TELETYPE CORPORATION
Skokie, Illinois, U.S.A.

SPECIFICATION 50501S
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INSTRUCTIONS FOR INSTALLING LOW LEVEL RFI (POLAR-EMC) KITS ON 28 AUTOMATIC SEND-RECEIVE SETS

1. GENERAL

1.01 The modification kits are used to convert the 28 Automatic Send-Receive (ASR) Sets as follows:

Teletype No.	Navy Nomenclature	Federal Stock No.	Used On
323806	MK-1087/UG	2Z5815-877-8999	AN/UGC5 AN/UGC5X
323807	MK-1088/UG	2Z5815-877-9013	AN/UGC6 AN/UGC6A AN/UGC6BX AN/UGC6F
323808	MK-1089/UG	2Z5815-877-9020	AN/UGC13 AN/UGC13AX AN/UGC16 AN/UGC32X

1.02 The purpose of modification kits 323806, 323807, and 323808 is to convert the 28 Automatic Send-Receive (ASR) Sets to low level rfi operation. Each kit includes a low level electrical service assembly for signal purposes (and another for clutch driver purposes), one or more selector magnet driver cards, power supply cards, two keyer cards, one or more selector magnet assemblies with dust cover, contact box assemblies, clutch magnet driver assemblies, and the necessary mechanical components to mount the various assemblies in the cabinet.

1.03 For information not included in this specification, refer to the following:

	Teletype Part No.	Teletype Spec No.	Navships Number
Dust covers	321216 321218	50503S	0967-274-1010
Contact box	320036 321219	50504S	0967-273-5010
Electrical service assemblies	303815 323811 323812 323815 323825	50505S	0967-273-6010

	Teletype Part No.	Teletype Spec No.	Navships Number
Clutch magnet driver	321991	50506S	0967-273-7010
Selector magnet driver	323810	50507S	0967-273-8010
Power supply card	321290	50508S	0967-274-7010
Polar line keyer	303142	50509S	0967-273-9010
Ventilation fan	324677	50512S	0967-287-6010

1.04 The electrical service assemblies will operate at voltages ranging from 100 to 130 v ac, and frequencies from 45 to 66 hertz. However, operate the set at 115 ± 10% v ac, 50 to 60 hertz, and the motors must be selected with regard to frequency. Where line frequencies are 60 hertz ± 0.75%, use the LMU12 synchronous motor for the keyboard base, and an LMU3 for the auxiliary reperforator. For 50 hertz ± 0.75% frequencies, use the LMU38 synchronous motor in both places. For other frequencies, or where frequency regulation is poor, the LMU39 series governed motor unit is required at the keyboard, and the LMU41 at the auxiliary reperforator.

1.05 During installation of these modification kits, certain features will be removed from each set as outlined below:

Mod Kit	Set Code	Features Removed
323806	AN/UGC5 AN/UGC5X	Line shunt relay; line test key; line break switch; lock bar switch
323807	AN/UGC6 AN/UGC6A AN/UGC6BX AN/UGC6F	Line shunt relay; line test key; line break switch; lock bar switch; signal bell controlled by auxiliary LPR; tape feed out on auxiliary LPR
323808	AN/UGC16	
323808	AN/UGC13 AN/UGC13AX AN/UGC32X	Lock bar switch

1.06 The 323806, 323807, and 323808 modification kits consist of:

Part No.	Description	Modification Kit 323806	323807	323808
252M	Magnet	1	1	1
256M	Magnet	2	2	2
2191	Lockwasher	2	3	3
3598	Nut	2	3	3
7002	Flat washer	2	3	3
84551	Strap	4	5	5
92260	Lockwasher	2	3	3
115412	Screw	8	8	8

Part No.	Description	Modification Kit 323806	323807	323808
117608	Nut, speed	3	3	3
135563	Ground strap	3	3	3
151631	Screw	2	3	3
152757	Plate, blank	1	2	2
154197	Plug, button	3	3	3
155751	Tubing	1	1	1
160387	Rack	1		1
182520	Diode	1	1	1
303142	Keyer	2	2	2
305143	Power supply assembly	1	1	1
320036	Contact box assembly	1	1	1
321216	Selector dust cover	1	1	1
321218	Selector dust cover		1	2
321219	Contact box assembly	1	1	1
321290	Power supply card	2	2	2
321991	Clutch magnet driver	2	2	2
323810	Selector magnet driver	1	2	3
323811	Electrical service assembly		1	
323812	Electrical service assembly	1	1	1
323815	Electrical service assembly			1
323825	Electrical service assembly	1		
324148	Label	1	1	1
324157	Cable	1	1	1
324159	Cable	1	1	1
324677	Fan, modification kit	1	1	1
324682	Cable			1
324689	Cable			1
324691	Cable			1
326354	Core	2	2	2
326355	Cable	1	1	1
326357	Contact assembly	1	1	1
326372	Contact assembly	1	1	1
326778	Strap	2	2	2
326788	Cable	1	1	
327343	Cable	1	1	1
327907	Identification plate	1		
327908	Identification plate		1	
327909	Identification plate			1

2. THEORY OF OPERATION

2.01 For theory of operation not included in this specification, refer to the specifications on the individual units listed in Paragraph 1.03.

2.02 The 323806 modification kit includes a 160387 apparatus rack for mounting the low level electrical service assemblies (323812 and 323825) in the cabinet. The modification kit also includes a 321216 dust cover for the page printer, a 323810 selector magnet driver (SMD) circuit card, two 321290 power supply cards, two 303142 keyer cards, two 321991 clutch magnet driver (CMD) circuit cards, a 321219 contact box assembly, a 252M coil, and a 326357 contact assembly for the LAK; a 320036 contact box assembly, two 256M coils, two 323354 cores, and a 326372 contact assembly for the LXD; and necessary hardware and cable assemblies.

2.03 The 323807 modification kit includes 323811 and 323812 electrical service assemblies, a 321216 dust cover for the page printer, a 321218 dust cover for the typing reperforator, two 323810 selector magnet driver (SMD) circuit cards, two 321290 power supply cards, two 303142 keyer cards, two 321991 clutch magnet driver (CMD) circuit cards, a 321219 contact box assembly, a 252M coil, and a 326357 contact assembly for the LAK; a 320036 contact box assembly, two 256M coils, two 323354 cores, and a 326372 contact assembly for the LXD; and necessary hardware and cable assemblies.

2.04 The 323808 modification kit includes a 160387 apparatus rack for mounting the 323812 and 323815 low level electrical service assemblies in the cabinet. The modification kit also includes a 321216 dust cover for the page printer, two 321218 dust covers for the typing reperforators, three 323810 selector magnet driver (SMD) circuit cards, two 321290 power supply cards, two 303142 keyer cards, two 321991 clutch magnet driver (CMD) circuit cards, a 321219 contact box assembly, a 252M coil, and a 326357 contact assembly for the LAK; a 320036 contact box assembly, two 256M coils, two 323354 cores, and a 326372 contact assembly for the LXD; and necessary hardware and cable assemblies.

2.05 Power modification kit 324149 may be used with any of the above three modification kits. (This modification kit must be ordered separately.)

2.06 When modified, the set receives 7.42 unit, up to 74.2 baud, or 7.00 unit, up to 75 baud, $\pm$6 volt polar signals, depending on the sets gearing, and translates the signals into printed page copy or chadless printed paper tape. The modified set also translates the keyboard or transmitter distributor output into 7.42 unit, 74.2 baud, or 7.00 unit, 75 baud, $\pm$6.0 volt polar signal for transmission.

2.07 The equipment transmits or receives at various speeds depending on the gearing in the set.

Note: The signal and stepping pulse flow is shown in Figure 1.

2.08 Modification kits 323806 and 323807 (refer to WDP0041 and WDP0042)

(a) With the keyboard auxiliary switch in the K position (relays R1, R2, R4, and R5 energized) signal inputs may be applied to the selector magnet drivers (SMD s) and step input to both clutch magnet drivers (CMD s). The signal output from the keyer (KA) is connected to the line. The 323806 modification kit is used in ASR Sets (AN/UGC5 and AN/UGC5X) without the auxiliary reperforator.

(b) With the keyboard auxiliary switch in the KT position (relay R6 energized), the set is off line except for the AUX LPR. (Sets using modification kit 323806 do not have an auxiliary reperforator.) The +6 volts applied to the (CB) CMD permits the keyboard to be operated without a step pulse. Information from the keyboard is translated to page copy at the typing unit (LP), and to punched tape at the reperforator (LTPE) which is mechanically linked to the keyboard.

(c) With the keyboard auxiliary switch in the T position (relays R1, R2, and R4 energized), a tape signal may be sent on line from the transmitter distributor if a step pulse is available at the (CA) CMD. These signals are monitored by the LP if options B and D (see Par. 2.10) are present. The alternate input to the (SA) SMD is also on line so that the set will also translate incoming signals to page copy. Note that the set cannot simultaneously transmit from tape and receive page copy unless the strap from LLK to (SA) SMD is removed. The AUX LPR (where present) is also on line.

2.09 Modification kit 323808 (refer to WDP0043)

(a) With the keyboard auxiliary switch in the K position (relays R1 through R5 energized), signal inputs may be applied to all selector magnet drivers (SMD s) and a step input to both clutch magnet drivers (CMD s). The signal output from the keyer (KA) is connected to the line.

(b) With the keyboard auxiliary switch in the KT position (relay R6 energized), the set is off line except for the AUX LPR. The +6 volts applied to the (CB) CMD permits the keyboard to be operated without a step pulse. Information from the keyboard is translated to page copy at the typing unit (LP), if option B is present, and to punched tape at the typing reperforator (LPR) which is mechanically linked to the keyboard.

(c) With the keyboard auxiliary switch in the T position (relays R1, R2, and R4 energized), taped signals may be placed on line from the transmitter distributor (LXD). These signals are monitored by the LP if options B and D are present. The alternate input to the (SA) SMD is also on line so that the set translates incoming signals to page copy. Note that the set cannot simultaneously transmit from tape and receive on page copy unless the strap from LLK to (SA) SMD is removed. The AUX LPR is also on line.

2.10 Strapping options

(a) Option A permits the signal inputs to be applied to any or all of the SMD's. This strapping option is not supplied.

(b) Option B enables monitoring or not monitoring page copy as required.

(c) Option C provides for stepping from either one or two sources. This strapping option is not supplied.

(d) Option D permits a separate signal output from the LXD. This requires a second keyer card.

(e) Factory installed straps are: strap from TC-5 to TC-6 in all signal electrical service assemblies (option B); strap from TD-5 to TD-6 in all signal electrical service assemblies (option D).

2.11 Revised auxiliary switch operation is such that after rewiring, all of the old functions of this switch are inoperative. The new functions are outlined below.

Half Duplex

Aux Switch Position	Operative Functions	Inoperative Functions
K	Keyboard to LLK to LP SMD Keyboard to LLK to output LXD to LLK to LP SMD LXD to LLK to output Both CMD inputs All SMD inputs	Input to LP SMD with simultaneous keyboarding or simultaneous LXD transmission causes garbling. Simultaneous LXD transmission and keyboarding causes garbling.
K-T	Auxiliary LPR SMD input Keyboard to LLK to LP SMD Keyboard CMD supplied +6 v internally Mechanical operation of LPR or LTPE by keyboard for tape preparation	LLK output LP and keyboard LPR SMD inputs Both CMD inputs
T	LP and aux LPR SMD inputs LLK output LXD to LLK to LP SMD LXD CMD input Mechanical operation of LPR or LTPE by keyboard for tape preparation	LAK, LPR, SMD input LAK CMD input Input to LP SMD with simultaneous LXD transmission causes garbling

Notes:

1. AN/UGC5 and AN/UGC5X sets do not have auxiliary LPR or LPR on LAK, but do have LTPE on keyboard for local tape preparation.

2. AN/UGC6, AN/UGC6A, AN/UGC6BX, and AN/UGCF sets do not have LPR on LAK, but do have LTPE on keyboard for local tape preparation.

3. Full duplex operation can be obtained by the addition of a keyer card and the removal of the strap between the keyers. Functions are the same as half duplex except there is no garbling between LP and LXD in the K position of the auxiliary switch.

4. In the full duplex condition, if the LP is to monitor the LXD, remove the strap between TC-5 and TC-6. Strap TC-6 to TB-3.

5. All previous functions of the auxiliary switch have been replaced by the above.

3. INSTALLATION

A. 323806 Modification Kit

3.01 Remove the printer from the set according to Bulletin 217B. Install the 321216 selector dust cover assembly in accordance with Specification 50503S.

3.02 Ground the printer standard connector shell to the printer side frame (Figure 2).

(a) Solder a 135563 ground strap to an unused pin on the printer connector, and another to its mating pin in the cable connector from the electrical service unit.

(b) Connect the terminal lug end of the strap, on the printer connector, to the printer frame with the 151631 screw, 7002 flat washer, 2191 lockwasher, and 3598 nut. (If a tapped hole is available, discard the 3598 nut.)

3.03 Direct the other strap out through the hole in the shell and connect the terminal to the shell cable clamping screw, using the 92260 lockwasher (Figure 2).

3.04 If all pins are occupied, remove a lead not being used (such as the selector magnet lead) and use that terminal for grounding. Tape and tie back any conductors removed.

3.05 Remove the keyboard from the cabinet according to Bulletin 250B.

3.06 Remove all wires from the F connector. All wires (including straps) may be cut off (cut close to connector) except for the red wire on pin 6, and the two yellow wires on pin 8, which should be unsoldered. Remove the connector from the keyboard, and clean all pins. The purple wire on pin 12 and the slate wire on pin 13 run to the motor terminal block. Pull these two back to the terminal block and reroute directly to the F connector when reinstalling. Strip approximately 1/4-inch of insulation from these two wires in preparation for resoldering to the connector.

3.07 On sets equipped for synchronous pulse operation, remove the wiring to the existing magnet and contact. Replace the existing magnet with the 252M magnet. Replace the existing contact assembly with 326357 contact assembly, using the hardware from the old assembly. Readjust the contact assembly and the magnets according to Bulletin 250B.

Note: On sets not equipped for synchronous pulse operation, 164659 modification kit may be ordered and installed.

3.08 Wire the 326355 cable assembly, from the 252M magnet and the 326357 contact assembly, to the keyboard connector following the same cable routing as the old cable. Utilize pins 0, 1, 2, 3, 4, and 5 for this cable (Figure 3).

Note: At this point, reconnect the red, yellow, purple, and slate wires (previously removed) as follows:

Connector Pin Number	Wire Color
9	Red
10	2 Yellows
12	Purple
13	Slate

3.09 The K-KT-T auxiliary switch in the keyboard must be rewired to control the relays in the 323812 and 323825 electrical service assemblies. For better access to the switch, remove the tape container and its bracket according to Bulletin 250B.

3.10 Only the wires shown in Figure 4 (on terminals 1, 2, 4, and 7) should remain on those terminals. All other wires on terminals 1, 2, 4, and 7 should be moved to other terminals. After wiring cable 327343 in place, install the 182520 diode as shown in Figure 4. Cover the diode with tubing. Solder a 135563 strap to pin 18 and connect the terminal end of the connector mounting bracket to any unused hole available within reach. Use the 151631 screw, 7002 flat washer, 2191 lockwasher, and 3598 nut supplied.

