

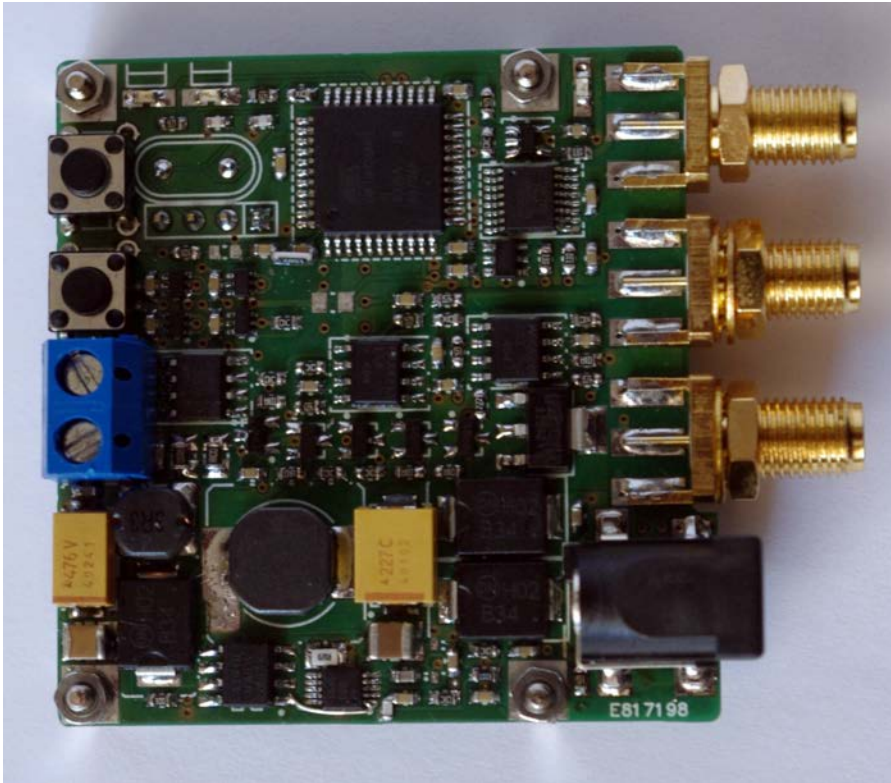
## UPS Driver Manual

### Features

- Easy to use
- Low cost
- Simple control using dedicated software or a virtual port
- Adjustable voltage driving the IR source
- CW or pulsed operation
- Current and voltage monitor
- powered from USB (<0.5A) or DC JACK connector
- Compact size
- Custom configuration upon request
- Additional accessories available

### Applications

- Process monitoring in manufacturing
- Chemical threat detection
- Silicone detection
- Real-time gas, liquid, and surface analysis
- Industrial / outdoor lightning
- Automotive
- OEM applications



### Description

The IR driver is a flexible, low cost, configurable generator, power supply and the output stage providing the signal to drive the IR sources. The IR driver can produce either the pulsed voltage as well as the CW signal, which makes it suitable for driving: thermal sources, LEDs and QCLs. The control over the parameters is provided by the PC software. The parameters are stored in the EEPROM memory, therefore the configuration may be restored immediately after power is on, with no need to use the PC. The device is equipped with the voltage and current monitor, trigger output. Safety button provides the immediate signal turn off.

## General information

### Connectors:

- trigger output
  - SMA connector
  - output impedance 50  $\Omega$
  - standard LVTTTL: logic 0 - 0 V, logic 1 – 3,3 V @ Hi-imp, 1.65 V @ 50  $\Omega$
- output current monitor
  - SMA connector
  - DC offset ~ 100 mV @ 50  $\Omega$
  - current sensitivity 0.1 V/A @ 50  $\Omega$  / can be modified
  - 100 MHz BW
- output voltage monitor
  - SMA connector
  - DC offset ~ 100 mV @ 50  $\Omega$
  - voltage sensitivity 50mV/V @ 50  $\Omega$  / can be modified
  - 100 MHz bandwidth
- micro-USB connector
  - communication with PC, virtual COM port
  - power supply, if current consumption of the driver does not exceed 0.5 A (USB 2.0 standard)
- DC Jack 2.5/5.5
  - power supply, if driver requires more than 0.5A (USB 2.0 standard), or the PC is not used (configuration is restored from the memory)
- PCB dimensions 60x50x15mm (width×height×depth), including connectors

