INSTRUCTIONS FOR INSTALLING 179612 OR 179644 MODIFICATION KIT (NAVY NOMENCLATURE MK-837/UG OR MK-836/UG, RESPECTIVELY) TO REDUCE RADIO-FREQUENCY NOISE IN TELETYPEWRITER SET TT-47D/UG OR TT-47C/UG, RESPECTIVELY

1. GENERAL

a. The 179612 or 179644 modification kit is applicable to Teletypewriter Sets as indicated below:

MODIFICATION KIT	SET	NAVSHIPS MANUAL
179612 (Navy Nomenclature MK-837/UG)	TT-47D/UG	93241
179644 (Navy Nomenclature MK-836/UG)	TT-47C/UG	93241

b. The general function of the 179612 and 179644 modification kits is to provide a signal line circuit that is essentially free of radio-frequency interference when being keyed in a telegraph circuit. The modification kits are intended for use in installations which require suppression of radio-frequency noise, and are to be used only on short signal line loops, generally less than 1000 feet in length and with loads having low radio-frequency interference characteristics. The modification kits will operate satisfactorily with up to ten 192730 selector magnet drivers and ten 192740 low-level keyers on one signal line; however, if the electrical motor control feature is used on these units, the number of units that can be placed on the signal line is limited to no more than eight units at 60 milliamperes signal line current and six at 20 milliamperes line current (assuming zero line resistance). External resistance must be added in series with the signal line loop to limit the current to either 60 or 20 milliamperes, whichever is being used.

c. The 179612 modification kit is operable with the keyboard base signal generator of the TT-47D/UG set. This kit consists of a 192730 selector magnet driver, a 192740 low-level keyer, a revised contact box assembly with 179643 filter network, mounting hardware and cabling. The 179644 modification kit is operable with the keyboard base signal generator of the TT-47C/UG set. This kit is the same as the 179612 modification kit, except for minor differences in the contact box components.

d. The purpose of the 192730 selector magnet driver is to furnish driving current to the receiving selector magnet while producing a minimum amount of radio-frequency interference.

e. The function of the 192740 low-level keyer is to minimize radio-frequency interference from a transmitter. To accomplish this it is necessary to have the signal generator contacts control very low voltage and current. These low-level signals are amplified to produce standard current levels of 20 and 60 milliamperes at 48v loop potential.

f. The 192730 selector magnet driver and 192740 low-level keyer operate with signal loop current provided by the 192750 dc line rectifier (48v) which supplies up to 0.070 ampere of continuous direct current at 48v from a source of 115 ± 10 per cent v ac 50 or 60 cps.

g. The driver and keyer units are for installation in the bottom section of the cabinet on a special bracket supplied with the modification kit.

h. The 179612 and 179644 kits consist of:

			179612	179644
2	1293	Screw	X 2.80c	X
	2191	Lockwasher	3 .14c	2
	3598	Nut	1 1.25c	2
1	3599	Nut	X 1.15c	X
1	5847WD	Diagram, Actual Wiring	X	X
	7002	Washer, Flat	3 .46c	2
1	7163WD	Diagram, Schematic Wiring	X	X
2	81778	Screw	X 1.00c	X
2	103782	Screw, Drive	X	X
3	104074	Screw	X 3.15c	X
3	110743	Lockwasher	X .20c	X
1	112626	Nut	X 1.35c	X
1	121245	Clamp, Cable		X
	151442	Screw	1 .44c	2
1	151572	Lockwasher	X 1.50c	X
2	151632	Screw	X .47c	X
1	153817	Screw	X 1.25c	X
1	157230	Jumper	X .13	X
1	157231	Jumper	X .13	X
	177894	Spacer	4 7.00c	1
1	179634	Bracket	X .80	
1	179637	Cable Assembly	X 9.85	X
1	179639	Contact Assembly	X 7.40	X
1	179640	Plate, Instruction	X 1.95	X
1	179643	Filter Network Assembly	X	X
1	179647	Cover, Contact Box		X
1	179751	Cable Assembly	X 11.40	X
1	192730	Driver Assembly, Selector Magnet	X	X
1	192740	Keyer Assembly, Low-Level	X	X

			179612	179644
1	194964	Resistor Assembly	X 1.95	X
1	195187	Screw	X .28	X
2	195269	Jumper	X .13	X
2	195270	Jumper	X .17	X
1	195651	Box, Contact	X .33	
1	195652	Cover, Contact Box	X .60	
1	198599	Bracket	X 14.00	X
1	199069	Bar, Spacing	X .10	X
1	199193	Bushing	X 7.40c	
1	199196	Link Assembly	X 1.70	
1	304530	Cable Assembly		X
1	304531	Bracket		X
1	304561	Cable Assembly	X 5.80	
1	310145	Plate, Identification (Navy Only)	X	
1	310150	Plate, Identification (Navy Only)		X

2. THEORY OF OPERATION (Figure 1)

a. A low voltage and current (3 volts dc at approximately 70 microamps) is supplied to the signal generator contacts. A filter network is placed in the signal generator contact box to filter out noise generated by the contacts. This low-level signal is fed to the low-level keyer through shielded leads to prevent picking up of stray radio-frequency noise in the cabinet. In the keyer assembly the low-level signal from the signal generator is amplified for use in keying a 48 volt dc, 20 or 60 milliampere signal line.

b. In the receiving selector magnet driver the signals from the 48 volt dc signal line are repeated in a local loop (60 ma.) to the selector magnets. Current for the selector magnet is supplied by a local power supply in the selector magnet driver.

c. A 24 volt dc or 60 milliampere tap is provided on the low-level keyer assembly to provide battery for the unit when it is in the local test position. This tap could be used to provide line battery for the loop, provided the external loop resistance and equipment do not drop the current below 10 per cent of nominal (either 20 or 60 ma.). When this arrangement is used, the motor control of the unit supplying the line battery is not operable. It is recommended that this 24 volt source be used on loops of no more than two stations. For signal line wiring refer to Figure 1.

d. The signal line loop battery is supplied from a specially built rectifier assembly.

3. INSTALLATION (Refer to 5847WD and 7163WD wiring diagrams included in the kits.)

NOTE

The following installation instructions apply to both modification kits unless otherwise specified.

a. The modification kits, as shipped, are arranged for 60 milliampere operation. For 20 milliampere operation change strapping as follows before installation:

(1) 192730 selector magnet driver assembly

(a) Remove the four screws which mount the driver circuit card and circuit card cover to the assembly. The driver circuit card is viewed with the power resistors on top of the unit toward the observer.

(b) Change strapping as shown in Figure 3. Replace the circuit card, circuit card cover and mounting screws.

(2) 192740 low-level keyer assembly

(a) Remove the four screws which mount the keyer circuit card and circuit card cover to the assembly. The keyer circuit card is the left circuit card as the unit is viewed with the power resistors on top of the unit toward the observer.

(b) Change strapping as shown in Figure 3. Replace the circuit card, circuit card cover and mounting screws.

b. Remove the typing unit and the keyboard base in accordance with standard practice.

c. Remove the rod that operates the power switch on the electrical service unit.

d. If cabinet is equipped with a signal line filter, remove it and reconnect the signal line to the cabinet "C" terminal block. Do not remove the power line filter if one is supplied.

e. Remove the two mounting studs which mount the electrical service unit to the upper shelf of the cabinet.

f. Invert the electrical service unit and remove all leads from its terminal boards terminating in the line relay mounting assembly and the rectifier assembly, if the service unit is so equipped. Remove the line relay and rectifier.

g. On the "A" terminal block, remove the strap between terminals 7 and 8, between A6 and A4, and between A5 and A3. Be sure there is a strap between A1 and A4, and between A2 and A3. Add a strap between A7 and A9.

h. Mount the 194964 resistor assembly on the underside of the electrical motor control assembly (see Figure 6 and 5847WD wiring diagram). Locate the 400 ohm resistor and remove the resistor mounting screw. Mount the 194964 resistor assembly between the fiber washer and the metal washer at the head end of the screw. Secure the screw (and resistor assembly) in its original position with the original nut and lockwasher. Connect the blue-white leads from the resistor assembly to terminals 4 and 9 of the "D" terminal block. (The motor control assembly is wired for 60 ma. signal line current. For 20 ma. line current

change strapping as directed in 5847WD wiring diagram.

i. Install the 179751 cable assembly in the electrical service unit. Route cable as shown in Figure 4. Wire the cable to the terminal block as shown on 5847WD wiring diagram. Attach the selector magnet driver and low-level keyer bracket grounding lead to the electrical service unit ground screw. This is facilitated by first removing the plate which mounts the fuseholder and convenience receptacle. Relocate the ground point to a lower mounting hole, if necessary, to avoid proximity to the fuse lugs. Route the three legs of the 179751 cable assembly through the left opening of the electrical service unit and down through the left shelf opening in the cabinet. Return the electrical service unit to its normal position in the cabinet. Attach the switch rod which operates the power switch on the electrical service unit. Be sure that no wires have worked their way under the frame of the electrical service unit. Bolt the service unit in position using its mounting studs.

j. Mount the 198599 bracket on the rear wall of the lower cabinet compartment (see Figure 5). Using the bracket as a template, drill three 0.196 inch diameter holes (Drill No. 9) in the back wall of the cabinet. Attach the bracket using three 104074 screws, one 177894 spacer, one 151572 lockwasher, and one 112626 nut.

k. Connect the cable grounding lead to the lower mounting screw of the 198599 bracket (see Figure 5). Connect the other two legs of the cable to the 192740 low-level keyer and 192730 selector magnet driver as shown on 5847WD wiring diagram.

l. Route the terminal lug end of the 179637 cable assembly down through the left opening of the cabinet shelf into the lower cabinet compartment. Connect the cable to the 192740 low-level keyer as shown on 5847WD wiring diagram.

m. Install the 192740 low-level keyer and 192730 selector magnet driver on the 198599 bracket using the clamps on one side of the keyer and driver (install the keyer closest to the cabinet wall). See Figure 5. Attach the 199069 spacing bar across the front of the 198599 bracket using two 151632 screws, 2191 lockwashers and 7002 flat washers. Tighten the remaining clamps on the keyer and driver units.

n. 179644 Modification Kit - TT-47C/UG Set

(1) Remove and retain the 3599 nut and 110743 lockwasher from the signal generator contact box cover; remove and discard the cover.