Note: In wiring the diode to the K-KT-T switch, use a low wattage soldering iron of approximately 25 watts.

3.11 Remount the connector on the keyboard and replace all terminal covers and hardware.

3.12 Install the 321219 contact box assembly on the keyboard in accordance with Specification 50504S. When mounting the connector bracket on the keyboard base, tie the cable at sufficient points to prevent the cable from being damaged.

3.13 The leads from the keyboard must be made available at the C terminal strips in the cabinet to make the various connections. Unplug the existing cable to the keyboard, tape the connector completely, and tie the cable at the rear of the LCXB base. Make sure no part of the old connector plug touches any metal in the cabinet.

(a) Replace the existing cable with the 324159 cable assembly and attach to the C terminal strips according to Figures 6 and 7.

(b) Tape and tie back to the 324159 cable the W-BR, W-R, W-S, and BL wires (which are not used), and the unused drain wire.

(c) In preparing for the connection of this cable, remove the wires (if present) from C terminals 1, 2, 3, 4, 5, 6, 10, 11, 12, 13, and 14. Also, remove the straps from C terminals 4, 5, 10, 13, and 14.

(d) Place the green wire (originally on terminal C11) on terminal C10. Place the orange wire (originally on terminal C12) on terminal C14.

(e) Tape and tie back the remainder to the body of the cable, making sure no terminals touch each other.

3.14 To service the electrical service unit (LESU13) used in conjunction with this modification kit, refer to Bulletin 217B for disassembly and reassembly instructions. Discard the line test key control assembly at the left end of the unit, and the name plate and screws on the cabinet. Remove the line relay mounting assembly and its cable from the electrical service unit.

3.15 Disconnect the orange and white-slate wires from the line shunt relay coil. Remove the purple wire from E4, the slate wire from E7, and the orange wire from E8. Tape and tie back these wires to the body of the cable, making sure no terminals touch each other.

3.16 Move the rectifier assembly to the left to make room for the power supply. Install the 305143 power supply assembly, provided in the electrical service unit, next to the D terminal block with the fuse holder toward the front. Wire the power supply according to Figure 7 with the 84551 straps provided.

3.17 Remove the transmitter distributor with its cable and connector according to Bulletin 235B. Replace the existing magnet cores with the new 323354 cores. Replace the existing magnets with the 256M magnets. Adjust according to Bulletin 235B.

3.18 Remove the control lever contact assembly and replace it, using the old mounting hardware, with the 326372 contact assembly according to Bulletin 235B. Adjust this new contact assembly according to Bulletin 235B.

3.19 Remove entire cable from the LXD3 and replace it with the 326788 cable assembly according to Figure 8.

3.20 Remove the existing contact box assembly and install 320036 contact box assembly in the transmitter distributor according to Specification 50504S.

3.21 Disconnect the cable between the transmitter distributor base and the electrical service unit, and retain any cable clamps.

(a) In preparing for the connecting of the new cable, remove all the wires present from the C terminals 136, 137, 138, 139, 140, 141, 142, and 143.

(b) Remove the white-slate wire from C34.

(c) Tape and tie back these wires to the body of the cable, making sure no terminals touch each other. Also remove all the straps from these terminals. Retain straps.

3.22 Replace the old cable with the 324157 cable assembly provided, and attach it to the C terminals according to Figure 8. Tape the connector of the old cable from the electrical service unit and tie the cable to the cabinet or to the rear of the LCXB base. Make sure no part of the old cable connector plug touches any metal part in the cabinet.

3.23 Attach a ground strap according to Figure 8.

3.24 Remove the lower door from the cabinet and drill holes for the 324677 fan modification kit (see Specification 50512S) according to Figure 11.

(a) Mount fan, hardware, and cable connector bracket according to Specification 50512S.

(b) Attach the 326778 straps according to Figure 12.

3.25 Install the 160387 apparatus rack in the cabinet according to Specification 5915S. See note on Figure 13. If rack has been installed, position it according to Figure 13.

3.26 Mount the 323812 and 323825 electrical service assemblies in the cabinet on the 160387 apparatus rack (Figure 13), using the 115412 screws and 153017 nuts provided. Mounting channels are supplied with the 323812 ESA.

(a) Route the signal cables from the 323825 electrical service assembly up through the opening in the cabinet and route to the printer, keyboard, and transmitter distributor connectors according to Figure 13.

(b) Tie the cables at sufficient places to prevent them from being damaged.

(c) Bring the remaining cables from the 323812 and 323825 electrical service assemblies up through the opening in the cabinet and attach to the C terminals according to Figures 6, 7, and 8.

3.27 Replace the LXD3 on its base according to Bulletin 235B. Mount the contact box assembly connector according to Specification 50504S.

3.28 Replace the LESU13 electrical service unit according to Bulletin 217B.

3.29 Replace the LAK4 according to Bulletin 250B.

3.30 Replace the LP14 according to Bulletin 217B.

3.31 Connect the signal cables to the LXD, LAK, and LP connectors as shown in Figure 13.

3.32 Remove the covers from the 323812 and 323825 electrical service assemblies.

(a) Attach power and signal leads in accordance with WDP0041.

(b) Use shielded conduit or flexible cable to bring power and signal leads into the set.

Note: Power connection modification kit 324149 may be used to aid in terminating power and signal cables. Order this modification kit separately.

3.33 Insert circuit cards in their appropriate connectors in accordance with 8180WD for the 323825 ESA and 8316WD for the 323812 ESA (see WDP0041).

3.34 Adjust the 321219 contact box assembly on the LAK4 according to Specification 50504S.

3.35 Adjust the 320036 contact box on the LXD3 according to Specification 50504S.

3.36 Replace covers on electrical service assemblies and reinstall the front panel on the cabinet, and other cabinet parts removed during disassembly.

3.37 Replace LXD cover.

3.38 Perform operational tests outlined in Bulletins 216B, 246B, 249B, and 258B. Refer to Paragraph 2.11 for the new mode switching conditions of the K-KT-T auxiliary switch.

B. 323807 Modification Kit

3.39 Remove the printer (LP14 or LP17) from the cabinet according to Bulletin 217B. Install the 321216 selector dust cover assembly in accordance with Specification 50503S.

3.40 Ground the printer standard connector shell to the printer side frame (Figure 2).

(a) Solder a 135563 ground strap to an unused pin on the printer connector and another to its mating pin in the cable connector from the electrical service unit.

(b) Connect the terminal lug end of the strap, on the printer connector, to the printer frame with the 151631 screw, 7002 flat washer, 2191 lockwasher, and 3598 nut. (If a tapped hole is available, discard the 3598 nut.)

(c) Direct the other strap out through the hole in the shell and connect the terminal to the shell cable clamping screw, using the 92260 lockwasher (Figure 2).

(d) If all of the pins are occupied, remove a lead not being used (such as the selector magnet lead) and use that terminal for grounding. Tape and tie back any leads removed.

3.41 Remove the keyboard assembly (LAK4, LAK9, or LAK42) from the cabinet according to Bulletin 250B.

3.42 Remove all wires from the keyboard F connector. All wires (including straps) may be cut off (cut close to connector) except for the red wire on pin 6, and the two yellow wires on pin 8 which should be unsoldered. Remove the connector from the keyboard and clean all pins. The purple wire on pin 12 and the slate wire on pin 13 run to the motor terminal block. Pull these two back to the terminal block and reroute directly to the F connector when reinstalling. Strip approximately 1/4-inch of insulation from these two wires in preparation for resoldering to the connector.

3.43 On sets equipped for synchronous pulse operation, remove the wiring to the existing magnet and contact. Replace the existing magnet with the 252M magnet. Replace the existing contact assembly with the 326357 contact assembly using the existing hardware. Readjust the contact assembly and the magnets according to Bulletin 250B.

Note: On sets not equipped for synchronous pulse operation, 164659 modification kit may be ordered and installed.

3.44 Wire the 326355 cable assembly, from the 252M magnet and the 326357 contact assembly, to the keyboard connector following the same cable routing as the old cable. Utilize pins 0, 1, 2, 3, 4, and 5 for this cable (Figure 3).

3.45 At this point, reconnect the red, yellow, purple, and slate wires previously removed, as follows:

Connector Pin Number	Wire Color
9	Red
10	2 Yellows
12	Purple
13	Slate

3.46 The K-KT-T auxiliary switch in the keyboard must be rewired to control the relays in the 323811 and 323812 electrical service assemblies. For better access to the switch, remove the tape container and its bracket according to Bulletin 250B. Only the wires shown in Figure 4, on terminals 1, 2, 4, and 7 should remain on those terminals. All other wires on terminals 1, 2, 4, and 7 should be moved to other terminals.

(a) After wiring the 327343 cable in place, install the 182520 diode as shown in Figure 4. Cover the diode with tubing.

(b) Solder a 135563 strap to pin 18 and connect the terminal end to the connector mounting bracket, or any unused hole available within reach. Use the 151631 screw, 7002 flat washer, 2191 lockwasher, and 3598 nut provided.

Note: In wiring the diode to the K-KT-T switch, use a low wattage soldering iron of approximately 25 watts.

(c) Remount the connector on the keyboard and replace all terminal covers and hardware.

3.47 Install the 321219 contact box assembly on the keyboard in accordance with Specification 50504S. When mounting the connector bracket at the left rear corner of the keyboard base, tie the cable at sufficient points to prevent it from being damaged.

3.48 The leads from the keyboard must be made available at the C terminal strips in the cabinet to make the various connections.

(a) Unplug the existing cable to the keyboard, and tape the connector completely, and tie it to the cabinet or behind the LCXB base. Make sure no part of the old connector plug touches any metal in the cabinet.

(b) Replace the existing cable with the 324159 cable assembly, and attach to the C terminal strips according to Figures 6 and 7.

(c) Tape and tie back to the 324159 cable the W-BR, W-R, W-S, and BL wires (which are not used), and the unused drain wire.

(d) In preparation for connecting this cable, remove the wires (if present) from C terminals 1, 2, 3, 4, 5, 6, 10, 11, 12, 13, and 14. Remove the white-slate wire from C34. Also remove the straps from C terminals 4, 5, 6, 10, 13, 14, 34, and 37. (Retain the straps.)

(e) Place the green wire (originally on terminal C11) on terminal C10. Place the orange wire (originally on terminal C12) on terminal C14.

(f) Tape and tie back the remainder of the wires to the body of the cable, making sure no terminals touch each other.

3.49 To service the electrical service units (LESU12, 13, 29, 73, or 111), refer to Bulletin 217B for disassembly and reassembly instructions. LESU12 and LESU73 (normally found in the pedestal of the cabinet) should be removed entirely, according to Bulletin 217B. Retain the LESUs. The LESU13, LESU29, or LESU111 should be turned over for servicing. Discard the line test key control assembly at the left end of the unit and the nameplate and screws on the cabinet.

3.50 Remove the line relay mounting assembly, and its cable from the LESU13 and LESU29. Also remove the electric motor control assembly and its cable from the LESU29.

3.51 Remove the typing unit selector magnet driver assembly, and its cable from the LESU111.

3.52 Disconnect the orange and white-slate wires from the line shunt relay coil in either the LESU13, LESU29, or LESU111. Remove the purple wire from E4, the slate wire from E7, and the orange wire from E8. Tape and tie back the wires to the body of the cable. Make sure no terminals touch each other.

3.53 Move the rectifier assembly to the left to make room for the power supply. Install the 305143 power supply assembly provided in the LESU13, LESU29, or LESU111 next to the D terminal block, with the fuse toward the front. Wire the power supply according to Figure 7 with the 84551 straps provided.

3.54 Remove the typing reperforator LPR9 or LPR42 from the set according to Bulletin 247B. Install the 321218 dust cover assembly according to Specification 50503S.

3.55 Remove the typing reperforator base LRB6, LRB5, or LRB36 from the cabinet according to Section 573-101-702TC.

3.56 To complete the ac path to the motor on the LRB base, terminal DH-3 should be strapped to DH-9 using an 84551 strap provided. Also, remove the red wire on DH-9, and the green wire on DH-3 (going to pin 9 of the F connector on the base) and tape and tie these two wires to the cable.

3.57 Remove the transmitter distributor LXD3, LXD4, or LXD27 with its cable from its base according to Bulletin 235B (retain hardware and cable clamps). In the case of the LXD4 on an LCXB8 base, remove the transmitter cable and connector and replace it with the 324682 cable assembly according to Figure 9. Replace the existing magnet cores with the new 323354 cores. Replace the existing magnets with the 256M magnets. Adjust according to Bulletin 235B.

3.58 Remove the control lever contact assembly and replace it (using the old mounting hardware) with the 326372 contact assembly, and adjust it according to Bulletin 235B. Remove entire cable from LXD3 or LXD27, and replace it with the 326788 cable assembly, according to Figure 8.

3.59 Remove the existing contact box assembly according to Bulletin 235B. Retain the hardware. Install the 320036 contact box assembly according to Specification 50504S.

3.60 Disconnect the cable between the transmitter distributor base LCXB1 or LCXB8 and the electrical service unit assembly, and retain any cable clamps. In preparation for the connecting of the new cable, remove the wires (if present) from C terminals 136, 137, 138, 139, 140, 141, 142, and 143. Tape and tie them back, making sure no terminals touch one another. Also remove all the straps from these terminals, and retain the straps. Replace the old cable with the 324157 cable assembly, and attach it to the C terminals according to Figure 8 for the LCXB1 and Figure 9 for the LCXB8. Tape the connector of the old cable from the electrical service unit and tie the cable to the cabinet or to the rear of the LCXB base. Make sure no part of the old cable connector plug touches any metal part in the cabinet. Attach the ground strap according to Figure 8.

3.61 Remove the lower door from the cabinet and drill holes for the 324677 fan modification kit (see Specification 50512S) according to Figure 11.

(a) Mount the fan, hardware, and cable connector bracket according to Specification 50512S.

(b) Attach the 326778 straps according to Figure 12.

3.62 The sets using this modification kit already have an 160387 apparatus rack modification kit installed. Make sure the rack is positioned according to Figure 14.

3.63 Install the 323811 and 323812 electrical service assemblies in the cabinet on the 160387 apparatus rack according to Figure 14 using the 115412 screws and 153017 nuts provided. Mounting channels are supplied with the 323812 ESA.

(a) Route the signal cables from the 323811 electrical service assembly up through the opening in the cabinet and route to the printer, keyboard, transmitter distributor, and auxiliary typing reperforator connectors according to Figure 14.

(b) Tie the cables at sufficient places to prevent them from being damaged.

3.64 Bring the remaining cables from the 323811 and 323812 electrical service assemblies up through the opening in the cabinet, and attach to the C terminal blocks according to Figures 6, 7, 8, and 9.

3.65 Replace the LXD3, LXD4, or LXD27 on its base according to Bulletin 235B. Mount the contact box assembly connector according to Specification 50504S.

