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ISSUE 2

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**STROMBERG-CARLSON  
1700-3 THREE-LINE  
EXECUTIVE TELEPHONE**

*installation and maintenance instructions*

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1700-3 Telephone

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## SECTION I GENERAL

### 1. TYPES OF TELEPHONES

#### a. 1700-3.

The 1700-3 is a three-line telephone with hold on each line. The telephone can be used for any three-line situation. One line can be used for manual intercom, with signaling being accomplished through use of the signaling button located above the line keys. Dial selective intercom can be used on one line with signaling being accomplished by use of the dial. Dial selective intercom leaves the signal button free for signaling a secretary or other uses. If three central-office or PBX lines are desired, and manual exclusion is not required it is possible through the use of the manual exclusion switch, to have intercom. The recall button, located above the dial, permits signaling for operator assistance without loss of a call. Incoming calls are identified by the neon lamps located below the line key, which flash and illuminate the line key of the called line

#### b. 1700-3A.

The key assembly of the 1700-3 has been modified to prevent paralleling of lines during switching. Paralleling of lines can cause false call transfer in the F-50A Dial PBX or false ring trip in other systems.

No change has been made to the method of mounting or wiring the key assembly; the old and new assembly are completely interchangeable. Stock numbers for the key assembly will not change, however, the code number for the key assembly (395) and telephone (1700-3) will be suffixed with "A" (395A key assembly and 1700-3A telephone).

### 2. OPTIONAL FEATURES

a. A manual exclusion button can be added to provide "private line" facilities for any one line associated with each telephone.

b. A common audible signal can be installed within the telephone to provide an audible ringing signal for incoming calls on any line. Flashing of the neon lamp, in the line button, identifies the line being rung. The neon lamps are standard equipment and operate from the ringing voltage on the line.

c. When a common audible signal is not used, a ringer will be required on each line. The ringers can sound alike; the flashing of the line button will identify the line.

d. Lamps can be installed in the sockets under the hold buttons to provide busy line identification. A step-down transformer is required.

e. Manual intercom requires a power-supply for ringing and talking voltage, and a buzzer in each telephone for manual intercom signaling.

f. Dial selective intercom requires the use of a suitable intercom system. The common audible signal when used, will provide the required signaling. An intercom buzzer is not required on dial selective intercom.

### 3. OPERATION

#### a. Answering an Incoming Call.

The ringer will sound and a lamp under one of the line buttons will flash identifying the line with the incoming call. Depress this line button which will lock down and release any other line button previously depressed. The line buttons are mechanically interlocked to prevent depressing of more than one line button at a time.

Lift the handset from the cradle. It will be connected to the selected line.

#### b. Releasing a Call.

When the call is completed, replace the handset in the cradle to release the connection. The line key will remain depressed, and a subsequent call on this line can be answered by simply removing the handset from the cradle.

#### c. Holding a Call.

To hold a call, depress the hold button immediately below the line button for the line to be held. This places a "hold" condition on this line and release the line button.

#### d. Manual Intercom.

To operate the manual intercom, depress the line button designated intercom and by signaling a predetermined code with the signal button, the called party will answer.

#### e. Recall Button.

To signal for operator assistance without losing a call, depress the recall button several times rapidly.

#### f. Manual Exclusion Option.

To engage a private line, depress the line key on the line offering manual exclusion and pull the manual exclusion switch out. When the handset is replaced on the cradle, the manual exclusion switch will automatically return to the "OFF" position.

#### g. Manual Intercom Through Exclusion Switch.

The manual exclusion switch is available for use as an intercom switch if necessary. The intercom is operated by pulling this switch out and signaling the desired party through the buzzer code. When the handset is replaced, the switch is restored in the normal position.

### 4. TYPES OF RINGING

The 1700-3 telephone will accept either the common audible signal, straight-line gong ringer or buzzer.

## SECTION II INSTALLATION

### 5. INSTALLATION OF TELEPHONE

The installation of the telephone will vary depending on the features desired. A 44A or equivalent terminal block at each station will be required for three-line installation. If extra features are desired, a second 44A or equivalent terminal block will be required.

The block diagrams figure 1 through 3 show typical installations. These diagrams are designed to give the user an idea of the variations possible in building a system. After the telephone system has been planned, select the wiring diagrams needed from figure 4 through 8.

Figures 4 through 8 are as follows:

Figure 4, Wiring Diagram, Typical Three-line Installation with Common Audible Signals in telephone.

Figure 5, Wiring Diagram, Typical Manual Intercom Installation.

Figure 6, Wiring Diagram, Manual Exclusion at Station One on Line One.

Figure 7, Wiring Diagram, Typical Busy Lamp Installation.

Figure 8, Wiring Diagram, Telephone to Dial Selective Intercom.

By combining the various diagrams, it is possible to construct the desired system. The following examples show the use of wiring diagram figure 4 through 8.

a. If a two-line system with audible signal and manual intercom is desired, select from figure 4, lines 1 and 2 and wire them accordingly. Wire line 3, manual intercom, from figure 5.

b. If three lines, with manual exclusion on Station 1 is desired, wire line 2 and 3 from figure 4, and line 1 from figure 6.

### 6. INSTALLATION OF RINGER

#### a. Internally Mounted Common Audible Signal.

- (1) Remove telephone housing, see paragraph 8.
- (2) Remove dial and network assembly, by removing the screw holding dial and network bracket to hookswitch bracket.
- (3) Mount the common audible signal to the base with the screws provided.
- (4) Connect the BRN-BLU of the line cord to earth ground. Connect the YELLOW lead on the common audible signal to terminal 13 on the large terminal block in the telephone.
- (5) For (-) battery connected ringing, connect RED lead to terminal 4, BLU lead to 5, and the GRN lead to terminal 6. Terminals 4, 5, and 6 are located on the large terminal board inside the telephone.



(6) For ground connected ringing, connect RED lead to terminal 1, BLU lead to terminal 2, and the GRN lead to terminal 3. Terminals 1, 2 and 3 are located on the large terminal board inside the telephone. Connect a strap between terminals 1 and 3 and 2 and 5 on the common audible signal as shown on wiring diagram, figure 9.

(7) A limited number of common audible signals may be connected in multiple on one line. The maximum loop resistance for the methods of bridging common audible signals are as follows:

No. of Common Audible Signals	Loop Resistance, Battery Connected Generator	Loop Resistance, Ground Connected Generator
2	-----	2,600 ohms
4	2,000 ohms	1,000 ohms
6	1,400 ohms	600 ohms
8	800 ohms	40 ohms
10	400 ohms	-----

b. Internally Mounted Straight-Line Gong Ringer.

- (1) Remove telephone housing, see paragraph 11.
- (2) Remove dial network assembly by removing the screw holding dial and network bracket to hookswitch bracket.
- (3) Mount the ringer to the base with the screws provided.
- (4) Connect the RED and BLACK leads of the ringer to terminals 1 and 4 respectively for line one, 2 and 5 for line two and terminals 3 and 6 for line three. These terminals are located on the large terminal board inside the telephone.

c. Internally Mounted Intercom Buzzer.

- (1) Remove telephone housing, see paragraph 11.
- (2) Remove dial and network assembly, by removing the screw holding the dial and network bracket to hookswitch bracket.
- (3) Mount intercom buzzer to the base, next to the hookswitch bracket, with the screw provided.
- (4) Connect the ORN and BRN leads of the line cord to the terminals of the buzzer.

## 7. INSTALLATION OF MANUAL EXCLUSION FOR PRIVACY FEATURE

When manual exclusion is required, order package assembly 204793-891 and install as follows:

- a. Remove telephone housing, see paragraph 11.

b. Mount the exclusion switch to the telephone base (lower left-corner) using the screws provided.

c. Connect the switch wires as shown in the following chart.

FROM EXCLUSION SWITCH	TO TELEPHONE TERMINAL BLOCK			
	Line No.	1	2	3
RED		7	7	7
BROWN		4	5	6
GREEN		1	2	3
WHITE		8	8	8

#### 8. INSTALLATION OF MANUAL EXCLUSION FOR INTERCOM USE

When manual exclusion is required for intercom, order package assembly 204793-891 and install as follows:

- a. Remove telephone housing, see paragraph 11.
- b. Mount exclusion switch to telephone base (lower-left-corner) using the screws provided.
- c. Connect the wires from the exclusion switch as shown on the following chart.

FROM EXCLUSION SWITCH	TO TELEPHONE TERMINAL BLOCK
BROWN	11
BLACK	7
SLATE	8
WHITE	14
GREEN	16

d. Change wires as shown below:

(1) Move the orange hookswitch wire from telephone terminal 16 to telephone terminal 14.

(2) Remove the orange key wire from telephone terminal 11, splice to red wire from exclusion switch. Tape the splice.

(3) Connect the line cord Brown-red to terminal 8 on telephone terminal block and connect the line cord Brown-Green to terminal 7 of the telephone terminal block.

## 9. BUSY LINE LAMP INSTALLATION

a. When busy lamp indication is required, order (3) three lamps 211108-000 and transformer power supply 202897-642.

b. Remove bezel, face plate and face mat assembly. With care first lift the bezel from the top of the housing, then raise upward and lift out.

c. Remove the lamp shield.

d. Insert the busy lamps into the sockets.

e. Connect lamp leads and transformer leads as shown in figure 7.