(2) Unsolder the 151639 R.F. filter leads at the signal generator and at the keyboard connector. Remove the two 151692 screws, 2191 lockwashers, and 76099 (or 7002) flat washers which mount the filter to the keyboard base. Discard the filter and 151692 screws; retain the lockwashers and flat washers.

(3) Mount the 304531 bracket, using the holes which formerly mounted the R.F. filter, with two 151632 screws, 3598 nuts and the retained 2191 lockwashers and 76099 (or 7002) flat washers (see Figure 7).

(4) Mount the 304530 cable assembly connector plug to the 304531 bracket as shown in Figure 7. Before tightening the mounting nut, be sure the locating ear on the locking disc is in the bracket slot and the locking ears are against the flats of the hex. portion of the connector. Use care not to overtighten the nut. The terminal end of the cable will later be connected at the signal generator.

(5) Remove and retain the two 151152 screws, 110743 lockwashers and 2034 flat washers which fasten the contact box assembly to the signal generator; remove and retain the contact box.

(6) Remove and retain the 125126 screw, 90791 lockwasher, 151182 fiber washer and 151183 bushing which mount the 151184 link to the 151171 toggle; also, retain the link.

(7) Remove the 110435 nut, 151731 screw, 151685 screw, and 110743 lockwasher which fasten the contact assembly to the contact box. Retain the nut and lockwasher; discard the screws and contact assembly.

(8) Align the screw terminals of the 179639 contact assembly to the 179643 filter network as follows: Slightly loosen the 195241 contact screws of the 179639 contact assembly. Attach the 179643 filter network by tightening the three captive screws on the network. With the filter network firmly attached, retighten the 195241 contact screws.

(9) Now remove the filter and install the 179639 contact assembly in the 151358 contact box using a 195187 screw with a retained 110435 nut and a 153817 screw with a retained 110743 lockwasher. Refer to Figure 9.

(10) Mount the retained 151184 link to the 179800 toggle of the contact assembly using the retained 125126 screw, 90791 lockwasher, 151182 fiber washer, and 151183 bushing.

(11) Mount the contact box assembly back on the signal generator using the two retained 151152 screws, 110743 lockwashers, and 2034 flat washers.

(12) Adjust the signal generator contact gap according to Paragraph 4.

(13) Check the terminal strapping of the 179643 filter network; make certain that:

Terminals B and I1 are strapped.

Terminals A and I2 are strapped. (Use 199659 strap supplied with filter.)

Terminals A and I1 are open.

Terminals B and I2 are open.

Check both the top and the solder side of the filter for the above strapping,

and correct, if required.

(14) Again attach the 179643 filter to the 179639 contact assembly by tightening the three captive screws.

(15) Route the terminal end of the previously installed 304530 cable assembly up to the signal generator as shown in Figure 13.

(16) Connect the 304530 cable leads to the filter network as follows using two 1293 screws, two 110743 lockwashers, and one 3599 nut:

Red lead to terminal 02.

Blue lead to terminal 01.

Green lead to terminal "GRD"

The terminal lugs of the red and blue wires should be twisted longitudinally 45 degrees to 90 degrees with respect to their shanks to facilitate installation.

(17) Place the 179647 contact box cover over the rubber bushing of the 304530 cable; fasten the cover using the original 3599 nut and 110743 lockwasher.

(18) Secure the cable as shown in Figure 13 using the 121245 cable clamp and existing screw.

(19) Solder a 195269 strap to pin 3 of the keyboard connector. Connect the terminal end of the strap under the 151692 screw which mounts the 152460 connector mounting bracket.

o. 179612 Modification Kit - TT-47D/UG Set

(1) Remove and discard the signal generator contact box cover but retain the 3640 lockwasher and 3599 nut.

(2) Disconnect the existing contact leads and suppression network by removing and retaining the two 1293 screws and 110743 lockwashers. Discard the suppression network. Tape each contact lead separately and tie the leads back.

(3) Disconnect the 86304 link spring from the 156644 link which protrudes from the right side of the contact box, and disengage the 156644 link from the signal generator mechanism. Remove and retain the two 151632 screws, 2191 lockwashers, and 7002 flat washers that secure the contact box mounting bracket to the signal generator front plate; remove the contact box and mounting bracket assembly.

(4) Remove the 125126 screw, 90791 lockwasher, 151182 fiber washer, and 156663 bushing which mount the 156644 link to the 151177 contact toggle. Retain the screw, lockwasher, and fiber washer; discard the link and bushing.

(5) Remove the 151880 nut, 151731 screw, 151686 screw, 151152 screw, and three 3640 lockwashers which fasten the contact box, contact assembly, and mounting bracket together. Retain the 151880 nut, 151152 screw, three 3640 lockwashers, and the mounting bracket. Discard the 151731 screw, 151686 screw, contact assembly, cardboard insulator, and contact box.

(6) Align the screw terminals of the 179639 contact assembly to the 179643 filter network as follows: Slightly loosen the 195241 contact screws of the 179639 contact assembly. Attach the 179643 filter network by tightening the three captive screws on the network. With the filter network firmly attached, retighten the 195241 contact screws.

(7) Now remove the filter. Refer to Figure 8. Mount the 195651 contact box to the retained mounting bracket using the retained 151152 screw and 3640 lockwasher. Mount the 179639 contact assembly in the 195651 contact box using a 195187 screw, 153817 screw and the retained 151880 nut, and two 3640 lockwashers. Mount the 199196 link and 199193 bushing to the contact toggle using the retained 125126 screw, 90791 lockwasher, and 151182 fiber washer.

(8) Install the modified signal contact assembly and mounting bracket assembly in the signal generator using the retained 151632 screws, 2191 lockwashers, and 7002 flat washers, two of each. Reconnect the 86304 link spring and engage the 199196 link with the signal generator mechanism.

NOTE

Make the contact clearance adjustment according to Paragraph 4.

(9) Refer to Figure 7. Slip the connector end of the 304561 cable into the hole in the 179634 bracket. Secure the connector to the bracket with the connector mounting nut and lock ring. Be sure the locating ear on the lock ring is in the slot in the bracket; use care not to overtighten the nut.

(10) Mount the 179634 bracket with the attached cable to the left rear of the keyboard as indicated in Figure 7, using two 151632 screws, 7002 flat washers, 2191 lockwashers, and 3598 nuts.

(11) Route the cable down into the keyboard base, forward and up to the signal generator.

(12) Install the 179643 filter and connect the 304561 cable leads to the filter network as follows using two 1293 screws, three 110743 lockwashers, and a 3599 nut, all

of which have been retained:

Red lead to terminal 02.

Blue lead to terminal 01.

Green lead to terminal "GRD"

Twist the terminal lugs of the red and the blue wires 45 degrees to 90 degrees with respect to their shanks to facilitate this installation.

(13) Insert the cable grommet into the 196652 contact box cover cutout and secure the cover with the previously retained 3640 lockwasher and 3599 nut. Some maneuvering of the red and blue wires may be required to properly fit the 196652 contact box cover. Use caution that the terminal of the blue wire does not contact the adjacent metal shield.

(14) Solder a 195269 strap to pin 3 of the keyboard connector. Connect the terminal end of the strap under one of the 151632 screws which mount the 179634 bracket.

p. CABINET MODIFICATIONS

(1) At the "C" cabinet terminal blocks do the following:

(a) Remove strap between terminals C8 and C9 and add it between terminals C9 and C10.

(b) Add a strap between terminals C9 and C21.

(c) Remove strap from C6 to C7. Remove strap from C10 to C13. Remove strap from C7 to C14. Add a strap from C6 to C13, add a strap from C7 to C16 and add a strap from C11 to C14.

(d) Remove strap terminal from C37. Connect to C35.

NOTE

If keyboard associated with the LESU does not have a signal line break keylever, there should also be a strap between terminals C10 and C11.

(2) Mount the 179640 instruction plate on the cabinet in the area of the copy-holder. Using the instruction plate as a template, scribe the centers of the mounting holes, making certain holes will not be immediately over cabling or brackets. Drill a 0.086 inch diameter hole (Drill No. 44) in the cabinet dome at each of the scribed centers. Mount the plate using two 103782 drive screws. Tap the drive screws with a light hammer until they hold the plate securely to the cabinet dome.

(3) On the typing unit "R" connector remove the shell of the cable-mounted portion of this connector. Install a 195270 strap as follows: Route the skinned end of the strap through the hole in the shell for the cable entrance. Remove the wire which is soldered to terminal 6 and tape. Solder the skinned end of the 195270 strap to this terminal. Fasten the terminal end of the strap to the shell when reassembling the connector, using an 81778 screw supplied in the modification kit and the lockwasher supplied with the original connector screw (see Figure 10).

