Assembly Instructions Oscilloscope Clock V1

IMPORTANT
Unless you are very experienced with kit-building, it is highly recommended to follow the steps below. First read the entire document twice, before starting. At the end of the document there are two pictures to help you check which parts should go on the top or bottom of the pcb.

First step is to solder all the resistors. The resistors have numbers printed on them, and you should not mix them up.

The value of a resistor is printed as a small number, for instance 472. This should be read as 47 plus 2 zero's, so the value would be 4700 ohms, which is the same as 4K7. It can also be printed as 4701, meaning 470 plus 1 zero, again 4700 ohms or 4K7. A printed value of 3300 means 330 plus 0 zero's (!) so that is indeed 330 ohm. When you are in doubt, use a multimeter and simply measure the value.

The resistors are numbered in increasing order, using designators like R1, R2, R2 etc. Their values can be found in the schematic and/or component list.

For soldering you need:

a) very thin solder, diameter 0.5 mm. (0.020 inch).
b) insanely good eyesight, or a jewelers loupe, magnifying glass, or cheap +3 reading glasses.
c) long sharp pointed soldering tip. 25-30 watt iron.
d) steady hand.
e) metal tweezers. Make sure the tweezers align properly, adjust them by either bending, grinding and sanding.

LAST WARNING
Believe it or not, but SMD components are like flees. They can jump hundred times their own size. Your tweezer has to be absolutely perfect, has to close 'parallel'. Even the best brand new tweezers need some bending, sanding, filing, etc. Make sure your table is clean. Make sure you have enough light. If an SMD components is upside down, don't try to turn it, it will jump away. Better is to lift it a couple of centimeters, using the tweezer, and let it drop again. With some luck, it is now facing up. Also, count all the components in the kit, so you will know how many have actually jumped away before you could solder them. No kidding!!!

Find a resistor and locate on the PCB where it has to go. First put a tiny bit of solder on one pad, about 2 mm. of (thin 0.5mm) solderwire is enough. Just make a nice little blob of solder on one of the pads. Now use the tweezer to place the resistor on the right pads, and reflow the solder on the pad you have just presoldered. Move away your soldering iron. Now the resistor won't move anymore, so you can let go of the tweezer. Solder the other pad, applying a few mm. of solder. Finally solder the first pad, adding some solder too. If the component has disappeared mysteriously, it probably hangs on the tip of your soldering iron.

Take your time, and don't panic. If you don't get the hang of it after 5 resistors or so, better stop and ask a friend to help you.

After you have done all the resistors, you can do the SMD capacitors. Then continue with all the other larger parts.

Mount the electrolytic capacitors, the square hole indicates the (+) connection. Take care to mount these correctly. A reversed capacitor will certainly fail; your clock won't work.

The leds should have the long leg inserted in the square hole. If you reverse them, they won't lit.

Some parts are not included, such as the encoder pot and perhaps the parts for the RTC if you have not ordered these. Also the parts for the programming connection are not included. If you intend to develop your own oscilloscope clock software, you have to provide these parts yourself. Check the BOM (Bill of Material).

Do not insert the microcontroller yet.

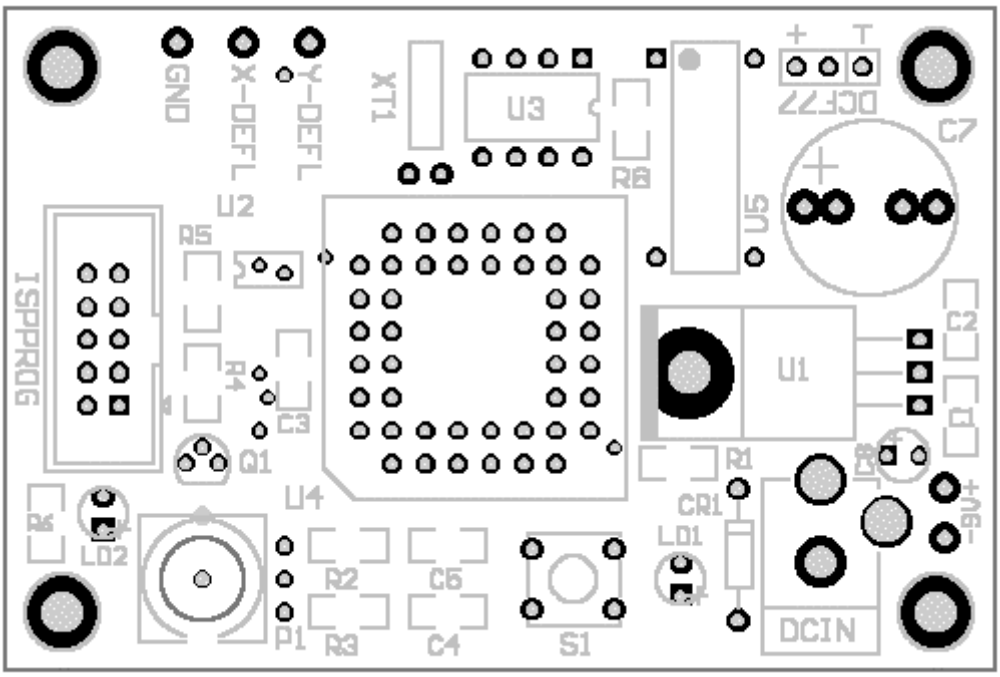
Connect a 12VDC/100mA (or better) adapter to the board. Test and measure if you have 5V on the 7805 regulator. If you don't have 5V, check the polarity of your DC-adapter, you may need to reverse the +/- and check things again. Proceed if you have a clear +5V.