3.66 Replace the LRB5, LRB6 or LRB36 base in the cabinet according to Section 573-101-702TC.

3.67 Replace the LPR9 or LPR42 typing reperforator on its base according to Bulletin 247B.

3.68 Replace the LESU13, LESU29, or LESU111 according to Bulletin 217B.

3.69 Replace the LAK4, LAK9, or LAK42 according to Bulletin 250B.

3.70 Replace the LP14 or LP17 according to Bulletin 217B.

3.71 Connect the signal cables to the LXD, LAK, AUX LPR, and LP connectors as shown in Figure 14.

3.72 Remove the covers from the 323811 and 323812 electrical service assemblies.

(a) Attach power and signal leads in accordance with WDP0042.

(b) Use shielded conduit or flexible cable to bring power and signal leads into the set.

Note: Power connection modification kit 324149 may be used to aid in terminating power and signal cables. Order this modification kit separately.

3.73 Insert the circuit cards in their appropriate connectors in accordance with 8322WD for the 323811 ESA and 8216WD for the 323812 ESA (see WDP0042).

3.74 Adjust the 321219 contact box assembly on the LAK4, LAK9, or LAK42 according to Specification 50504S.

3.75 Adjust the 320036 contact box assembly on the LXD3, LXD4, or LXD27 according to Specification 50504S.

3.76 Replace the covers on the electrical service assemblies and reinstall the front panel on the cabinet and other cabinet parts removed during disassembly.

3.77 Replace the LXD cover.

3.78 Perform operational tests as outlined in Bulletins 216B, 246B, 249B, and 258B. Refer to Paragraph 2.11 for the new mode switching conditions of the K-KT-T auxiliary switch.

C. 323808 Modification Kit

3.79 Remove printer LP77 or LP108 from the set according to Bulletin 217B. Install and adjust the 321216 dust cover assembly according to Specification 50503S.

3.80 Ground the printer standard connector shell to the printer side frame.

(a) Solder a 135563 strap to an unused pin on the printer connector, and another to its mating pin in the cable connector from the electrical service unit.

(b) Connect the terminal lug end of the strap, on the printer connector, to the printer frame with the 151631 screw, 7002 flat washer, 2191 lockwasher, and 3598 nut. (If a tapped hole is available, discard the 3598 nut.)

(c) Direct the other strap out through the hole in the cable connector shell, and connect the terminal to the shell cable clamping screw using the 92260 lockwasher provided (Figure 2).

(d) If all pins are occupied, remove any lead not being used (such as the selector magnet lead), and use that terminal for grounding.

(e) Tape and tie back any conductors that have been removed.

3.81 Remove the keyboard LAK21, 31, or 47 from the cabinet according to Bulletin 250B.

3.82 Remove all wires from the keyboard F connector.

3.83 For keyboard LAK21 or LAK47, all wires may be cut off. Remove connector from the keyboard and clean all pins.

3.84 Remove all wires from the F connector. All wires (including straps) may be cut off (cut close to connector) except for the red wire on pin 6 and the two yellow wires on pin 8, which should be unsoldered. Remove the connector from the keyboard and clean all pins. The purple wire on pin 12 and the slate wire on pin 13 run to the motor terminal block. Pull these two wires back to the terminal block and reroute directly to the F connector when reinstalling. Strip approximately 1/4-inch of insulation from these two wires in preparation for resoldering to the connector.

3.85 On sets equipped for synchronous pulse operation, remove the wiring to the existing magnet and contact assembly. Replace the existing magnet with the 252M magnet. Replace the existing contact assembly with the 326357 contact assembly, using the existing hardware. Readjust the contact assembly and the magnets according to Bulletin 250B.

Note: On sets not equipped for synchronous pulse operation, 164659 modification kit must be ordered and installed.

3.86 Wire the 326355 cable assembly, from the 252M magnet and the 326357 contact assembly, to the keyboard connector following the same routing as the old cable. Utilize pins 0, 1, 2, 3, 4, and 5 for this cable (Figure 3).

3.87 At this point (for keyboard LAK31 only), reconnect the red, yellow, purple, and slate wires previously removed as follows:

Connector Pin Number	Wire Color
9	Red
10	2 Yellow
12	Purple
13	Slate

3.88 The K-KT-T auxiliary switch in the keyboard must be rewired to control the relays in the 323812 and 323815 electrical service assemblies. For better access to the switch, remove the tape container and its bracket according to Bulletin 250B.

(a) Only the wires shown in Figure 4 for the LAK31, and Figure 5 for the LAK21 or LAK47 should remain on these terminals. All other wires on terminals 1, 2, 4, and 7 should be moved to other unused terminals.

(b) After wiring cable 327343 in place, install the 182520 diode as shown in Figure 4 or 5. Cover diode with tubing.

(c) Solder a 135563 strap to pin 18, and connect the terminal end to the connector mounting bracket or any unused hole within reach. Use the 151631 screw, 7002 flat washer, 2191 lockwasher, and 3598 nut.

Note: In wiring the diode to the K-KT-T switch, use a low wattage soldering iron of approximately 25 watts.

(d) Remount the connector on the keyboard and replace all terminal covers and hardware.

Note: The auxiliary switch should be equipped with the 158114 cam for mechanical linkup to the LAK-LPR. The keyboard must also have the 193802 modification kit to delay keyboard trip on repeat character. If not in older keyboards, these must be ordered separately.

3.89 Install the 321219 contact box assembly on the keyboard in accordance with Specification 50504S. When mounting the connector bracket at the left rear corner of the keyboard base, tie the cable at sufficient points to prevent the cable from being damaged.

3.90 The leads from the keyboard must be available at the C terminal strips in the cabinet to make the various connections.

(a) Unplug the old cable to the keyboard, tape the connector completely, and tie the cable at the rear of the LCXB base. Make sure no part of the old connector plug touches any metal in the cabinet.

(b) Replace the old cable with the 324159 cable assembly and attach to the C terminal strips according to Figures 6 and 7.

(c) Tape and tie back to the 324159 cable the W-BR, W-R, W-S, and BL wires (which are not used), and the unused drain wire.

(d) In preparation for the connecting of this cable, remove the wires present from C terminals 1, 2, 3, 4, 5, 6, 10, 11, 12, 13, and 14. Also remove the straps from C terminals 4, 5, 6, 10, 13, and 14.

3.91 When using the LESU13 with the LAAC237 cabinet (as in the AN/UGC16 set), place the green wire originally on terminal C11 on terminal C10, and place the orange wire originally on terminal C12 on terminal C14. Remove the white-slate wire from C34. Tape and tie back these wires to the body of the cable, making sure no terminals touch each other.

3.92 When using the 173824 electrical service unit with the LAAC229 cabinet (as in the AN/UGC13 or AN/UGC13AX sets), move the white-red wire on C16 to terminal C10, and move the white-black-slate wire on C17 to terminal C14. Tape and tie back the remainder of the wires to the body of the cable.

3.93 When using the 304203 electrical service unit with the LAAC229 cabinet (as in the AN/UGC32X set), move the black-slate wire on C17 to terminal C10, and move the white-brown wire on C18 to terminal C14. Tape and tie back the remainder of the wires to the body of the cable.

3.94 To service the electrical service units LESU12, 13, 173824, or 304203, refer to Bulletin 217B for disassembly and reassembly instructions. The LESU12 found in the cabinet pedestal in AN/UGC16 sets should be removed according to Bulletin 217B. Retain the LESU12.

3.95 When servicing the LESU13, turn the unit over (per Bulletin 217B) to aid in removing the line relay mounting assembly and its cable, and installing the 305143 power supply assembly. Place the 305143 power supply assembly next to the D terminal block with the fuse holder toward the front. If necessary, move the rectifier assembly to the left to make room for the power supply. Wire the power supply according to Figure 7 with the 84551 straps.

(a) Disconnect the orange and the white-slate wires from the line shunt relay coil.

(b) Remove the purple wire from terminal E4, the slate wire from terminal E7, and the orange wire from terminal E8.

(c) Tape and tie back these wires to the body of the cable, making sure no terminals touch each other.

WARNING: TERMINALS E4 AND E7 ARE HOT LEADS. DISCONNECT ALL POWER BEFORE WORKING ON THE LESU.

(d) Discard the line test key control assembly at the left end of the unit and the nameplate and screws on the cabinet.

3.96 When servicing the LESU173824, turn the unit over to aid in removing the three electronic keyers. Remove the wires from the terminal block of each keyer, and tape and tie these wires to the cable. Make sure non of the terminals touch each other. If necessary, move the rectifier assembly to the left to make room for the power supply. Install the 305143 power supply assembly, placing it next to the D terminal block with the fuse holder toward the front. Wire the power supply according to Figure 7 with the 84551 straps.

3.97 When servicing the LESU304203, turn the unit over to aid in removing the three selector magnet drivers. Remove the three selector magnet drivers and their cable. Install the 305143 power supply assembly, placing it next to the D terminal block with the fuse holder toward the front. Wire the power supply according to Figure 7 with the 84551 straps.

3.98 Remove the auxiliary typing reperforator LPR35 or LPR51 from its base in the cabinet according to Bulletin 247B.

3.99 Install and adjust the 321218 dust cover assembly according to Specification 50503S.

3.100 Remove the typing reperforator base LRB42 from the LAAC237 cabinet used in the AN/UGC16 set according to Section 573-101-702TC.

3.101 To complete the ac path to the motor on the LRB base, strap terminal DH-3 to terminal DH-9 using the 84551 strap. Also, remove the red wire from DH-9 and the green wire from DH-3 going to pin 9 of the F connector on the base, and tape and tie these two wires to the cable.

3.102 Remove the typing reperforator LPR36, LPR52, or LPR57 from the keyboard according to Bulletin 247B.

3.103 Install and adjust the 321218 dust cover assembly according to Specification 50503S.

3.104 Remove the transmitter distributor LXD11 or LXD31 from its base according to Bulletin 235B. Retain all hardware and cable clamps.

3.105 Replace the existing magnet cores with the 323354 cores, and replace the magnets with the 256M magnets. Adjust according to Bulletin 235B.

3.106 Remove the control lever contact assembly and replace (using the old mounting hardware) with the 326372 contact assembly, and adjust according to Bulletin 235B.

3.107 Remove the existing contact box assembly and install the 320036 contact box assembly in the transmitter distributor according to Specification 50504S.

3.108 Disconnect the cable between the transmitter distributor base LCXB13 and the LESU assembly, and retain all hardware and cable clamps. Also remove the LXD cable and connector from the LCXB base, and replace it with the 324682 cable assembly. In preparing for the connecting of the new cable, remove the present wires from the C terminals as follows:

Cabinet Code	C Terminal Block Numbers
LAAC229	168, 171, 172, 174, 175, 176, 177
LAAC237	136, 137, 138, 139, 140, 141, 142, 143

(a) Tape and tie these wires, making sure no terminals touch each other.

(b) Remove and retain all straps from these terminals.

(c) Replace the old cable with the 324157 cable, and attach to the C terminals according to Figure 9 or 10 (depending on which cabinet is being modified).

(d) The old cable from the LESU should have its connector completely taped and then tied to the cabinet or near the LCXB base. Make sure no part of the old connector plug touches any metal parts in the cabinet.

3.109 Attach the ground strap according to Figure 9 or 10.

3.110 Remove the lower door from the cabinet and drill holes for the 324677 fan modification kit (see Specification 50512S) according to Figure 11.

(a) Mount the fan, hardware, and cable connector bracket according to Specification 50512S.

(b) Attach the 326778 straps according to Figure 12.

3.111 Move the power factor corrector capacitors to the left side of the cabinet pedestal and mount approximately as shown in Figure 15. The old cables must be replaced by the 324689 and 324691 cable assemblies.

3.112 Install the 160387 apparatus rack in the cabinet according to Specification 5915S. If installed, position according to Figure 15. (See note on Figure 15.)

3.113 Mount the 323812 and 323815 electrical service assemblies in the cabinet on the 160387 apparatus rack (Figure 15), using the 115412 screws and 153017 nuts provided. Mounting channels are supplied with the 323812 ESA.

(a) Route the signal cables from the 323815 electrical service assembly up through the opening in the cabinet and route to the printer, keyboard, transmitter distributor, auxiliary typing reperforator, and the keyboard mounted typing reperforator connectors according to Figure 15.

(b) Tie the cables at sufficient places to prevent them from being damaged.

3.114 Bring the remaining cables from the 323812 and 323815 electrical service assemblies up through the openings in the cabinet, and attach to the C terminal blocks according to Figures 6, 7, 9, and 10.

3.115 Replace the LXD11 or LXD31 on its base according to Bulletin 235B. Mount the contact box assembly connector according to Specification 50504S.

3.116 Replace the LRB42 base in the cabinet according to Section 573-101-702TC.

3.117 Replace the LPR35 or LPR52 typing reperforator on its base according to Bulletin 247B.

3.118 Replace the LESU13, LESU173824, or LESU304203 according to Bulletin 217B.

3.119 Replace the LPR36, LPR51, or LPR57 on the keyboard according to Bulletin 247B.

3.120 Replace the LAK21, LAK31, or LAK47 according to Bulletin 250B.

3.121 Replace the LP77 or LP108 according to Bulletin 217B.

3.122 Connect the signal cables to the LXD, LAK, AUX LPR, LAK LPR, and LP connectors shown in Figure 15.

3.123 Remove the covers from the 323812 and 323815 electrical service assembly.

(a) Attach power and signal leads in accordance with WDP0043.

(b) Use shielded conduit or flexible cable to bring power and signal leads into the set.

Note: Power connection modification kit 324149 may be used to aid in terminating power and signal cables. Order this modification kit separately.

3.124 Insert the circuit cards in their appropriate connectors in accordance with 8316WD for the 323812 ESA and 8315WD for the 323815 ESA (see WDP0043).

