



PRODUCT

Scan by Zenith

040-0968-01

S39796, S43272

EXTERNAL DC OPERATION (OPTION 7)

For TEKTRONIX® 465B Oscilloscopes

Serial Numbers B010100 - Up

This modification kit provides a DC-to-AC Inverter assembly to enable the 465B Oscilloscope to operate from any 12VDC or 24VDC power source, including the Type 1106 Battery Pack.

Normal Line-Voltage operation (99-250VAC, 48-440Hz) is not affected by this modification.

PARTS INCLUDED IN MODIFICATION KIT:

Ckt. No.	Quantity	Part Number	Description
P11601	1 ea	131-1333-00	CONNECTOR, RECEPT. (DC POWER)
----	1 ea	161-0094-00	POWER CORD ASSEMBLY (DC)
----	0.2 ft	162-0504-00	SLEEVING, INSULATING, 0.034 ID
----	1 ea	210-0204-00	LUG, SOLDER, DOUBLE-ENDED
----	2 ea	210-0586-00	NUT, 4-40 X 0.25 (W/LOCK WASHER)
----	2 ea	210-0994-00	WASHER, FLAT, 0.125 ID X 0.250 OD
----	1 ea	211-0008-00	SCREW, 4-40 X 0.25 PNH
----	2 ea	211-0101-00	SCREW, 4-40 X 0.25 FLH
----	2 ea	211-0244-00	SCREW, 4-40 X 0.312 PNH
----	2 ea	213-0088-00	SCREW, 4-24 X 0.25 THREAD FORMING PNH
A4C4502, A4C4503	2 ea	283-0000-00	CAPACITOR, CER, 0.001 μ F +100-0 PCT 500V
A4C4501, A4C4513, A4C4517	3 ea	283-0003-00	CAPACITOR, CER, 0.01 μ F +80-20 PCT 150V
A4C4408	1 ea	283-0081-00	CAPACITOR, CER, 0.1 μ F +80-20 PCT 50V
C1672, C1674	2 ea	283-0263-00	CAPACITOR, CER, 0.0022 μ F 20 PCT 3kV
----	1 ea	334-2133-00	LABEL, DC INPUT DATA
----	1 ea	342-0229-00	INSULATOR, FILM, 2.550 X 1.500
----	1 ea	348-0005-00	GROMMET, RUBBER, 0.375 ID X 0.500 OD
----	4 ea	348-0365-00	FOOT, CABINET (GROOVED)
----	1 ea	-----	INSERT, PLASTIC, OPTION 7
----	1 ea	-----	DC INVERTER ASSEMBLY
----	1 ea	-----	SWITCH ASSEMBLY, POWER ON-OFF/AC-DC MODE

INSTRUCTIONS:

WARNING

Disconnect the instrument from the power source before proceeding.

- A. To Remove the cabinet and the POWER (PULL ON) Switch assembly:
- () 1. Install the front panel cover and set the instrument face down on a flat surface.
 - () 2. Completely loosen, but do not remove, the six screws holding the rear feet and ring assembly.
 - () 3. Remove the rear cabinet frame (with feet and screws) from the instrument as an intact assembly and set aside; then remove the cabinet.

- () 4. Remove the hardware holding the POWER (PULL ON) switch assembly to the Trigger circuit board.
- () 5. Unsolder the wires connected to the switch assembly and remove the assembly.
- B. To install the new Power switch assembly:
- () 1. Install the 0.5-inch rubber grommet included in the kit in the 0.5-inch hole located behind the Power Transformer in the right side of the 'U' channel.
- () 2. Dress all the cabinet wires from the new Power switch assembly through the grommet installed above.
- () 3. Dress the 5-wire cable section to the five terminals located on the edge of the power transformer winding. (The 3-wire cable section will be routed to the rear sub-panel in a later step.)
- () 4. Solder the five wires from the cable to the Power transformer as shown in Fig. 1:

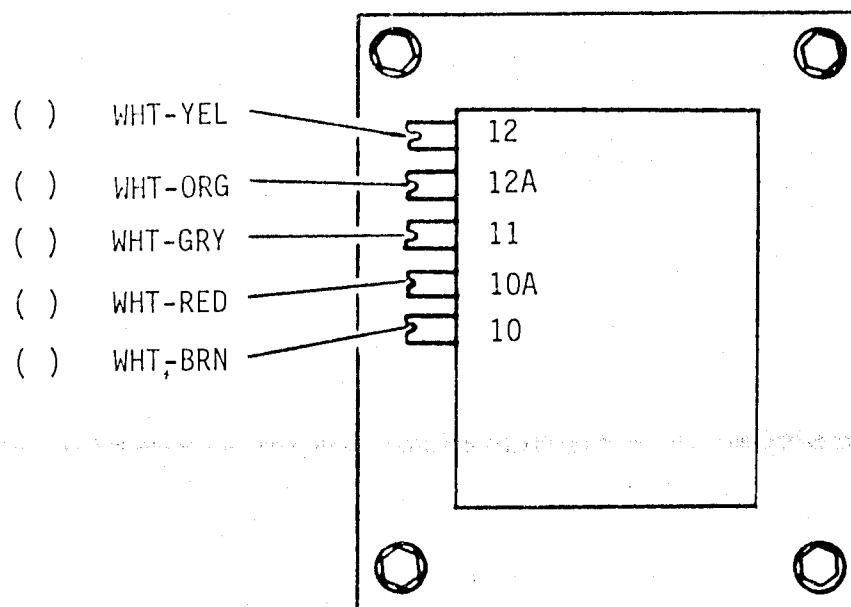


Fig. 1. Power Transformer Connections.

- () 5. Replace the single-ended solder lug located on the rear sub-panel (next to the Voltage Selector) with the double-ended solder lug from the kit.

- () 6. Solder the green-yellow wire from the new cable to the new ground lug located on the rear sub-panel.
- () 7. Solder the wires removed from the old POWER switch assembly to the new POWER ON-OFF/AC-DC MODE switch assembly as shown in Fig. 2:

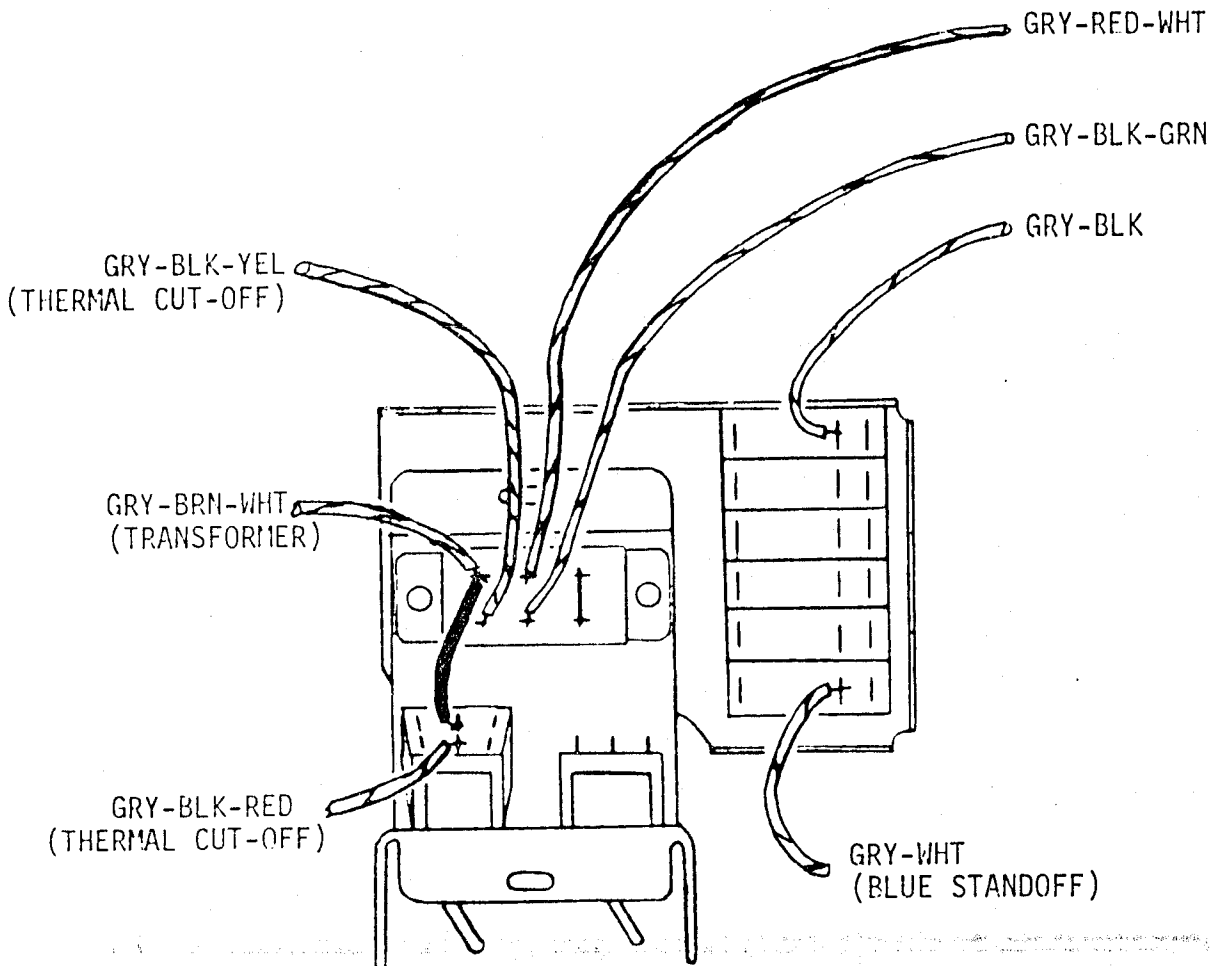


Fig. 2. POWER ON-OFF/AC-DC MODE Switch Assembly.

- () 8. Place the insulator film over the Power switch assembly mounting screws on the Trigger circuit board, oriented so that one corner of the film lines up with the corner of the Trigger board.
- () 9. Install the Power switch assembly on the Trigger circuit board. Before securing, check that the wires are dressed so they won't be pinched. Set the switch actuator in place and secure with the original hardware. Do not overtighten the nuts.

C. To modify the Interface circuit board:

NOTE

Steps C-1 through C-3 do not apply to Option 4 (EMI Suppression) has been installed.

- () 1. Add C1672 and C1674 (two 0.0022 μ F capacitors from the kit) as follows:
- () a. Cut one lead on each capacitor to about 3/8 inch in length and solder to the double-ended ground lug added in step B5.
 - () b. Trim the other lead of one of the capacitors (C1672) as needed to connect it to the bottom right terminal on the Line Selector block. Cover the lead with a piece of insulation sleeving from the kit and solder the lead in place.
 - () c. Trim the other lead of C1674 as needed to connect it to the blue-plastic post on the Interface circuit board. Cover the lead with a piece of insulating sleeving and solder into place.
- () 2. Add C4501, C4502, C4503, C4513, and C4517 as follows (see Fig. 3 for location):
- () a. Install C4501 (0.01 μ F)
 - () b. Install C4502 (0.001 μ F)
 - () c. Install C4503 (0.001 μ F)
 - () d. Install C4517 (0.01 μ F)
 - () e. Install C4513 (0.01 μ F) as shown; scrape the solder-resist coating from the circuit board run before soldering C4513 lead to the run.
- () 3. If present, cut the branch circuit board run adjacent to CR4516 as shown in Fig. 3.

