

SWITCHING SYSTEM NO. 400 INSTALLATION

1. GENERAL

1.01 This section provides installation information for the Switching System No. 400 (20-40 Dial Pak).

1.02 This section is reissued to rate the Switching System No. 400 (20-40 Dial Pak) manufacture discontinued (MD).

1.03 Connecting information for cabinet assemblies J53035A, L1 and L2 (MD) refer to Section 518-710-400; for cabinet assemblies J53035A, L3, L4, L8, and L9 (MD) refer to Section 518-710-401; and for cabinet assemblies J53035A, L10 and L11 (MD) refer to Section 518-710-402.

2. TOOLS

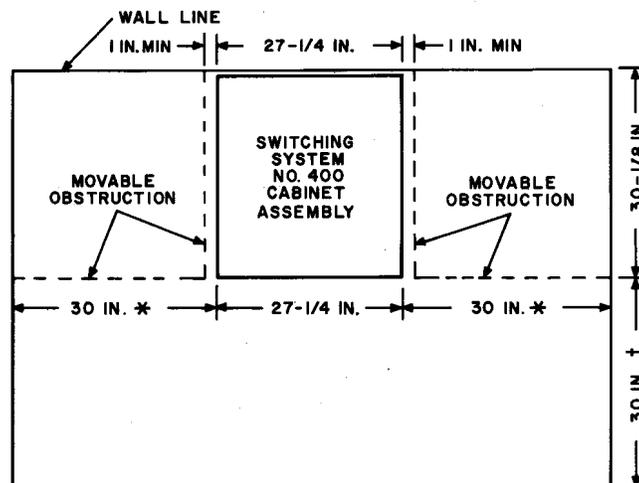
2.01 In addition to standard tools required for installation work, the following tools or their equivalent are required:

- R-1257 adjustable bench level
- R-2384 30-inch pinch bar
- 19/32-inch wrench for removing nut holding L-shaped steel bracket attached to top front and bottom front of each slide in (MD) cabinet assemblies, Lists 1, 2, 3, 4, 8, and 9 (Fig. 2 and 3)
- 5/16-inch wrench for removing nut from locking bolt on bottom of each slide in (MD) cabinet assemblies, Lists 10 and 11 (Fig. 4).

3. PLANNING

3.01 Figure 1 shows floor space requirements for the cabinet and required maintenance space.

3.02 The location of the equipment should provide ease of access (dimensions of cabinet in crate



* SPACE REQUIRED ON SIDES AS MAINTENANCE AREA.

† SPACE REQUIRED FOR WITHDRAWING SLIDES (MAY BE AISLE SPACE).

Fig. 1—Floor Space Requirements

are 40-1/2 inches deep, 35-1/2 inches wide, and 72 inches high for Lists 1 and 2 and 77 inches high for Lists 3, 4, 8, 9, 10, and 11). The floor must be strong enough to support the cabinets (cabinet equipped with 20 lines weighs approximately 740 pounds; with 40 lines approximately 820 pounds).

3.03 Refer to Section 460-110-180 for general information concerning the selection of equipment location.

3.04 Customer should provide commercial power wiring as follows:

- (a) 105- to 125-volt 60-cycle ac service on a separate 15-amp fuse not controlled by a switch.
- (b) 3-wire circuit with third wire grounded in distribution cabinet.
- (c) Hubbell No. 5261 (3-wire) or equivalent receptacle.

NOTICE

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(d) Receptacle should be located adjacent to cabinet and in a position readily accessible for removal of plug for maintenance purposes. (Locate receptacle at a height above normal to prevent accidental removal of power cord plug.) Where local regulations permit, an ES-528772 cord clamp bracket together with a Tinnerman cord clamp of proper size may be used to prevent accidental removal of power cord plug.

4. INSTALLATION OF CABINET

4.01 Uncrate cabinet as near as possible to its final location.

4.02 Level cabinet and, if necessary, shim the base with hardwood or metal shims. Use a sufficient number of shims to ensure equal weight distribution at base.