## SECTION III TELEPHONE MAINTENANCE

### 10. GENERAL

Make a visual inspection of the exterior and interior of the telephone. Look for obvious defects such as worn, loose or broken parts; obstruction of moving parts; or the presence of foreign matter that could interfere with proper operation.

### 11. HOUSING

To remove the housing, first remove the bezel, face mat and face plate by lifting the bezel from the top of the housing first, then raise upward and lift out. Loosen the two housing screws at the rear of the telephone housing, and lift housing up and forward.

### 12. HOOKSWITCH

#### a. Tension Spring Adjustment.

To check spring tension, remove the housing, paragraph 11. Replace the handset on the cradle. The hookswitch lever should rest on the mounting bracket. To increase the tension of the spring, bend the adjustment arm forward slightly. To decrease the tension, bend the arm backward slightly.

#### b. Contact Spring Adjustment.

The hookswitch consists of three sets of twin-contact springs. Sequence of "W" contact operation is not important; "X" contact must operate before "Y" contact. The springs have a slight curve and the upper springs of the combination should have a slight follow when operating. In adjusting these springs, be sure that the bar contacts on the lower spring of the combination, simultaneously engage the bar contacts of the upper springs.

#### c. Hookswitch Replacement.

To replace the hookswitch assembly, part number 200128-609, proceed as follows:

- (1) Remove telephone housing, paragraph 8.
- (2) Disconnect hookswitch leads.
- (3) Remove the screw in the upper left-hand corner of the dial bracket and slide the dial bracket back to disengage from base.
- (4) Remove the hookswitch tension spring; and slide the shaft out.
- (5) Remove the two screws holding the hookswitch bracket to the base.
- (6) Replace with new hookswitch assembly and assemble by reversing the above procedure.

### 13. DIALS

To replace the dial, part number 202145-511, proceed as follows:

- a. Remove the telephone housing, paragraph 11.
- b. Disconnect the dial leads.
- c. Remove the screw in the upper left hand corner of the dial bracket and slide the dial bracket back to disengage from base.
- d. Remove the two screws holding the dial to the dial bracket.
- e. Replace with new dial and assemble by reversing the above procedure.
- f. For maintenance, repair and adjustment of dial, see Section III of this manual.

### 14. SIGNAL AND RECALL KEY ASSEMBLY REPLACEMENT

To replace the signal and recall key assembly, part number 206011-511, proceed as follows:

- a. Remove the telephone housing, paragraph 11.
- b. Remove the two screws holding the signal and recall assembly plate to the dial assembly.
- c. Disconnect the two leads to both switches.
- d. Replace with new assembly and assemble by reversing the above procedure.

### 15. KEY ASSEMBLY REPLACEMENT

To replace key assembly, part number 206011-501, proceed as follows:

- a. Remove the telephone housing, paragraph 11.
- b. Disconnect key assembly leads, by removing plug at rear of set.
- c. Remove the two screws holding the key assembly to the key mounting bracket.
- d. Slide the short connecting rod from the hold return cam.
- e. Replace with new key assembly and assemble by reversing the above procedure.

### 16. LINE HOLD RELEASE ADJUSTMENT

The hold key is mechanically restored to normal by the operation of the hookswitch to the "on-hook" position. If the hold key does not release, adjust as follows:

- a. Remove the telephone housing, paragraph 11.
- b. Loosen the connecting plate screw, upper right-hand corner of telephone base.
- c. With the handset removed, manually depress the hookswitch so that the long connecting rod moves the connecting plate to the right slightly.
- d. Tighten the connecting plate screw securely.
- e. Depress at least two hold keys and replace the handset. Pressure of the handset should restore the hold keys to normal.
- f. If keys still do not operate properly, repeat steps b through e.



## 17. NEON LAMP REPLACEMENT

To replace the neon line-indicating lamp, use part number 200162-299, and proceed as follows:

- a. Remove the bezel, face plate and mat assembly by lifting up and forward.
- b. Remove the lamp shield.
- c. Remove the lamps by clipping the neon lamp leads as close to the socket as possible.
- d. Insert the new lamp into the socket. The replacement lamp is socket based and made for this application.
- e. Replace the lamp shield and bezel assembly.

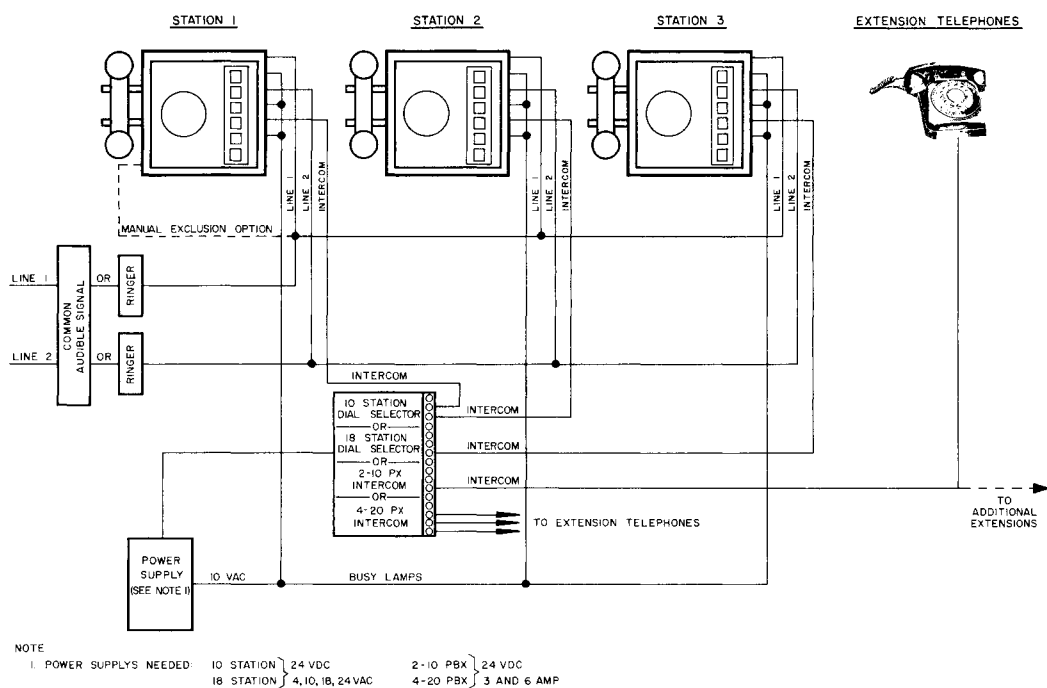


Figure 1. Three Stations with Intercom Extension, Two Outside Lines, Busy Lamps, Dial Intercom and Ringer or Common Audible Signal.

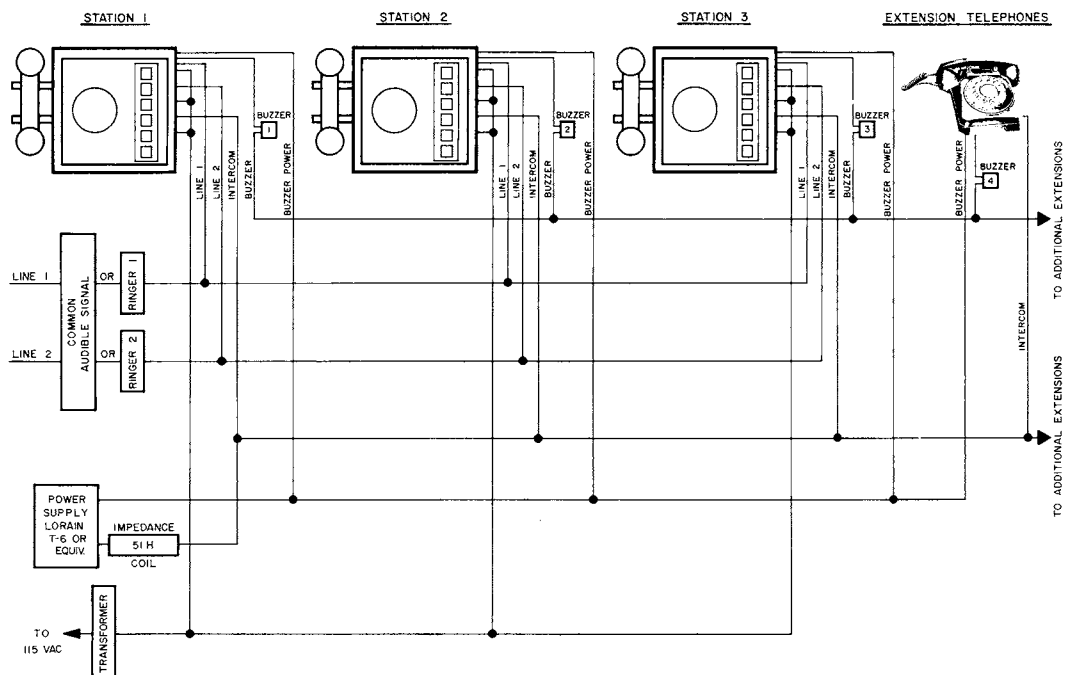


Figure 2. Three Stations with Intercom Extension, Two Outside Lines, Manual Intercom, Coded Buzzer System, Ringer or Common Audible Signal and Busy Lamps

