



050-1889-00

M51983, M53557

U800 REPLACEMENT

For the following TEKTRONIX® Oscilloscopes:

2445 Serial Numbers B010100 - B023599

2465 Serial Numbers B010100 - B024739

A new U800 Horizontal Amplifier System microcircuit, pn 155-0241-02, replaces the U800 Horizontal Amplifier System microcircuit, pn 155-0241-01, which is no longer available. Use of the new microcircuit requires the addition of the capacitor C804, and changing the value of the capacitor C809.

NOTE

If the instrument serial number is greater than those listed above or this kit has already been installed, disregard these instructions and use pn 155-0241-02 as a direct replacement.

CAUTION

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

OBSERVE THE FOLLOWING PRECAUTIONS TO AVOID DAMAGE:

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 special, anti-static type, desoldering tools.

KIT PARTS LIST:

Ckt. Number	Quantity	Part Number	Description
U800	1 EA	155-0241-02	MICROCKT, DGTL: HORIZ AMP SYS.
C804, C809	2 EA	281-0759-00	CAP, FXD, CER DI: 22pf, 10%, 100V
	1 EA	-----	LABEL, 050-1889-XX

INSTRUCTIONS:

WARNING

To avoid electric shock hazard, disconnect the instrument from all other electrical equipment and the power source before proceeding.

The following instructions are for use by qualified service personnel only. To avoid personal injury, do not perform any of the following procedure unless you are qualified to do so.

- () 1. Remove the instrument cabinet by performing the following steps:
 - () a. Unplug the power cord from the rear panel connector.
 - () b. Install the front panel protective cover, place the cabinet handle against the bottom of the cabinet, and set the instrument face down on a flat surface.
 - () c. Unwrap the power cord from the instrument feet.
 - () d. Remove the four screws in the rear panel feet. (See to Fig. 1)
 - () e. Remove the two screws from the top-center and bottom-center of the rear panel.
 - () f. Lift the rear panel and power cord away from the instrument, leaving the rear panel feet attached.
 - () g. Slide the cabinet off the instrument.

