COIN TELEPHONE NO. 1.

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1. INTRODUCTION.

1.1 With the introduction of decimal currency in February 1966, and the intended expansion of S.T.D. facilities, new types of public telephone became necessary.

1.2 The Coin Telephone No. 1 is a new style non-S.T.D. multicoin public telephone that was specially developed for the Australian Post Office and progressively introduced as from 1966. This telephone is designed to handle all types of local calls, phonograms and non-S.T.D. trunk calls and will eventually supersede all earlier models.

1.3 The term "multicoin P.T." refers to a public telephone instrument designed to accept coins of more than one denomination. Coin Telephone No. 1 is designed to accept 5c, 10c and 20c coins, and during the currency change-over will also operate on 6d, 1/- and 2/- coins.

1.4 Previous models of multicoin P.T. comprise a telephone and a separate coin attachment. The new Coin Telephone No. 1 has the telephone circuit and the coin attachment situated within the same metal case. On local calls it is basically a pre-payment buttonless type public telephone, but will also operate on a pay-on-answer basis. On a trunk call the user must operate the press button located in the cradle mounting to deposit the money into the cash tin.

1.5 This paper lists the facilities, and describes the construction, manual operation and circuit operation of Coin Telephone No. 1.

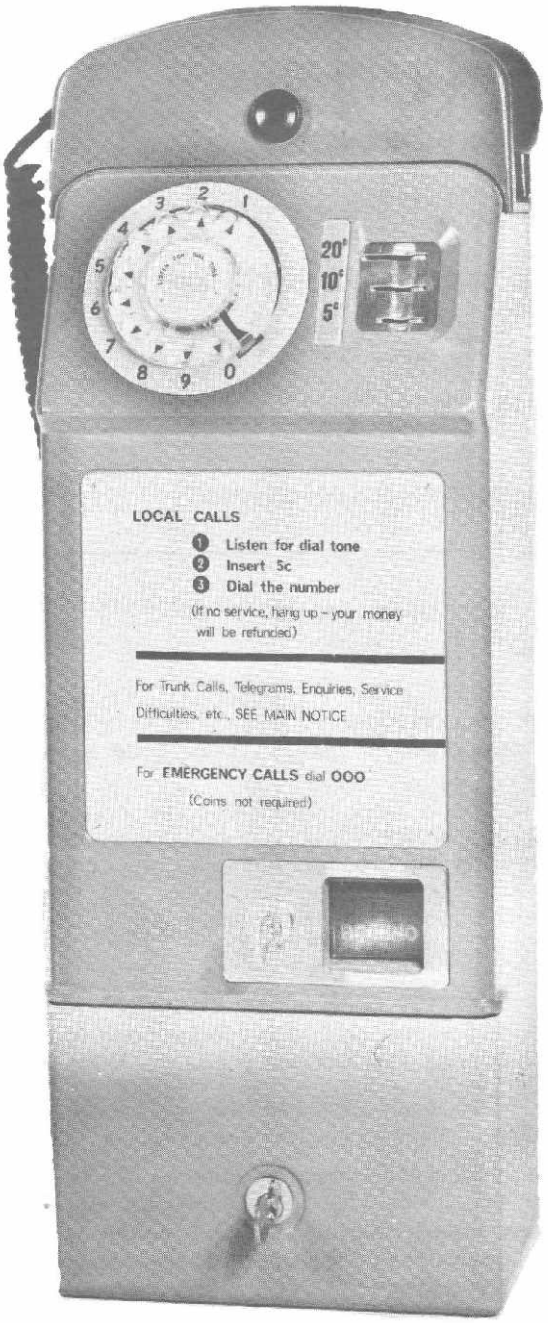


FIG. 1. COIN TELEPHONE NO. 1.

2. FACILITIES.

2.1 Facilities of the Coin Telephone No. 1 are:-

(i) Pre-payment operation on local chargeable calls. The P.T. will also operate on a post payment basis.

(ii) Calls to "Trunks","Service Difficulties", 09 levels, or to any number where a reversal does not occur may be made without coins.

(iii) On a local call made on a pre-payment basis, conversation may proceed immediately the called number answers. It is not necessary to press any buttons.

When a local call is made on a post-payment basis, conversation cannot proceed until the coin has been inserted.

(iv) Coins are automatically refunded on ineffective local calls when the handset is restored.

(v) On trunk calls, coin signals are provided to inform the telephonist:-

(a) That a public telephone is calling and that coins must be requested.

(b) The value of each coin as it is inserted.

(c) That the caller has momentarily replaced his handset and obtained a refund of the coins.

(d) That the cashing-in button has been pressed and the coins have been deposited in the container.

(vi) On trunk calls, the telephonist will not connect the call until the signal indicates that the cashing-in button has been pressed.

(vii) When there is a dispute regarding the coins inserted on a trunk call, the caller, by momentarily operating the gravity switch, can recover the coins without losing the connection.

2.2 In previous types of multicoin public telephone, it was necessary to press button A to deposit the coins on an effective call or button B to obtain a refund of the coins on an ineffective call. Each of these buttons also mechanically restored a coin slot springset and were difficult to operate.

In the Coin Telephone No. 1 it is possible to make a local call without pressing any buttons. The circuit is arranged so that an effective call automatically deposits the coin and allows conversation to proceed. An ineffective call does not deposit the coins, and when the caller hangs up the coins are automatically refunded.

On the manually assisted trunk call the fee is inserted when instructed by the trunk operator, but the coins are not deposited until a cashing-in button is operated. As this button serves only to complete an electrical circuit to a magnet, very little effort is required for its operation.

In the event of a dispute over the coins inserted, the caller, by momentarily operating the gravity switch, can obtain a refund without losing the connection. A special mechanical delay on the gravity switch prevents the loop circuit from being broken, provided the handset is not restored for more than two seconds.

When the handset is lifted to answer an incoming call to the public telephone a pair of auxiliary gravity switch contacts make momentarily and short circuit the line thus ensuring that the ring is tripped.

3. CONSTRUCTION AND COMPONENT FUNCTIONS.

3.1 Case. Coin Telephone No. 1 differs from earlier multicoin P.Ts. in that the telephone circuit and the coin mechanism are both situated in the same container. The case is divided into two compartments, the upper section housing the mechanical and electrical items, and the lower section containing the self-sealing coin tin. The lock for the mechanism door is common to all Coin Telephone No. 1 type public telephones. Fitted on the door are an instruction plate and the dial number ring (Fig. 1). Alongside the dial number ring is an opening in the case giving access to the three coin slots.

3.2 Handset Moulding. Mounted at the top of the case is a special handset moulding which also contains the coin depositing button. The handset rests on two operating plungers which project through the moulding and engage the switchhook mechanism within the upper compartment of the main case.

3.3 Assemblies. Inside the mechanism compartment are the following main assemblies:-

(i) Chassis assembly.

(ii) Mechanism assembly.

(iii) Gravity Switch Delay mechanism assembly.

Chassis Assembly. The steel chassis assembly (Fig. 2) is situated in the top compartment behind the coin mechanism.

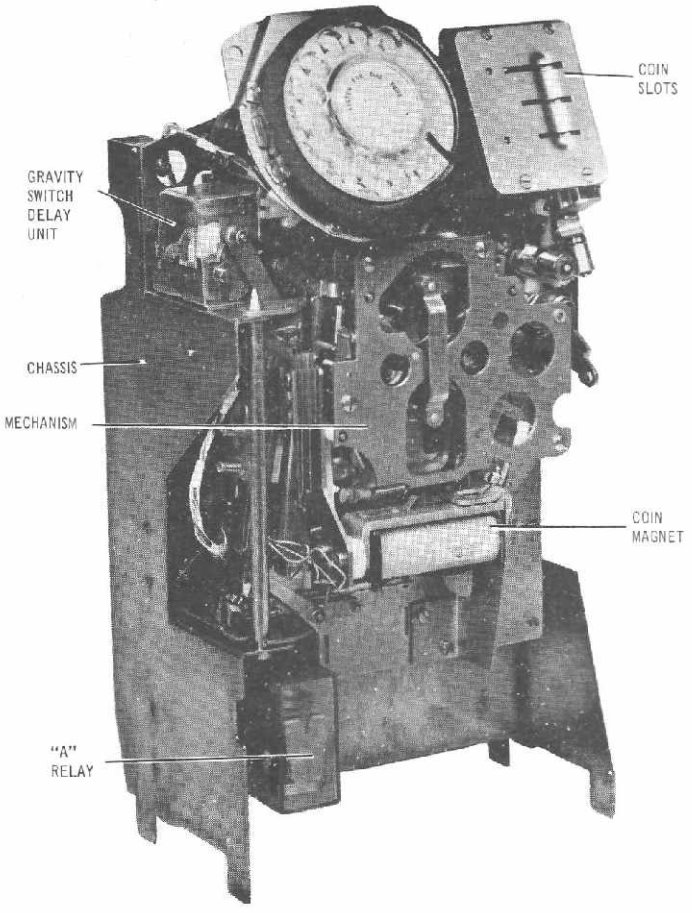


FIG. 2. CHASSIS ASSEMBLY.

The back of the chassis carries the printed circuit board, the tone generator and SCR delay units (Fig. 3). These items are discussed in detail in para. 3.4.

