



040-0785-01

M24099
M34167. S35105

VERTICAL AMPLIFIER MICROCIRCUIT REPLACEMENT

For the following TEKTRONIX[®] instruments:

7A26 Serial Numbers B010100 - B139377

This kit provides parts and instructions to replace one of the vertical amplifier microcircuits. For serial numbers below B110000, the emitter compensation networks for U1750 and U2750 need to be modified. In order to optimize the 100Hz to 100kHz square wave response (low-frequency compensation), selection of several components may be necessary.

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
*	1 ea	155-0078-10	Microcircuit, li. vertical amplifier
C1721 C2721	2 ea	281-0123-00	Capacitor, var. cer. 5-25pF, 100V
R1722 R1724 R2722 R2724	4 ea	315-0150-00	Resistor, cmprsn. 15Ω, 5%, 0.25W
	1 ea	-----	Label, 040-kit

* U1350, U1450, U1550, U1750, U2350, U2450, U2550 or U2750

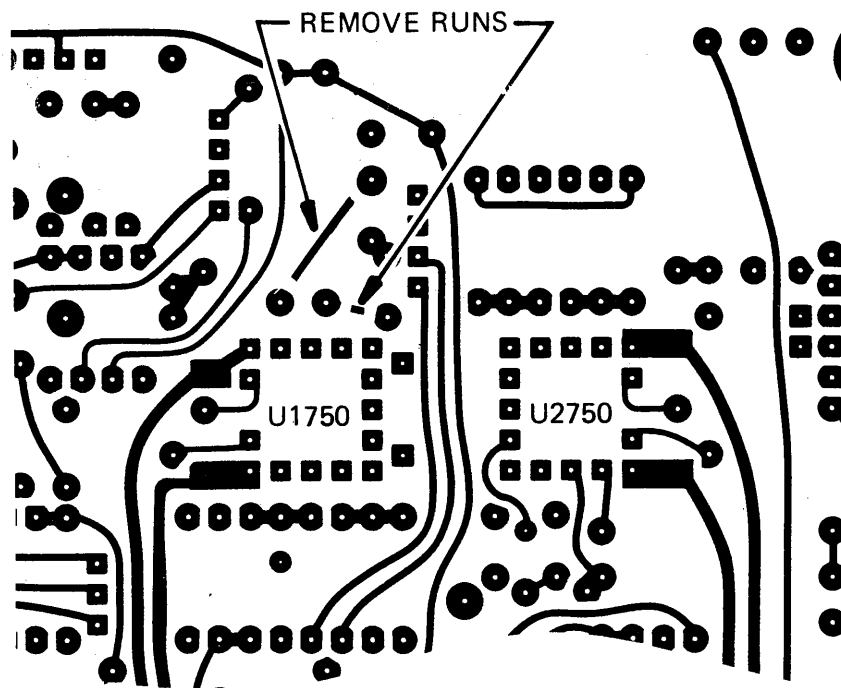


Fig. 1. Partial - Amplifier circuit board (solder side)

INSTRUCTIONS:

WARNING

Before proceeding, ensure the mainframe power switch is in the off position, then remove the amplifier plug-in from the mainframe.

- () 1. Remove the left and right side electrical shields.

NOTE

The emitter compensation networks for U1750 and U2750 were modified at serial number B110000. Steps 2 through 16 are instructions to add this modification to the 7A26. Therefore, these instructions (steps 2 through 16) may be disregarded for amplifiers in serial number range B110000 to B139377 or in instruments which have already had this kit installed.

Steps 2 through 8 involve the removal of C1721, C2721, R1721 and R2721. These components were added to the 7A26 at serial number B050000. Instruments in serial number range B010100 to B049999 may disregard steps 2 through 8.

- () 2. Remove the CH1 Readout circuit board (A3) mounting screws - one near the rear and six near the front.
- () 3. Swing the CH1 Readout circuit board out of the way to gain access to the back of the Amplifier circuit board (A2).
- () 4. Amplifiers in the serial number range B050000 to B109999 only: Cut and remove the two runs on the back of the Amplifier circuit board as shown in Fig. 1.

NOTE

The runs to be removed are located under the CH1 VARIABLE (CAL IN)/ GAIN potentiometer-switch combination. Removal of the combination will facilitate access to the circuit board runs.

