



050-1425-02

M41128, M43700
M48666, M53047
M56036, M64387

U290 OR U315 REPLACEMENT

For TEKTRONIX[®] TG501 Time Mark Generators

Serial Numbers B010100 - B036899

To eliminate the need to select U290 and U315, L323 (a 510nH coil) must be added between U290A and U290B; Q330 must be changed from a type 2N5087 transistor to a type 2N3906 transistor. The addition of L323 compensates for variations in the characteristics of different brands of microcircuits that may be used as U290 or U315. Also, to prevent break-up of the 1nS and 2nS outputs and to correct missing marker output pulses in the 20nS position, additional, extensive changes need to be made.

NOTE

If the instrument serial number is greater than those listed above or this kit has already been installed, disregard these instructions and use the appropriate microcircuits provided in the kit as direct replacements for U290 and U315.

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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. Number	Quantity	Part Number	Description
L323	1 ea	108-0262-00	Coil, rf, 510nH
	1 ea	175-5358-01	Cable assy, rf, 50 Ω coax, 18.5 L
Q330	1 ea	151-0188-00	Transistor, PNP, Si, 2N3906
U290	1 ea	156-0205-02	Microckt, dgtl, quad 2-input NOR gate
U315	1 ea	156-0230-00	Microckt, dgtl, dual D, M/S, FF
	2 ea	214-0982-00	Contact, elec, grounding
	2 ea	276-0614-00	Core, em, toroid, ferrite, 0.375 OD
	1 ea	276-0635-00	Core, em, toroid, ferrite, 0.50 OD
C291	1 ea	283-0160-00	Capacitor, cer, 1.5pF, \pm 0.1pF, 50V
C265	1 ea	283-0204-00	Capacitor, cer, 0.01 μ F, 20%, 50V
C497	1 ea	283-0359-00	Capacitor, cer, 1000pF, 10%, 200V
R294	1 ea	315-0131-00	Resistor, cmpsn, 130 Ω , 5%, 0.25W
R296	1 ea	315-0820-00	Resistor, cmpsn, 82 Ω , 5%, 0.25W
	1 ea	-----	Label, 050-kit

INSTRUCTIONS:**WARNING**

Before proceeding, ensure the mainframe power switch is in the off position, then disconnect the instrument from the power source.

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 left and right side electrical shields.
- () 2. Remove the eight Multiplier circuit board mounting screws (be careful to note the length and locations of the three different types of mounting screws).
- () 3. Remove the Multiplier circuit board, disconnecting cables as necessary to gain access to the front of the Main circuit board near the front of the plug-in.

MODIFY THE MAIN CIRCUIT BOARD (COMPONENT SIDE)

- () 4. Remove U290 and cut the circuit board run between U290-2 and U290-7.

- () 5. Replace U290 with the microcircuit (pn 156-0205-02) included in the kit.
- () 6. Replace U315 with the microcircuit (pn 156-0230-00) included in the kit.

MODIFY THE MAIN CIRCUIT (SOLDER SIDE)

- () 7. Cut off both leads of the 510nH coil (included in the kit) to about 3/8 of an inch. Solder the coil (L323) to pins 2 and 7 of U290 on the back of the Main circuit board (if a 51 Ω resistor exists at this location, first remove and discard it).
- () 8. Replace R294 (390 Ω) with the 130 Ω resistor from the kit.
- () 9. Add R296 (82 Ω resistor from the kit) from U290-11 to +5V (U290-16).
- () 10. Add C265 (0.01 μ F capacitor from the kit) from the collector of Q265 to ground.
- () 11. Add C291 (1.5pF capacitor from the kit) from the base to the collector of Q290.
- () 12. Replace Q330, a 2N5087 transistor near U315, with the 2N3906 transistor from the kit.

MODIFY THE MULTIPLIER CIRCUIT BOARD

- () 13. Add C497, the 1000pF capacitor (included in the kit) in parallel with C496.

NOTE

Dress all bypass capacitors (C494, C458, C457, C455, C462, C489, C490, C492) as close to the board as possible.

- () 14. Replace the 15" Marker Output cable with the new 18.5" cable (included in the kit).
- () 15. Slip the two ferrite cores (included in the kit) onto the new cable so that they will be positioned at P470.
- () 16. Add the single, ferrite core (included in the kit) to the six-lead ribbon cable between the Main and Multiplier boards. Locate the core near the end of the cable that is connected to the Multiplier circuit board. Wrap the cable two turns (one loop) through the core before re-soldering.

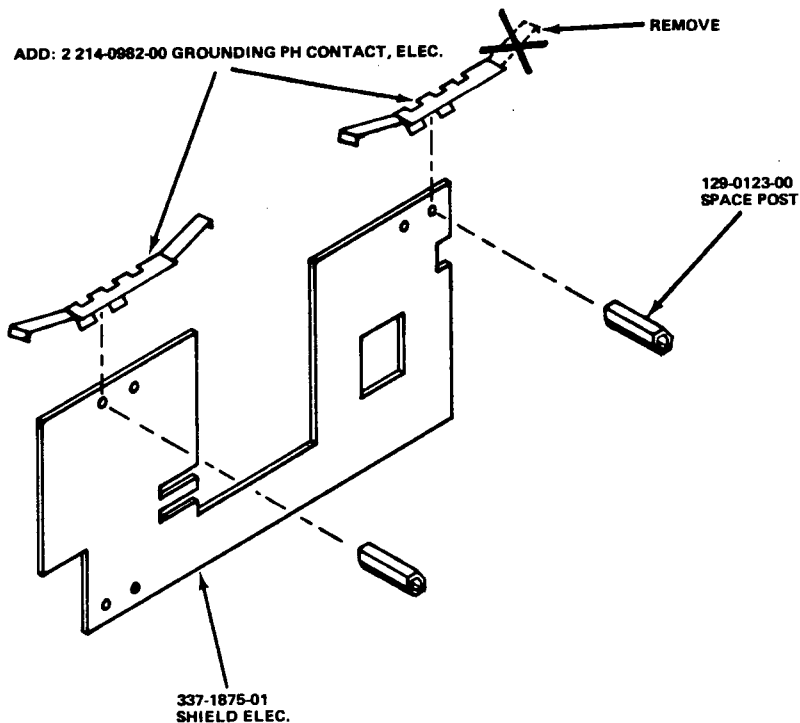


Fig. 1 - Ground Spring Installation

- () 17. Install the included ground springs between the top front and rear spacer posts. Remove the rear facing leaf from the rear ground spring (so it will clear the rear panel). See fig. 1.
- () 18. Reinstall the Multiplier circuit board, reconnecting any cables you have disconnected and reroute the new 18.5" cable toward the rear end of the Multiplier circuit board along the bottom frame rail.
- () 19. Refer to the Calibration procedure in your Instruction Manual, recalibrate as necessary, and reinstall the electrical shields.
- () 20. Attach the Manual Modification Insert (which follows) to the Instruction Manual.
- () 21. Remove the protective backing from the 050-kit label and place the label on a clean area of the frame rail near the serial number tag.

RH: rh