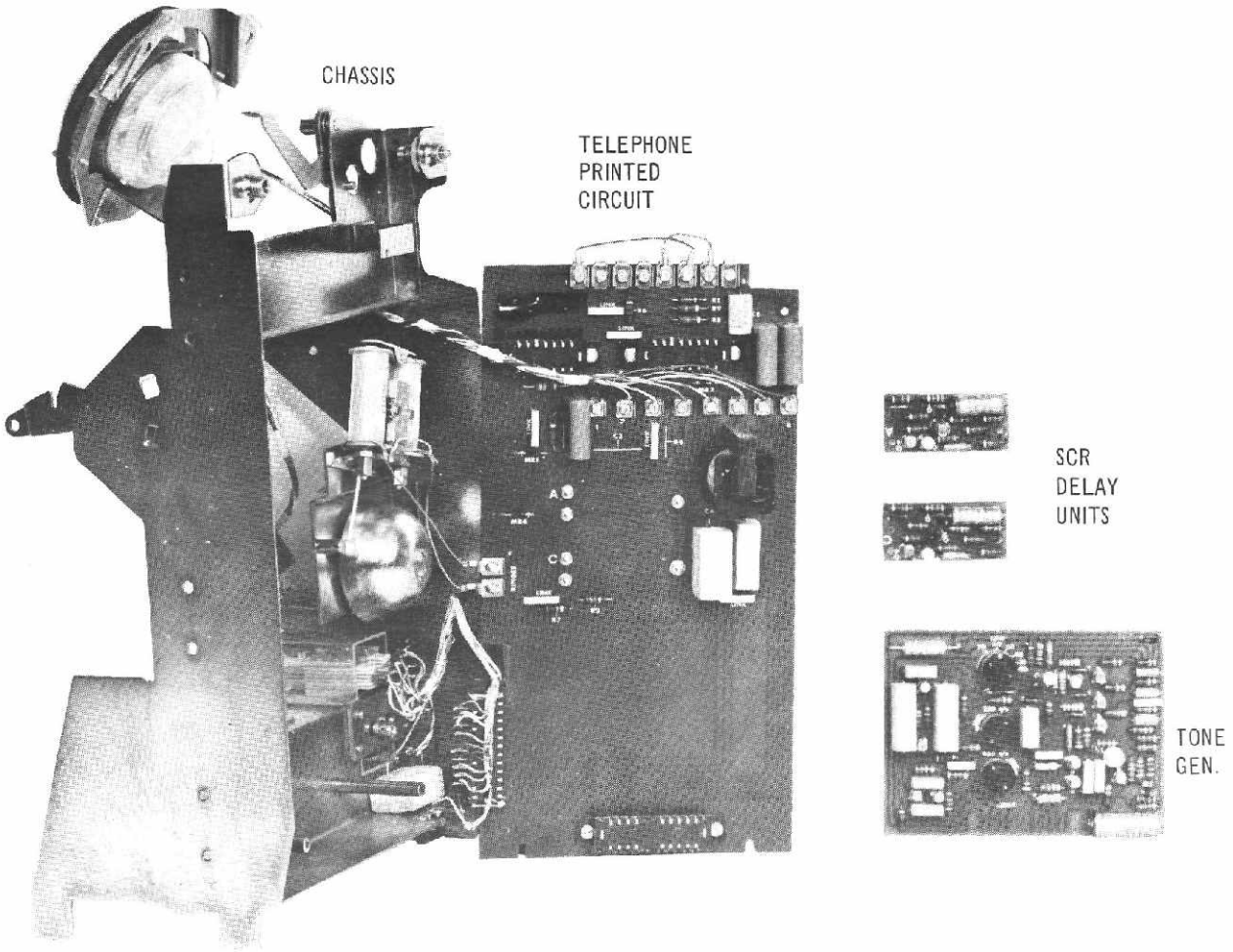


FIG. 3. ATTACHMENTS TO REAR OF CHASSIS.

The steel chassis also carries the hinges for the coin mechanism and the assembly for the gravity switch delay mechanism. A system of adjusting screws allows the chassis to be located correctly in the case so that the lever assembly connecting to the handset plungers engages properly with the operating lever of the gravity switch mechanism. A 3000 type relay and the coin tin alarm microswitch are attached to the bottom left section of the chassis.

Mechanism Assembly. The coin mechanism assembly (Fig. 4) is hinged on the chassis and is normally held in position by a catch on the right side of the chassis. When the catch is depressed the coin mechanism may be swung out for easy access. (Fig 7). Although the mechanism can be dismantled into a number of sub-assemblies, such dismantling must not be undertaken in the field, and is only to be carried out by specially trained staff at a depot or workshops.

When a coin is inserted, the coin slot level is operated, the mechanism is placed in "set" position and the coin, after passing down a gauging ramp, comes to rest on the balance arm where it is held by two linkages. (Fig. 7).

On an effective call, the collect magnet is operated by the reversal (local call) or by the operation of the coin depositing button (manually assisted trunk call).

One of the linkages is moved and allows the coin to fall into the coin tin.

On an ineffective call, when the handset is replaced, the opposite linkage is moved and the coin falls into the refund chute.

On manually assisted trunk calls, each coin as inserted operates a coin contact to initiate an appropriate tone signal to the operator.

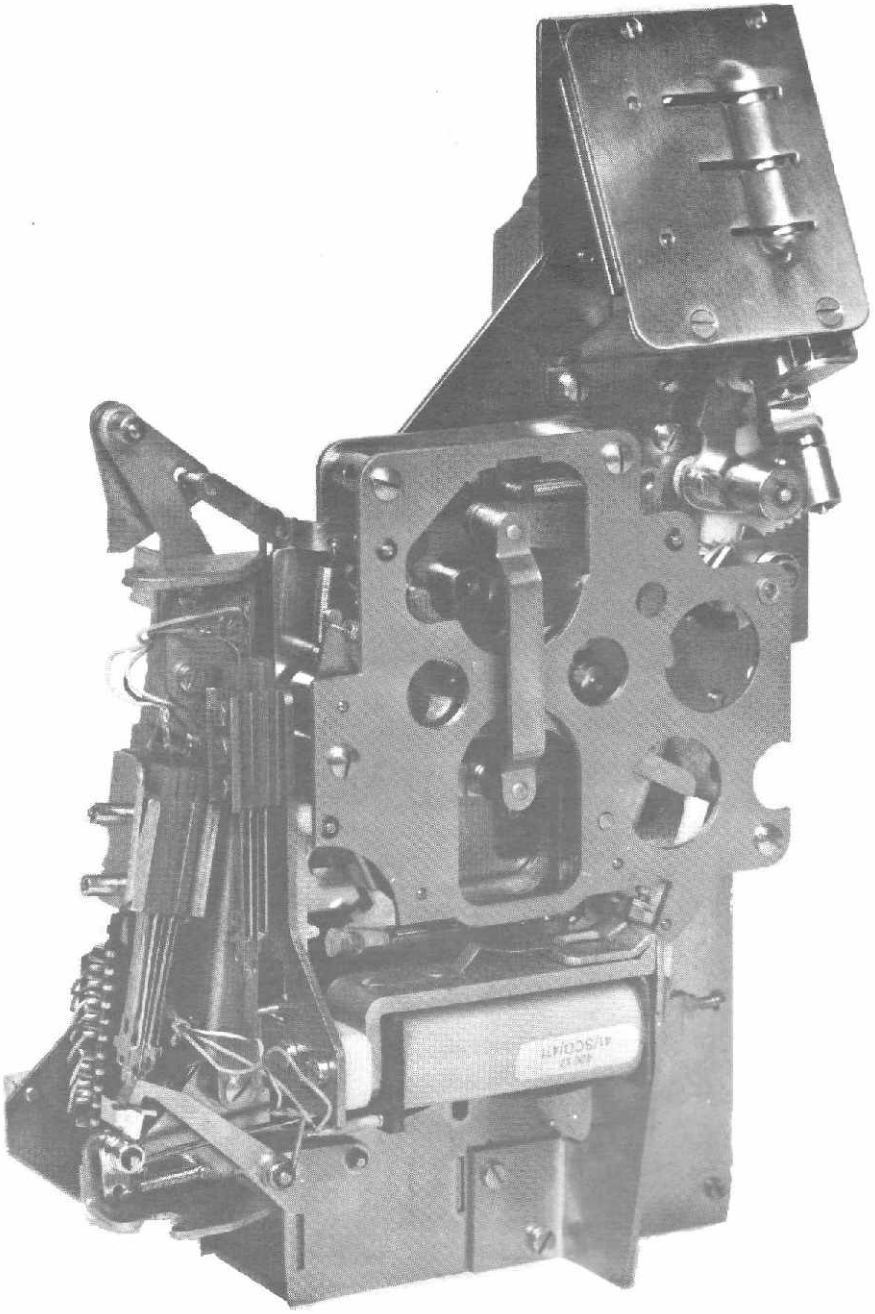


FIG. 4. COIN MECHANISM.

Gravity Switch Delay Assembly. The gravity switch delay assembly is attached by two screws to the top of the chassis.

The mechanism comprises two banks of springsets with a special cam action and a delay mechanism. One bank contains two contact units with a normal springset operation, and the other bank provides a special "X" and "Y" combination. When the receiver is lifted the Y contact operates for 100 milliseconds; when the receiver is replaced the "X" contacts break for 100mS. Fig. 5 shows the gravity switch delay assembly with the dust cover removed.

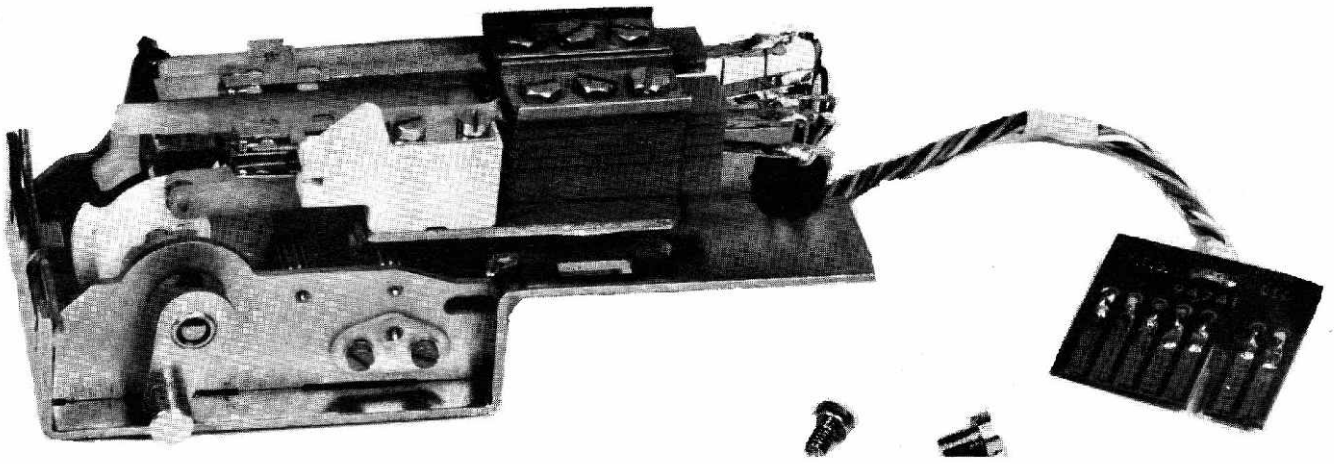


FIG. 5. GRAVITY SWITCH DELAY ASSEMBLY.

3.4 Electrical Assemblies. The complete telephone circuit is made up of a number of electrical assemblies and sub-assemblies. Some of these assemblies are:-

(i) Telephone plate assembly.

(ii) Tone Generator sub-assembly.

(iii) SCR Delay sub-assemblies.

Telephone Plate Assembly. This assembly consists of a large printed circuit board which carries the bulk of the telephone circuitry. Attached are the tone generator sub-assembly, the two SCR delay sub-assemblies and a transmission pad containing several resistors and a capacitor. This pad may be inserted as required by line conditions. Fig. 6 shows the printed circuit board attached to the rear of the chassis.

Tone Generator Sub-Assembly. The tone generator sub-assembly has a printed circuit and is attached to the telephone plate by a plug connector. It is a two frequency device with its own inbuilt delay circuits. The 250c/s tone has a two-second delay circuit so that a coin operating the cashing-in make contact causes the tone to be transmitted for two seconds. The 900c/s generator transmits one, two or four coin signal pulses according to the coin contact operated. The 900c/s generator also transmits a two-second tone pulse each time the receiver is replaced while the line polarity is normal. This serves as an indication to the trunk telephonist that the caller has replaced his receiver and recovered the coins.

