



product modification

050-2700-01

M71709

FRONT PANEL AND CPU/DISPLAY BOARD REPLACEMENT

For TEKTRONIX[®] 222 Digital Storage Oscilloscopes:

Serial Numbers B010100 - B016225

A new CPU/Display board, pn 671-0062-01, and Front Panel board, pn 671-0063-01, replace CPU/Display board, pn 671-0062-00, and Front Panel board, pn 671-0063-00, which are no longer available. The older versions of the CPU/Display board and Front Panel board must be replaced as a set, and a 2.21k Ω resistor must be added on the Power Supply board.

NOTE

If the instrument serial number is greater than those listed above or if this kit has been installed previously, disregard the instructions and use pn 671-0062-01 or pn 671-0063-01 as a direct replacement for the CPU/Display board or Front Panel board, respectively.

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CAUTION

STATIC SENSITIVE DEVICES

Static discharge can damage any semiconductor component in this instrument. Static voltages of 1kV to 30kV are common in unprotected environments.

TO AVOID DAMAGE, OBSERVE THE FOLLOWING:

1. Minimize handling of static-sensitive components.
2. Transport and store static-sensitive components or assemblies in their original containers, on a metal rail, or on conductive foam. Label any package that contains static-sensitive assemblies or components.
3. Discharge the static voltage from your body by wearing a wrist-strap while handling these components. Servicing static-sensitive assemblies or components should be performed only at a static-free work station by qualified service personnel.
4. Nothing capable of generating or holding a static charge should be allowed on the work station surface.
5. Keep the component leads shorted together whenever possible.
6. Pick up components by the body, never by the leads.
7. Do not slide the components over any surface.
8. Avoid handling components in areas that have a floor or work-surface covering capable of retaining a static-charge.
9. Use a soldering iron that is connected to earth ground.
10. Use only approved, anti-static type, desoldering tools.

KIT PARTS LIST:

Ckt. No.	Quantity	Part Number	Description
	0.5 ft	162-0026-00	Insulation sleeving: clear
	1 ea	322-3226-00	Resistor, fxd, film: 2.21k Ω , 1%, 0.2W
A2	1 ea	671-0062-01	Circuit board assy: CPU/Display
A6	1 ea	671-0063-01	Circuit board assy: Front Panel
	1 ea	----	Label: 050-kit

INSTRUCTIONS:

- () 1. Remove the six front panel knobs using a 1/16 inch Allen (hex) wrench.
- () 2. Open the battery compartment, then disconnect and remove the battery.
- () 3. Place the 222 on its top on a flat anti-static work surface.
- () 4. Remove the five screws (three long and two short) from the bottom cabinet using a T15 Torx-head screwdriver.
- () 5. Remove the two hexagonal standoff posts from the RS-232 connector on the rear panel using a 3/16 inch open-end wrench or nutdriver.
- () 6. Turn the 222 over and set it down with the front panel facing you.
- () 7. Pull the bottom of the front panel assembly out until it clears the bottom cabinet half. Then, disengage the top of the front panel from the top cabinet half and pull the Front Panel assembly slightly away from the instrument (extending the connecting cable only about an inch).
- () 8. Note the orientation, then disconnect the 6-wire cable and the two 14-wire ribbon cables from the Front Panel board and remove the Front Panel assembly.
- () 9. Lift the top cabinet half off the instrument.

CAUTION

Do not use a heat gun to melt the glue used to secure the Front Panel board. Excess heat may damage the plastic Front Panel assembly.

- () 10. The Front Panel board is glued in place using hot glue on the guide hole post through the board. Gently break the glue off the board to remove the board from the front panel.

NOTE

Do not touch either the switch contact area on the Front Panel board or the carbon contact area on the rubber switch activators with bare fingers. Body oils can cause the contact surfaces to corrode over time.

NOTE

When installing the new Front Panel board in the following step, ensure the rubber switch-actuator is in place and that the switch buttons on the new board are properly aligned in the front panel.