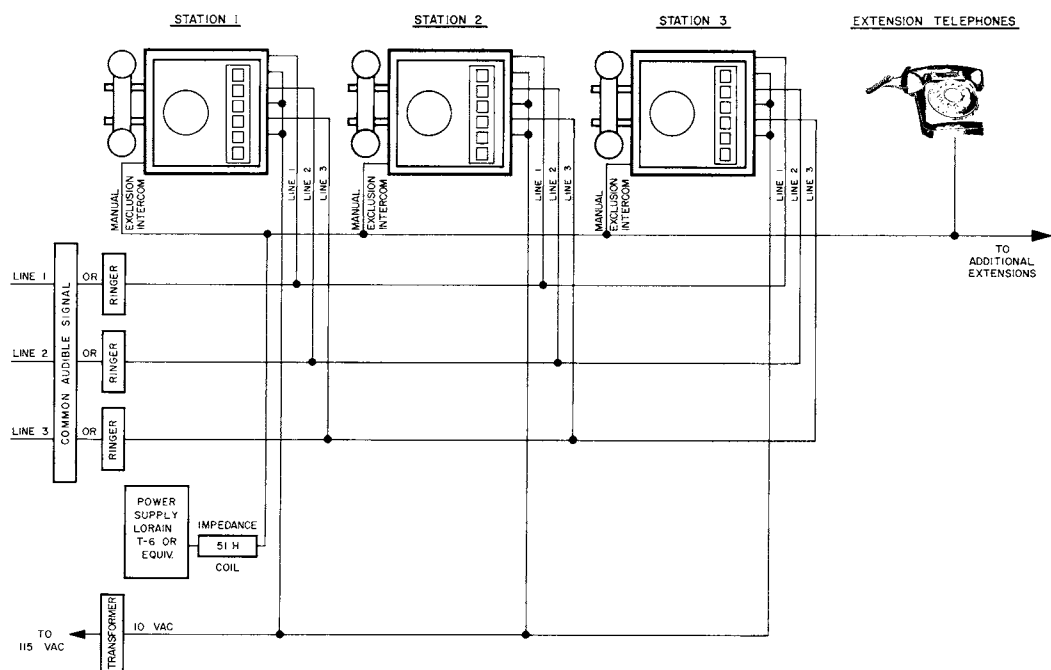
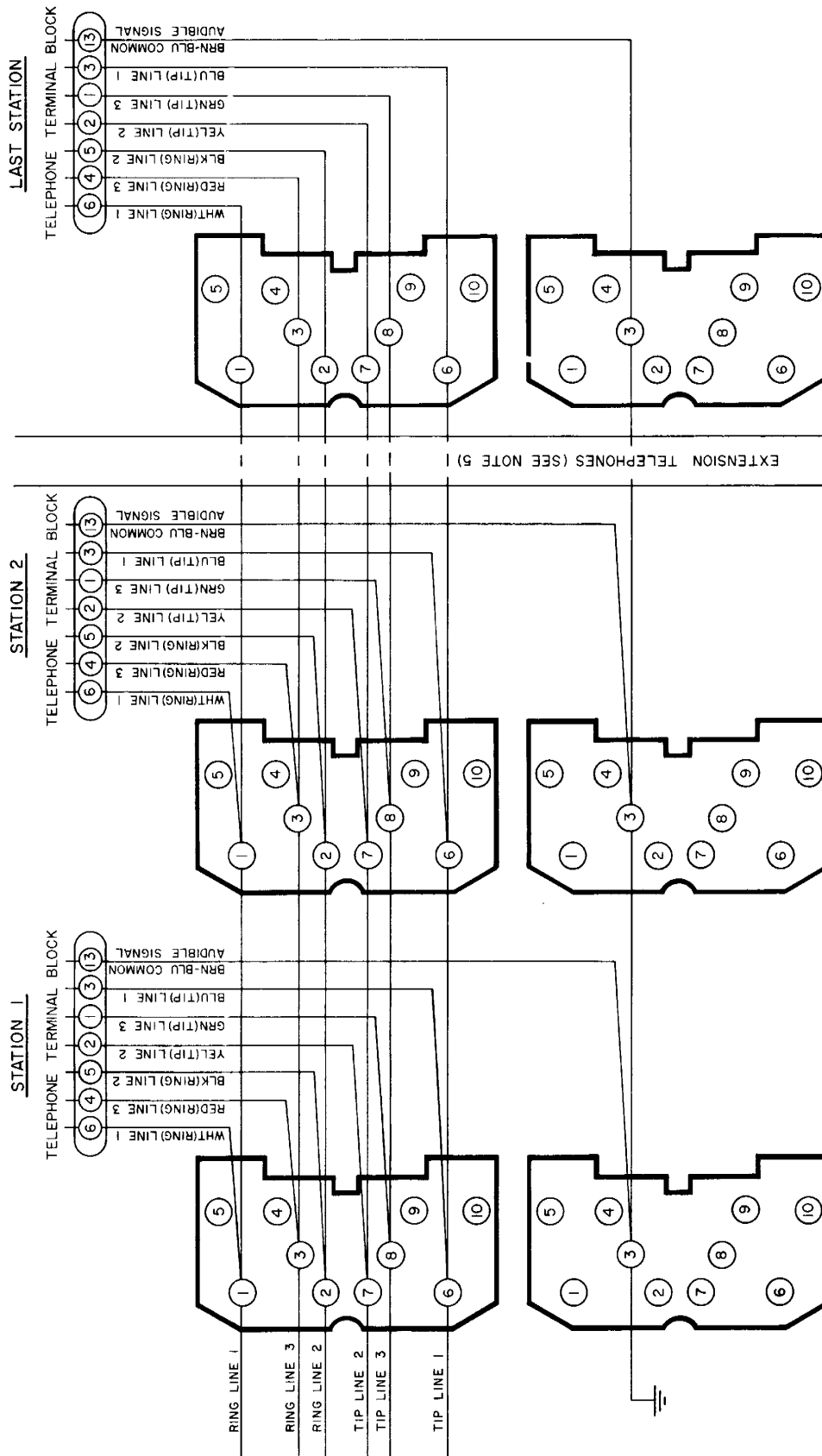


Figure 3. Three Station with Intercom Extension, Three Outside Lines with Manual Intercom using Manual Exclusion Switch, Ringer or Common Audible Signal.



#### NOTES

1. FOR DIAL INTERCOM ON LINE 3 WIRE LINE 1 AND LINE 2 FROM THIS FIGURE AND LINE 3 INTERCOM FROM FIGURE 8
2. FOR MANUAL EXCLUSION OPTION WIRE MANUAL EXCLUSION SWITCH FROM FIGURE 6
3. FOR MANUAL INTERCOM ON LINE 3 WIRE LINE 1 AND LINE 2 FROM THIS FIGURE: WIRE LINE 3 FROM FIGURE 5
4. FOR BUSY LAMP FEATURE WIRE LINES TO THIS FIGURE AND BUSY LAMPS FROM FIGURE 7
5. BUSY LAMP FEATURE LIMITS THE NUMBER OF STATIONS TO SIX.

Figure 4. Wiring Diagram. Typical Three-Line Installation  
with Common Audible Signals in telephone.