There are three potentiometers associated with the tone generator. Two are volume controls for varying the output of the two tones, and the third provides for adjustment of the tone generator to function correctly on various line currents. The calibrations for these controls can be seen through an aperture in the chassis, and screwdriver type adjustments can be carried out from the front of the telephone. Fig. 7 shows a view of the tone generator and SCR delay units in position in the telephone. The mechanism has been removed to facilitate viewing.

SCR Delay Sub-assemblies. These two delay units use identical printed circuit boards, but the values of components are varied to give delay times of 200-400mS and 2-3 seconds respectively. The first unit controls the coin magnet, and the second controls the A relay.

✱ Both of these sub-assemblies are connected to the telephone plate by bolting down on the three fixings soldered into the telephone plate. The "C" delay unit prevents the coin magnet from operating to line reversals of less than 150mS.

The "A" delay unit applies a short-circuit to release relay A after it has been operated for approximately two seconds.

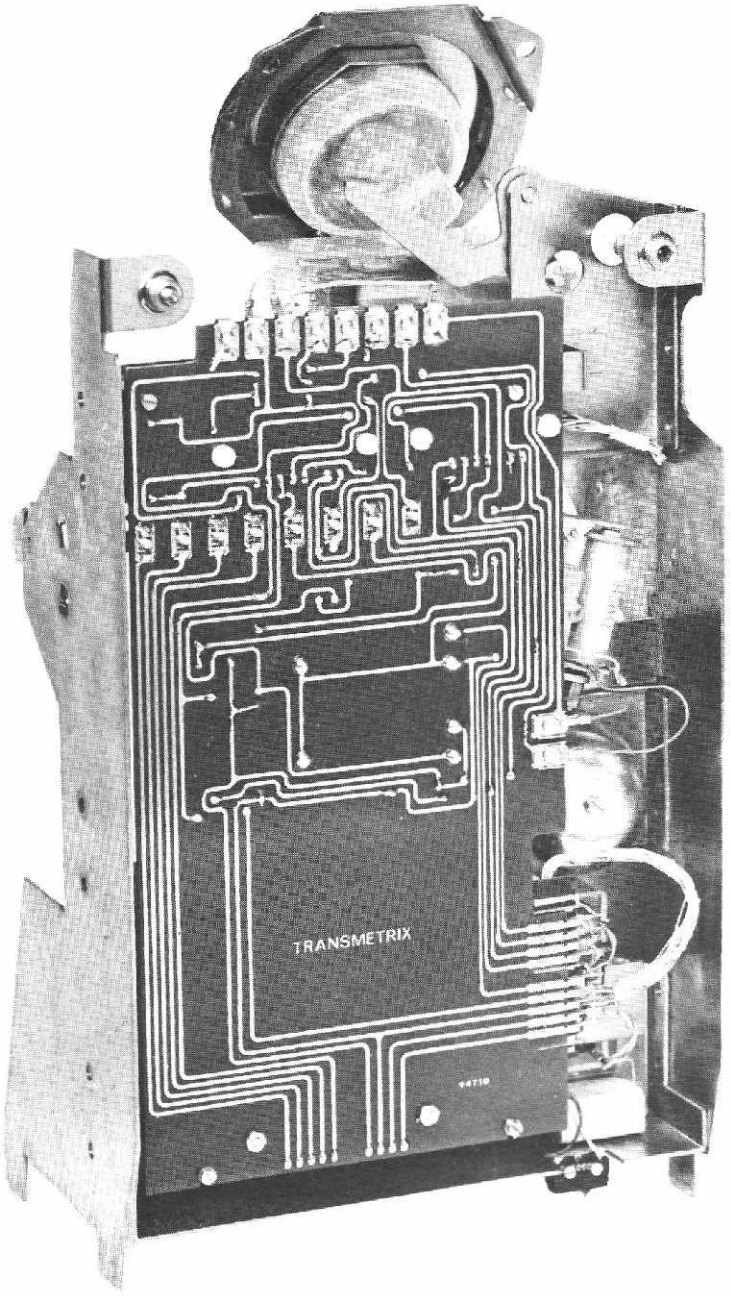


FIG. 6. PRINTED CIRCUIT BOARD.

3.5 Miscellaneous Components.

Relay A - Operates when the receiver is replaced while the line polarity is normal. It is used to send a two-second tone pulse to indicate to the trunk telephonist that the caller has recovered the coins.

Coin Magnet - Deposits the coins into the container. It operates on a local call when a reversal is received. On manually assisted trunk calls it operates when the cashing-in button is pressed.

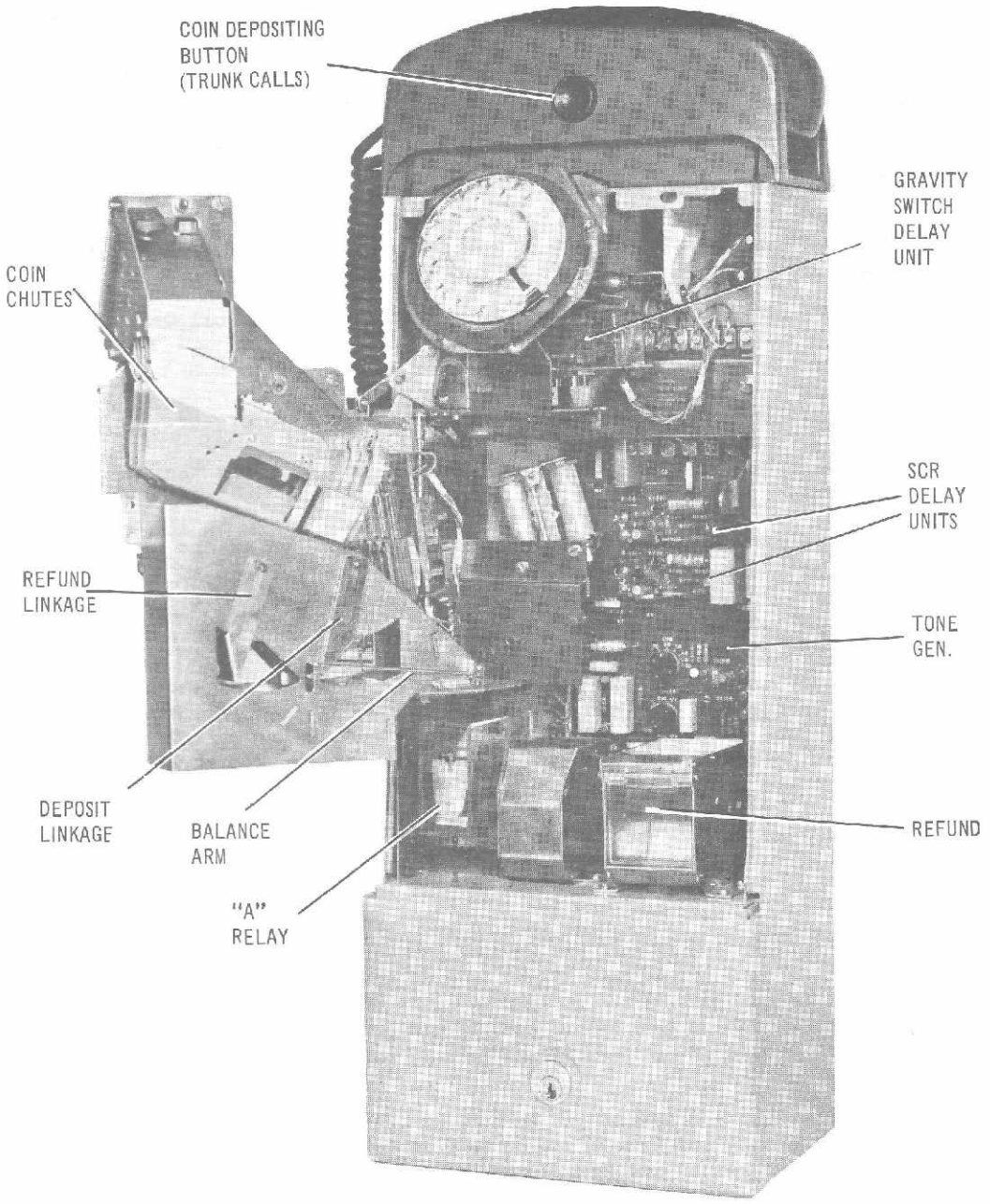


FIG. 7. TONE GENERATOR AND SCR DELAY UNITS.

4. MANUAL OPERATION.

4.1 The instructions regarding the use of public telephones are prominently displayed on a framed notice attached to the wall of each public telephone cabinet. An additional instructional panel is fixed to the front of the new type public telephones such as Coin Telephone No. 1.

4.2 On local chargeable calls, the instrument is operated as follows:-

(i) Lift the handset and listen for dial tone.

(ii) Insert a 6d or 5c coin and dial the required number.

(iii) When the called subscriber answers, a reversal of polarity occurs on the line wires. Within the P.T. this automatically operates a magnet to deposit the coins into the cash container. Conversation may now proceed.

(iv) If the P.T. is operated as a pay-on-answer device, conversation cannot take place until the fee has been inserted.

(v) If the called number does not answer, the handset is replaced and the coin is returned into a refund receptacle.

4.3 On manually assisted trunk calls the P.T. is operated as follows:-

(i) Lift the handset and listen for dial tone.

(ii) Dial the number allotted for the manual trunk operator.

(iii) Insert the required amount of money as requested by the operator (when the required number has been obtained).

(iv) Press the coin depository button when requested by the operator. This action deposits the coins and allows the call to proceed.

The operator normally asks for the button to be pressed when she is satisfied that the correct money has been inserted. Should there be any doubt about the money deposited, the operator, instead of asking for the coin depository button to be pressed, will request the caller to momentarily replace the handset. This action refunds the money without losing the connection to the operator and allows the depositing procedure to be repeated.

When an extension of time is required, additional money can be deposited as described above.

Coins are not required to first call the manual operator or to make a non-chargeable local call.

4.4 On deferred trunk calls the P.T. caller is recalled (using the telephone bell) when the connection can be successfully completed. The trunk operator then requests the coins to be deposited as described above.

If the caller momentarily hangs up instead of pressing the coin depositing button, an uninterrupted 900c/s refund tone of 2 seconds minimum duration is given to the trunk operator. After the tone has ceased, the operator requests that the coins be inserted once more and the button pressed. The operator receives pulses of 900c/s tone as each coin is inserted and a 2 second duration tone of 250c/s when the coin depositing button is pressed.

5. CIRCUIT OPERATION - LOCAL CALL.

5.1 The Coin Telephone No. 1 is designed to operate on line currents varying from 20mA to 70mA. On short lines where the line current would normally exceed 50mA the special transmission pad is inserted into the circuit (para. 8.2).

As the C relay network introduces an additional 255 ohms into the circuit, the D.C. resistance limit for signalling purposes in 255 ohms less than that for ordinary telephones. The additional resistance is used to provide sufficient voltage for satisfactory operation of the tone generator.

