MGB VDO Clock Repair

Michael Stedman's Journal - MGB Clock Repair : The MG Experience

When I acquired my 1977 MGB, one of the parts in the spare parts box was a clock (Manufactured by VDO). There was an ammeter in the car where the clock would normally reside.

I tested the clock by working the adjusting knob and there appeared to be no problem. I then tested the clock by connecting it to a 12v power source. The second hand did not move so I concluded that it was inoperable.

I found very little information after several internet searches on repair of VDO manufactured clocks used in MG vehicles. I did stumble on to a site that discussed repair of VDO clocks used in Porsche vehicles and the pictures were of a similar style clock.

http://www.pelicanparts.com/techarticles/mult_vdo_clock_repair/mult_vdo_clock_repair.htm

- This looks very similar to the clock in the MGF. Article copied at end

http://forums.audiworld.com/showthread.php?t=2227194

I gathered the following facts from my Internet research.

- The VDO Clocks were never intended to be repaired, this is reflected in the way the lens is attached with no convenient means to remove it or to remove the works from the case.
- There are typically two potential failure points in these instruments.
  1. The first is a mechanical failure which involves one of the gears breaking or the adjustment mechanism breaking.
  2. The second involves a failure of the electronics that run the clock. Typically, a failure of the capacitor components of the circuit.

Based on the disassembly instructions listed on the Porsche site, I began by carefully prying the back of the bezel loose from case.

This bezel is made of brass and is very tightly rolled to the lip of the steel clock case.

I began by carefully prying the bezel back with the tip of a knife until I could get a small screwdriver into the space. Then I continued with the screwdriver repeatedly working around the edge until I had created enough gap that the bezel and lens could be removed.

Before removing the lens completely, the adjusting knob must be removed and carefully stored so that it is not lost.

Once the lens is off, be careful as the clock hands will be exposed to potential damage.

Next, even before removing the screws in the back of the case, the ground connection to the case must be de-soldered.

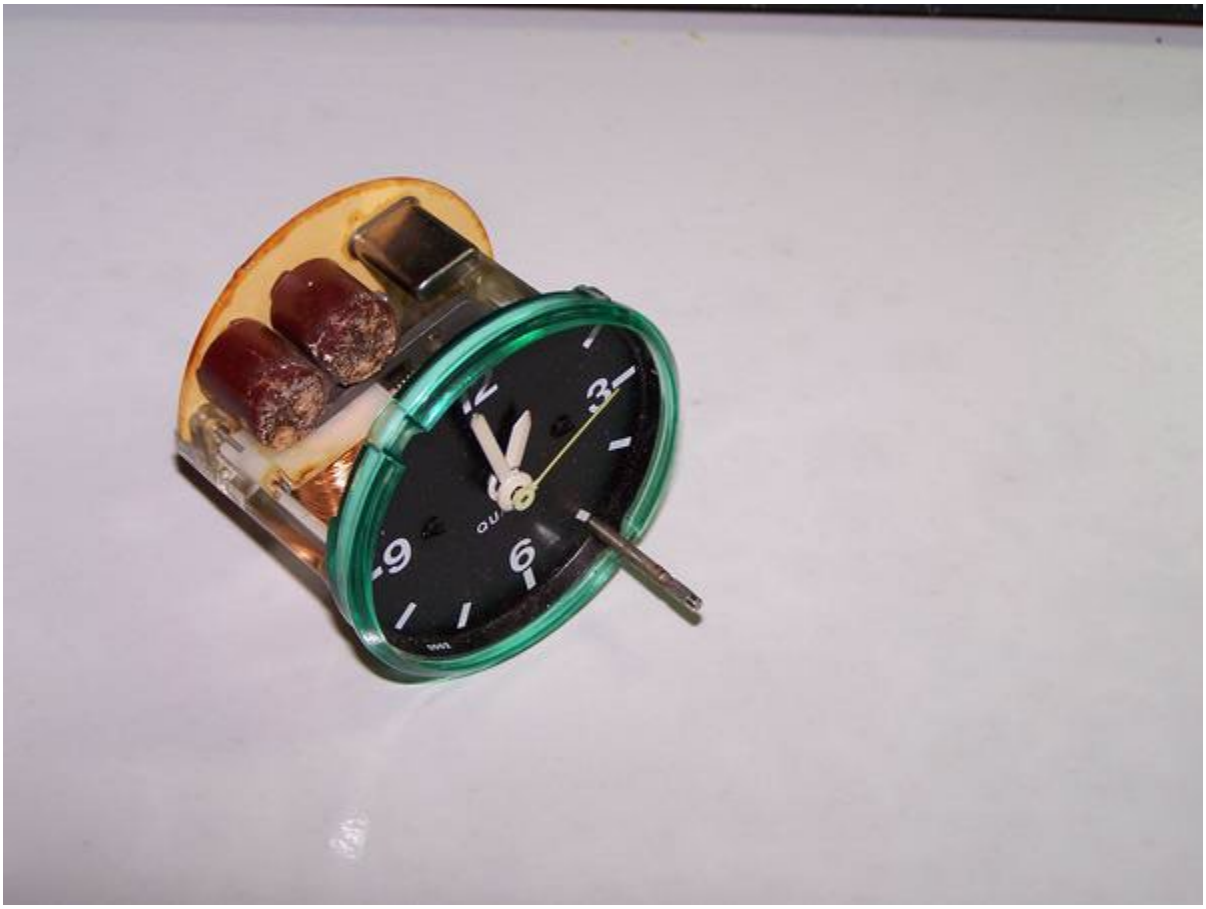
Once the ground has been de-soldered, the three screws in the back of the case can be removed. Once the screws are removed, the mechanism will be free and can be carefully extracted from the case. Remember to stow the three screws someplace where they won't be lost.

