Amplifier, and Record Circuit, Functional Diagram

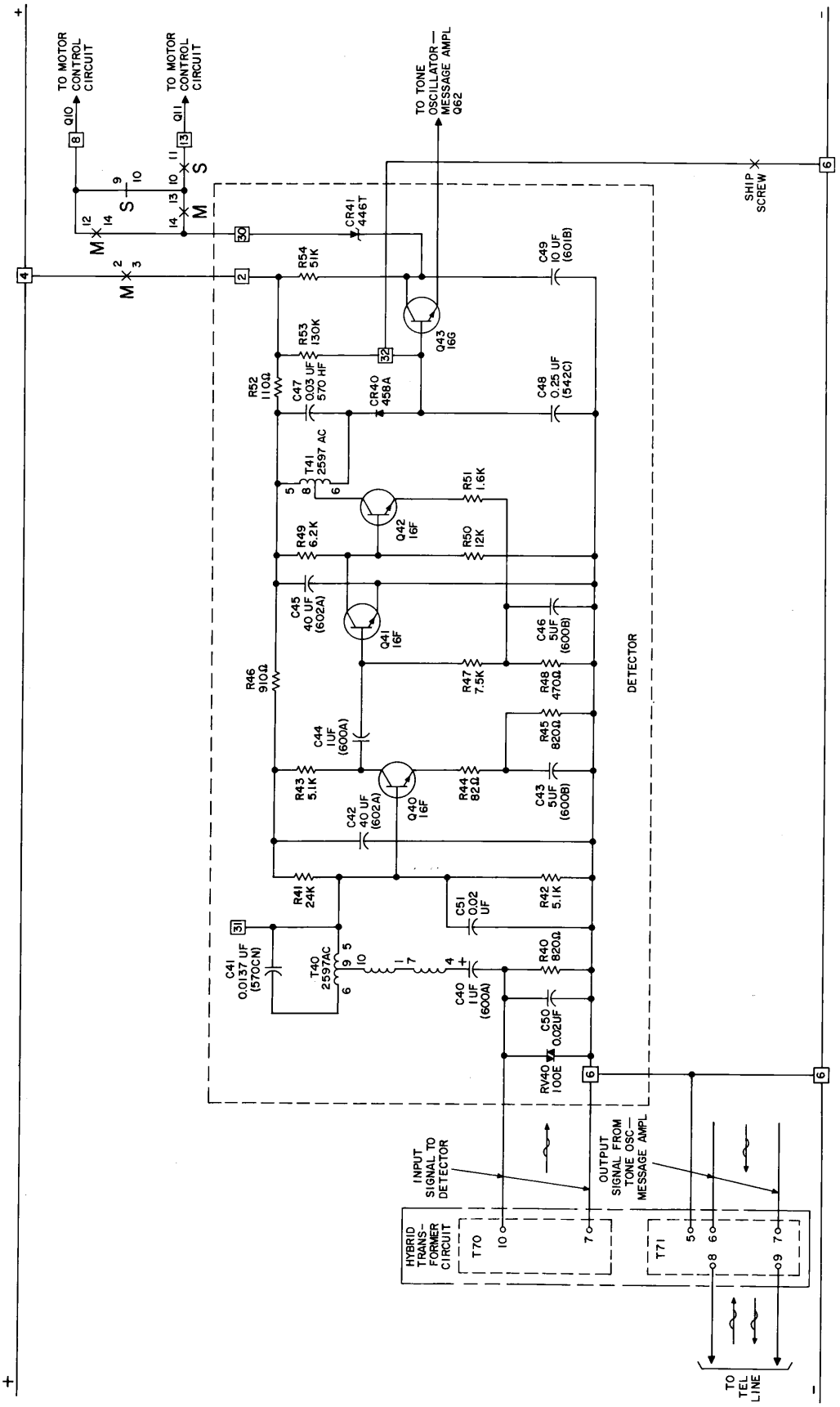


Fig. 7e—Detector Circuit, Functional Diagram

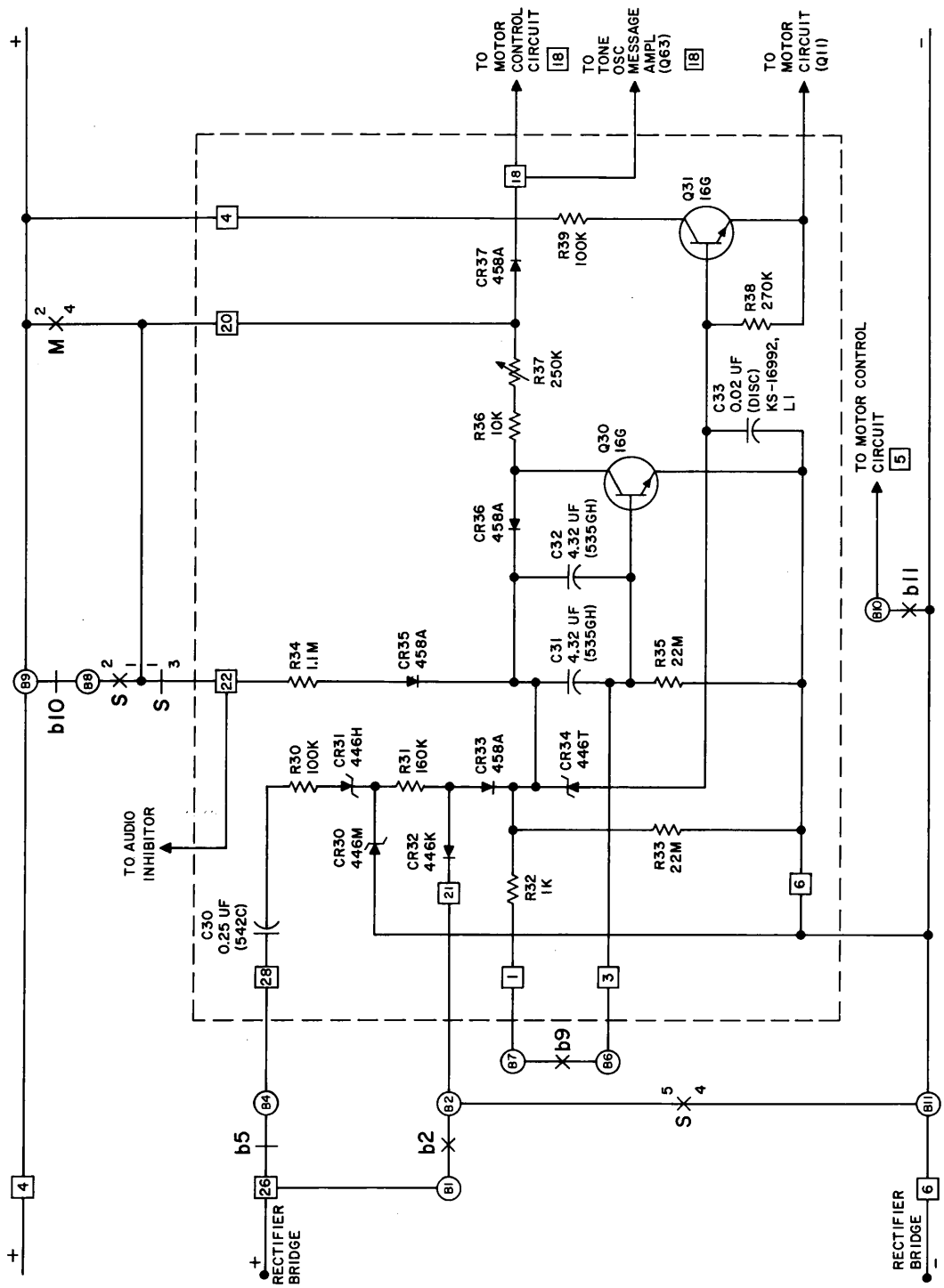


Fig. 7f—Timer/Ringing Detector Circuit, Functional Diagram

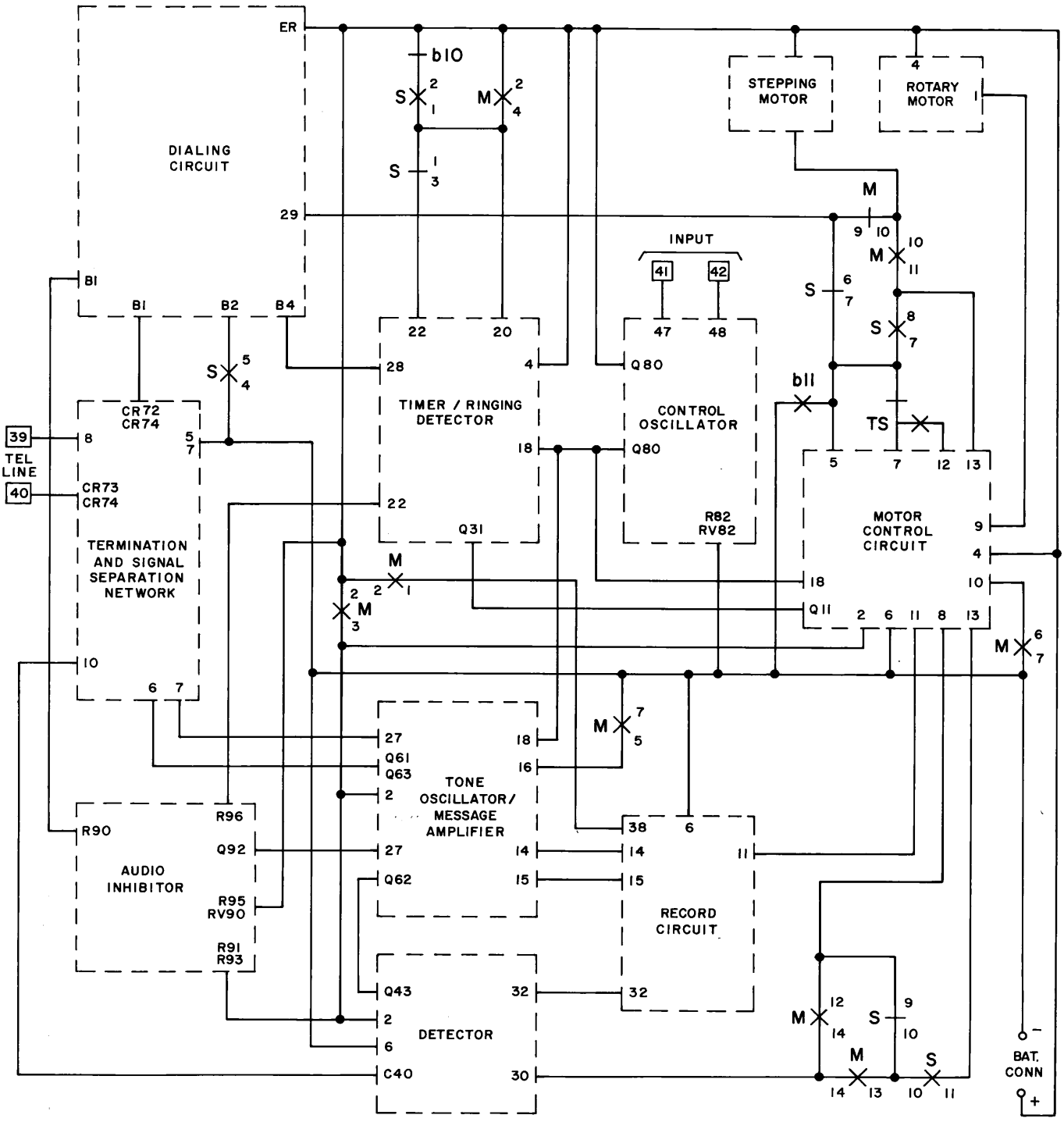


Fig. 8—1A Telephone Reporting Set, Block Diagram

AUDIO INHIBITOR

3.11 The audio inhibitor functions to disable the tone oscillator/message amplifier during dialing. This prevents interference with voice frequency signaling apparatus used in the telephone switching system. Operation of the tone oscillator/message amplifier is restored 2 to 5 seconds after the last digit is dialed (Fig. 7, 7D, and 8).

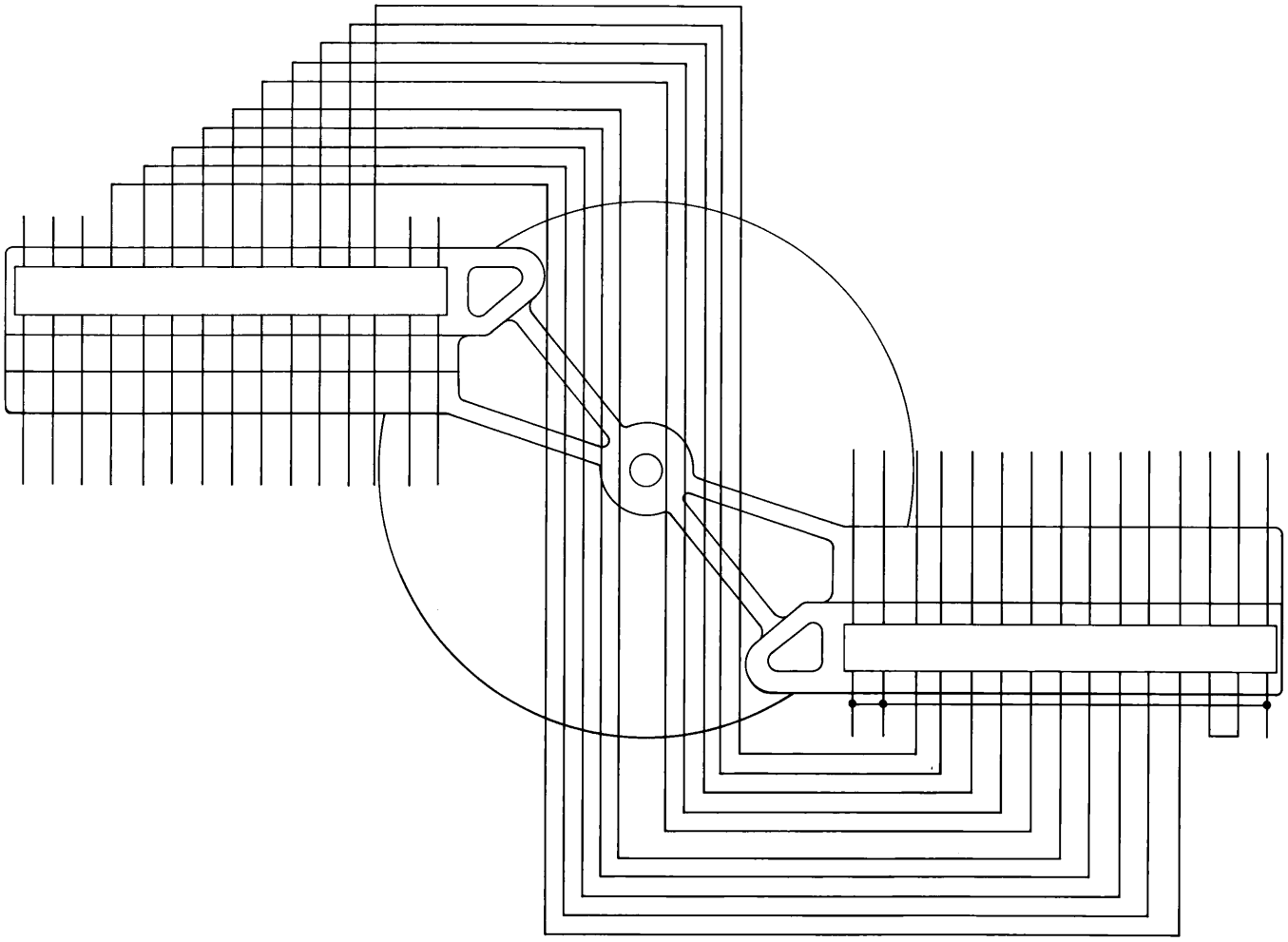


Fig. 9—"B" Brush Circuitry

RECORD CIRCUIT

3.12 The record circuit permits the user to record the voice message on the magnetic tape in the reporting set. It is put into operation with the RECORD/PLAY switch which also causes the rotary motor to start. Power for the erase and recording functions is timed by the M-wheel commutator to insure that the message is recorded on the correct portion of the tape (Fig. 7, 7D, and 8).

4. PRESET DIALER LOGIC

