

TELEPHONE SET  
GTE AUTOMATIC ELECTRIC TYPE 187  
DESCRIPTION

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**1. GENERAL**

1.01 This section contains a description of the GTE Automatic Electric Type 187 Telephone Set, which is used to initiate, answer, and hold calls on a maximum of three lines without using auxiliary relay equipment or power supplies. This section is re-issued to upgrade the descriptive data, and to include information about visual signaling apparatus and its associated power supply. Due to the extensive number of changes involved, marginal arrows have been omitted. Remove and destroy Issue 1.

**2. DESCRIPTION**

2.01 The Type 187 Telephone Set is manufactured in both a desk and a wall mounted configuration. Both configurations may be equipped with either a rotary dial or a Touch Calling unit. The rotary dial equipped desk model set is shown in Figure 1. Figure 2 shows the same set equipped with a Touch Calling unit. Figures 3 and



Figure 1. Type 187 Telephone Set, Desk Mounting, with Rotary Dial.



Figure 2. Type 187 Telephone Set, Desk Mounting, with Touch Calling Unit.

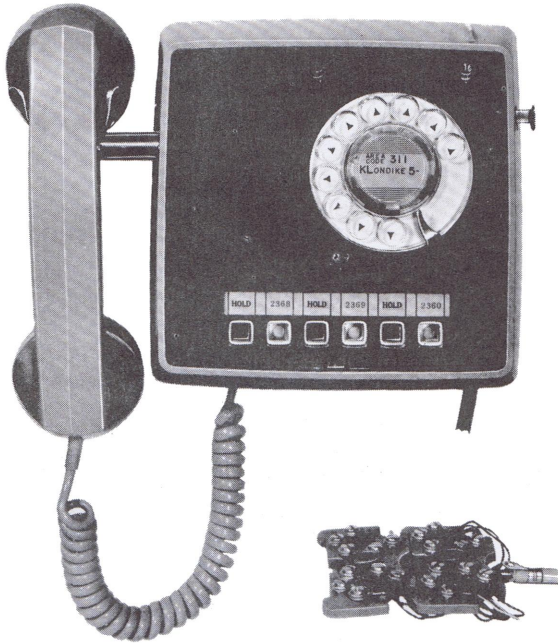


Figure 3. Type 187 Telephone Set,  
Wall-Mounting, with Rotary  
Dial.



Figure 4. Type 187 Telephone Set,  
Wall-Mounting, with Touch  
Calling Unit.

4, show the Wall-mounting configuration of the Type 187 Telephone Set with rotary dial and Touch Calling unit, respectively.

2.02 The desk configuration of the Type 187 Telephone Set is approximately 8-1/2 inches deep, 9-1/2 inches wide, and 4-1/2 inches high. In the wall-mounting configuration the set is approximately 8-1/2 inches high, 9-1/2 inches wide and 4-1/2 inches deep.

#### Intended Use

2.03 The Type 187 Telephone Set is a six-key set which can initiate, answer, and hold calls on a maximum of three central office, PBX, PABX, or intercom lines, without the need for auxiliary relay apparatus or power supplies. This set is usually installed as part of a planned complement of apparatus marketed as a "convenience system." Four such arrangements have been adopted as standard for service offering within the General System. They are:

- (a) Access to two central office lines with hold.
- (b) Access to three central office lines with hold.
- (c) Access to two central office lines, with hold, and one intercom line (hold provided but not essential).
- (d) Access to two central office lines, with hold, and one dial-selective-signaled intercom line (hold provided but not essential), with additional pushbutton signaling between stations if desired.

#### Dialing Provisions

2.04 The Type 187 Telephone Set may be equipped with either a rotary dial or a Touch Calling unit. Sets equipped with rotary dial, use a modification of the Type 52 dial. In place of the usual extended number plate, the dial is equipped with a three-inch diameter white dial plate with black arrowheads, and with the finger stop completely external to the base diameter. The dial number and letter designations are molded in the surrounding telephone set faceplate. Touch Calling sets are equipped with the GTE Automatic

Electric 12-button Touch Calling unit with metropolitan pushbutton designations molded in the front surface of the individual pushbuttons.

#### Housing

2.05 The housing is molded of plastic in separate versions for desk and wall sets. While both types are of the same general dimensions, and are attached to the telephone set mechanism in the same manner, they are not interchangeable. Bosses molded into the inner surface support two securing lugs along the shorter wall and the bracket for a shoulder-head securing screw in the center of the taller wall. The lugs and bracket are secured to the housing by means of self-tapping screws threaded into the bosses.