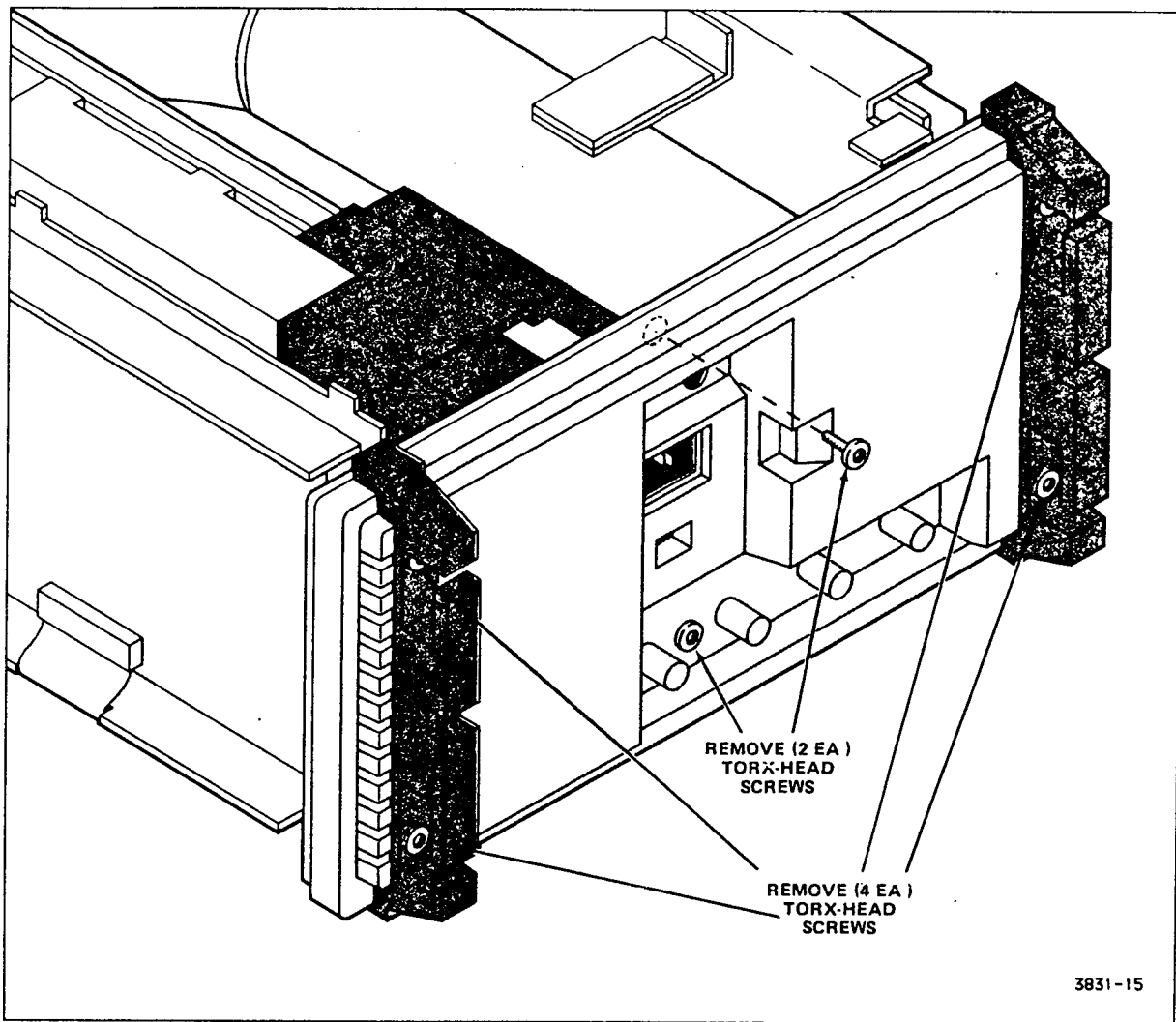


Fig. 1 Rear Panel Removal

- () 2. Set the Instrument, bottom down, on a flat surface.
- () 3. Remove the two securing screws from the top-edge of the rear-panel chassis.
- () 4. Remove the securing screw from the left side of the chassis.

- () 5. Remove the two top securing screws at the front edge of the cover plate.
- () 6. Remove the top securing nut at the rear of the cover plate.
- () 7. Remove the Top-Cover Plate up and away from the instrument.

WARNING

The line-rectifier filter capacitors normally retain a charge for a short period (approximately 15 to 20 seconds) after the instrument is turned off and can remain charged for a longer period if a bleeder-resistor or power-supply problem occurs. Before beginning work on the internal circuitry of the oscilloscope, verify that the capacitors have discharged to 24V or less. Measurement is made at the three points indicated on the plastic primary input shield at the rear of the instrument. If the capacitors retain charges of greater than 24V for more than 20 seconds, discharge them using a 1k Ω , 5-watt resistor connected point-to-point across the capacitors (through the access holes). Ensure that the capacitors are discharged before commencing repairs.

- () 8. Using a small-blade screwdriver, pry the trim strip from the top edge of the front-panel trim ring. Gently pry up on the back edge to release it, then pry gently at each of the front edge retaining clips to remove the strip.
- () 9. Remove the five screws from the top edge of the front-panel trim ring.
- () 10. Remove the four screws and the two plastic feet from the bottom edge of the front-panel trim ring.
- () 11. Remove the screws from both sides of the front-panel trim ring (screws are recessed in the front-cover catches on earlier instruments).