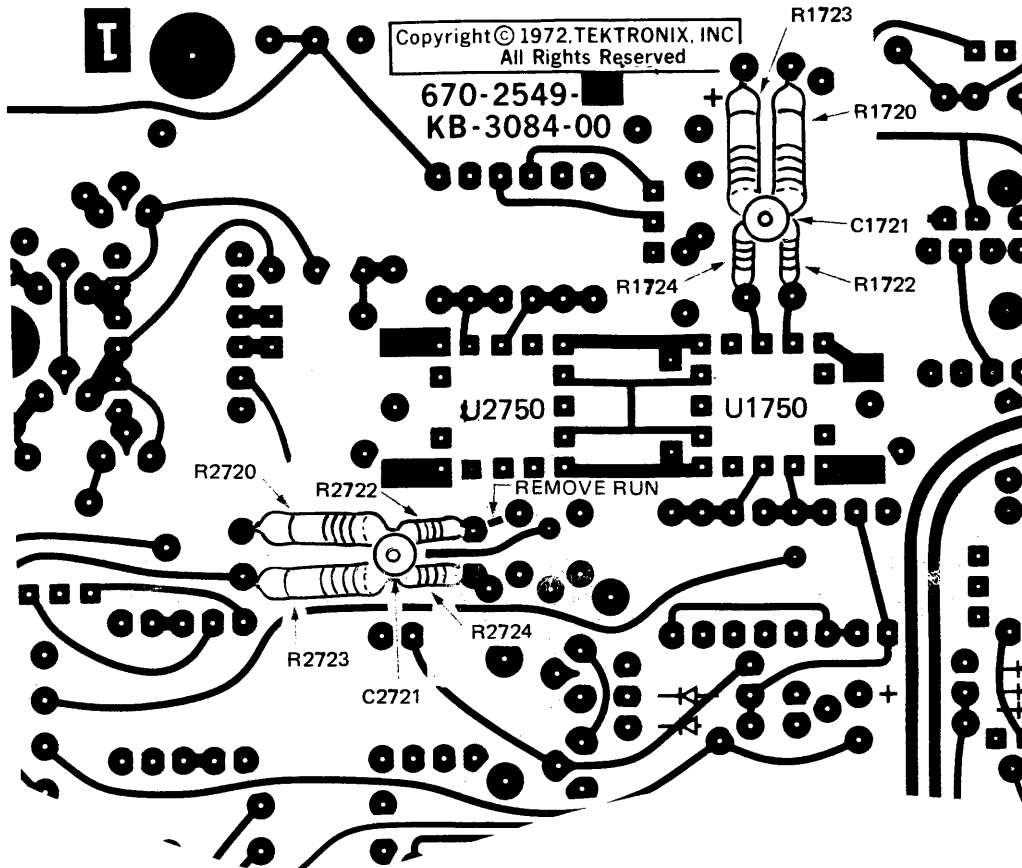


Fig. 2. Partial - Amplifier circuit board (component side)

- () 5. Place the CH1 Readout circuit board on the Volts/Div cam switch bearings and secure the circuit board with the seven screws removed above.

For steps 6 through 15, refer to Fig. 2.

- () 6. On the front (component) side of the Amplifier circuit board, cut and remove the run between C2721, a 5-25pF variable capacitor, and R2721, a 27 Ω , 0.25W resistor.

- () 7. Remove C2721 and R2721.
- () 8. Remove C1721, a 5-25pF variable capacitor, and R1721, a 25 Ω , 0.25W resistor, located near U1750.
- () 9. Unsolder and lift the ends of R1720 and R1723 (both 1.37k Ω resistors) which connect to pin 2 and 3, respectively, of U1750.
- () 10. Trim the leads of the four 15 Ω resistors, included in the kit, to about 3/16 (0.1875) inch.
- () 11. Add R1722 and R1724, two of the 15 Ω resistors, in series between the lifted ends of R1720/R1723 and the circuit board pads from which the ends were lifted.
- () 12. Add C1721, one of the 5-25pF variable capacitors included in the kit, between the junctions of R1720/R1722 and R1723/R1724.
- () 13. Unsolder and lift the ends of R2720 and R2723 (both 1.3k Ω) nearest U2750.
- () 14. Add R2722 and R2724, the two remaining 15 Ω resistors, in series between the lifted ends of R2720 and R2723 and the circuit board pads from which the resistors were lifted.
- () 15. Add C2721, the remaining 5-25pF variable capacitor, between the junctions of R2720/R2722 and R2723/R2724.
- () 16. Replace the faulty amplifier microcircuit (U1350, U1450, U1550, U1750, U2350, U2450, U2550 or U2750) with the microcircuit provided in the kit.
- () 17. Refer to the Calibration Section (5) in the 7A26 Instruction Manual and check instrument performance, making any necessary adjustments. The attached manual insert contains supplemental calibration information.

NOTE

In order to optimize the 100Hz to 100kHz square wave response (low-frequency compensation), several components may need to be selected. If U1350, U1450 or U1550 has been replaced, C1332, R1332, C1431, R1341 or C1436 may need to be selected. Replacement of U2350, U2450 or U2550 may require selection of C2332, R2332, C2431, R2431 or C2436. In some cases, removal of C2533 may be desirable.

- () 18. Remove the protective backing from the 040-kit label (included in the kit) and apply it to the top frame section. The label indicates the installation of this kit for future reference.
- () 19. Install the electrical shields.
- () 20. Attach the included manual insert to the Instruction Manual.

REH:rh



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 FIELD MODS 73-860

REPLY

WILL MAKE CHANGE IMMEDIATELY

WILL MAKE CHANGE AT NEXT PRINTING

OTHER _____

SIGNED _____ DATE _____

TEKTRONIX

MANUAL MODIFICATION INSERT

VERTICAL AMPLIFIER MICROCIRCUIT REPLACEMENT

for

7A26 Serial Numbers B010100 - B139377

Installed in SN _____ Date _____

This modification insert is provided to supplement the manual for the above listed product(s). The information given in this insert supersedes that given in the manual.

