

## PureFize<sup>®</sup> Ocean 2 New Driver Platform

The PureFize<sup>®</sup> Ocean 2 Driver Platform from LightLab Sweden is a modular product platform, allowing for multiple different driver product versions to be implemented in terms of input voltage, output power levels and number of output channels. This driver platform is developed and intended for use with the PureFize UVC chip light sources. The modularity of the PureFize Ocean 2 Driver Platform allows you to optimize the UV disinfection solution according to your specific needs.



### General description

PureFize Ocean 2 Driver Platform is a small size, cost optimized platform specifically developed and intended to drive UVC chip light sources based on PureFize UV disinfection technology.

Since the UVC chips will deliver a UV output power directly proportional to the electrical input power, the driver platform is designed to deliver and maintain a constant power (i.e. not constant voltage or constant current) to ensure a precise UV dose control. This is done independently for each channel to allow for minor differences between chips.

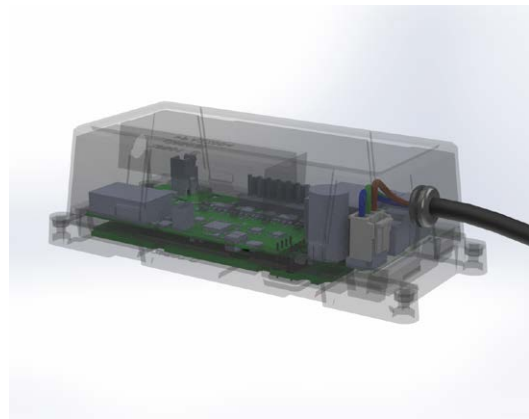


Figure 1. PureFize<sup>®</sup> Ocean 2 Driver Platform



## Functional description

The overall functionality is:

- Input power: 12-24 V DC or 120/240 V AC
- Total output power range: 1–8 W
- Output power per channel: 500–750 mW
- Number of output channels: 2–10 channels

- Delivers constant power, independently for each UVC chip. The power outputs are kept constant within  $\pm 10\%$  independent of time, operating point and specific UVC chip. The power output channels use a common positive HV connection and a separate negative connection for each UVC chip.
- Designed and optimized for a minimum 10,000 hours guaranteed operational lifetime, RoHS compliant and designed to comply with CE regulations, specifically with EMC & EMI regulations.
- Failsafe mechanisms are implemented.
- Designed to support up to 3 meter cable connection between the UVC chips and the driver. It is recommended to integrate a 750 kOhm series resistor for each channel on the UVC chip side, in order to minimize disturbance on the precise power control feedback loop.

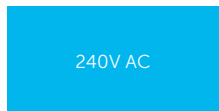
Input power

Output power

MODULE 1



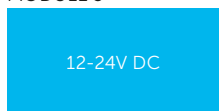
MODULE 2



MODULE 4



MODULE 3



## Specification

	Min	Nom	Max	Unit	Comments
<b>Power input – AC versions</b>					
Input voltage	90		265	VAC	50/60 Hz
<b>Power input – DC versions</b>					
Input voltage	10.8		26.4	VDC	
<b>High voltage outputs</b>					
Number of channels	2		10		One common HV connection
Total output power	1		8	W	
Output power variants	500		750	mW	
<b>DC output voltage</b>					
Min		5.0		kV	
Max		8.5		kV	
Typical power efficiency @ 8W output power	75			%	
Typical power efficiency @ 2W output power	55			%	
<b>Physical dimensions</b>	130 x 60 x 30			mm	(L x W x H)
<b>Temperature, ambient, storage</b>	-20		70	°C	
<b>Temperature, ambient, operational</b>	5		60	°C	
<b>Humidity (RH)</b>			85	%	Storage, operational



## Communications interface

The driver platform uses a galvanically isolated communication interface and control interface.

- Isolation uses 3.75 kV rated opto-couplers.
- The interface includes 2 signals for hardware control of the driver.
- The interface includes 1 UART suitable for software control of the driver.
- Hardware and software control can be independently enabled/disabled\* allowing maximum flexibility including support for standalone operating mode.
- Supports operating voltage range of 3.0–5.5 V.

\* *Hardware interface is enabled/disabled at manufacturing.*

### Hardware control interface

“UV Enable” signal is used to control on/off without necessarily breaking the power supply connection and can for example be used to ensure that UV light is not on when there is a risk of exposure to humans. When “UV Enable” is on the UV light is turned on unless disabled by the software control interface.