5.2 On local calls the Coin Telephone No. 1 is intended to operate as a pre-payment buttonless type P.T. Fig. 8 shows the basic circuit conditions when the calling subscriber lifts his handset, loops the exchange equipment and receives dial tone.

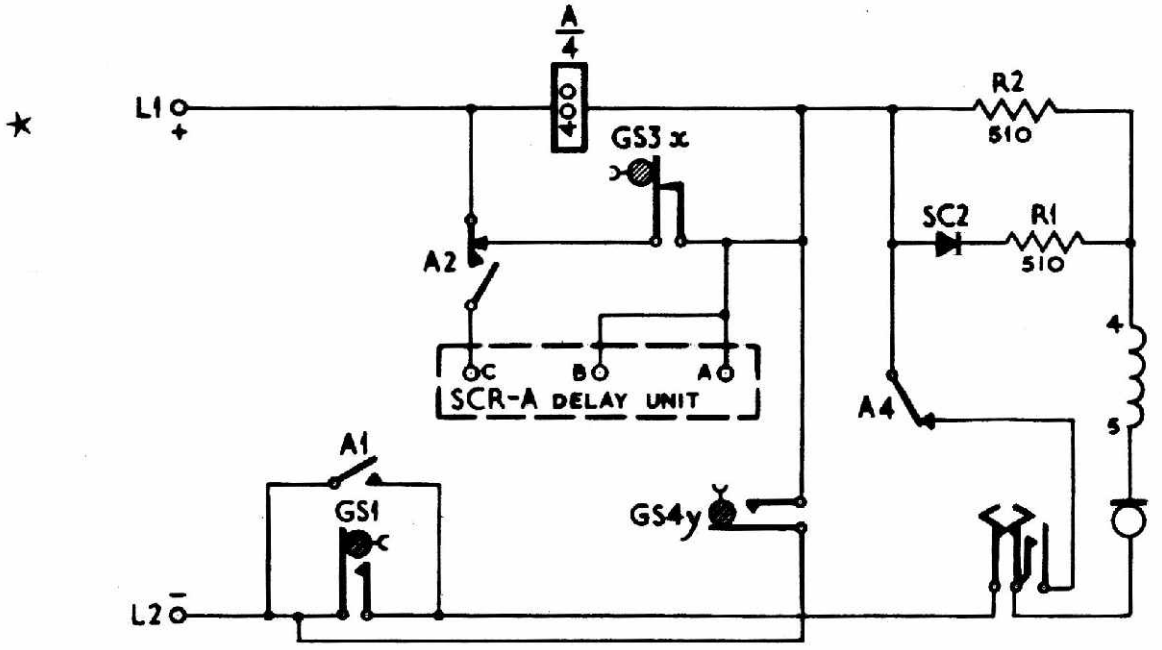


FIG. 8. CALLER LOOPS LINE.

The caller in lifting the handset operates the gravity switch GS. Contacts GS1 make and complete the normal loop circuit via the dial and transmitter. The GS4 contacts make during the upward movement for approximately 100mS and during this period a short circuit is applied across the line via A2 normal, GS3 normal, GS4 operated and GS1 operated. GS3 contacts do not operate during the upward movement. After 100mS
★ the GS4 contacts open again and the loop circuit is now via A2, GS3, R1 & R2 (SC2 is conducting), induction coil, transmitter, dial contacts and GS1.

The main reason for the momentary short circuit is to ensure that ring is tripped on an incoming call, although it does assist in looping the exchange equipment on an outgoing call.

5.3 Insertion of Coin. The caller hears dial tone and inserts a 5 cent coin. As the shunt diode SC1 is in the blocking direction it does not prevent the reception of dial tone. When the coin has been inserted and accepted by the coin detector mechanism it falls on to the balance arm which latches into the operated position. Balance arm contacts BA1 remove the diode SC1 from the circuit to prevent short circuiting speech on reversal (Fig. 9).

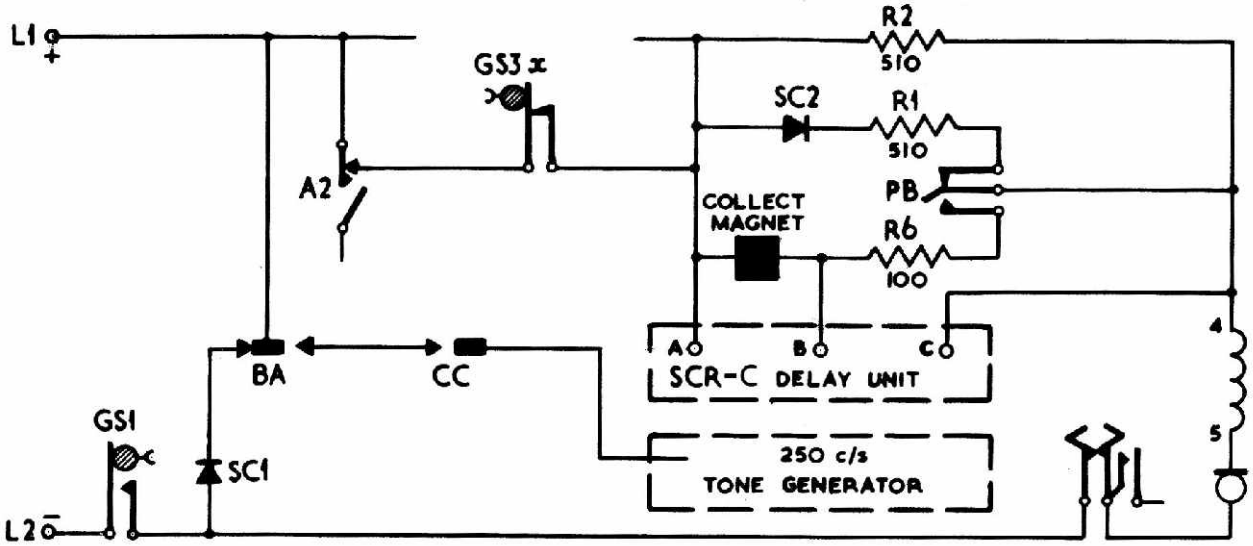


FIG. 9. COIN RECEPTION.

5.4 The Caller Dials. The caller dials the required number. During dialling the dial off-normal springs provide a clear dialling loop by short-circuiting the transmitter, induction coil and resistors R1, R2 (Fig. 8).

Fig. 10 shows the main elements involved in the dialling circuit.

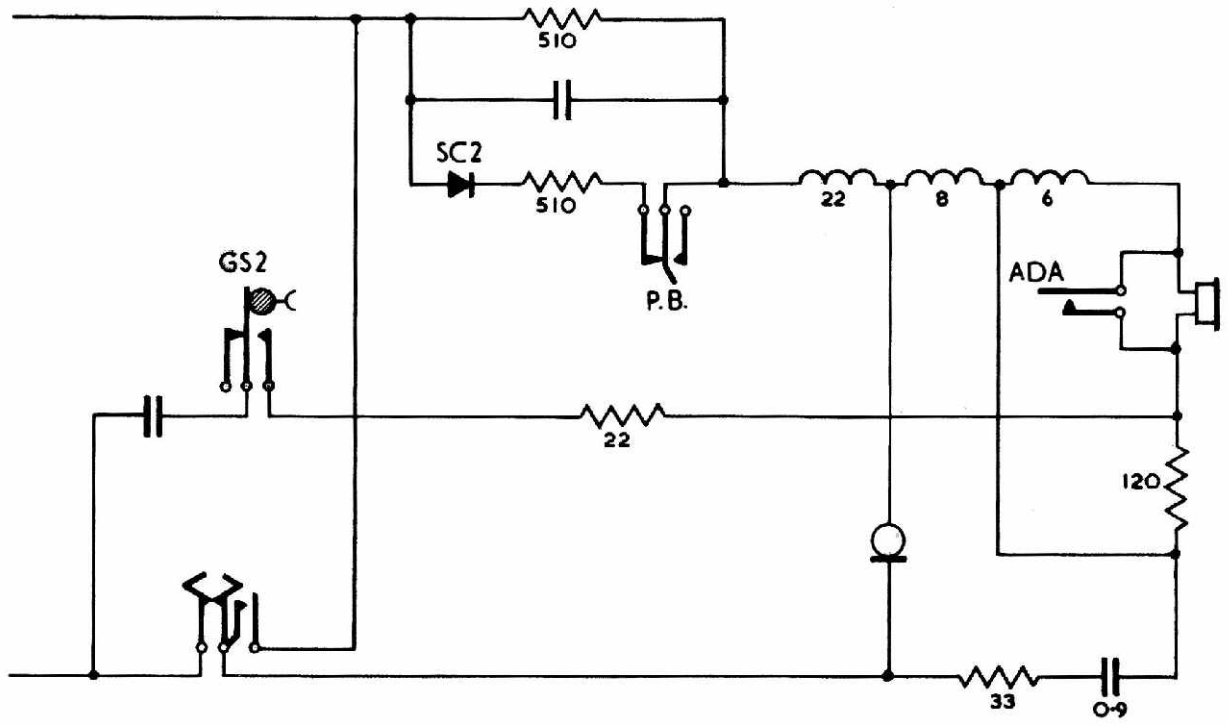


FIG. 10. DIALLING CONDITIONS.

When the dial off-normal springs make, one set places the dial directly across the A and B sides of the circuit, and the other set places a short circuit across the receiver circuit. Fig. 10 shows the quench circuit connected across the dial during pulsing.

5.5 The Called Number Answers. When the called number answers, the line polarities to the calling P.T. at the originating exchange are reversed. The coin collecting magnet is operated by the reversal and deposits the coins into the coin tin. Speech may now take place, with the circuit functioning as an 800 telephone (MS 021).

5.6 The caller Dials without Coins Inserted. If the caller dials without the coin being first inserted, the balance arm is normal and diode SC1 remains connected across the line. This does not have any appreciable effect on dialling as SC1 is in the blocking direction.

When the called subscriber answers, the line polarity reversal causes the diode SC1 to become conducting and short circuit speech.

5.7 Coin Collecting Magnet Delay Unit. Associated with the coin collecting magnet is a 200-400mS delay unit. The purpose of this delay unit is to prevent the magnet from operating when the reversal is only applied for 150mS or less. Fig. 11 shows a typical delay unit, and Fig. 9 shows the relationship between the delay set, the magnet and the remainder of the circuit.