2.06 The difference in the two housings lies in provisions for accomodating handset and line cords, and for clearance for the handset cradle or hanger. The desk set housing has two rectangular openings on the left side to clear the hookswitch cradle. A small entry slot for the handset cord is located at the left front, and a large slot at the right rear provides entrance for the line cord. The housing for the wall mounting set has a large slot for the shaft of the handset hanger on its left side. A small entry slot for the handset cord is located at the bottom left, and a large slot for admitting the line cord is located at the bottom right.

2.07 On the housing for the wall-mounting set, a ridge running from front to rear about an inch in from the right edge is molded onto the upper surface. This provides a storage position for the handset when the user must leave the telephone in the off-hook condition.

#### Faceplate

2.08 The faceplate is molded of clear plastic with a smooth outer surface. The under-surface is ribbed; and is painted to match the housing, or in one of the following colors of beige, medium gray, white, silver, green, vermillion, yellow, blue, flamingo, gold and brown. It is also available in clear plastic for special decor applications. The faceplate is not furnished with the telephone set, but must be ordered separately. Two versions are available for rotary dial models - one with metropolitan numbering and one with numbers only. One version is available for twelve-button Touch Calling units.

2.09 The faceplate has an unpainted rectangular area above the opening for the key assembly which provides a window through which the key designations may be read. In the faceplate for sets equipped with Touch Calling unit, rectangular opening is provided below the Touch Calling unit openings for inserting a telephone number card. A clear plastic cover, supplied with the telephone set, snaps into position in this opening.

2.10 The faceplate has a tab on its upper edge which engages a slot in the supporting ridges of the housing. A corresponding slot in the ridge on the opposite wall of the housing is equipped with a spring clamp which latches the faceplate into position.

#### Component Arrangement

2.11 Figure 5 is a front view of the rotary dial equipped Type 187 Telephone Set with the housing and faceplate removed. Figure 6 is the rear view of the same set with the chassis raised and a common audible signal installed. Both the wall and the desk configurations of the Type 187 Telephone Set are constructed on the same type of pressed steel base, to which are eyeleted two U-shaped brackets for support of the chassis. The bracket with the shorter vertical legs runs laterally near the edge of the base which forms the front of the desk telephone set, and the top of the wall-mounting set. Two turned up tabs with horizontal pierced slits extend forward from this shorter bracket and serve to engage securing lugs in the shorter wall of the housing. The taller bracket lies along the opposite edge of the base, and has a central turned up tab with a vertical slot for engaging a housing securing screw located in the taller wall of the housing.

2.12 A printed wiring board transmission unit is fastened directly to the baseplate with two screws. The rotary dial set uses a Type WA-1154-A transmission unit. A WA-1155-A transmission unit is used in the Touch Calling set. The ringer, when used, is attached to the base with screws. When a common audible signal is included, it is attached to the base and the tall "U shaped" mounting bracket with screws.

2.13 Two horizontal slots in the legs of the shorter mounting bracket, and two axial slots in those of the longer one, are engaged by



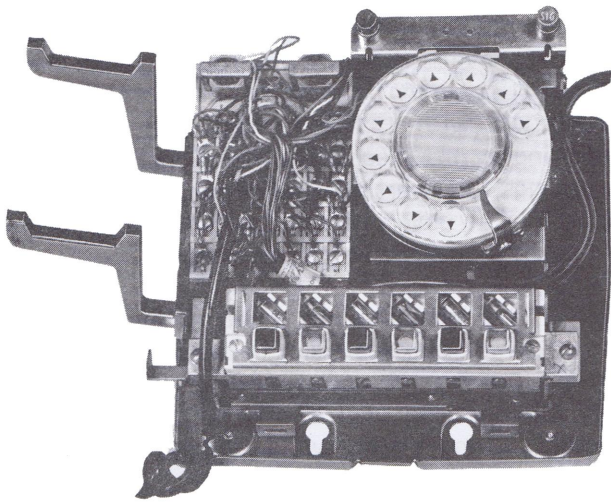


Figure 5. Front View of a Rotary-dial-equipped Type 187 Telephone Set with Housing and Faceplate Removed.