(4) On the Keyboard "F" connector remove the shell of the cable-mounted portion of the connector. Route the skinned end of a 195270 strap through the hole in the shell for the cable entrance. Remove the wire which is soldered to terminal 3, tape and fold back. Solder the skinned end of the strap to terminal 3. Fasten the terminal end of the strap to the shell when reassembling the connector, using an 81778 screw supplied in the modification kit and the lockwasher supplied with the original connector screw (see Figure 11). Reinstall the keyboard.

(5) Attach the connector receptacle of the 179637 cable assembly to the connector plug of the 304561 or 304530 cable assembly on the base. Twist the locking disc so that the locking lugs fully engage the locking ears of the mating connector.

(6) Make certain that the frames of the printer set and of the source of signal line current are connected to the ac power line ground.

q. TYPING UNIT MODIFICATION - Solder a 195269 strap to pin 6 of the typing unit connector; connect the terminal end of the strap under one of the connector mounting bracket mounting screws.

r. NAVY ONLY - For both kits remove backing from the 310145 identification plate (179612 kit) or 310150 identification plate (179644 kit) and apply plate (on clean surface) below the present overall set plate.

4. ADJUSTMENTS - Contact Clearance Requirement (Contact Box Adjustment) - The clearance between the marking and spacing contacts and the toggle should be equal within 0.001 inch when the contacts are in their extreme open position determined by rotating the cam after the "Y" keylever has been depressed. To adjust (signal generator of TT-47D/UG set - 179612 modification kit), loosen the two mounting screws on the signal generator front plate to friction tightness, then move the entire contact box assembly to the left or right by means of the eccentric located between the two mounting screws. Tighten the screws. To adjust (signal generator of TT-47C/UG set - 179644 modification kit), loosen the two top mounting screws for the signal generator contact box assembly to friction tightness. Loosen the locknut for the adjusting screw on the left end of the contact box bracket. Move the entire contact box left or right by means of the adjusting screw. Tighten the mounting screws and the adjusting screw locknut.

5. SERVICING

a. General

(1) This section covers troubleshooting the 179612 and 179644 modification kits when installed in Teletypewriter Sets TT-47D/UG and TT-47C/UG, respectively.

(2) Field servicing should be limited to replacement of a complete unit (selector magnet driver or low-level keyer) only, and that repairs of the unit should not be attempted in the field.

(3) Repair service should be made only at a maintenance center which is properly equipped, and should be handled only by personnel who are familiar with transistor circuitry and with radio-frequency interference test equipment.

(4) Field tests and replacement of units can be handled by personnel familiar with standard Teletype equipment.

(5) Storage Temperature - Temperature should not exceed +85C (185F).

b. Field Tests

(1) Special Equipment Required - An accurate voltmeter (20,000 ohms per volt) and a milliammeter (2 per cent).

(2) Checks for Locating Trouble (See 5847WD and 7163WD wiring diagrams included in the kits).

(a) Typing Unit Running Open

1. Check polarity of incoming signal line. At cabinet terminal board, C5 is positive; C15 is negative. Check current in signal line. The signal line current should be 60 + 10 per cent ma. or 20 + 10 per cent ma. (Check for proper strapping for either current.) Check to be sure that all connectors are firmly seated in their respective receptacles.

2. Check voltage across cabinet terminals C21 and C15. If there is a voltage drop of more than 1 volt, check the following: Check strap between terminals C21 and C10. Check voltage across C10 and C11 if keyboard is equipped with signal line break key. If a voltage drop is present, check signal line break key. Check voltage across terminals C11 and C15. If voltage drop of more than 1 volt is present, check electrical motor control.

3. Measure voltage drop across the low-level keyer at cabinet terminal boards (C21 and C8) with the keyboard in the stopped position. Terminal C8 is positive; terminal C21 is negative. If voltage drop is more than 5 volts, perform the following checks: Remove cover of the signal generator contact assembly. With the

keyboard in the stopped position, check the voltage across the marking contact (terminals A and I2 for the 179612 modification kit; terminals B and I2 for the 179644 modification kit). See Figure 12. If a voltage drop is present, clean and readjust the signal generator contacts. If no voltage drop is present, check voltage across the 179643 filter network (terminals 01 and 02). See Figure 12. If voltage is more than 3 volts, replace the filter network. If the filter network meets requirements, remove the low-level keyer from the electrical service unit. Check wiring to be sure all connections are correct. If wiring is correct, replace the low-level keyer.

4. Check the voltage across C6 and C7. If voltage drop is present, check the line shunt relay.

5. Check voltage drop across terminals C7 and C8. C7 is positive, C8 is negative. If voltage drop is more than 5 volts, remove the selector magnet driver from the electrical service unit; check wiring to be sure wiring is correct. If wiring is correct, replace the selector magnet driver.

6. Make certain that the frames of the printer set and of the signal line current source are connected to ac power line ground.

(b) Typing Unit not Being Keyed by Keyboard - With keyboard in stopped position, depress line break key or disconnect one side of the signal line. If typing unit runs open, check the low-level keyer as outlined below. If typing unit does not run open replace the selector magnet driver. To check the low-level keyer perform the following: Remove the cover of the signal generator contact assembly. Check voltage across the marking contact with contacts in the spacing condition (terminals A and I2 for the 179612 modification kit; terminals B and I2 for the 179644 modification kit). See Figure 12. If a voltage drop of 3 volts is not present readjust the contacts. Check the voltage across terminals 01 and 02 when the contacts are in the spacing condition. The voltage drop should be 4 volts. If this voltage drop is not present, replace the 179643 filter network. If the filter network and contacts meet requirements, replace the low-level keyer.

(c) Typing Unit Being Keyed by Keyboard but Garbling Message

1. Check adjustments of signal generator contacts.

2. Check range scale adjustment on selector of typing unit.

c. Special Maintenance Information for Gold-Plated Signal Contacts.

(1) Maintenance interval for gold-plated signal contacts will be 1500 operating hours, provided operation is limited to low voltage and current levels.

(2) Clean the contacts only with twill jean cloth (KS2423). Burnishers, files, etc, must never be used.

(3) To clean the contacts, draw the center area of a twill jean strip up and down between the closed contacts but do not permit the edge of the strip to be drawn between the contacts. This procedure will prevent small fibers from the edge of the twill jean strip from lodging between the contacts.

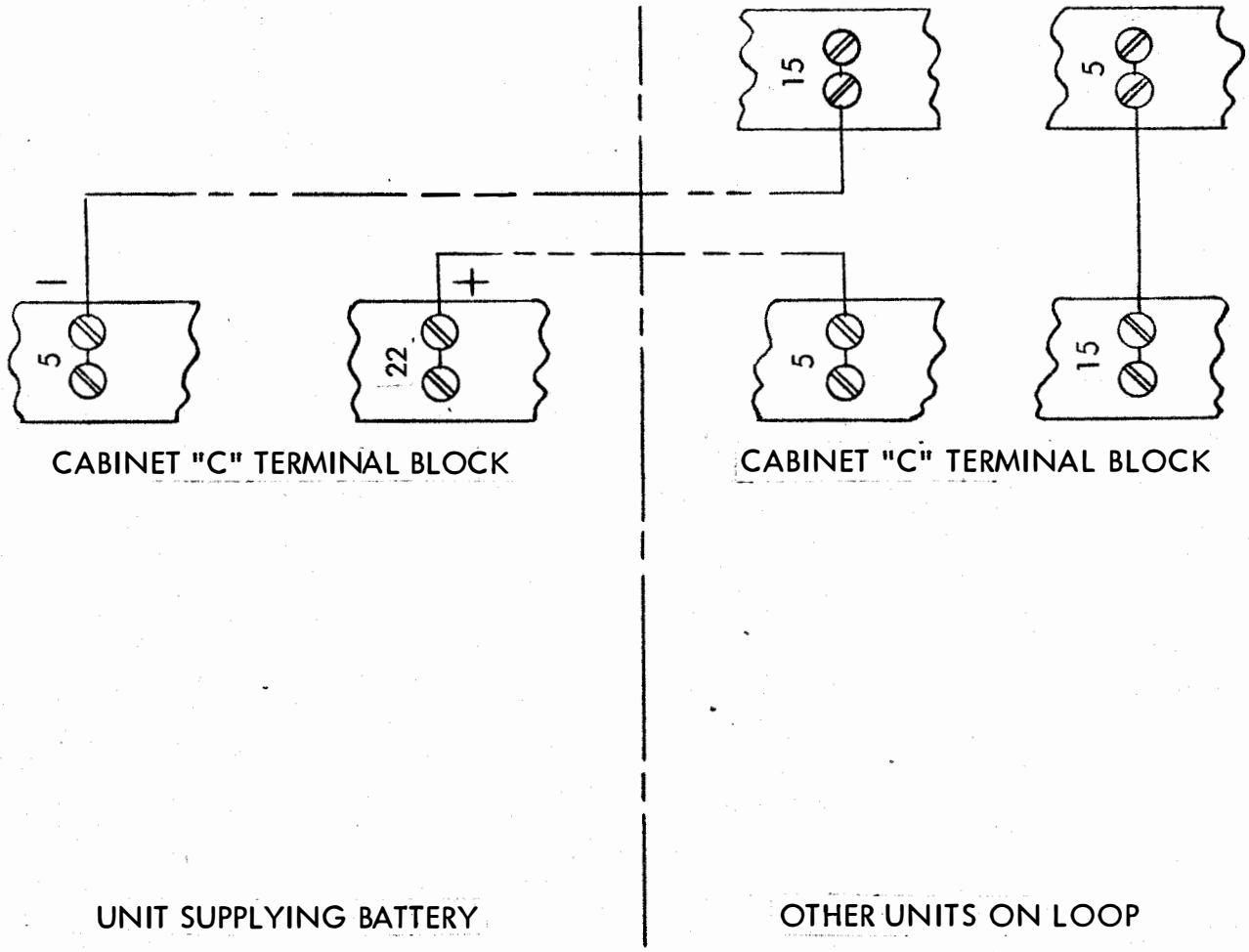
(4) After a period of service, loose specks or flakes of gold will collect in the contact box and the contact area may appear to have lost its plating. However, if clean, the contacts will conduct reliably even through the gold may not be seen without the use of a microscope.