- () 12. Using firm pressure, pull the knobs from the four controls directly below the crt (INTENSITY, FOCUS, READOUT INTENSITY, and SCALE ILLUM).
- () 13. Slide off the front-panel trim ring and outer crt bezel.
- () 14. Disconnect the two ribbon-cable connectors from the front edge of the Control board (P651 and P652).
- () 15. Pull out the Front-Panel and Variable board assembly.
- () 16. Disconnect the two power-supply multipin connectors from the power supply Regulator board (P121 and P122).
- () 17. Disconnect the three ribbon-cable connections from the bottom of the Main board (P411, P511, and P512).
- () 18. Carefully disconnect the vertical and horizontal deflection leads from the crt neck pins (which are easily damaged). Access is via holes in the Main board. Use long-nose pliers to disconnect the pins by gently pulling straight up on the connectors. Avoid putting excessive side pressure on the metal-to-glass seal of the crt neck pins.
- () 19. Disconnect the CH 2 OUT connector from near the center of the Main circuit board (P105).
- () 20. Disconnect the rear-panel BNC connector leads from the rear of the Main circuit board (P106, P107, and P108).
- () 21. Disconnect the six multipin connectors for the controls beneath the crt (P111, P112, P113, P114, P115, and P116).
- () 22. Disconnect the two-conductor connector for the Scale Illumination circuit board from between the ASTIG and SCALE ILLUM control connections (P181).
- () 23. Remove J141 from the Dynamic Centering (A14) circuit board.

- () 24. Unsnap the Power-switch rod from the switch hinge at the rear of the instrument by applying counterclockwise torque to the shaft and sliding it out of the hinge.
- () 25. Remove the Power-switch push-button mounting screw from the front of the instrument (on the bottom of the front frame) and extract the Power-switch rod.
- () 26. Remove the six screws holding the Attenuator assemblies and the CH 3 and CH 4 input connectors to the front frame.
- () 27. Remove the Main circuit board mounting screws. There are eleven screws on the Main circuit board, however, only seven screws actually secure the Main circuit board to the instrument chassis, the other four screws are used to secure the delay line to the Main circuit board. To ease removal of the Main circuit board, do not remove the two screws which mount into the square pads on the circuit board. These screws help secure the delay line to the Main circuit board and if left in, ease removal of the Main circuit board by preventing the delay line from hanging loose from the circuit board.
- () 28. Raise the rear of the Main board to unplug J191 and separate the Main circuit board from the HV board. When the plug pins are completely disengaged and the rear of the board clears the rear frame, slide the Main board rearward out of the front-panel frame.
- () 29. Lift the Main board and Delay Line clear of the instrument while working the power supply cables through the slot in the frame.

REPLACE U800

CAUTION

Attempts to unsolder, remove, and resolder leads from the component side of a circuit board may cause damage to the reverse side of the circuit board.

- () 30. From the BACK side of the Main circuit board, very carefully unsolder the leads of the microcircuit.

CAUTION

Excessive heat can cause the etched circuit conductors to separate from the circuit board. Never allow the solder extractor tip to remain at one place on the board for more than three seconds. Solder wick, spring-acutated or squeeze-bulb solder suckers, and heat blocks (for desoldering multipin components) must not be used. Damage caused by poor soldering techniques can void the Instrument warranty.

- () 31. From the top side of the Main circuit board, remove the nuts which secure the microcircuit and remove the defective component.
- () 32. Locate the capacitor C809 (See Fig. 2). Replace it with one of the capacitors supplied in the kit.
- () 33. Locate the resistor R804 (See Fig. 2). Solder the remaining capacitor in parallel with R804.