3.125 Adjust the 321219 contact box assembly on the LAK21, LAK31, or LAK47 according to Specification 50504S.

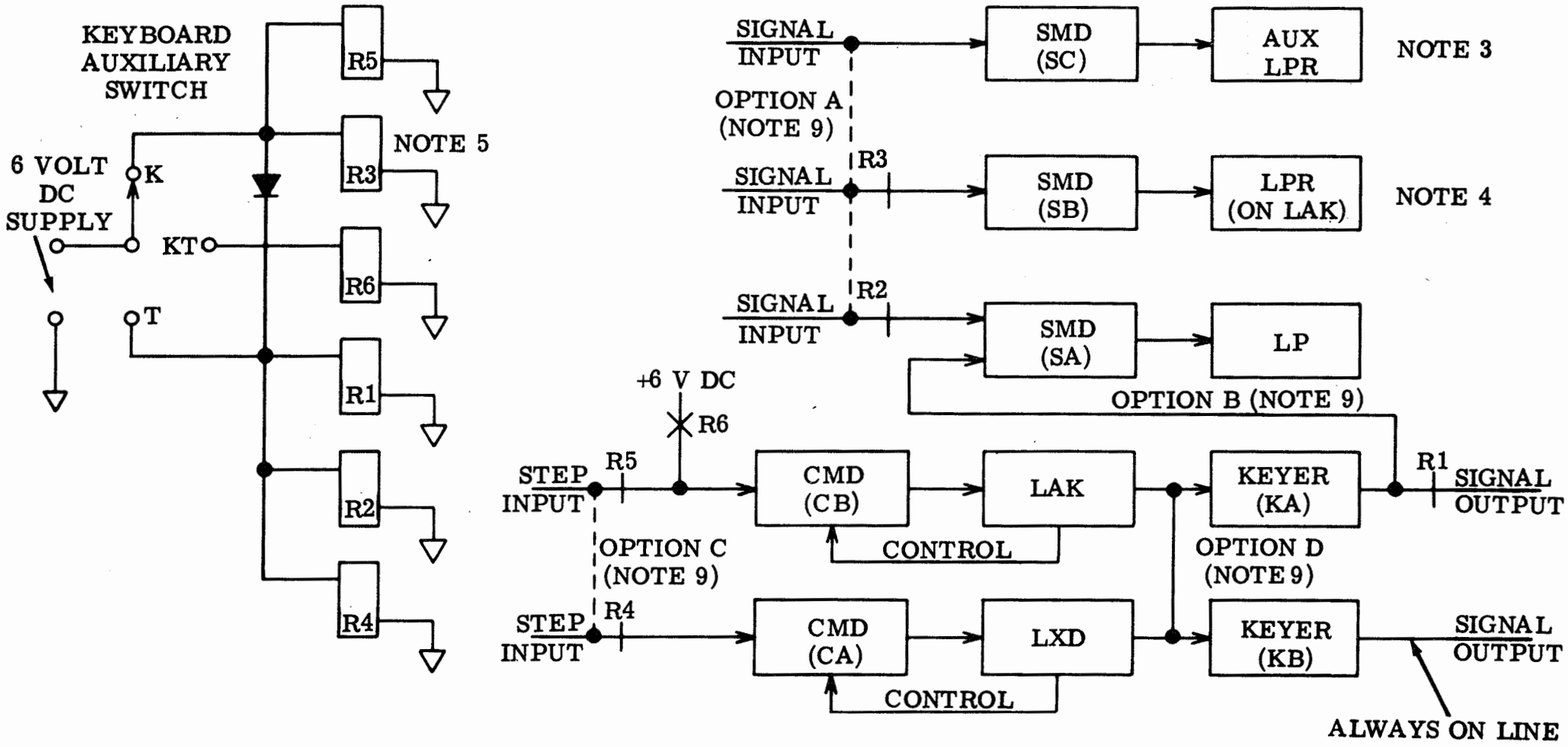
3.126 Adjust the 320036 contact box assembly on the LXD11 or LXD31 according to Specification 50504S.

3.127 Replace covers on electrical service assemblies and reinstall the front panel on the cabinet and other cabinet parts removed during disassembly.

3.128 Replace the LXD cover.

3.129 Perform operational tests outlined in Bulletins 216B, 246B, 249B, and 258B. Refer to Paragraph 2.11 for the new mode switching conditions of the K-KT-T auxiliary switch.

3.130 The 324148 CAUTION label should be affixed to a prominent place on all cabinets.



Notes:

1. Relay contacts shown with keyboard auxiliary switch in K position.
2. Dashed circuitry is not supplied as part of electrical service assemblies.
3. AUX LPR and attendant SMD not in sets using modification kit 323806.
4. LPR on LAK and attendant SMD not in sets using modification kits 323806 or 323807.
5. Relay R3 only provided with modification kit 323808.
6. With keyboard auxiliary switch in K position, relays R1, 2, 3, 4, 5, are energized.
7. With keyboard auxiliary switch in KT position, relay R6 is energized.
8. With keyboard auxiliary switch in T position, relays R1, 2, 4 are energized.
9. Options are explained in Paragraph 2. 10.