(5) The gold-plated signal contacts may be strobed with a standard DXD type distortion test set. Current and voltage should be limited to 110v dc at 5 milliamperes. After strobing, clean the contacts with twill jean cloth.

(6) Except for the short strobing periods the contacts must not be required to operate in high voltage circuits or contact damage may result, which will impair low-level operation.

(7) LSS type strobe units must not be used to strobe gold-plated contacts; limit strobe levels to 110v dc, 5 ma. when using DXD type strobe.

* * *



SIGNAL LINE WIRING USING LOCAL TAP ON LOW-LEVEL KEYER ASSEMBLY TO SUPPLY LINE BATTERY

FIGURE 1

CONNECTION OF SPECIAL LOOP BATTERY SUPPLY

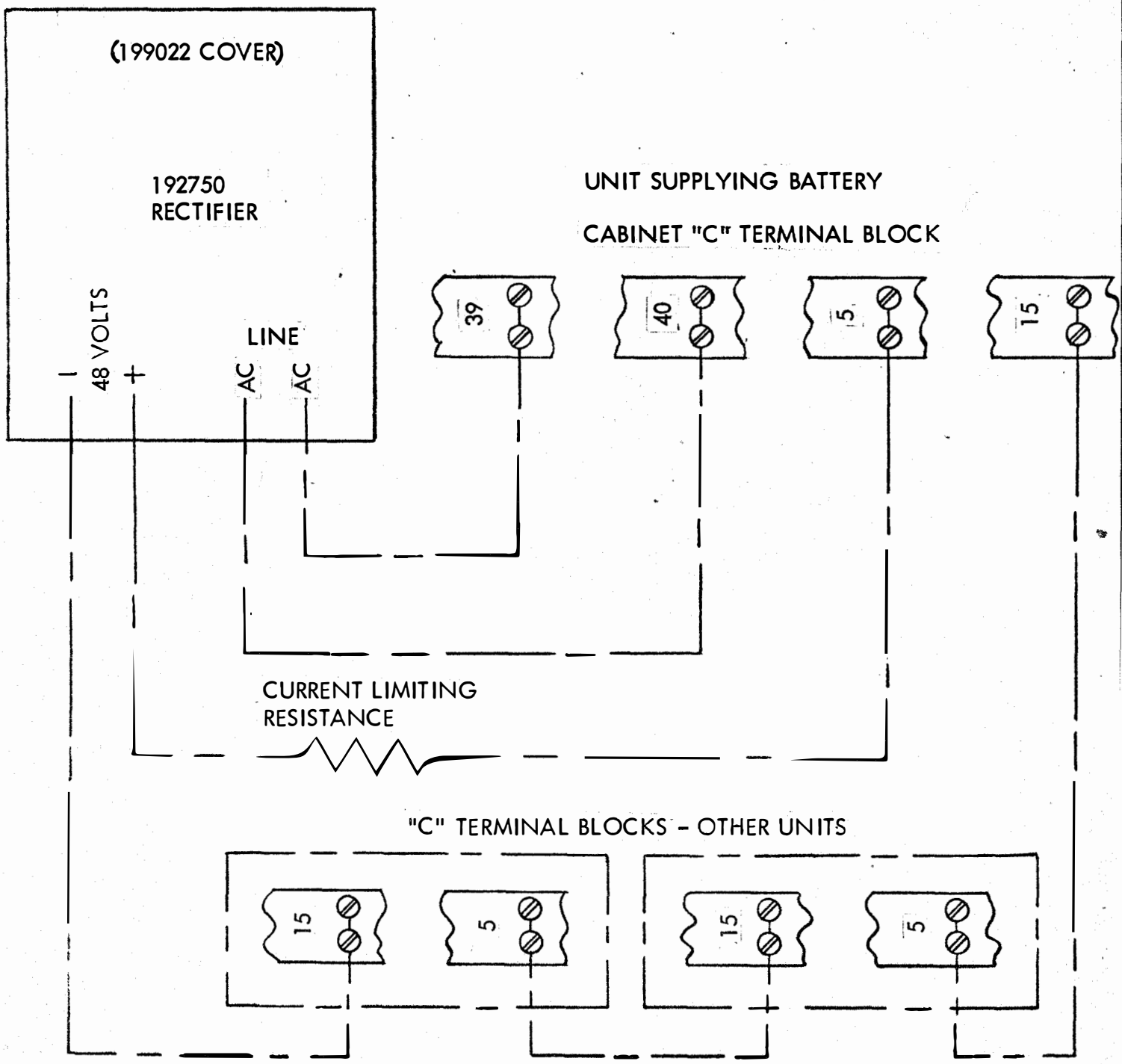
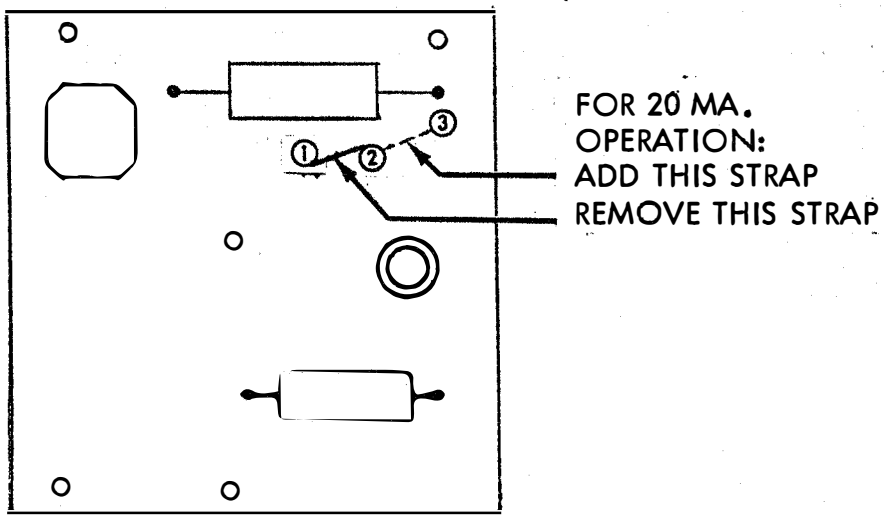
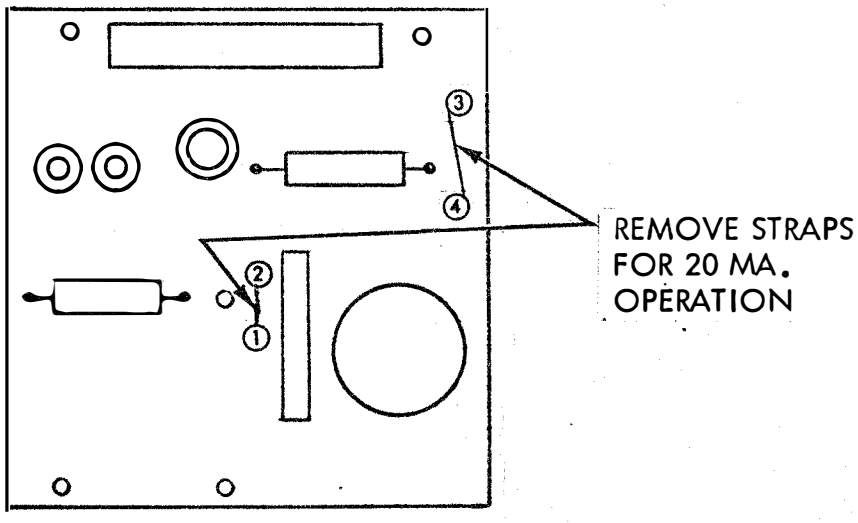


