



050-0920-02
M23233-1, M31427
M32247-3
Type 7D15

U758 and U762 REPLACEMENT

For the TEKTRONIX® 7D15 Universal Counter/Timers

Serial Numbers B010100 - B099999

Four decade counter microcircuits, pn 155-0171-00, replace the four-decade counter microcircuits (U758 and U762), pn 155-0090-00, which are no longer available. Use of the new counters necessitates replacement of both microcircuit plus several circuit changes.

NOTE

If the instrument serial number is greater than those listed above or if this kit, pn 050-0920-XX, has been previously installed, disregard these instructions and use the microcircuit, pn 155-0171-00, as direct replacement for U758 or U762.

PARTS INCLUDED IN PARTS REPLACEMENT KIT:

Ckt. No.	Quantity	Part Number	Description
Q748	1 ea	151-0302-00	Transistor, NPN, Si, 2N2222A
CR752	1 ea	152-0141-02	Diode, silicon, 30V 150mA, 1N4152
VR797	1 ea	152-0175-00	Diode, Zener, 5.6V 5% 0.4W, 1N752A
U758 U762	2 ea	155-0171-00	Microcircuit, di, 4 decade counter
	0.25 ft	162-0504-00	Insulation sleeving, black, 0.034 ID
C752	1 ea	283-0023-00	Capacitor, cer, 0.1 μ F +80-20% 12V
C781	1 ea	283-0076-00	Capacitor, cer, 27pF 10% 500V
C746	1 ea	283-0080-00	Capacitor, cer, 0.022 μ F +80-20% 25V
R752 R778	2 ea	315-0103-00	Resistor, cmpsn, 10k Ω 5% 0.25W
R747	1 ea	315-0123-00	Resistor, cmpsn, 12k Ω 5% 0.25W
R748	1 ea	315-0222-00	Resistor, cmpsn, 2.2k Ω 5% 0.25W
R794	1 ea	315-0751-00	Resistor, cmpsn, 750 Ω 5% 0.25W
	1 ea		Marker, identification

INSTRUCTIONS:

WARNING

Before proceeding, ensure the oscilloscope POWER switch is OFF, then disconnect the 7D15 from the mainframe.

- () 1. Remove the right electrical shield.
- () 2. Disconnect the following connectors from the Time Base and Logic circuit board, A7:
 - () a. P231, a single-pin connector from the Gate Switch circuit board, A1.
 - () b. P602, a single-pin connector from the EXT CLOCK IN jack, J601.
 - () c. P699, a six-pin connector from the Clock Switch circuit board, A4.
 - () d. P599B, a five-pin connector from the Average circuit board, A3.

- () 3. Loosen the five (5) Time Base and Logic circuit board mounting screws.
- () 4. Remove the circuit board by pulling straight out. Take care not to bend the interconnect pins of the Interface circuit board.

NOTE

At serial number B070000, a modification (M23233-1), effecting the row data circuitry, was included in the instrument. Some of the components in this kit effect the same circuitry. For this reason, components to be changed or removed may have more than one value. A subsequent modification revised the circuit board layout at serial number B090000. To cover the various situations brought about by these two modifications, two circuit board layout diagrams (Fig. 1 and 2 on pages 6 and 7) are included to help identify component locations.

- () 5. Make the following changes on the front (component side) of the Time Base and Logic circuit board:
 - ~~()~~ a. Remove CR757, a hot carrier diode near U758 (SN B089999 and below) or near R756 (SN B090000 and up).
 - ~~()~~ b. Remove CR761, a hot carrier diode near Q896.
 - ~~()~~ c. Remove R751, a 22.6k Ω (SN B069999 and below) or 11.5k Ω (SN B070000 and up), 0.125W metal film resistor at the top of the board near Q748.
 - ~~()~~ d. Remove C750, a 27pF ceramic disc capacitor (SN B069999 and below), or VR750, a selected Zener diode (SN B070000 and up).
 - ~~()~~ e. Remove R746, a 2.7k Ω , 0.25W resistor near Q748.
 - ~~()~~ f. Replace R778, the 22k Ω , 0.25W resistor adjacent to the removed CR761, with one of the 10k Ω resistors from the kit.
 - ~~()~~ g. Replace C746, a 470pF ceramic tubular capacitor next to R746, with the 0.022 μ F ceramic disc capacitor included in the kit.

