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NIXIE CLOCK KIT

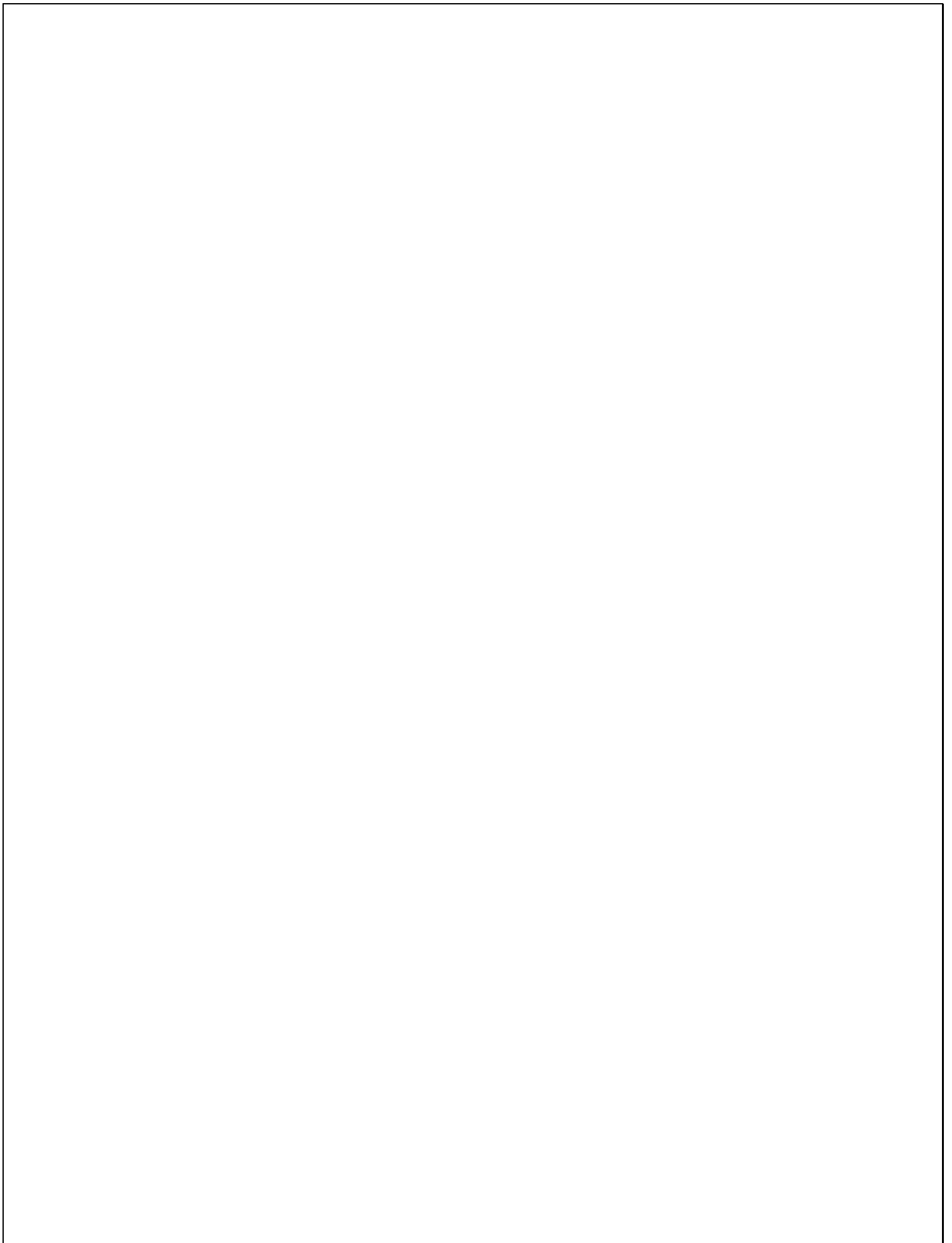
ASSEMBLY INSTRUCTIONS

For more on Nixie Clocks, check out

Glowingtech.com

Rev 1.2 IN-14-nv edition

From the Nuts and Volts article of October 2006.



Thank you for purchasing our Nixie Clock Kit. We hope you will have fun assembling it. This manual will provide you with the instructions and visual aids necessary for assembly.

TIP! If you plan on finishing the case (staining, painting, lacquering, etc.) do it before assembling the kit. It will be much easier.

The kit consists of the following parts:

Part	Quantity
ATTiny2313	1
7809	1
78L05	1
MUR160 or equiv.	1
CD4028	2
LM555	1
Irf730 or equiv.	1
MPSA42	23
MPSA92	3
4.096 xtal	1
470 UH	1
Switch	2
1k	1
10k	3
15k	6
33k	3
47k	20
470k	3
100k	3
22pf	2
2200pf	1
2.2uf 400v	1
470uf 16v	2
Power plug	1
Nixies	6
PCB	1
Driver board	1
Cables	
Power supply	1

To assemble this clock you will need the following tools/supplies:

- Fine Tipped Soldering iron
- Solder
- Screwdriver
- Sandpaper
- Epoxy glue
- Wire strippers
- Wire cutters
- Multi-meter for testing/measuring
- File

After a visual inspection to make sure the parts are all there, it is time to start assembling the clock.

