



product modification

050-0681-02
M18527, M20683

VARIABLE ATTENUATOR REPLACEMENT

For the following TEKTRONIX® Amplifiers

7A19 Serial Numbers B010100 - B029999
7A19 Option 4* Serial Numbers B010100 - B039999

*Option 4 has also been designated as 950A or 950H.

The Attenuator circuit board and cam switch assembly (A2), pn 672-0430-00, replaces the variable step attenuator (A10), pn 119-0319-00, which is no longer available. The new assembly requires replacement of some of the hardware and interconnecting cabling. Also, the D-shaped hole in the front subpanel needs to be filed into a circular hole.

NOTE

If the amplifier serial number is greater than those listed above or if this kit or Variable Attenuator Replacement Kit, pn 050-0921-XX, has been installed, these instructions may be disregarded and the Attenuator assembly, pn 672-0430-00, used as a direct replacement.

PARTS INCLUDED IN PARTS REPLACEMENT KIT:

| Ckt. No. | Quantity | Part Number | Description |
|----------|----------|-------------|--|
| | 1 ea | 198-3733-01 | Wire kit, consisting of: |
| | 1 ea | | Cable, RF, 50 Ω , w/conn, blu-brn, 46" |
| | 1 ea | | Cable, RF, 50 Ω , w/conn, blu-brn, 4" |
| | 1 ea | | Cable, RF, 50 Ω , w/conn, blu-red, 17" |
| | 1 ea | | Cable, RF, 50 Ω , w/SMA conn, blu-red 17" |
| | 1 ea | 210-0013-00 | Washer, lock, internal, 0.391 ID |
| | 1 ea | 220-0495-00 | Nut, plain, hex, 0.375-32 x 0.438 |
| R7 | 1 ea | 317-0472-00 | Resistor, cmpsn, 4.7k Ω 5% 0.125W |
| | 1 ea | 384-0702-00 | Extension shaft, 0.125 OD x 2.5" |
| A2 | 1 ea | 672-0430-00 | Assembly, Attenuator ckt bd w/cam sw |
| | 1 ea | | Marker, identification |
| | 1 ea | | Wire, solid, 22 AWG, bare, 3" |

INSTRUCTIONS:

WARNING

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

- () 1. Remove the left and right electrical shields.
- () 2. Disconnect the spring from the latch release bar on the plug-in latch assembly and pull the latch bar out as far as possible.
- () 3. Turn all front panel controls fully clockwise, loosen the set screws and remove the knobs. The IDENTITY button is friction fit and will pull off with the POSITION knob.
- () 4. Using a 5/32" hex wrench, remove the threaded bushing and washer securing the GAIN potentiometer, R73.
- () 5. Use a small screwdriver to carefully pry off the front panel.
- () 6. Remove the four screws securing the front subpanel to the top and bottom frame sections.

- () 7. For Option 4 instruments only, remove the variable delay line assembly, DL13, using the following procedure:
 - () a. Disconnect the input coaxial cable from J13 (bottom connector) on the variable delay line.
 - () b. Disconnect the delay line output coaxial cable from J12 on the Vertical Amplifier circuit board.
 - () c. Loosen the setscrews in the shaft coupler at the front of the delay line.
 - () d. Remove the two screws attaching the variable delay line front panel angle bracket to the front subpanel.
 - () e. Remove the two screws securing the delay line to the hex spacer posts attached to the Amplifier circuit board.
- () 8. Loosen the 5/16" nut on the jack, J11, at the rear of the step attenuator and disconnect the delay line from the attenuator.
- () 9. Disconnect P9, the step attenuator input coax connector, from J9 on the Amplifier circuit board.
- () 10. Loosen the setscrews in the shaft couplers at both ends of the VOLTS/DIV extension shaft. The shaft connects the step (variable) attenuator, A10, and the Readout VOLTS/DIV switch, S135.
- () 11. Move the front subpanel forward about one inch for clearance and remove the shaft and flexible couplers.
- () 12. Remove the 7/16" hex nut securing the step attenuator, A10, to the front subpanel and remove the step attenuator.
- () 13. File the D-shaped subpanel hole, vacated by the step attenuator, into a circular hole. The hole may have to be enlarged to accommodate the new assembly.
- () 14. Ensure the shaft on the new Attenuator circuit board cam switch assembly (included in the kit) is fully clockwise (10mV) position.
- () 15. Install the new Attenuator assembly, positioning the circuit board vertically and facing to the right side. To allow alignment with the front panel, the key (tab) on the front cam switch bearing needs to be removed.
- () 16. Secure the assembly, using the lock washer and nut provided in the kit.
- () 17. Transfer the flexible couplers from the extension shaft, removed above, to the new shorter shaft included in the kit.

- () 18. Install the new extension shaft with couplers between the new Attenuator assembly and the Readout VOLTS/DIV cam switch.
- () 19. Ensure the extension shaft is in place, then secure the front subpanel to the frame sections with the four screws removed in step 6.
- () 20. Tighten the VOLTS/DIV extension shaft coupler setscrews.
- () 21. Remove F6 and F7, the 0.1A fuses located near J9 on the Vertical Amplifier circuit board.
- () 22. Using the 22 AWG bare wire provided in the kit, short between the sockets for F6.
- () 23. Replace R7, a 2k Ω or 3k Ω resistor located near the sockets for F6 and F7 on the component side of the Vertical Amplifier circuit board, with the 4.7k Ω resistor included in the kit.
- () 24. Install the four inch blue-brown coaxial cable (included in the kit) between J9 on the Vertical Amplifier circuit board and the rear jack, J10 (near the fuse), on the new Attenuator circuit board.
- () 25. For the standard 7A19 only, replace the fixed delay line, DL12, with the 46 inch blue-brown coaxial cable provided in the kit. Wrap the new cable around the spacer posts in the same manner as the old cable. The connectors connect to J12 on the Vertical Amplifier circuit board and the front jack, J11, on the Attenuator circuit board.

The following two steps apply to the 7A19 Option 4 only. For the standard 7A19, skip to step 28.

- () 26. Install the variable delay line assembly, using the reverse of the procedure described in step 7. Disregard part a (see next step).
- () 27. Connect one of the 17 inch blue-red coaxial cables between J13 (bottom connector) on the variable delay line and J11, front jack near 10X attenuator, on the new Attenuator circuit board. The cable used will depend on the connector on the variable delay lines.
- () 28. Reinstall the front panel and knobs using the reverse of the procedure described in steps 2 through 5.
- () 29. Refer to the Calibration Section (5) of the Instruction Manual and check instrument performance, making any necessary adjustments.
- () 30. Remove the protective backing from the provided identification marker and apply the marker to a clean, dry area on the top frame section. This marker indicates the installation of this kit for future reference.
- () 31. Install the electrical shields.
- () 32. Attach the following manual insert to the instrument instruction manual.

DH:cs