

MOUNTING AND ALIGNING APPARATUS
"SE" TO VAR" (SEATS THRU VARISTORS)

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1. GENERAL

1.1 Scope of Section

1.11 This section covers the requirements and methods for mounting and aligning apparatus classified alphabetically from "SE" to "VAR" inclusive.

1.12 The requirements covered in this section should be followed except as modified by applicable specifications and drawings.

1.2 General Information Pertaining to Arrangement of Tools, Precautions, Drawings and Figures, and Associated Information

1.21 Refer to Section 52 for information pertaining to the above subjects.

2. INSTALLING EQUIPMENT

2.1 Tools

2.11 In addition to tools supplied in the general kits, the tools and supplies listed may be required for the operations covered by this section.

2.12 Additional Tools

ED-63343-01	Brackets, Maintenance (See Note)
KS-7782	Pliers, Parallel Jaw
R-2443	Screwdriver, Cab., 3"
R-6854	Screwdriver, 3-1/2"
R-3334	Wrench, O.E., 3/8" - 1/2"
R-4300	Wrench Set, Small Nut and Bolt
R-4052	Torque Wrench
R-3168	658A Terminal Extractor
R-6433	Diagonal Cutters

NOTE: Used to support equipment units mounted on double-sided at back-to-back duct type bays when performing work operation on the normally inaccessible side of the unit. Method of using the brackets is covered in BSP 065-125-801. (Brackets and BSP may be borrowed from the telephone company.)

2.2 Supplies

Obtain Locally	Washer, Brass No. 4
RM647944	Wax Compound
R-3126	Silicone Compound

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3. SEATS, PLUG

- 3.1 Mount plug seats so that the variation between the centers of the drillings in the plug seats and plug shelf will not interfere with the proper functioning of the cords and plugs.

4. SEMI-CONDUCTORS, STUD MOUNTED

- 4.1 When mounting stud mounted semi-conductors, R-4873, KS-21343 L1 Non-Silicone Base Heat Conductive Compound shall be applied to the mounting surfaces. The mating surfaces shall include both sides of any hardware (washers, insulators, etc.) between the apparatus and heat sink or chassis. The compound is only required on the mating side of the heat sink or chassis and need not be applied on the far side.
- 4.2 The following torque limits shall be followed when mounting stud mounted semi-conductor devices:

Stud Diameter	Torque (Inch-Pounds)	
	MIN	MAX
.190"	12	15
1/4"	25	30
5/16"	40	50
3/8"	85	100
1/2"	125	150

5. SHELVES, WRITING

- 5.1 Mount writing shelves at telephone repeater and similar bays at the height indicated on the equipment drawing.

- (a) Locate the three mounting screws and spacers, which are supplied with each bracket, at the top, bottom and center holes of each bracket.
- (b) Mount brackets with spacers furnished so brackets may be placed on top of the mounting plate screws without interference, unless it is necessary to remove all mounting plate screws to permit aligning the shelf with other shelves.
- (c) When folding type shelves are specified to be locked, as to test board positions, assemble shelf on brackets with locking screws in place before mounting on relay rack. Place the upper mounting screw as near the top of the bracket, as convenient.

- (d) When brackets interfere with insertion of cord in 91D designation strips on 44A1 repeaters, rotate the designation strip 180 degrees and remount it with the opening to the left. Use the same mounting screws and holes when this is necessary.

