



product modification

040-1344-00

M74953

CRT (154-0861-10) NOISE REDUCTION

For the following TEKTRONIX® instruments:

2220	Serial Numbers	B010100 - UP
2221	Serial Numbers	B010100 - UP
2224	Serial Numbers	B010100 - B010376
2230	Serial Numbers	B010100 - UP
2232	Serial Numbers	B010100 - B015163

This modification kit provides a four inch length of copper tape and instructions for installing the tape over the anode dam on the crt. The tape provides a path to conduct the electrostatic discharge from the crt anode lead to the electro-dag coating which prevents the electrostatic discharge from being displayed as undesirable noise spikes on the crt display.

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:

Quantity	Part Number	Description
1 ea	-----	Tape, copper: 4 inch length
1 ea	-----	Label: 040-kit

INSTRUCTIONS:

WARNING

Dangerous shock hazards may be exposed when the instrument cabinet is removed. Before proceeding, ensure the POWER switch is in the OFF position, then disconnect the instrument from the power source. Disassembly should only be attempted by qualified service personnel.

CABINET REMOVAL

- () 1. Disconnect the power cord from the instrument. For instruments with a power cord securing clamp, remove the philips-head screw holding the power cord securing clamp before disconnecting the power cord.
- () 2. Remove the two screws from the cabinet, one from the right-rear side and one from the bottom front.
- () 3. Remove the two screws used to secure the rear panel and power cord retainers. Set the power cord retainers and rear panel aside.
- () 4. Remove the four screws used to secure the side panel to the left rear side of the instrument (if the instrument has GPIB, remove two screws and two standoffs or if the instrument has RS-232, remove two screws and four standoffs). Set the side panel aside.
- () 5. Pull the front panel and attached chassis forward and out of the cabinet. Set the cabinet aside.

PLACE THE STORAGE CIRCUIT BOARD IN THE SERVICING POSITION

- () 6. Remove the eleven push buttons with extension shafts from their respective switches along the front edge of the Storage circuit board. Insert a small screwdriver between the extension shaft and the switch shaft, then push down and forward until the extension shaft is disengaged and pull the shafts straight back through the front panel.

- () 7. Disconnect the following connectors from the left edge of the Storage circuit board:
 - () a. P2111, the four-wire CH1 connector. Mark this CH1 connector with a small piece of tape for easy identification when reconnecting.
 - () b. P2112, the four-wire CH2 connector.
 - () c. Disconnect P8100, the fifty-wire connector (Option 10 or Option 12 Only) from the left edge of the Storage circuit board.
- () 8. Remove the three Storage circuit board screws that are identified by the etched words "Remove To Lift Board".
- () 9. Remove the screw used to secure the left edge of the Storage circuit board to the instrument chassis.

Steps 10 and 11 only apply to 2221 and 2230 instruments.

- () 10. Lift the Storage circuit board up until the cable of P9430 (on the front edge of the Storage circuit board) clears the back of the CURSORS control.
- () 11. Disconnect P9430, the six-wire connector, from the Storage circuit board by pulling it toward the front panel.
- () 12. Raise the Storage circuit board to its service position ensuring that the board latch clears the top of the chassis side rail. Place the board latch tab in the chassis side rail slot.

X-Y PLOTTER OR OPTION BOARD ASSEMBLY REMOVAL

- () 13. Disconnect the following connectors from the rear edge of the X-Y Plotter, GPIB, or RS-232-C circuit board assembly.
 - () a. P4110, a two-wire connector.
 - () b. P6423, a four-wire connector.
 - () c. P9301, a five-wire connector.

NOTE

The field-installed GPIB Option and RS-232-C Option have one more connector to be removed than the factory-installed options. For standard instruments and instruments that have a factory-installed GPIB or RS-232-C, go to step 15. For a field-installed option, proceed with step 14.

- () 14. Disconnect either P1316 (GPIB) or P1216 (RS-232-C) from the front of the Option circuit board.
- () 15. Stand the instrument on its side (X-Y Plotter/Option assembly up) and remove the two screws used to secure the assembly to the bottom edge of the instrument chassis. One of the screws is located under the delay line cable.
- () 16. Lay the instrument down and remove the screw used to secure the X-Y Plotter/Option assembly to the top edge of the instrument chassis.
- () 17. Remove the X-Y Plotter/Option assembly from the instrument.

CRT REMOVAL

WARNING

Use care when handling the crt. Breakage of the crt may cause high-velocity scattering of glass fragments (implosion). Protective clothing and safety glasses should be worn. Avoid striking the crt on any object which may cause it to crack or implode. When storing the crt, either place it in a protective carton or set it face down on a smooth surface in a protected location with a soft mat under the faceplate.

