

TELEPHONE SET
500 TYPE
DESCRIPTION

1. GENERAL

- 1.01 This practice describes the type 500 telephone set which is a standard common battery desk-style telephone. All of the type 500 instruments may be used for dial or manual common-battery services. High impedance ringers are standard for biased, harmonic, synchronomic and decimonic ringing requirements. See Figure 1.



FIGURE 1 THE 500 DESK TYPE TELEPHONE

2. COMPONENTS

- 2.01 The housing, which covers and protects the base assembly, has a cradle upon which the handset rests and an opening at the back for use as a handhold to conveniently carry the telephone set. The plunger assembly is a part of the cradle assembly and contains the two plungers for activating the switch hook contacts, in the base, when the handset is removed or replaced.
- 2.02 The handset consists of the receiver unit, transmitter unit, transmitter holder assembly, handset cord, and two removable caps, which hold the transmitter and receiver units in place.
- a. The transmitter unit has a wide frequency response and is stable in operation. Two springs in the transmitter holder assembly provide electrical connection to the transmitter.

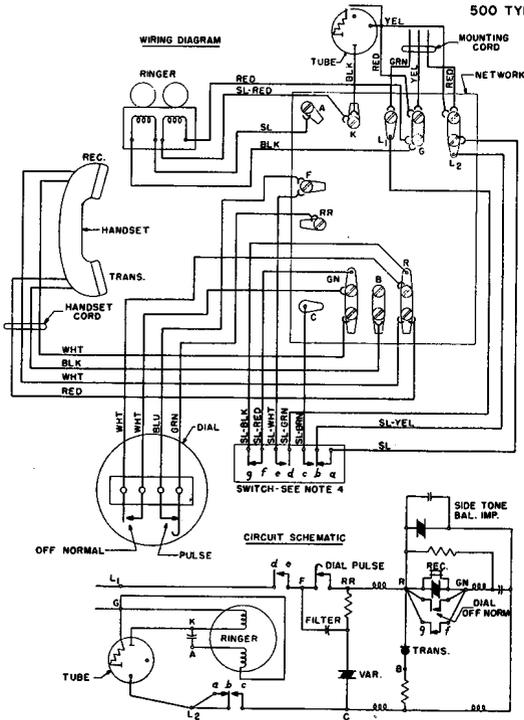
- b. The receiver unit consists of a ring armature receiver assembly and a varistor. The ring armature receiver is a domed diaphragm that is actuated at its circumference by a ring-shaped armature. This type of construction increases the receiver efficiency and frequency range. The varistor is directly across the receiver to protect the user from peak acoustical outputs and the receiver from electro magnetization by abnormal transient electrical influences.
 - c. The short hand piece provides a means of getting the transmitter closer to the subscriber, and results in increased transmission.
 - d. The four (4) conductor handset cord has a jacket and is anchored to the handset by a cord strain relief band. At the base end of the cord a similar hook anchors the cord to the base plate.
- 2.03 The base plate is attached to the housing-plunger assembly by two removable lockscrews. The base assembly consists of a dial mounting bracket switch assembly, network, ringer, all of which are mounted on the steel base plate. Two holes are provided in the rim of the base plate for attaching cords.
- 2.04 The dial consists of the number card assembly, finger plate, numeral ring, finger stop, and the dust-cover to protect the cams and contact spring assembly. In cases of lucite finger plates, the card assembly is part of the finger plate. The characters on the numeral ring are outside the finger plate, providing greater visibility. The characters are white on a black background, or black on a light colored background, with a marker spot under each finger hole to facilitate dialing. The contact spring assemblies consist of a pair of off normal contacts and a pair of pulsing contacts. When closed, the off normal contacts shunt the receiver circuit. The dial is attached to its mounting bracket by the two removable screws.
- 2.05 The ringer used in the 500 type telephone set is of a single-coil design with a high impedance, allowing more ringers to be placed on the line with no increase in bridging loss, or increase in unbalance on divided ringing circuits.
- a. A volume control is provided by which the subscriber may adjust the sound output. The two gongs have harmonically related frequencies, the fundamentals of which are reinforced by resonant air chambers below the gongs.
 - b. A laminated soft iron core carries the single coil and is clamped to the soft iron yoke which is bolted to the cast non-magnetic alloy frame.
 - c. The armature and clapper are mounted to the frame to allow them to vibrate. Due to the magnetic field produced by the coil, increased sensitivity is provided by biasing the armature by means of a permanent magnet clamped in the frame.
 - d. The ringers are designed to function from an alternating current source and are equipped with flexible wire leads for connecting to other components in the telephone set.