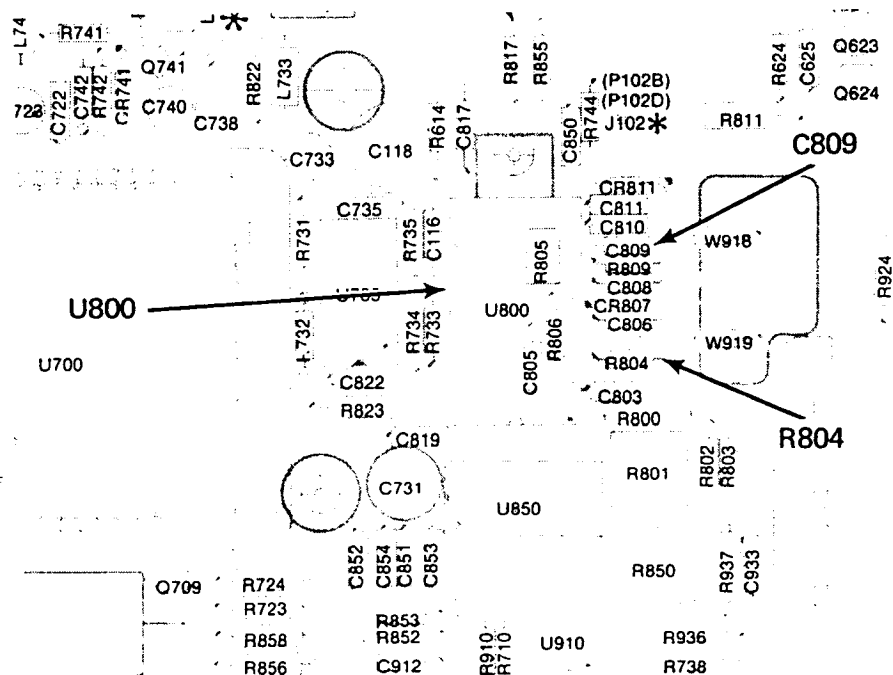


Fig. 2 Location of U800, C809, & R804

- () 34. Place the new microcircuit in position, do not solder, and secure with the nuts previously removed, tightened to 5 inch-lbs.
- () 35. Turn the circuit board over, and solder the leads of the microcircuit.

INSTALL MAIN CIRCUIT BOARD

- () 36. Guiding the power supply cables through the slot in the chassis, slide the Main board into the instrument and press down firmly to engage J191.
- () 37. Install the Main circuit board mounting screws.
- () 38. Reinstall the six screws which secure the Attenuator assemblies and the CH 3 and CH 4 input connectors to the front frame.
- () 39. Reinstall J141 on the Dynamic Centering circuit board.
- () 40. Reinstall the power-switch rod and the push-button mounting screw.
- () 41. Reconnect the two-conductor connector (P181) for the Scale Illumination circuit board.
- () 42. Reconnect the six multipin connectors beneath the crt (P111, P112, P113, P114, P115, and P116).
- () 43. Reconnect the rear-panel BNC connector leads (P106, P107, and P108).
- () 44. Reconnect the CH 2 OUT connector (P105) near the center of the Main circuit board.
- () 45. Carefully reconnect the leads to the crt.
- () 46. Reconnect the three multipin connectors (P411, P511 and P512) along the edge of the Main circuit board.

- () 47. Reconnect the two power-supply multipin connectors (P121 and P122) to the power supply Regulator circuit board.
- () 48. Reinstall the Front-Panel and Variable board assembly.
- () 49. Reconnect the two ribbon-cable connectors (P651 and P652) to the Control circuit board.
- () 50. Reinstall the four control knobs below the crt.
- () 51. Reinstall the screws located on the sides of the front-panel trim ring.
- () 52. Reinstall the four screws and two plastic feet on the bottom edge of the front-panel trim ring.
- () 53. Reinstall the five screws located along the top edge of the front-panel trim ring.
- () 54. Reinstall the trim strip along the top edge of the front-panel trim ring.
- () 55. Disconnect the power cord from the rear cover and plug it into the instrument.
- () 56. Check that the instrument power switch is in the off position, then, plug the power cord into an AC power source.
- () 57. Calibrate the instrument according to the Adjustment Procedure section in the Service Manual.
- () 58. After the instrument has been calibrated, reinstall the top-cover plate, and then the instrument cabinet.
- () 59. Remove the backing from the 050-1889-XX label and affix it to a clean section of the rear cover to indicate this kit has been installed.

- () 60. For future reference, update the Replaceable Electrical Parts list in the Instrument Service Manual, using the information in the Kit Parts List, on page 3 of these instructions.

CM: cm