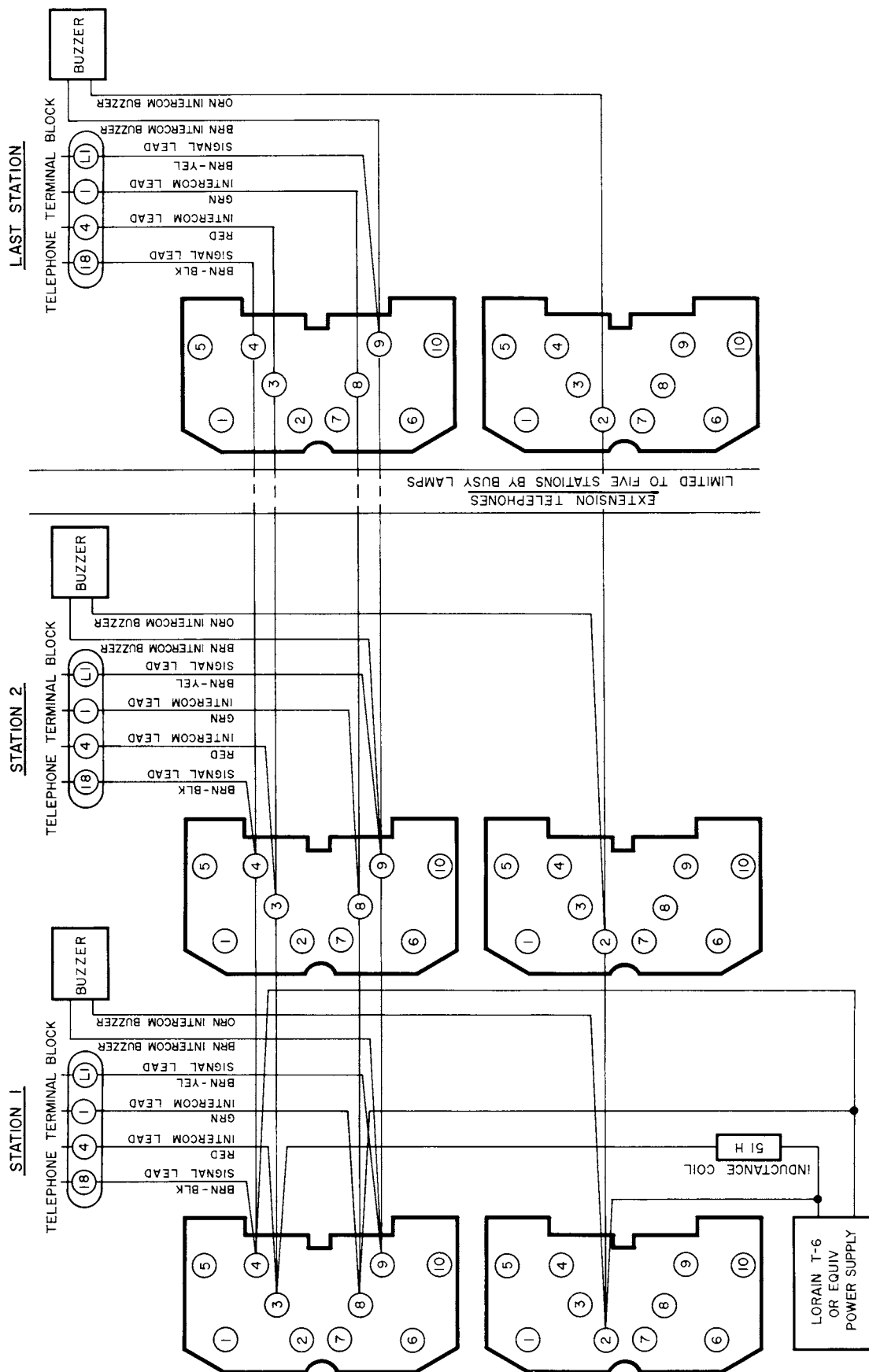


Figure 5. Wiring Diagram. Typical Manual Intercom Installation.

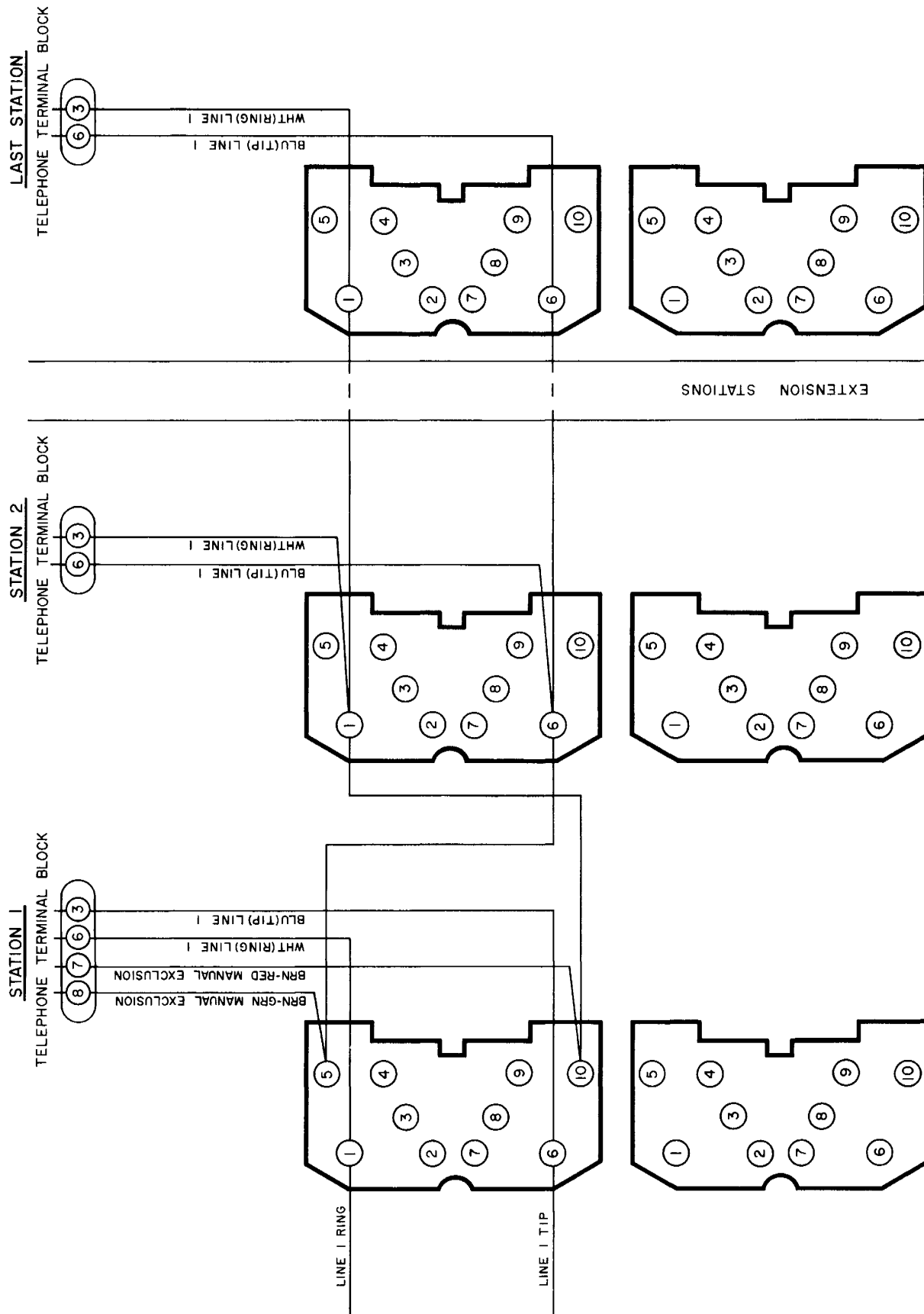
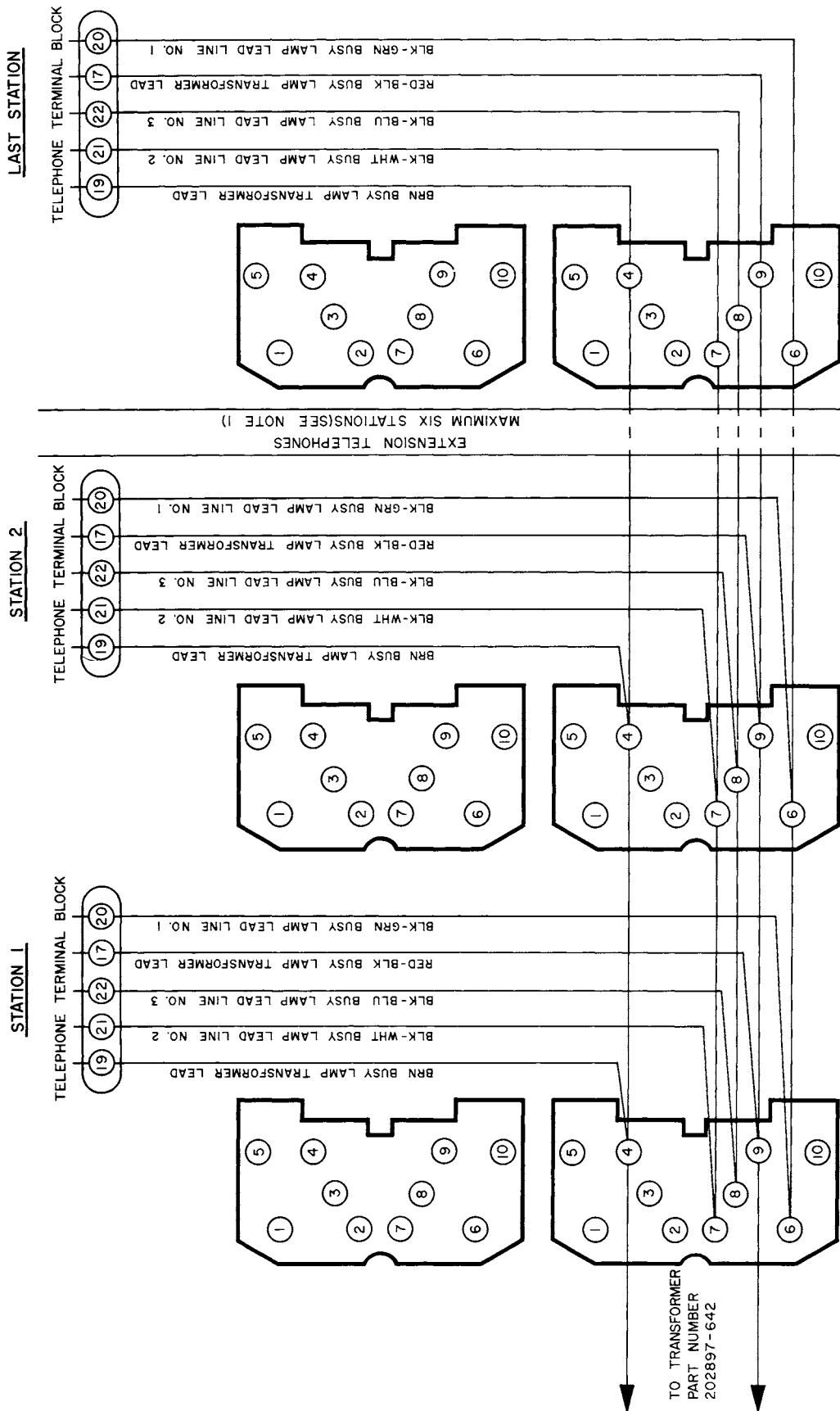


Figure 6. Manual Exclusion at Station One on Line One.