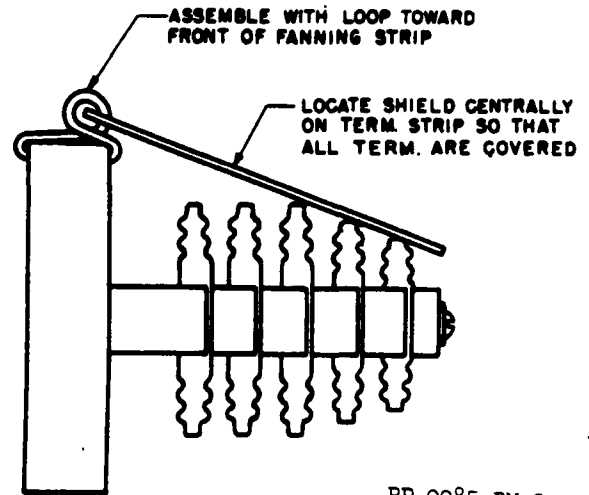
6. SHIELDS

- 6.1 When magnetic shields of the type used with 2" channel type mounting plates are slightly bowed, mount them with the bow downward, the shield to rest on the top flange of the plate beneath. If bowed more than 1/16" between any two points, straighten or replace the shield.
- 6.2 Mount 37 type shields, when specified on the terminal strips as shown in Figure 1. 37 type shields may be used for terminal strips arranged for wire wrapped connections as well as those arranged for soldered connections. Figure 1 shows a terminal strip arranged for soldered connections.
- (a) Locate shield centrally on the terminal strip so that none of the terminals will be exposed. In some cases it may be necessary to mount the shield with the code number on the lower surface in order to accomplish this.
- 6.3 The KS-20132 Terminal Strip Guards shall be mounted in the following manner:
- (a) The guard shall be centered on the terminal strip with curved edge hooked over the terminal strip protection tab.
 - (b) The tails of the cable ties shall be inserted through the rear of the fanning holes first. They should then be looped through the holes on the guard and hand tightened.
 - (c) Using the R-6433 Diagonal Cutters, the cable tie shall be cut off square and as close to the head as possible.
 - (d) The head of the cable tie shall be dressed to the rear of the terminal strip, where it will be out of contact from personnel working on the frame.

- 6.4 If it becomes necessary to remove the guards, (thus destroying the KS-20308-L1 Cable Ties) the standard R-4265 Ties may be substituted.

7. SOCKETS, INDIVIDUAL LAMP

- 7.1 Mount individually mounted lamp sockets of the No. 46 or similar type so that the nickel or shell terminal will be at the bottom.
- 7.2 When mounting individually mounted lamp sockets in switchboards and desks, a No. 4 brass washer, purchased locally, may be used under the lugs to bring the front edge flush with the surface.
- 7.3 The 49A, 50A, 53A and similar type individually mounted lamp sockets should not be grounded through contact with the framework or by means of wiring or any other manner. Mount these types so that the front edges of the sockets are flush with the surfaces in which they appear. A variation of $1/32$ " either way is permissible, except that the variation between any two adjacent lamp sockets in the same panel should not exceed $1/32$ ".
- (a) Lamp sockets may project as much as $1/16$ " beyond a lamp socket mounting where the mounting is normally $1/32$ " less than the shelf dimension of the socket. An example is a 53A lamp socket mounted in a 275 type lamp socket mounting.
- (b) Before mounting lamp sockets be sure the mounting bracket is securely fastened to the body of the socket. The brass screw which holds the bracket in place is easily stripped. Therefore, when checking or tightening this screw use a KS-6854 Screwdriver held tightly between the fingers. The screw should be turned until snug.
- (c) A certain amount of movement is permissible in shop mounted lamp sockets. If the movement at the terminal end is not greater than $\pm 3/16$ " in a vertical or horizontal direction, the socket may be considered satisfactorily mounted.



RP-0085 RM-2

FIG. 1 METHOD FOR MOUNTING 37 TYPE SHIELDS ON TERMINAL STRIPS (PAR. 6.2) (BSP 800-610-154 FIG. 23)

8. SOCKETS, ELECTRON TUBE

- 8.1 In the absence of other information on the equipment or circuit drawings electron tube sockets should be mounted with the large prong holes downward for horizontal mounted tubes or toward the maintenance man for vertically mounted tubes. Unless otherwise specified, sockets should be mounted by means of RHM screws and nuts with the head of the screw at the front or tube side of the panel.

9. STRIPS, DESIGNATION

NOTE: Where designation strips are furnished as part of the apparatus, such as strips for lamp sockets, the designation card should be inserted in the direction for which the strip is arranged when the apparatus is mounted. The following requirements may, therefore, not necessarily apply.

- 9.1 Designation strips shall be installed so that the celluloid strips and designation cards can be readily inserted as follows:
- (a) Vertically mounted designation strips should be arranged so that designation cards can be inserted from the top.