4.01 Following the closure of the customer's alarm sensing contacts, the motor control circuit energizes the two motors. The stepping motor advances the S-wheel one step out of a "home" position and the rotary motor drives the dial pulsing contacts and the rotating brush assemblies through a gear train (Fig. 3 and 4). Ten pulses per second are generated by the dial pulsing contacts and the switching sequence is controlled by the brushes contacting the printed circuit pattern of the B-disk. Combinations of electrically connected brushes and conductive paths constitute switches b1 through b8 (Fig. 9, 10, and 11). A switch is closed when two paths are electrically short circuited through a brush pair. Switches b1 through b6 are combinations of slow scan brushes and conductive paths on the back side of the B-disk (Fig. 10). Switches b6 and b7 are on the front side and are operated as the fast scan brushes rotate (Fig. 11). A b8 switch is closed when a number button is positioned at the desired digit on each one of the fourteen radial rows of contacts (Fig. 6). The dialing circuit is energized only during the ALARM mode when S-wheel contacts S4-5 are closed.

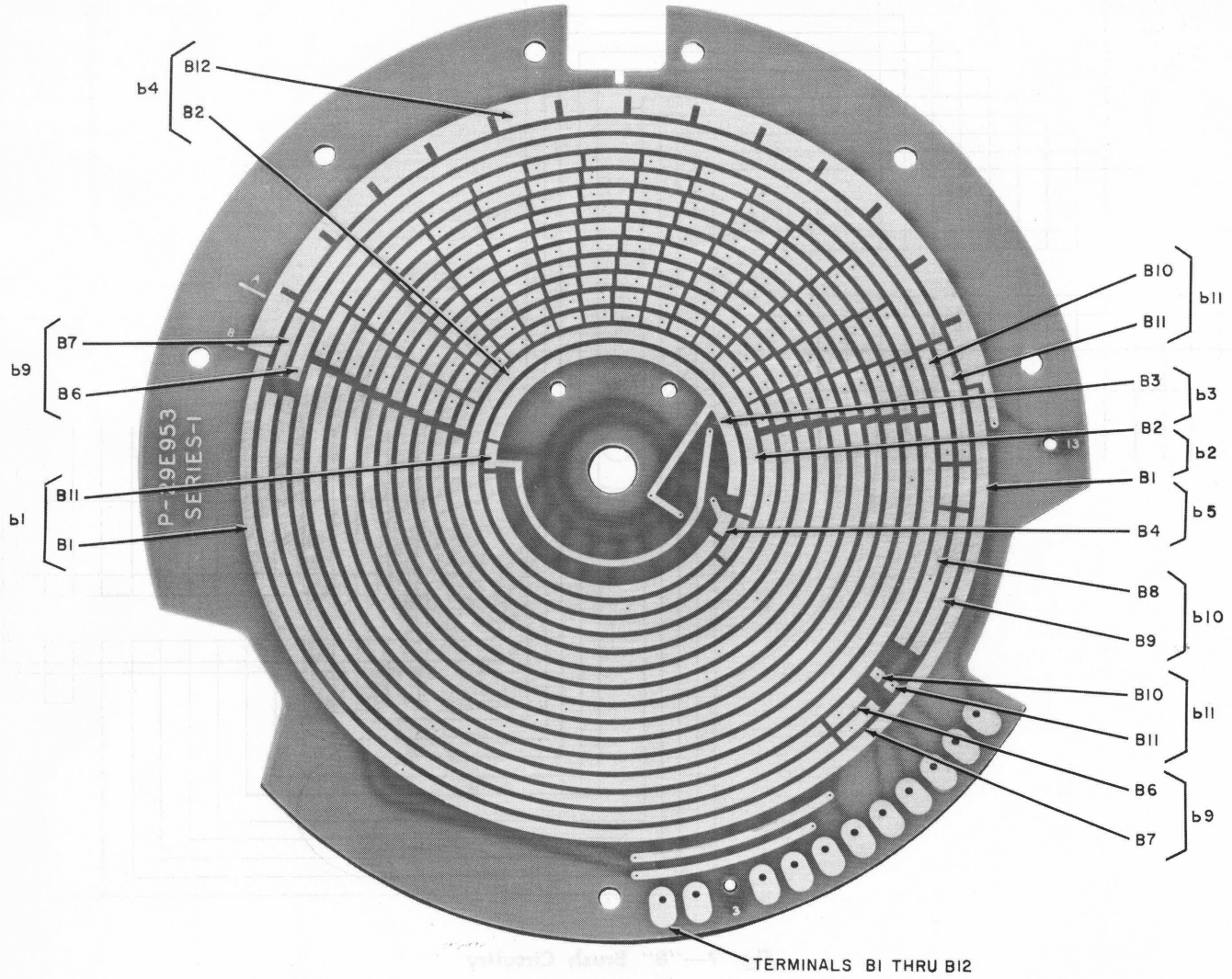


Fig. 10—Preset Dialer Logic Disk (Back)