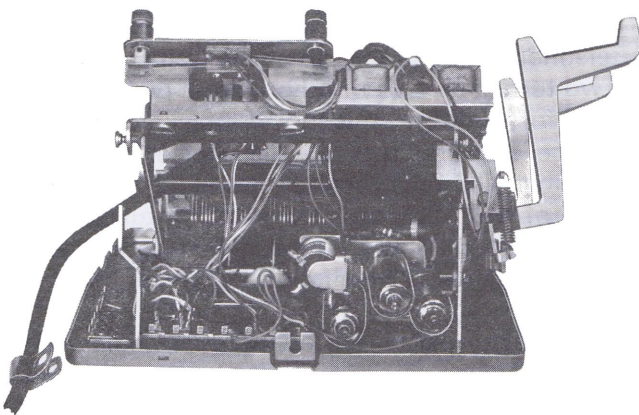


Figure 6. Rear View of Type 187 Telephone Set with Chassis Raised and Common Audible Signal Unit in Place.

shoulderhead screws which secure the chassis to the brackets. The dial or Touch Calling unit, key assemblies, and buzzer (when included) are mounted on the chassis. On the desk configuration, a hookswitch assembly is suspended below the left edge of the chassis by means of an angle bracket, and is actuated by the handset cradle. On wall-mounted sets, the hookswitch is mounted directly to the underside of the chassis, and is actuated by the rotating shaft of the handset hanger.

2.14 On rotary dial sets, the dial is mounted on a semicircular bracket having a slotted leg to engage a tab on the chassis at the left. It also has locating holes and a slot for screw attachment to a vertical extension of the chassis at the right. Sets equipped with Touch Calling unit are equipped with two angle brackets which are attached to the chassis in the same manner as the dial mounting bracket, and are arranged with locating holes and slots for screw attachment to the body of the Touch Calling unit.

2.15 The buzzer provided as an auxiliary signal on some sets, is mounted in vertical position at the right end of the chassis, adjacent to the dial or Touch Calling unit and key assembly.

2.16 The desk telephone set has four circular feet riveted to the base, one at each corner with the foot at the right rear corner positioned some distance in from the corner to avoid placing it below the terminals of the transmission unit. On wall-mounted sets, the base is used without feet, to facilitate fastening it directly to the wall.

2.17 Conversion from desk configuration to wall-mounting configuration, and vice versa, is possible by changing the housing hookswitch assembly, reversing the position of the chassis, and adding or removing the feet. However, these changes should be undertaken in the shop only.

#### Keys

2.18 A six-button key assembly is mounted at the front of the desk-type set, and at the bottom edge of the wall-mounted set. The keys are paired to provide three sets of hold and pickup keys—one set for each line. The hold keys are equipped with red pushbuttons, while the pushbuttons of the pickup keys are clear. Two sliding “ladders” are used to provide interlock among the pickup plungers. The ramps on the ladders at each position

are arranged so that depressing the line 1 pickup plunger causes the rear of the plunger lock screw to force both ladders to the right. Depressing the line 3 plunger forces both ladders to the left, while depressing the line 2 pickup plunger forces the front ladder to the right and the rear ladder to the left. In each case, the force is transmitted to the other two pickup plungers if they are operated, and causes them to restore by action of the ladder ramp against the plunger screw.

2.19 Operation of any hold key connects a 330 ohm resistor and a series inductor with a dc resistance of 165 ohms, across the associated line before releasing the interlocked pickup key and disconnecting the transmission unit from the line. This dc bridge hold the central office connection, but the audio-frequency impedance of the inductor is sufficiently high that transmission is not impaired if conversation is resumed from another station before the hold key is restored.

2.20 An operated hold key is not affected by the operation of pickup or hold keys serving the other two lines. However, to insure that no line can be left on hold unintentionally, a third sliding ladder is linked to the hookswitch actuator. This ladder is arranged so that restoring the handset forces it to the left. This causes one of its three ramps to bear against the lock screw of any operated hold key plunger, forcing it upward and thus removing the hold bridge from the line.

2.21 A set of break contacts which are momentarily actuated by a black plunger, is situated above and to the left of the dial or Touch Calling unit. This key is provided as a recall button for disconnect and reseizure. It is also for attendant flash in PBX and PABX systems, and for consultation call in those PABX systems providing this feature. It is wired in series with the hookswitch to avoid use of the latter for flashing when to do so would release a line from hold.

2.22 A set of make contacts which are momentarily actuated by a red plunger with the designation SIG engraved in its top, is located above and to the right of the dial or Touch Calling unit. This key may be used for signaling between stations, or for call transfer in PABX systems requiring a grounding key for this function.

### Indicator Lamps

2.23 In the key assembly lamp jack, the positions associated with the pickup keys are equipped with KID neon lamps and 27K series resistors to illuminate the associated pickup pushbuttons and line designations when ringing potential is applied to the lines. Each of these three lamp jacks, in series with this 27K resistor, is wired across one of the lines to which the set has access. When ringing potential is applied from the central office, the lamp lights to indicate which pickup key should be operated to answer the incoming call. Lamp flashes will also be noted during dialing or other line surges.