- (b) Horizontally mounted designation strips installed in the face of switchboards or desks should be arranged so that the designation cards can be inserted from the left, that is from the end adjacent to the associated hundred's number.
- (c) Horizontally mounted designation strips, such as those on vertically mounted panels and those used in jack fields of toll or test bays where the jacks are usually designated in pairs or quads should be installed so the cards can be inserted from the right.
- (d) Designation strips mounted in a horizontal plane, such as a key shelf, should have the open end of the designation parallels face equipment. In other cases, as in test wagons or portable test sets, they should be arranged with the end to the right. Where the designation strip is installed at right angles to the face of jacks, the open end of the designation strip should be at the front.

9.2 63 type terminal strips for bulb angle framework are equipped with spring steel mounting clips. Designation strips are to be mounted to the frame uprights as depicted in FIG. 2.

10. STRIPS, FANNING

- 10.1 On panel district, office and line finder multiple banks, mount the fanning strips so that the odd and even numbers are on the same side of the bank as the odd and even soldering terminals. Refer to Handbook 9 for information covering locating the odd and even soldering terminals.

PRECAUTION: GROUNDING OF MULTIPLE BANKS MAY OCCUR WHEN MOUNTING FANNING STRIPS IF SCREWS ARE LONG ENOUGH TO PENETRATE THE CONTACT STRIPS OF THE BANK. IN NO CASE SHOULD SCREWS ENTER BANK MORE THAN 1/16".

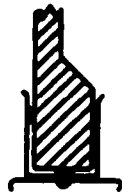
NOTE: If any insulating studs used on 17A fanning strips should be found missing, or be lost on the job, they may be ordered separately as "P-473702 stud."

11. STRIPS, TERMINAL

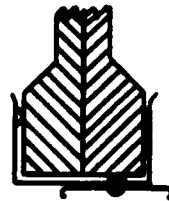
- 11.1 Check terminal strips for defects before mounting. Look for chipped or split fanning strips and broken calmping strips and separators.

NOTE: If any of the wire guides furnished as part of D type terminal strips are broken, they may be ordered separately as "P-10A914 wire guide."

- 11.2 Top or bottom or left or right of terminal strips are not determined by code stamping. Mount strips without reference to stamping unless position of mounting screw holes or fanning holes is affected.
- 11.21 When one side of the fanning strip on distributing frame terminal strips (P and M Type) is provided with elongated holes arranged to serve two rows of terminals, mount the terminal strip so that the elongated holes are located at the switchboard cable side of the terminal strip.
- 11.3 Adjacent terminal strips such as the 35, 65 and similar types should not be more than 1/8" out of alignment.
- 11.4 Rows of terminal strips of the same general dimensions, such as are encountered on distributing frames, should not be out of alignment more than 1/8" per foot nor more than 1/2" in the complete row.
- 11.5 The mounting holes on some types of terminal strips designed for mounting on the horizontal side of the MDF are not symmetrically arranged in the fanning strip. The fanning strip extends 31/32" beyond the mounting holes on one side and 1-7/32" beyond on the other side. These terminal strips should be mounted so that the 1-7/32" side of the fanning strip is the switchboard cable side (lower when mounted horizontally and left when mounted vertically) as shown in Figure 3. The method of mounting 65-type terminal strips on wall-type distributing frames is also shown in Figure 3.
- 11.51 When mounting distributing frame terminal strips having a complement of more than two mounting screws, give consideration to cabling and



CROSS SECTION VIEW
SINGLE UPRIGHT
APPLICATION



CROSS SECTION VIEW
DOUBLE UPRIGHT
APPLICATION



SINGLE UPRIGHT



DESIGNATION STRIP

DOUBLE UPRIGHT

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FIG. 2 DESIGNATION STRIP MOUNTING APPLICATIONS

wiring, that is, install only enough mounting screws to hold the terminal strips on the transverse arms since it may be necessary to dismount them for the wiring operations. After completion of the wiring, they should be permanently fastened with a full complement of mounting screws.