The kit should be put together in a logical order. The preferred order is:

1. Solder parts into the main printed circuit board, hereafter the PCB
2. Solder the nixies in the driver board
3. Connect the boards
4. Assemble the back panel
5. Connect the two boards to the back panel
6. Plug it in

Assembling the PCB

The PCB is organized in a certain way and it is recommended that the parts be added in a defined order (this is only a suggestion). The first thing is to compare the schematic with the PCB. Figure 1 is the schematic from the article in the October 2006 issue of Nuts and Volts magazine. The major sections are shown.

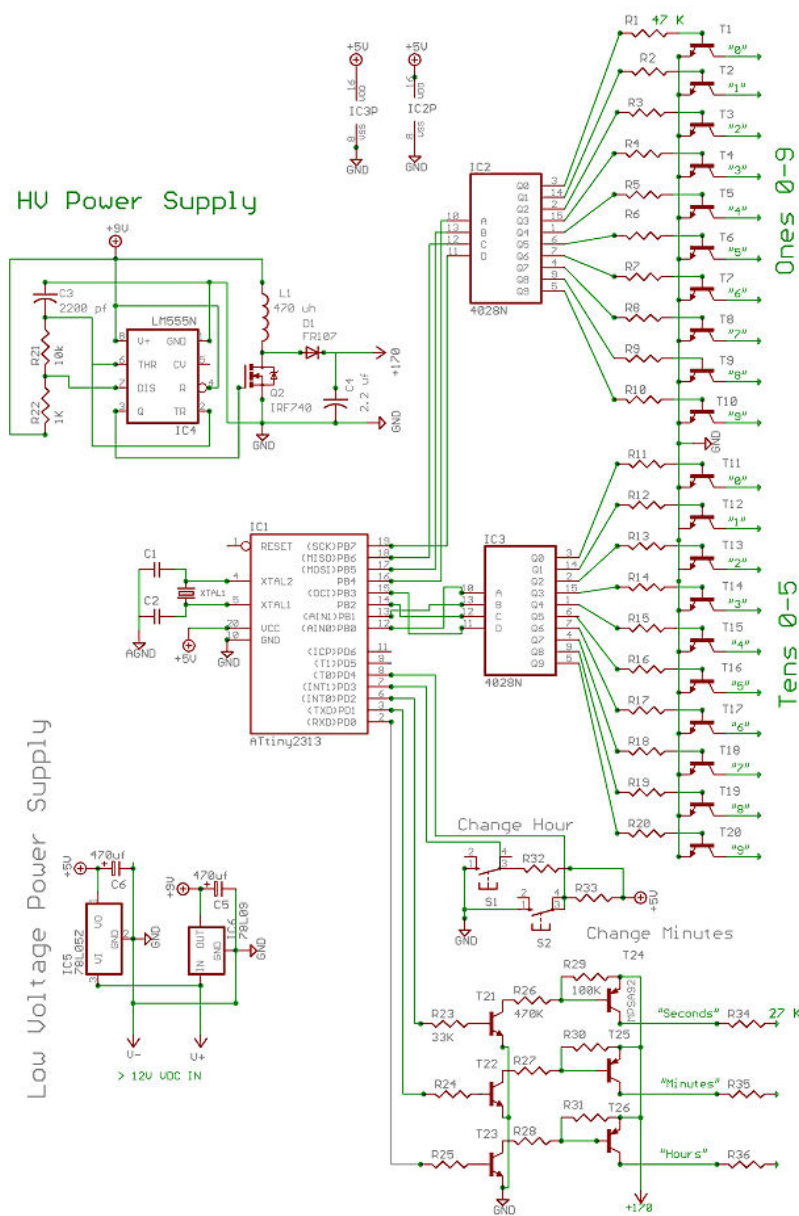


Figure 1

Figure 3 shows the connections and the pinouts for the PCB.