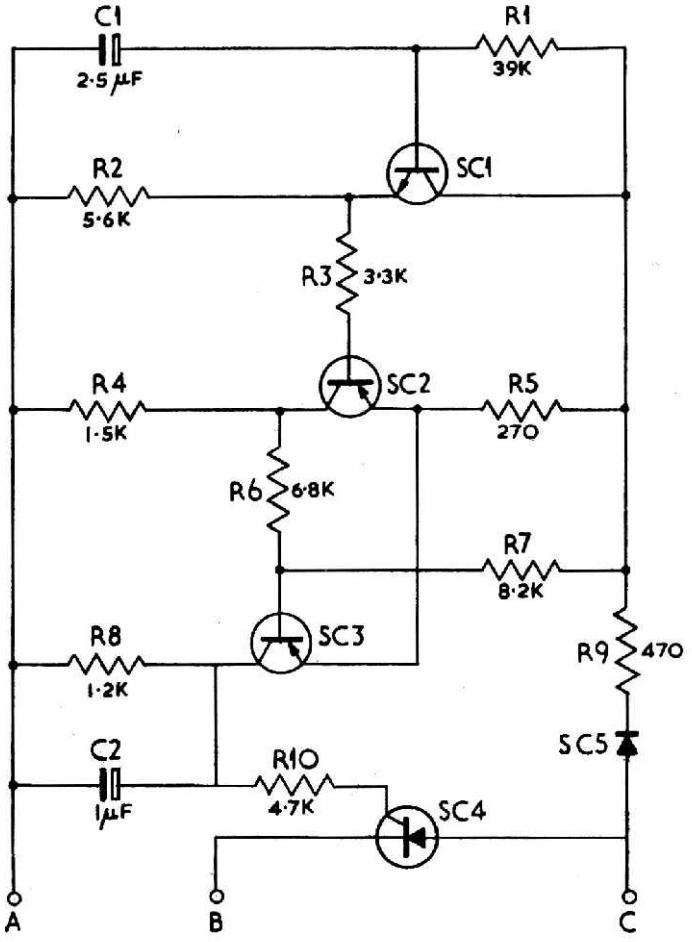


FIG. 11. COLLECTING MAGNET DELAY UNIT (SCR-B).

The coin magnet is connected between terminals A and B of the delay unit. Before reversal the magnet does not operate as the silicon controlled rectifier SC4 is non-conducting. This rectifier will conduct only when terminal C of the unit is positive and a positive potential is also applied to the third control lead or "gate".

When a reversal occurs, capacitor C1 charges via resistor R1. It is this combination which provides most of the delay period. As the capacitor charge rises, an increasing positive potential is applied to the base of SC1 via an emitter follower network. SC2 and SC3 are arranged in a special circuit arrangement known as a "Schmitt trigger circuit" and when the base voltage applied to SC2 reaches a certain potential, SC3 conducts and applies a positive potential to the third control lead of the controlled rectifier SC4. SC4 conducts and supplies a low resistance path between terminals C and B, allowing the coin magnet to operate. The additional diode SC5 is included to prevent the application of excessive reverse voltage to the semiconductors.

5.8 Clearing Conditions. The call is cleared by the caller replacing the handset. During the downward movement of the handset the gravity switch contacts GS3 open briefly and close again. If line 1 is positive, diode SC4 in the main telephone circuit is blocking and the short circuit is removed from across relay A. During the brief period that GS3 is open (Fig. 8), relay A operates and at A2 disconnects the short circuit path. When the GS3 contacts close again the A relay is connected across terminals B and C of its associated delay unit. Relay contact A1 places a short circuit across the GS1 contacts and prevents the release of the connection.

The delay unit functions in a similar way to that described in para. 5.7. After the delay period, the silicon controlled rectifier shunts the A relay which releases and at A1 opens the connection.

If L2 is positive when the gravity switch is restored (reversal of normal potential), the A relay is shunted by SC4 in the main telephone circuit and the connection releases without delay.

The A relay and its delay circuit are intended to provide on trunk line working a means of momentarily hanging up and recovering coins without losing the connection.

6. CIRCUIT OPERATION - TRUNK CALL.

6.1 Caller Deals Trunk Operator. When a manually assisted trunk call is required, the caller at the Coin Telephone No. 1 is able to dial the code of the trunk operator without inserting the unit fee. The loop circuit is the same as that described for a local call (para. 5.2 and Fig. 8). When the trunk operator answers, the caller is able to speak as there is no reversal applied to the line.

6.2 Demand Working. The caller holds the call while the trunk operator obtains the required number. Before completing the connection the operator asks the caller to insert the coins necessary for payment of the call. The first coin inserted operates the balance arm which latches in position. As each coin is inserted, it operates coin signal contacts, and the tone generator transmits one or more pulses of 900c/s tone to identify the coin denomination to the telephonist (Fig. 12). One pulse represents 5 cents, 2 pulses represent 10 cents and 4 pulses means that a 20 cent coin has been inserted. (A description of the tone generator is given in Section 7).

When the coins have been inserted, and the telephonist is satisfied that the correct amount has been paid, the caller is advised to press the coin depositing button situated near the top of the telephone. The coin collect magnet is operated, and CC contacts make as the coins are deposited. The CC contacts "trigger" the tone generator, which transmits for 2 seconds a 250c/s tone as an indication to the telephonist that the coins have been deposited. The telephonist then completes the connection.

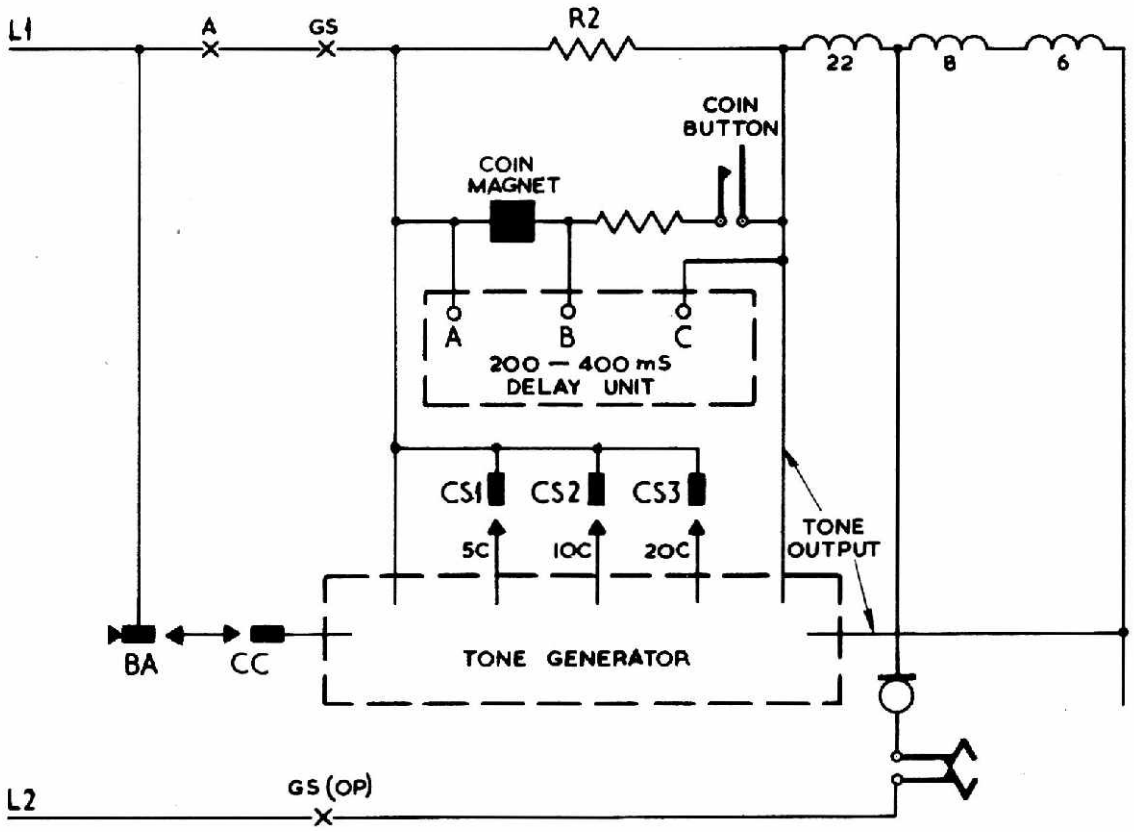


FIG. 12. COIN SIGNALS.

6.3 If the telephonist is not satisfied that the correct amount has been paid, the caller is asked to recover the coins by momentarily hanging up, and then to carefully re-insert them. During the down stroke of the gravity switch, contacts GS3 open for approximately 100mS and, by removing the short circuit, allow relay A to operate. Contact A2 disconnects the short circuit path, and A1 places a short circuit around the GS1 contacts to prevent disconnection of the call.

When the GS3 contacts make again the A relay is connected across terminals B and C of the 2 second delay unit (Fig. 8). A 2 second pulse of 900c/s tone indicates to the telephonist that a refund has been obtained. If the handset is not lifted again before the 2 second delay period elapses, the delay unit short circuits relay A and the call is released at A1. If the handset is lifted before 2 seconds the loop is maintained at GS1 and the call is resumed.

6.4 Delay Working. When the call has been deferred due to the required number busy or non-availability of trunk circuits, the operator will ring the caller when the connection can be successfully completed. The caller will then be requested to insert the coins and the connection will be completed in the usual way.

6.5 Phonogram Call. In the case of a phonogram call the phonogram telephonist is notified by the special P.T. tone that the call is from a P.T. Despatch of the phonogram will not commence unless the correct fee is deposited.

7. TONE GENERATOR.

7.1 Tone Generator. The tone generator is a transistor type two frequency device working in conjunction with some external and some inbuilt delay circuits. The 250c/s tone has its own 2 second delay circuit so that when the circuit is actuated by contacts momentarily making as coins are deposited in the coin container, the 250c/s tone is transmitted for 2 seconds.

The 900c/s tone circuit can be triggered in two different ways. If the receiver is replaced while the line polarity is normal, it corresponds to the coin refund condition. Relay A operates and A3 contact actuates the 900c/s tone circuit. As the A relay is associated with its own 2 second delay circuit, the tone is transmitted for 2 seconds.

The other condition is when coins are inserted while the polarity is normal (trunk call condition). There are three sets of coin contacts, one for each coin denomination, and as each coin is inserted, the tone generator transmits one, two or four pulses of 900c/s tone, according to the coin contact operated. The duration of each pulse (50mS on and 50mS off) is controlled by the 10c/s multivibrator circuit.

7.2 The tone generator circuit can be sub-divided into functional units as follows:-

(i) Single stage output amplifier.

(ii) 250c/s Timing circuit (2 seconds delay).

(iii) 250c/s Generator.

(iv) 900c/s Generator.

(v) 10c/s Generator.

(vi) One, two and four pulse trigger circuits.

(vii) Pulse counter and cut-off circuit.

The complete tone generator obtains its operating potential from the exchange line. It is connected across a resistor in the telephone loop circuit in parallel with the coin magnet delay unit. A diode in the negative input lead prevents damage to the transistors by a polarity reversal. Fig. 21 attached shows the complete tone generator circuit, and should be studied in conjunction with the simplified diagrams used to indicate the principle of operation.