FIGURE 2

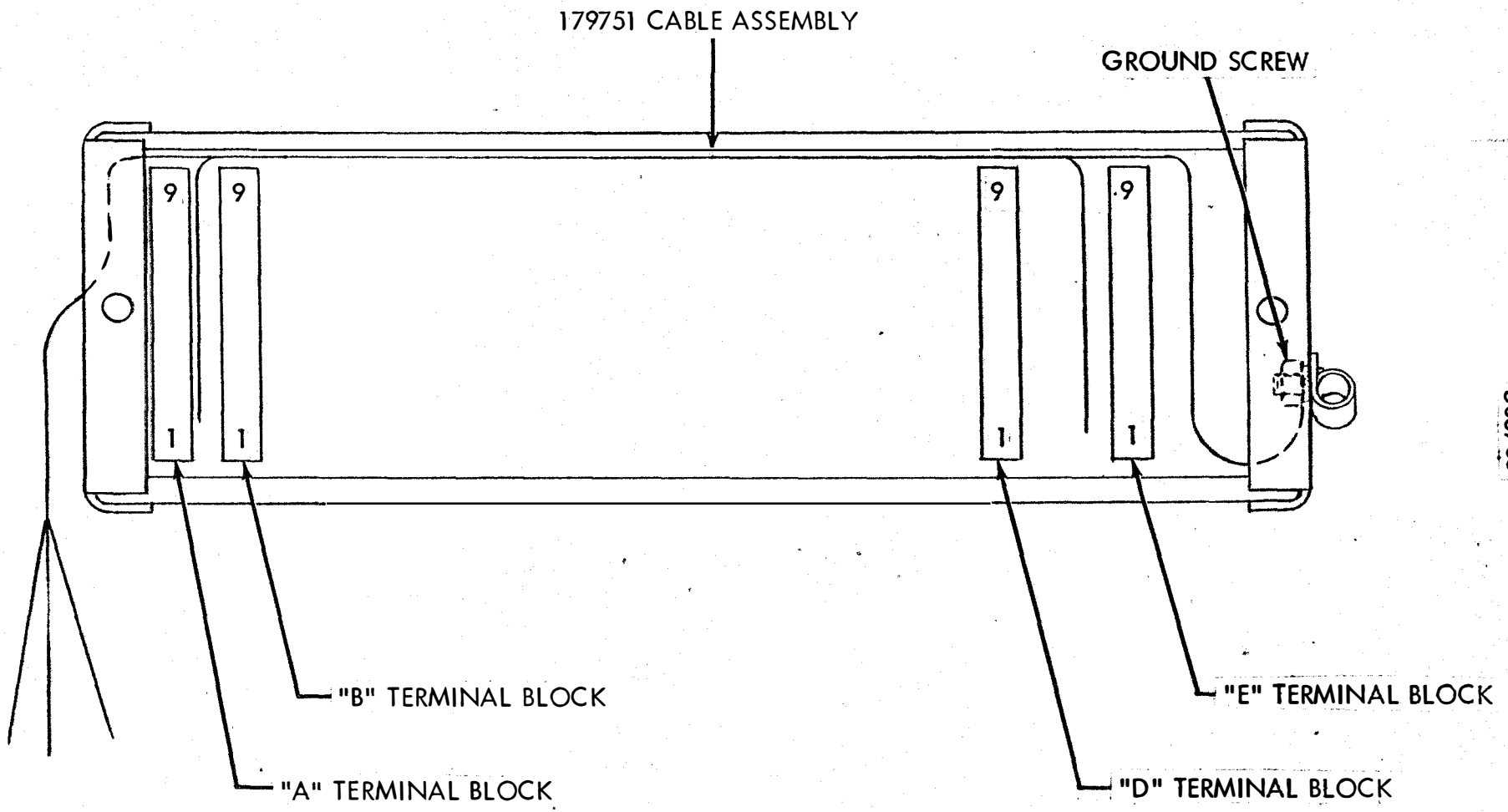


192730 SELECTOR MAGNET DRIVER
(199001 CIRCUIT CARD)



192740 LOW-LEVEL KEYER
(199004 CIRCUIT CARD)

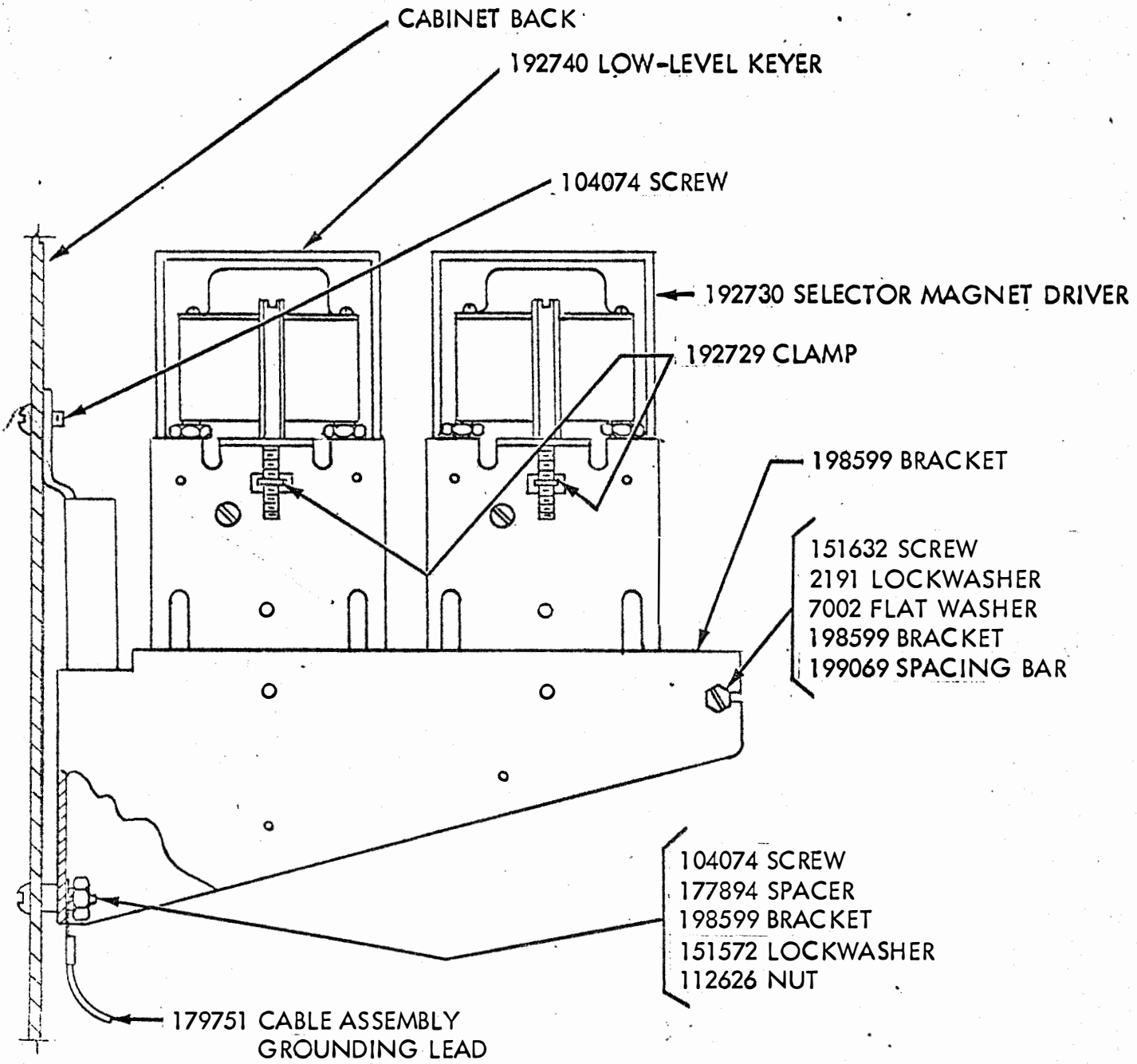
FIGURE 3



ELECTRICAL SERVICE UNIT AS VIEWED FROM BOTTOM

FIGURE 4

503735



SELECTOR MAGNET DRIVER AND