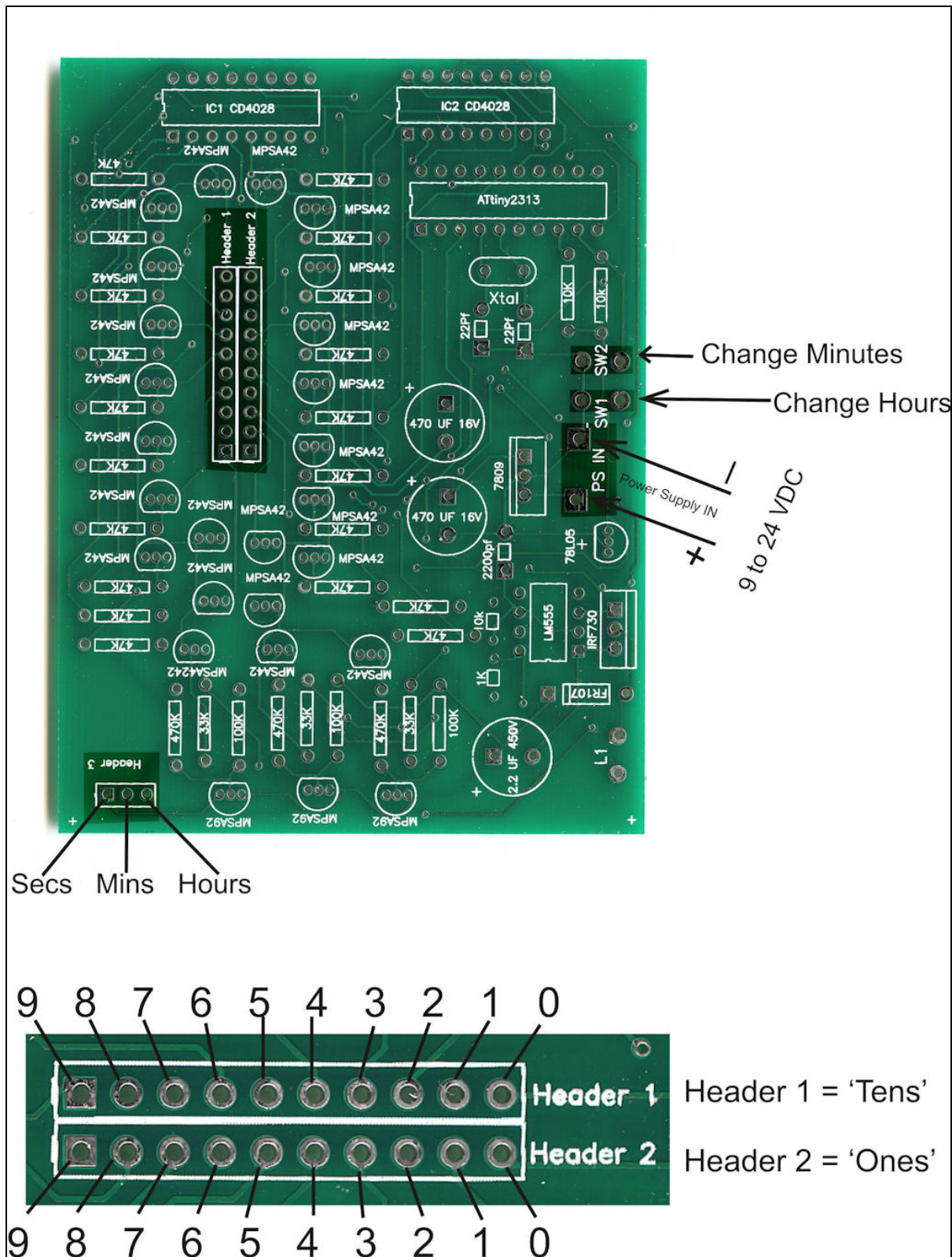


Figure 3

There are a number of things that the builder must be aware of when building up the PCB. The primary one is the High voltage section. When connected and powered up the HV generator can deliver 300V DC, under load this drops to around 150V DC. This is a substantial voltage and can deliver a powerful shock. **Always be aware of this. Once soldered in don't touch this section.**

The best way of assembly is to follow a logical order. It is suggested that you install the components that are closest to the board first in the following order:

1. Sockets
2. Resistors, small capacitors
3. Small Transistors
4. Tall parts and wires

The following diagrams show the progression of the PCB being populated.