### Busy Visual Indication

2.24 The three lamp jacks adjacent to the hold keys are equipped with incandescent lamps. By use of an externally mounted L-7048 power supply (Figures 7 and 8), these lamps can be made

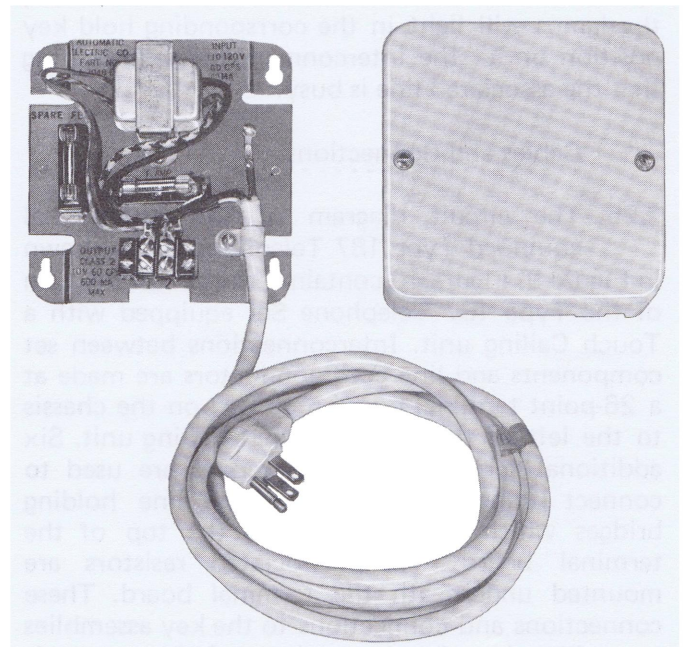


Figure 7. L-7048 Power Supply with Cover Removed.

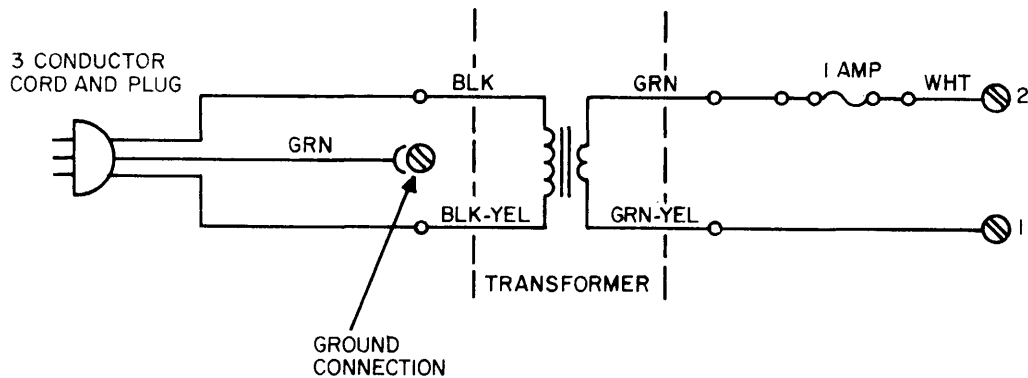


Figure 8. L-7048 Power Supply Schematic Diagram.

to indicate line busy condition. To implement this feature, terminals 1, 2, 4, 5, and 6 on the number 2 connecting blocks of up to five telephone sets are connected in multiple, with the output terminals of the L-7048 power supply connected across the multiplied terminals 1 and 2. When a pickup or hold key on any of the interconnected sets is operated with the set in the off-hook condition, the lamps will light in the corresponding hold key position on all the interconnected sets, indicating that the associated line is busy.

#### Cables and Connections

2.25 The circuit diagram of the rotary dial equipped Type 187 Telephone Set is shown in Figure 9. Figure 10 contains the circuit diagram of the Type 187 Telephone Set equipped with a Touch Calling unit. Interconnections between set components and line cord conductors are made at a 26-point terminal board mounted on the chassis to the left of the dial or Touch Calling unit. Six additional terminals without screws are used to connect three indicators for the line holding bridges which are mounted on the top of the terminal board. Their associated resistors are mounted underneath the terminal board. These connections and connections to the key assemblies are soldered to lug protrusions of the terminals beneath the terminal board. All other connections are made by means of screws and spade lugs. The handset cord is equipped with a J-hook strain relief clamp at its point of exit from the telephone set.

2.26 The line cord exits from the telephone set base at the right rear on desk sets, and at the lower right on the wall-mounted set. It is fastened

to a leg of the taller mounting bracket by means of a cable clamp. The line cord is terminated on its free end in two Type 44A connecting blocks, as shown in Figures 9 and 10. On wall-mounted sets, the main portion of the keyhole-shaped knockout located near the right edge of the base, serves as an entry point for inside wiring cable if it is preferred in place of the 16-conductor line cord furnished with the set.