LOW-LEVEL KEYER MOUNTING

FIGURE 5

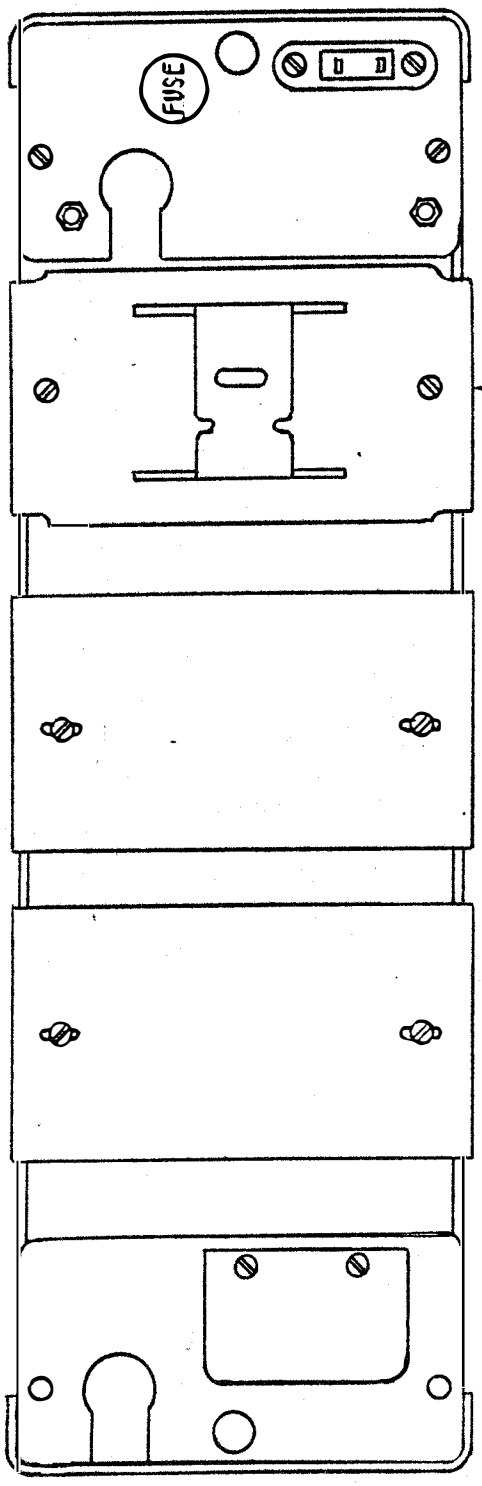
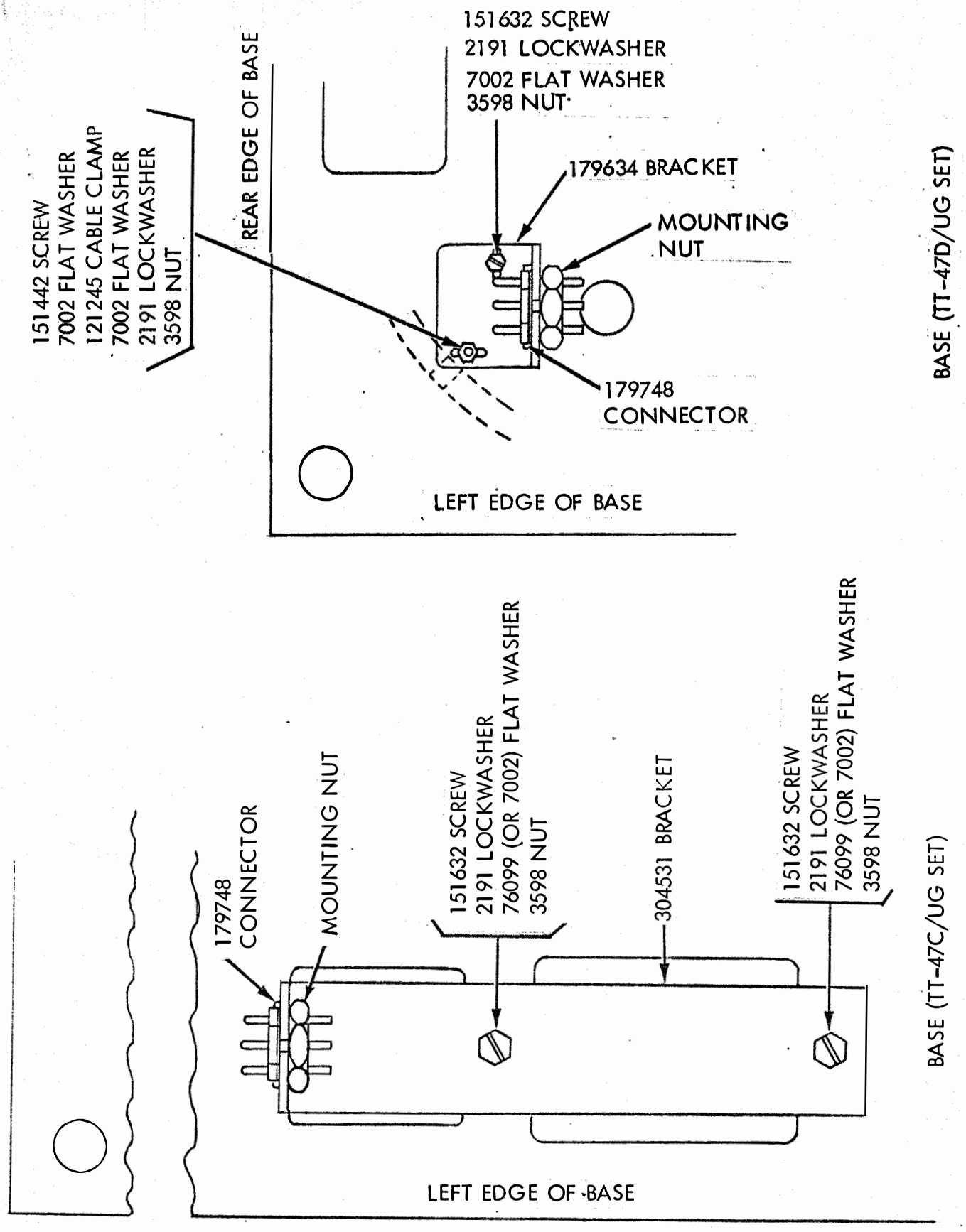
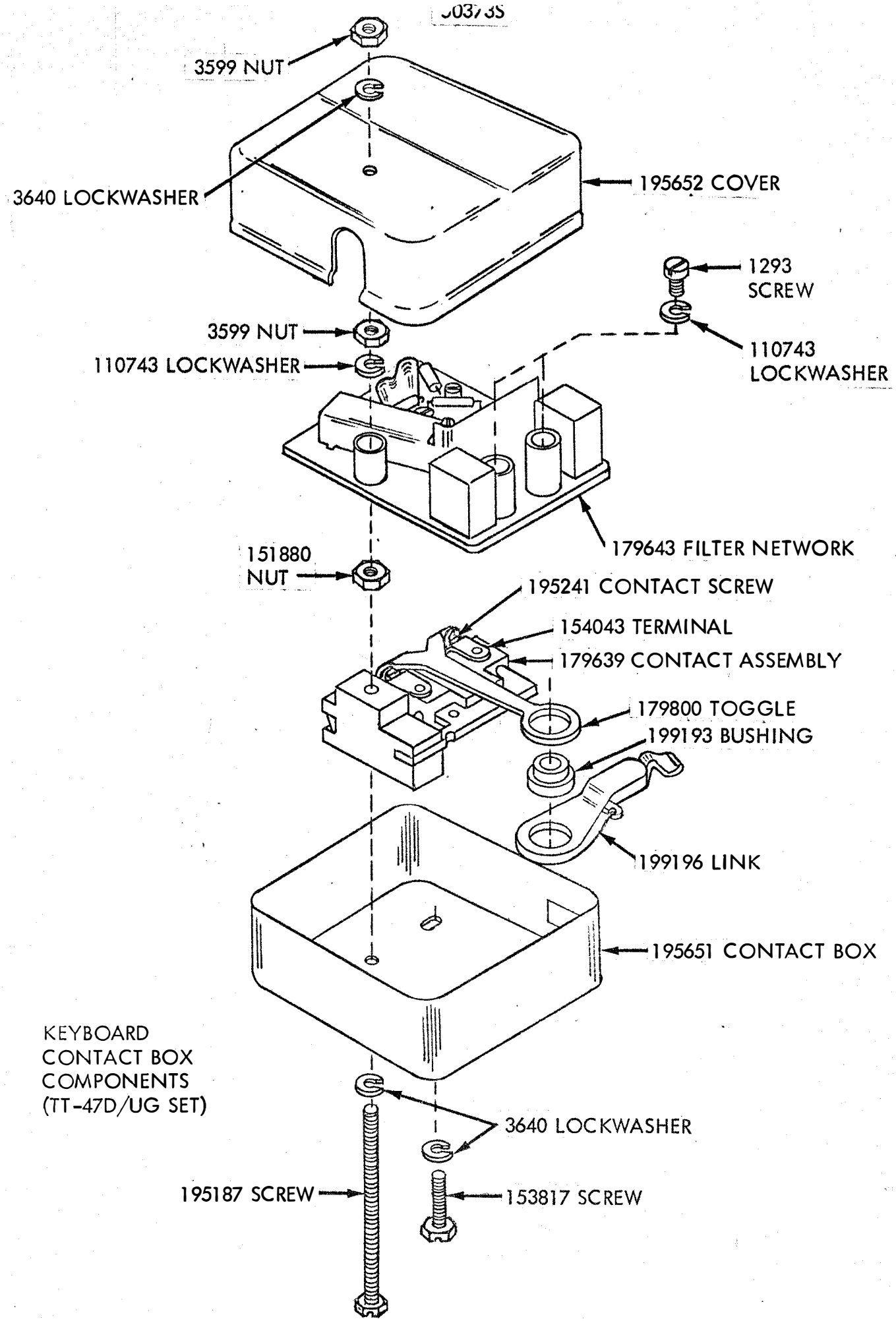


FIGURE 6



INSTALLATION OF CONTACT BOX CABLE BRACKETS

FIGURE 7



KEYBOARD CONTACT BOX COMPONENTS (TT-47D/UG SET)