Figure 1 - Signal and Stepping Pulse Flow Diagram

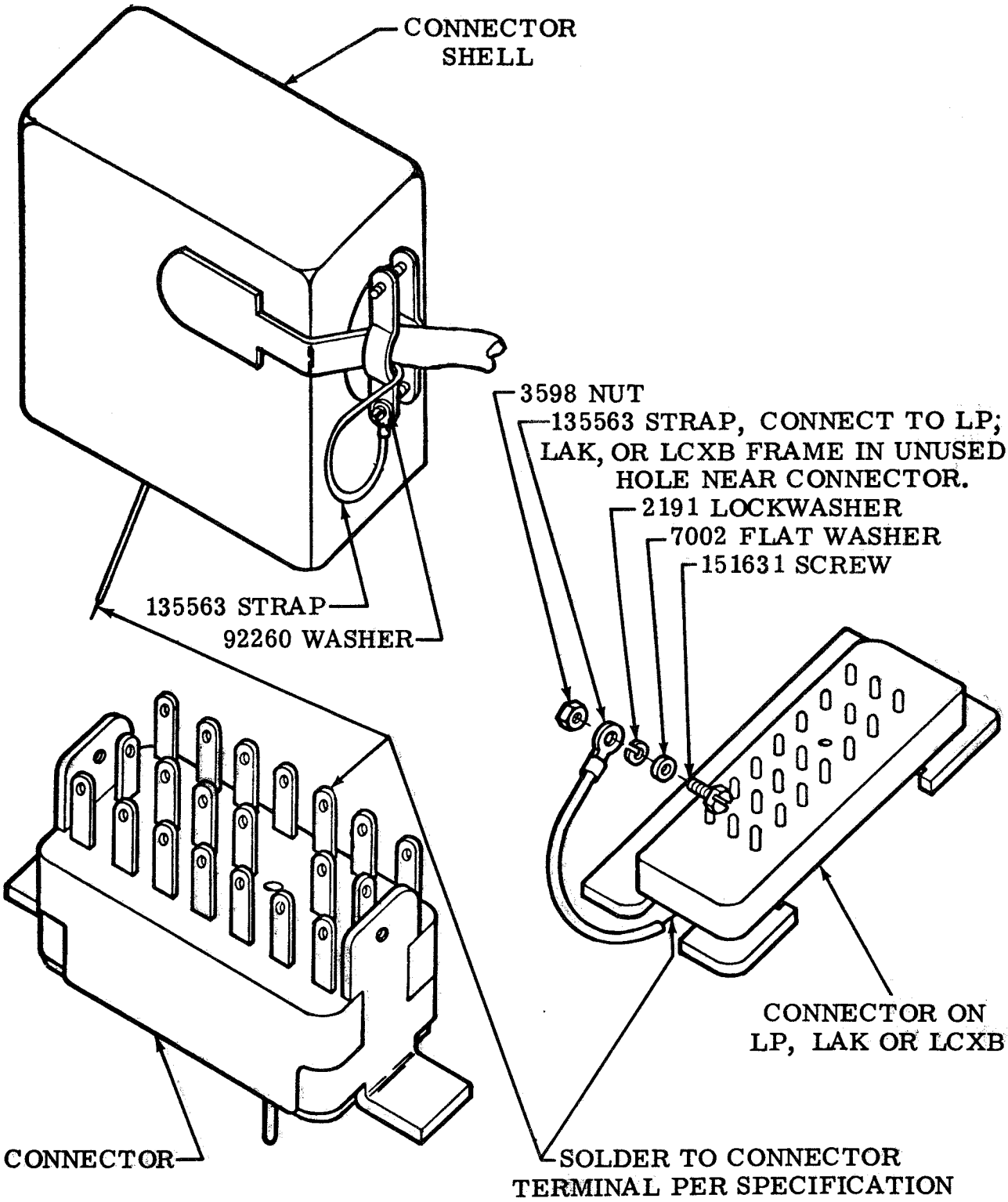


Figure 2 - Strapping for Unit Connectors

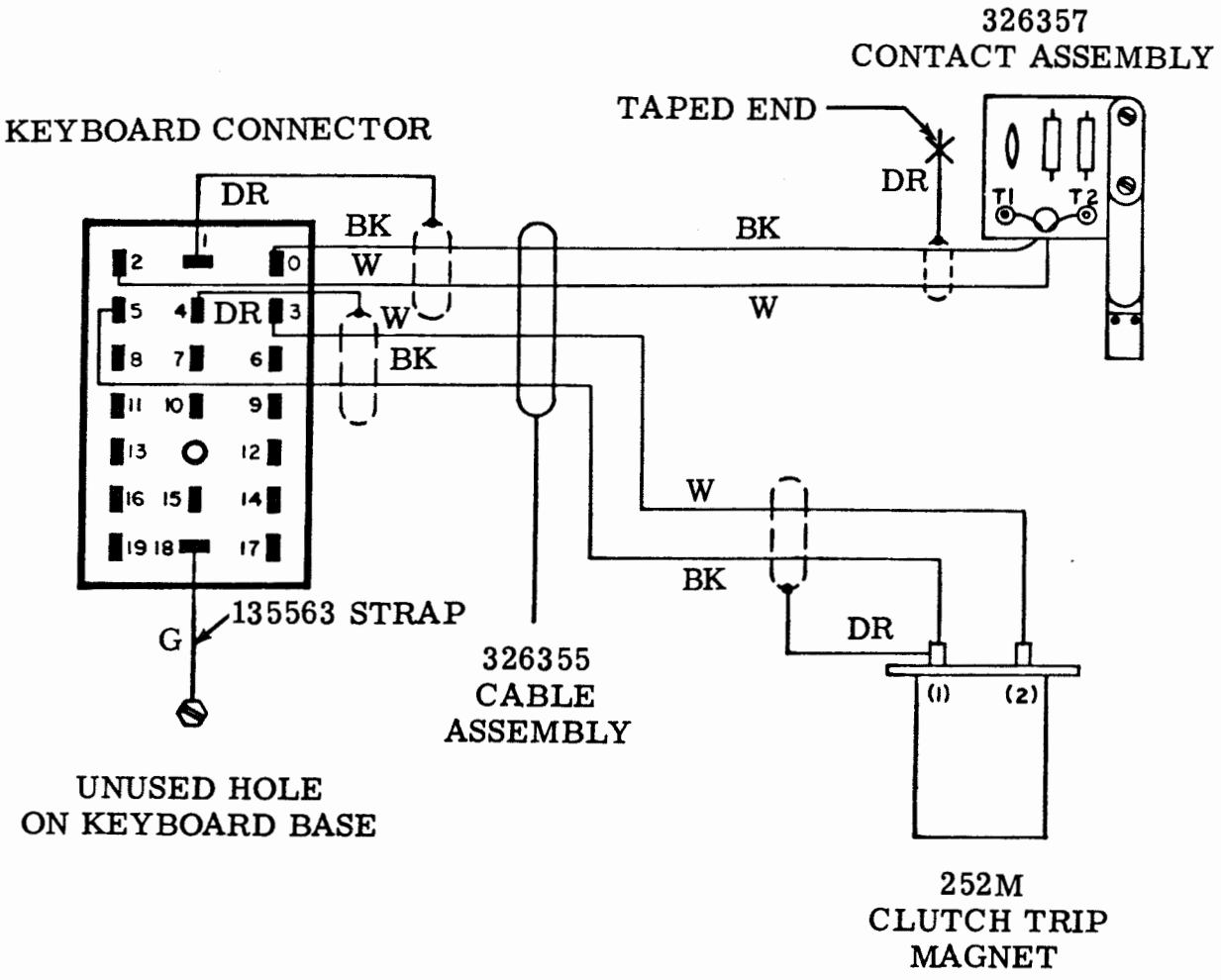


Figure 3 - Wiring for 326355 Cable Assembly

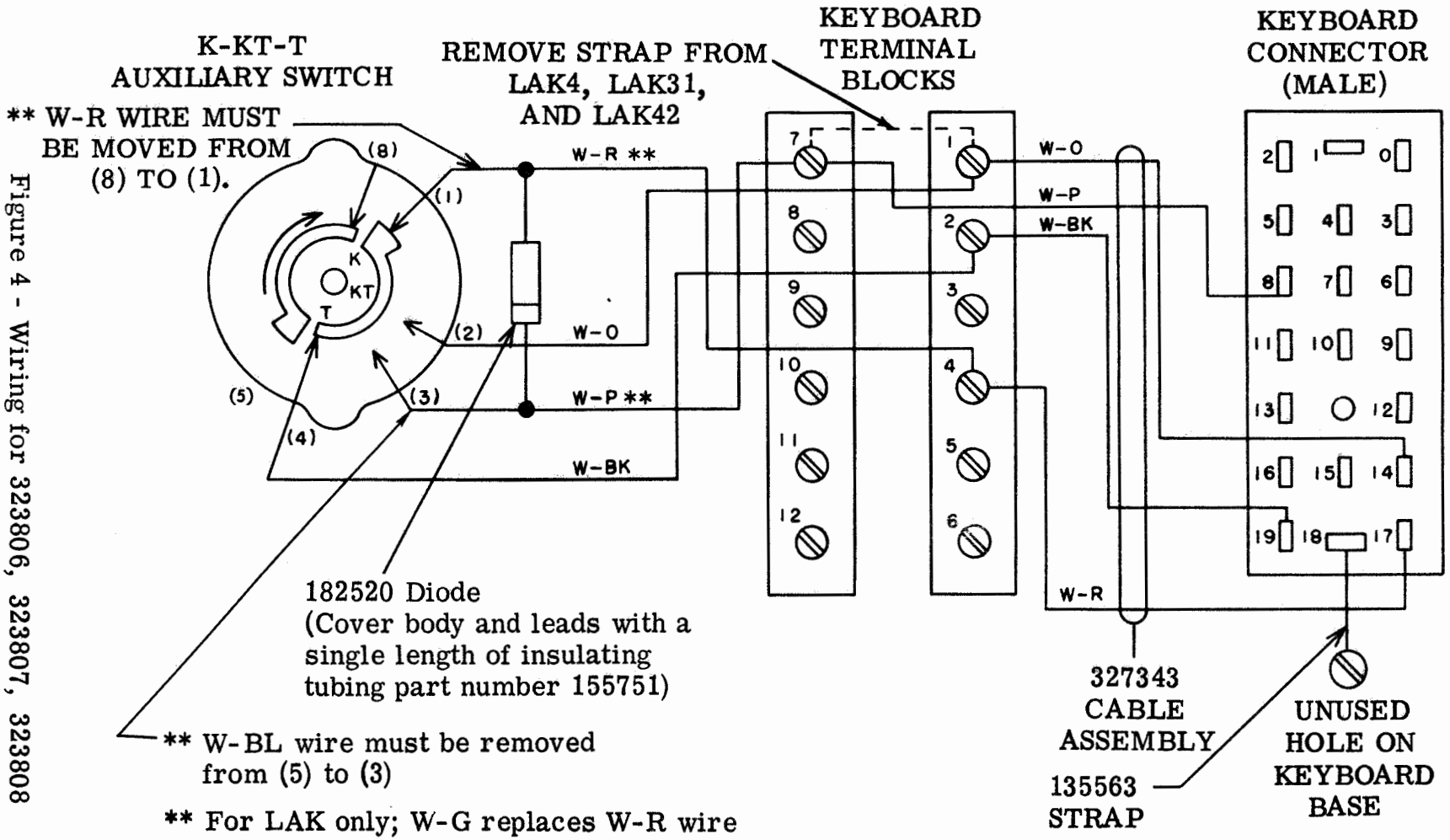


Figure 4 - Wiring for 323806, 323807, 323808
LAK4, LAK9, LAK31, LAK42

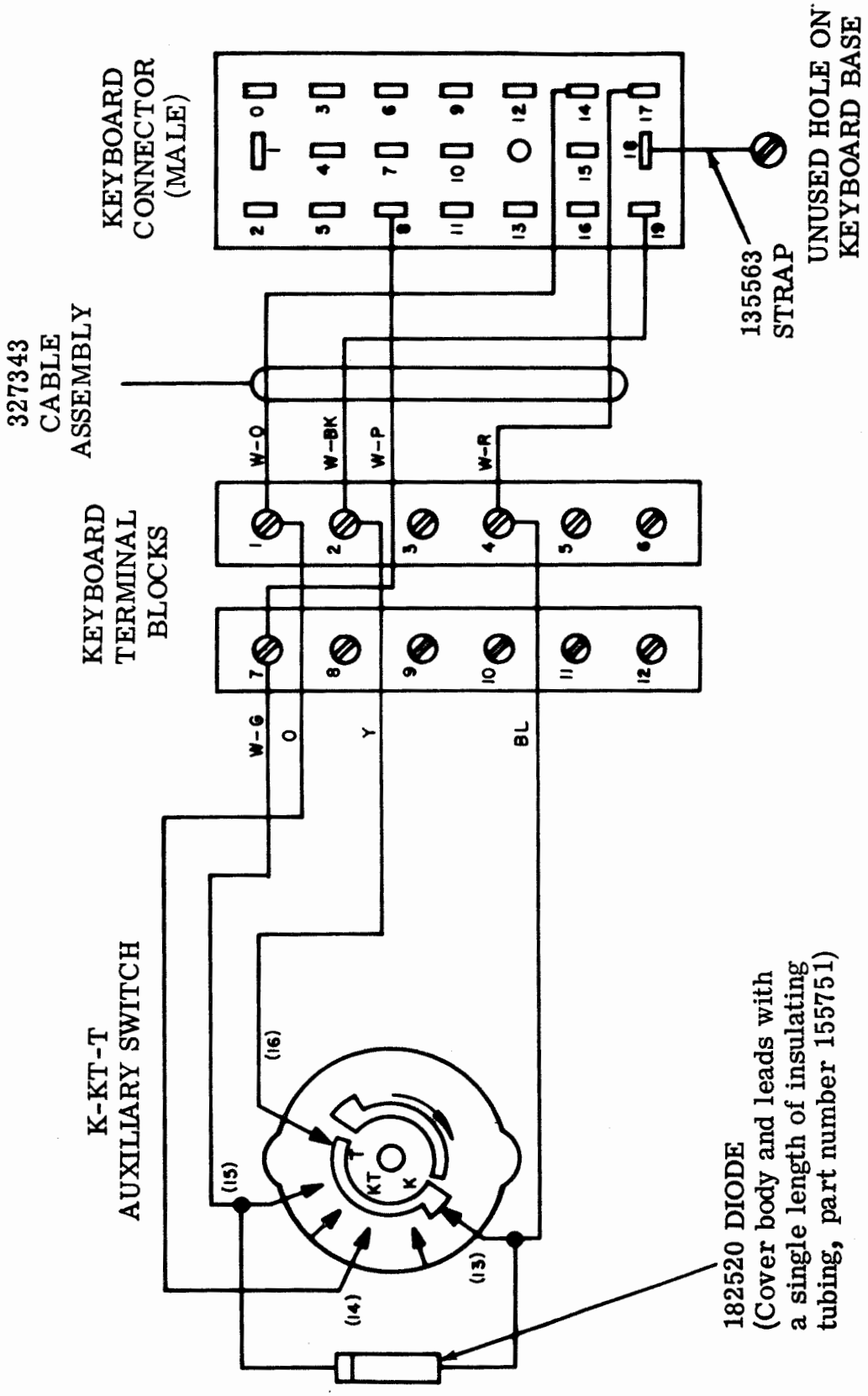


Figure 5 - Wiring for 323808 - LAK21 and LAK47

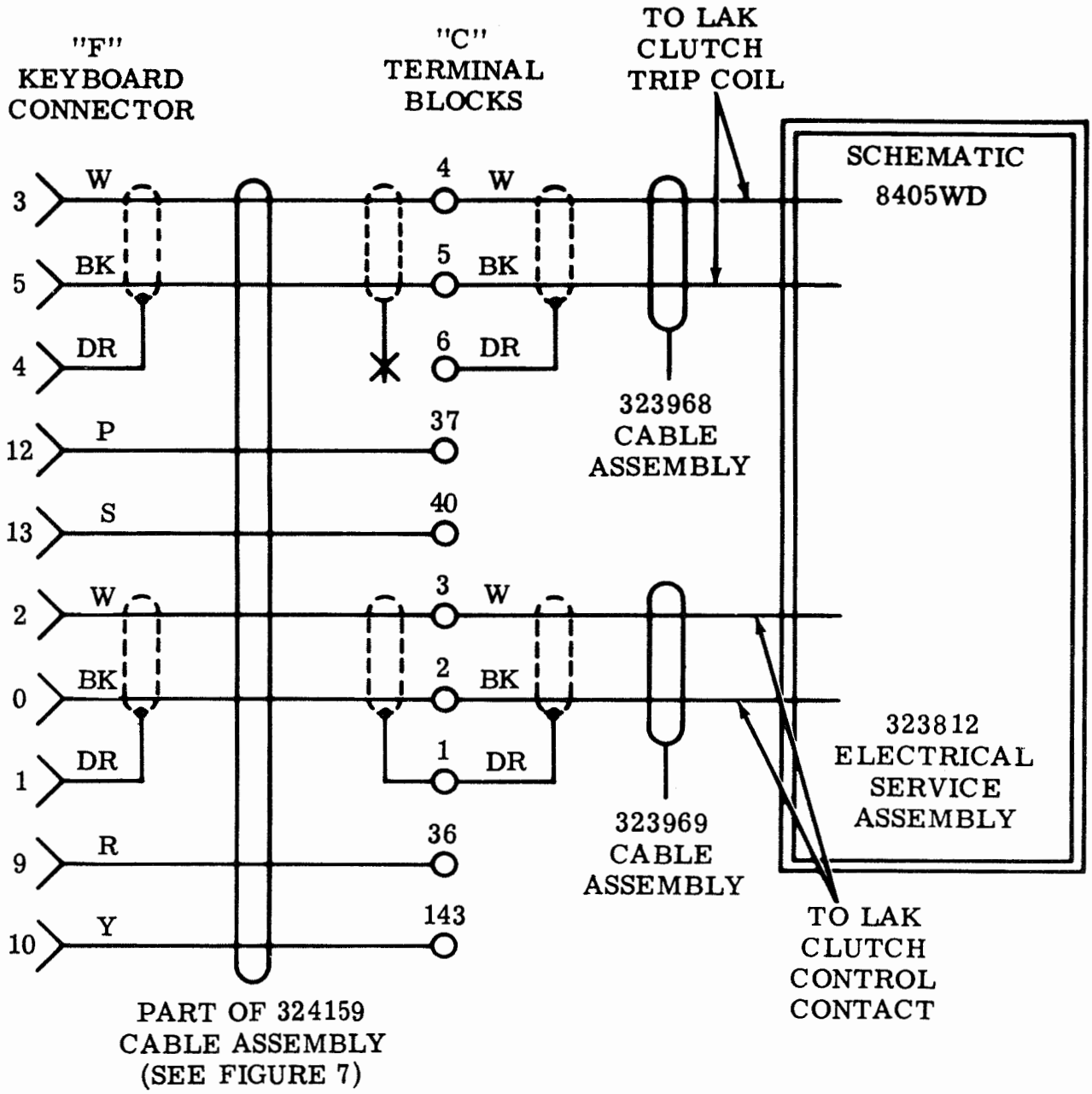


Figure 6 - Part of 324159 Cable Assembly

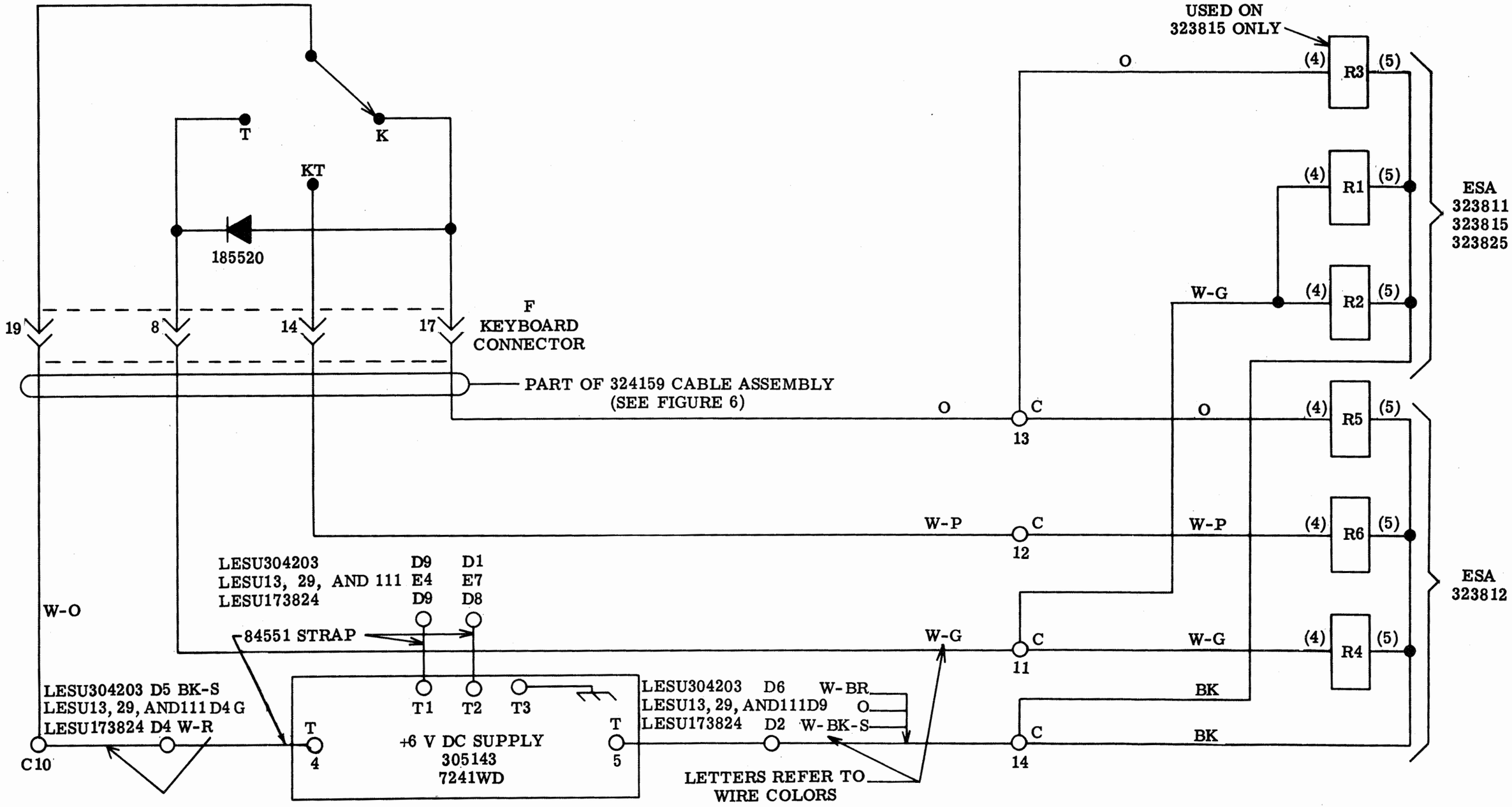
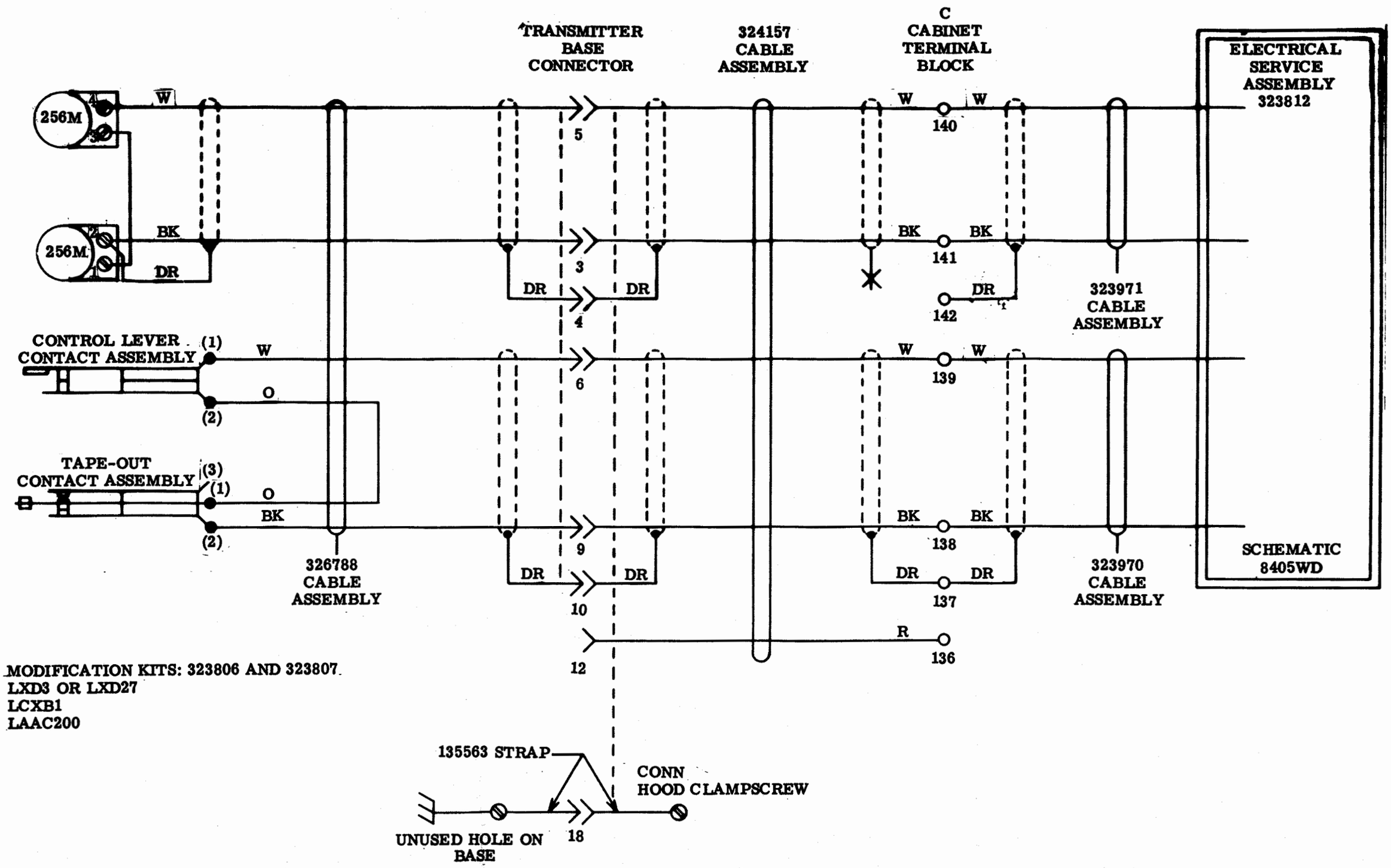
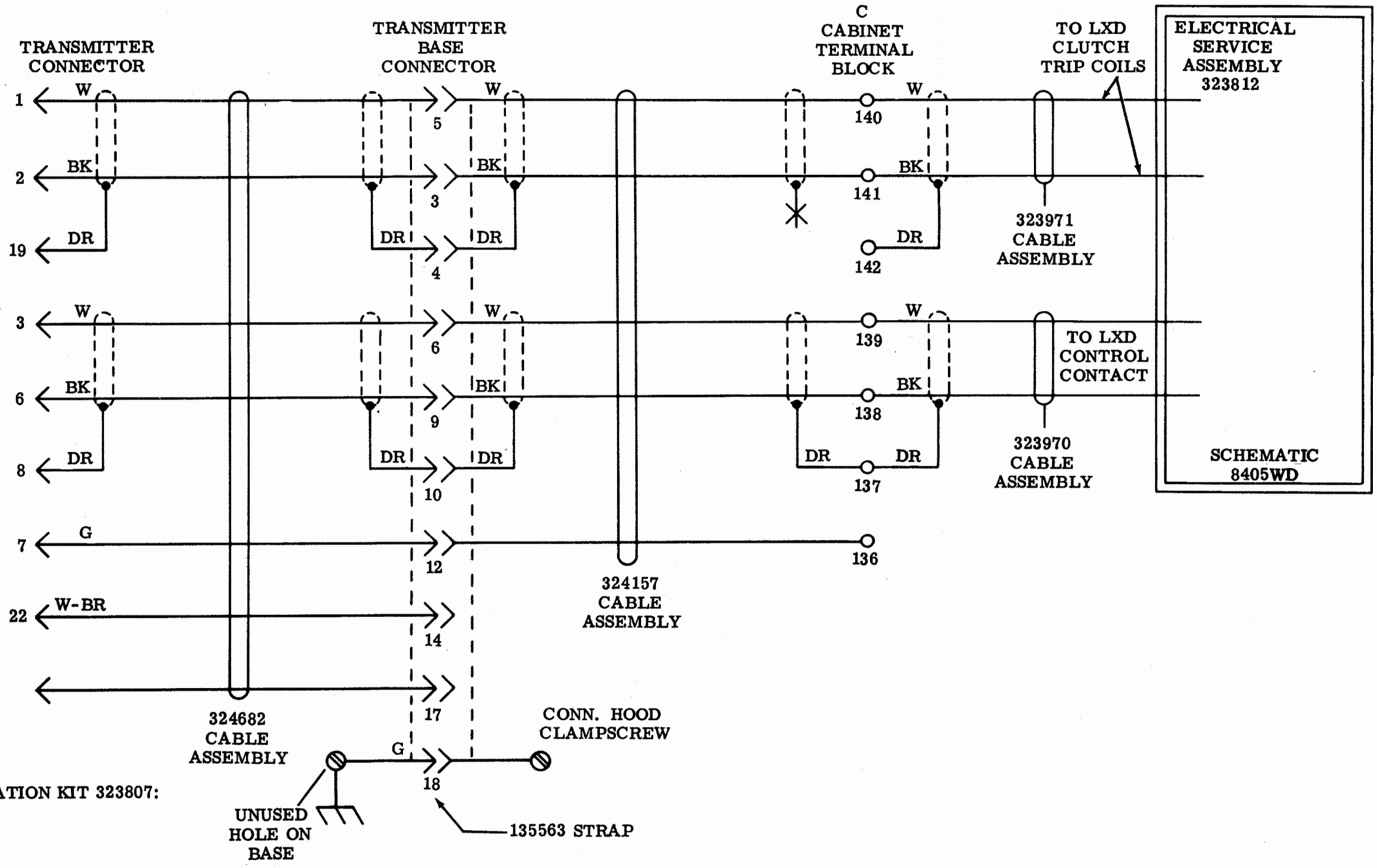