- () 11. Install the new Front Panel board, included in this kit, over the guide posts and glue the board to the Front Panel assembly using a small amount of hot glue.
- () 12. Lift the Potentiometer board assembly out of the bottom cabinet half. Note that there are slots in the bottom of the cabinet that align with the metal bracket holding the Potentiometer board.
- () 13. Pull the probe cable retaining assembly out of the slots in the bottom cabinet half and push the probe cables back to provide more clearance.

CAUTION

The crt is a high-vacuum component. Wear the proper eye protection when handling the crt. Use care not to place excessive strain on the neck or connector pins. Place the crt in a protected location while it is out of the instrument.

- () 14. Pull up on the front of the Power Supply board to disconnect the Power Supply board from the connectors on the Main board, then lift the Power Supply board and crt out of the bottom cabinet half.
- () 15. Hold down the Main board and pull up on the center of the CPU/Display board to disconnect it from the two connectors securing it to the Main board.
- () 16. Lift the CPU/Display board up out of the bottom cabinet half.
- () 17. Position the new CPU/Display board, included in this kit, into the bottom cabinet half (the RS-232 connector is at the rear of the board).
- () 18. Align the connectors on the CPU/Display board with the pins on the Main board. You may have to guide the foam board support on the back side of the board past the edge of the bottom cabinet half to clear it.
- () 19. Plug the CPU/Display board into the Main board.

NOTE

When installing the resistor in the following step, Do Not shorten the leads. The entire lead length of the resistor will be required to reach the connection points.

- () 20. Solder one lead of R479, the 2.21k Ω resistor included in this kit, to the solder pad used for the left end of C407 on the Power Supply board. Refer to Fig. 1.
- () 21. Place a length of insulation sleeving over the full length of the resistor to ensure the leads will not short to adjacent components.
- () 22. Solder the remaining lead of R479 to the solder pad used for R422 that is nearest the center of the Power Supply board. Refer to Fig. 1.
- () 23. Remove the INTENSITY knob extension from the intensity potentiometer shaft located along the rear edge of the Power Supply board.