“Status” signal is of open collector type and is used to inform the host about status of the UV chips and/or the driver. The signal can be configured to either indicate the presence of an error or to indicate when the UV light is turned on. In error reporting mode the status signal is constantly pulled low as long as no error occurs, if an error is detected the signal is released and pulled high by an intergraded pull-up resistor. In UV light reporting mode the signal is pulled low when the UV chips are not lit and released and pulled high by an intergraded pull-up resistor as soon as the UV light is lit.

### Software control interface

The software control interface uses a UART with the following configuration:

- Baudrate: 9600
- Parity: No parity
- Data width: 8 bits
- Stop bits: 1 bit
- Flow control: No flow control

The host TX output must be able to sink up to 4 mA when using 5 V supply voltage. The protocol uses access configuration registers.

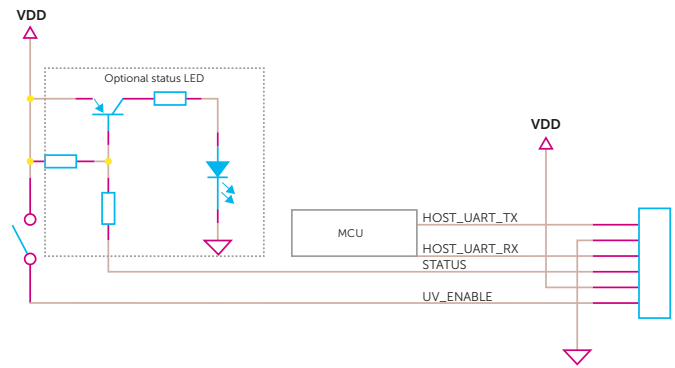


Figure 2: Typical circuit for simultaneous usage of both hardware and software control.

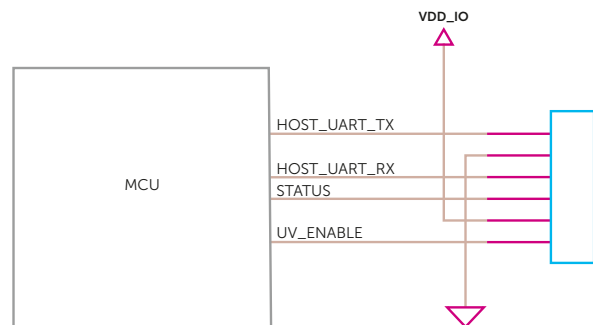


Figure 3: Typical circuit for control using microcontroller. STATUS and UV\_ENABLE can be omitted (not connected) if the hardware control interface is disabled.



## Software configurations

The default software configuration of the PureFize® Ocean 2 Driver Platform is set to automatically turn off the UV light after 12 hours. The automatic turn-off of the UV light is implemented to avoid unnecessary UV exposure. The total exposure time can also be controlled from the host by using UV Enable at the communication interface in the case when shorter or longer time for lighting is wanted.

The PureFize Ocean 2 Driver Platform has multiple configuration options accessible over the software control interface:

- Configuration of on/off/total cycle time
- Configuration start-up behaviour autostart/wait for software start command
- UVC system status including error codes
- Software controlled start/stop as replacement or complement to hardware "UV Enable" signal
- Select status signalling mode.
- Number of active output channels\*\*.

\*\* *The configured number of active channels must match the number of physically connected PureFize UVC chips.*

## Handling precautions

- To connect the PureFize Ocean 2 to PureFize UVC chips, proper high-voltage cables specified for 10 kV DC should be used. A minimum bending radius of 1 cm is recommended for the cables.
- The dielectric isolation at the connection has to be taken care of when connecting the high-voltage cables between the driver and the UVC chips.
- The appearance and specifications of the product may be modified for improvement without notice.

### Safety guidelines

The PureFize UVC chips are operated in a high voltage/ low current mode and the driver delivers an output voltage in the range of 5,000–8,500 V, and drive currents in the order of 100 uA for each channel.

Even if the power is low, below 1 W for each channel and the stored energy extremely low, do not touch the driver, the high-voltage cables or the PureFize UVC chips while the power is on.

The PureFize Ocean 2 Driver Platform is single isolated; if double isolation is required, we recommend using for example an isolation transformer.



# Partner up with us

LightLab Sweden is a Swedish cleantech company with a strong belief in sustainable technological innovation. Being Swedish, our heritage reminds us to take care of each other and to live close to and in harmony with nature.

We are also raised in a culture of high-quality standards, where functionality is prioritized and where science continuously inspires us to evolve. We innovate with sustainability in mind to improve quality of life for ourselves and our loved ones, here and now, and for future generations to come.

## LightLab Sweden

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