4.02 Before the motors are energized, the fast scan brushes and the slow scan brushes are at their respective starting positions. Switches b1, b2, b3, b4, and b7 are open, while b5 and b6 are closed. The b8 switches are physically closed but are not yet in the circuit because of the position of the rotating brush assemblies. Pulsing contacts DP are closed. Relay ER is not energized. S-wheel contacts S4-5 are open. All dialer circuits are open.

4.03 When the motor starts, the commutator brushes in contact with printed circuit patterns on both sides of the B-disk begin to rotate in synchronism at speeds determined by the gear train—1.1 RPM for the slow scan brushes and 37.5 RPM for the fast scan brushes. The dialing sequence occurs during the first half revolution of the slow scan brushes. During the second half revolution the dialing mechanism is reset.

4.04 To understand the following sequence, refer to Fig.—10, 11, 12, 13, 14, 15, and 16.

- The S-wheel is moved one step out of "home" position causing contacts S4-5 to close.
- After approximately 1 second, switch b5 opens and disconnects the 1A Telephone Reporting Set battery charging circuit from the telephone line.

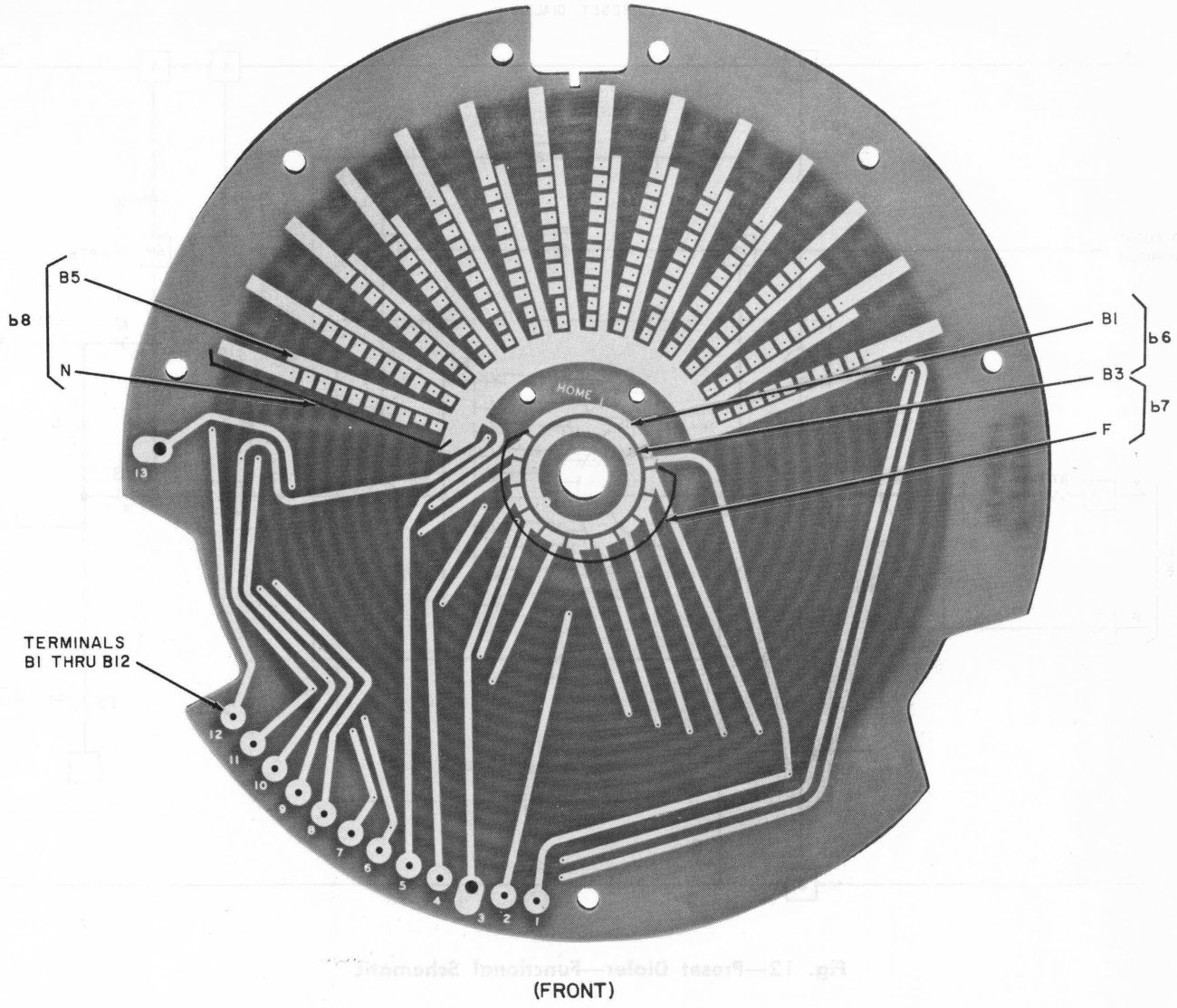


Fig. 11—Preset Dialer Logic Disk (Front)

- b2 closes next, seizing and holding the line through contact S4-5 for approximately 4.8 seconds to allow time for the central office to supply dial tone.

- b3 closes and will remain closed for about 27 seconds (the first half revolution of the slow scan brushes). The line remains held through contacts b2 and S4-5.

- b2 opens and since b6 is closed the line is now held through contacts b6, b3, and S4-5.

- b4 closes. line remains held through contacts b6, b3, and S4-5.

- After b6 opens and before b7 closes, pulsing contacts DP close, holding. the line through contacts DP, ER, b4, and S4-5. b6 opens for a time period corresponding to one digit (1.0 second) and closes for the time between successive digits (0.6 second). The total time required to dial each digit of the telephone number is 1.6 seconds.