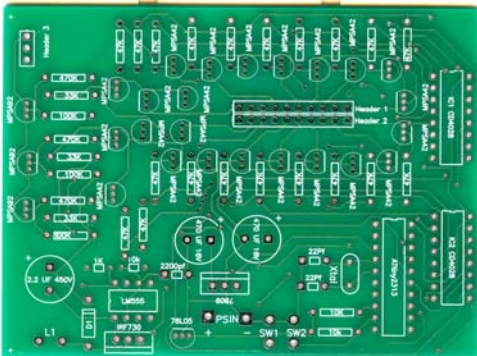


Figure 4 - Empty PCB

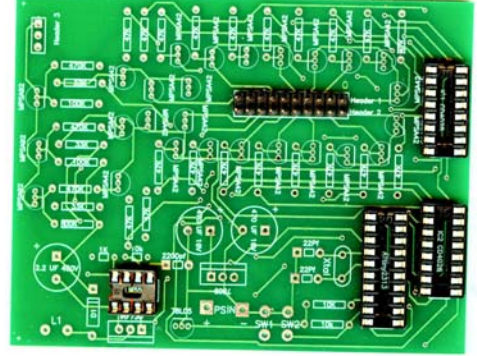


Figure 5 - Sockets inserted

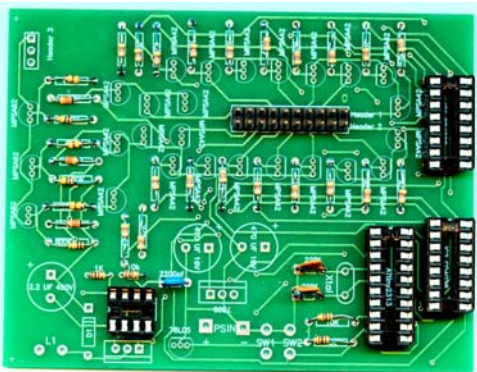


Figure 6 - Resistors, small capacitors inserted

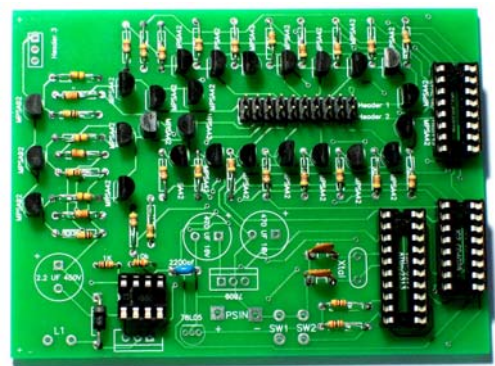


Figure 7 - Transistors soldered in



Figure 8 - Tall objects and wires soldered in

Assembling the Driver Board

The driver board consists of the Nixies and current-limiting resistors. See Figure 9 below.

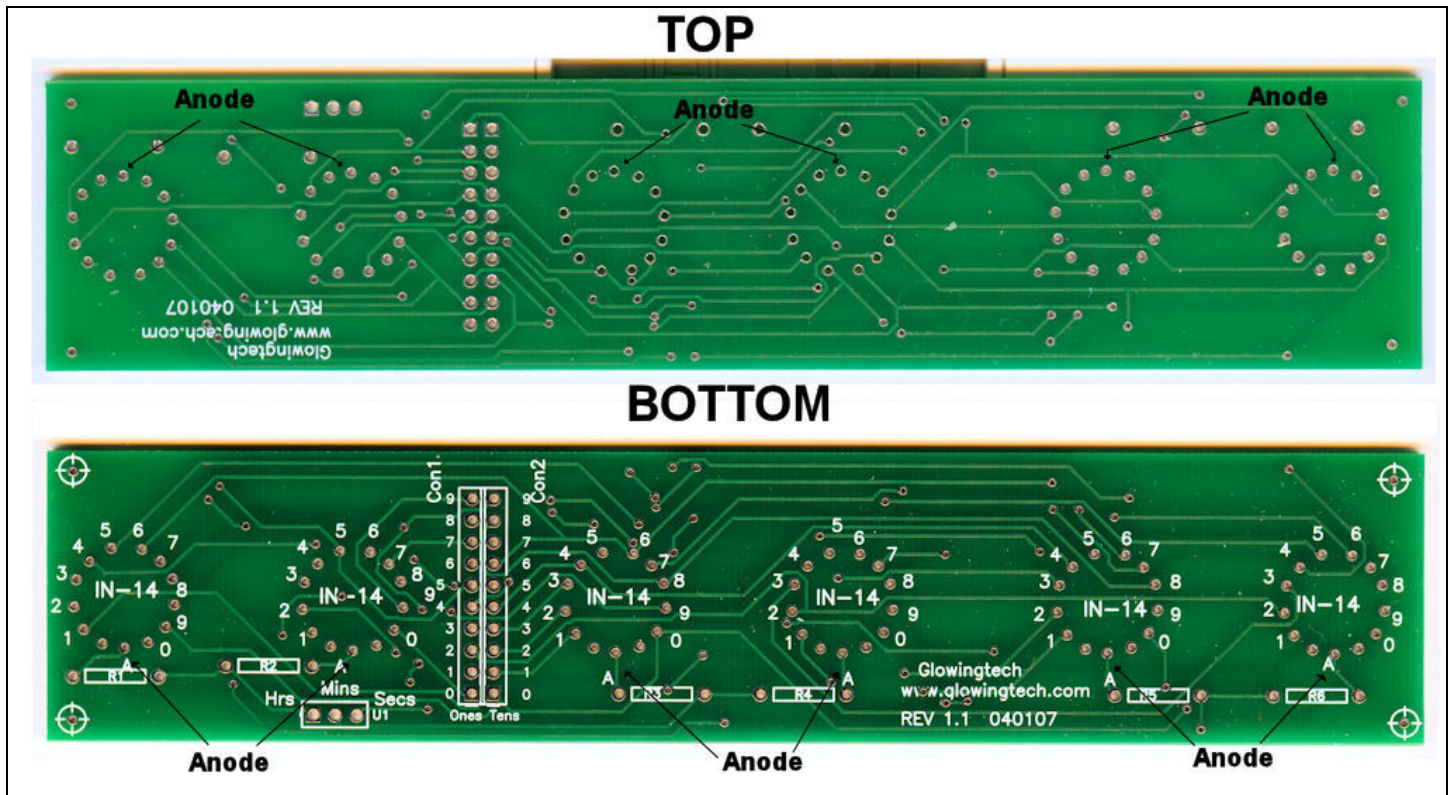


Figure 9 - The driver board

The Nixie tubes are threaded into the holes and then soldered. The orientation of the tubes is shown in Figure 10 - bottom view of IN-8-2 Nixie tube.

