SERVICE NOTE

Supercedes:
8405A-8

HP MODEL 8405A VECTOR VOLTMETER

Serial Prefix 2014A and Below

"APC UNLOCKED" Indicator Light Replacement

DESCRIPTION

The incandescent "APC UNLOCKED" indicator light (DS2) used in 8405A Vector Voltmeters serial prefix 2014A and below is no longer available. The "APC UNLOCKED Indicator Replacement Kit" contains all the parts needed to replace the bulb with an amber Light Emitting Diode (LED). The LED requires less current to light and is physically smaller; it is therefore necessary to change the current-limiting resistor on the A12 Search assembly, and install a mechanical LED mounting adapter. Additionally, the biasing on the transistor that drives the light should be modified to prevent flickering or a false unlocked indication. Allow one-half hour to make the modifications; no calibration is required after the modifications.

NOTE

When replacing the A12 Search assembly (HP Part Number: 08405-6012), the incandescent "APC UNLOCKED" light, A12R27, and A12R21 should be replaced by the components included in this kit, if necessary.

Table 1. Parts Included in APC UNLOCKED Indicator Replacement Kit (HP Part Number: 08405-60076)

Reference Designator	Description	HP Part Number
A12 R27	RESISTOR 1.8K 5% .5W	0686-1825
–	ADAPTING WASHER	08405-20065
DS2	LED YELLOW	1990-0524
–	MOUNTING CLIP SET (Two Pieces Per)	1400-0560
A12 R21	RESISTOR 9.09K 1% .12W	0757-0288
A12 C17	CAPACITOR (TA) 10 μF 35V	0180-2811
–	SINGLE POST CONNECTORS (Two Required)	0360-0124

(Note: Quantity is one each per kit unless otherwise noted.)

MODIFICATION PROCEDURES

A12R27 and A12R21 Modification Procedure:

1. Remove the line power cord and top cover from the instrument.

2. Remove the A12 Search Assembly (HP Part Number: 08405-6012) from its socket. It is located in the right-hand card cage, about half-way towards the rear of the instrument.

3. Locate A12R27. (Refer to Figure 1.) If the value of R27 is not 1.8kΩ, replace it with the 1.8kΩ resistor (HP Part Number: 0868-1825) supplied with the kit.

4. Locate and remove A12R21. (Refer to Figure 1.) Insert and solder the two Single Post Connectors (HP Part Number: 0360-0124), supplied with the kit, in the vacant holes. Attach and solder the 9.09 kΩ resistor (HP Part Number: 0757-0288) and 10 μF capacitor (HP Part Number: 0280-2811), supplied with the kit, in parallel across the two posts. The capacitor is polarized, and must be installed with the "+"- side to the right.