- (X) h. Replace R748, a $1k\Omega$ (SN B069999 and below) or 510Ω (SN B070000 and up), 0.25W resistor near Q748, with the $2.2k\Omega$, 0.25W resistor provided in the kit.
- (X) i. Replace R750, a $10k\Omega$ (SN B069999 and below) or $5.49k\Omega$ (SN B070000 and up), 0.125W resistor, with C752, the $0.1\mu\text{F}$ ceramic disc capacitor included in the kit.

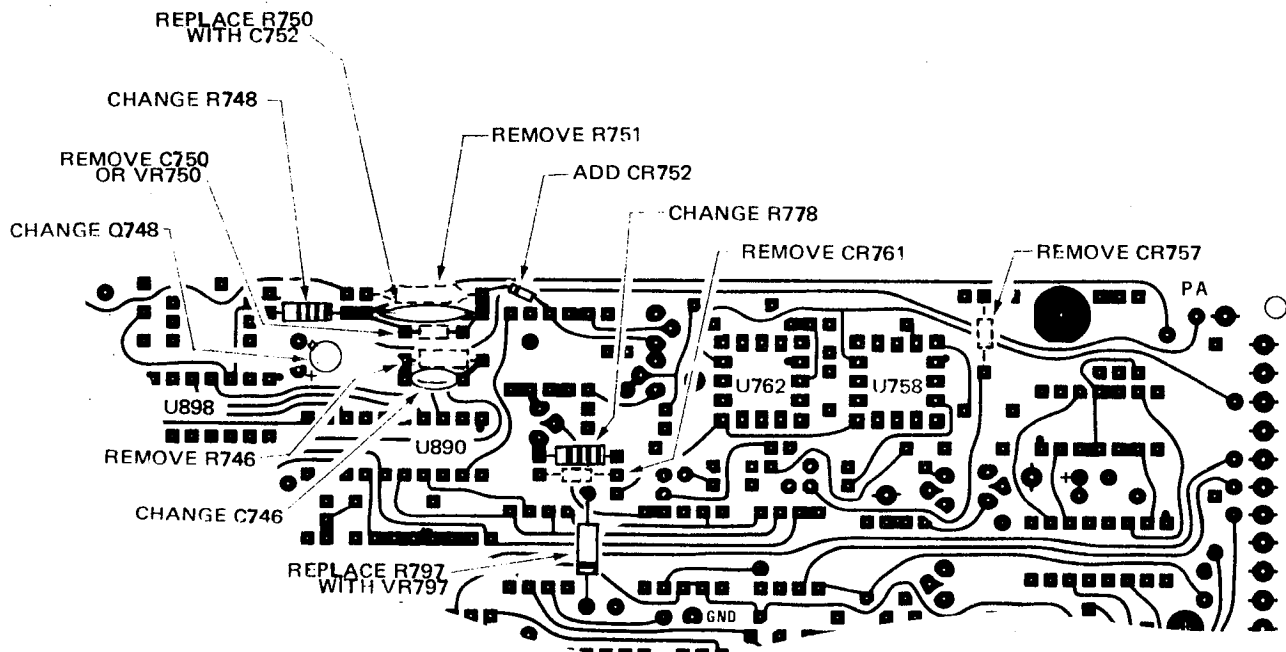
NOTE

To prevent the leads of added components from shorting to adjacent components or circuit board runs, use insulation sleeving (provided in the kit) on the leads.