Figure 7 - Part of 324159 Cable Assembly



MODIFICATION KITS: 323806 AND 323807
LXD3 OR LXD27
LCXB1
LAAC200

Figure 8 - 326788 Cable Assembly



MODIFICATION KIT 323807:
LXD4
LCXB8
LAAC207

MODIFICATION KIT 323808:
LXD11
LCXB13
LAAC237

Figure 9 - 324157 Cable Assembly for LAAC229 Cabinet

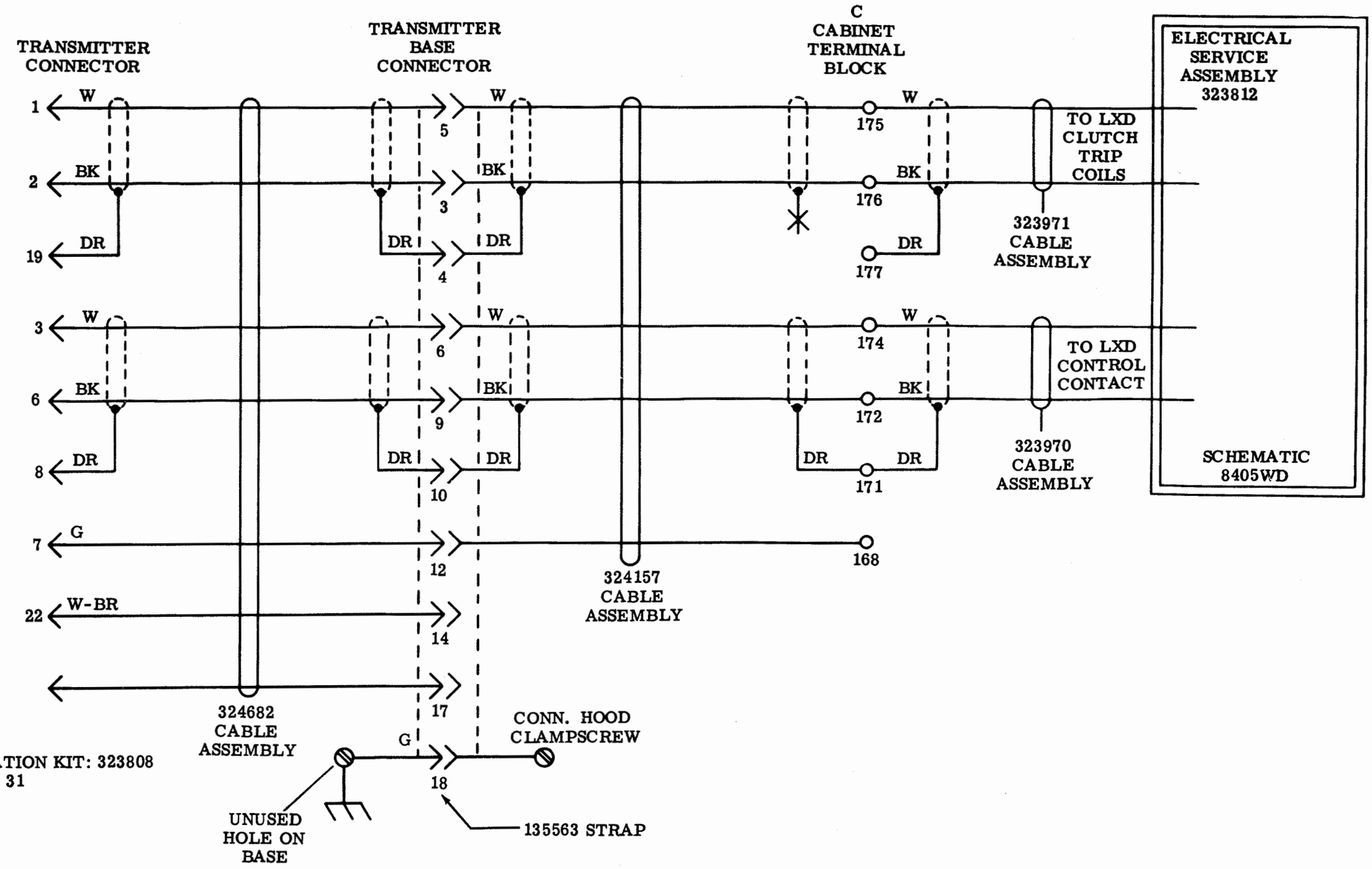
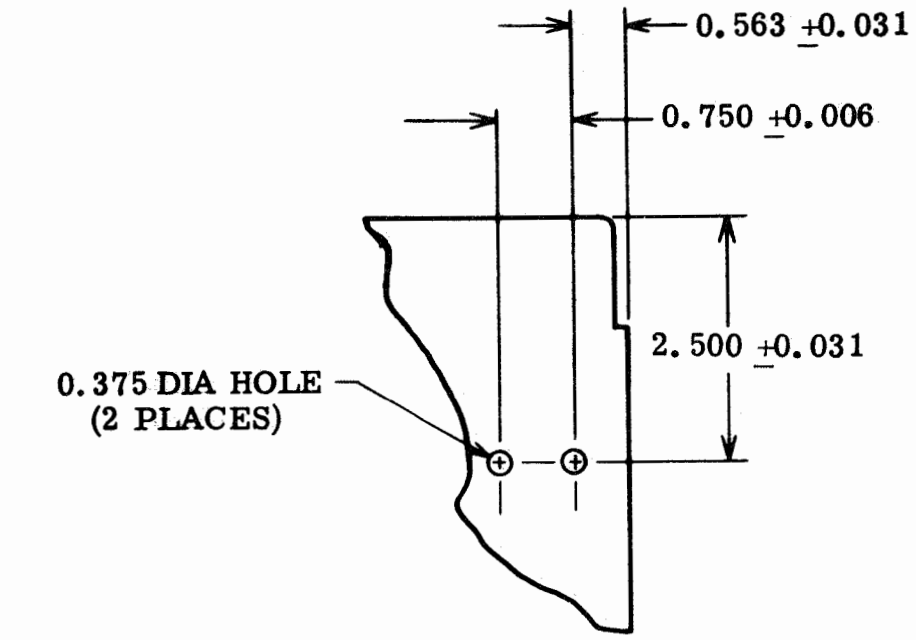
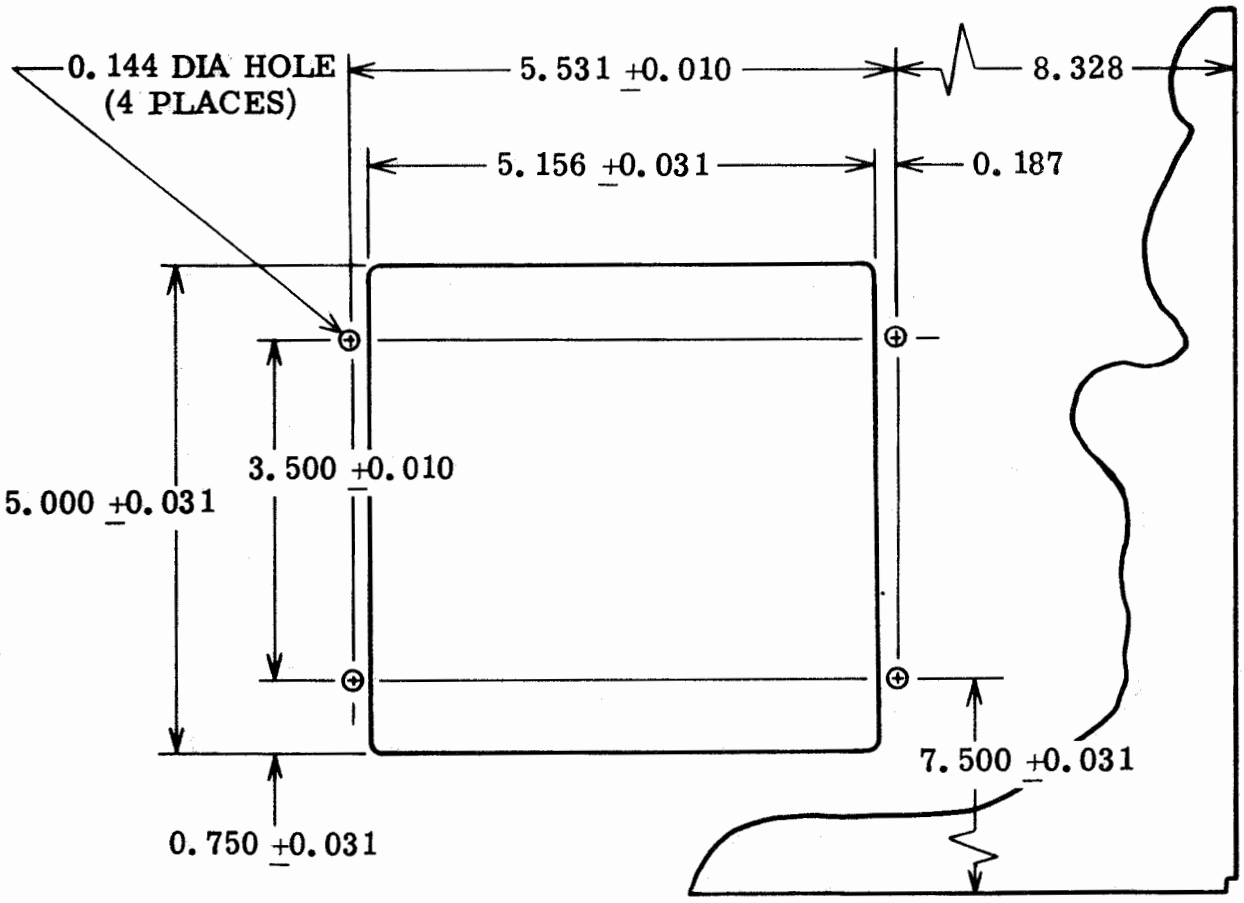


