Assembling VFD Ellipse Clock recommendations

It is quite easy to assemble this clock. Please have a look at circuit diagram and components layout documents to see what and were components should be soldered in. Here is some recommendation, which I hope will help you to assemble your clock smoothly.

Please note that this clock contains 2 SMD IC chips, which are already carefully aligned and soldered on the board, so you do not need to do it yourself.

Assembling main uC PCB:

- You are welcome to solder components in any order you would like to do, but below are my recommendations based on the experience I've got assembling this clock.

- **To help you easy identify diodes in your kit, we usually cut shotky diodes in one pair, so if you see 2 diodes stuck on the paper strips, then it's shotky diodes, 5.1v zener diode has bended leg, so you can easy identify it too, another zener diode should have both legs straight.**

- **As 78L05 regulator and transistors have the same TO-92 cases, to easily identify 78L05 regulator we usually slightly bend one its leg. But do not forget to double check its marking too.**

- Firstly I solder all SMD components I have to. As IC SMD chips are already pre-soldered on your kit board, you only need to solder 2SD1804 smd transistor on the board. Is it is reasonably big (compare to other SMD components),so it should not be difficult to solder it on the board yourself.
  Just put it in the marked position on the board, align it so all its legs step on solder pads, hold it and sold one contact. Have a look if its position on the board is OK, then solder opposite contact. Again , just check if all its legs are remains on its solder pads, then solder the rest contacts.

- Perform visual inspection of your soldering quality work on SMD components. Use bright torch to illuminate board from beneath, so you can clearly see if all contacts does not have shortcuts between.

- Next step is to solder all low height components, like resistors, diodes, fuse, small capacitors, crystal. Please refer to the components layout picture to see were to mount these components.

- Then solder all high height components like electrolytic capacitors, buttons, connectors and buzzer. Please note that buzzer should be installed with correct polarity.

- Solder Transformer. Please note that as transformer was manufactures in China it has first contact on the the left bottom raw and it's market with black dot on the top of transformer label. Make sure that transformer key (dot) matches the key shown on the board.

- Leave display unsoldered yet.

- **Carefully check that all components are soldered to its designed places and they were inserted with correct polarity.**

- **It's worth to check all soldering pads, that it has good contact between board pad and soldered to it component's wire and there is no any unsoldered pads or shortcuts on the board.**

- Connect your clock to 12DC power supply. Clock should take about 7-10mA. Don't mix polarity on your 12v DC input connection

- It would be good to check the voltages your board is generating now. On Anode D2 diode you should have +5V, on anode of DZ1 or DZ2 Zenner diodes you should get about -30V.
  Clock board with connected display should take about 7-8mA current at 12V DC.

- Disconnect your clock from your power adapter and insert VFD display. Carefully align on to the board. Optimal gap between board and display is 3 mm. Solder first and last pins of the top raw display. Double check if display is aligned to the board well.

- **DO NOT solder bottom raw (pins marked 36-70) display pins until you fully check the clock functionality, as display covers all board solder pads and traces, so you won't be able to troubleshot and trace the fault and cannot solder anything in the display covered areas, as there is no access to it.**

- **Check that clock is running in its all display modes (4 digits time mode, alarm1, alarm2, and no time display mode), than check that you can upload composition to the clock and check all display segments and dots are functioning properly.**

- Finally solder all display contacts. Make sure you do it carefully and no short cuts left, as display contacts pitch is only 2.54mm.

- Connect your clock to 12DC power supply. Clock should start running and it takes about 220-250mA at its full brightness.

- Well done! You have successfully assembled VFD Ellipse Clock.