- 11.52 Where acorn cap nuts are provided for mounting terminal strips on the vertical side of distributing frames, they shall be mounted in accordance with the applicable ED drawing (either ED-61936-73 or ED-26353-71). A small wrench from the R-4300 Small Wrench Set may be used to facilitate installation.

- 11.53 When mounting 65C, 82B and 182D main distributing frame terminal strips, install appropriate guard.

Terminal Strip	Guard Piece Part No.
65C	P-13B137
82B	P-13B137
182D	P-13B134

These guards are made of 0.062-inch phenol fabric sheet, 2-3/16 inches wide and in lengths of approximately 8 and 16 inches to accommodate the two lengths of terminal strips involved. They are mounted horizontally on the lower edge of the terminal strip base and project out beyond the terminals to form a protective barrier. The 16-inch guard is used on the 182D Terminal Strip and is held in place by three molded Delrin spring clamps that are inserted in fanning holes of the base of the terminal strip. This mounting arrangement permits easy mounting and removal of the guard for maintenance purposes. Two clamps are used for a similar mounting and removal of the guard for maintenance purposes. Two clamps are used for a similar mounting arrangement for the 8-inch guard on the 65C and 82B Terminal Strips.

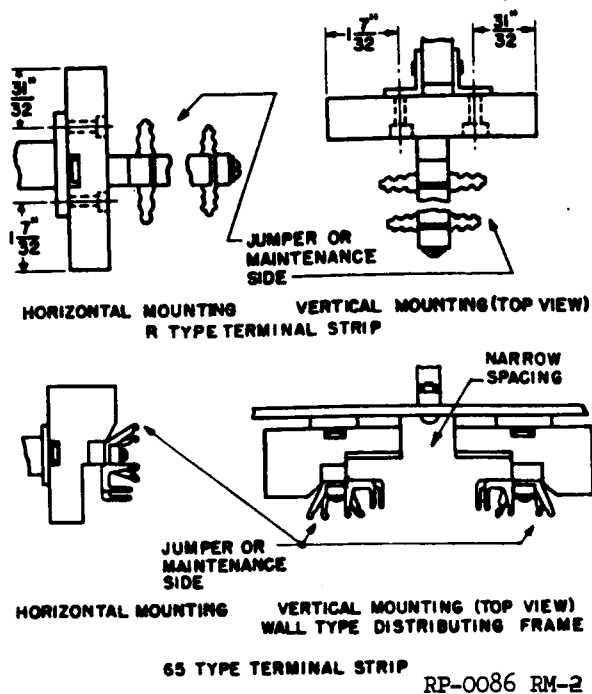


FIG. 3 METHOD FOR MOUNTING 65 AND SIMILAR TYPE TERMINAL STRIPS (PAR. 11.5)

- 11.6 When 180-Type Terminal Strips are to be mounted on DTA's of step-by-step selector frames with holes drilled for 164A terminal strips, it will be necessary to drill and top holes for the lower mounting screws of the 180A terminal strips.

NOTE: Although the R-2443 Screwdriver can be used for mounting 183-Type Terminal Strips, (wire wrap) the R-2226 Screwdriver (with screwholding device) will be found more effective. If not available on a job, purchase locally a screwdriver having a minimum blade length of 6".

- 11.7 When mounting 183 Type Terminal Strips, which are equipped with eight screw holes for mounting purposes, on distributing frames or connector heads, four mounting screws shall be used when installing three to eight point type blocks, utilizing the two outside holes on the top or bottom of the terminal strip.
- 11.8 A full complement of screws, eight, shall be used when installing nine-point type terminal strips to standard type distributing frames.

When these terminal strips are installed in CDO's or PBX's on connector heads and an adapter bar is required, then four mounting screws shall be used.

- 11.9 22-7 Type Terminal Strips are furnished either with the fabricated phenol fiber terminal pileup or with the molded selection pileup. The fabricated pileup is screwed to a supporting bracket, P-376276, which contains two tapped holes for receiving the pileup screws. The molded selection pileup contains two pilot holes for self tapping screws and the supporting bracket, P-376470, has two clearance holes through which the pileup mounting screws pass.