NOTE  
1. BUSY LAMP FEATURE LIMITS THE NUMBER OF STATIONS TO SIX.

Figure 7. Wiring Diagram. Typical Busy Lamp Installation

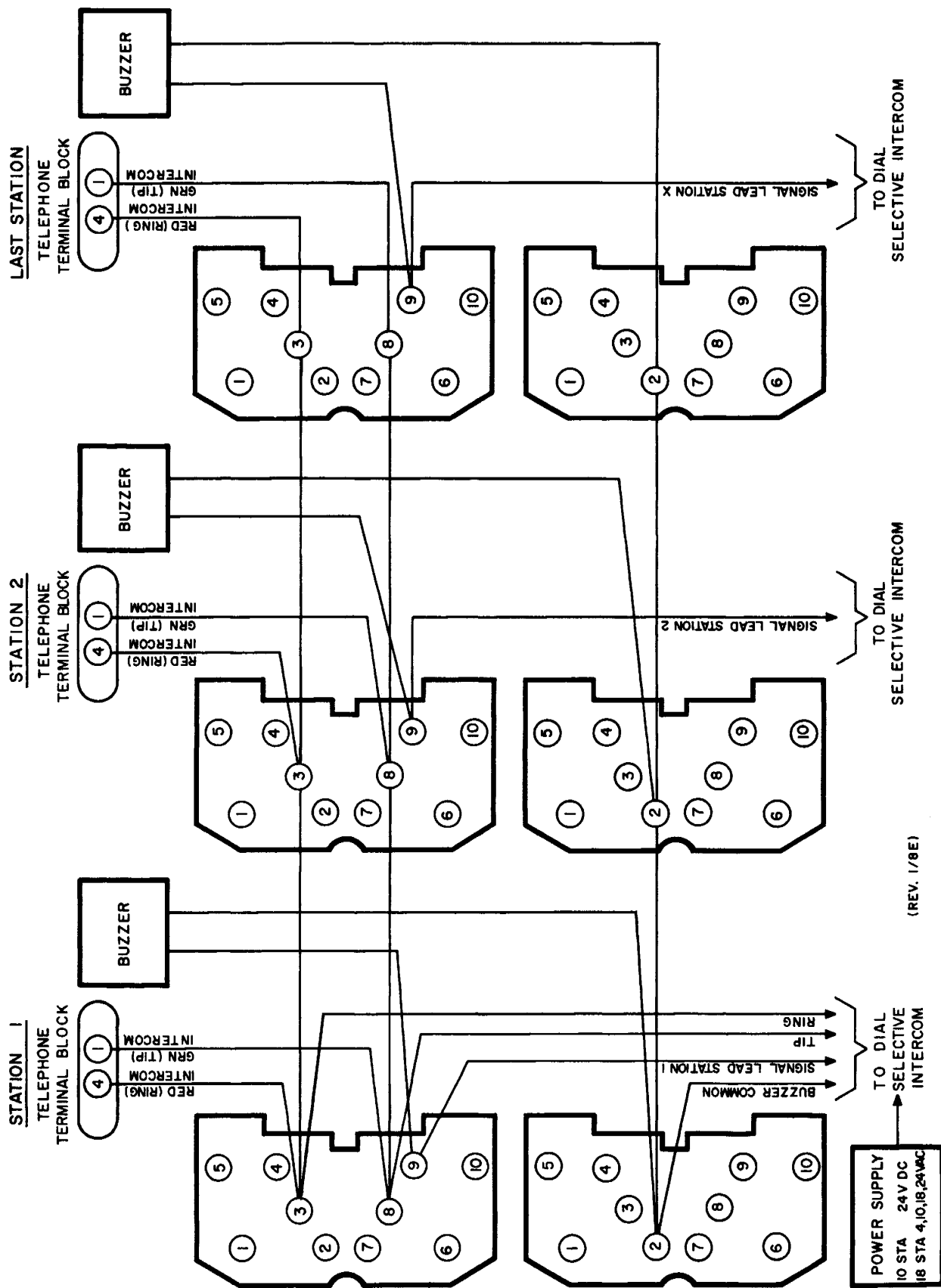


Figure 8. Wiring Diagram. Telephone to Dial Selective Intercom.