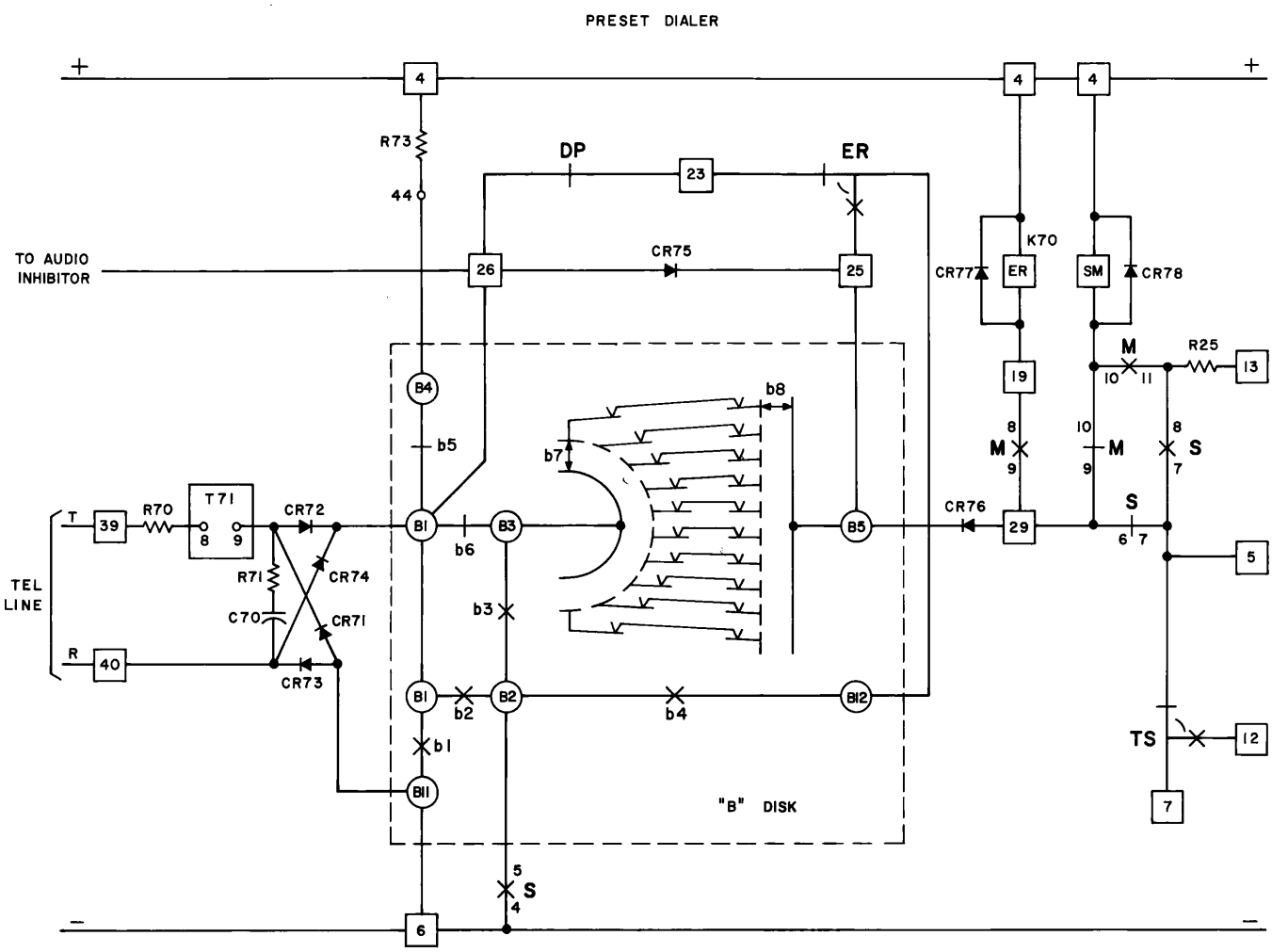


Fig. 12—Preset Dialer—Functional Schematic

- After b7 closes, DP opens for the duration of one b7 closure. The line is thus pulsed until the number button setting closes b8. When b8 closes, the operate circuit for the ER relay is completed through M8-9, CR76, b8, b7, b3, and S4-5 contacts. During the time the ER relay is being actuated the line is held through CR75, b8, b7, b3, and S4-5 contacts. After the ER relay contacts have transferred, the line is held through contacts CR75, ER, b4, and S4-5. During the remainder of the digit interval, b7 contacts and DP contacts continue to open and close. The line is not pulsed, however, because the DP contacts are short circuited by CR75 and the ER relay contact.

- After the fast scan brush pair has passed the tenth b7 contact segment, b7 opens and b6 closes for 0.6 second until the next digit interval. b4 opens when the slow scan brush moves into the gap in the B12 printed circuit pattern (Fig. 10) and the ER relay is de-energized. The line is held through b6, b3, and S4-5.

- At the start of the next digit period b4 again closes and the dialing circuit through DP and the normally closed ER contacts is again established. The line remains held through b6, b3, and S4-5.

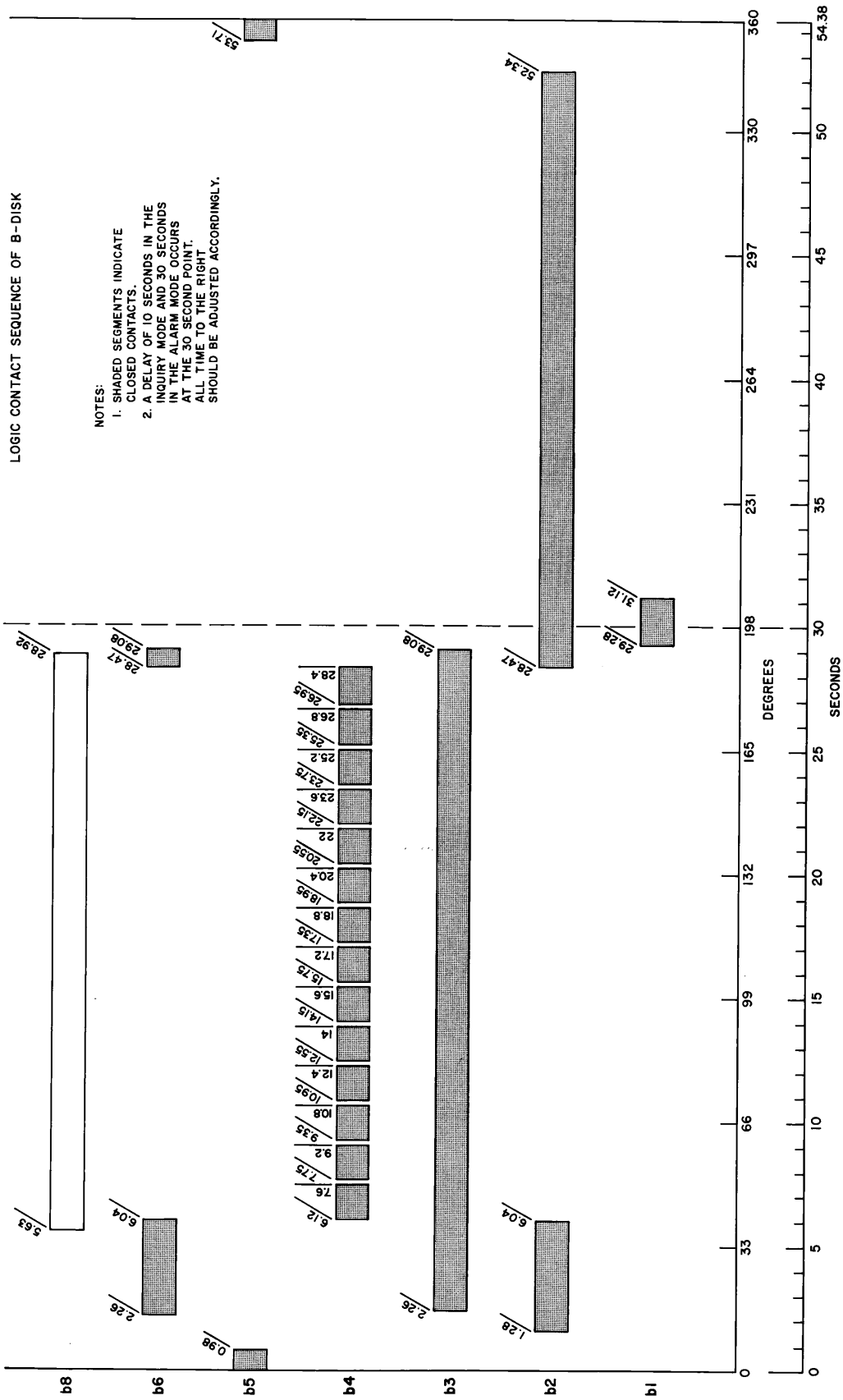


Fig. 14—Logic Contact Sequence of B-Disk (Slow Scan)

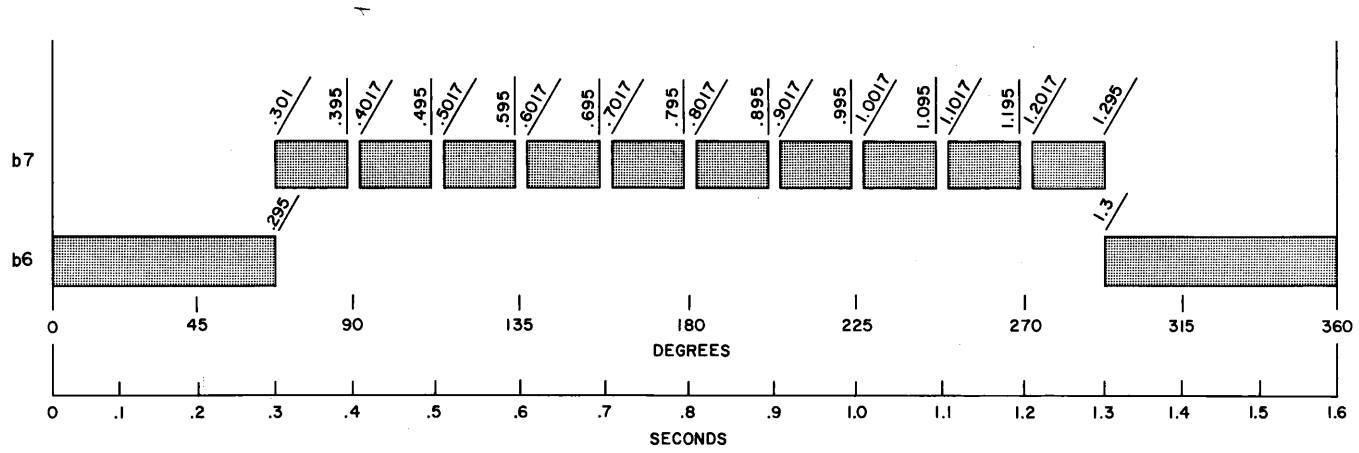


Fig. 15—Logic Contact Sequence of B-Disk (Fast Scan)

- b3 opens, followed by the closure of b1. After b1 closure, M2-4 closes, which applies battery voltage to the timer/ringing detector circuit. The application of battery voltage starts the 30-second time period.

- M6-7 opens, the rotary motor stops, the line is held through b1.

- After the 30-second hold interval the timer starts the motor again and b1 opens. During the second half revolution of the slow scan brushes the line is held through b2 and S4-5 until the brushes approach their "home" position, and b2 opens to release the telephone line.