- 11.91 The R-3168 658A Terminal Extractor is used for replacing broken terminals (double twin notch or wire spring) on wired selectron (molded) terminal strips except the 227 code. Detailed instructions for replacing broken terminals are given on the shipping case chart. The following terminals can be replaced with the tool and should be ordered as equipment.

Double Twin Notch Terminal

<u>Overall Length</u>	<u>Piece Part No.</u>
1-3/8"	P-463181
1-9/16"	P-463180
1-3/4"	P-463179

Wire Spring Terminal

<u>Overall Length</u>	<u>Piece Part No.</u>
1-1/2"	P-11A313
2"	P-11A296
2-5/16"	P-16A199

Where unwired terminal strips are received with broken terminals, new terminal strips should be requisitioned unless the terminal extracting tool is available on the job.

- 11.10 When mounting 19B and 27A fanning strips in conjunction with 251 or 256 type terminal strips on new or old type mounting bars, mount with three screws only. Use the longer screws (P-49C347 PHT 6-20 x 1-1/8" or P-49C274 PHT 6-20 x 1-1/8" or P-49C274 PHT 6-20 x 1") provided

with the terminal strips. When mounting 251 or 256 type terminal strips without fanning strips on old type counter bored bars, use the shorter length screws (P-46F348 PHT 6-20 x 7/8" or P-42B790 PHT 6-20 x 3/4") provided with terminal strips. When mounting 18A and 19A wooden fanning strips in conjunction with 251 or 256 type terminal strips on new mounting bars (three screws) it will be necessary to drill and counter bore (1/8") the fanning strips to agree with the mounting bar hole locations. Use longer screws provided with the terminal strips.

12. INCREASING CAPACITY OF DISTRIBUTING FRAME TYPE TERMINAL STRIPS

- 12.1 This provides a method for increasing the capacity of non-molded distributing frame type terminal strips, such as the 183, 211 and similar type terminal strips. This method covers only the addition of terminal rows to the front portion of terminal strips.

- 12.2 Remove the two end clamping strip screws of the terminal strip to be modified, and replace with R-4288 Guide Pins. Slightly loosen intermediate clamping strip screws for easy insertion of guide pins. Band both ends of terminal rows, excluding the clamping strip section, using the R-4265 4" Plastic Cable Tie Wrap and tighten securely with the R-4266 Tie Wrap Gun, as covered in Section 205, Handbook 9. See Figure 4. Remove remaining clamping strip screws.

- 12.3 Using the assembly fixture shown in Figure 5 with two guide pins set in the appropriate holes, place newly assembled terminal rows onto guide pins. Remove clamping strip from terminal strip to be modified, and place onto newly assembled terminal rows and tape both ends of new rows securely with 1 inch masking tape.

- 12.4 Remove newly assembled rows and clamping strip from assembled fixture and place on terminal strip to be modified. Place proper length clamping strip screw in center of

newly assembled rows for aligning purposes and tighten. Tape can now be removed from terminal strip. Remove guide pins from newly assembled unit and install remaining clamping strip screw and tighten securely. Check to see that all new clamping screws are of proper length, and that any excess of length be cut off.

- 12.5 Tools and supplies: Guide pins presently are being standardized and are not available for field use. Until these guide pins are available at service center, they may be made up on the job location. See Figure 6 for specification. The following tools, and supplies are required:

- 1 - R-4266 Tie Wrap Gun
- 2 - R-4265 4" Cable Tie Wrap
- 1 - R-5420 1" Masking Tape
- *4 - R-4288 Guide Pin

NOTE: Quantities predicated to work operation.

*Until this item is available in service centers, it is recommended that the following methods be adapted:

- (a) Order sufficient quantity of 9 point clamping strip screws P-356942.
- (b) To purchase locally required amount of 4-40 threaded rod.
- (c) Using items (a) or (b), make up on the job using specification in Figure 6.

13. SWITCHES, CROSSBAR

- 13.1 Mount crossbar switches with .216" -24 special head machine screws as listed in Section 50G and P-423635 lock-washers on frames with tapped mounting holes. The .216"-24 pan head self-tapping screws as listed in Section 50G should be used to mount crossbar switches on sheet-metal structures, such as No. 5 crossbar frames, that are perforated for them.

