

ADCLoad Calibration

Prerequisites:

Hardware:

- Amp-meter,
- Volt-meter,
- Power supply (0..24V, 8A)

Software:

- A serial terminal emulator (eg: “HyperTerminal” or “Tera Term” on Windows, “minicom” or “cutecom” on Linux).

The communication settings are: 57600, 8, N, 1

Process Description

Step 1: Maximum Current

Select “Step 1” in the calibration spreadsheet file.

Connect the amp-meter and the power supply to the DC load, for current measurements. Open your serial terminal emulator, connect the DC load, then type:

:DAC:4095

Write down the mA value readed on the amp-meter to the “mAmax” column. Now, type:

:DAC:0

Edit the aDCLoad.h source file, browse down the file, looking for the following line:

static const float CURRENT_MAXIMUM = 7.845; ///< Maximum value of load current (A)

If necessary, change the 7.845 value to the one you've got on your amp-meter (don't forget to convert it from mA to A), then reflash the board with new code (using Code::Blocks IDE or the provided Makefile, running “make burn” command).

Remember, if you have to reflash the board, that could be only done using ICSP programming. There is no bootloader flashed on the MCU, due to flash space restriction.

Calibration step 1 is now done.

Step 2: Voltage

Select “Step 2” in the calibration spreadsheet file.

Connect your power supply to the DC load, sets to 0V. The DC Load should the sets to 0mA. In the serial terminal emulator, type:

:CAL:ON

Set your power supply voltage output for each value in “Vset” column, and write down the readed value in “Vread” column.

Once you went through the whole array, the calibration string should be entered into the serial terminal emulator, like:

:CAL:V:x.xxx,y.yyy

Please note that the decimal separator **SHOULD** be a dot ('.'), as in US format.

Calibration step 2 is now done.

Step 3: Current

Select “Step 3” in the calibration spreadsheet file.

Connect the amp-meter and the power supply to the DC load, for current measurements.
Sets the output voltage to 5V.

Using the DAC command, try to adjust its value to match each value in the “A Amp-Meter” column, and write down the readed value, on the LCD or serial terminal emulator output, into the “A LCD/Term.” column.

You can change the values in the “A Amp-Meter” column to strictly match the ones you're reading on the amp-meter.

The syntax of the DAC command is:

:DAC:value where *value* is an integer from 0 to 4095.

Once you went through the whole array, set **DAC** to 0:

:DAC:0

The calibration string should be entered into the serial terminal emulator, like:

:CAL:C:x.xxx,y.yyy

Please note that the decimal separator **SHOULD** be a dot ('.'), as in US format.

Calibration step 3 is now done.

Step 4: DAC

Select “Step 4” in the calibration spreadsheet file.

Connect the amp-meter and the power supply to the DC load, for current measurements.
Sets the output voltage to 5V.

Set the DAC value for each value in “Steps” column, and write down the readed value on the amp-meter into the “mAread” column.

The syntax of the DAC command is:

:DAC:value where *value* is an integer from 0 to 4095.

Once you went through the whole array, set **DAC** to 0:

:DAC:0

The calibration string should be entered into the serial terminal emulator, like:

:CAL:D:x.xxx,y.yyy

Please note that the decimal separator **SHOULD** be a dot ('.'), as in US format.

Calibration step 4 is now done.

Step 5: Voltage Drop

Select “Step 5” in the calibration spreadsheet file.

Connect the amp-meter, the volt-meter and the power supply to the DC load, for current **AND** voltage measurements.

Sets the output voltage to 5V (the last entry in the array should be set around 12V).

Using the DAC command, try to adjust the its value to match each value in the “mA” column on the amp-meter, and write down the voltage readed value on the volt-meter into the “mV meter” column, and the readed value on the LCD and/or serial terminal emulator to the “mV LCD/Term.” column.

The syntax of the DAC command is:

:DAC: *value* where *value* is an integer from 0 to 4095.

You can change the values in the “mA” column to strictly match the ones you're reading on the amp-meter. For the last row on the array, set the output voltage to around 12V.

Once you went through the whole array, set **DAC** to 0:

:DAC:0

The calibration string should be entered into the serial terminal emulator, like:

:CAL:VD:x.xxx,y.yyy

Please note that the decimal separator **SHOULD** be a dot ('.'), as in US format.

Calibration step 5 is now done.

Last Step: Backup

Once the full calibration is done, you **SHOULD** save the values into the EEPROM, using the following command:

:CAL:SAVE

Now, the calibration is done, and you can use your DC load.