3. TURN AND PUSH KEY ASSEMBLIES

- 3.01 The turn and push keys are mounted to the base of either the desk or wall type telephones so that the lucite knob projects through the housing. Various types of contact assemblies are available to meet the requirements for the different types of telephone circuits.
- 3.02 Each of the contact springs is provided with a flexible, plastic insulated wire lead, with bare or spade terminal end, for connections to the other components in the telephone instrument.

5. CONNECTIONS

5.01 The connections at the connecting block and terminal board of the network assembly will depend upon the type of ringing (biased or frequency selective) and the ringing service (See Figure 2 and 3).



500 TYPE TELEPHONE CIRCUIT

| CLASS OF SERVICE | TABLE OF CONNECTIONS (POLARIZED RINGING) | | | | | | | | | | | | |
|------------------|--|-----------|------------|--------------|---|------------------------|-----------|------------|--------------|----|----|---|---|
| | CONNECTIONS AT CONNECTING BLOCK | | | | | CONNECTIONS AT NETWORK | | | | | | | |
| | LINE | MTG. CORD | TUBE LEADS | RINGER LEADS | | LINE | MTG. CORD | TUBE LEADS | RINGER LEADS | | | | |
| (-) RING | R | G | Y | R | G | Y | L2 | K | G | G | A | K | |
| (+) RING | R | G | Y | R | G | Y | L2 | K | L2 | L2 | L2 | A | K |
| (-) TIP | R | G | Y | G | R | Y | L2 | K | G | G | G | A | K |
| (+) TIP | R | G | Y | G | R | Y | L2 | K | L2 | L2 | L2 | A | K |

- NOTES:
- FOR MANUAL SERVICE: REPLACE DIAL WITH DUMMY PLUG ASSEMBLY AND TRANSFER SLATE-WHITE SWITCH LEAD TO (RR) TERMINAL ON NETWORK.
 - TO PERMANENTLY SILENCE RINGER: FOR RING PARTY, CONNECT THE YELLOW MOUNTING CORD CONDUCTOR TO THE (R) TERMINAL OF THE CONNECTING BLOCK. FOR TIP PARTY, CONNECT THE YELLOW MOUNTING CORD CONDUCTOR TO THE (G) TERMINAL OF THE CONNECTING BLOCK.
 - RINGER CUT-OFF CONTROL BY CUSTOMER: SEND STOP NEXT TO DETENT ON RINGER VOLUME CONTROL SO THAT COMPLETELY CLEARS THE RIM OF THE RINGER FRAME. THIS PROVIDES A FURTHER POSITION ON VOLUME CONTROL WHICH PREVENTS ARM MOVEMENT.
 - WHEN THE HANDSET IS REMOVED CONTACT g f BREAKS LAST.

FIGURE 3

6. NETWORK TYPE 75335-1

- The type 75335-1 network assembly provides all the components necessary to connect and match the impedance of the handset transmitter and receiver units to a two wire telephone circuit.
- The unit incorporates radio frequency filter and side tone balancing circuits and a 0.5 MFD ringer capacitor in addition to the other circuits.
- All the components are mounted on the underside of the molded terminal board, which is clipped to the sealing compound filled mounting container.

6.08 The 180Ω resistor and .10 MFD capacitor provide a filter network to suppress high frequency signal components of the dial pulses which might otherwise be radiated from the telephone line and cause local interference with broadcast radio reception.

7. TESTING OF THE NETWORK ASSEMBLY

7.01 Thorough testing of the network assembly can only be performed with elaborate test equipment. An adequate check on performance, for maintenance purposes, is to compare a suspected unit with a known good unit by substitution. Resistance and capacitance checks can be carried out between many of the terminals, as can be seen from Figure 4. Note that the soldered connection between terminals P and Q can be opened to permit testing of the two network capacitors. Figure 5 shows the layout of the terminal board of the assembly.