14. SWITCHES, STEP-BY-STEP

- 14.1 Add or relocate switch equipment where necessary so as to agree with the equipment drawings.

NOTE: Shelves as furnished may be unequipped, partially equipped or fully equipped with switches. Additional switches will be shipped separately when necessary.

- 14.2 When switches are transferred, they are to be replaced by bank supports taken from the switch positions in which the switches are relocated, not more than two adjacent switch banks being left unsupported at any one time.

- 14.3 When removing a bank support, the best procedure is to remove the bank rod nuts first, using the R-3334 Wrench. Then hold the bank support in place while removing the mounting bolt using the opposite end of the R-3334 Wrench. If this procedure is not followed, the bank support may drop down and touch the shelf jack and operate a fuse.

NOTE: The old shelves and switches referred to in the following paragraphs are those on which the capacitors are mounted on the shelf lower angle, being held in place by a 1/8" by 3/4" carriage bolts. With the new shelves and switches the capacitor strap and carriage bolts are not used, the capacitor being mounted on the rear cover plates of the switches.

- 14.4 When new switches are to be mounted on old shelves, remove the carriage bolts and spacers (and the capacitor strap where it interferes with the capacitors mounted on the switch rear cover plates) from the positions to be equipped with new switches. It will be necessary to cut the capacitor strap except where complete lengths can be removed. When sawing the strap, provide adequate protection to prevent chips from falling into the equipment.

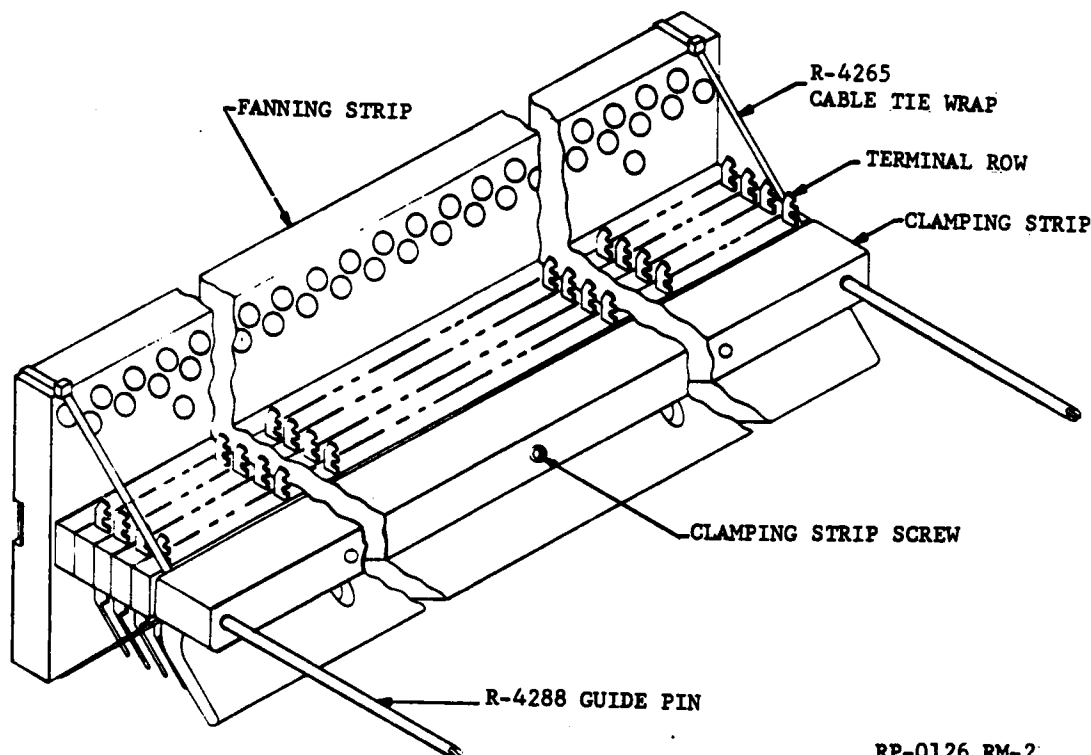


FIG. 4 CLAMPING STRIP REMOVAL
(PAR. 12.2)

- 14.5 On new switches shipped from Hawthorne, packing detail (PS577526) which is mounted near the top of the switch mounting plate shall be removed and discarded.