Now that the works are out of the case, you find a foam pad that insulates the small printed circuit board from the case. Remove this foam pad and stow it where you can find it for the re-assembly.

Now that the works are exposed you can inspect the clock for damage.

Carefully inspect that gears and other mechanical parts for damage, missing teeth on the gears, or gunk blocking the function of the movement. If the mechanism is full of dirt and gunk, a good careful cleaning may be all that is required. If there appears to be no missing teeth or jammed parts carefully attempt to spin the hands of the clock by rotating the gears with light pressure from one of your fingers. If, like in my case, there appeared to be no problems with the mechanical aspects of the clock. I then proceeded to inspect the electrical components.

Since I had read that the **most common electrical failure was due to failed capacitors**, I visually inspected these two components very closely and found a crusty residue on them that seemed to indicate an overheating situation at some point in time.

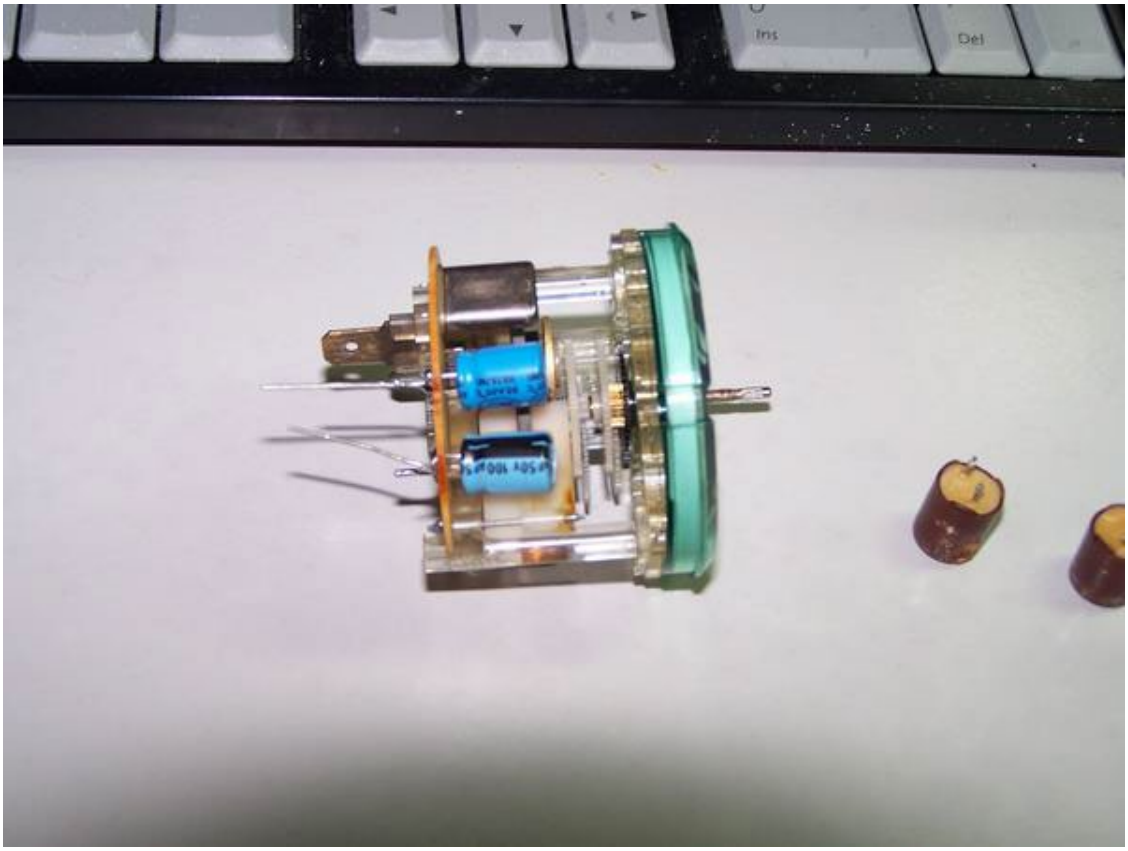


I do not have at my disposal, any means to test a capacitor, so I concluded that since these were the only components that did not appear to be in near new appearance, that there was a good chance they had failed.

The markings on the top of my two capacitors were 100/16 meaning 100 microfarads and I believe 16 Volts.

A trip to the local Radio Shack electronics store produced two replacement capacitors. I had several choices based on differences in voltage ratings. I chose to go with a component with a 50 volt rating based on the assumption the higher voltage rating would allow the device to survive a higher temperature in the dash before failure.

I carefully de-soldered the original capacitors and then soldered in the new capacitors being careful to connect the positive and the negative leads on the capacitors to the proper runs on the printed circuit board.



Once the new capacitors were installed, I connected the works to a 12v power source to test the repair (being careful of the exposed clock hands).

Once I confirmed that the clock now worked, I began the re-assembly process.

Re-assembly steps are as follows:

