

Assembling IV-18 VFD Clock recommendations

It is quite easy to assemble this clock. Please have a look at circuit diagram and components layout pictures to see what and where components should be soldered in.

Here is some recommendation, which I hope will help you to assemble your clock smoothly.

- Please assemble main PCB first
- The only difference between 28mm and 38 mm version of the Clock is that shorter tube plastic holder is used for 28mm and tube PCB connector is soldered directly into the main board, so it's **very IMPORTANT** that you fully assemble and test main PCB, as once you have soldered tube PCB connector to the main board you will have limited access to some components on the main board.
- I would recommend to have both 28mm and 38mm kits, so you can assemble 38mm Clock first, then test second completed tube PCB on it.

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 got .
- Firstly I solder all SMD components I have to. At the current PCB release there is only one SMD component on the main board – 220uH inductor. Its size is relatively big to other SMD components, so it should not be a problem to solder it. Just put in the marked position on the board, hold it by few fingers and solder one contact. Have a look if its position on the board is OK, then solder opposite contact.
- Next step is to solder all low height components, like resistors, diode, fuse, small capacitors. Please refer to the components layout picture to see where to mount these components.
- Solder all PDIP chips – MAX771, MAX628 and PIC16F628A. Double check that first pin of the chip matches square pad on the board.
- The only tricky moment during assembling main board is to bend and solder IRF720 and KA7805. They are both in TO220 case. And laying down on the PCB in 69 position. Both have slightly wide contact areas, which go straight from the case. These areas are 1.2mm wide and only 3-4mm long, than the rest contact thickness is reduced to 0.8 mm.
- Please bend all 3 IRF720 pins at the middle of the wide area on 90 degrees towards to unmarked flat metal side of transistor case. Insert in to the main board and check that it is fully laying down on the marked area and there is no gap between PCB and transistor. Solder it.

- Please bend all 3 KA7805 pins at the middle of the wide area on 90 degrees towards to marked flat plastic side of the case. Insert in to the main board and put on the top of the IRF720 transistor. Check that is fully laying down on the IRF720 transistor and there is small vertical gap between KA7805 and IRF720 transistor. Solder it.
- Don't forget to solder connectors and buzzer. Please note that buzzer should be installed with correct polarity.
- Don't mix polarity on your 9v connection, as it could damage your Clock

Assembling tube PCB:

- Solder MAX6921AUI chip to PCB first. Use very tiny amount of solder. I also recommend to use liquid flux even your solder wire has it inside. Extra liquid flux and small amount of solder will prevent shortcuts between pads.
- When you have soldered MAX6921AUI, hold the PCB up to the light and look through the PCB to check that there is no shortcuts.
- Wash with soap the PCB to remove liquid flux, then dry it well.
- Solder two row right angle pin connector to the PCB. Insert it from the white silk mark side.
- Insert your IV-18 VFD tube from the silk mark side. Tube has 23 wires, one of them is slightly shorter than others, this is the key one and should be inserted where small arrow is pointing to. By slightly bending wires, insert it one by one in the PCB holes. Do not try to push the Tube too hard and insert it very close to PCB, leave 3-4 mm between tube and PCB.
- Carefully insert this PCB in to the main PCB connector. Adjust it, so the tube PCB stays vertically and horizontally to the main PCB. Have a look at the clock from the top, and adjust it so tube's edge line is parallel to main PCB edge line.
- When you are happy with the tube position, solder three tube wire to fix its position to the tube PCB.
- Disconnect Tube PCB from the main PCB and solder the rest of the tube wires.
- Tube PCB is assembled now.