### Electrical parameters:

- Power supply:
  - USB (see above)
  - +5 ... +6 V, for the power supply connected to the DC Jack connector
- Average power sources
  - max. 1.5W, for the power supply from USB
  - max. 10W, for the power supply connected to the DC Jack connector
- Adjustable power supply for IR source, in the range 0.5 – 25V, 4095 steps
- Maximum current: 10 A (tested with QCL at 20 V and 100 ns of pulse width)
- Monitor for the supply voltage source (ADC)
- Master clock period / frequency:

main clock period / frequency	output signal maximum period / minimum frequency
◦ 25 ns / 20 MHz	1.638 ms / 610 Hz
◦ 50 ns / 10 MHz	3.27 ms / 305 Hz
◦ 100 ns / 50 MHz	6.55 ms / 152 Hz
◦ 200 ns / 2.5 MHz	13.1 ms / 76.3 Hz
◦ 1600 ns / 0,31 MHz	104 ms / 9.54 Hz
◦ 6.4 $\mu$ s / 78 kHz	420 ms / 2.38 Hz

- 25.6  $\mu$ s / 19 kHz                                  1.677 s / 0.594 Hz
  
- Pulse repetition period
  - adjustable in the range 1 ... 65535 times the period of the master clock
- IR pulse duration
  - adjustable in the range 1 ... 65535 times the period of the master clock
  - if pulse duration is higher than the period, source is permanently on – CW operation
- IR driving signal rise / fall times < 3 ns.
- Jitter of the IR pulse : 6 ns pp (refer to the Fig.1)
- Trigger output
  - starts 50 ns before the IR pulse
  - adjustable duration time in the range 1 ... 65535 times the period of the master clock
- Power supply monitor
- IR source average current monitor
  - time constant 100 ms
- All parameters have their equivalent – minimum/maksimum to provide the safe operation
- Anode of the LED is connected to ground, cathode below ground potential

**IR driver waveforms**

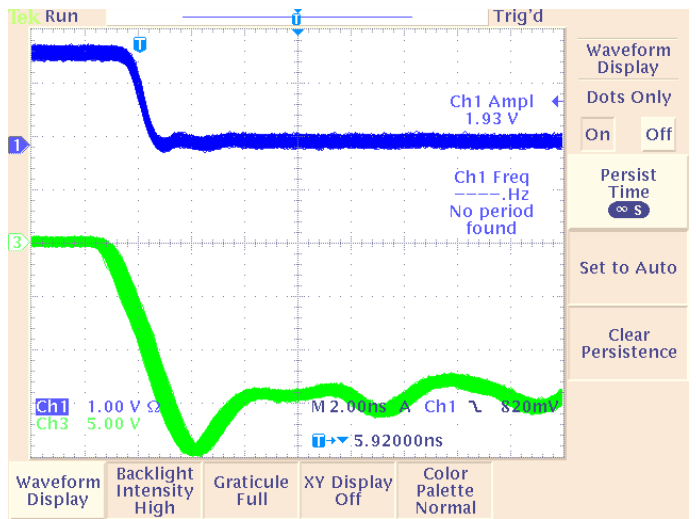
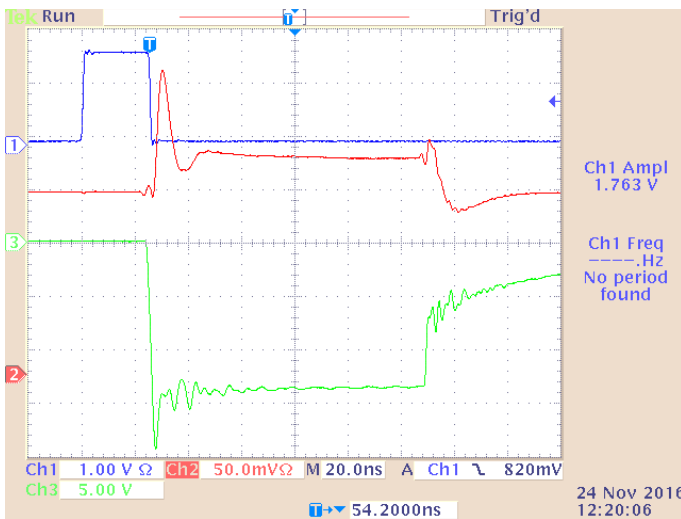