- 14.6 When old switches are to be mounted on new shelves, add capacitor leads as required. Furnish and install the correct length of capacitor strap and carriage bolts and mount the capacitors on the shelf lower angle. See drawings T-616819, T-616820 and T-616821.

NOTE: In some cases capacitor leads and capacitor strap will be furnished with the shelf.

- 14.7 The procedure for mounting selectors, connectors, line finders, repeaters, etc., is outlined in the following paragraphs.

NOTE: A check should be made of repeater shelf jacks before repeaters are mounted, to make sure that the jacks have been adjusted in accordance with the special requirements covered on the various SD drawings.

- (a) Before mounting a switch examine the shelf jack springs to determine whether they require cleaning. If they do, clean them in accordance with information given in Handbook 16.
- (b) Remove the switch cover and support the shaft in the elevated position. Grasp the switch firmly with the right hand so that the thumb rests on the release armature bracket and the first three fingers rest on the release armature. Hold the bank assembly with the left hand exerting a slight pressure toward the shelf so as to prevent damage to the wipers. Place the switch firmly against the shelf with the openings in the bayonet slots slightly above the associated shelf pins. Then slowly lower the switch until its downward movement is checked by the shelf pins coming in contact with the upper extremity of the bayonet slots. At the same time make sure that the

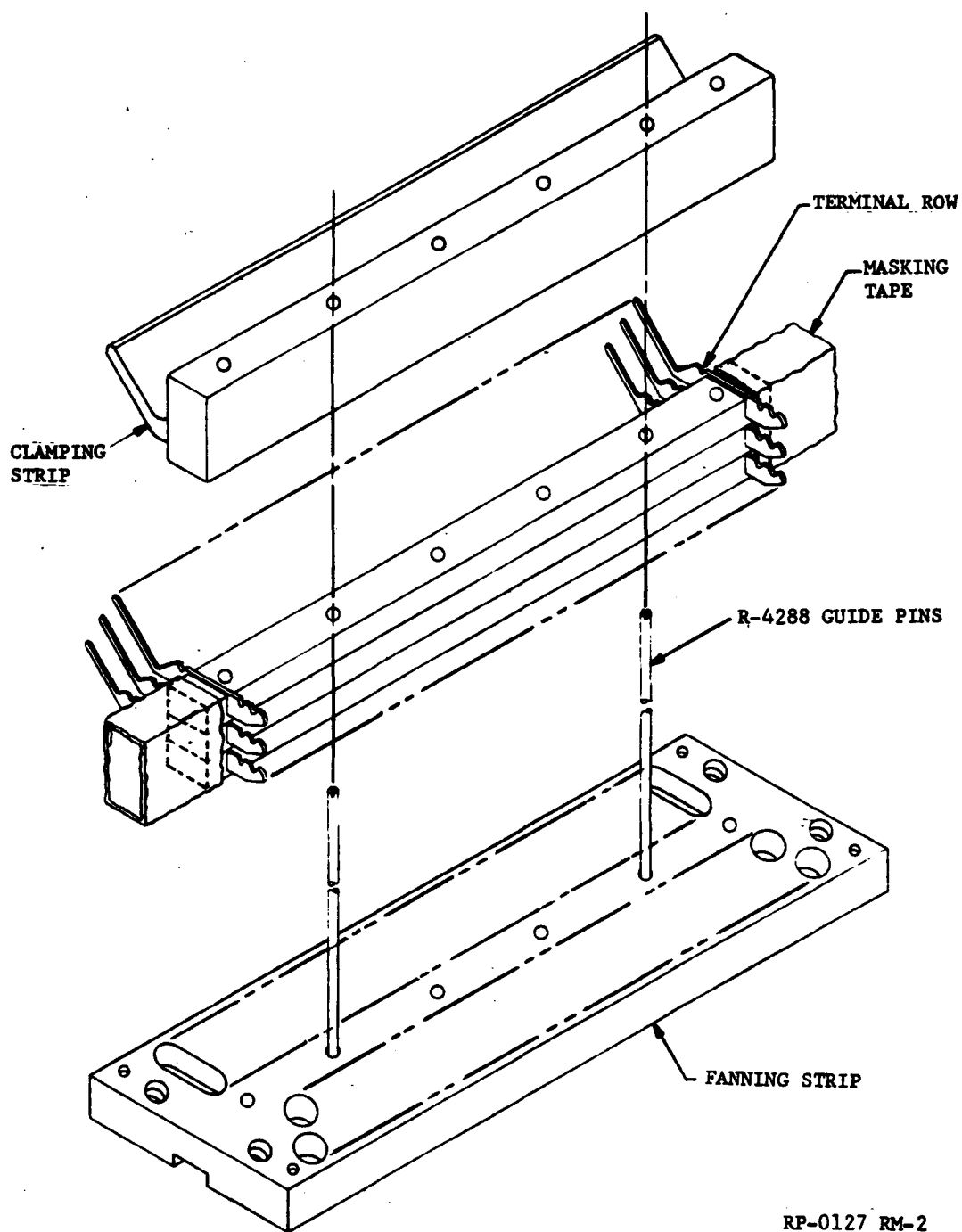


FIG. 5 ASSEMBLY FIXTURE (PAR. 12.3)

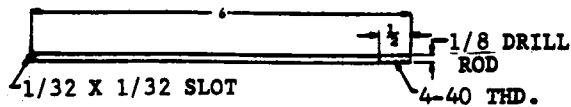


FIG. 6 R-4288 GUIDE PIN (PAR. 12.5)

switch plug properly engages the shelf jack and guide the bank rods into the holes in the switch frame. Replace and securely tighten the bank rod nuts using the R-3334 Wrench. Mount the cord guide when provided. Where difficulty is experienced in mounting a switch on a shelf due to improper alignment of the switch plug and jack, loosen the jack mounting screws with the R-2443 Screwdriver and shift the jack as required to align the parts. Replace the switch cover.

- (c) Where difficulty is experienced in placing or removing switch covers, examine the cover for bent hooks. If they are bent, straighten them with the KS-7782 Pliers. If, with the hooks properly straightened, the cover is still difficult to remove, apply RM-647944 Wax Compound (Door-Ease) sparingly to both sides of each of the cover hooks.
