

UPS Driver 2.0

Second Generation Universal Photon Source Driver & Step (Clock Pulse) Signal Generator



1. Description

The **Universal Photon Source Driver** is a programmable electrical step/pulse signal generator designed to power and control various sources of optical photons, including especially thermal emitters, LEDs, and even quantum cascade lasers (QCLs). It provides precise control over pulse voltage, pulse repetition rate and pulse duration, delay relative to external triggers, and synchronization settings. The driver features both internal and external triggering, allowing flexible operation in various configurations. The output voltage is adjustable from 0V to 25V with a step resolution of 1mV, and the output current is limited to 3A. The maximum CW power is capped at 10W. The device also includes synchronization output with adjustable delay and pulse width.

The driver is programmed via a user-friendly Windows PC application, utilizing the SCPI (Standard Commands for Programmable Instruments) protocol over a USB interface. Once programmed the program can be written to/stored on the device itself after which it will retain the program in non-volatile memory until overwritten. It can be down powered and restarted, and the program will restart when the power is restored. Note that one possible program command is “Wait for on-device button to be pushed by operator before resuming output after down power” for added control. The SCPI command set is fully documented and accessible, enabling users to create custom applications to control the device as needed. In addition to its advanced functionality, the device is compact, with a small form factor, and operates with low noise and minimal interference, ensuring high performance in demanding environments. Power can be supplied via USB for reduced power output or through an external power supply for full performance, making the new Universal Photon Source Driver ideal for a wide range of scientific, industrial, and OEM applications.

2. Features

- **Pulse repetition rate 5 MHz to 0.033 Hz**
- **Pulse period 200 nanoseconds to 30 seconds**
- **Pulse width 20 ns to 30 seconds in steps of 8 ns**
- **Internal or external trigger**
- **Pulse width alternatively adjustable as % duty cycle 0 to 100% (CW)**
- **Protection against over current, output voltage drop and power supply overload**
- **Max output ≤ 10 W in any combination of current \times voltage \times duty cycle ≤ 10 W (valid $>$ Hz)**
- **Easy to use: pluggable/unpluggable socket make device connection easy and quick.**
- **Controlled over USB Virtual Com Port - no drivers required**
 - UART (serial port) control to be available later
- **Powered from USB tether for limited power (< 2 W) capabilities or from external power supply for full power (≤ 10 W) performance**
- **signal output is grounded: photon source anode connected to the ground. Observe connected device polarity!**

CAUTION - FOR LEDs and Lasers, OBSERVE POLARITY (see case for polarity marking). To avoid overcurrent damage to delicate semiconductors, operate with load resistor in series.

- variable signal output and synchronization output delay
- the output signal delay and synchronization pulse delay can be independently adjusted, with a range from 100 ns to 30 s
- **Output voltage adjustable from 0 to 25 V in 1 mV steps**
- output signal rise / fall time: approx. 10 ns.
- various trigger options:
 - internal
 - external (SMA connector):
 - edge triggering, level triggering
 - single pulse, repeated pulse
 - optional, PC controlled 50 Ω termination
- synchronization output
 - 3.3 V logic levels
 - 50 Ω output impedance
- current monitor output for sensing the signal source current
 - sensitivity: 1 V/A @ 1 M Ω
 - rise/fall time: 500 ns
- power supply input (use either alone or both simultaneously)
 - USB
 - output power depends on the capabilities of the USB port, usually limited to ~2 W
 - external power supply
 - DC 2.5/5.5 socket, 5V / 3A
- continuous output power of 10 W
- maximum output current 3A
- control protocol: SCPI (Standard Commands for Programmable Instruments)
- Windows application for UPS Driver control and monitoring
 - user friendly and responsive
 - Easy creation and retrieval of scripts specifying all operating parameters.
 - features a Graphic User Interface (GUI) to help the user configure operating and triggering parameters
 - displays the output voltage, the average output current and the input supply voltage

- indicates status of operation of the device
- once programmed properly, computer can be disconnected and last script loaded run from device itself
- user button on device for immediate STOP and optional START of the output signal
- dimensions:
 - 65 x 50 x 18 mm (W x D x H); PCB version only
 - 65 x 72 x 20 mm (W x D x H); packaged version, entire device, connectors included
- Device connector: Degson 2EDGK-5.08-02P-14-1000L(H) 2 Position Terminal Block Plug, Female Sockets 0.200" (5.08mm) Free Hanging (In-Line) or equivalent

4. PC application