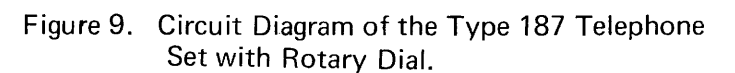
#### Signaling Provisions

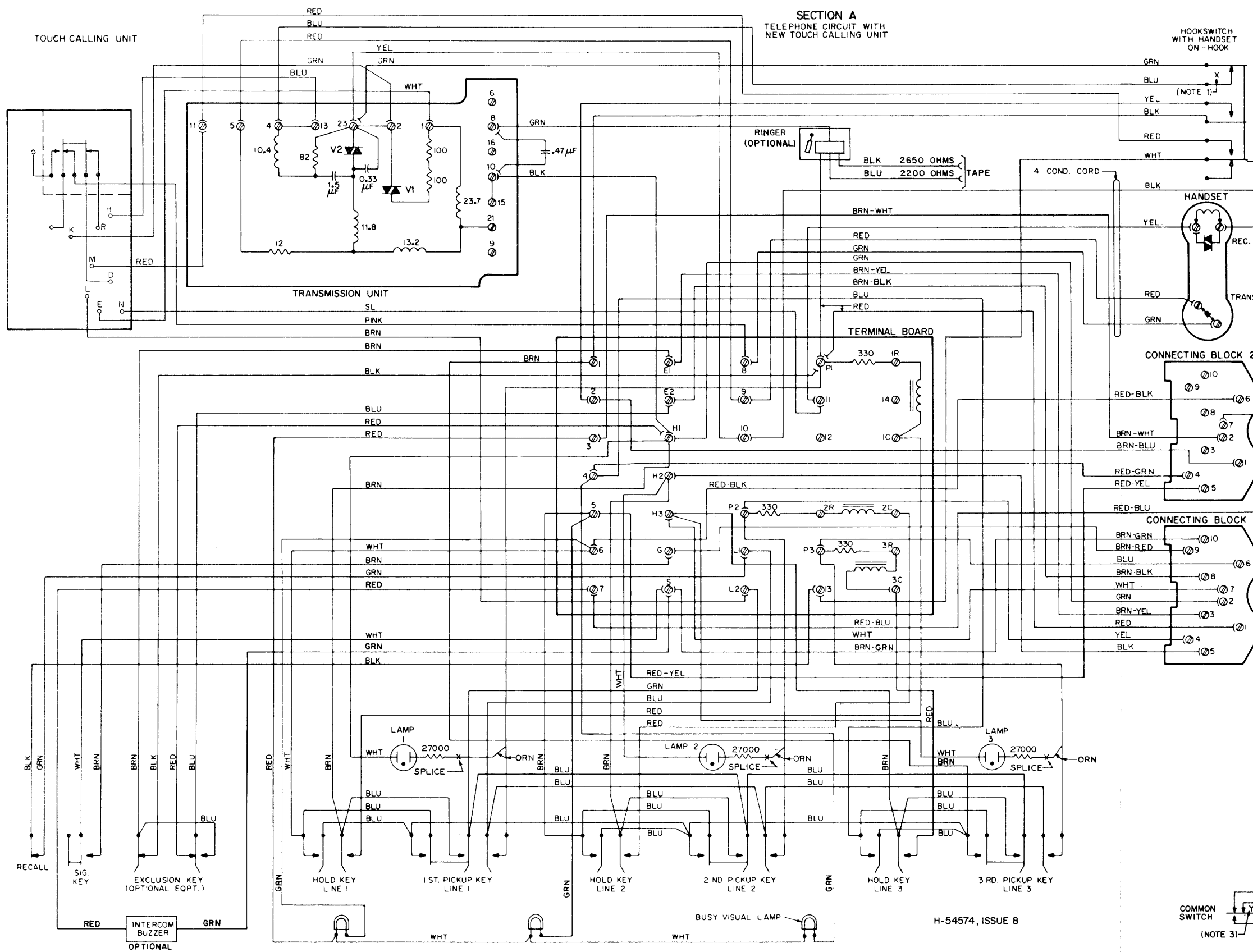
2.27 In installations in which access is limited to central office lines, and special pushbutton signaling is not included, no special signaling apparatus is required. When ringers for all but one of the lines are included elsewhere and are audible at the Type 187 set location, a ringer for the remaining line may be installed in the Type 187 set. If other stations having access to part of the lines are all located beyond earshot of the Type 187 set, or if there are no additional sets with access to any of the lines, either of two options may be used as follows:

- (a) A common audible signal unit (Figures 11 and 12), to serve all lines, may be installed in the Type 187 Telephone Set.
- (b) One ringer may be mounted in the Type 187 Telephone Set with one or two additional ringers mounted in external ringer boxes.