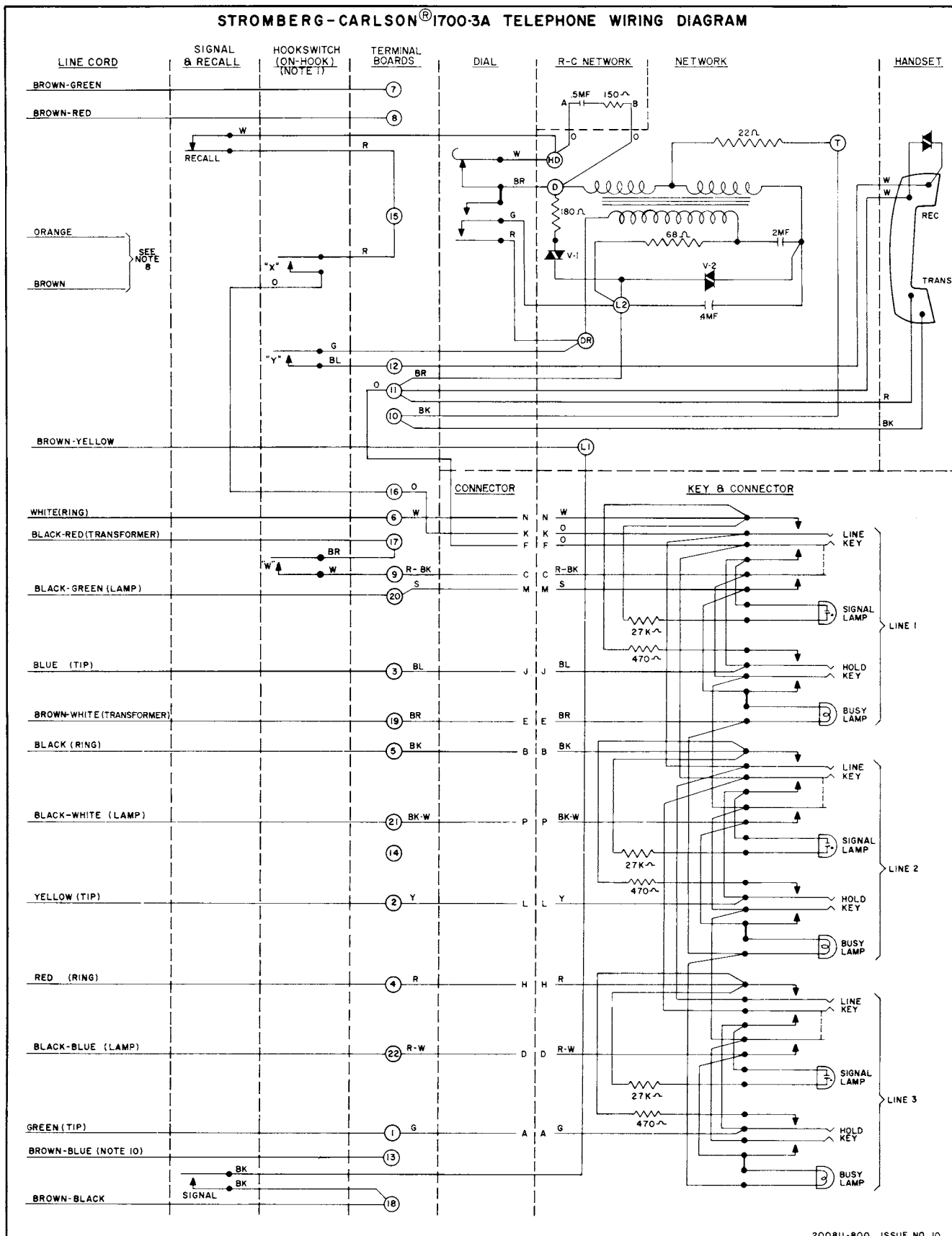


Figure 9. Wiring Diagram. 1700-3A Telephone, Sheet 1

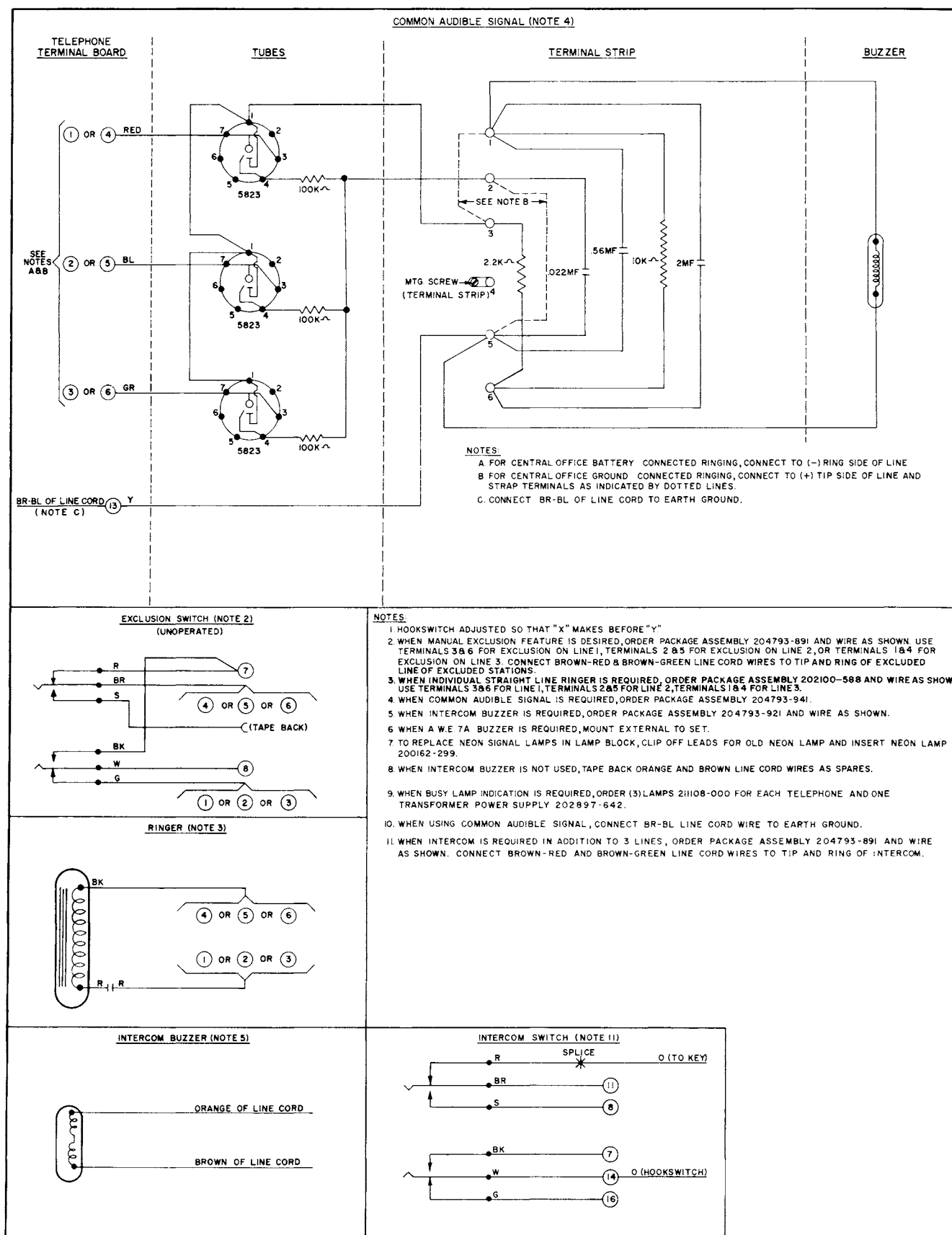


Figure 9. Wiring Diagram. 1700-3A Telephone, Sheet 2

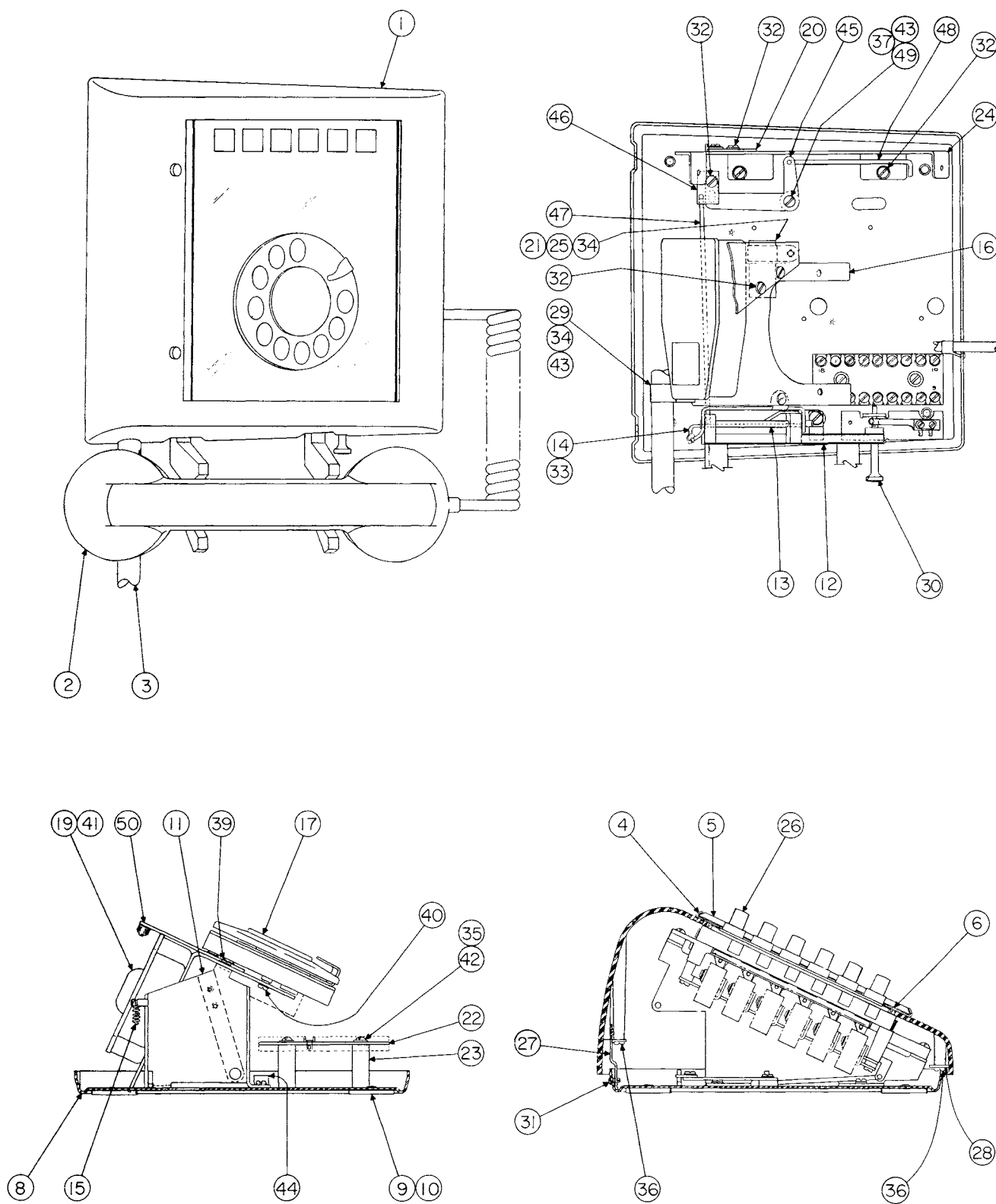


Figure 10. Identification of Parts - 1700-3A Telephone



## 18. ORDERING INFORMATION

### a. Complete Telephones.

To order a complete 1700-3A telephone select stock number of color desired from the following chart.

Color	Stock Number
Olive Green	200811-805
Sand Beige	200811-814
Light Gray	200811-819
Black	200811-809

### b. Telephone Parts List.

Order individual parts or the 1700-3A telephone from the following list.

Color	Housing Item 1	Handset Item 2	Receiver Cap. 54	Transmitter Cap. 55
Olive Green	303116-605	200735-105	303105-105	303110-105
Sand Beige	303116-614	200735-114	303105-114	303110-114
Light Gray	303116-619	200735-119	303105-119	303110-119
Black	303116-609	200735-109	303105-109	303110-109

Color	Handle 56	Handset Cord 57	Line Cord Item 3
Olive Green	303100-105	2003805-105	200316-805
Sand Beige	303100-114	200308-114	200316-814
Light Gray	303100-119	200308-119	200316-819
Black	303100-109	200308-109	200316-809

## MISCELLANEOUS PARTS LIST

<u>Stock Number</u>	<u>Item No.</u>	<u>Description</u>
300972-251	4	Bezel
300971-841	5	Face Plate
300973-641	6	Face Mat
204794-811	7	Package Assembly (includes item 4, 5, 6)
300973-591	8	Base
300970-541	9	Foot