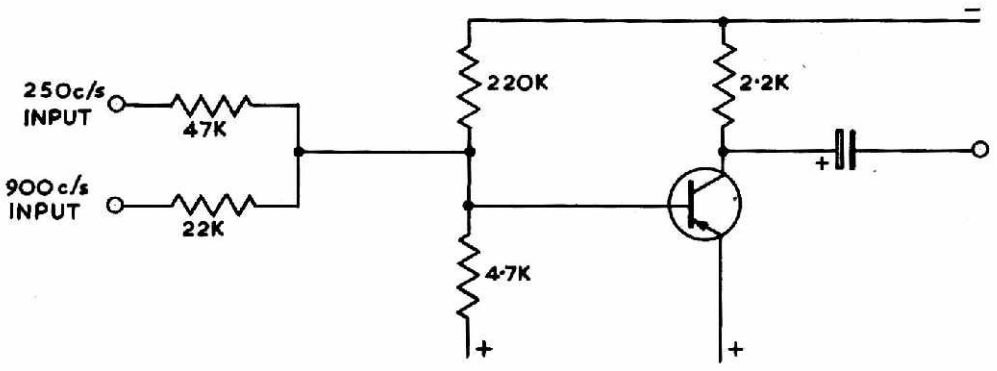


FIG. 13. TONE OUTPUT AMPLIFIER.

7.3 Output Amplifier. Fig. 13 shows in simplified form the output stage of the tone generator. A voltage divider is connected across the supply and the bias voltage is obtained from the voltage drop across the 4.7K resistor. Individual inputs are provided from the 250c/s and 900c/s tone generators, and the amplifier output is connected across the A.S.T.I.C. of the telephone as shown in Fig. 12.

7.4 900c/s Generator. Fig. 14 shows a simplified circuit of the 900c/s generator. It is provided with two trigger circuits. The generator is actuated for 2 seconds when the A3 completes the circuit from the negative supply. The A relay has its own 2 seconds delay circuit separate from the tone generator.

Alternatively, the circuit is triggered by pulses from the 10c/s generator, so that the 900c/s generator gives pulses of tone of 50mS duration with 50mS between pulses. The output of the generator is connected to the input of the amplifier.

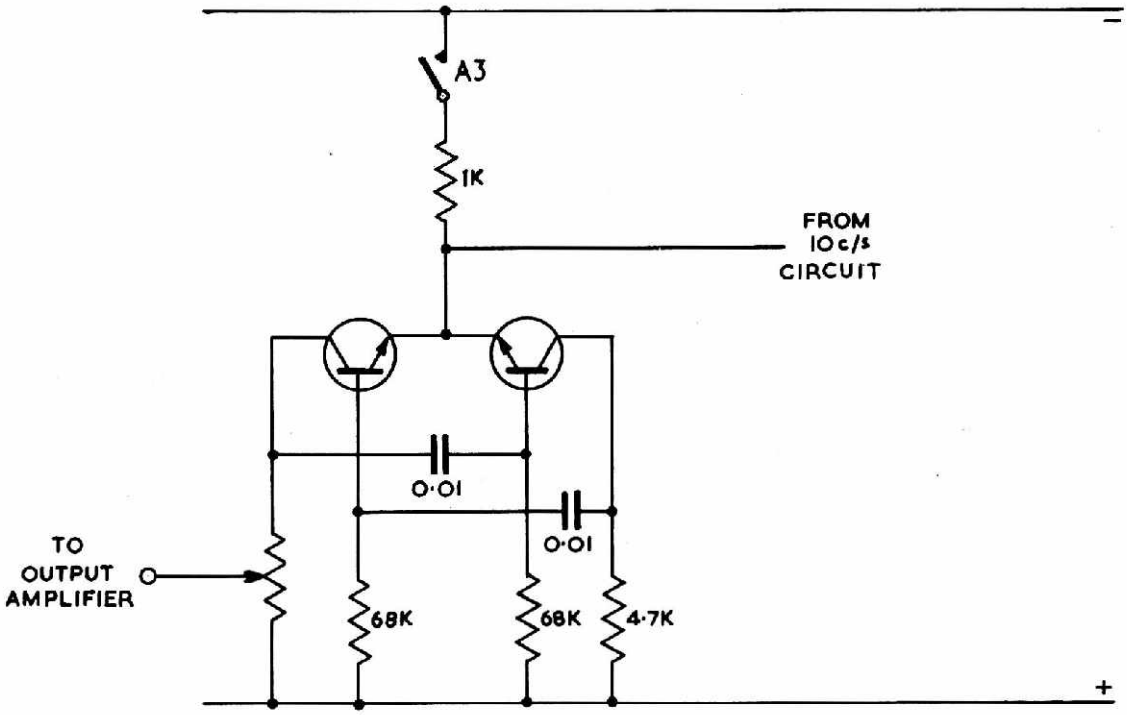


FIG. 14. 900c/s TONE GENERATOR.

The 900c/s generator is a typical multivibrator circuit using NPN type transistors. The two capacitors provide the coupling between the output of one stage and the input of the other, and together with the resistors in the charge and discharge circuits, determine the frequency of the output.

The miscellaneous note MG 211 describes in Section 6 the principle of operation of various types of relaxation oscillators. The general theory of operation of multivibrators should be revised at this stage. From your analysis of Fig. 14 you should be able to decide the class of operation of this particular circuit.

7.5 250c/s Generator. Fig. 15 shows the circuit of the 250c/s generator and its associated 2 seconds delay circuit. The 250c/s generator is once again an NPN multivibrator as used in the 900c/s case, but using different capacitor and resistor values to obtain the required frequency.

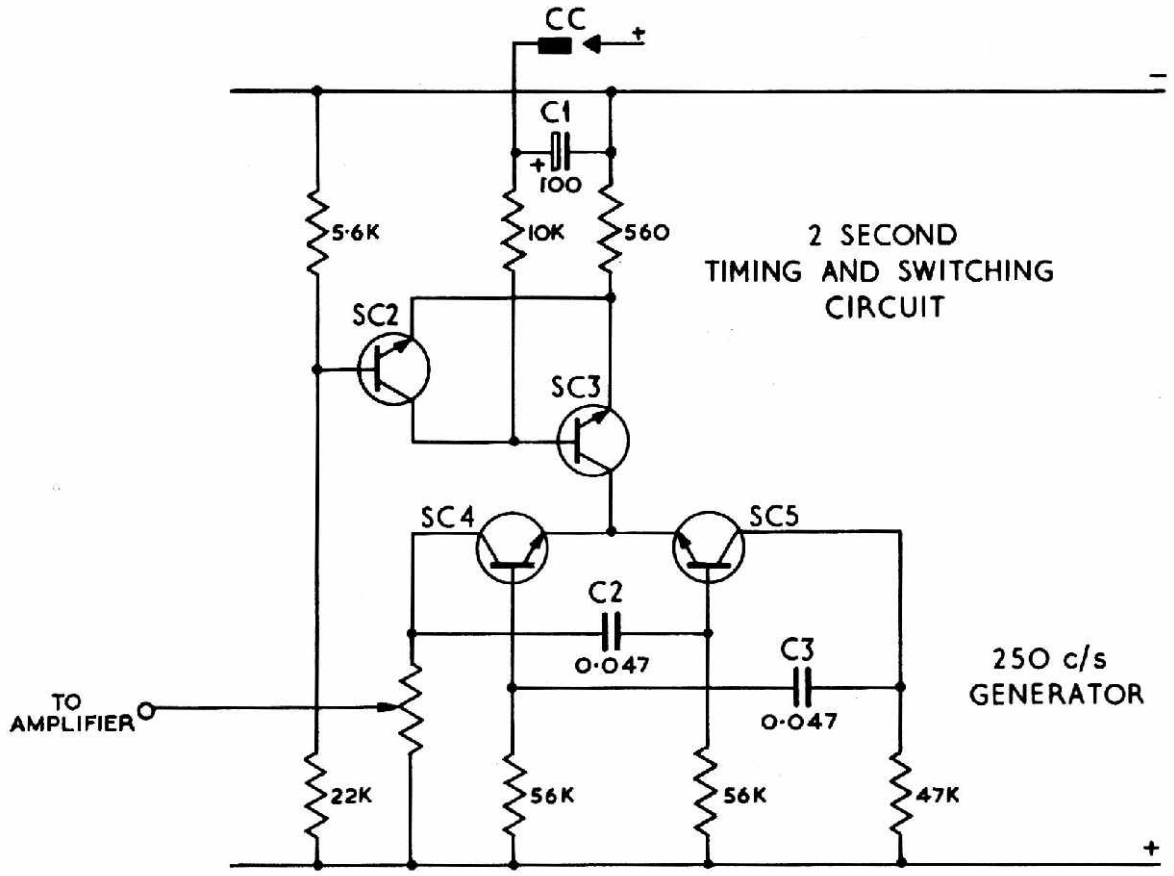


FIG. 15. 250c/s GENERATOR AND TIMING CIRCUIT.

When the button is pressed and the coins are deposited into the coin container, in falling they momentarily operate the CC contacts, causing the capacitor C1 to be charged and placing SC3 in a conducting direction so that it acts as a switch and connects the negative supply to SC4 and SC5 in the generator circuit.

When the CC contacts open, the capacitor C1 discharges through the 5.6K resistor and SC2. After approximately 2 seconds the capacitor discharges to the point where SC3 cuts off and disconnects the negative supply to the tone generator.

In any analysis of the complete tone generator circuit (Fig. 21), you must exercise extreme care as the various sections use a mixture of PNP and NPN transistors. The most important difference between the two types is that opposite polarities are required for the external circuit connections. The use of the two types in the one circuit is merely an expediency to simplify the circuit layout.

7.6 10c/s Generator. Fig. 16 shows the principle of the 10c/s generator and its associated coin signal trigger circuits. The multivibrator circuit is triggered when one of the transistors SC12, SC13 or SC14 switches the negative supply lead to the emitter of SC8.