2.28 In cases where an intercom line with pushbutton signaling is required, all buzzers





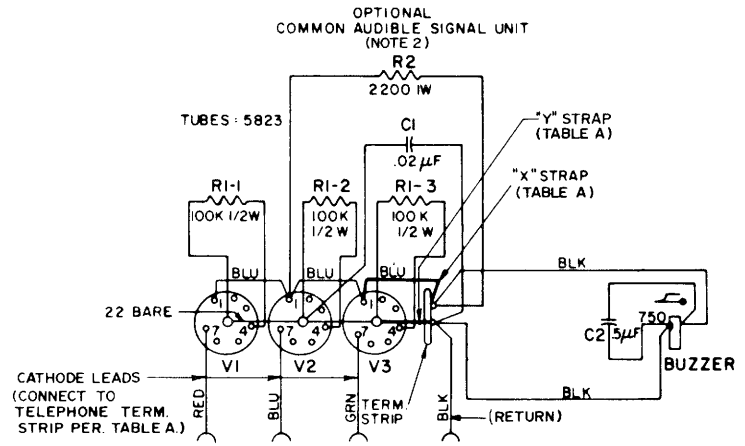


- NOTES:**
1. "X" CONTACTS ON HOOKSWITCH BREAK LAST.
  2. THE COMMON AUDIBLE SIGNAL UNIT MAY BE APPLIED ONLY WHEN ALL LINES ARE SERVED BY SWITCHING EQUIPMENT WITH ONE TYPE OF RINGING SCHEME. STRAP OPTIONS AND CONNECTION TO TELEPHONE TERMINAL STRIP TO BE DETERMINED BY TABLE A.
  3. "Y" CONTACTS ON HOOKSWITCH BREAK FIRST.

**TABLE A**

RINGING SCHEME	GENERATOR CONNECTED	RING VOLTAGE APPEARS ACROSS	STRAPS TO BE CUT	* CONNECT CATHODE LEADS AS FOLLOWS			CONNECT RETURN
				RED	BLU	GRN	
BRIDGED (METALLIC RINGING)	GRD. CONN. GEN.	TIP(+) & RING(-)	NONE	P1	P2	P3	H1, H2 & H3 BUSED TOGETHER
	BAT. CONN. GEN.	TIP(+) & RING(-)	X & Y				
DIVIDED (GRD. RET. RINGING)	GRD. CONN. GEN.	TIP(+) & GRD.	X	H1	H2	H3	EARTH
		RING(-) & GRD.	X & Y	P1	P2	P3	GRD.

\* P1'S L1 RING(-) SIDE OF LINE  
\* H1'S L2 TIP(+) SIDE OF LINE



TELEPHONE CIRCUIT WITH OLD TOUCH CALLING UNIT  
(FOR REMAINDER OF CIRCUIT REFER TO SECTION A)