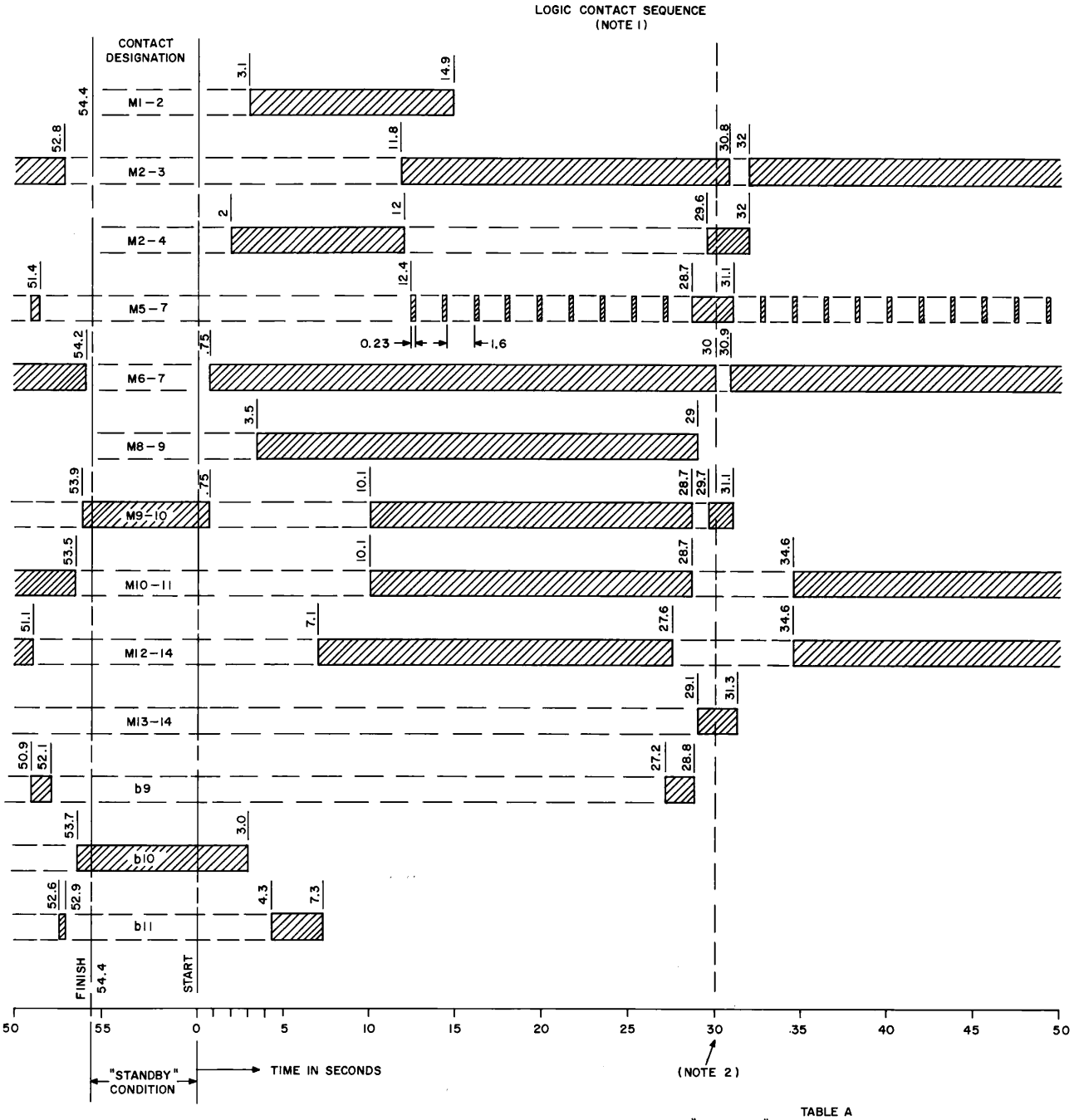
- b5 closes to connect the battery charging circuit.

4.05 When the "home" positions are reached, the M-wheel has made one rotation and the motor stops. Conditions are now as they were at the beginning of the dialing sequence, except that the S-wheel is out of "home" position.

4.06 The slow scan brushes have made one revolution while the fast scan brushes have completed 34 revolutions.

5. ALARM MODE

5.01 The contacts of the customer's alarm sensing device are connected to the input terminal points 41 and 42 (Fig. 7, 7A, and 8) which are located on the circuit board shroud (Fig. 17). Closure of the input contacts places a shunt across a winding coupled to the tuned circuit of the control oscillator Q81. Q81 is a free running oscillator at a frequency of approximately 55 KHz. When the contacts close the oscillator stops, removing the reverse bias from Q80, causing it to turn on. When Q80 is turned on, positive battery voltage is applied to capacitor C11 in the motor controlled circuit, and the resulting pulse causes silicon controlled switch Q10 to turn on.



NOTES:

1. SHADED SEGMENTS INDICATE CLOSED CONTACTS.
2. A DELAY OF 10 SECONDS IN THE INQUIRY MODE AND 30 SECONDS IN THE ALARM MODE OCCURS AT THE 30 SECOND POINT. ALL TIME TO THE RIGHT SHOULD SHOULD BE ADJUSTED ACCORDINGLY.

TABLE A
"S-WHEEL" LOGIC CONTACT SEQUENCE

CONTACTS	WHEEL AT A HOME POSITION	WHEEL OUT OF HOME POSITION
S1-2	OPEN	CLOSED
S1-3	CLOSED	OPEN
S4-5	OPEN	CLOSED
S6-7	CLOSED	OPEN
S7-8	OPEN	CLOSED
S9-10	CLOSED	OPEN
S10-11	OPEN	CLOSED

Fig. 16—Logic Contact Sequence of M- and S-Wheels

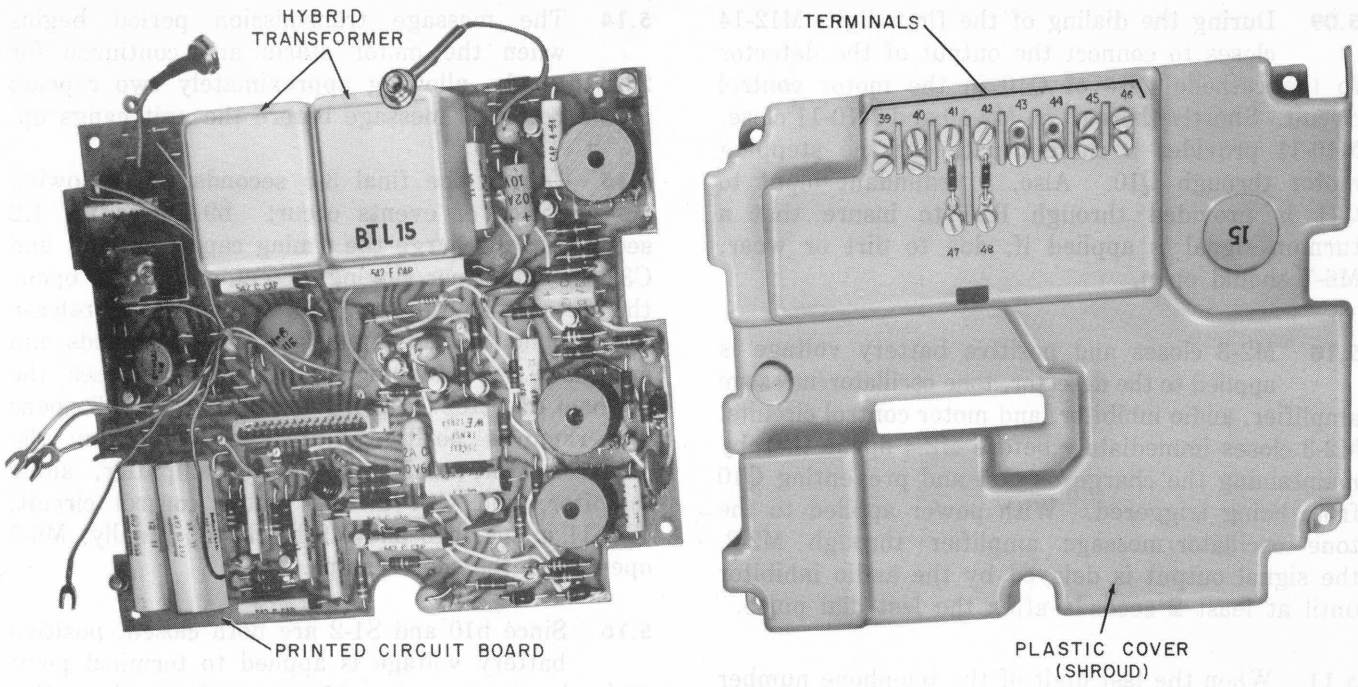


Fig. 17—Circuit Board Assembly

5.02 The stepping motor (SM) is energized through Q10 and the following contacts; transfer switch (TS), S6-7, and M9-10. SM is stepped once and as it completes its power stroke, it actuates TS which connects negative battery voltage to Q11 through Q10. Q11 is triggered on and the rotary motor starts. TS also opens the current path to the stepping motor and it is de-energized. As SM releases, a pawl on its armature advances the S-wheel one step from a "home" position and causes all normally closed S contacts to open and all normally open S contacts to close.

5.03 Refer to the logic contact sequence charts (Fig. 14 and 16) for the following discussion. Three quarters of a second after the rotary motor starts, the M9-10 contacts open and the M6-7 contacts close. The M6-7 contacts maintain a current path for the rotary motor and short circuits Q11 which stops conducting. The stepping motor will not step again because the circuit through S6-7 and M9-10 is now open.

5.04 S1-2 has closed to apply battery voltage through b10 (Fig. 7) to the timer/ringing detector and to capacitor C11 in the motor control. While C11 remains charged, the triggering of Q10 is prevented. Successive operation of the customer's contacts will have no effect during the operating sequence.

5.05 The battery charging circuit is opened when b5 opens, approximately 1 second after the rotary motor started.

5.06 Following this, b2 closes and the telephone line is seized and held through S4-5 for the 4.8-second dial tone wait period (Fig. 1 and 12).

5.07 After 3 seconds b10 opens. Note that M2-4 closed 1 second earlier to maintain the charge on C11 and prevent triggering of Q10.

5.08 Before the dialing period starts, M8-9 closes to connect the ER relay into the dialing circuit. At the end of the 4.8 second wait for dial tone, b2 opens, b4 closes and dialing starts.

5.09 During the dialing of the first digit, M12-14 closes to connect the output of the detector to the cathode gate of Q10 in the motor control circuit. Shortly thereafter, M9-10 and M10-11 close. M10-11 provides a current path for the stepping motor through Q10. Also, a redundant input to Q11 is provided through R25 to insure that a turn-on signal is applied if, due to dirt or wear, M6-7 should open.

5.10 M2-3 closes and positive battery voltage is applied to the detector, tone oscillator/message amplifier, audio inhibitor, and motor control circuits. M2-3 closes immediately before M2-4 opens thereby maintaining the charge on C11 and preventing Q10 from being triggered. With power applied to the tone oscillator/message amplifier through M2-3, the signal output is delayed by the audio inhibitor until at least 2 seconds after the last dial pulse.

5.11 When the last digit of the telephone number has been dialed and the 2- to 5-second time delay of the audio inhibitor has elapsed, the tone oscillator/message amplifier is energized to allow the recorded voice message (and status tone bursts) to be transmitted over the telephone line.