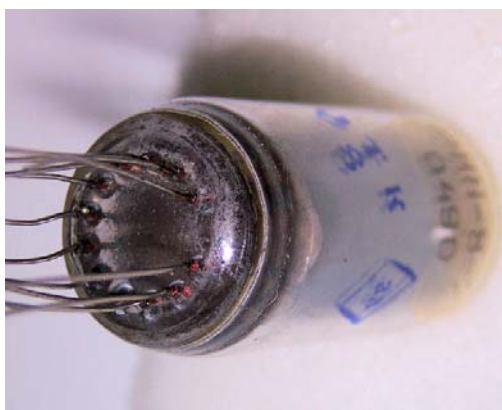


Figure 10 - Bottom View

Tip! Inserting the tubes into the holes can be made easier if the leads on the tubes are cut in a descending pattern like a spiral staircase.

1. Tube
2. leads cut in a descending spiral pattern

Figure 11 below shows the sequence for an IN-14 tube.

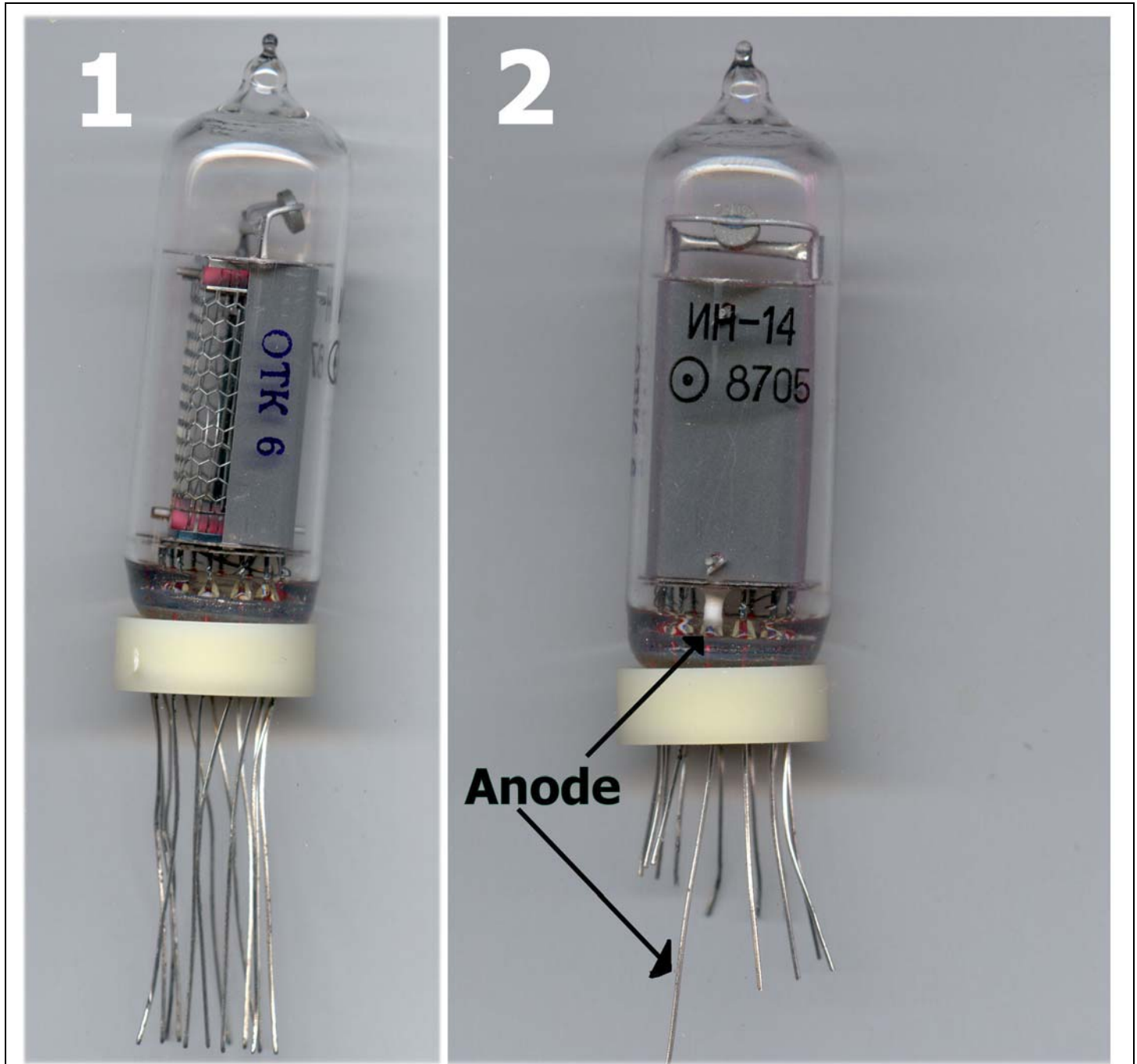


Figure 11

The tubes are then pushed down onto the driver board and soldered into place. Then the 15K ohm resistors are soldered into place (See Figure 12) and the connector strip is soldered in. These resistors control the brightness of the digits. They are a 'best guess' as to the correct level of brightness. If the tubes need to be adjusted for brightness then changing the values of these resistors will do it, if the tubes show excessive ghosting the values of these resistors should be increased till the ghosting is gone or minimized.

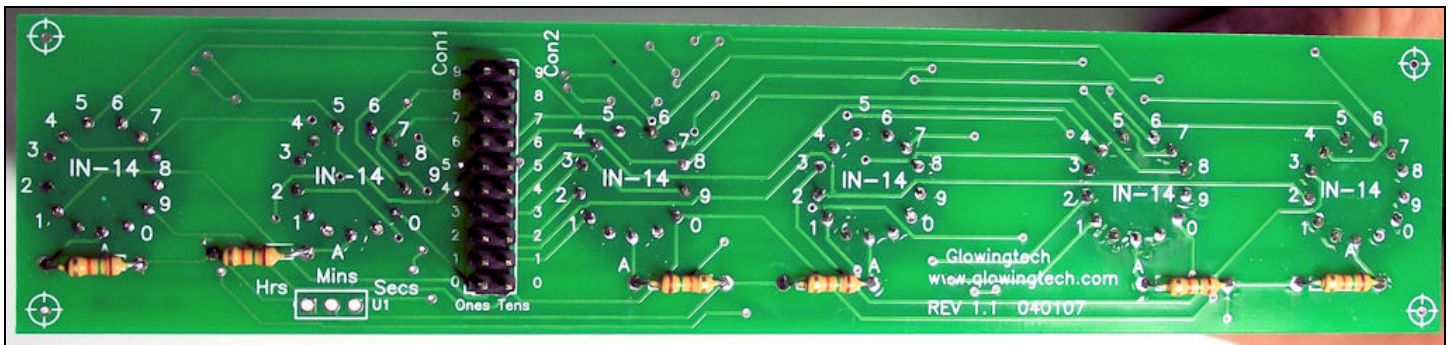


Figure 12 - Resistors soldered into place

The next step is to solder the hours/minutes/secs cables. Figure 13 shows the completed driver board with cable.