- (d) Although the methods outlined in Paragraph (b) are generally applicable, these procedures should be varied as required in order to prevent damage to switches equipped with vertical interrupter springs or release contact springs. Another case when these procedures should be varied is the very long switches such as toll transmission selectors. On these switches a handle is provided near the top which may be used to advantage when mounting the switch.

→ Indicates new or changed information

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Reason for Reissue:
Update BSP Issue and
update Paragraph 4.1.

- (e) When removing a switch from the shelf, reverse the mounting procedures covered above.

NOTE: Where difficulty is experienced in obtaining sufficient clearance between the sleeve cutoff jack assembly mounted on some trunk finder switches and the adjacent upper bank terminals, the jack assembly may be repositioned to the extent permitted by the jack mounting clearance holes or by placing a piece of sheet fiber between the jacks and the adjacent bank terminals.

- 14.8 Where different types of switch can covers are furnished, arrange them to present the best appearance possible.

15. SWITCHES, TOGGLES

- 15.1 When mounting toggle switches on panels with two mounting nuts (one on each side) the nuts shall be so tightened that no more than one thread of the bushing is exposed. In no case may the end of the bushing be underflush with the mounting nut.

16. TUBES, ELECTRON

- 16.1 Due to the delicate nature of the pins and filaments on miniature electron tubes, it is recommended that they be left in their shipping cartons until they are mounted. These tubes should not be handled any more than necessary and should not be placed loosely in a carton or pocket.

17. VARISTORS

- 17.1 Unless otherwise specified, 303 and similar type single stud-mounted varistors should be turned so that the terminals are in the most convenient location for wiring. Also where practicable, they should be mounted so that the code markings are visible.
- 17.2 Mount 300-type varistors so that the strap wire is on top.

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