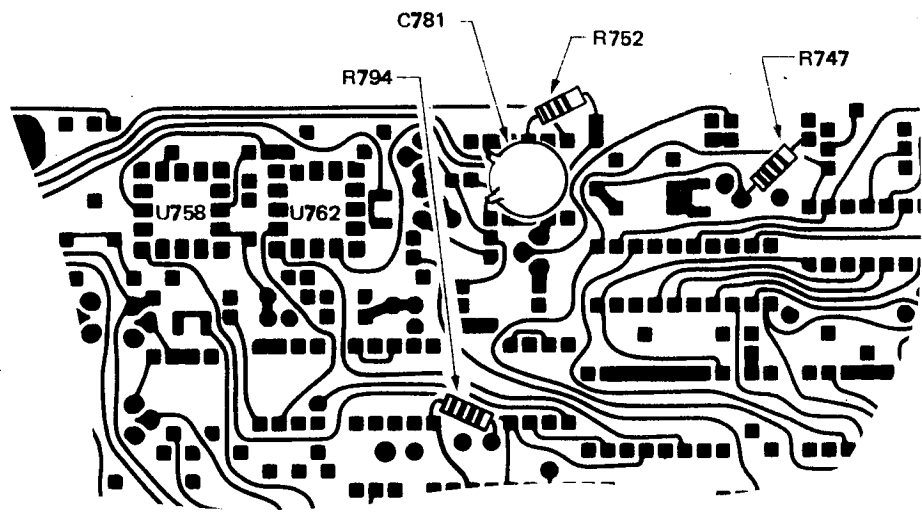
- (X) j. Add CR752, the 1N4152 diode from the kit, with the anode to -5V (anode of CR776) and cathode to closest pad from which R751 was removed.
 - (X) k. For SN B069999 and below ONLY, replace R797, a $10k\Omega$, 0.125W metal film resistor, with VR797, the 5.6V Zener diode (1N752B) provided in the kit. Anode connects to R795 and cathode to pin 6 of U790.
- () 6. Turn the circuit board over and add the following components to the back of the board:
- (X) a. R752, the remaining $10k\Omega$, 0.25W resistor from the kit, in parallel with CR752 (added above) between -5V (anode of CR776) and closest pad from which R751 was removed.
 - (X) b. R747, the $12k\Omega$, 0.25W resistor included in the kit, between the base of Q748 and +5V end of R748.
 - (X) c. C781, the 27pF ceramic disc capacitor provided in the kit, in parallel with R781, the $47k\Omega$, 0.25W resistor near Q778 and Q782.
 - (X) d. For SN B069999 and below ONLY, add R794, the 750Ω , 0.25W resistor, between the cathode end of VR797 (added above) and the +5V end of R894, a $470k\Omega$, 0.25W resistor near R760.
- () 7. Turn the board over again and replace the following components:
- () a. U758 and U762 with the microcircuits included in the kit.
 - (X) b. For SN B069999 and below ONLY, Q748 with the 2N2222A transistor included in the kit.
- () 8. Install the Time Base and Logic circuit board in the instrument using the reverse of the procedure as described in steps 2 through 4.

- () 9. Refer to the Calibration Section (5) of the Instruction Manual, check instrument performance and make any necessary adjustments.
- () 10. Install the right electrical shield.
- () 11. Remove the protective backing from the identification marker (included in the kit) and apply the marker to a clean, dry area on top frame section. This marker indicates the installation of this kit for future reference.
- () 12. Attach the following Modification Insert to the Instruction Manual.