5.12 After approximately 22.4 seconds, M6-7 opens, and the rotary motor is de-energized. Just before M6-7 opens, b9, b2, M5-7, and M2-4 close. Contact b9 closes for 1.6 seconds and discharges the timing capacitors C31 and C32 in the timer/ringing detector. Contact b2 closes to hold the line through b2 and S4-5. Contact b9 opens, followed by the closure of M2-4. Battery voltage is thus applied to the timer/ringing detector and timing capacitors C31 and C32 begin to charge. This starts the 30-second holding period. Since M5-7 is closed, Q63 in the tone oscillator/message amplifier is biased on and generates the 2125Hz identifying tone for the duration of the holding period. The rotary motor is stopped and no alarm message is transmitted.

5.13 If no 1475Hz control signal is received at the set, C31 and C32 continue to charge for 30 seconds, at which time zener diode CR34 breaks down causing Q31 to turn on, Q11 to conduct, and the rotary motor to start. M6-7 closes after the motor starts, short circuits Q11, and maintains a current path for the motor.

5.14 The message transmission period begins when the motor starts and continues for 23.2 seconds, allowing approximately two repeats of the recorded message before the unit hangs up.

5.15 During the final 3.5 seconds the following series of events occur: b9 closes for 1.2 seconds to discharge the timing capacitors C31 and C32 in the timer/ringing detector, M12-14 opens the detector output to Q10, b2 opens to release the telephone line, b11 closes for 0.3 seconds and energizes the stepping motor and advances the S-wheel one step. During this interval M2-3 opens and removes positive battery voltage from the detector, tone oscillator/message amplifier, audio inhibitor, and C11 in the motor control circuit. M10-11 opens, b10 and M9-10 close. Finally, M6-7 opens and the motor stops.

5.16 Since b10 and S1-2 are both closed, positive battery voltage is applied to terminal point 20 in the timer/ringing detector and capacitors C31 and C32 begin to charge.

5.17 Normally, a ringing voltage applied to line terminals 39 and 40 will activate the unit. In the alarm mode this cannot occur because S4-5 is closed, which grounds terminal point 21.

5.18 After approximately 30 seconds, timing capacitors C31 and C32 will be charged to 8 volts, zener diode CR34 will conduct and Q31 will turn on. The output of Q31 will trigger Q11 and the rotary motor starts, initiating a new alarm reporting call.

5.19 Since there are 10 steps between "home" positions on the S-wheel, nine calls in succession will be made following an alarm input before the 1A Telephone Reporting Set automatically resets to its standby condition.

5.20 At certain times in the reporting cycle, the control signal can alter the sequence (Fig. 1).

5.21 If, when the control point telephone rings, the attendant answers immediately and signals the 1A Telephone Reporting Set with the 1475Hz control tone, Q43 in the detector will be turned off and Q10 in the motor control circuit will be triggered on through M12-14. Q10, in turn, causes the stepping motor to step the S-wheel directly to

a "home" position which opens S7-8 and de-energizes the stepping motor. All S contacts are returned to their normal condition, S4-5 is therefore open, the telephone line is released, and message transmission is stopped.

5.22 The rotary motor continues to run until M6-7 opens and the motor is de-energized. Immediately prior to M6-7 opening, b9, b1, and M2-4 close. The b9 closure discharges the timing capacitors, C31 and C32, in the timer/ringing detector. The line is seized and held when b1 closes. After C31 and C32 are discharged and b9 opens. M2-4 closes and the timing capacitors again start to charge. After about 10 seconds, C31 and C32 will be charged to 8 volts, zener diode CR34 will conduct and Q31 will turn on. The output of Q31 will trigger Q11 and the rotary motor starts.

5.23 Immediately after the M-wheel and the B-disk switching assemblies start to rotate, b1 opens and the line is released. After the M-wheel has made one complete revolution, M6-7 opens, the rotary motor stops and the unit has been reset. All M, S, and b contacts are then in the condition shown in Fig. 7.

5.24 Before another alarm can be initiated, C11, in the motor control circuit, must be discharged. This requires about 20 seconds and the input contacts must have opened and remained open for at least that long after the unit has reset.

5.25 If the control signal is received at the unit during the message period following the 30-second holding time (Fig. 1), the stepping motor will step the S-wheel directly to a "home" position and the rotary motor will be turned off when M6-7 opens as previously described.

5.26 If the 1475Hz control signal is received during the identifying tone interval, Q43 in the detector will be turned off. Since M12-14 is open and M13-14 and S10-11 are closed, the output of the detector triggers Q11 in the motor control which energizes the rotary motor and the unit advances to the message period.

5.27 If the customer's input contacts remain closed during the operating sequence after dialing has been completed, the periodic closures of M5-7 will apply emitter bias to Q63 and bursts of 2125Hz identifying tone will be transmitted every 1.8 seconds. These tone bursts will be superimposed on the voice message.

6. INQUIRY MODE

6.01 When the 1A Telephone Reporting Set is called from the control point, the ac ringing voltage appearing at line terminals, 39 and 40, will be rectified by the polarity guard (CR71, CR72, CR73, and CR74). After 3 or 4 rings the timing capacitors C31 and C32 will have charged to 8 volts which will cause CR34 to conduct. When CR34 conducts, Q31 is turned on and, in turn, Q11 is triggered. The rotary motor is started and 0.75 seconds later M6-7 closes to turn off Q11 and maintain a current path for the motor.

6.02 Since the stepping motor is not energized at this time, the S contacts will remain at a "home" position. M9-10 opened at the same time that M6-7 closed.

6.03 B-disk contact b2 closes, but the telephone line is not seized because S4-5 is open (Fig. 12).

6.04 M2-4 closes after 2 seconds and applies positive battery voltage to C11 in the motor control circuit, but the stepping motor does not operate because M9-10 is open.

6.05 M and b contacts function as the wheel and brushes continue to rotate, but since the unit has not seized the line, ringing voltage continues to be applied between terminal points 39 and 40.

6.06 After about 29 seconds b1 closes. Thus, the line is seized and ringing is terminated. Contacts M2-4 and M5-7 close and apply voltage to the tone oscillator/message amplifier causing the 2125Hz identifying tone to be generated.

6.07 The following sequence occurs if no 1475Hz control signal is transmitted during the 10 second period when the 2125Hz identifying tone is being generated.

6.08 M6-7 opens and the rotary motor stops. Approximately 3 seconds before the rotary motor stops, b9 closes for approximately 1.6 seconds to discharge the timing capacitors C31 and C32.

6.09 When M2-4 closed, positive battery voltage was also applied to the timer/ringing detector, and the timing capacitors began to charge. After 10 seconds, zener diode CR34 conducts and Q31 turns on. This triggers Q11 in the motor control circuit and the rotary motor starts again.

6.10 M2-3 opens momentarily after the motor starts. This turns the message amplifier off and provides a short delay in message transmission which insures that very little of the alarm message will be transmitted before b1 opens and releases the line.

6.11 When the M-wheel has turned through one rotation, M6-7 opens, the rotary motor stops, and the unit hangs up.

6.12 If the control signal is received at the unit during the identifying tone period (Fig. 1), Q43 in the detector will be turned off.

6.13 The closure of M9-10, prior to the opening of M6-7, connects Q10 to stepping motor SM. M13-14 also closed before M6-7 opened, connecting Q10 to the detector.

6.14 The output of Q43 in the detector triggers Q10 in the motor control circuit, and the stepping motor is energized. The S-wheel advances one step out of "home" position, Q11 is triggered, the rotary motor is started, and the message transmission period begins.

6.15 The 1A Telephone Reporting Set has now, in effect, shifted to the ALARM mode (Fig. 1) and the operating sequence will be the same as in the ALARM mode.

7. MESSAGE RECORDING

7.01 The message recording sequence is initiated by operating the RECORD/PLAY switch from the PLAY position to the RECORD position. Normally the erase winding of the magnetic head is short circuited, and the record/play winding is connected to the input of the message amplifier (Fig. 7 and 7D).

7.02 Operation of the switch to the RECORD position will transfer the record/play winding from the message amplifier input (Q60) to the record circuit amplifier (Q1) output. The short circuit is removed from the erase winding and negative battery voltage is applied to the erase circuit and to the anode gate of Q11 in the motor control circuit.

7.03 Q11 is triggered, the rotary motor starts and drives the tape loop and the M-wheel (Fig. 18). Contacts M1-2 close 3 seconds later and the record circuit is energized. The record lamp lights, indicating that the voice input to the N1 transmitter will be recorded on the magnetic recording tape.

7.04 The tape passes the erase gap of the magnetic head first and any previously recorded message is removed. The tape next passes over the record/play gap of the magnetic head and the new message will be recorded.

7.05 Contacts M1-2 remain closed for 11.8 seconds, permitting a message of that length to be recorded.

7.06 When M1-2 opens, positive battery voltage is removed from the record circuit, Q1 is turned off, and the record lamp is extinguished.

7.07 The RECORD/PLAY switch must be returned to the PLAY position after the record lamp is extinguished.

7.08 The rotary motor continues to run until the unit reaches the end of the sequence and is reset as in the INQUIRY mode.

8. LOCAL OPERATION TESTS

8.01 The INPUT button provides a means for locally activating the 1A Telephone Reporting Set to test its operation.

8.02 Pressing the INPUT switch button I (Fig. 7 and 7A) completes a current path for the stepping motor, causing it to step once, advance the S-wheel, and start the rotary motor. This initiates the ALARM mode and the unit operates as explained in Part 5.

8.03 It should be noted that a false call will be made to the control point telephone. This may be avoided by lifting the handset of the associated telephone to prevent the dial pulses from reaching the Central Office.