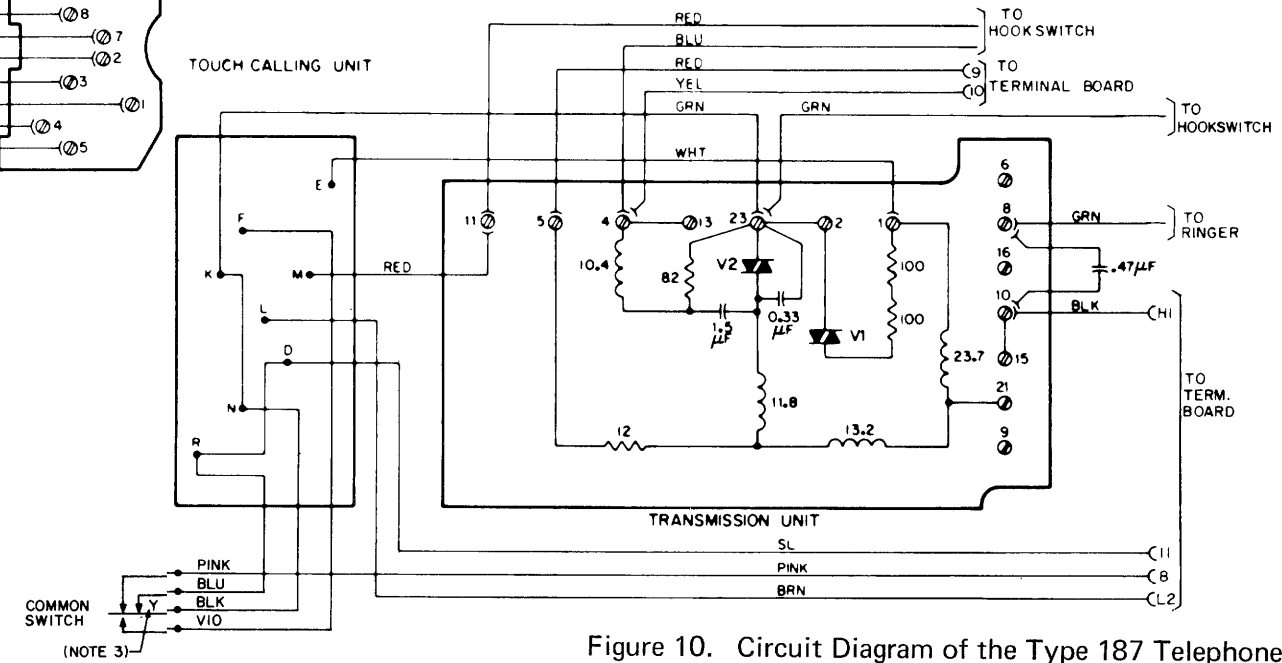


Figure 10. Circuit Diagram of the Type 187 Telephone Set with Touch Calling Unit.



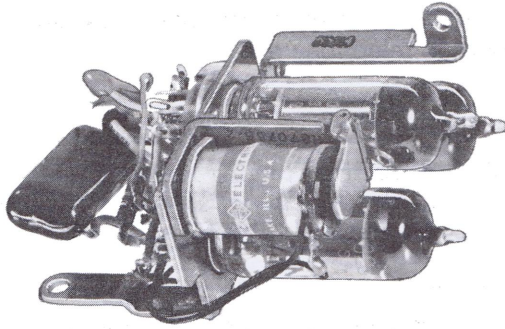


Figure 11. Common Audible Signal Unit.

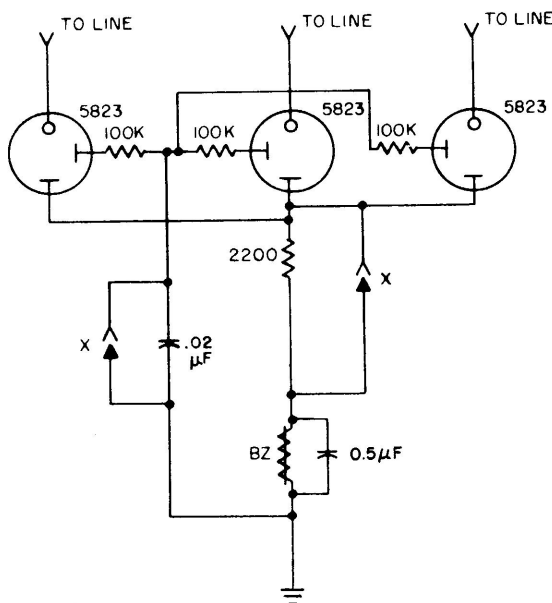


Figure 12. Common Audible Signal Unit  
Circuit Diagram.

and all pushbuttons in a group are connected in parallel. Pushing a signaling pushbutton on any station sounds the buzzers at all stations in the group. In this signaling arrangement, an intercom power supply unit such as the Proctor Model P400BT is required. This unit supplies filtered 8.2 volts dc to serve as talking battery for up to five stations on the intercom line. It also has 9 and 18 volt ac taps for supplying power to buzzers. For information concerning the Proctor Model P400BT power supply, see the 490-101 series of the GTE Practices.

NOTE: In applications requiring busy visual signal, talking battery and intercom signaling, a single Proctor P-411 power supply may be used to replace both the L-7048 and the Proctor P400BT power supplies.

2.29 In cases where signaling is desired without intercom service, only a signal transformer such as the Model S-9883 is required. This unit supplies 6, 12, or 18 volts ac for buzzers. Control of the buzzer is provided by the SIG key in the station normally answering calls, with the buzzer located at a station which picks up the phone only in response to the sounding of the buzzer.

2.30 Where dial-selective-signaled intercom line is to be provided, a key telephone system power supply unit is required as a source for talking battery and buzzer power, and also for the 18 to 28 volts dc required for the selective signaling apparatus. The latter, an H-883002-70 dial intercom key telephone unit requires an H-884900 bracket assembly for mounting. For further information about this unit see the 484-400 series of the GTE Practices. In this arrangement, up to nine stations may have access to a common intercom talking path and an individual lead is run to each station for buzzer operation.