5. Reinstall the A12 assembly.

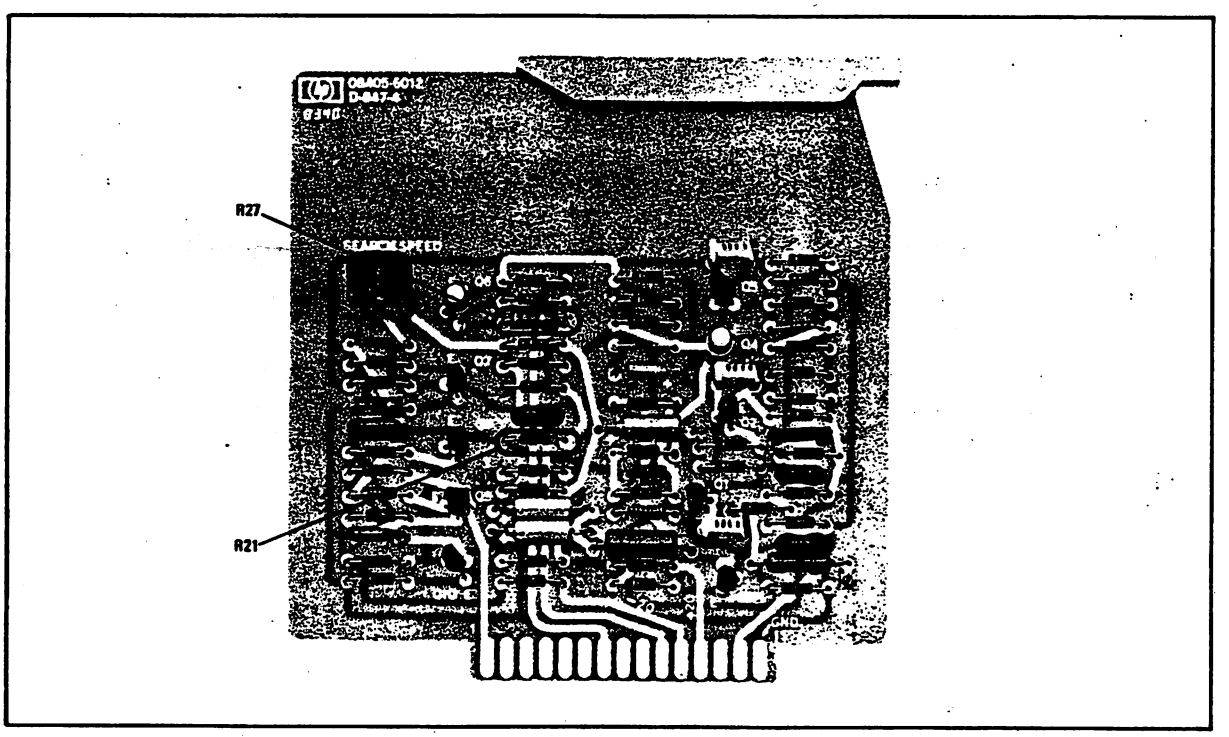

Figure 1. A12 Search Assembly Component Location

LED Modification Procedure:

1. Remove the line power cord and top cover, if necessary.

2. Locate the "APC UNLOCKED" indicator (DS2). If DS2 is an incandescent bulb (sealed inside a red or amber plastic housing, and secured by a metal clip), it must be replaced by an LED. If DS2 is already an amber LED (secured by a black plastic collar), do not change it and skip the rest of this procedure.

3. Cut off the two wires attached to the rear of DS2 close to the light.

4. Remove the spring-metal clip securing the indicator by prying between the clip and the front panel with a flat-blade screwdriver or other sturdy tool.

CAUTION

The red plastic housing of DS2 may break before the retaining clip can by removed. Be careful not to strike any nearby components if the housing should break suddenly while prying at the clip.

Remove and discard the light.

5. Locate the lead protruding from the LED (supplied with the kit) nearest the flat surface molded into the package. This denotes the cathode, which must be negatively biased with respect to the anode for proper operation. (Refer to Figure 2.) Put a small crimp or bend in the cathode lead near its end for future identification. (This is necessary because later steps will hide the flat surface.)

6. Install the adapting washer (supplied with the kit) into the front panel hole from the front side, with its shoulder outward. Then install the larger half of the LED mounting clip set (supplied with the kit) through the adapting washer from the front. (Refer to Figure 2.)

7. Insert the LED into the mounting clip from the inside of the instrument until it snaps into place. Secure the LED by pushing the mounting clip collar over the mounting clip inside the instrument while bracing the LED from the front. (Refer to Figure 2.)