Fig. 1. Waveforms

- 1 – trigger output signal
- 2 – laser current
- 3 – laser driving voltage

Fig. 2.

- 1 – trigger output signal
- 3 – laser driving voltage – leading edge

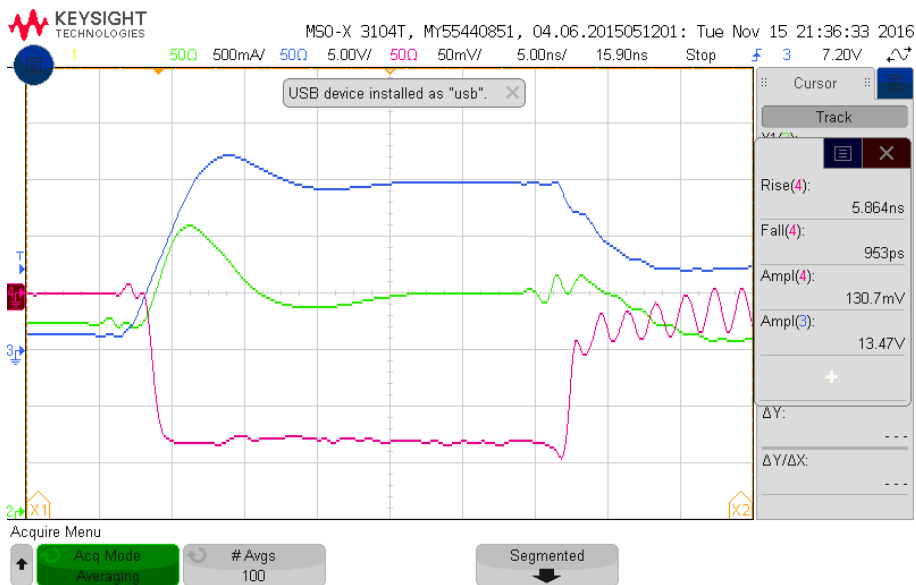


Fig. 3.

- 2 – laser driving voltage
- 3 – trigger output signal
- 4 – laser current

## IR driver Software

IR driver can be configured using a PC software. IR driver utilizes simple text protocol for communication. The control word consists of:

- text command (1...4 letters)
- arguments:
  - decimal number (or numbers, separated by commas)
  - text string
- <enter> character

```

command:  TXT:LED,1kHz,10V,100ns<enter> //give a name to a set of parameters
response: TXT:LED,1kHz,10V,100ns<enter>

command:  W:100<enter> //set pulse width
response: W:100,50,1,65535<enter> //IR driver sends all data
related to the parameter:
user_set / default / user_min / user_max

command:  W<enter> //show pulse width related parameters, no
change of parameters
response: W:100,50,1,65535<enter>

```

Table 1. Example of command by configuring the IR driver.

The IR driver can be also be configured by using VIGO software „UPS-driver”. Fig. 3 shows a screenshot of VIGO software.