The next step is to insert the Atmel Microcontroller. Make sure to align the chip with the socket, pin 1 to pin 1.

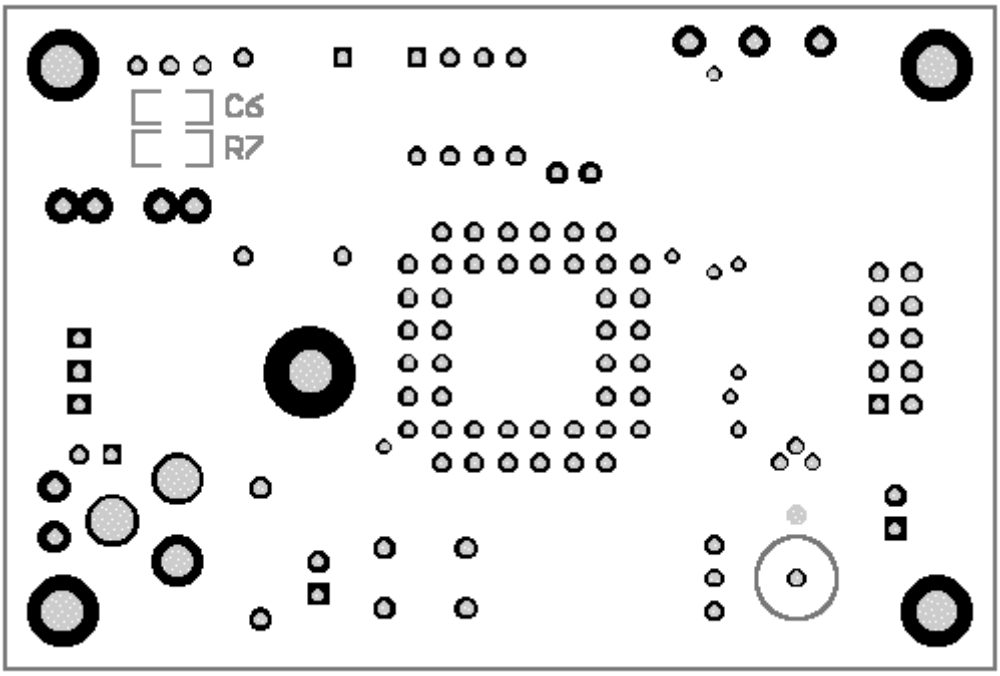
Connect the DC adapter again, and see if the led starts blinking. If it doesn't, turn off power and carefully check all solderings.

If you have a blinking led, it's time to hook up your oscilloscope. Connect the channels A and B of your oscilloscope to the X and Y outputs of the board. Put the oscilloscope in X-Y mode. Sometimes that is the last or first position of the timebase knob, sometimes it is a pushbutton. Best image is often achieved with 1:1 probes. Set both channels to 1V/Div and see what happens. If the image is rotated, swap the probes. If it is mirrored, you may have to flip a switch on your scope to invert the channel.

Now your Oscilloscope Clock is ready! Congratulations! If it doesn't work and you can't find what is wrong, just send me an email at support@franktechniek.nl



This picture shows which parts should be fitted on the top.



Only two parts go at the bottom, C6 and R7.