Digitimer DS5 Signal generator

With the Digitimer DS5 signal generator it's possible to send a pulse or pulse train to the Digitimer. The signal generator is connected to the stimulus pc with an serial (cdc) connection. The firmware of the signal generator will handle the output to the DS5 and will measure the current and voltage used by the DS5 to accomplish the requested current.

Serial port settings

The signal generator requires a serial port with the following settings, 115200 baud, 8 bit, 1 stop bit and no parity.
115200, 8N1

Digitimer settings

The Digitimer DS5 needs to be set every time it's switched on to 5V/25mA input range.
Press the **F1** button, then choose **FS input voltage**, Go with the **F3** button to **5V** and press the **Ok** button. Choose now **FS output current** with the help of the **F4** button. Go with the **F3** button to **25mA** and press **Ok** followed by the **Exit** button.
Check the upper right corner of the Digitimer for the correct settings.
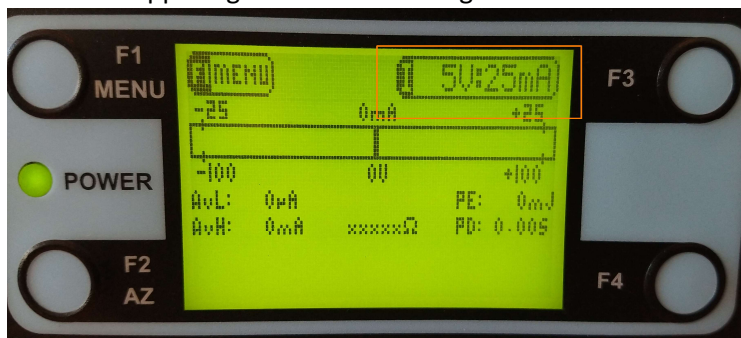
Protocol

With the help of a simple json string it's easy to set the requires pulse width, height, pause and cycle repeat.
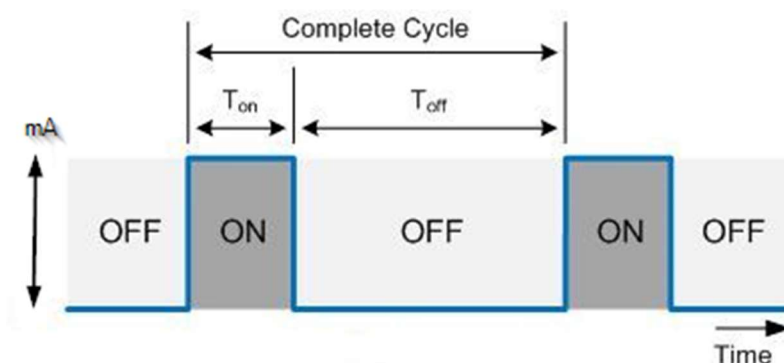
Example: {"current":3.3, "Ton":1.0, "Toff":3.5,"repeat":3} + Line Feed.

This will generate as pulse of 3.3mA for 1mS and a pause of 3.5mS, this all will be repeated 3 times.

Response

The signal generator will response after generating the pulse with a json string with the measured current and volt values. For the above sample and a load resistor of 1.1KΩ to the Digitimer this will be the response:

{"Ver":"1.3","Serial":"S00758","samples":3,"current":[3.32,3.3,3.24],"voltage":[3,3,3]}

The response will contains 2 json arrays. The array "current" will hold the measured current in mA and the array "voltage" will have the measured voltage in volt. In the variable "samples" the number of samples and therefore the length of the array's will be stored.

Due memory limitation it's not possible to store more than 100 samples in the signal generator. Above the this value the signal generator will response only with the maximum and minimum value of the measured current and voltage. For example:

{"Ver":"1.3","Serial":"S00758","samples":1003,"MaxCurrent":3.64,"MinCurrent":2.97,"MaxVolt":74,"MinVolt":68}

"Ver" will contains the version number of the firmware and "Serial" is the serial number of the signal generator.

Error response

The signal generator will give an error response if one of the values doesn't meet the requirements or if there occurs another error.

{"Error#":2,"Error":Pulsduration must be at least 100 uS}

The error response contains the variable "error#" with the error number for easy handling by the host application. The variable "error" will show the readable error message.

Limitations

These are the know limitations with firmware version 1.1

- The signal generator has an output of 3.3V max. This will make with the above Digitimer settings the maximum current of 16.5mA.
  (25mA/5V) * 3.3V = 16.5mA
- Pulse duration must be 100 µS minimum
- Maximum cycle repeat is 20000 pulses
- Toff should be minimal 100 µS
- Accuracy for pulse width is around 1%