DRL:cs



FRONT



BACK

Fig. 1. Partial Time Base and Logic circuit board layout - SN B010100 - B089999

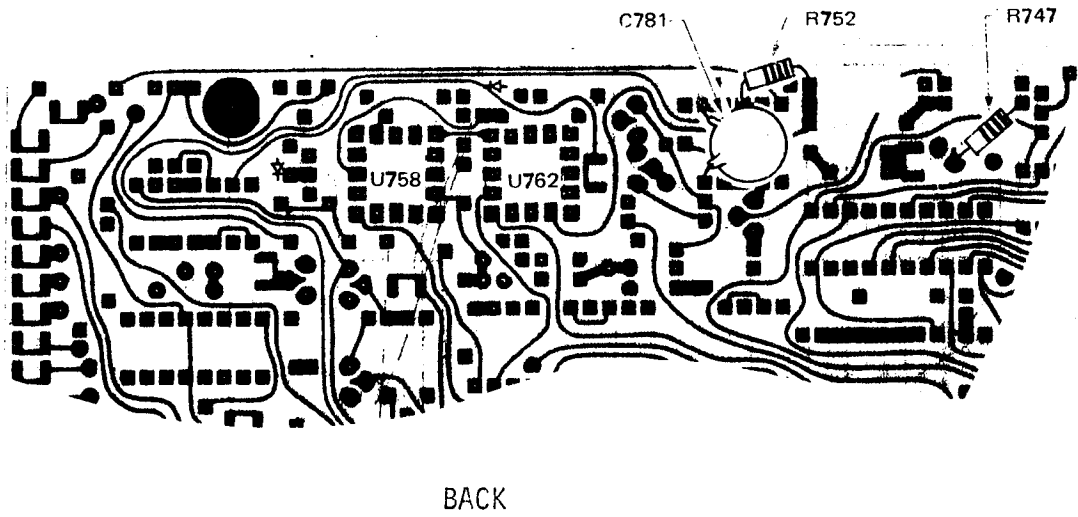
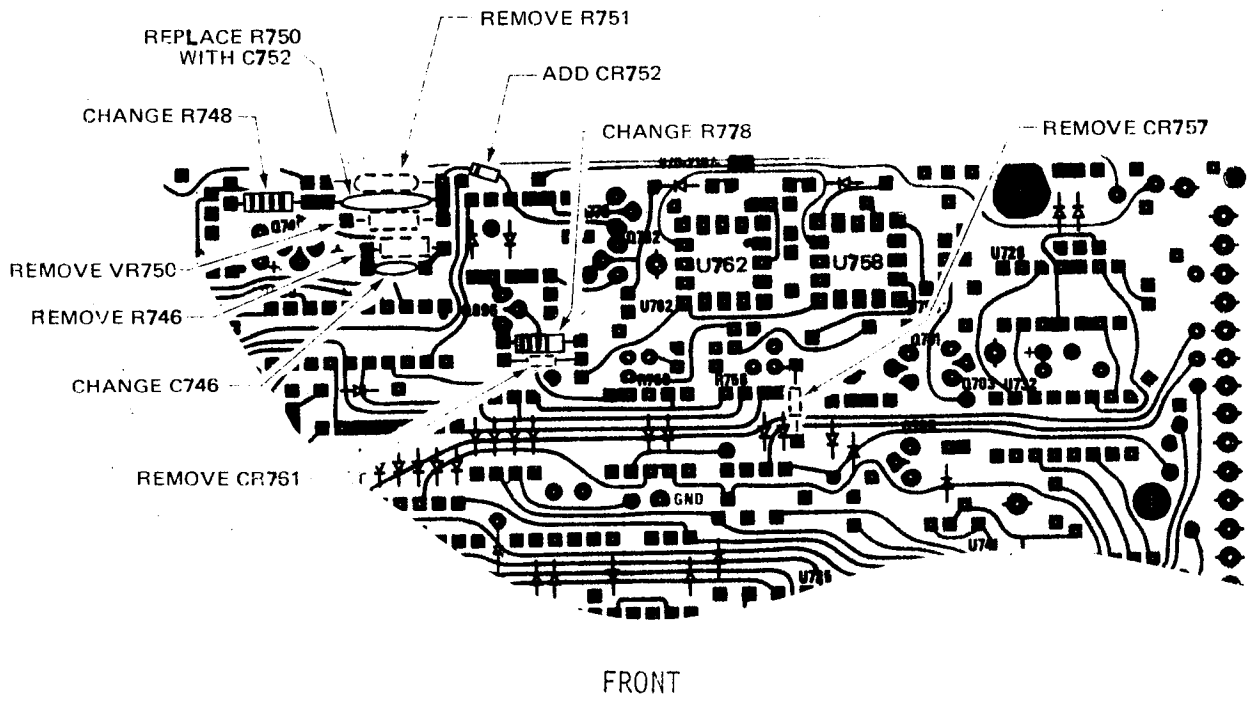


Fig. 2. Partial Time Base and Logic circuit board layout - SN B090000 and Up.



Product Modification Kit SUGGESTION/CORRECTION FORM

DATE _____

KIT NUMBER _____ STEP/PAGE _____

FIGURE NUMBER _____ PUBLICATION DATE _____

DISCREPANCY _____

SUGGESTED CORRECTION / COMMENTS _____

SUGGESTED BY: NAME / ORGANIZATION _____

REPLY REQUESTED

RETURN TO LOCAL FIELD OFFICE / SERVICE CENTER

FIELD OFFICE / SERVICE CENTER / DEL. STA. _____

SERVICE CENTER: RETURN TO PARTS RESEARCH 73-848

REPLY

WILL MAKE CHANGE IMMEDIATELY

WILL MAKE CHANGE AT NEXT PRINTING

OTHER _____

SIGNED _____ DATE _____

INSTRUCTION MANUAL

MODIFICATION INSERT

U758 AND U762 REPLACEMENT
for 7D15
Serial Numbers B010100 - B09999

Installed in SN _____ Date _____

This modification insert is provided to supplement the Instruction Manual for the above listed products. The information given in this insert supersedes that given in the Manual.