4.03 To prevent damage to slides in shipping the (MD) Lists 1, 2, 3, 4, 8, and 9 cabinet assemblies, a 2-inch wide L-shaped steel bracket is attached to top and bottom front of the supporting framework of each slide. These brackets must be removed before slides can be opened. To remove bracket proceed as follows:

- (1) Remove 19/32-inch hex nut and washer holding bracket (Fig. 2).
- (2) Remove bracket.
- (3) Turn bracket over (flange facing right) and remount for future shipping use (Fig. 3).

4.04 To prevent damage to slides in shipping the (MD) Lists 10 and 11 cabinet assemblies, a 5/16-inch bolt is placed through the bottom of each slide and its supporting framework (Fig. 4). These bolts must be removed before slides can be opened. Retain bolts for future shipping use.

4.05 To open a slide, the latch located at the top front edge must be released. Only one slide can be opened at a time.

4.06 To gain access to crown terminal strips in:

- J53035A, Lists 1 and 2 (MD) cabinets, raise hinged top cover and engage brace
- J53035A, Lists 3, 4, 8, 9, 10, and 11 (MD) cabinets, slide top cover forward and remove.

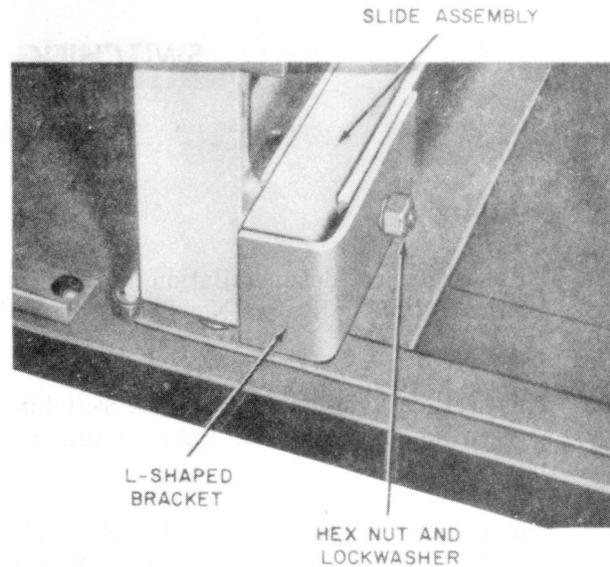


Fig. 2—Bottom Bracket Holding Slide (MD Cabinets)

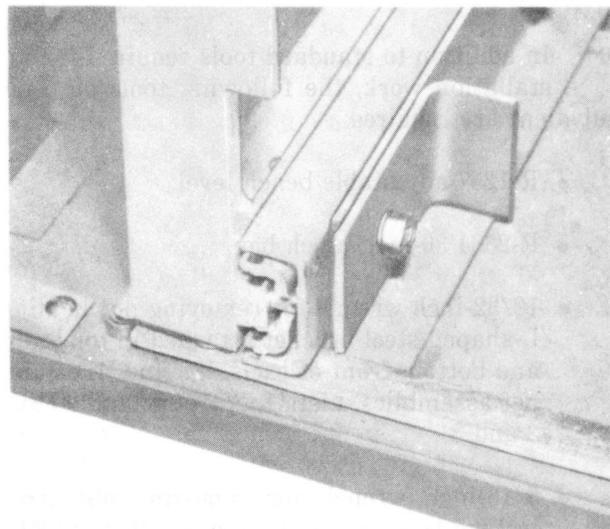


Fig. 3—Position of Bracket for Future Shipping Use (MD Cabinets)

5. CABLING AND WIRING

5.01 Place station cable and wire in accordance with existing practices.

5.02 Cables and wires enter cabinet at top rear, left or right. Wiring should be dressed along sides

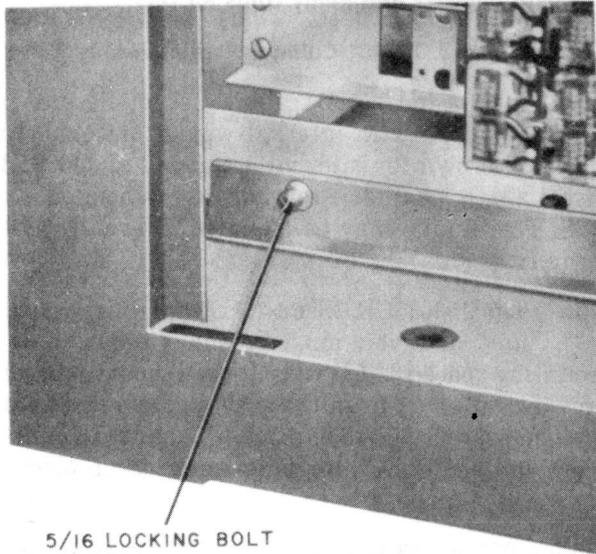


Fig. 4—Locking Bolt in Position for Shipping (MD Cabinets)

to the front and then to right or left side of appropriate connecting block.