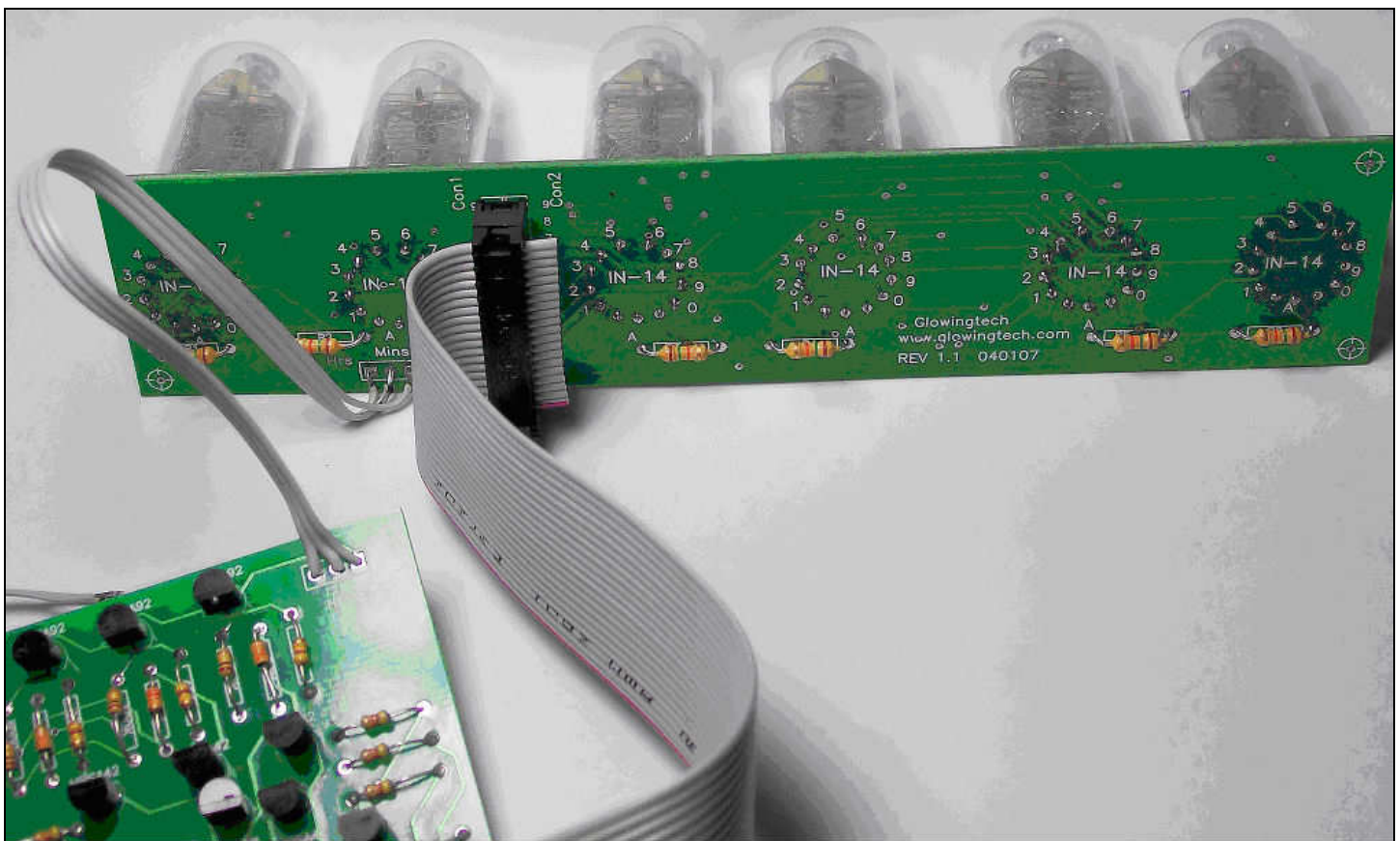


Figure 13 - Completed driver board with cable

The boards can now be connected together. (See Figure 14).