- Re-apply the foam insulating pad to the back of the printed circuit board
- Insert the clock works back into the case being sure to align the screw holes and the grounding point.
- Re-insert and tighten the three screws
- Re-solder the grounding point to the case
- Clean the lens
- Re-install the lens and bezel ensuring that there is no stress or pressure on the adjusting stem.

Once the lens and bezel is back on, you must re-crimp the back of the bezel over the lip of the case. I found after several attempts that the best means of doing this is to use a pair of pliers with one of the jaws of the pliers wrapped with material to protect it from damaging the front of the bezel. I used a pair of Craftsman RoboPliers with the plastic jaw cover on the bottom jaw. The same could be achieved by wrapping one jaw of regular pliers with plastic electrical tape.

The next to the last step is to re-install the adjusting knob.

As a final step I installed a new 2 3/16" O-ring around the case behind the bezel before re-installing the clock in the dash.

How to repair your VDO clock. From Pelican Parts

BMW E30/E36 VDO Clock Repair | 3-Series (1983-1999) | Pelican Parts DIY Maitenance Article

Go to website for lots of great photos – attached below

The mechanisms from the various Porsche cars are very similar. Although Demick speaks specifically of the 914, the VDO clocks that are used within the other Porsche models all share a similar mechanism, and the similar repair problems. This article details the problems with the internal electrical solder connections that often fail. There are a few other problems with the clocks that cannot be repaired without special parts, such as new pendulum springs. For clocks that need this additional repair, please contact Pelican Parts.

VDO Clock Repair

There are two types of clocks styles available in the 914 that I am aware of. Both look identical from the front, but are easily differentiated from the rear and have very different mechanisms inside. Both are shown in Figure 1. In the spirit of VW, I will refer to the clock on the left as Type I and the clock on the right as Type II. To the best of my knowledge, the Type I clock is the earlier model, and the Type II clock replaced it in 1973.