- 5.03** Raise hinged bracket holding connecting blocks and engage braces.
- 5.04** Use 714B tool or equivalent to terminate wires in clips.
- 5.05** Use 635A tool or equivalent to terminate wires on wire wrap terminals of crown power terminal strips (277A terminal strip). (Refer to Section 069-132-811.)
- 5.06** Use wire unwrapping tool, KS-16492, List 2 or equivalent, to remove wires from wire wrap terminal strips.
- 5.07** Ground for the cabinet is normally furnished by the third wire in power cord. However, to ensure that the cabinet remains grounded should power cord be removed, a local ground must be provided. Connect a 12-gauge wire or equivalent from an approved ground-to-ground connector located in right front of crown.

6. GENERAL INFORMATION FOR INITIAL INSTALLATION

- 6.01** Certain options for the following equipment are shop wired:

- Universal line units
- Add-on line units
- Key telephone units
- Auxiliary register unit for direct station selection (DSS)
- Alarm circuit
- TOUCH-TONE® calling
- Station make-busy units.



When placing these units in service, remove options not required. See Sections 518-710-400, 518-710-401, and 518-710-402 entitled Switching System No. 400, Method of Connecting for specific equipment.

- 6.02** All station lines must be strapped for assigned or unassigned service.
- 6.03** Tens digits, 4 to 0 are wired to busy-tone. These digits are normally assigned as follows:
 - 4 and 5 to station lines 40-49 and 50-59.
 - 6, 7, and 8 to universal lines 6, 7, and 8. However, digits 9 and 0 may also be used by appropriate strapping in dial pulse register.
 - 9 and 0 are normally unassigned.



To remove these digits from the busy condition, strapping must be changed on each dial pulse register terminal strip, and on the line, link, and connector terminal strip involved. Refer to Sections 518-710-400, 518-710-401, and 518-710-402 entitled Switching System No. 400, Method of Connecting.

- 6.04** All fuses are provided in fuse panel. Remove fuse and replace with dummy fuse in all unused circuits.

7. INSTALLATION OF AUXILIARY EQUIPMENT IN CABINET ASSEMBLIES

A. Line, Link, and Connector Units

7.01 Mount line, link, and connector unit for station line group 40-49 on mounting spaces 1 through 6 of slide 1 with four mounting screws provided. Attach shop-wired connectors 1, 2, and 3 to plugs 1, 2, and 3 located on left of switch as viewed from the rear. This connects the line, link, and connector unit into the system and extends the necessary leads to the terminal field in crown.

Note: If mounting space 6 is occupied by a DSS unit, remove DSS unit and install in an external cabinet.

7.02 Mount line, link, and connector unit for station line group 50-59 on mounting spaces 7 through 12.

Note: When this unit is added, all DSS units must be installed in an external cabinet.

7.03 Stamp designations on line, link, and connector unit as shown in Fig. 5.

Note: Figure 5 indicates stamping for lines 40-49. Stamping for lines 50-59 should be entered as applicable.