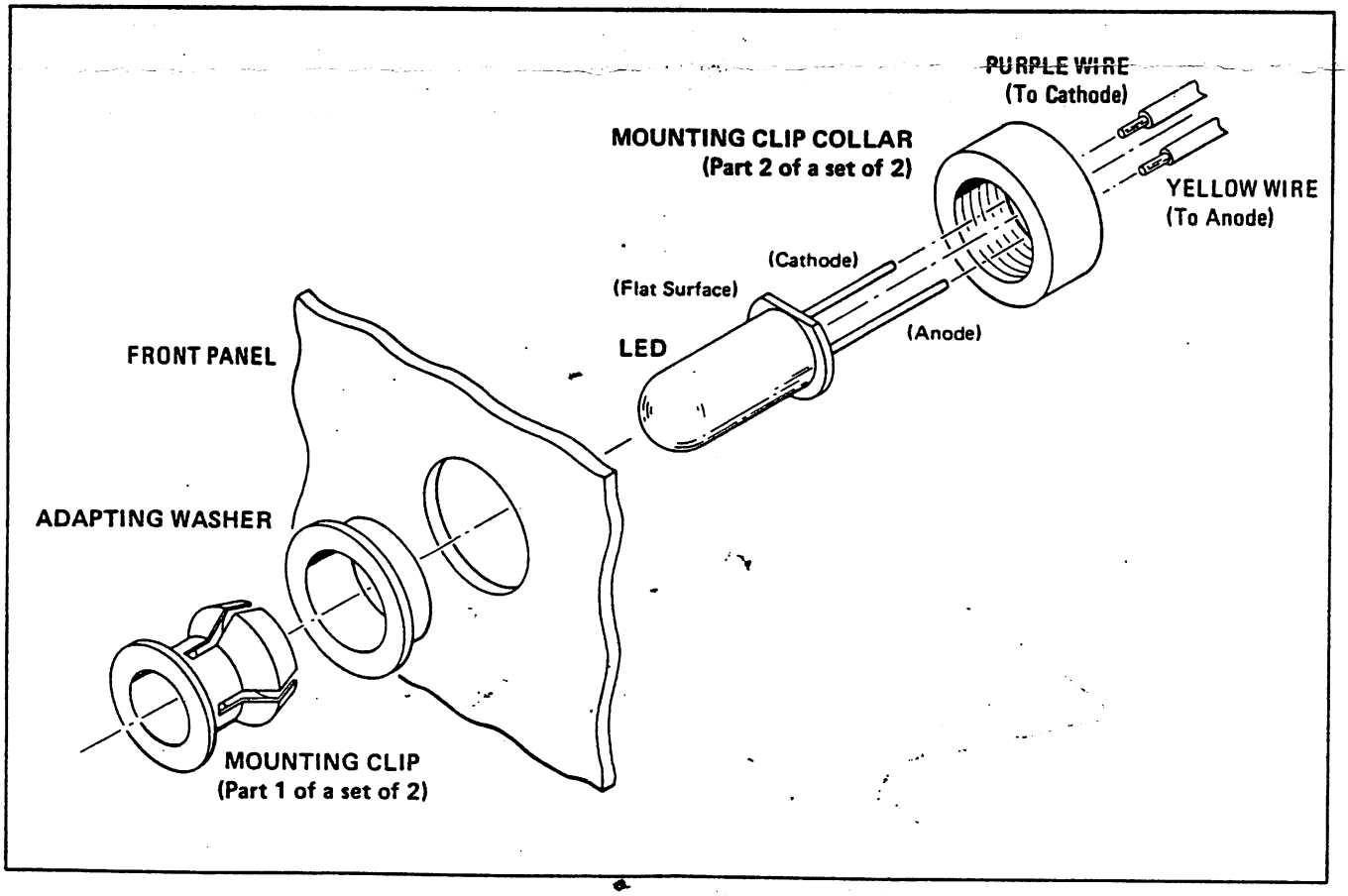

Figure 2. LED Modification Parts Diagram

8. Solder the purple wire to the cathode (the lead with the crimp) of the LED, and the yellow wire (orange in some instruments) to the anode. Use long-nose pliers or a heat-sink to prevent over-heating and melting the plastic LED body. Solder the wires close to the LED, trim the excess leads down to the connection, and bend the leads apart to ensure that they will not short together.

9. Replace the top cover and secure it with four screws.

Operation Verification:

1. Test for an effective repair as follows:

   a. Reconnect the line cord and plug the instrument into a line outlet.

   b. Push the "ON/OFF" switch, and verify that the "LINE" indicator is lit.

   c. Do not connect the probes to anything, and check that the "APC UNLOCKED" indicator is lit, regardless of front panel settings.