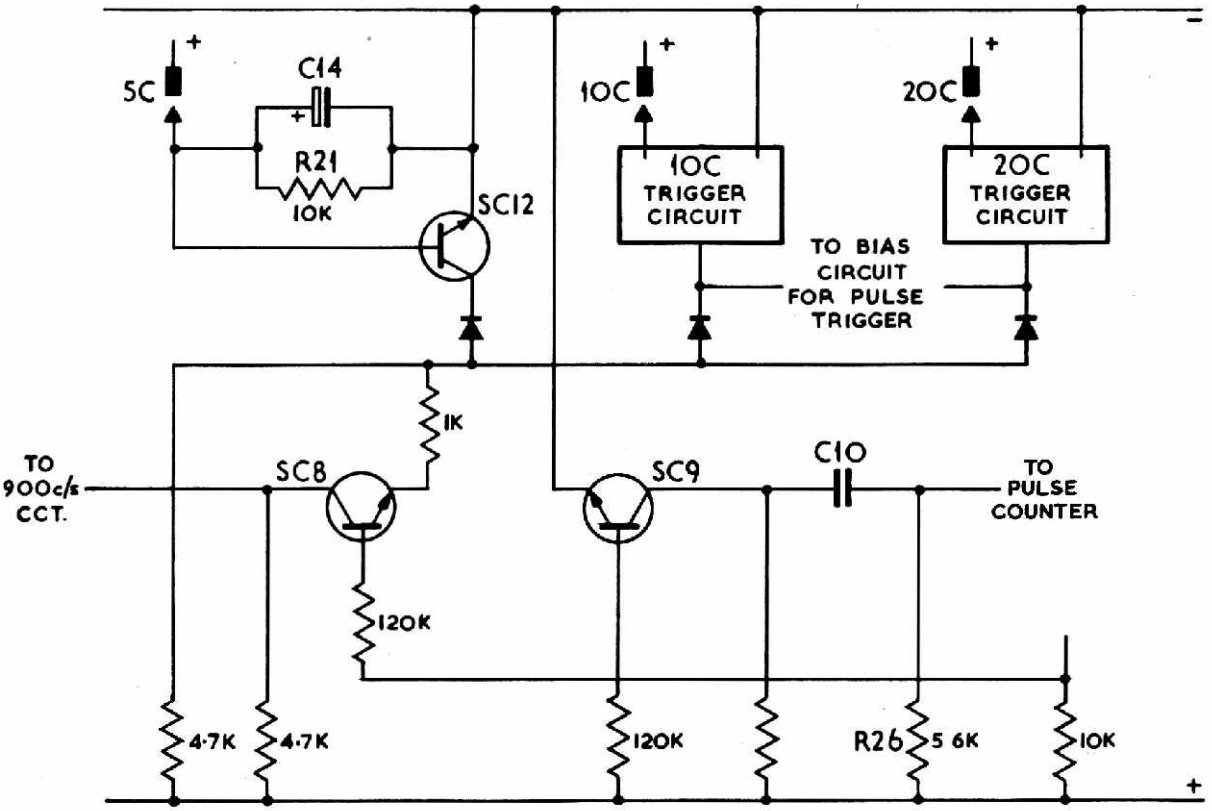


FIG. 16. 10c/s GENERATOR AND COIN SIGNAL TRIGGERS.

When a 5 cent coin is inserted, the coin signal contacts make momentarily and capacitor C14 charges to maintain a positive potential on the base of SC12, which switches the negative supply to the emitter of SC8 to trigger the 10c/s generator. A connection from this generator is applied to the 900c/s generator which produces a pulse of 900c/s tone. The 10c/s generator is triggered in a similar way by the insertion of a 10 cent coin.

To ensure that the correct number of 900c/s pulses is transmitted, the output from the 10c/s generator is connected to a pulse counter and trigger circuit which counts the pulses and disconnects the 10c/s multivibrator when the correct number of pulses have been transmitted (Fig. 17).

When a 5 cent coin is inserted the 10c/s multivibrator must be disconnected after only one 900c/s pulse. A 10 cent coin inserted permits two pulses to be transmitted and a 20 cent coin allows 4 pulses to be transmitted before the 10c/s multivibrator is disconnected.

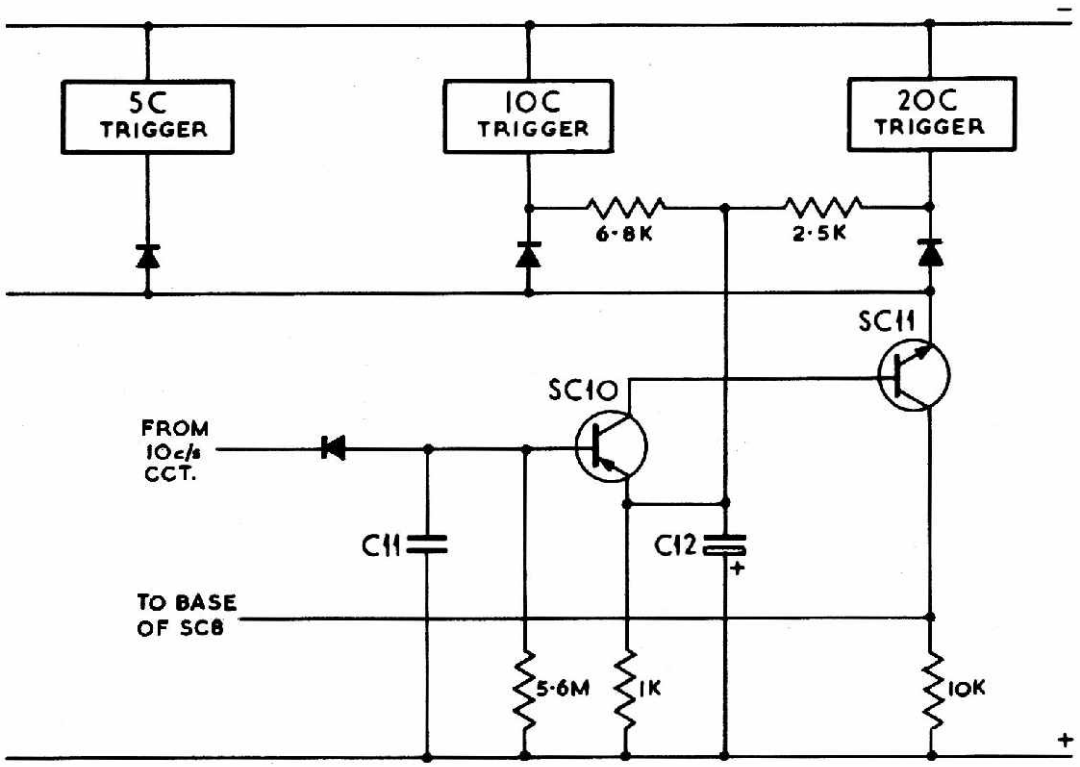


FIG. 17. PULSE COUNTER AND TRIGGER CIRCUIT.

The output from the 10c/s multivibrator is applied via the diode to C11. In the case of a 5 cent coin being inserted the first pulse into C11 raises the base voltage of SC10 so that it conducts and triggers SC11 which also conducts. The voltage drop across the 10K resistor in the SC11 collector circuit provides a negative bias to the base of SC8 so that the 10c/s multivibrator is cut off.

When a 10 cent or 20 cent coin is inserted an additional bias is applied to the emitter circuit of SC10, and more pulses must be applied to C11 before the base potential of SC10 is sufficient for SC10 to conduct. When this point is reached, SC11 once more disconnects the 10c/s multivibrator circuit.

8. INSTALLATION TESTS.

8.1 Additional resistance is included in the loop circuit to provide the required voltage for the tone generator, SCR-C delay unit etc. This causes the D.C. resistance limits for signalling purposes to be 255 ohms less than that for an ordinary telephone.

8.2 The P.T. is supplied with the line pad strapped out of circuit. If this arrangement results in a line current in excess of 50mA the line pad is placed in circuit by removing a link from between terminals 5 and 7 and inserting it between terminals 6 and 8. As this would result in three wires on terminal 6, the line wire L1 is transferred from terminal 6 to terminal 8 (Fig. 18).

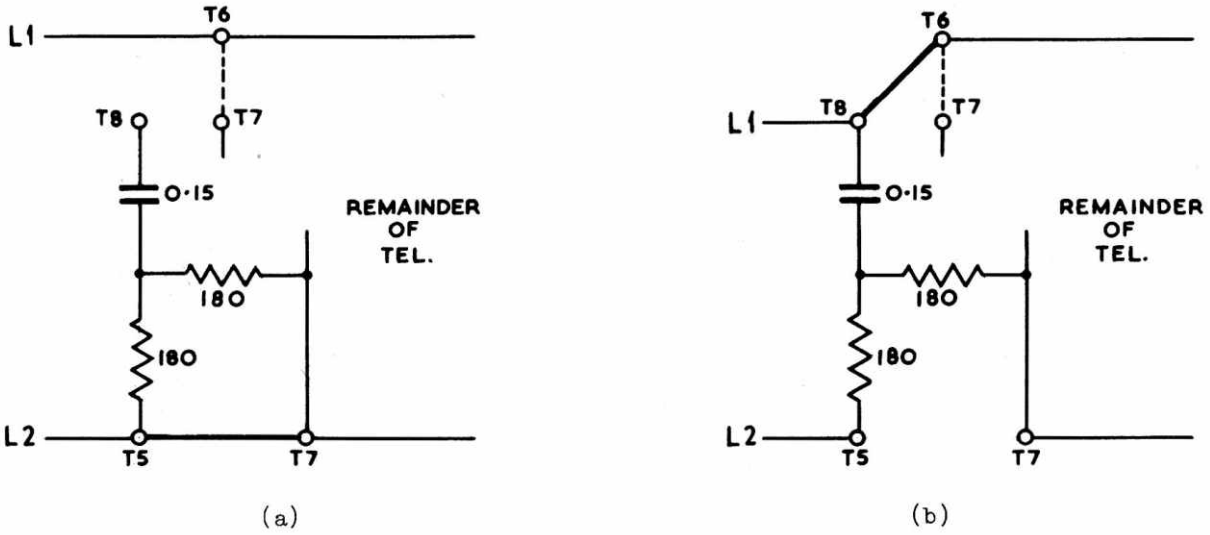


FIG. 18. LINE PAD ARRANGEMENTS.

8.3 With the line pad in the correct position, the line current potentiometer and the two volume controls for the 250c/s and 900c/s tones are adjusted. Each of the controls can be adjusted by a screwdriver after the mechanism has been swung out. The positive and negative supply to the tone generator is via a voltage stabilising network which contains the line current potentiometer RV3, the electolytic capacitor C13 and the diode connected across the capacitor (Fig. 19). The diode in the negative lead in series with the potentiometer prevents damage to the transistors during line reversal conditions. The potentiometer RV3 has a calibrated scale in terms of line current and must be set at its correct value for each installation to ensure stable operation of the tone generator.

With the line current potentiometer adjusted to its correct setting, the volume controls associated with the 250c/s and 900c/s tone generators are adjusted to provide a suitable level of tone.

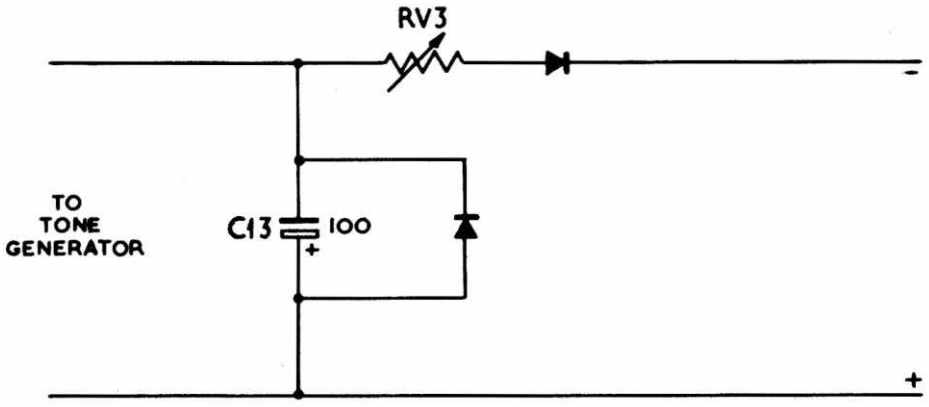


FIG. 19. VOLTAGE STABILISER.

A complete schedule of the functional test to be performed after installation is provided in the E.I. TELEPHONE, Substation E 3111.