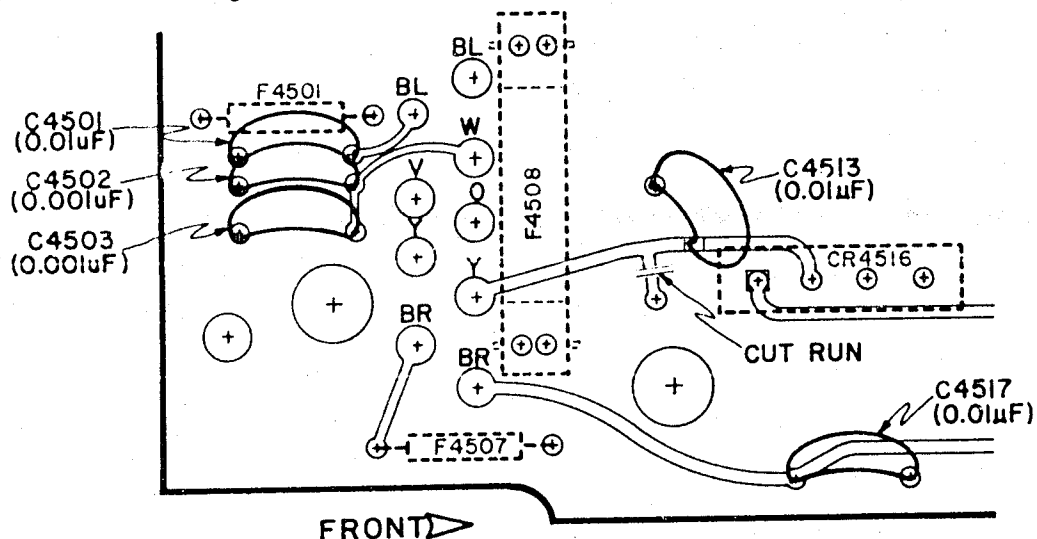


Fig. 3. Partial Interface (A4) Circuit Board.

() 4. Add C4408, the 0.1 μ F capacitor from the kit, in parallel with R4407. See Fig. 4 for location of R4407 and C4408.