   If the LED is *not* lit:

   a. Check the cathode for −20 Vdc, and troubleshoot the −20 Volt Supply if it is missing.

   b. Check the LED anode for approximately −18 Vdc. If the anode measures approximately −2 Vdc instead, suspect an open LED. Before replacing it, however, try reversing the connections to it.

   c. Trace the wiring between the LED and A12 assembly against the schematic in Figure 3.

2. Update the 8405A Operating & Service Manual (HP Part Number: 08405-90024; Print Date: May 1971) in Table 6-1, Table 6-2, Figure 7-15a/b, corresponding parts of text, and the Overall Schematic Diagram, to reflect this modification.

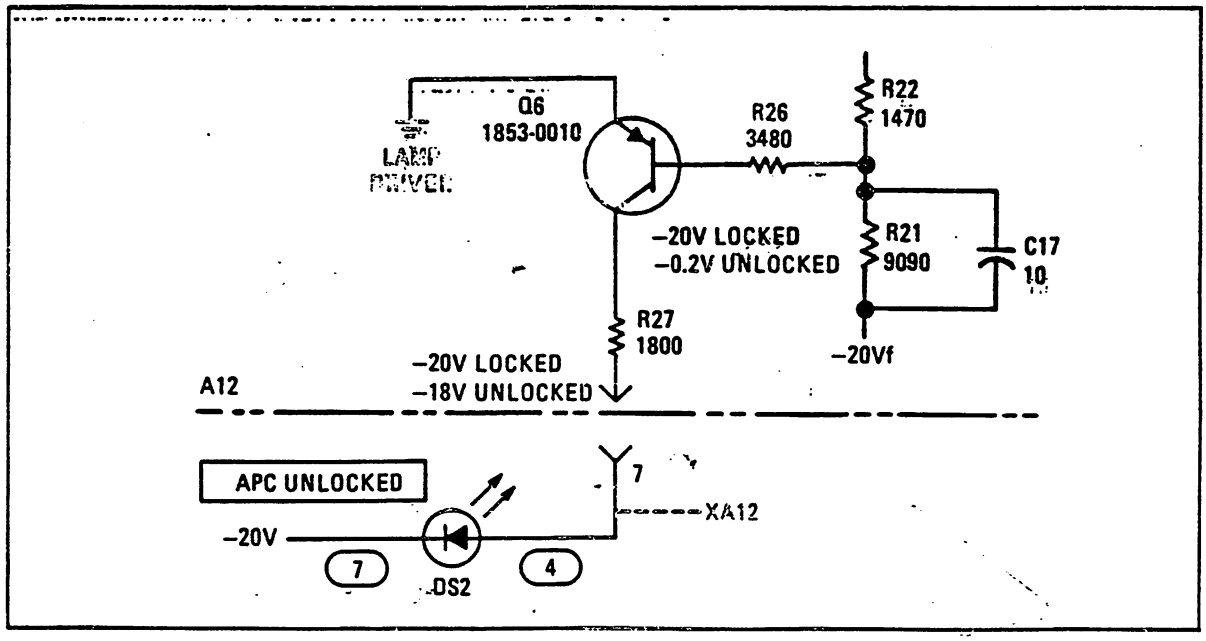

Figure 3. Partial Schematic of Affected Circuitry

For more information, call your local HP Sales Office or nearest Regional Office: Eastern (201) 265-5000; Midwestern (312) 255-9800; Southern (404) 955-1500; Western (213) 970-7500; Canadian (416) 678-9430. Ask the operator for instrument sales. Or write Hewlett-Packard, 1501 Page Mill Road, Palo Alto, CA 94304. In Europe: Hewlett-Packard S.A., 7, rue du Bois-du-Lan, P.O. Box, CH 1217 Meyrin 2, Geneva, Switzerland. In Japan: Yokogawa-Hewlett-Packard Ltd., 29-21, Takaido-Higashi 3-chome, Suginami-ku, Tokyo 168.

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