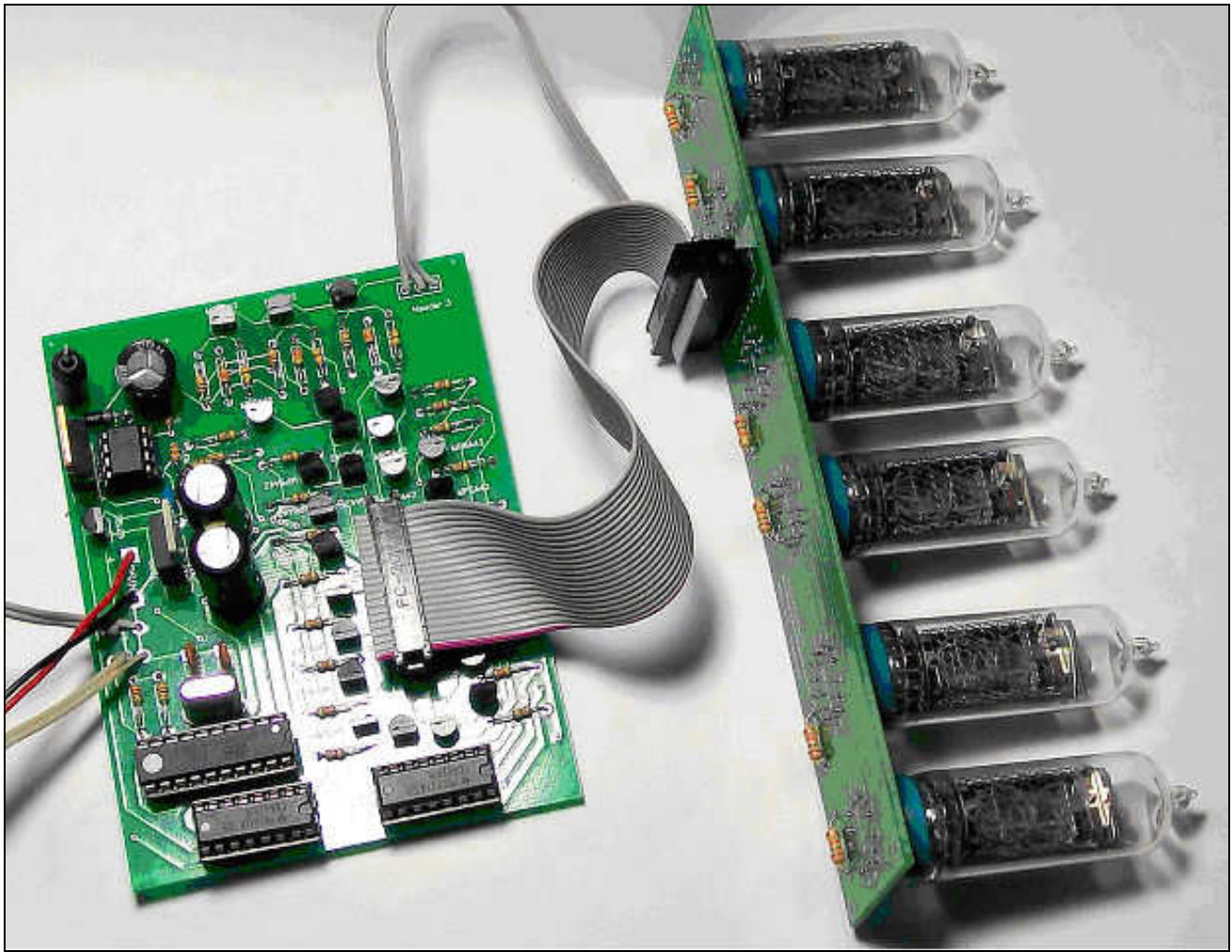


Figure 14 - Boards soldered together

We now connect power supply plug to the board. The Wires are attached as illustrated in figure 15.

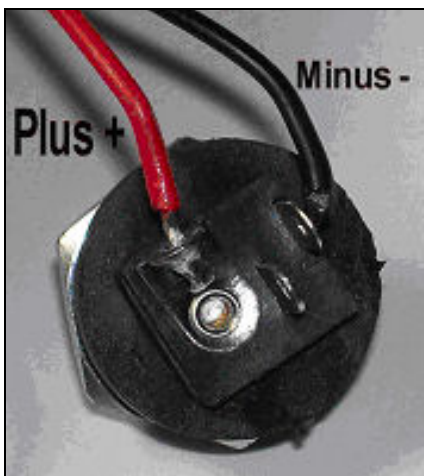


Figure 15 – Connection for the power supply