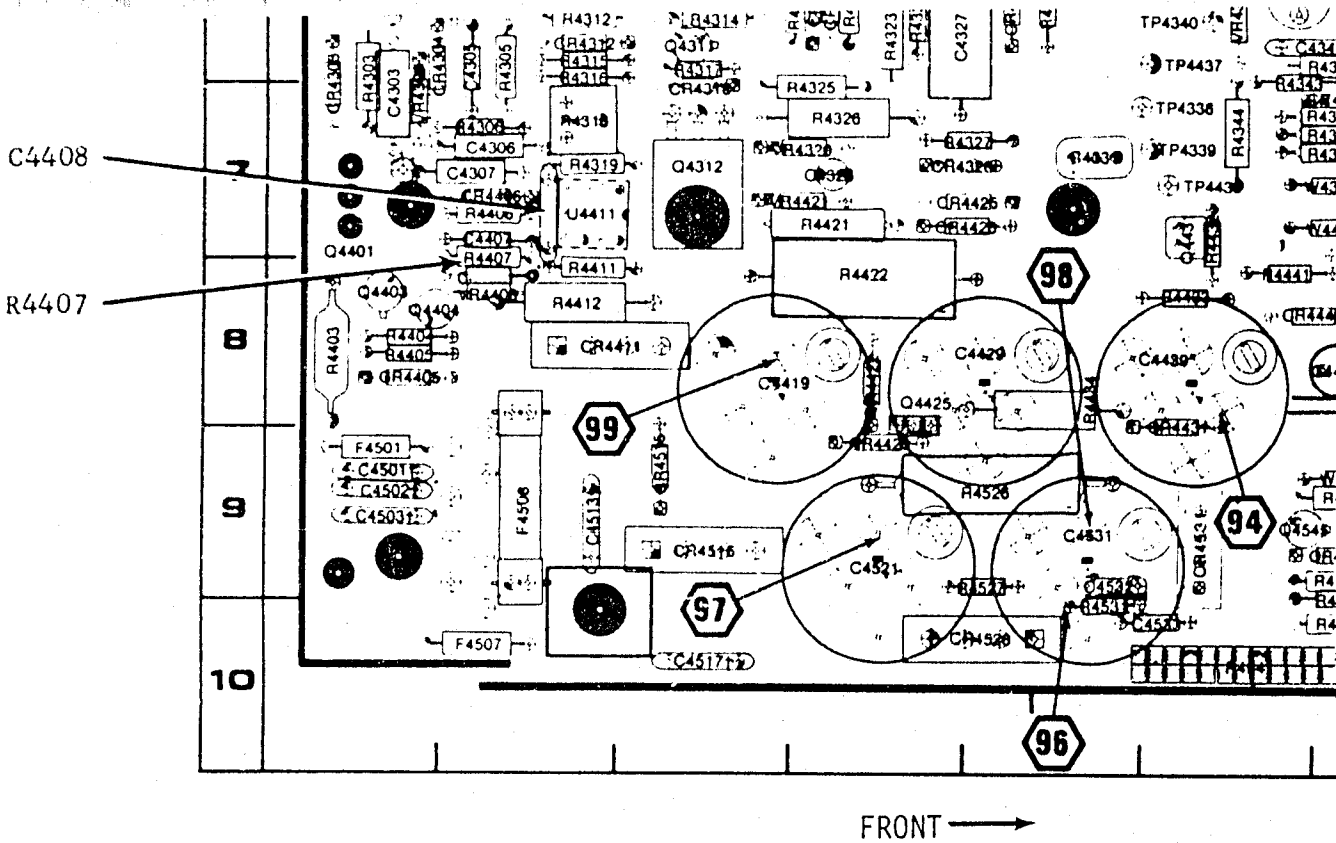


Fig. 4. Partial Interface (A4) Circuit Board.

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D. To install the DC Power receptacle:

- () 1. Remove the plastic rear-fan cover. (Do not unsolder the BNC connector cables.)
- () 2. Cut out the relieved areas on the inside of the cover just below the air filter. Use a sharp knife for the large square opening; use a drill for the round holes.
- () 3. Install the DC Power receptacle from the outside of the cover with the positive terminal at the bottom, using the 4-40 flat-head screws and nuts w/lock washers.
- () 4. Dress the 3-wire cable from the Power switch assembly through the 0.5-inch plastic grommet in the rear sub-panel. Solder the three-wires to the DC Power receptacle as shown in Fig. 5:

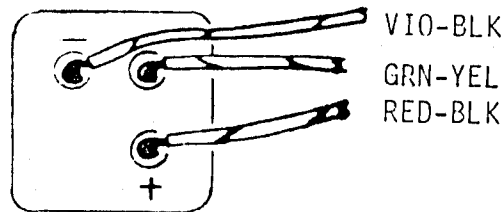


Fig. 5. DC Power Receptacle (as viewed from the front of the instrument).

- () 5. Replace the rear-fan cover using the two 4-40 flat-head screws removed in step D-1.

E. To install the DC Inverter assembly:

() Dress the cable across the DC Inverter circuit board as shown in Fig. 6, except run the cable along the bottom edge of the circuit board, then straight up along the left edge.