9. MAINTENANCE PROCEDURES.

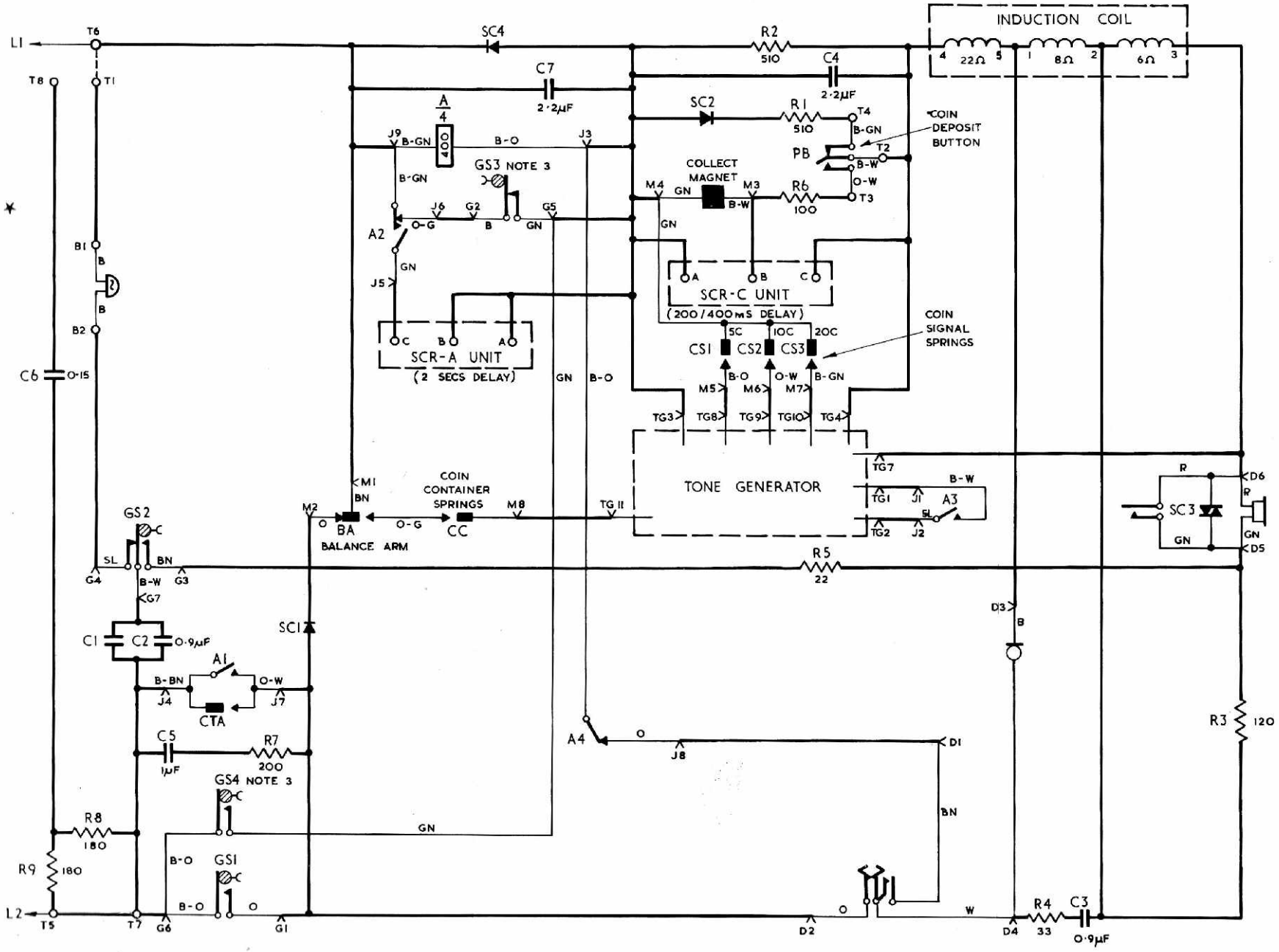
9.1 The E.I. TELEPHONE, Substation M 3001 describes in detail the new principles and procedures to be applied to the servicing of all types of public telephones. It is based on a simple quality control technique and provides for special attention to be given to those public telephones that are generating the greatest number of trouble reports.

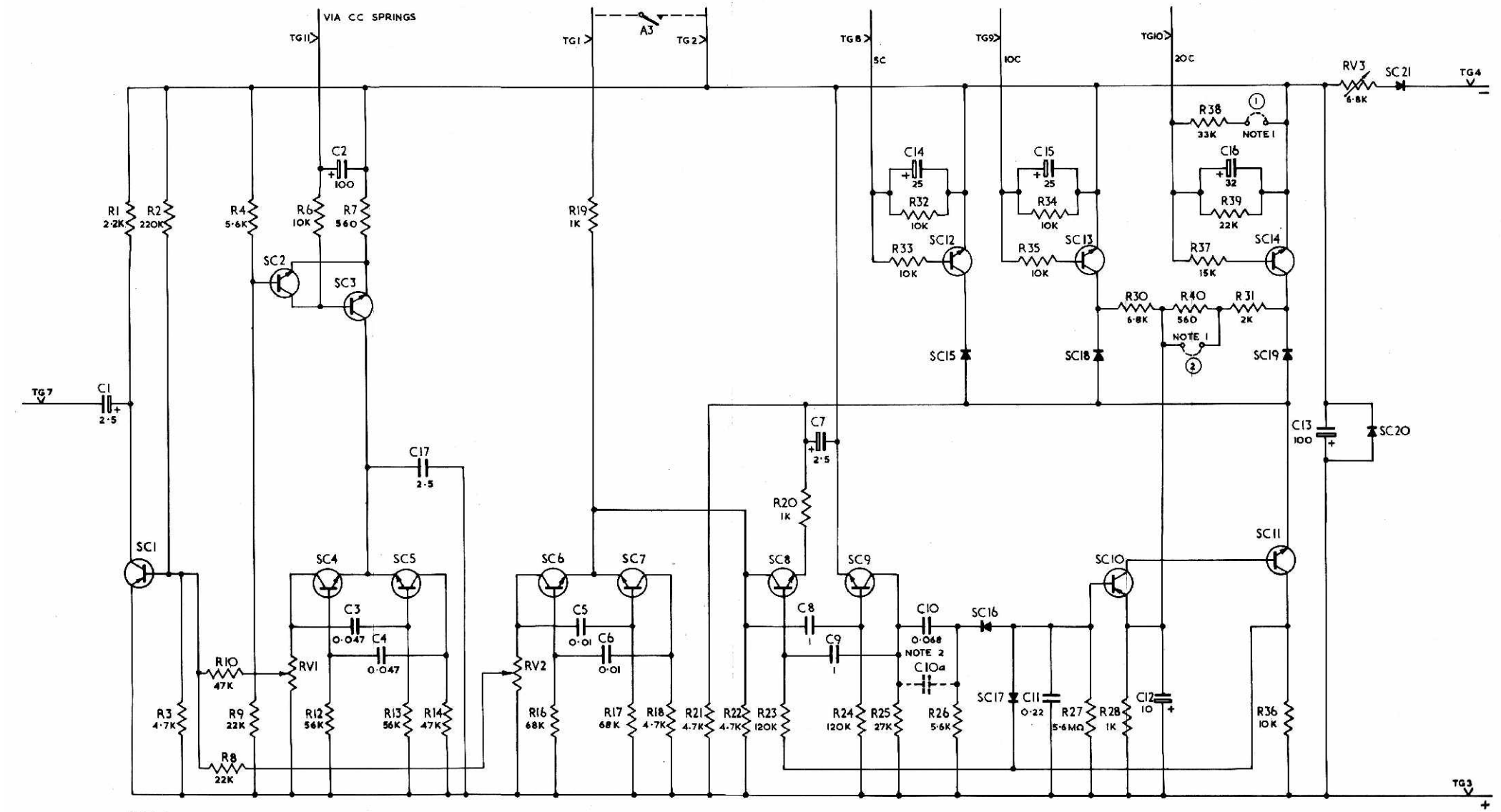
9.2 The normal public telephone maintenance is performed by the Area Maintenance technician. He carries out "front line" maintenance only, which means that he will perform function tests, clear coin blockages, replace ear pieces, mouth pieces, transmitter insets; handset cords and dials. When the fault requires additional attention, the technician advises his Supervising Technician who will either advise the area technician to perform the additional work or call on the services of a public telephone maintenance specialist. The Supervising Technician may also arrange for an inspection by the specialist when the public telephone has an unsatisfactory fault history.

9.3 The Coin Telephone No. 1. contains a number of easily replaceable assemblies. The specialist by observation and testing isolates the trouble to one of the units and replaces the complete unit, which is returned to a maintenance depot for servicing.

9.4 The dismantling, re-assembling and adjusting procedures for Coin TELEPHONE No. 1 are detailed in the E.I. TELEPHONE, Substation, E 3111.

END.


INDUCTION COIL
4 22Ω 5
1 8Ω 2
6Ω 3
L1
L2
T6
T8
T1
T5
T7
SC4
R2
510
C4
2·2μF
C7
2·2μF
SC2
R1
510
T4
B-GN
COIN DEPOSIT BUTTON
PB
T2
B-W
O-W
T3
R6
100
COLLECT MAGNET
M4
GN
M3
B-W
A/4
J9
B-GN
B-O
J3
GS3 NOTE 3
B-GN
J6
G2
G5
A2
O-G
B
GN
J5
GN
SCR-C UNIT
(200/400mS DELAY)
A
B
C
SCR-A UNIT
(2 SECS DELAY)
C
B
A
5C
10C
20C
CS1
CS2
CS3
COIN SIGNAL SPRINGS
B-O
O-W
B-GN
M5
M6
M7
TG3
TG8
TG9
TG10
TG4
TONE GENERATOR
TG7
TG1
J1
A3
SL
TG2
J2
B-W
M1
BN
COIN CONTAINER SPRINGS
M8
TG11
M2
BA
BALANCE ARM
O-G
CC
B1
B
B2
C6
0·15
GS2
SL
BN
G4
B-W
G3
G7
C1
C2
0·9μF
SC1
A1
B-BN
O-W
J4
J7
CTA
C5
1μF
R7
200
GS4 NOTE 3
R8
180
R9
180
B-O
GS1
B-O
O
G6
G1
GN
R5
22
A4
O
J8
D1
BN
D2
O
W
D4
R4
33
C3
0·9μF
D3
B
R3
120
R
D6
R
SC3
GN
GN
D5



NOTES :-

1. AS DRAWN, FLEETING EARTHS APPLIED TO JACKS POINTS TG8,9 & 10 GIVE 1,2 & 4 PULSES OF 900 ~ TONE. TO GIVE 1,2 & 5 PULSES FOR 5,10 & 50 CENT COINS REMOVE STRAP 1 AND INSERT STRAP 2.
2. C10a WILL BE FITTED IF REQUIRED TO ADJUST C10 TO PRECISE VALUE.