- () 18. Disconnect the four deflection plate wires at the middle of the crt neck, noting wire colors and connection locations for reference during installation.
- () 19. Unplug the Trace Rotation connector (P9006) from the Front Panel circuit board, noting its location and orientation for reference during installation.

WARNING

The crt anode lead and the high-voltage multiplier output lead retain a high-voltage charge after the instrument is turned off. To avoid electrical shock, disconnect the high-voltage multiplier lead from the crt anode lead and ground both leads to the main instrument chassis.

- () 20. Disconnect the crt anode lead connector from the high-voltage multiplier lead located between the power supply shield and the crt shield. Discharge both the anode lead connector and the high-voltage multiplier lead to chassis ground.
- () 21. Remove the two front panel screws that retain the plastic crt frame and light filter to the front panel. Remove the crt frame and light filter from the instrument.

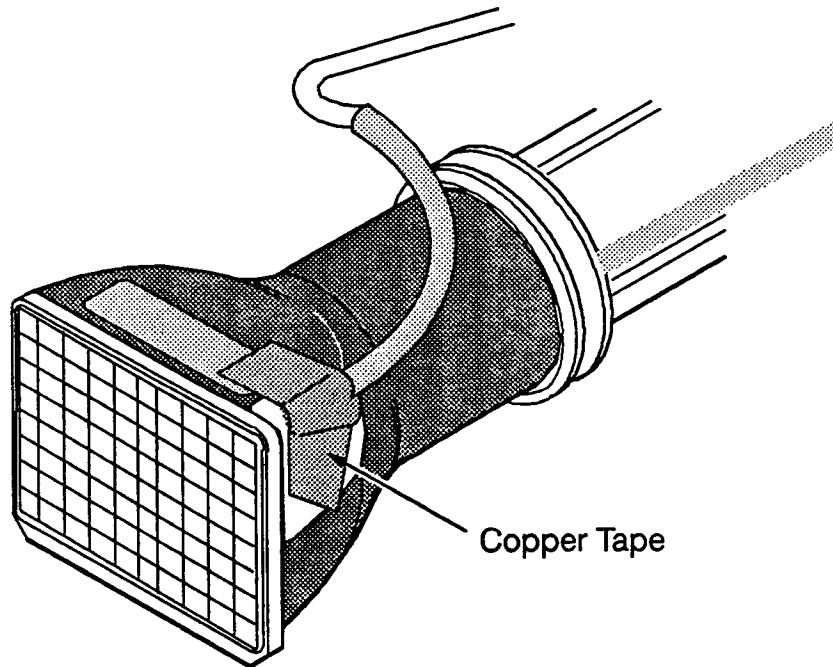


Fig. 1. Orientation of tape on crt.

- () 22. Remove the crt socket cap from the rear of the crt socket; retain the cap for later reassembly.
- () 23. Press forward gently on the crt funnel near the front of the crt to disengage the crt base pins from the socket, then remove the crt and the crt shield through the instrument front panel. If the plastic crt corner pads fall out, save them for reinstallation.

COPPER TAPE INSTALLATION

NOTE

Optimum results are obtained when the tape installed in the following step completely covers and conforms to the shape of the anode dam. The tape must be like a skin over the dam, connecting it electrically to the black electro-dag coating over the funnel. It is also important that as little air as possible be trapped under the tape, as the discharges will continue in the voids under the tape.

- () 24. Remove the protective backing from the copper tape, included in this kit, and place the tape on the crt so that it covers the entire anode dam area. Refer to Fig. 1.

REASSEMBLY AND PERFORMANCE CHECK

- () 25. Install the crt by performing the reverse of the procedure described in steps 18 through 23.

NOTE

When installing the crt into the instrument, reinstall any loose plastic corner pads that are out of place. Ensure that all crt pins are straight and that the indexing keys on the crt base, socket and shield are aligned. Ensure that the ground clip makes contact only with the outside of the crt shield.

- () 26. Install the X-Y Plotter/Option circuit board assembly by performing the reverse of the procedure described in steps 13 through 17.
- () 27. Refer to the Performance Check Procedure in the appropriate service manual and verify product performance.
- () 28. Lower the Storage circuit board into the instrument and install the cabinet by performing the reverse of the procedure described in steps 1 through 12.

NOTE

To ensure that the cabinet is properly grounded to the instrument chassis, the screws at the right-rear side and bottom front of the cabinet must be tightly secured when reassembling the instrument.

- () 29. Remove the protective backing from the 040-kit label, included in this kit, and place the label on a clean, flat surface of the rear panel. The label indicates this kit has been installed.

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