Auxiliary Register and Relay Units for DSS

B. Lists 1 and 3 (MD) Cabinet Assemblies

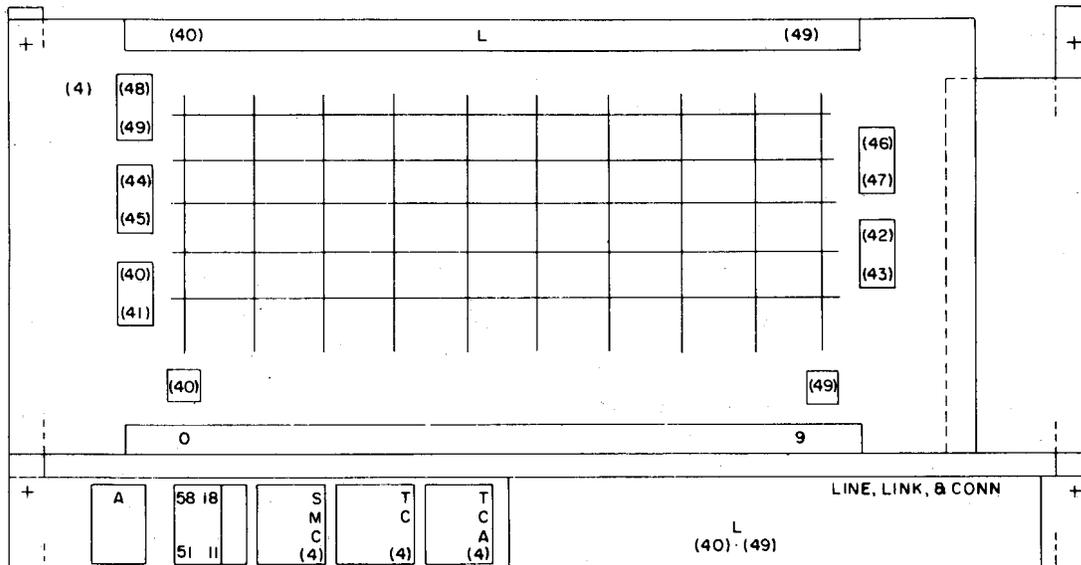
7.04 Lists 1 and 3 (MD) cabinet assemblies are *not* equipped with internal wiring or connecting blocks in crown for internal mounting of J53035BC, List 1 (MD) auxiliary relay units associated with DSS. These units may be mounted internally or externally.

7.05 The J53035CB, List 1 (MD) auxiliary register unit however, must be mounted in slide 2, mounting space 10, if DSS is desired. Local cabling is provided to wire the unit into the system and extend the necessary leads to externally mounted auxiliary relay units via DSS register connecting block in crown of cabinet.

Adding DSS to J53035A, List 1 (MD) Cabinet Assembly

7.06 The DSS can be added to a List 1 cabinet assembly by installing the following items of equipment:

- (a) One J53035A, List 5 additions and maintenance (A&M) which includes:
 - Five connecting blocks (66E132)
 - One auxiliary register unit, J53035CB, List 1 (MD)



STAMP DESIGNATIONS AS INDICATED

Fig. 5—Line, Link, and Connector Unit Designations

- Associated wiring material and mounting hardware.
- (b) Auxiliary relay units, J53035BC, List 1 (MD), (one required per four line circuits equipped with DSS).
- (c) Plug-in DSS tens and units diode assembly, J53035BC, List 2 (MD) (one required for each line circuit equipped with DSS, up to a maximum of four per auxiliary relay unit).

Adding DSS to J53035A, List 3 (MD) Cabinet Assembly

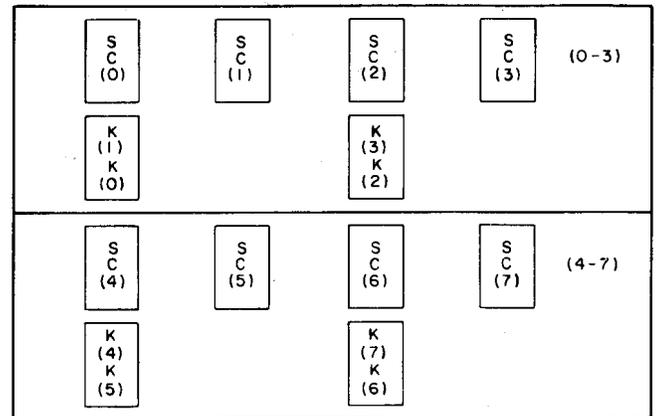
7.07 The DSS can be added to a List 3 cabinet assembly by installing one J53035A, List 6 (A&M) which contains the same equipment and apparatus as J53035A, List 5 (A&M). The only difference is in the associated wiring and hardware.