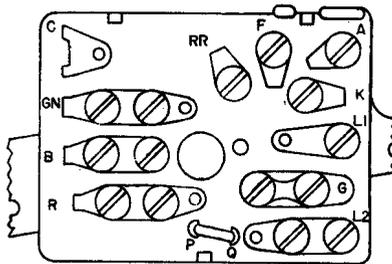


FIGURE 5 TERMINAL BOARD LAYOUT

7.02 To assist in testing network assemblies in the field, Table 1 gives the values of resistance and capacitance which should be measured when tests are made between various pairs of terminals.

8. TYPE 502-30 DESK TELEPHONE SET

8.01 The 502-30 desk telephone is a standard desk type instrument with the addition of a switch that is actuated by raising the left hand plunger in the handset cradle. Raising the plunger opens the circuit to any extension telephones on the line and prevents overhearing of confidential conversations. Replacing the handset automatically resets the switch to the normal position. An external two wire circuit connection is provided that may be used to light a "busy" lamp at all extensions.

9. TYPE 510-30 AND TYPE-36 DESK TELEPHONES

9.01 The 510-30 and 510-40 telephones are standard desk type instruments with the addition of a turn and push key which permits the instrument to be switched to either one of two lines. The ringer is permanently connected to Line 1 and a separate ringer must be provided for Line 2.

9.02 Both units are available with biased or frequency selective ringers for bridged ringing service. The 510-30 unit may be wired for divided ringing service if the signalling circuit is not used or if one conductor of this circuit may be grounded.

- 9.03 The instruments are designed for service in small business establishments where a switchboard or key telephone system would be uneconomical. A 6-way cord and a 10-way terminal block are provided with the 510-30 unit and the push section of the key is wired for an interphone signalling circuit. A 4-way cord and terminal block are provided with the 510-36 unit and the push section of the key is ineffective.
10. **TYPE K-554 WALL TELEPHONE SET**
- 10.01 The K-554 series provides a range of compact, anti-sidetone type wall mounting telephones which operate efficiently over a wide range of loop resistance and loop impedance.
- 10.02 The instrument is available with its internal components and circuit arranged for any class of service on any type of automatic or manual telephone system. It can be supplied in a number of different versions with various special features, as required.
11. **TYPE 558-30 WALL TELEPHONE SET**
- 11.01 The 558-30 telephone is a standard wall type instrument with the addition of a turn and push key which permits the instrument to be switched to either one of two lines. The ringer is permanently connected to Line 1 and a separate ringer must be provided for Line 2.
- 11.02 This instrument is designed for service in small business establishments where a switchboard or key telephone system would be uneconomical.
- 11.03 The instrument is available with biased or frequency selective ringers for bridged or divided ringing.

TABLE 1: POINT TO POINT TEST VALUES (Fig. 5)

| Terminals | Components | Test Value |
|-----------|--------------------------------------|------------------------------|
| F - RR | Filter Capacitor | .09 - .14 |
| A - K | Ringer Capacitor | .43 - .54 |
| R - Q | Network Capacitors | (4) 2.4 - 3.0 |
| C - RR | V1 and filter resistor | (1) 4.7K min (2) 890-1070 |
| C - P | TA ₂ and TB windings | 28.8-35.2 |
| B - C | TA ₂ winding and resistor | 35.1-42.9 |
| B - P | TB winding and resistor | 33.3-40.7 |
| R - GN | TC winding and resistor | 74.3-90.7 |
| R - RR | TA ₁ ; winding | 12.1-14.9 |
| R - P | V2 | (1) 1.6K min (3) 72-87 |

NOTES: All capacitance values in microfarads and all resistance values in ohms.
 (1) with 1 ma dc flowing through circuit.
 (2) with 10 ma dc flowing through circuit.
 (3) with 100 ma dc flowing through circuit.
 (4) with strap P-Q removed.