Figure 10 - 324157 Cable assembly for LAAC229 Cabinet



UPPER RIGHT HAND CORNER



LOWER RIGHT HAND CORNER

Figure 11 - Fan Modification Kit Hole Pattern

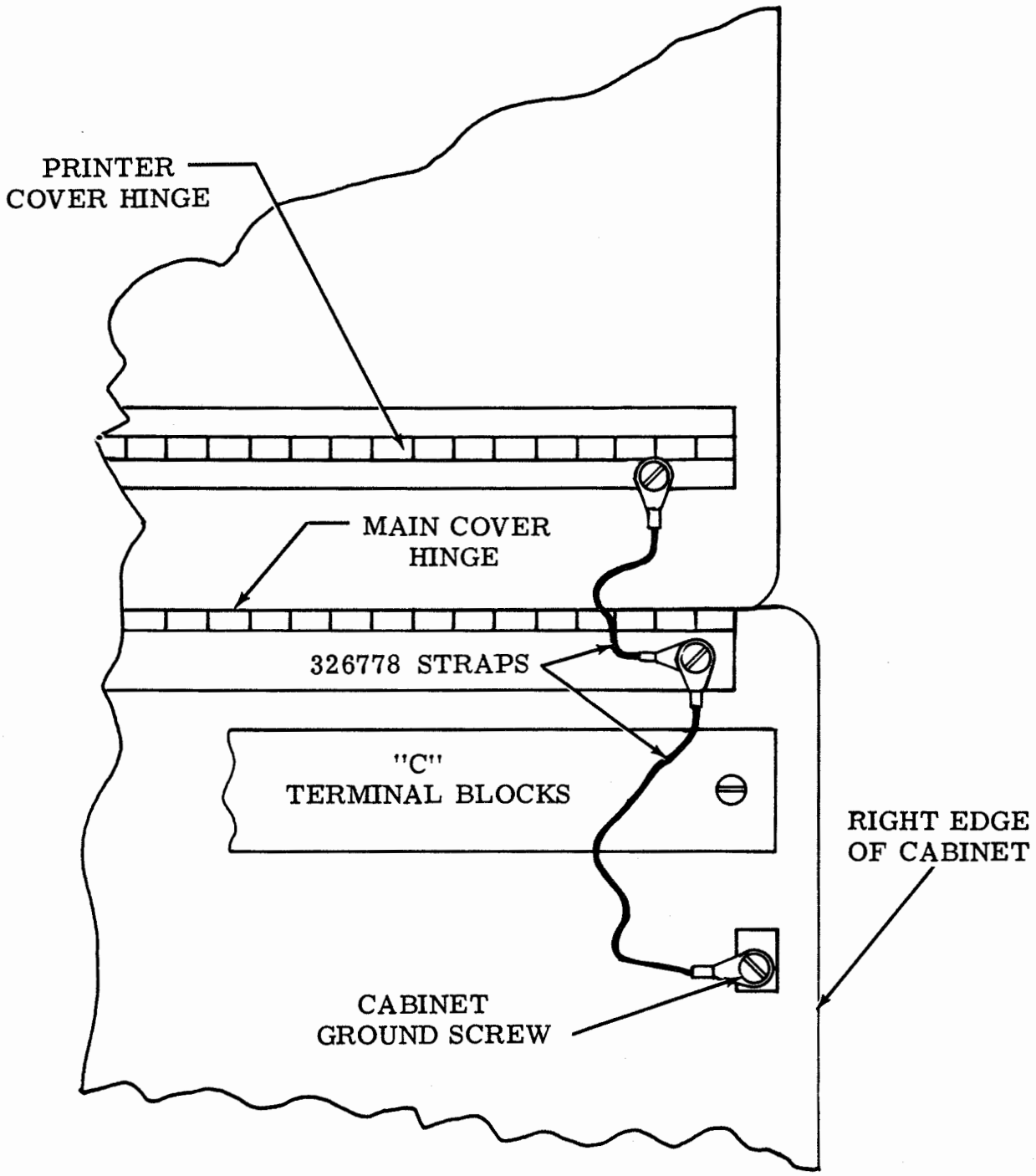


Figure 12 - Grounding for Cabinet Cover

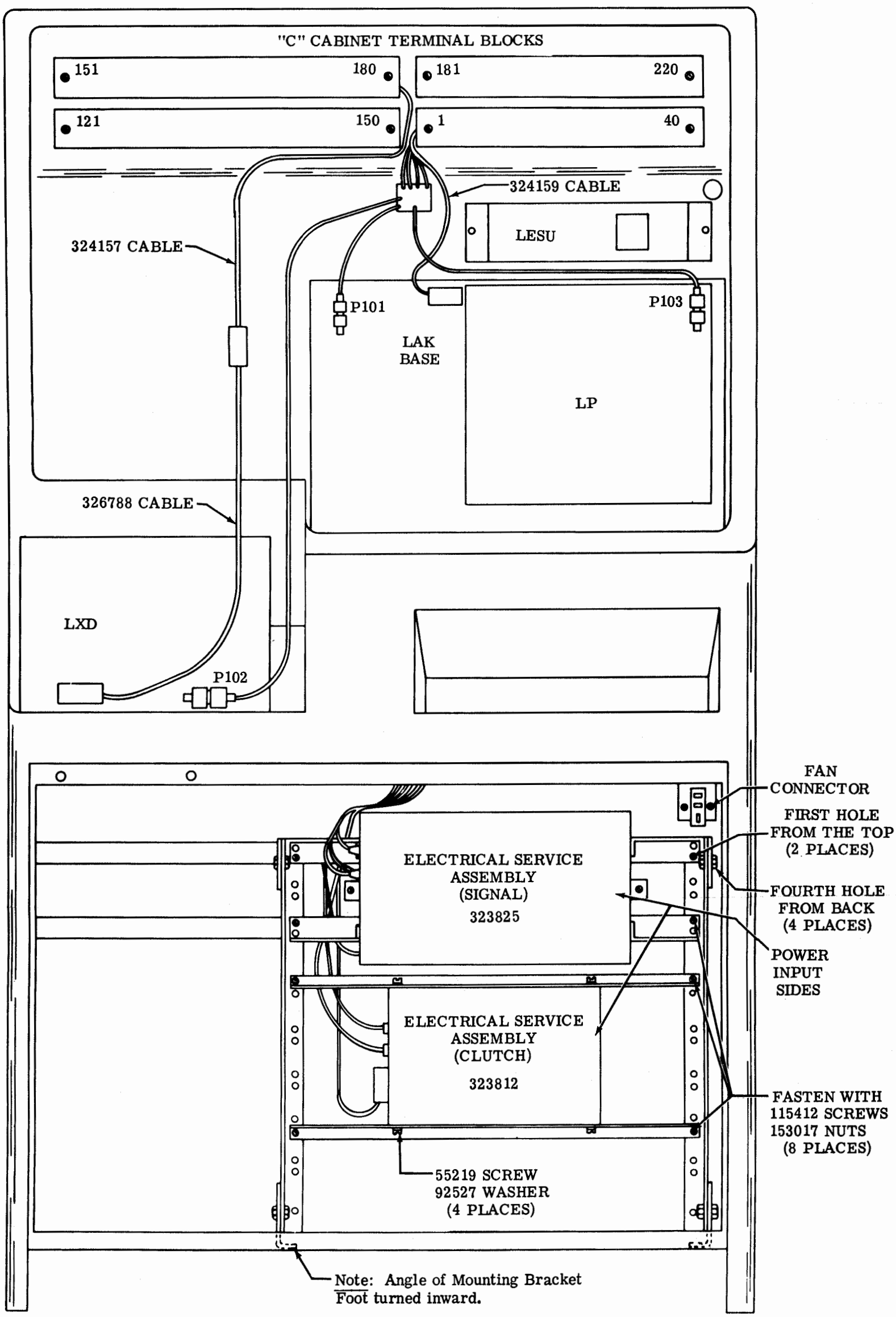


Figure 13 - 323806 Modification Kit for Location of Cables, ESA's and Other Components in Set

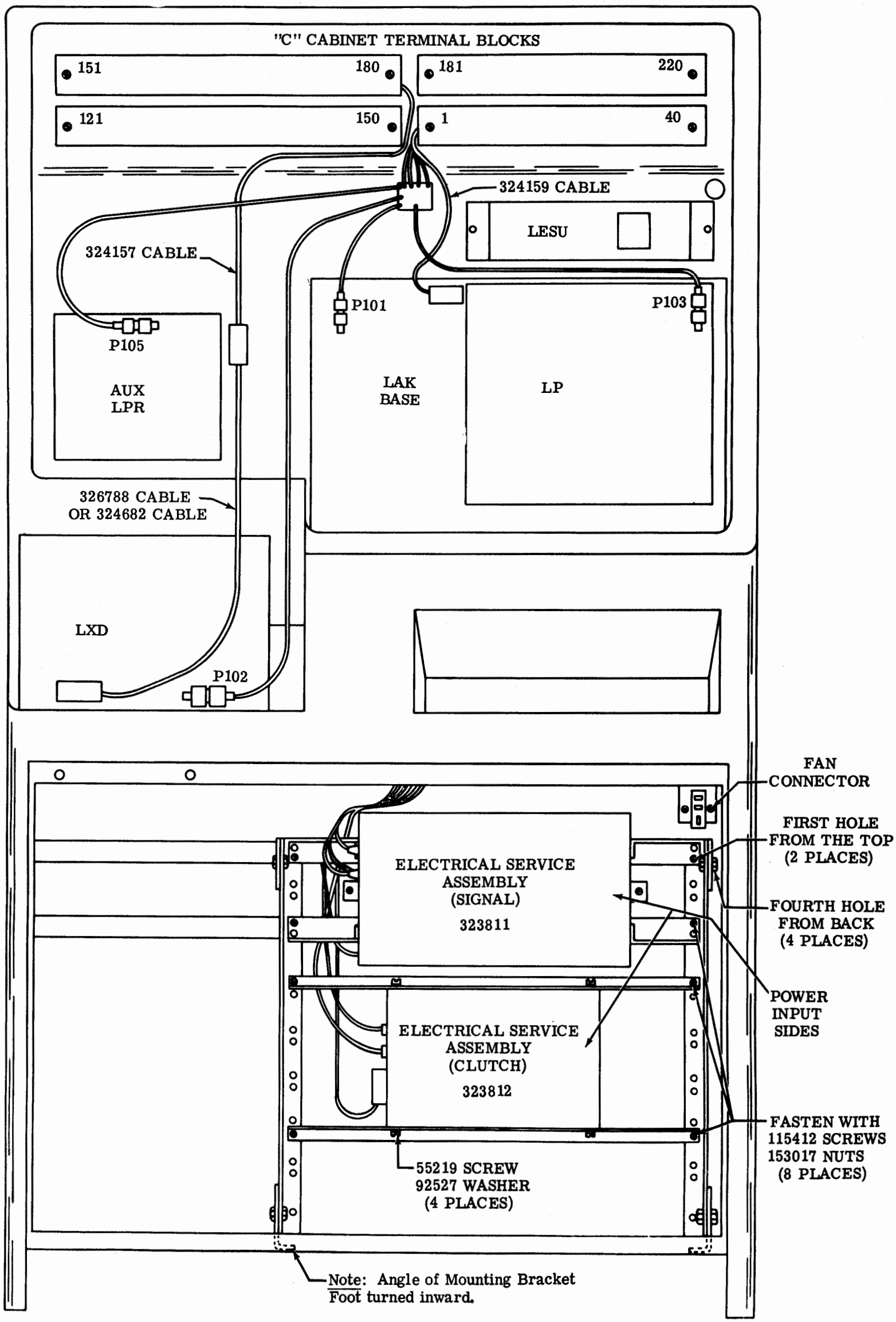


Figure 14 - 323807 Modification Kit for Location of Cables, ESA's and Other Components in Set

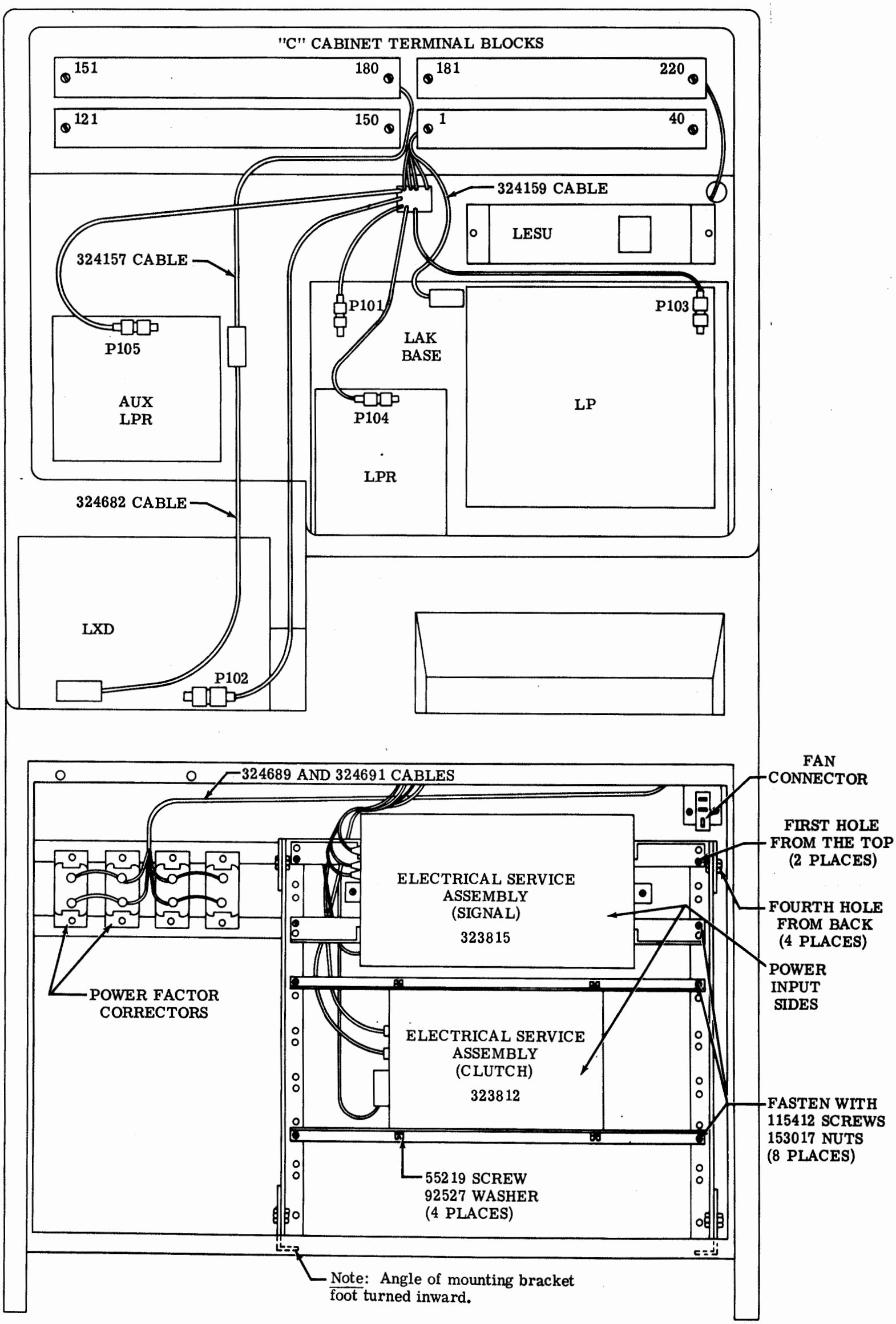


Figure 15 - 323808 Modification Kit for Location of Cables, ESA's and Other Components in Set