7.08 To install the DSS equipment in Lists 1 and 3 (MD) cabinet assemblies proceed as follows:

- (1) Mount auxiliary register unit in mounting space 10, slide 2 (one per system).
- (2) Connect auxiliary register unit as shown in Sections 518-710-400 and 518-710-401. Leads will be found in tubes at equipment mounting space locations.
- (3) Install auxiliary relay units in slide 1 mounting spaces 15 to 6. Each unit requires two spaces. For example, the first unit (circuits 0 to 3 for lines 20 to 23) will occupy spaces 15 and 14. Then continue downward, adding units as required. The last unit placed (circuits 16 to 19 for lines 36 to 39) will occupy spaces 7 and 6, making 20 DSS equipped lines, which is the maximum that can be internally mounted. If Switching System No. 400 contains the 40 to 49 group of station lines, then the maximum number internally mounted DSS equipped lines is 16. When the system is equipped with more than 30 station lines, all auxiliary relay units for DSS must be mounted in an external cabinet.

7.09 A J53035BC, List 2 (MD) plug-in diode assembly must be ordered separately for each station line arranged for DSS. Plug assembly into appropriate jack on auxiliary relay unit.

7.10 Stamp number designations on relays K and SC and mounting plate of auxiliary relay units as shown in Fig. 6.



STAMP DESIGNATIONS AS INDICATED

Fig. 6—Auxiliary Relay Unit Designations

Lists 2, 4, 9, and 11 (MD) Cabinet Assemblies

7.11 Lists 2, 4, 9, and 11 (MD) cabinet assemblies come equipped and wired with the following:

- (a) J53035CB, List 1 (MD) auxiliary register unit mounted in slide 2, mounting space 10.
- (b) Two J53035BC, List 1 (MD) auxiliary relay units (four circuits per unit) equipped with eight J53035BC-1, List 2 (MD) plug-in diode assemblies mounted in slide 1 mounting spaces 15 through 12.
- (c) Connecting blocks in crown for terminating 20 DSS stations.
- (d) Local wiring for three additional auxiliary relay units.

7.12 Mount additional auxiliary relay units in slide 1 on mounting spaces 11 through 6 as required.

Note: If station line group 40 to 49 is provided, the auxiliary relay unit normally mounted on spaces 7 and 6 must be installed in an external cabinet. If station line group 50 to 59 is provided, all auxiliary relay units must be externally mounted.

7.13 A J53035BC, List 2 (MD) plug-in diode assembly must be ordered separately for each additional station line arranged for DSS. Plug assembly into appropriate jack on auxiliary relay unit.

7.14 Stamp number designations on relays K and SC and on right side of mounting plates in numerical order using units (0-3) and (4-7) as a guide, as shown in Fig. 6.

Add-On Line Units in J53035A, Lists 1 and 2 (MD) Cabinet Assemblies

7.15 Two J53035CF-1, List 1 (MD) add-on line units are furnished and wired with Lists 1 and 2 (MD) cabinet assemblies. Units are mounted in slide 2 on mounting spaces 6 and 5.

7.16 Four additional units may be mounted in slide 2 on mounting spaces 4 through 1 as required. Local wiring is provided to extend the necessary leads to the telephone sets via connecting blocks in crown of cabinet.

Add-On Line Units in J53035A, Lists 3, 4, 8, 9, 10, and 11 (MD) Cabinet Assemblies

7.17 Two J53035CH, List 1 (MD) (plug-in type) add-on line units are furnished wired with J53035A, Lists 3 and 4 (MD) cabinet assemblies. These units are mounted in slide 2 at mounting spaces 6 and 5.

7.18 Four additional units may be mounted in slide 2 at mounting spaces 4 through 1 as required. Local wiring for each unit is terminated in a plug at each mounting space location.

Note: Mounting spaces 4 through 1 can also be used for strip-mounted key telephone units (see paragraph 7.20). When add-on requirements exceed the available space within the cabinet, panel-mounted key telephone units coded 249A and 250A must be ordered and mounted in an external cabinet. Two 249A and one 250A key telephone units are the equivalent of a J53035CF, List 1 (MD) add-on line unit.