Now plug in the power supply and see if it works, it does – see Figure 16.

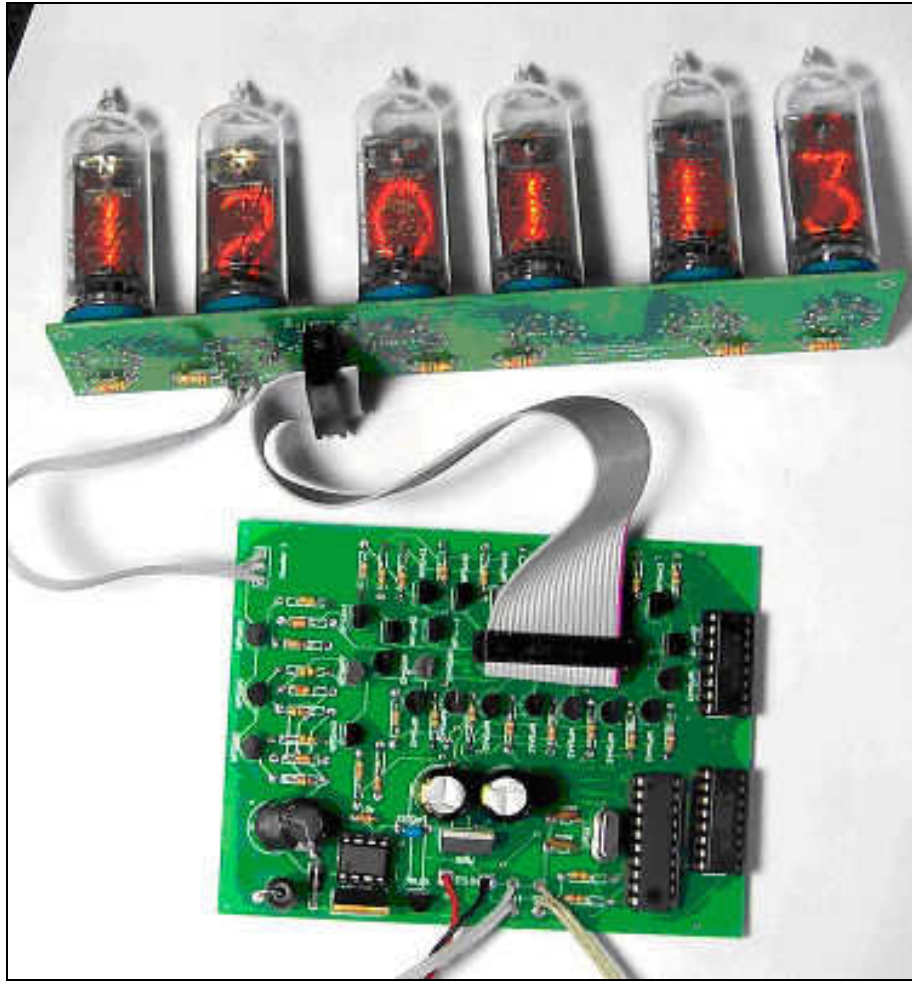


Figure 16

Congratulations on making a nixie clock that will give you years of enjoyment

FEEDBACK!

Do you have a suggestion or advice on how to make the kit work better?

Drop us a line at info@glowingtech.com