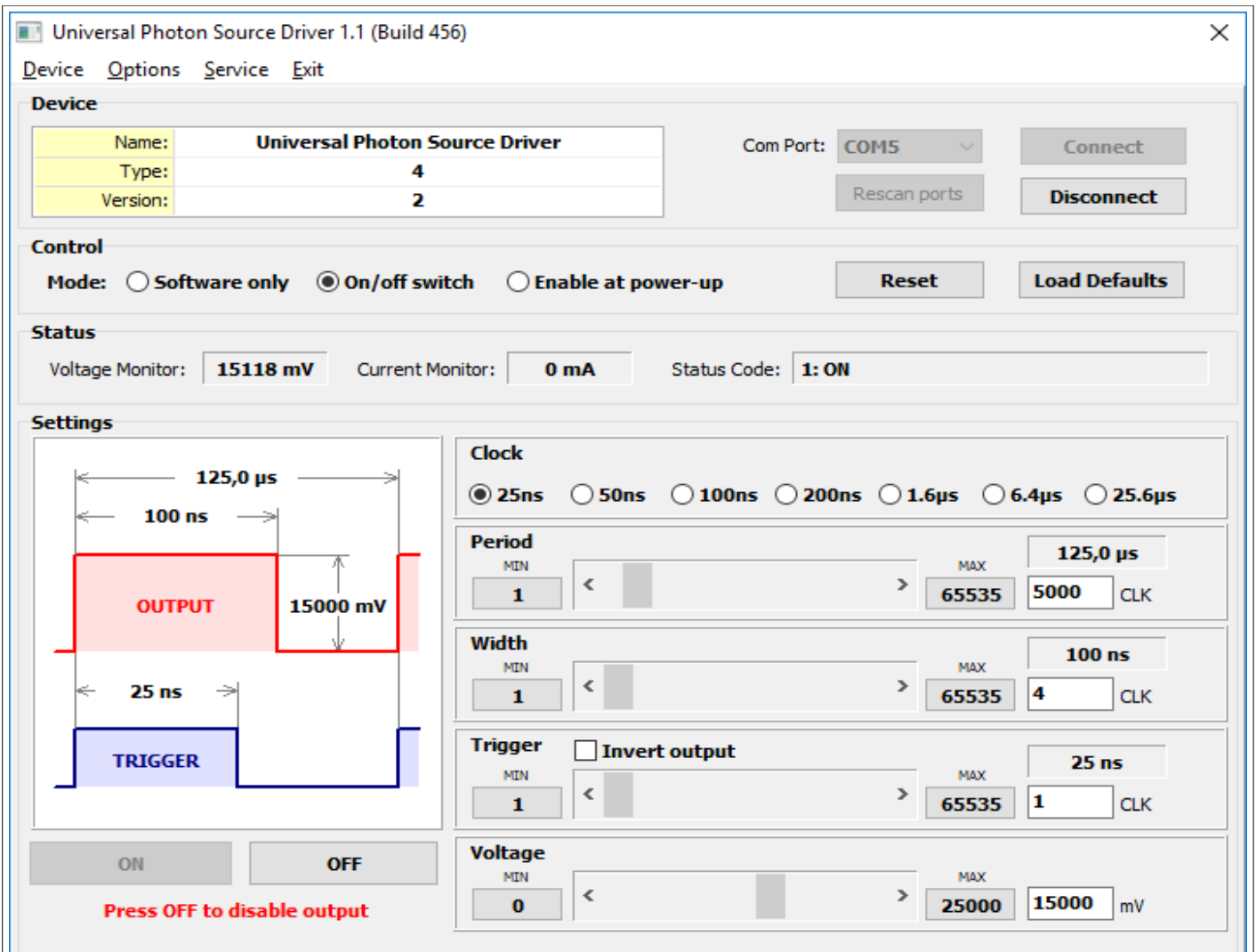


Fig. 3. VIGO software „UPS-driver”

**Additional photos**