Comparing the two clocks, I like Type I much better. It is much easier to open up and you will have a much greater chance of successfully making repairs. Also, Type I has a way to externally adjust the speed at which the clock runs so you can dial it in to be quite accurate. Type II has a different clock mechanism which presumably eliminates the need for adjustment (since there is no external adjustment, although I believe there is an internal adjustment), but I have never had experience with an operating Type II clock so I cannot verify its accuracy.

The Type I clock has an easily removable rear cover. Three small nuts are all it takes to remove the rear cover (you may need to break the small plastic that goes around these nuts if the clock has never been opened up before). Inside you will find a series of gears and a coil and a couple of springs (Figure 2). There is a steel disk about 3/4" in diameter near the rear end of the clock which has an electrical contact mounted under it. When this electrical contact is closed, current is sent to the coil which spins the steel disk around about 1/2 turn. This is how the clock is wound. The disk is spring loaded and will slowly over the course of about 3-4 minutes return to its original position - operating the clock as it goes around. When the contacts close again, the process starts all over again. For this reason, this clock only uses power for a fraction of a second every 3-4 minutes. You can turn the disk manually and see how this all works. The rest of clock works like a regular clock with all of the gears, etc.

This clock has a built-in fuse, which is what is normally the cause of this clock not working. Right next to the coil is a set of metal tabs which should be soldered together (Figure 3). If your clock is not working, chances are that these two tabs are no longer soldered. The process to repair it is simple: re-solder the connection. To do this correctly, you need to use a low temperature solder (specification is solder with a fusing point of 120C or 248F). Where to find this? I don't really know. I had some low temperature solder laying around which came in strips and was designed to be wrapped around a wire and then melted with a match. It never worked good like that, but it worked fine in this application (minus the match). I don't know what the actual fusing point of this solder was though. Using regular solder is an option that will work fine, but someday your clock will really get fried because this fuse didn't melt like it was supposed to and you will not be able to repair it. The choice is up to you. Also, when you solder the two tabs together, be sure that the top tab is pulled down (so it is spring loaded) to meet the other tab and then soldered. Don't try to bridge the large gap because this spring loading is what helps to separate the tabs when the fuse melts. Note: The solder job shown is Figure 3 is NOT done correctly for exactly this reason (big blob of solder bridging the gap)

Well, that's about it! Put the rear cover back on and plug it in. Adjustment of the clock speed is made by the small, slotted screw which protrudes through the rear cover. Counter-clockwise goes faster. Best that I can tell, each 1/8 of a turn affects the clock by about 5 minutes per day.

Getting inside the Type II clock is a bit more difficult. Just like most all of the other 914 instrumentation, it involves using a sharp object (small screwdriver, chisel, etc) and carefully prying around the outside of the outer face ring. This part is a real pain. You will

have to pry the formed flange up for at least 1/2 of the way around the clock, and then remove the clock ring and glass from the rest of the canister. Now it is time to remove the guts of the clock from the canister: remove the 3 screws from the rear surface of the clock and unsolder the ground connection (Figure 4). The guts of the clock should now slide out (Figure 5).

Once open, you will notice that the inside looks quite different from the Type I clock. This clock is run by an electric motor rather than a spring loaded disk wound by a coil. The most common failure with this type of clock is a damaged gear. In my case, it was a gear whose support shaft had broken. In order to fix this shaft, I wanted to separate the PCB portion of the clock from the gear portion (shown separated in Figure 6). This is possible to do given the following: Remove the obvious screw which holds the PCB on and unsolder the two posts which are arrowed in Figure 7. These two posts are how the electrical connection is made to the electric motor. If you do not unsolder these posts, the PCB is still very easy to remove, but your clock will never work again. The posts will come out with the PCB, but the very fine wires which go into the motor will break and there is no way to re-connect them (I know, I've tried - that's why the motor in Figure 7 is partially cut open). With the PCB removed, you can get access to do the gear repair. In my clock, I did the gear repair very carefully with epoxy, and then found out on re-assembly about the broken wires - but I am confident that the repairs would have worked had I not broken the wires.

Re-assembly is just the reverse of this process. Test the clock before putting it completely back together (that face ring is really a pain - you don't want to do it twice). Also, note in Figure 6 that there is an adjustment pot mounted to the PCB. I believe that this pot is the clock speed adjustment and it is not accessible except by clock dis-assembly.