# MISCELLANEOUS PARTS LIST (cont)

<u>Stock Number</u>	<u>Item No.</u>	<u>Description</u>
540351-025	10	Eyelet
200128-609	11	Hookswitch
300971-671	12	Hook
300971-681	13	Shaft
300971-701	14	Plate Stop
300971-061	15	Spring
304146-951	52	Connector Plug (Female)
300973-631	16	Bracket (Dial Mtg.)
202145-511	17	Dial Assembly
204785-012	18	Station No. Card Package Assembly
202136-076	19	Network Assembly
206011-231	20	Terminal Board
206011-549	21	R/C Network Assembly
294000-125	22	Terminal Board
300972-571	23	Spacer
300971-711	24	Bracket
540201-010	25	Clamp (Network)
206011-501	26	Key Assembly
300971-871	27	Bracket (Housing)
300971-861	28	Clip
540201-005	29	Clamp (Line Cord)
300973-701	53	Spacer
204973-891	30	Package Assembly, Exclusion
503792-000	31	6-32 x 5/16 O. H. I. M. S.
213821-000	32	6-32 x 3/16 P. H. I. M. S.
540383-345	33	6-32 x 1/4 P. H. I. M. S.
503672-000	34	6-32 x 1/4 P. H. I. M. S.
504552-000	35	6-32 x 1-1/8 R. H. I. M. S.
300970-691	36	6-32 x 5/16 THD Cutting Screw
503772-000	37	6-32 x 5/16 P. H. I. M. S.
502272-000	39	4-40 x 1/4 P. H. I. M. S.
213624-000	40	4-36 x 3/8 P. H. I. M. S.
540379-264	41	4-3/16 Self tapping PH Screw
526207-000	42	#6 Washer
525532-000	43	#6 Washer
501482-000	58	3-48 x 3/8 F. H. I. M. S.
502272-000	38	Resistor 27K-ohms 1/2 watt
203052-000	44	Clamp
300973-271	45	Lever plate
300973-281	46	Connecting plate
300973-291	47	Connecting rod (any)
300973-301	48	Connecting rod (short)
300973-311	49	Bearing
206011-511	50	Switch Assembly

## SECTION IV DIAL MAINTENANCE

### 19. GENERAL

a. Paragraphs 19, 20 and 21 outline the recommended procedure for the replacement of parts, adjustment, and lubrication of the Stromberg-Carlson DE 400 Dial in the field. Any dials requiring further disassembly and adjustment should be replaced in the field, and the required maintenance accomplished in the shop.

b. The suffix letter "A" on the DE-400 dial designates the use of the bridge and spring assembly shown in figure 12. The instructions are applicable to both types of dials, the differences will be noted in the individual paragraph headings.

### 20. REPLACEMENT OF PARTS (Fig. 13, page 27)

The station number card, finger plate, and dial card can be replaced without removing the dial from the telephone. All other parts are accessible only when the dial is removed from the telephone.

#### a. Station Number Card.

The station number card (3) provides space for recording the station number, and is covered by a clear plastic protector (2). The station number card and protector are secured to the finger-plate (6) by a card holder ring (1).

To replace the station number card, insert the blade of a small screwdriver into the slot provided in the inside edge of the card holder ring and carefully pry up. Remove the protector and station number card.

Install the new station number card and protector. Align the indentation in each with the index tab in the finger plate. Align the card holder ring with the groove in the finger plate and press it on.

#### b. Finger Plate.

To clear plastic finger plate (6) is shock mounted between the top clamping spring (5) and the bottom clamping spring (13), and is secured to the main shaft with a 5/8-inch hex nut (4). To replace the finger plate, remove the hex nut, using a 5/8-inch nut driver or socket wrench. Remove the top clamping spring and the finger plate. Install the new finger plate and replace the top clamping spring and hex nut. When tightening the hex nut, hold the finger plate, to prevent undue stress on the bottom clamping spring, power shaft and casting stop.

#### c. Finger Stop.

The finger stop is secured to the front of the dial casting with two screws (7) and (8). To remove the finger stop remove the two mounting screws.

d. Dial Card.

The dial card is fastened to the front of the dial casting with a screw (10) and clip (11) assembly and with the finger stop. To remove the dial card remove the finger stop (see para. 20c) and the securing screw and clip.

21. LUBRICATION (Fig. 13, page 27)

The dial may require occasional lubrication, especially after continued hard use. Stromberg-Carlson Dial Lubricant, part number 209285-000 must be used when lubricating the dial mechanism; ordinary lubricant must never be used.

The parts of the dial requiring lubrication are shown in figure 13. Method of lubrication of each part is described in the following paragraphs.

a. Worm Shaft (24).

Apply one drop of lubricant to both of the worm shaft bearings; the tail bearing (23) and governor cup bearing (25). Apply one drop to one of the governor weights. Apply one drop of lubricant to the worm shaft (24) where it contacts the worm wheel.

b. Pinion Shaft (17).

Apply one drop of lubricant to both bearings, one in the bridge (15) and the other in the front casting (26). Distribute one drop of lubricant as evenly as possible on the outside of the spring clutch (17).

c. Power Shaft (21).

In order to lubricate the power shaft properly, the finger-plate and clamping springs, must first be removed.

Note. When the bottom clamping spring is removed, the tension on the power spring is released. After lubrication, wind the power spring 1-1/2 turns and secure it by installing the bottom clamping spring.

Remove any dust or dirt around the bearing and the power shaft. Distribute one drop of lubricant as evenly as possible between the power shaft and the main bearing in the front casting (26). Do not lubricant the bridge bearing since the combination cam is made of nylon. The cam and bearing surface should be wiped clean.

d. Power Spring (19).

Apply several drops of lubricant to the exposed area of the power spring (19). Operate dial to distribute lubricant.

## 22. DISASSEMBLY OF DIAL MECHANISM (Fig. 13, page 27)

### a. Bridge and Spring Assembly.

Remove the bridge and spring assembly (15) by removing the two mounting screws (14).

### b. Impulse Cam.

Remove the impulse cam (16) by lifting it off the shaft of the pinion shaft assembly (17).

### c. Pinion Shaft Assembly.

Extract the pinion shaft assembly (17) from the bearing in the dial front casting (26).

### d. Worm Shaft Assembly.

(1) Loosen the locknut (22) on the tail bearing (23) and remove the tail bearing.

(2) Slide the worm shaft assembly (24) forward through the tail bearing mounting hole.

(3) Remove the governor cup (25) by removing the 1/4-inch nut (22).

(4) Remove the worm shaft assembly.

### e. Power Shaft Assembly.

(1) Carefully release the spring tension by lifting bottom clamping spring (13) until it clears the stop on the dial front casting.

(2) Remove power shaft assembly.

(3) Remove combination cam (18) by pulling it off.

(4) Remove power spring (19).

(5) Remove spring anchor (20).

### f. Cleaning and Lubrication of Parts.

When the dial is disassembled, inspect and clean all parts. Replace worn or broken parts.

Wipe all fiber parts with a clean dry cloth. Clean all metal parts with chloroethene. Do not allow fiber parts to be contaminated with chloroethene.

After the parts have been cleaned, lubricate as outlined in paragraph 21.

## 23. REASSEMBLY OF DIAL MECHANISM (Fig. 13, page 27)

### a. Power Shaft Subassembly.

(1) Install the power shaft subassembly (21) in the main bearing of the dial front casting (26); and secure it in place by installing the bottom clamping spring (13), finger plate (6), top clamping spring (5) and hex nut (4).

When tightening the hex nut, hold the finger plate to prevent undue stress on the bottom clamping spring, power shaft, and casting stop.

(2) Install spring anchor (20) over the power shaft. Make sure that the feet of the anchor are properly seated in the casting.



(3) Install the power spring (19) on the power shaft. One end of the spring is secured under the tab directly below the impulse spring group.

(4) Wind the spring 1-3/4 turns and seat the spring in the slot in the top of the power shaft.

(5) Install the combination cam (18) on the power shaft by pressing it on.

Note. The combination cam must be tightly seated on the shoulder of the power shaft to prevent binding.

b. Worm Shaft Assembly and Governor Cup.

(1) Insert the spiral end of the worm shaft assembly (24) through the tail bearing mounting hole.

(2) Assemble the governor cup (25) to the dial front casting (26) using one of the 1/4-inch hex nuts (23).

(3) Install the tail bearing (23). Make sure the ends of the worm shaft are properly seated in the governor cup and tail bearings.

(4) Adjust the tail bearing for .005 inch to .010 inch end-play and tighten the locknut.

c. Pinion Shaft and Impulse Cam Assemblies.

(1) Install the impulse cam (16) on the pinion shaft assembly (17). Make sure that the bottom spring of the impulse cam butts against one of the 30-degree slots in the ratchet.

(2) With the pinion shaft and impulse cam thus assembled, install them in the dial so that one of the flats of the impulse cam is approximately parallel with the center line running through the pinion shaft and main shaft bearings.

Make sure that the gear at the end of the pinion shaft is properly engaged with the gear of the power shaft; and that the worm wheel is properly engaged with the worm shaft.

d. Bridge and Spring Assembly.

The bridge and spring assembly (15) can now be mounted to the dial front casting with two screws (14). Make sure that the tightening of these screws does not cause any binding of the pinion shaft or the main shaft.

## 24. ADJUSTMENT (Fig. 13, page 27)

The use of Stromberg-Carlson No. 12B Speed and Percent Make Test Set will facilitate these adjustments. If dial speed test circuits are available, the speed adjustment can be accomplished using these circuits.

a. Adjustment of the Impulse Spring Group for the DE-400 Dial  
(See Fig. 11).

(1) To adjust the contact pressure hold the finger plate "off normal". Using a gram gauge, adjust the springs for a contact pressure of  $40 \pm 5$  grams.

(2) Percent Make (Impulse Ratio).

