

Hewlett Packard HP004OK OCXO Assembly Instructions

Thank you for purchasing this kit form of our HP004OK OCXO time base. In order to successfully complete the kit assembly and install the device, you will need soldering equipment, a PCB vise or holder, water-soluble or rosin flux solder 20mil diameter or similar.

Whether you have an HP5315A/B or 5316A/B frequency Counter, the OCXO works the same. Both mount in horizontal positions. As noted in the following instructions, for best performance you will need a GPS Disciplined Oscillator (GPSDO) as a reference source. Even with such a reference, if you adjust the OCXO on a bench in the open and then install it in a HP5315A or HP5316A you can expect a measured change in the frequency once the OCXO stabilizes in the closed meter. On the HP5316 you can both monitor and adjust the OCXO from a closed box. Without modifications, you can't do this with a HP5315A.

Cautions:

First and obvious, un-plug the meter from the mains! **Use reasonable ESD protection methods like mats & wrist bands.** Read all of the instructions first! **It is important that the sequence is followed for ease of assembly and testing!** The 5-6 pin header strip should be installed last.

Bill of Materials

1. LD1085 or LD1086
2. 1 6-pin strip & 1 2-pin strip
3. 2-100 ohm resistors
4. 1-680 ohm resistor
5. 1-560 ohm resistor
6. 2-330uF E-caps
7. 1-10uF E-cap
8. 1 – 1nF leaded capacitor
9. 3 – 0.1uF leaded capacitors
10. 1-20K 25T pot
11. 1 PCB
12. 1 heatsink
13. 1 heatsink insulator
14. 1 #6-32 heatsink screw & washer & nut
15. 2 #6-32 screws & spacers & lock washers
16. 1 optional Morion MV85 OCXO module

If you purchased the kit w/o the MV85, they are readily available on eBay or Aliexpress.

Assembly Instructions

1. Temporarily fit the LD1085, heat sink & insulator with the included #6 screw to the PCB. Mark and bend the leads to fit the PCB holes.

Insert LD1085 into PCB holes and stack up assembly as follows:

- a. Regulator
- b. Thermal paste if available
- c. Heat sink

- d. Insulator pad
 - e. PCB
 - f. Insulator washer
 - g. #6-32 screw from bottom
 - h. Nut from top
2. Tighten mounting screw & solder regulator in place. With an ohmmeter, check that the #6 screw is insulated from the ground plane! If not, FIX NOW!
 3. Attach and solder the (3) 0.1uF & (1) 1nF capacitors.
 4. Attach & solder the 4 resistors. Measure them first for correct positioning!
 5. Insert and solder the (2) 330uF capacitors and (1) 10uF capacitor from the top paying attention to polarity. Depending on the board artwork, the WHITE CRESCENT IS ECap NEGATIVE on B1-B boards while on C1-A boards the POSITIVE ECap terminals are marked with (+) PLUS signs.
 6. Insert and solder the 20Kohm pot.
 7. The original design was made for the HP5316A/B in which connector pins 1 & 6 appear to both connect to un-switched 9-10VDC power. However, on the 5315A/B things are a bit more confusing. The 5315A originally was available with battery power and NO OCXO option. (The 4hr normal battery run time would be severely reduced with OCXO.) On the series numbers below 2XXXA pin 1 is switched and is a separate circuit from the pin 6 10VDC. So in this situation either trim one pin off the header (5-pin) or cut pin 1 off after attaching the 6-pin header. In either case, just don't use pin 1 in a 5315 meter. Ok, attach the pin strip **from the bottom, short legs through PCB** and solder.
 8. On C1-A PCB optionally insert 2-pin test header from top and solder in place.
 9. Clean the PCB as necessary and check visually and with an ohmmeter that there are no shorts and that there are good solder joints everywhere, particularly on the power or ground plane connections where thermal reliefs are used.
 10. Insert and solder the MV85 oscillator and clean again as necessary.
 11. Attach a scope or counter to pin 2 (10Mhz) & pin 3 (GND), (or on C1-A boards to the dedicated 2-pin header installed in step 8) and a 9-10VDC current limited (~600mA) power supply to pin 6 (+9VDC) & ground and ramp the supply from zero monitoring the current and scope. Initially 500-600mA is needed to heat the module. It should settle down to ~150mA.
 12. Using the 20K pot, adjust the frequency to 10Mhz using a trusted 8-10 digit frequency counter or by using a 2-channel oscilloscope to zero the OCXO drift against a GPSDO.
 13. If all is well, insert the module into the meter and fasten to the A1 PCB with included fasteners.
 14. As noted earlier, you may want to readjust the OCXO once installed in a meter and closed up. But even without this step you should see a vast improvement in the time base temperature stability over the original XO or TCXO.

Please refer to the following photos as guidance.

Feedback on these instructions is always encouraged!

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Figure 1 Assembled Top View Ver B1-B

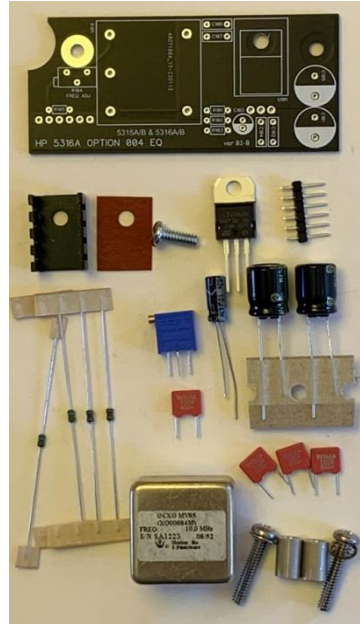


Figure 2 Parts Kit HP004OK



Figure 3 Bottom View

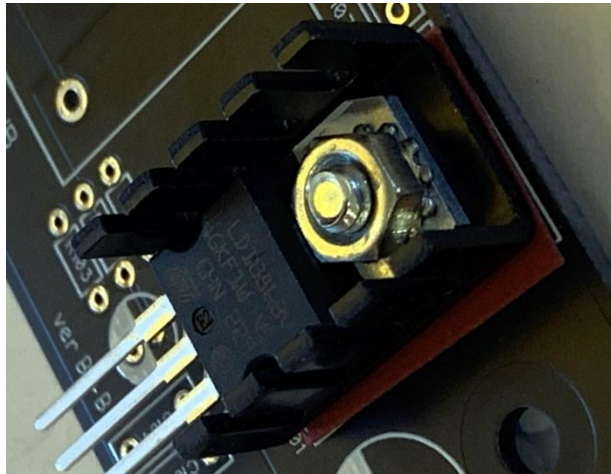


Figure 4 Mounting Regulator

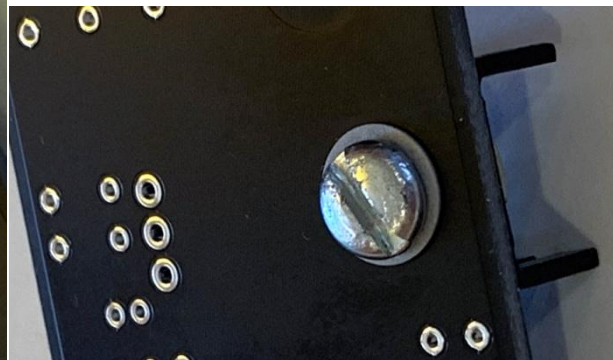


Figure 5 Top Ver C1-A (assembled & bare)