That's about all of the tips that I have, so good luck in your 914 clock repairs! There are not all that many 914 clocks that still work. Maybe with this information, there will soon be a few more....

Figure 1 – Two different clock mechanisms

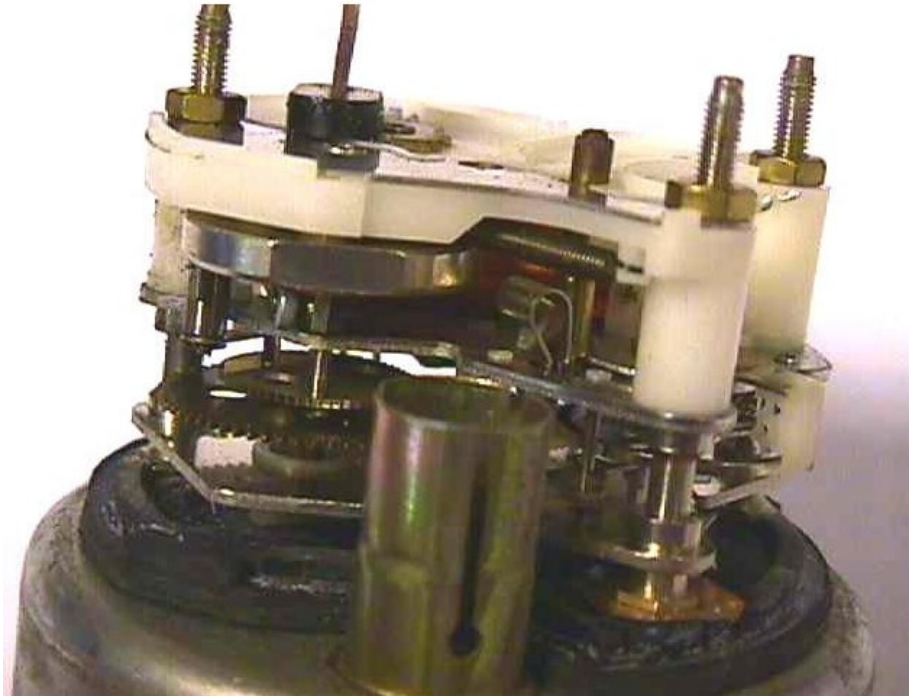


Figure 2