To adjust the percent make bend the tension spring toward or away from the impulse cam with standard relay adjusting tools. The impulse ratio should be 37% to 40% average.

Note 1. A very slight movement of the spring group away from the impulse cam will increase the percent make. Conversely a slight movement of the spring group toward the impulse cam will decrease the percent make.

Note 2. When a new bridge and spring assembly is ordered, a new type bridge and spring assembly will be supplied (see fig. 12). These bridge and spring assemblies are interchangeable, however, the new assembly must be adjusted as outlined in paragraph 24b. When the new bridge and spring assembly is used the DE 400 Dial becomes the DE 400A Dial.

b. Adjustment of the Impulse Spring Group for the DE 400A Dial  
(See Fig. 12).

(1) To adjust the contact pressure hold, the finger plate "off-normal". Using a gram gauge adjust the springs for a contact pressure of  $40 \pm 5$  grams.

(2) Percent make.

To adjust the percent make, bend the support spring toward or away from the impulse cam with a standard relay adjusting tool. The impulse ratio should be 37% to 40% average.

Note. A very slight movement of the spring group away from the impulse cam will increase the percent make. Conversely a very slight movement of the spring group toward the impulse cam will decrease the percent make.



Figure 11. DE-400 Dial Bridge and Spring Assembly

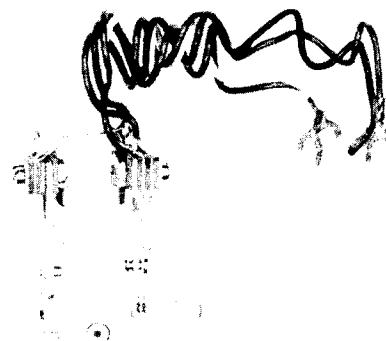


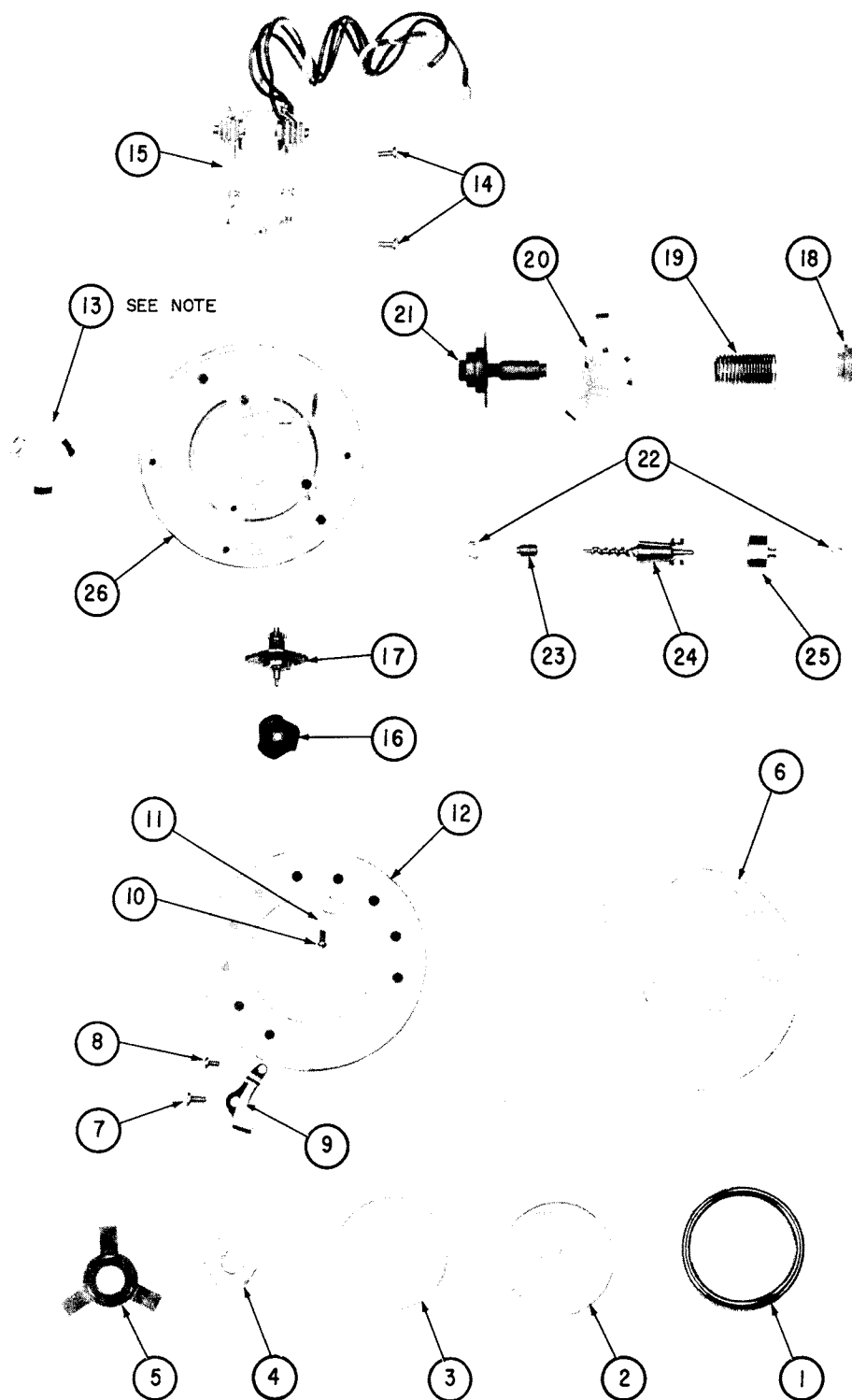
Figure 12. DE-400A Dial Bridge and Spring Assembly

c. Speed Adjustment.

Using a Stromberg-Carlson No. 12B Speed and Percent Make Test Set, check the speed of the dial. The speed should be 10 pulses per second, plus or minus 1/2 pulse. To regulate the speed of the dial, carefully adjust the springs of the worm shaft (24) to increase or decrease the friction of the weights on the inside of the governor cup (25). A slight spreading will reduce speed, while a slight compression (bending inward) will increase speed.

Note. Take care to maintain symmetry of the governor springs. There must be perceptible end-play in the worm shaft, but this end-play must not exceed .015 inch.

If end-play exceeds .015 inch adjust the end-play by loosening the locknut (22) on the tail bearing (23); then loosening or tightening the tail bearing to decrease or increase end-play.



Note:



Clamping spring (part number 300000-041) and lock washer (part number 300000-011) are used in some dials instead of clamping spring item 13.

Figure 13. DE-400A Dial Identification of Parts

## 25. PARTS LIST FOR DE-400A DIAL (Fig. 13, page 27)

<u>Stock Number</u>	<u>Item No.</u>	<u>Description</u>	<u>Quantity</u>
300000-281	26	Dial Front	1
213071-000	9	Finger Stop	1
213056-000	21	Spur Gear	1
300000-091	6	Finger Plate	1
300000-651	13	Stop Washer	1
300000-051	5	Clamping Spring ( top )	1
49814-000	4	Nut	1
213059-000	20	Spring Anchor	1
212924-000	24	Worm Shaft Assembly	1
213490-000	23	Worm Shaft Bearing	1
49780-000	25	Cup and Bearing Assembly	1
213070-000	19	Power Spring	1
213057-000	18	Combination Cam	1
213069-000	17	Pinion Shaft Assembly	1
212947-000	16	Impulse Cam Assembly	1
200280-269*	15	Dial Spring "E" Comb.	1
300971-501	27	Cover Dial	1
300000-431	12	Dial Card	1
300000-201	11	Clip Dial	1
501152-000	10	#3-48 x 3/16 RHIMS	1
8927-000	22	Nut	2
501220-000	14	#3-48 x 1/4 BHBMS	2
515273-000	7	#4-36 x 1/4 BHIMS	1
501173-000	8	#3-48 x 3/16 PHIMS	1
300000-061	1	Card Holder Ring	
300000-071	2	Station No. Card	
300000-081	3	Protector	

\* Individual springs for the bridge and spring assembly are no longer available. The bridge and spring assembly must be tested, adjusted and replaced as an assembly.

ADDENDA A TO T-1094 ISSUE 2  
STROMBERG-CARLSON 1700-3 THREE LINE EXECUTIVE TELEPHONE  
INSTALLATION AND MAINTENANCE INSTRUCTIONS

- Page 2, par. 2f.      Should read: Dial selective intercom requires a power supply for ringing and talking voltage, a fixed capacity dial selective intercom, and a buzzer in each telephone for signaling.
- Page 3, par. 6a(1).    Change reference from, see paragraph 8 to see paragraph 11.
- Page 7, par. 12c(1).    Change reference from, paragraph 8 to paragraph 11.
- Page 15, figure 8.      Replace page 15 figure 8 with attached revised page, marked Rev. 8E.  
Note: Revised page has a gummed back. Moisten back of page and paste directly over the original page 15.
- Page 19, par. 18b.      Under Handset Cord column, change Part Number 2003805-105 to 200308-105.
- Page 20, par. 18b.      Change MISCELLANEOUS PARTS LIST Item 30, Part Number 204973-891 to 204793-891.



**STROMBERG-CARLSON**  
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