7.19 Stamp number designations on additional add-on line units in numerical order using units 0 and 1 as a guide.

Key Telephone Units in J53035A, Lists 1 and 2 (MD) Cabinet Assemblies

7.20 Four strip-mounted J53035CG, List 1 (MD) key telephone units (three line circuits per unit) may be mounted in slide 2 on mounting spaces

1 through 4 (Fig. 7). Local wiring is provided to extend necessary leads to telephone sets via connecting blocks in crown of cabinet.

Key Telephone Units in J53035A, Lists 3, 4, 8, 9, 10, and 11 (MD) Cabinet Assemblies

7.21 Four strip-mounted J53035CH, List 1 (MD) (plug-in type) key telephone units (three line circuits per unit) may be mounted in slide 2 on mounting spaces 1 through 4 (Fig. 7). Local wiring is terminated in a plug at each mounting space location.

Note: If mounting spaces 1 through 4 are occupied by add-on line units, standard panel-mounted 1A1 key telephone units must be ordered and installed in an external cabinet.

7.22 Stamp number designations on H relays and designation strips as shown in Fig. 7.

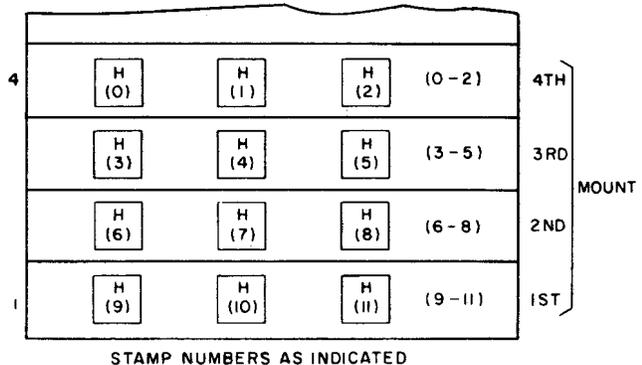


Fig. 7—Key Telephone Unit Designations

TOUCH-TONE Calling (C1 Receivers) in J53035A, Lists 1 and 3 (MD) Cabinet Assemblies

7.23 Install two KS-14672, List 2 connectors on one end of 16-pair cable (see Section 518-710-400 or 518-710-401). Fasten cable to drape between slides 1 and 2. Allow sufficient slack at mounting positions 13 and 14 for two KS-14672, List 2 connectors to engage the receivers.

7.24 Mount two J58844A, List 1 (MD) J58844B, List 1 (Type C1) receivers in positions 13 and 14 of

slide 1. Connect two KS-14672, List 2 connectors to the receivers.

7.25 Mount the 404C tone generator in position 15 on slide 1. Install cable on KS-14528, List 2 connector, and plug connector into tone generator. See Section 518-710-400 or 518-710-401 for connections.

7.26 Replace the two AF63 (P2A) relays, in the dial pulse registers, with two AF156 (P2A) relays.

TOUCH-TONE Calling (C1 Receivers) in J53035A, List 8 (MD) Cabinet Assembly

7.27 Mount two J58844A, List 1 (type C1) receivers in positions 13 and 14 of slide 1. Connect the two KS-14672, List 2 connectors provided to the receivers.

7.28 Mount the 404C tone generator in position 15 on slide 1. Install cable on KS-14528, List 2 connector, and plug connector into tone generator. Refer to appropriate connection section.

TOUCH-TONE Calling (C1 Receivers) in J53035A, List 10 (MD) Cabinet Assembly

7.29 Mount two J58844A, List 1 (MD) J58844B, List 1 (type C1) receivers in positions 13 and 14 of slide 1. Connect the two KS-14672, List 2 connectors provided to the receivers.

8. INSTALLATION OF AUXILIARY EQUIPMENT IN EXTERNAL CABINET

8.01 Due to space limitations within the cabinet, the following equipment *may* be mounted externally when necessary:

- Auxiliary relay units for DSS, strip-mounted on 4-inch by 23-inch mounting plates.
- Add-on line units, panel-mounted, 24-volt version of strip-mounted unit supplied with system.
- Key telephone units, standard panel-mounted units.
- Two-way tie trunk units.

8.02 TOUCH-TONE calling receivers (type A3), associated applique unit, and station make-

busy units *must* be mounted external to the equipment cabinet.