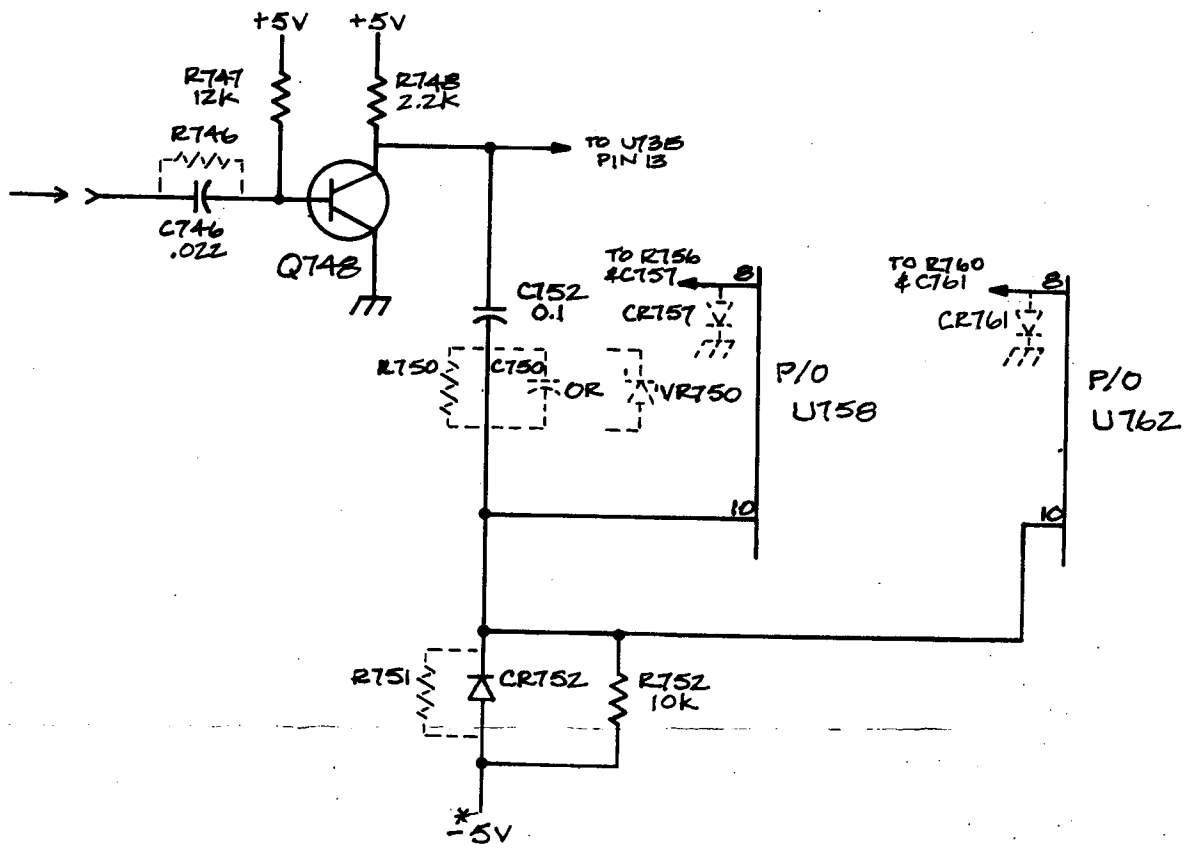
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GENERAL INFORMATION

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REPLACEABLE ELECTRICAL PARTS:

Ckt. No.	Part Number	Description
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C752	283-0023-00	Capacitor, cer, 0.1 μ F +80-20% 12V
C781	283-0076-00	Capacitor, cer, 27pF 10% 500V
CR752	152-0141-02	Diode, switching, Si, 30V 150mA, 1N4152
Q748	151-0302-00	Transistor, NPN, Si, 2N2222A
R747	315-0123-00	Resistor, cmprsn, 12k Ω 5% 0.25W
R748	315-0222-00	Resistor, cmprsn, 2.2k Ω 5% 0.25W
R752	315-0103-00	Resistor, cmprsn, 10k Ω 5% 0.25W
R778	315-0103-00	Resistor, cmprsn, 10k Ω 5% 0.25W
R794	315-0751-00	Resistor, cmprsn, 750 Ω 5% 0.25W
U758	155-0171-00	Microcircuit, di, 4 decade counter
U762	155-0171-00	Microcircuit, di, 4 decade counter
VR797	152-0175-00	Diode, Zener, 5.6V 5% 0.4W, 1N752A



* WAS -15V

Partial - CH1 COLUMN/ROW DATA 5