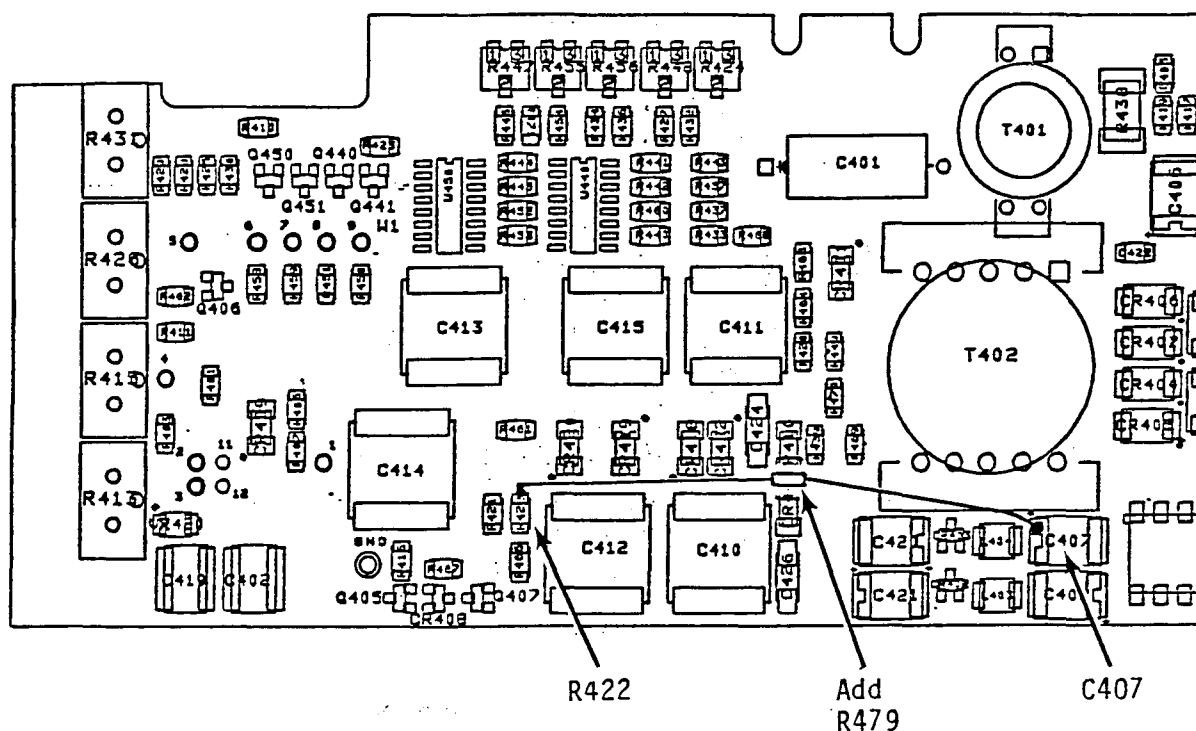


Fig. 1. Power Supply Board Component Locations.

CAUTION

In oscilloscopes below B016000, conductive foam was used to ground the body of the Horizontal Rotation potentiometer to the top cabinet half and to separate the probe cables from the adjacent potentiometers. The conductive foam was used in earlier instruments to minimize the common mode rejection ratio.

When installing the crt and Power Supply board in the following steps, ensure the conductive foam is secured and remains in its original position on the Horizontal Rotation potentiometer. If the conductive foam slips, it may short the A4 Power Supply.

- () 24. Position the crt and Power Supply board assembly into the bottom cabinet half.
- () 25. Align the intensity potentiometer shaft with the hole through the rear of the bottom cabinet half, and align the two connectors near the front of the Power Supply board with the pins on the Main board.
- () 26. Press down on the Power Supply board to mate the connector pins.
- () 27. Reinstall the INTENSITY knob extension on the intensity potentiometer shaft.
- () 28. Align the neck support bracket with the slots on the Power Supply and CPU/Display boards and the square holes on the Acquisition board housing and lower the crt into place.
- () 29. Insert the probe retaining assembly into the slot in the bottom cabinet half.
- () 30. Position the Potentiometer board assembly into the bottom cabinet half, lining the bottom of the bracket up with the slots in the cabinet.
- () 31. Position the Front Panel assembly in place in front of the instrument.
- () 32. Reconnect the three connectors to the Front Panel board. Dress the cables into the Potentiometer board bracket as much as possible.
- () 33. Refer to the Adjustment Procedure in the 222 Service Manual and recalibrate as required.
- () 34. Ensure the probe leads and the circuit boards are all positioned correctly for reassembly of the cabinet.
- () 35. Position the top cabinet half on the bottom cabinet half, carefully align the two halves.

NOTE

Be sure the strap handle is properly captured between the top and bottom clips in the cabinet halves.

- () 36. Hold the two halves of the cabinet together and turn it over.
- () 37. Install the three long screws at the rear and center of the cabinet. Do not overtighten.
- () 38. Guide the pot shafts through the Front Panel board with the top of the Front Panel assembly angled toward the top cabinet half. The five slots on the top of the Front Panel assembly must catch on the five tabs on the top cabinet half.
- () 39. With the top of the Front Panel assembly caught, press the bottom of the Front Panel assembly over the front edge of the bottom cabinet half.

- () 40. Install the two short screws that hold the Front Panel assembly to the bottom cabinet half.

CAUTION

Do not overtighten the hexagonal standoff posts when reinstalling them in the RS-232 connector. The recommended torque is 3.5 in/lbs.

- () 41. Reinstall the two hexagonal standoff posts in the RS-232 connector on the rear panel. Tighten only until snug.
- () 42. Reinstall the battery and press the power on button to ensure the instrument powers on.
- () 43. Turn off the oscilloscope and close the battery compartment cover.
- () 44. Install the three larger Front Panel knobs.

NOTE

Do not overtighten the set screws in the knobs. Excessive pressure can burr the shafts and make them difficult to remove.

- () 45. Install the three smaller Front Panel knobs. Leave enough space between the large knobs and the smaller knobs so that positive switching occurs when the knobs are pressed in.
- () 46. Remove the protective backing from the 050-kit label, included in this kit, and place the label on a clean, flat surface of the bottom cabinet. The label indicates this kit has been installed.
- () 47. For future reference, update the Replaceable Parts lists in the 222 Service Manual with the information provided in the parts list of this kit.

JLG