Hello misses Simons and mister Hilven.

This year there was a project to make a soldering iron throughout the year.

Here is a quick preview about what is going to be present.

First there is a word about this build, what is does and what the main characteristics are. There is also an explanation of some of the most important components and is a quick walkthrough of the construction process to make it. Each electric part of the soldering iron will be discussed and the working of every aspect of the electrical circuit will be explained. There is also a discission with the problems and how to fix them.

Here you can see a photo of the soldering iron. Important to know is the type of the device. It is a temperature regulation soldering iron. These are the most common type of soldering irons. The iron can be set on the desired temperature by an encoder. This soldering iron has a temperature range from 0 degrees to 450 degrees.

In this soldering iron are 0805 SMD resistors and capacitors used. There also THT capacitors, coils, diodes, transistors, IC’s, power relay and not to forget the ATmega4809-PF. This microcontroller is used for sending all the right information to all of the components. It’s the brain of the whole device. The soldering iron works with a 42R series EIC connector protected with a 250V by 0.63A fuse. As display there is a 4-digit 7-segment display controlled by a TM1637 controller. This soldering iron will use the Oem Jbc C245 soldering iron pen. As said before the temperature of this pen is configured with the rotary encoder.

Most of the components are ordered on mouser. The components that are not available on Mouser are bought on Conrad and TME. The toroidal transformer comes from TME. The electric design and the PCB are designed on Altium Designer. The PCB is ordered on JLCPCB. The case is modeled on Autodesk Fusion 360. The case is sliced with the Prusa slicer app on a laptop and it is printed on the school’s Prusa Mini 3D printer. When the PCB arrives it is time to solder all the components.

The soldering iron is fed by one toroidal transformer. One secondary winding is used for the +5V power supply for the logic and control circuits trough the bridge rectifiers and IC1. There is a Zener diode that is used as overvoltage protection.

The regulator works as followed; The temperature of the pin on the soldering iron is PWM-sent by the power controlled by the transistors. They are used to regulate electric current.

Around IC2A and IC2B are 2 opamp circuits that amplify the voltage on the temperature sensor terminal.

The CPU is the ATmega which is a 8-bit microcontroller that controls most of the components in the device.

There are a few problems with finding all the right components but as said before there are found on Conrad and TME. The postage costs on Mouser are pretty high so order together.

When trying to solder the components watch out for footprints that are not right on mouser. If there are still some, this is fixed by soldering cables onto the PCB and connecting these cables to the right pins of the component.

Now you know a bit more about the project and I hope it was interesting!