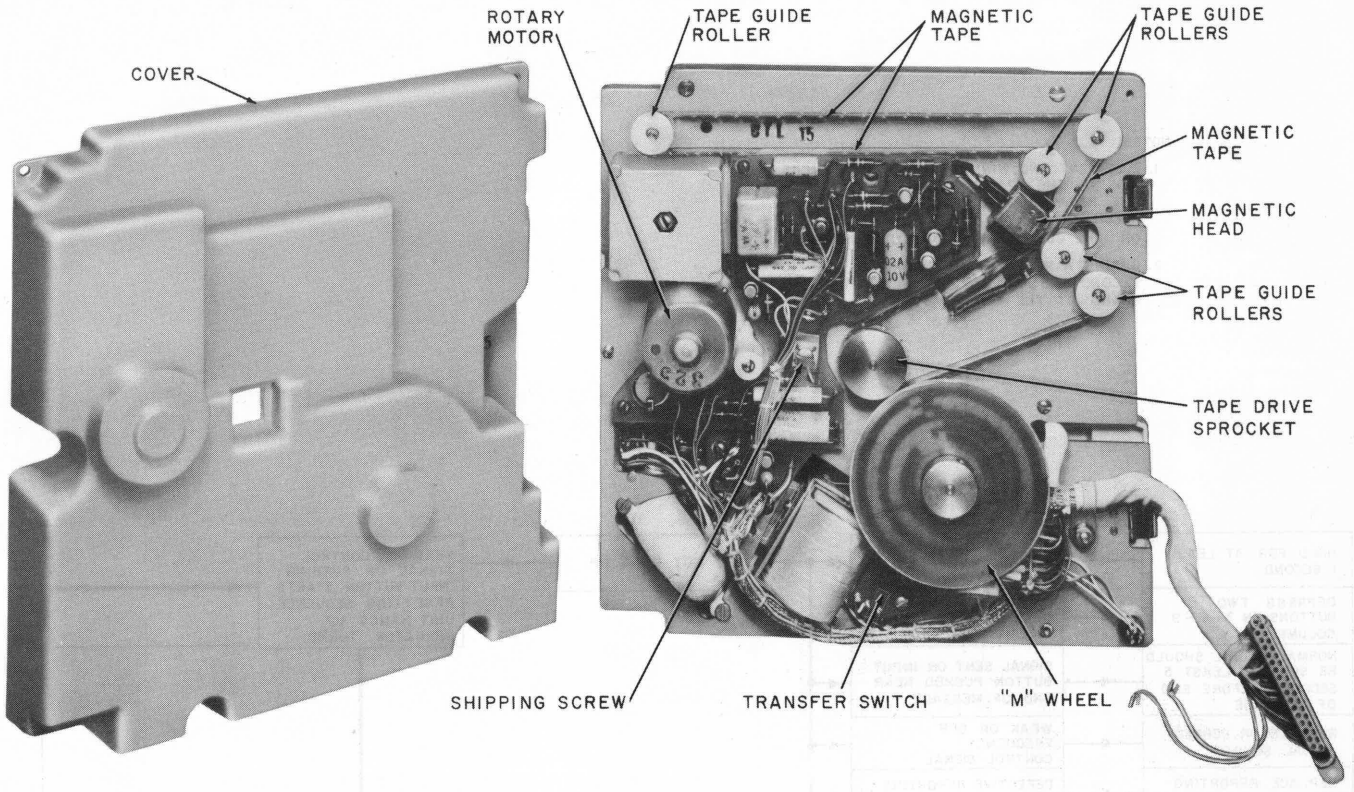


Fig. 18—Mechanical Drive Panel—Interior View

8.04 The associated telephone may be used to monitor the voice message and the operation of the 1A Telephone Reporting Set.

8.05 Pressing the INPUT button again during the message period will reset the unit to standby status.

9. OPERATION AND TROUBLESHOOTING

9.01 Refer to Fig. 19 for alarm reporting sequence.

9.02 Refer to Fig. 20 for inquiry sequence.

9.03 Refer to Fig. 21 for recording sequence.

REMEDY | CAUSE | MALFUNCTION | ALTERNATE OPERATION

NOTES:

1. EQUIPMENT AND WIRING ON THE CUSTOMERS SIDE OF THE 42A CONNECTING BLOCK IS THE RESPONSIBILTY OF THE CUSTOMER. REFER TO 514-230-100 FOR REQUIREMENTS ON THE CUSTOMER, LINES AND EQUIPMENT.
2. DURING A RESET FROM REPORTING, THE 10 SECOND WAIT WITH TONE WILL NOT BE HEARD BY THE CALLED PARTY.

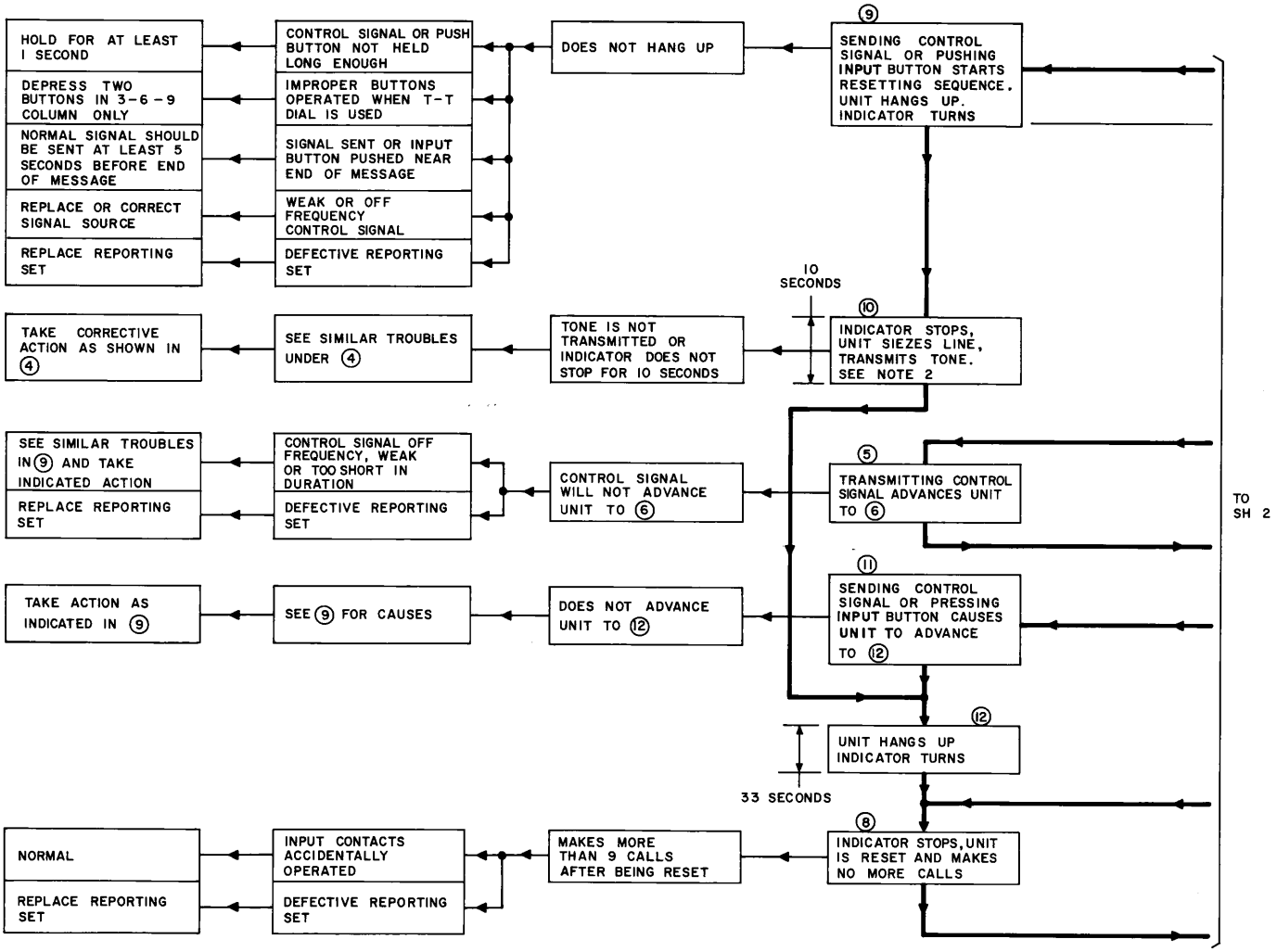


Fig. 19—Operation and Troubleshooting Chart—Alarm Reporting Sequence (Sheet 1 of 2)