FIGURE 8

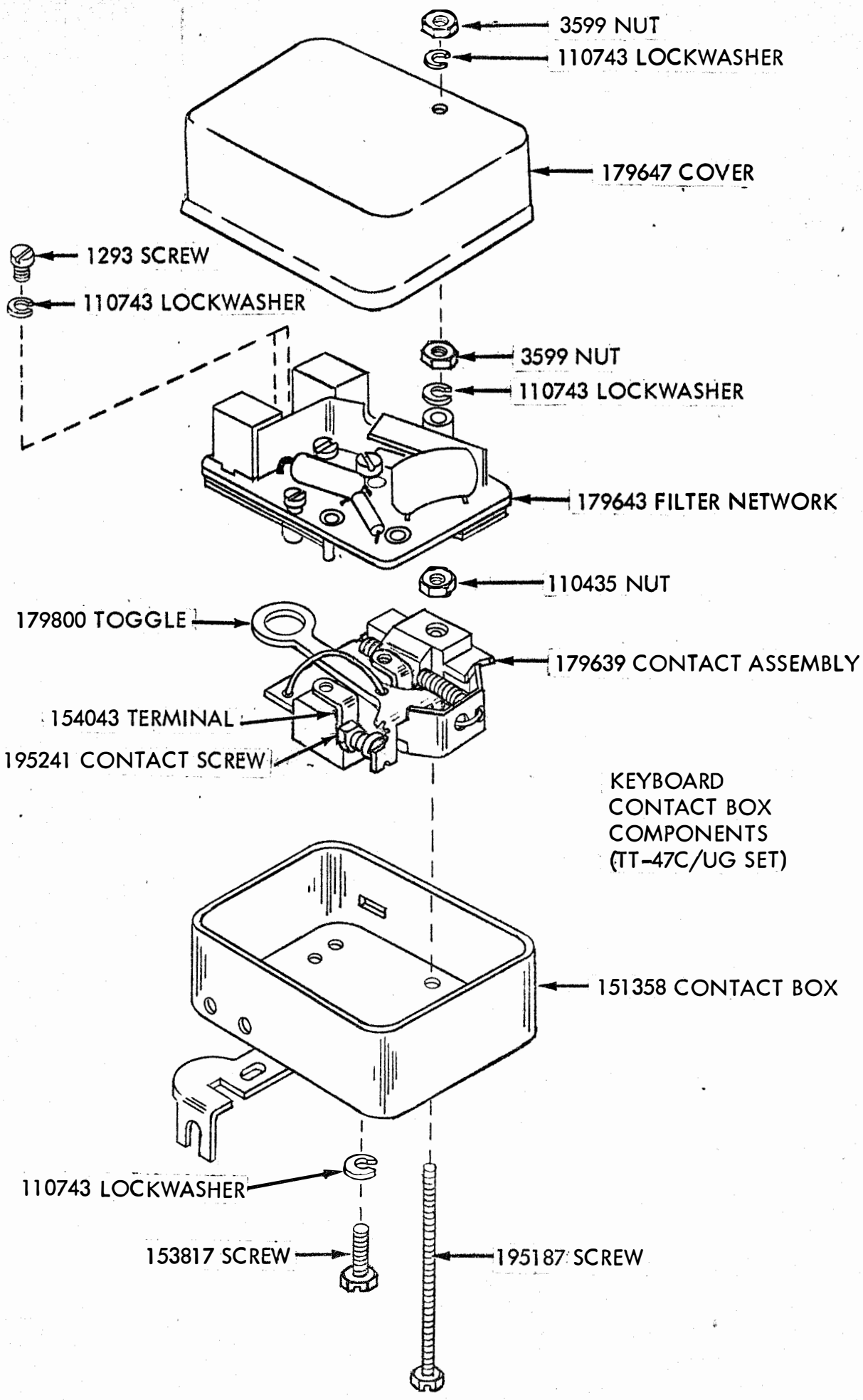

3599 NUT
110743 LOCKWASHER
179647 COVER
1293 SCREW
110743 LOCKWASHER
3599 NUT
110743 LOCKWASHER
179643 FILTER NETWORK
110435 NUT
179800 TOGGLE
179639 CONTACT ASSEMBLY
154043 TERMINAL
195241 CONTACT SCREW
KEYBOARD
CONTACT BOX
COMPONENTS
(TT-47C/UG SET)
151358 CONTACT BOX
110743 LOCKWASHER
153817 SCREW
195187 SCREW

FIGURE 9

STRAPPING FOR TYPING
UNIT CONNECTOR "R"