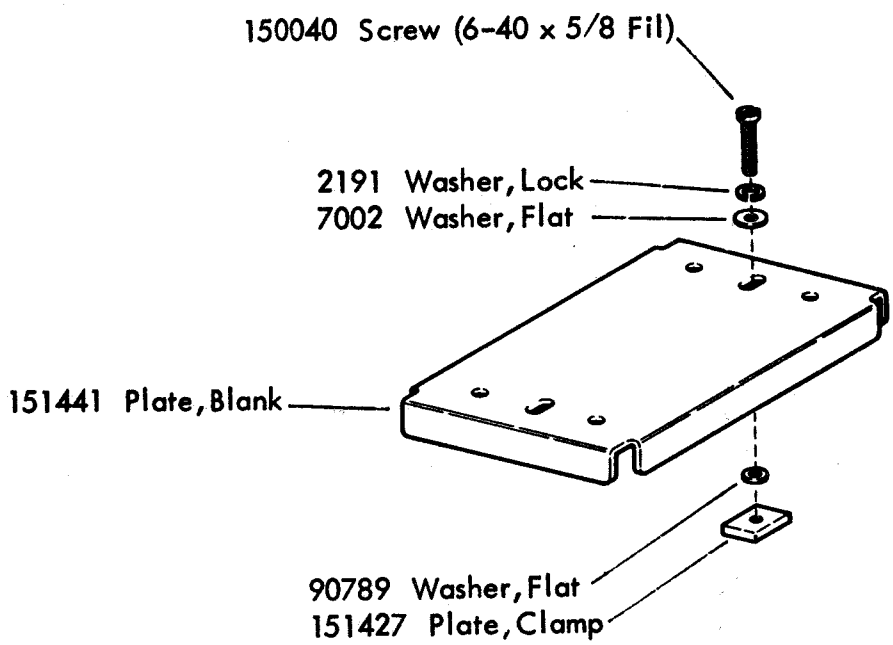
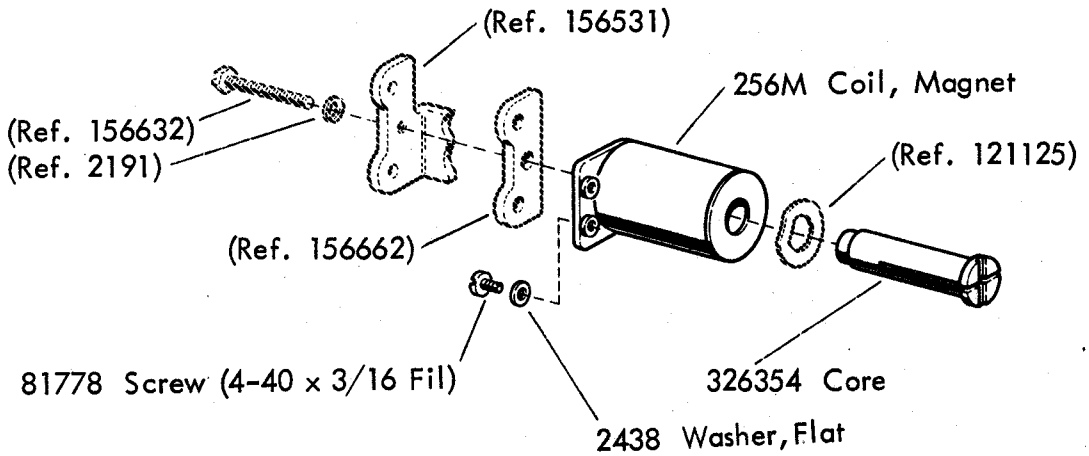


Figure 16 - 152757 Blank Plate Assembly



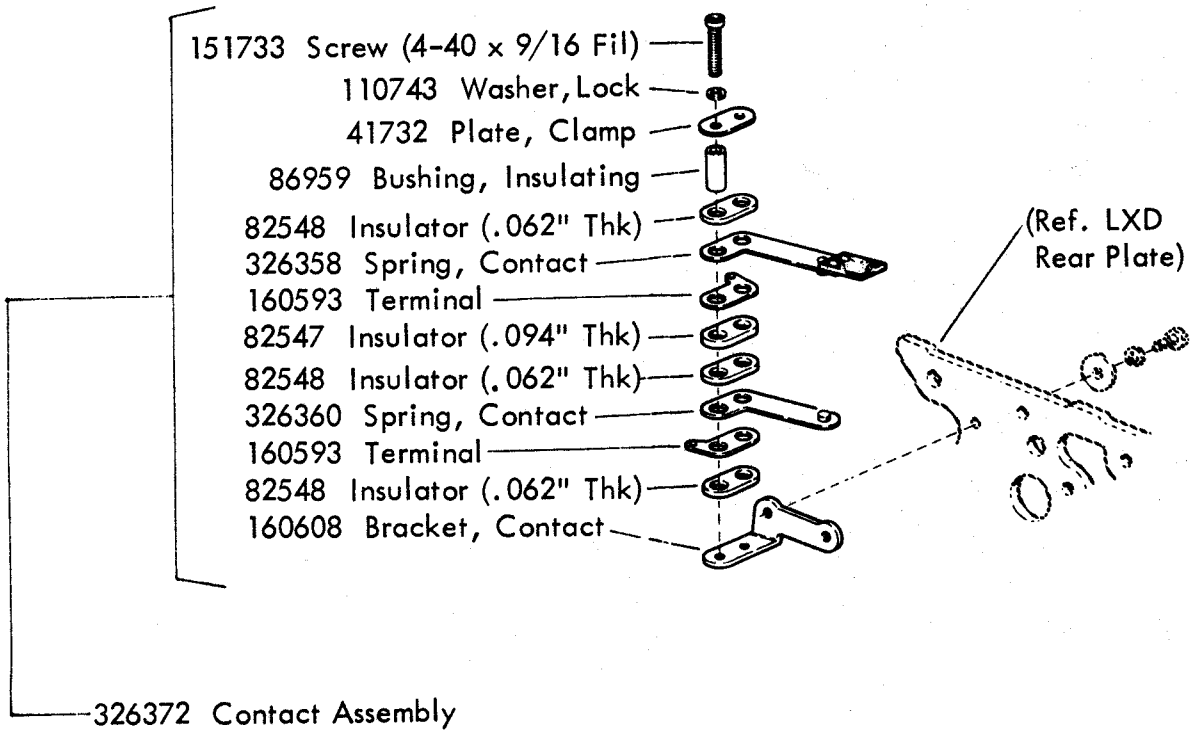


Figure 17 - Start-Stop Contact and Clutch Trip Parts for Transmitter Distributor (LXD)

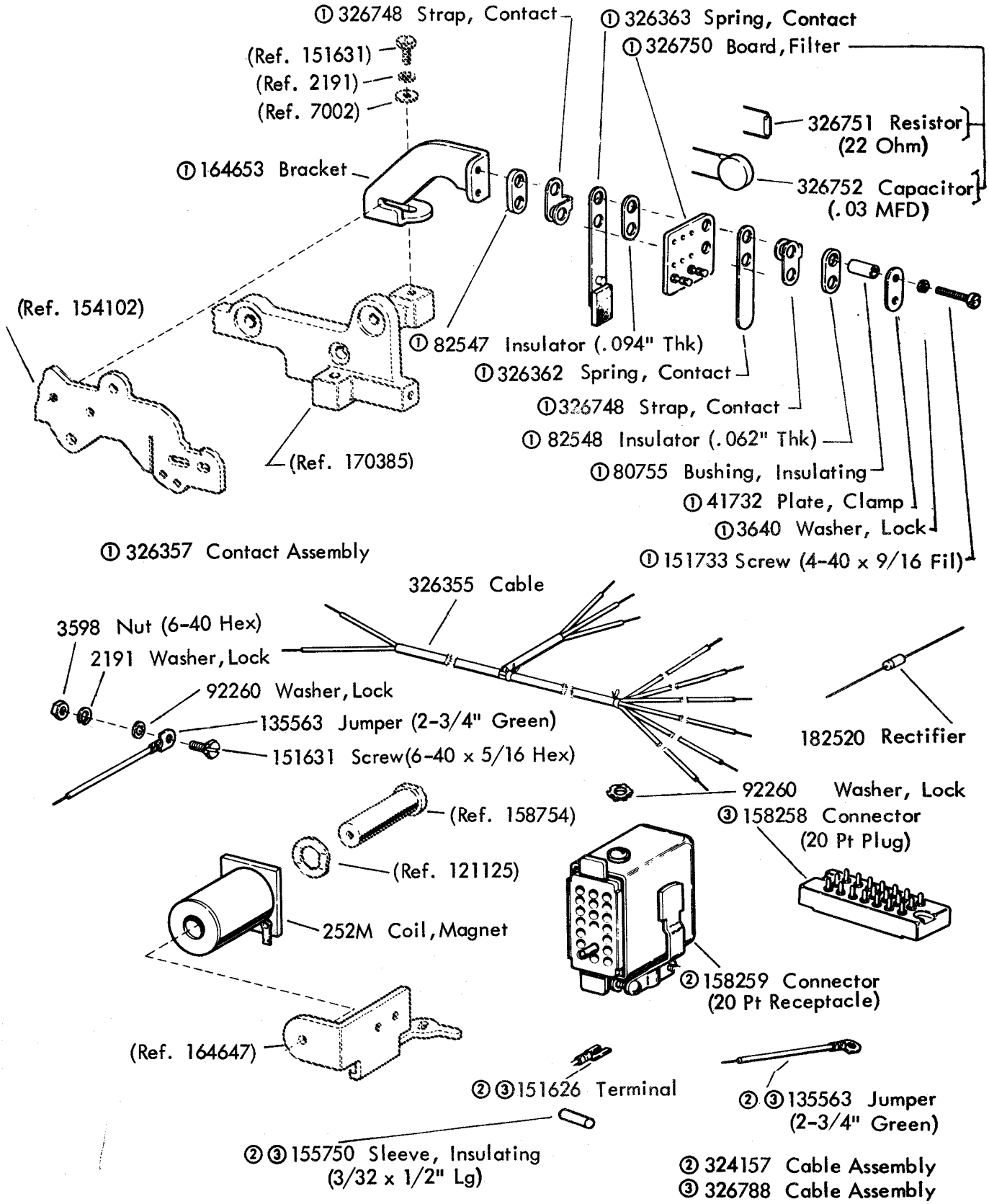
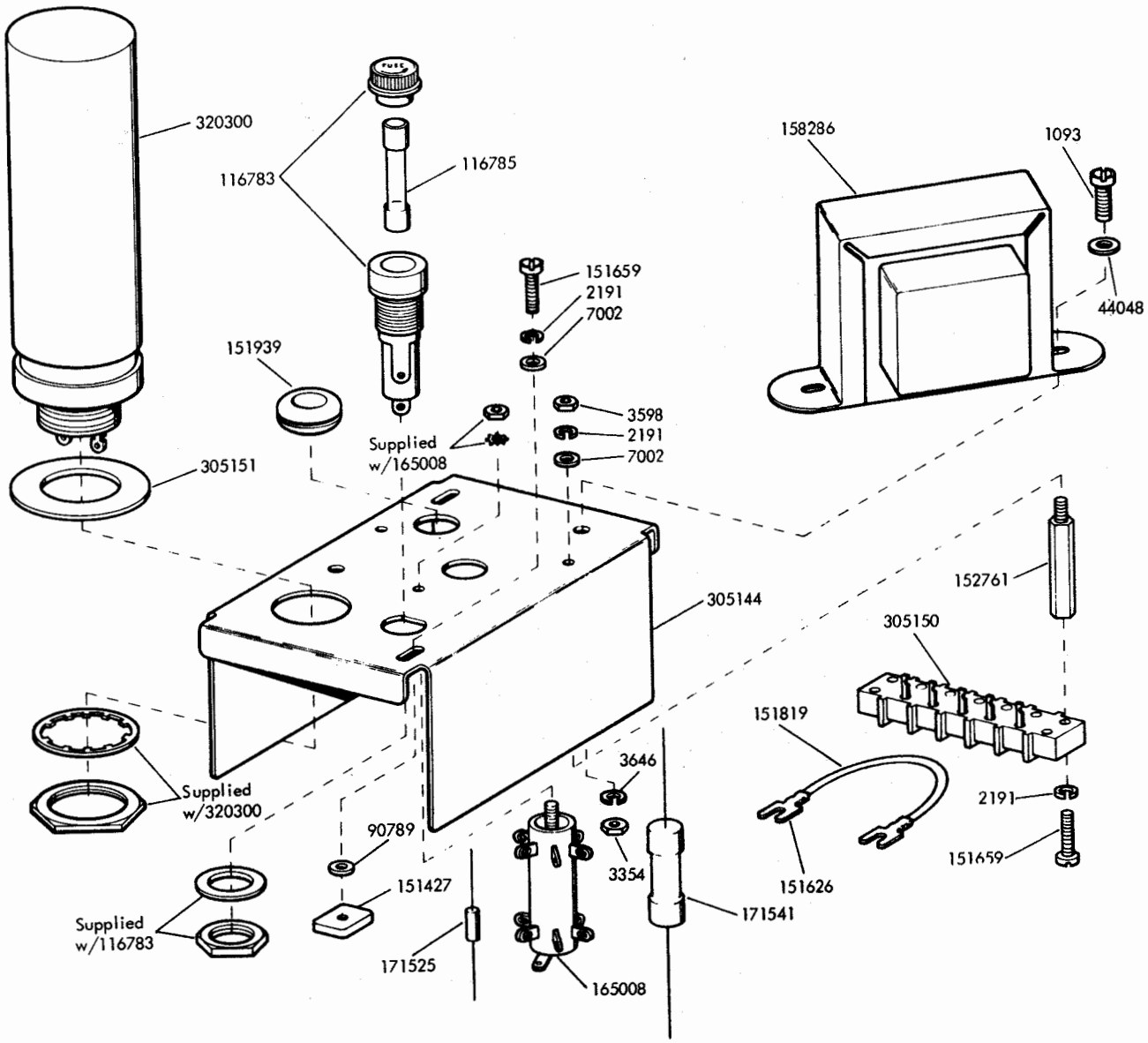


Figure 18 - Signal Generator Parts for Keyboard (LAK)



Part Number	Description
1093	Screw (8-32 x 7/16 Fil)
2191	Washer, Lock
3354	Nut (8-32 Hex)
3598	Nut (6-40 Hex)
7002	Washer, Flat
44048	Washer, Flat
90789	Washer, Flat
116783	Holder, Fuse
116785	Fuse, 3 Amp
151427	Plate, Clamp
151626	Terminal
151659	Screw (6-40 x 1/2 Fil)

Part Number	Description
151819	Jumper w/Terminals, 3" Black
151939	Grommet, Rubber
152761	Stud
158286	Transformer
165008	Turret, Terminal
171525	Resistor, 1000 Ohm
171541	Diode
305143	Rectifier Assembly, 6 V, DC
305144	Plate, Mounting
305150	Block, Terminal
305151	Washer, Insulating
320300	Capacitor, 5000 MFD

Figure 19 - 305143 6 V DC Rectifier Assembly