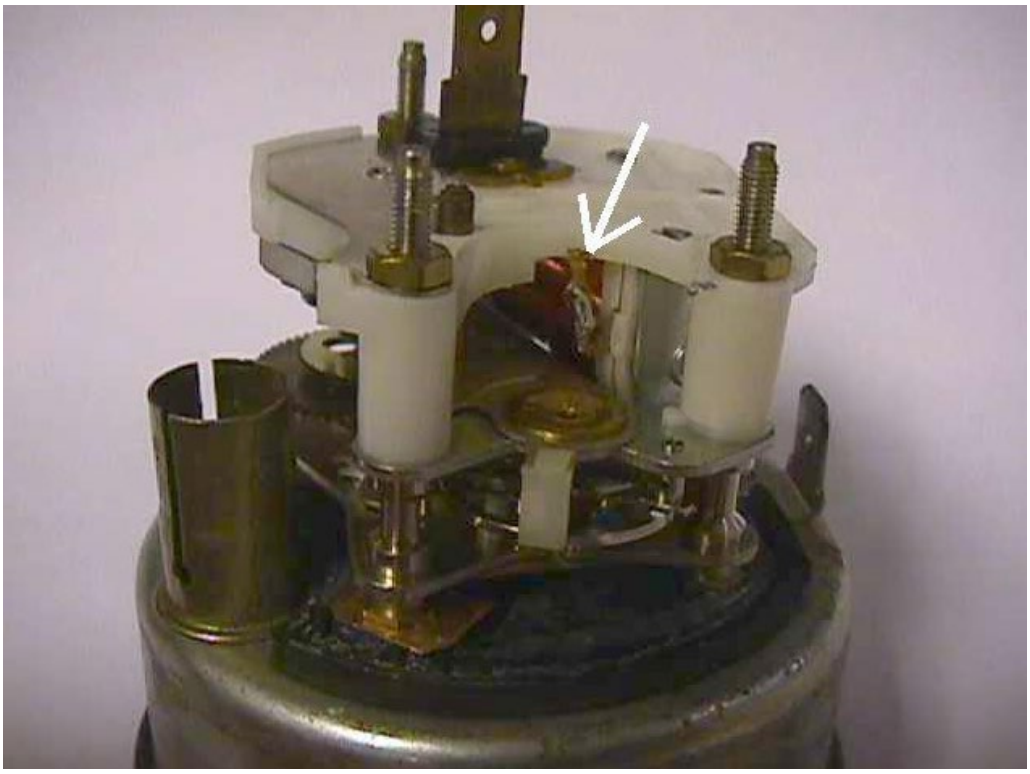


Figure 4

Figure 5

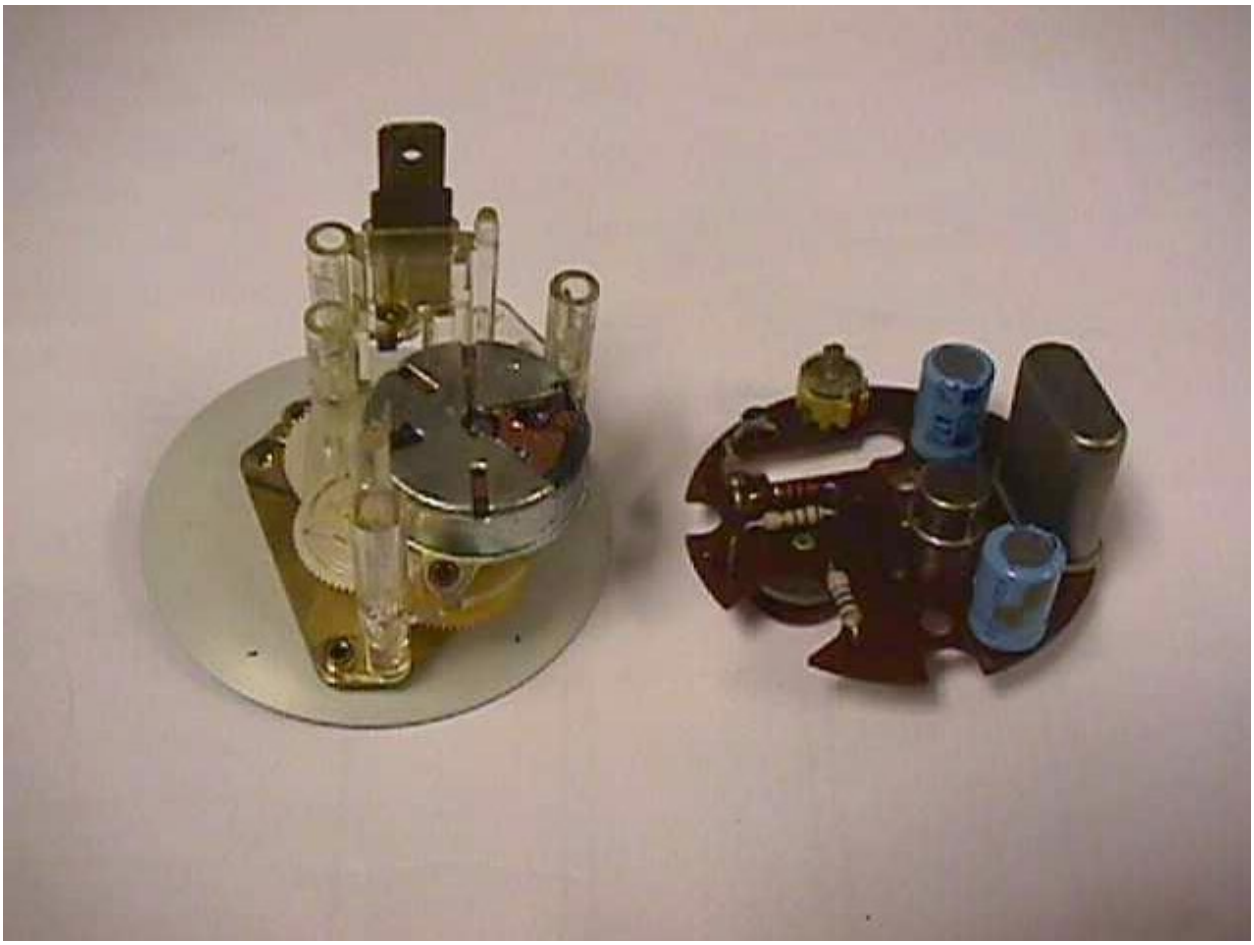


Figure 6

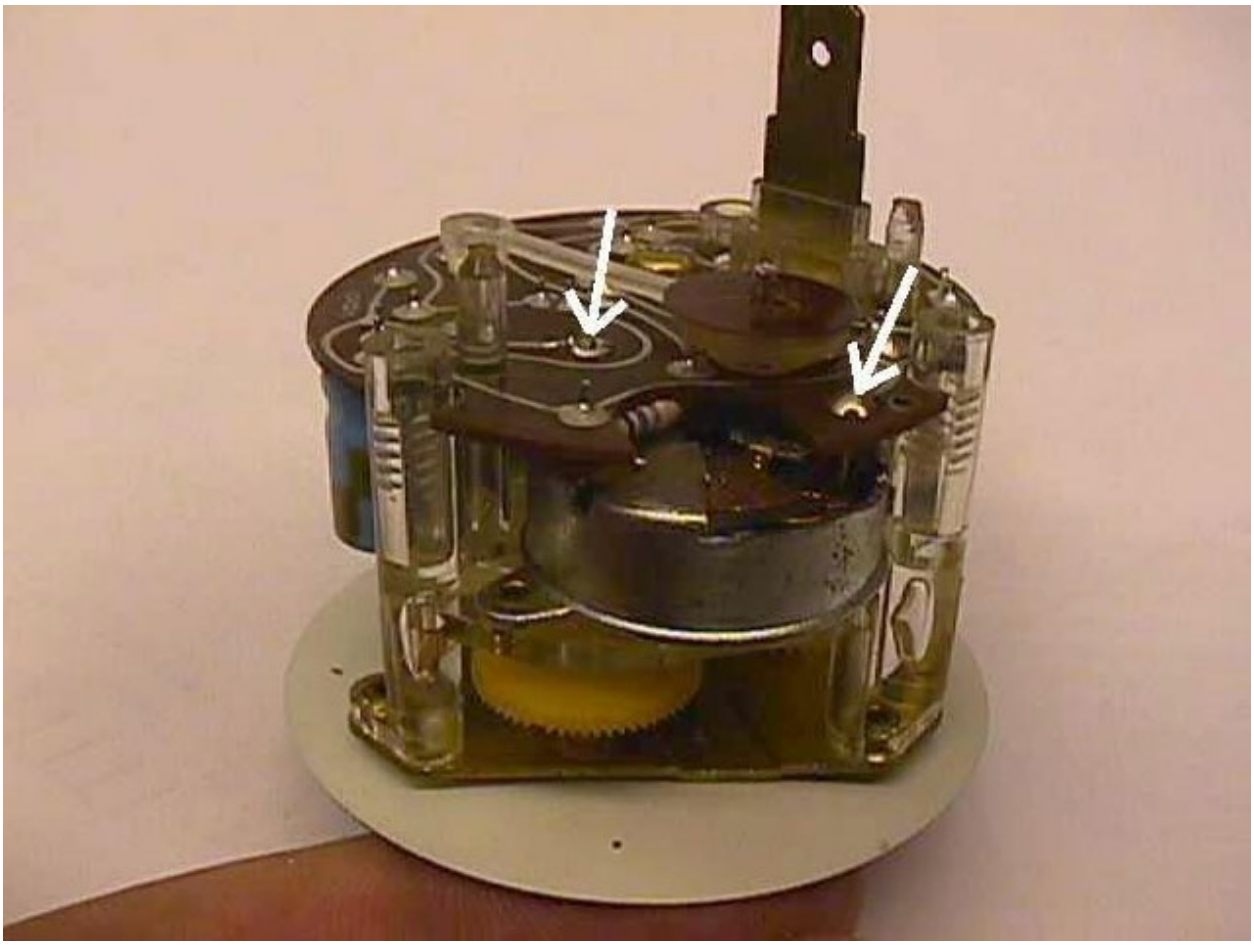


Figure 7