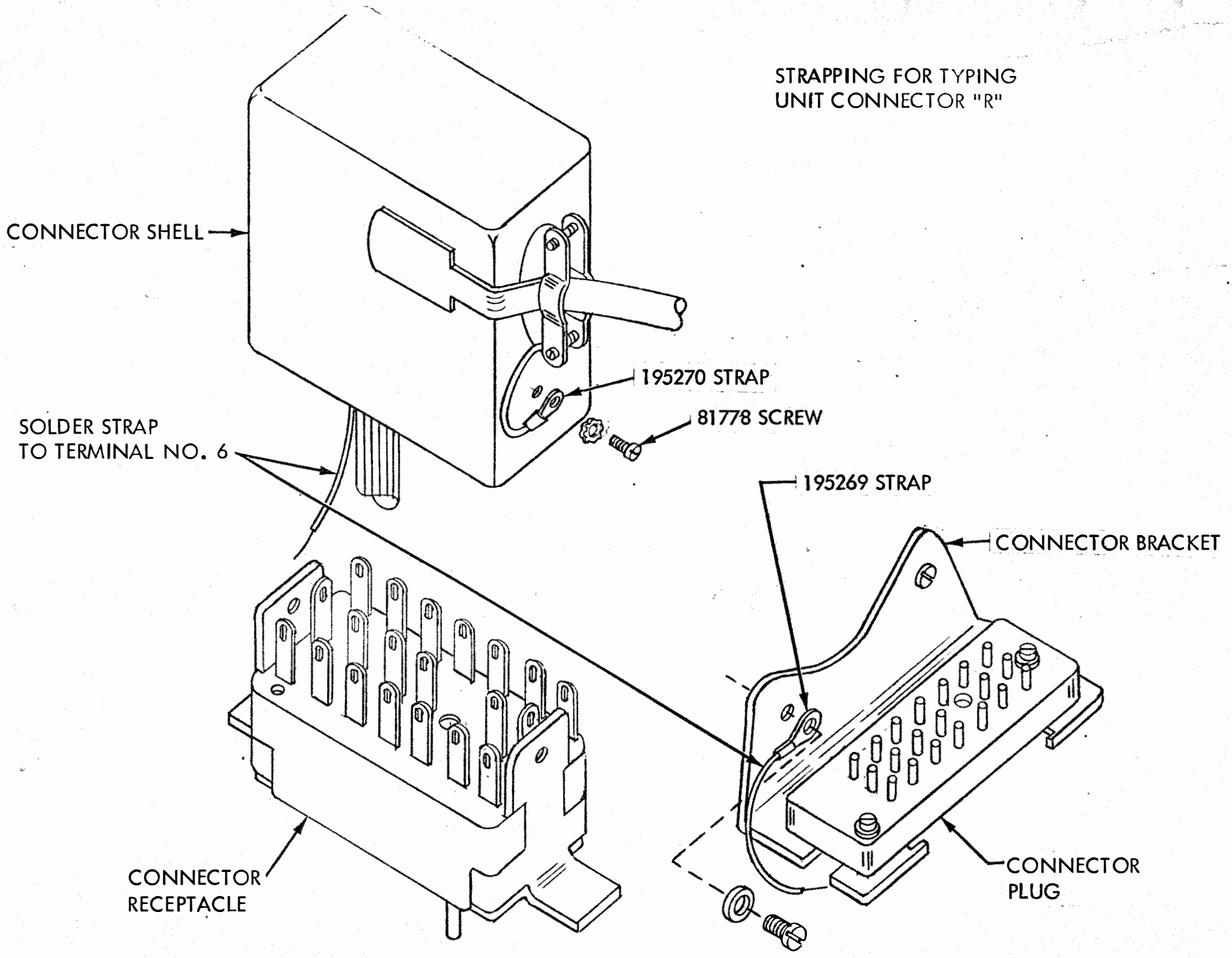


FIGURE 10

50373S

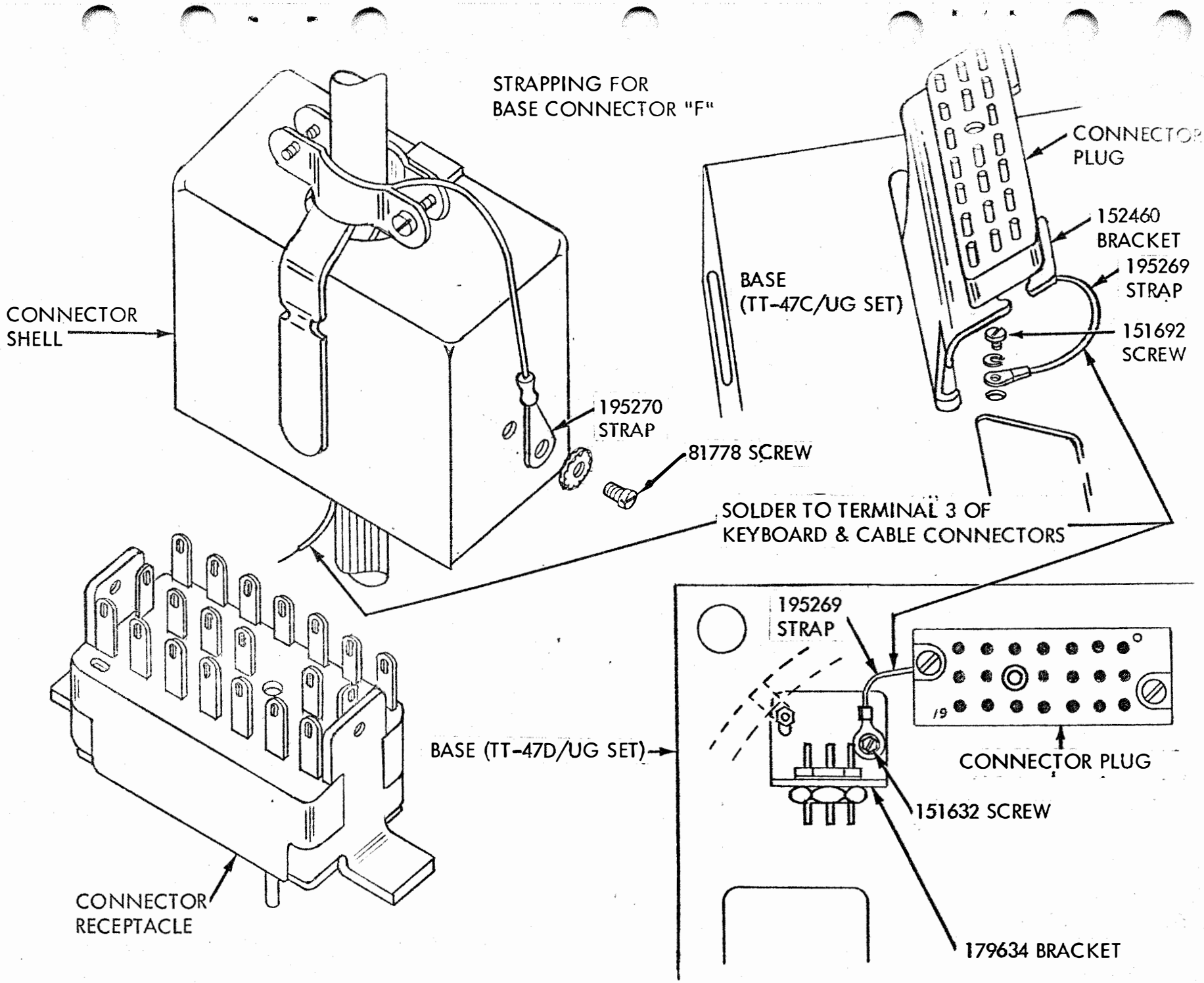
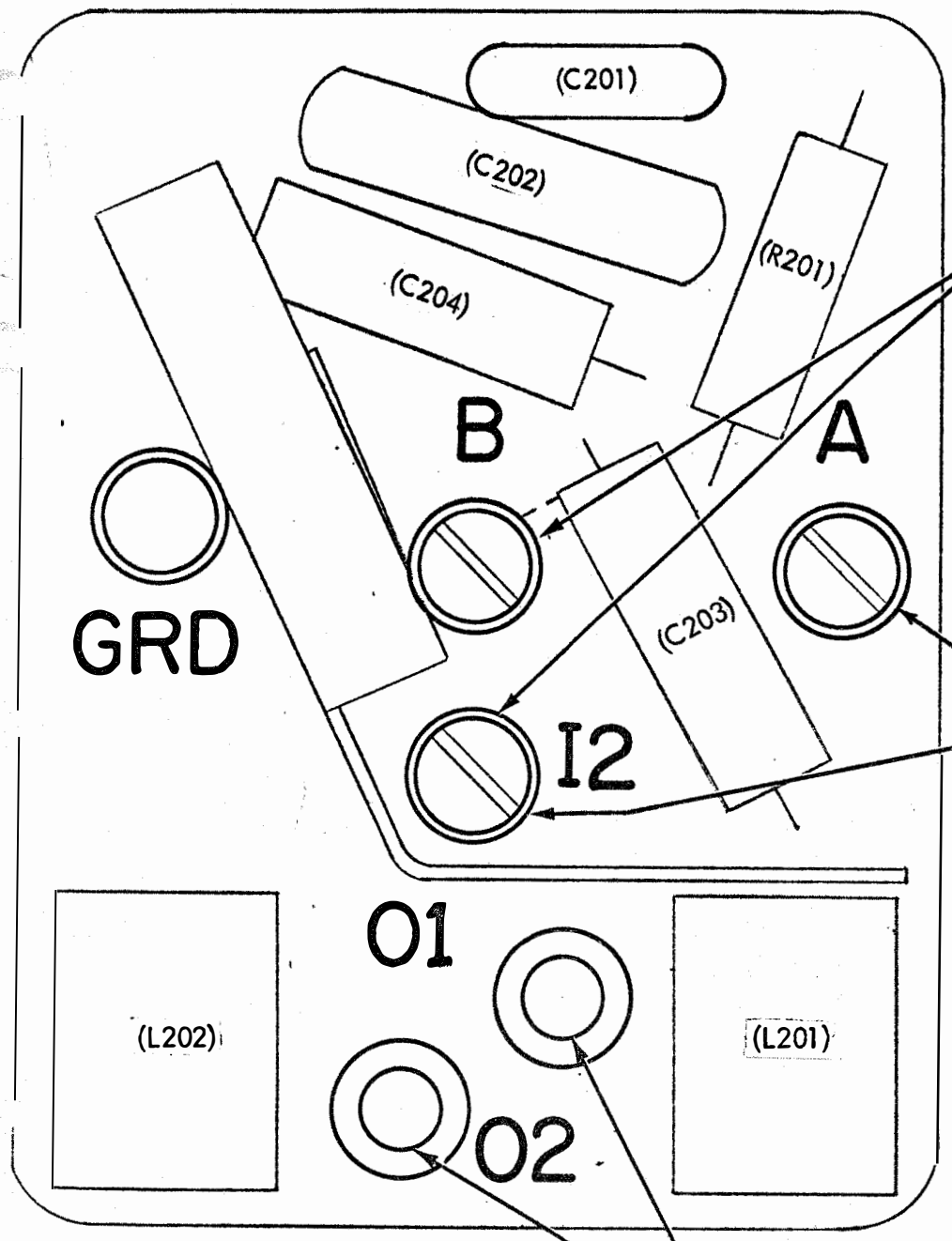


FIGURE 11

503735



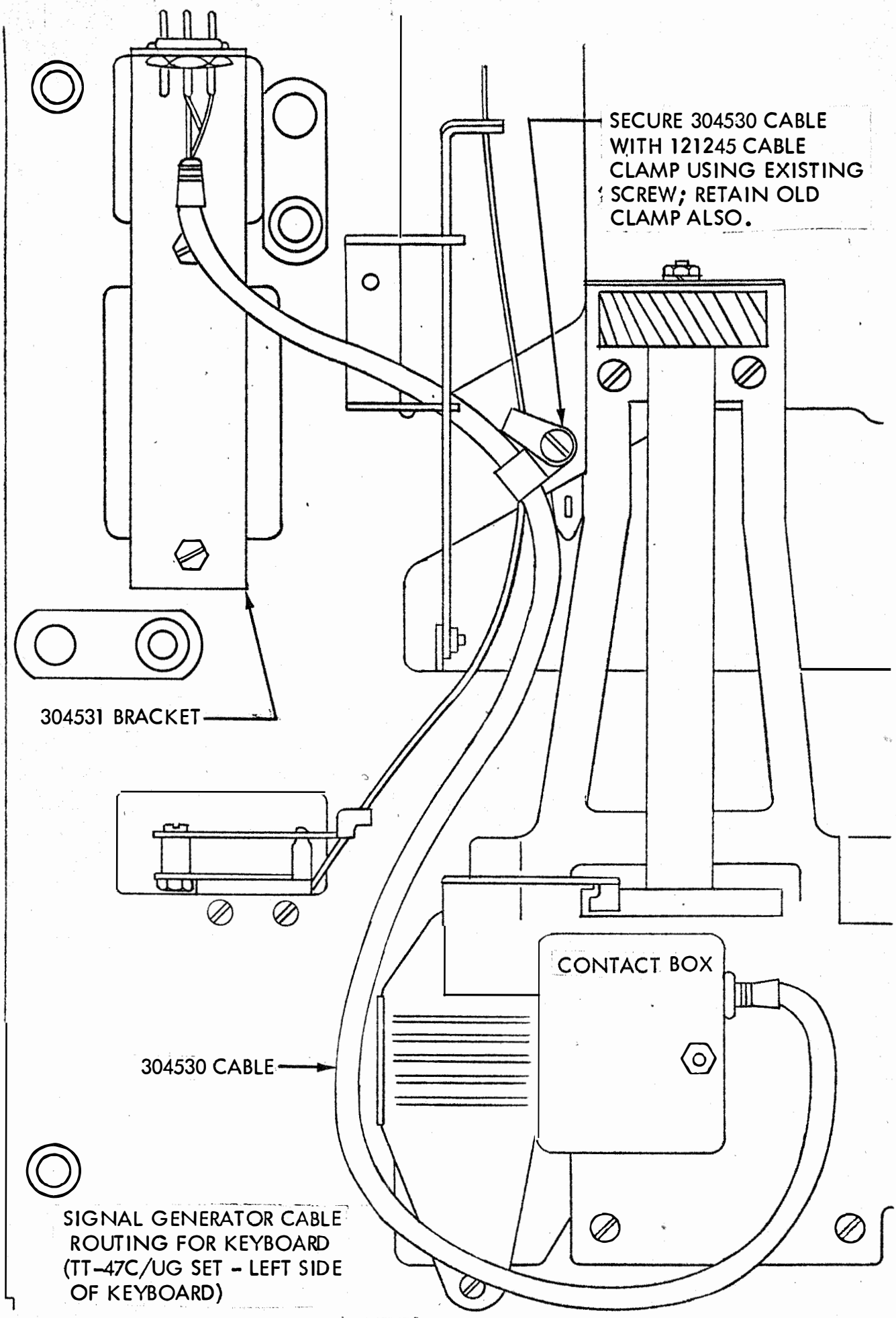
VOLTAGE
(179644 MOD. KIT):
0 WITH CONTACTS
MARKING
3 VOLTS WITH
CONTACTS SPACING

VOLTAGE
(179612 MOD. KIT):
0 WITH CONTACTS
MARKING
3 VOLTS WITH
CONTACTS SPACING

179643 FILTER NETWORK

VOLTAGE (BOTH MOD. KITS):
3 VOLTS WITH CONTACTS MARKING
4 VOLTS WITH CONTACTS SPACING

FIGURE 12



SIGNAL GENERATOR CABLE ROUTING FOR KEYBOARD (TT-47C/UG SET - LEFT SIDE OF KEYBOARD)

FIGURE 13