12. **TYPE 576-30 DESK TELEPHONE SET**
- 12.01 The 576-30 desk telephone is a six-button type of key instrument with the same transmission circuit as the 500 series of instruments. It is designed for use on either regular exchange lines or interphone circuits in small business offices, where up to three lines are required on the one telephone. A small push (recall) button is fitted in front of the handset cradle to provide a signal circuit for PBX operation.

- 12.02 The six keys are arranged in pairs. The right hand key of each pair is the LINE key and the left hand key is the HOLD key. All line keys are interlocked so that only one line may be picked up at any time, although one or more lines may be held at the same time. Optionally, the third HOLD key may be modified to provide an interphone signalling circuit. ALL operated HOLD keys are automatically released when the handset is replaced in the cradle.
13. TYPE 564-30 AND TYPE 564-40-DESK TELEPHONE SET
- 13.01 The 564-30 and 564-40 desk telephones are six-button types of key instruments with the same transmission circuit as the 500 series of instruments. They are designed for use on key telephone systems, which may be installed as branch exchanges or completely private systems, of either the automatic or manual type. The only difference between the two instruments is that the 564-40 telephone has its desk stand cord terminated in an amphenol plug. This feature allows the instrument to be changed quickly and easily should such action become necessary for maintenance purposes or system testing.
- 13.02 The six keys on the units are allocated for use, from left to right, as follows. The first key is a HOLD key which may be used to hold a call received on any line while another call is made on a second line. The second and third keys are individual LINE keys and the remaining three keys may each be optionally wired as either LINE or interphone SIGNAL keys. Thus a maximum of five lines may be accessed from the one instrument, with a common hold key, and up to three of these lines may be connected as private intercommunication lines to other instruments, one additional key being used for the common interphone signalling circuit.
14. TYPE 565-30 AND TYPE 565-40 DESK TELEPHONES
- 14.01 The 565-30 and 565-40 desk telephones are six-button types of key instruments with the same transmission circuit as the 500 series of instruments. They are designed for use on key telephone systems, which may be installed as branch exchanges or completely private systems, of either the automatic or manual type. The only difference between the two instruments is that the 565-40 telephone has its desk stand cord terminated in an amphenol plug. This feature allows the instrument to be changed quickly and easily should such action become necessary for maintenance purposes or system testing. These instruments incorporate an exclusion switch, operated by lifting the left hand plunger which is automatically reset when the handset is replaced, so that any other telephones on one of the lines may be disconnected for confidential conversations. See Figure 6.



Fig. 6 565-30/40 Telephone Set

The six keys on the units are allocated for use, from left to right, as follows. The first key is a HOLD key which may be used to hold a call received on any line while another call is made on a second line. The second and third keys are individual LINE keys and the remaining three keys may be optionally wired as either LINE or interphone SIGNAL keys. Thus a maximum of five lines may be accessed from the one instrument, with a common hold key, and up to three of these lines may be connected as private intercommunication lines to other instruments, one additional key being used for the common interphone signalling circuit.

15. TYPE 565-39 AND TYPE 565-42 DESK TELEPHONES

- 15.01 The 565-39 and 565-42 desk telephones are six-button types of key instruments with the same transmission circuit as the 500 series of instruments. They are designed for use on key telephone systems, which may be installed as branch exchanges or completely private systems, of either the automatic or manual type. The only difference between the two instruments is that the 565-42 telephone has its desk stand cord terminated in an amphenol plug. This feature allows the instrument to be changed quickly and easily should such action become necessary for maintenance purposes or system testing. These instruments incorporate an exclusion switch, operated by lifting the left hand plunger which is automatically reset when the handset is replaced, so that any other telephones on one of the lines may be disconnected for confidential conversations.
- 15.02 The instrument is also wired for use with speaker phone equipment. The six keys on the unit are allocated for use, from left to right, as follows. The first key is a HOLD key which may be used to hold a call received on any line while another call is made on a second line. The second and third keys are individual LINE keys and the remaining three keys may each be optionally wired as either LINE or interphone SIGNAL keys. Thus a maximum of five lines may be accessed from the one instrument, with a common hold key, and up to three of these lines may be connected as private intercommunication lines to other instruments, one additional key being used for the common interphone signalling circuit. Two wire circuits are provided for each signalling lamp thus allowing flexibility in lamp signal circuitry.