8.03 Equipment cabinets for housing the units are covered in Sections 463-140-100 and 463-140-200.

TOUCH-TONE Calling (A3 Receivers) With J53035A, List 10 (MD) Cabinet Assembly

8.04 Place the J99289A mounting shelf and J58847AE (MD), J58847CE (A&M) applique unit in an external equipment cabinet. Install cabling between terminal strip (G) of the shelf and terminal strips (A) and (B) of the applique unit. Terminate cable as shown in the applicable connection section.

8.05 Install a 25-pair cable between terminal strips (A) and (B) on the applique unit and the Switching System No. 400 cabinet. Install a KS-19162, List 1 connector on the switching cabinet end of cable (refer to applicable connection section) and plug into connector (AA) in crown of cabinet.

8.06 Plug the two A3 receivers into the mounting shelf.

Station Make-Busy Units With J53035A, Lists 1, 2, 3, 4, 8, and 9 (MD) Cabinet Assemblies

8.07 Mount the J53035CK, List 1 station make-busy unit and, if required, the J53035CK, List 2 (MD) units (three maximum) in an external equipment cabinet. Mount the List 2 units below the List 1 unit. Plug the cable provided with each List 2 unit into its respective connectors (4, 5, and 6) on List 1 unit.

8.08 When central office (CO) or PBX lines have multiple appearances, mount the P-43J265 terminal strip mounting assembly and the P-43D316 fanning strip above the List 1 unit. Install required number of 281A terminal strips (three maximum) on the mounting assembly and wire-wrap the 446F diodes to the terminals on the 281A terminal strip as required (one diode [M] per primary appearance, two diodes [M and MB] per secondary appearance). Refer to appropriate connection section for polarity of diodes.

8.09 Install three A25C connector cables (ordered separately) between List 1 station make-busy unit and Switching System No. 400 cabinet. One cable

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terminates on 66-type connecting block in crown. Allow sufficient slack in cable number 2 to reach slide No. 1. Allow sufficient slack in third cable to reach slide No. 3. Connect the three A25C connector cable plugs into connectors 1, 2, and 3 on List 1 station make-busy unit. When the installation has multiple station line appearances, cable number 3 should be run to the external key telephone system terminal first to isolate "A" leads to stations.

8.10 When required, install 6-pair inside wiring cable for lamp leads, between terminal strip (A1) on List 1 unit and the switching cabinet crown, or between terminal strip (B1) on List 2 units and the externally mounted key telephone units (KTUs).

8.11 When externally mounted KTUs are required, place a J53035CK, List 4 (MD) connector cable (24-pair, 20 feet long) between each List 2 unit provided, and the externally mounted KTUs. Plug the connector cable into the connector provided on each List 2 unit.

8.12 Refer to applicable connection sections for terminating the raw-ended connector cables and inside wiring cable.

Station Make-Busy Units With J53035A, Lists 10 and 11 (MD) Cabinet Assemblies

8.13 Installation procedures are the same as outlined in paragraphs 8.07 through 8.11 except three connector cables (J53035CK, List 3 [MD]) are provided in place of the A25C connector cables. Lists 10 and 11 (MD) cabinet assemblies are internally wired for station make-busy with two connectors provided in the cabinet crown to accept two of the List 3 connector cables. The third connector cable is raw ended on one end and must be terminated on the

(MISC and ADD-ON) terminal strips in the cabinet crown, or via an external key telephone system terminal when station lines have multiple appearances.

9. TESTS

9.01 Table A lists the tests to be made before system is turned over to customer for use.

**TABLE A
OPERATION TESTS**

CIRCUITS	SECTION NUMBER	REQUIRED TESTS
Alarm	518-710-500	All
Key Telephone Units and Add-On Units	518-710-501	All
Line, Link, and Marker	518-710-502	All
Junctor	518-710-503	All
Dial Pulse Register	518-710-504	C and F
Busy-Tone Trunk	518-710-505	All
TOUCH-TONE Calling	518-710-507	All

10. INSPECTIONS

10.01 The completed installation shall be in accordance with all job information and practices covering equipment installed.

10.02 The SD drawings, CD sheets, and any connecting records prepared should be stored in the crown of the equipment cabinet.