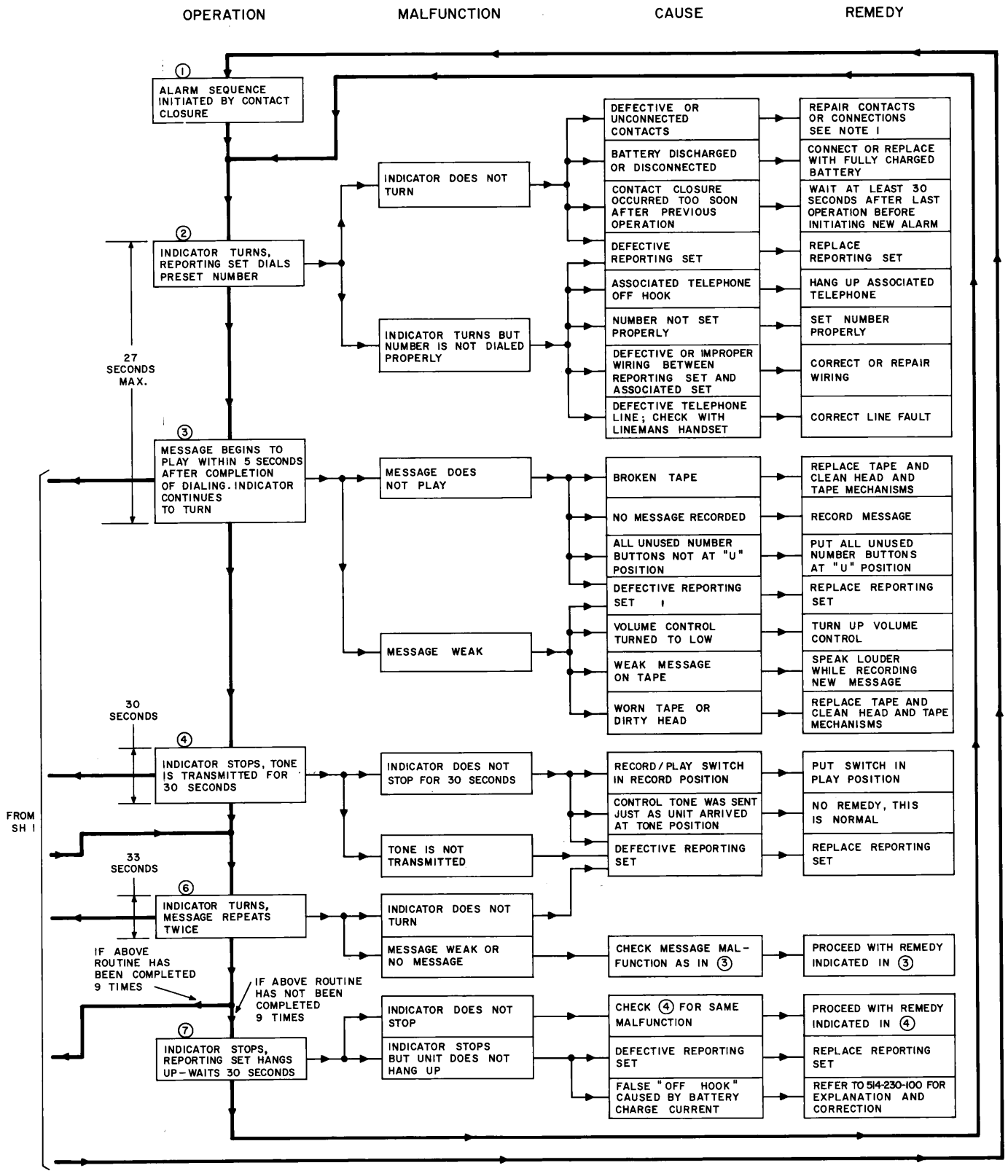


Fig. 19—Operation and Troubleshooting Chart—Alarm Reporting Sequence (Sheet 2 of 2)

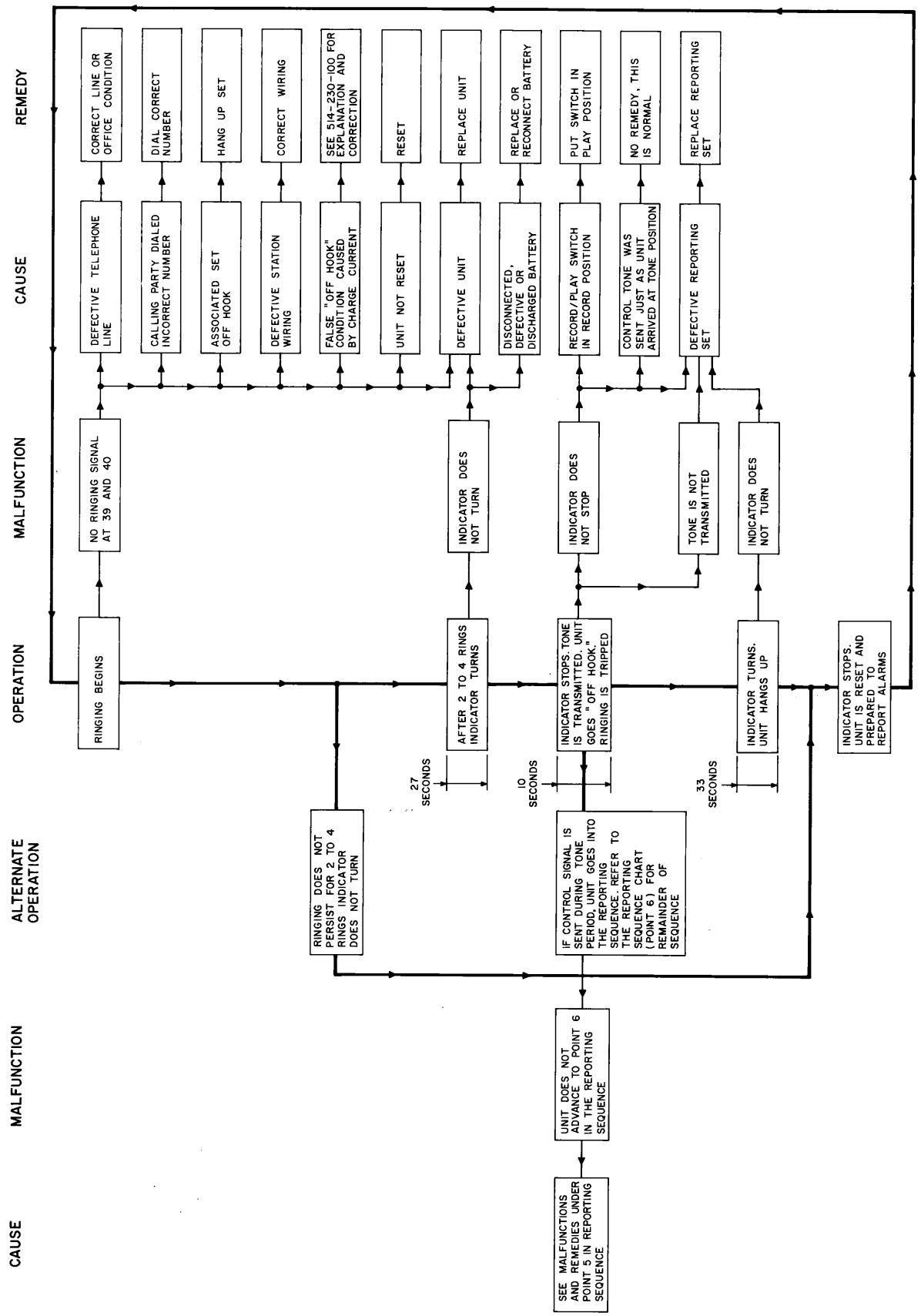


Fig. 20—Operation and Troubleshooting Chart—Inquiry Sequence

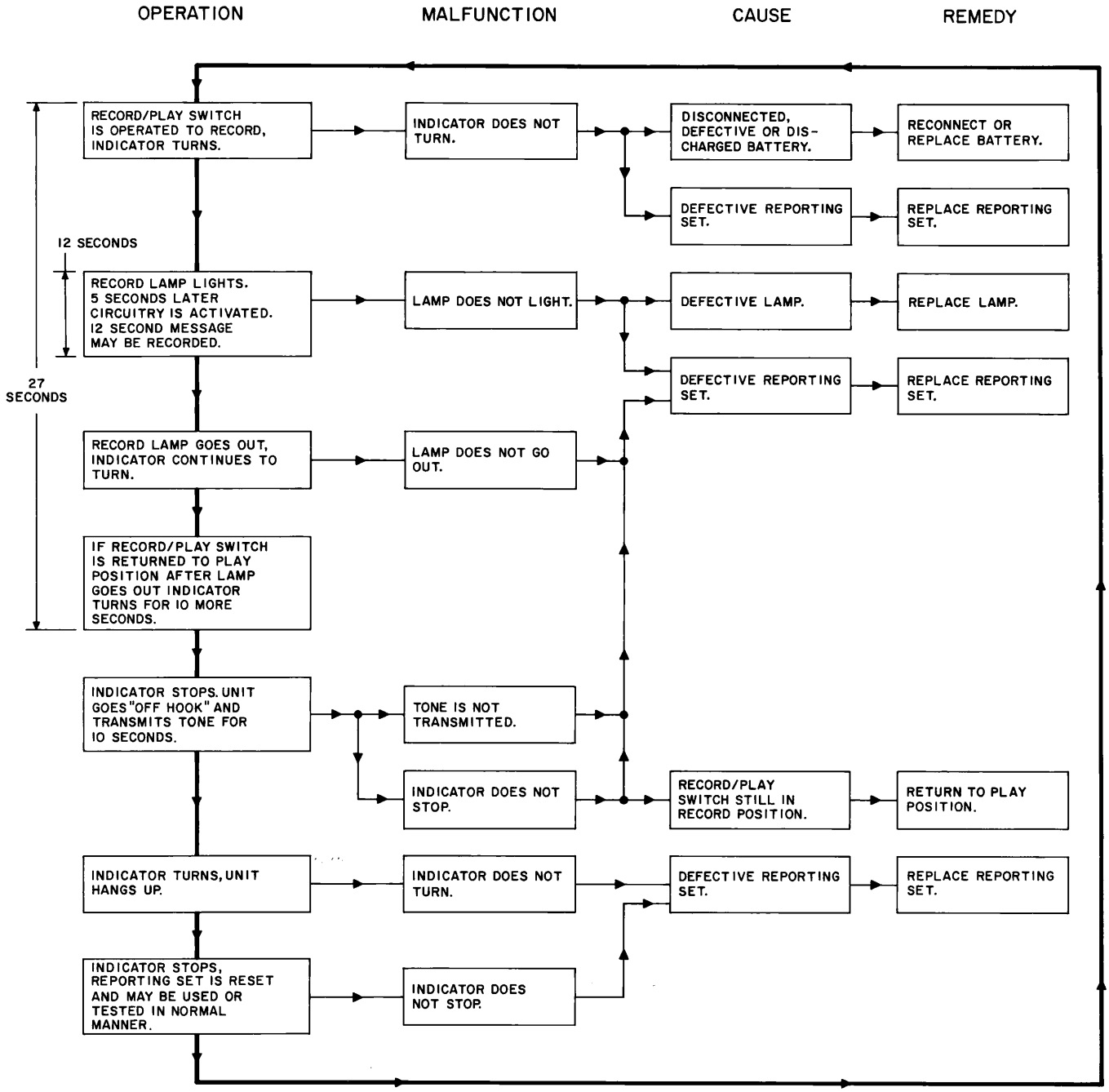


Fig. 21—Operation and Troubleshooting Chart—Recording Sequence