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GENERAL INFORMATION

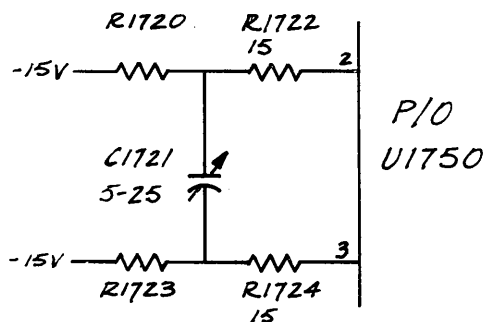
This kit provided parts and instructions to replace one of the vertical amplifier microcircuits. For instruments in serial number range B010100 to B109999, the emitter compensation networks for U1750 and U2750 were modified.

In order to optimize the 100Hz to 100kHz square wave response (low-frequency compensation), several components may have been selected. For Replacement of U1350, U1450 or U1550, changes in the values of C1332, R1332, C1431, R1431 or C1436 may have been required. Selection of C2332, R2332, C2431 or C2436 may have been necessary if U2350, U2450 or U2550 was replaced. In some cases, removal of C2533 may have been beneficial.

REPLACEABLE ELECTRICAL PARTS

CKT. NO.	PART NUMBER	DESCRIPTION
C1721	281-0123-00	Capacitor, var. cer. 5-25pF 100V
C2721	281-0123-00	Capacitor, var. cer. 5-25pF 100V
R1721	DELETE	
R1722	315-0150-00	Resistor, cmprsn. 15Ω 5% 0.25W
R1724	315-0150-00	Resistor, cmprsn. 15Ω 5% 0.25W
R2721	DELETE	
R2722	315-0150-00	Resistor, cmprsn. 15Ω 5% 0.25W
R2724	315-0150-00	Resistor, cmprsn. 15Ω 5% 0.25W
*	155-0078-10	Microcircuit, linear, vertical amplifier

* U1350, U1450, U1550, U1750, U2350, U2450, U2550 or U2750



Partial - CH1 AMPLIFIER schematic

A similar schematic applies to channel 2. The first digit in each circuit number changes to 2, e.g. C2721.

SECTION 5 - CALIBRATION

Replace step 8 with the following:

8. CHECK/ADJUST CHANNEL 1 AND 2 HIGH FREQUENCY COMPENSATION.

- a. Set the CH1 and CH2 VOLTS/DIV switches to 10mV.
- b. Connect the Pulse Generator to the 7A26 CH2 input through a 5X 50 Ω attenuator and a 50 Ω terminator.
- c. Set the time-base unit to obtain a triggered display at a rate of approximately 0.2 μ s per division.
- d. Position the top of the waveform to one division above the center screen. Note the peak-to-peak amplitude.
- e. CHECK - Aberrations should not exceed $\pm 4\%$ and 6% peak-to-peak of the pulse amplitude noted in part d.
- f. ADJUST - High-frequency compensations C2336, R2336, C2432 (C1432 and C2432 added at serial number B083790), C2435, R2435, C2531, R2531, C2345 and R2345 for best front corner and flat top.
- g. Remove the 7A26 from the Vertical compartment and insert the plug-in extender to the same compartment.
- h. Insert the 7A26 into the plug-in extender.
- i. Reverse the trigger cable connections from A11 to A13, and B11 to B13 of the plug-in extender.
- j. CHECK - Aberrations should not exceed $\pm 10\%$ and 15% peak-to-peak total of the pulse amplitude.
- k. ADJUST - High-frequency compensation C2721 for minimum aberrations.
- l. Repeat step f.
- m. Remove the plug-in extender from the mainframe vertical compartment and insert the 7A26 into the mainframe vertical plug-in compartment.
- n. Disconnect the Pulse Generator from CH2 and connect to the CH1 input through a 5X 50 Ω attenuator and a 50 Ω termination.
- o. Set the DISPLAY MODE switch to CH1.
- p. CHECK - Aberrations should not exceed $\pm 4\%$ and 6% peak-to-peak of the pulse amplitude.
- q. ADJUST - High-frequency compensations C1336, R1336, C1432 (C1432 and C2432 were added at serial number B083790), C1435, R1435, C1531, R1531, C1345 and R1345 for best front corner and flat top.
- r. Remove the 7A26 from the vertical compartment and insert the plug-in extender into the compartment.
- s. Insert the 7A26 into the plug-in extender.

- t. CHECK - Aberrations should not exceed $\pm 10\%$ and 15% peak-to-peak total of the pulse amplitude.
- u. ADJUST - High-frequency compensation C1721 for minimum aberrations.
- v. Repeat part q.
- w. Remove the plug-in extender from the mainframe vertical compartment and insert the 7A26 into the mainframe vertical compartment.
- x. ADJUST - C134 (both channels) for best compromise between 10, 20 and 50mV positions for first 20nSec of pulse.
- y. Disconnect all test equipment.
- z. Repeat Channel 1 and 2 Low-frequency Compensation check and adjust.