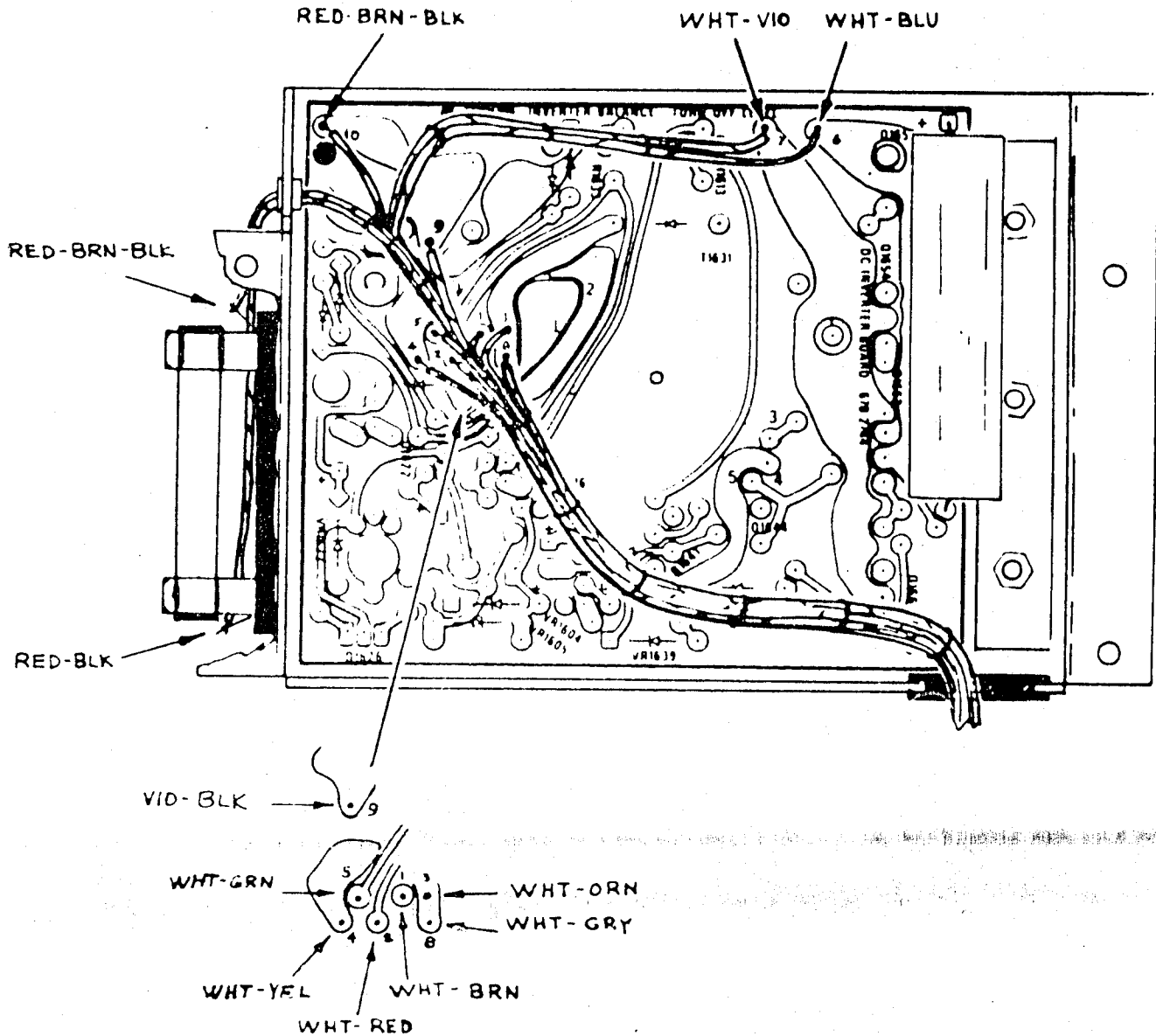


Fig. 6. DC Inverter Assembly.

- () 2. Solder the remaining cable wires to the DC Inverter assembly as shown in Fig. 6.

When soldering wires to the circuit board, do not use extreme heat and be careful not to create solder bridges between circuit runs.

Be careful to position the wires in the circuit board holes so the ends barely project through to the other side. If they extend too far, they might short circuit to the chassis.

- () 3. Mount the DC Inverter assembly on the bulkhead over the mu-metal shield. Make sure the cable is not being pinched; fold the cable as it comes through the rubber grommet if necessary to take up excess slack.
- () 4. Use two 4-24 self-tapping screws and flat washers (from the kit) at the top of the chassis, and a 4-40 x 0.25 PNH screw at the bottom rear edge, to fasten the assembly to the bulkhead. (If press-mount studs have been installed in the top holes, use the 4-40 x 0.312 PNH screws from the kit in the two top holes.)

F. To install the cabinet:

- () 1. Fasten the 465 DC Input label from the kit to the smooth area at the left of the DC Power receptacle.
- () 2. Replace one of the blank plastic mod inserts in the rear sub-panel with the Option 7 insert included in the kit.
- () 3. Check the instrument for correct operation. Refer to the Option 7 Section of the 465B Service Manual for operational details and calibration procedure.
- () 4. Replace the bottom feet in the cabinet with the ones from the kit which are grooved to hold the 1106 Power Supply.

CAUTION

Do not overtighten the screws.

- () 5. Install the cabinet as follows:
 - () a. Disconnect the instrument from the power source.
 - () b. Install the front panel cover and set the instrument face down on a flat surface.
 - () c. Pull the power cable through the cabinet and slide the cabinet over the instrument.
 - () d. Using both hands, press lightly on the top and bottom sides of the cabinet to guide the front edge of the cabinet into the braid-gasket groove around the edge of the front panel frame.

- () e. Pull the power cord through the rear cabinet frame and align the cutout portion in the frame for proper fit at the Line Voltage Selector.
- () f. Set the rear cabinet frame in place. Seat the cabinet edge in the gasket groove of the front and rear frames and tighten the six screws of the rear frame to a snug fit. Do not over-tighten these screws.

() If A4C4408 is not listed under Replaceable Electrical Parts for Option 07 in your 465 Instruction Manual, add as follows:

A4C4408 283-0081-00 CAP., FXD, CER DI:0.1 μ F +80-20 50V

Also, on the Power Supply 12 diagram, add C4408 between ground and the junction of R4407, R4411, and pin 5 of U4411B.

DCL:cp