

1.1 Calibration of Brenner8 under Linux

After the assembly of the Brenner8, the programming of the control PIC and the installation of the USB-driver the Vpp-generation of the Brenner8 has to be calibrated.

A non-calibrated Brenner8 can destroy every target-PIC in shortest time! It can produce Vpp-voltages of 25V and above. No PIC survives this!

A small boost-converter is used in the Brenner8 to generate the programming voltage Vpp. The voltage level can be controlled by software. Such every target-PIC gets its ideal programming voltage.

This can function only if the control PIC of the Brenner8 can measure the Vpp level precisely.

The programming voltage is measured by the control PIC via a voltage-divider and compared with a reference voltage (from a zener-diode). During calibration Z-voltage and voltage-divider-ratio are determined.

To calibrate the programmer you need:

- Brenner8
- usburn-software
- Voltmeter

1.1.1 Preparation

Connect the Brenner8 to the PC.

The calibration is done in 3 steps

1. manual adjustment of the zener-voltage
2. manual adjustment of the voltage divider (Div)
3. automatic regulator adjustment

1.1.2 Step No. 1: Z-Voltage

The Brenner8 contains a 3,3V-Zener-Diode, but typical Z-diodes have up to 10% voltage error. Thus we have to measure the real voltage of our individual Z-diode.

The voltage over the Z-Diode D3 has to be measured by a voltmeter. (At the Brenner8P e.g. between contacts LSP2 und LSP3.)

Start now usburn with the option **-k** or **--calibration**. In the terminal usburn shows now the internally stored value of the Z-diode-voltage.

By typing in „+↵“ and „-↵“ (the „↵“-symbol stands for the Enter-key) the value can be changed in small increments, until it is identical to the value measured by the voltmeter.

(One can type in e.g. „+++++++↵“ to save time :-)

By typing in „=↵“ this calibration step is finished, and the new Z-voltage is stored in the Brenner8.

1.1.3 Step No. 2: Voltage-Divider

The resistors R4 and R5 build up a voltage divider to measure the Vpp-voltage. Their default divider-ratio is 3.14, but the real value may differ a little bit because of tolerances.

Connect the voltmeter between the cathode of D1 and Vss (or between both terminals of C5). At the Brenner8 you can connect the voltmeter between the contacts LSP1 and LSP3.

The Brenner8 measures the Vpp-voltage and shows the result in the terminal as **Vpp-mess**.

By typing in „+↵“ und „-↵“ (the arrow is the ENTER-key again) the DIV-value will be changed and the indicated voltage at the terminal will be changed consequently. Adjust the indicated value until it is as close as possible to the value at your voltmeter.

By typing in „=↵“ this calibration step will be finished and the new divider-ratio is stored in the Brenner8.

1.1.4 Step No. 3: Regulator-Adjustment

Finally usburn has to determine the individual reaction of the Vpp-source of you Brenner8.

This is done automatically and needs some seconds (6 seconds).

During this process voltage of up to 30 volts can be applied to the Testsocket and the ICSP-connector of the Brenner8. No target-PIC should be in the testsocket or connected to the ICSP-Connector during calibration, or it may be destroyed!

After this some values are presented in the terminal. They may be helpful in the case of an malfunction-analysis

To check out the function the Brenner8 generates now Vpp-levels of **10V**, **11V**, **12V** and **13V** after you press the Enter-key. The acceptable voltage error is about 0.3V.