2.31 Where additional signal must be provided at the station for each line accessed, a common audible signal unit (Figures 11 and 12) may be mounted in the space provided for the ringer.

#### Signaling Methods

2.32 The common audible signal control shown in Figures 11 and 12, as wired at the factory (with X-strapping included) provides a cold cathode tube wired in common to a relay-buzzer for each of three lines terminated on the set. The cathode of each tube is connected individually to the line conductor over which the station will be rung. The anodes of the tubes are connected through 100K isolation resistors to ground. A 0.5 microfarad capacitor connected in parallel with the buzzer serves to shape the waveform and improve the buzzer tone. The X-strapping option is used in exchanges equipped with a ground-connected ringing generator.

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2.33 In exchanges where battery-connected ringing generator is used, the peak values of ringing potential applied to the line conductor to which the called is assigned, are higher by the amount of the battery potential, than in the case of the ground-connected generator. Therefore, when the common audible signal unit is used in exchanges employing battery connected ringing generator, X-strapping must be removed.

2.34 In the common audible signal unit, removal of one X-strap inserts an additional 2.2K resistance in series with the buzzer, to compensate for the higher peak potential. Removal of the other strap inserts a .02  $\mu$ fd capacitor in the common path from the starter electrodes to ground. This limits to a single click, the response of the buzzer to a train of dial pulses.

2.35 Use of the common audible signal should be confined to installations in which each line accessed by a given Type 187 Telephone Set is served by switching equipment using the same type of ringing generator connection. In all cases, the cathode of each of the cold-cathode tubes should be connected to whichever conductor of the associated line that a conventional ringer would have to be connected for divided ringing.

2.36 The number of common audible signal units which may be installed on a given line is dependent upon the ringing potential available at the central office ringing generator terminals, and on the resistance of the line conductor over which the signal units are operated. Assuming that all common audible units are the same distance from the central office ringing generator, these variables are correlated in Table 1.

#### Code Number Identification

2.37 The stocklist code number stamped on the base of the Type 187 Telephone Set identifies color and operational characteristics originally provided at the factory. It does not indicate repair shop alterations, or field modifications, unless appropriate code changes have been made at the time that such work was performed.

2.38 The stocklist code number consists of a two-letter prefix, a base number, and a group of numerical and alphabetical suffixes. A typical stocklist code number is NC-873000-AXX. Each component of this number has its own special

significance in regard to the makeup of the represented telephone set.

Table 1. Minimum Ringing Potential (Measured at the Generator) Required to Operate Common Audible Signal Units.

Battery Connected Generator					
Line Loop (ohms)	Number of Units				
	1	2	3	4	
0	97V	104V	116V	122V	
600	108V	116V	122V	133V	
1000	111V	118V	128V		
1200	113V	120V	130V		
Ground Connected Generator					
Line Loop (ohms)	Number of Units				
	1	2	3	4	5
0	74V	74V	74V	76V	80V
600	77V	80V	82V	85V	86V
1000	77V	82V	89V	97V	100V
1200	78V	82V	90V	101V	112V
Line Loop (ohms)	Number of Units				
	6	7	8	9	10
0	80V	87V	87V	87V	87V
600	95V	100V	102V	109V	130V
1000	101V	118V	126V	135V	
1200	119V	125V	135V		

2.39 The two letter prefix NC indicates a self-compensating telephone set with a printed wiring board transmission unit.

2.40 The base number may be either of two three-digit numbers with individual significance, as follows:

- (a) 873 indicates a desk type telephone set with handset, retractile handset cord and 16-conductor line cord.
- (b) 973 indicates a wall-mounted telephone set with handset, retractile handset cord and 16-conductor line cord.

2.41 The fourth and fifth digits of the stocklist code number (immediately following the base number) indicate the color of the set as follows:

- (a) 00 - Black
- (b) 10 - Sand Beige.
- (c) 19 - Gardenia white.

2.42 The sixth digit of the stocklist code number refers to optional key for exclusion of extension stations as follows:

- (a) 0 - The extension exclusion key is not provided.
- (b) 1 - The extension exclusion key is provided.

2.43 The first letter suffix of the stocklist code number indicates the type of calling device (rotary dial or Touch Calling unit) with which the set is equipped, as follows:

- (a) A - Rotary dial.
- (b) J - Touch Calling unit.

2.44 The last two letter suffixes indicate the type of signaling provisions incorporated in the set, as follows:

- (a) CA - Common audible signal.
- (b) CB - Common audible signal and buzzer.
- (c) RB - Straight line ringer and buzzer.
- (d) XX - No signaling device included.
- (e) SL - Straight line ringer.