

## MATLAB “D850\_driver” v2

This document shows a brief description on how to correctly use the “D850\_driver” interface for MATLAB. This version (v2) is able to capture high resolution pictures from the camera and save them as TIFF files or passing them in memory. Furthermore, it can set up live view imaging through direct memory data stream. This driver only works for the Nikon D850 camera and for a 64-bit MATLAB.

### Required files

The following files should be placed in the workspace folder:

FILE	DESCRIPTION
D850_driver_v2.mexw64	MATLAB camera interface as MEX function
NkdPTP.dll	Nikon SDK USB transfer protocol library
Type0022.md3	Nikon SDK routine library for D850 camera
jpeg62.dll	libjpeg-turbo library
test01.m (Optional)	MATLAB example script

### Commands

This version (v2) has the following commands for user usage:

COMMAND	DESCRIPTION
open	Initializes the Nikon SDK module and connects with the camera
close	Closes and releases all the resources needed for the driver
live_on	Sets the camera in live view mode
live_off	Disable live view mode
live_get	Returns a low resolution (640x424) live image
capture_file	Captures high resolution TIFF images and save them in a custom path
capture_mem	Captures high resolution RGB images and save them as MATLAB variables
get_ISO, set_ISO	Get/Set the ISO sensitivity
get_shutter_speed, set_shutter_speed	Get/Set the shutter speed parameter

## Usage

For a first use of this driver call:

```
ok = D850_driver_v2('open');
```

In order to set/get custom camera parameters you can use the following commands:

```
ok = D850_driver_v2('set_ISO', '<isovalue>');  
[ok, isovalue] = D850_driver_v2('get_ISO');  
  
<isovalue> = {'LO-1', 'LO-0.7', 'LO-0.3', '64', '80', '100', '125', '160',  
'200', '250', '320', '400', '500', '640', '800', '1000', '1250', '1600', '2000',  
'2500', '3200', '4000', '5000', '6400', '8000', '10000', '12800', '16000',  
'20000', '25600', 'Hi-0.3', 'Hi-0.7', 'Hi-1.0', 'Hi-2.0'}
```

```
ok = D850_driver_v2('set_shutter_speed', '<ssvalue>');  
[ok, ssvalue] = D850_driver_v2('get_shutter_speed');  
  
<ssvalue> =  
{ '1', '1/1.3', '1/1.6', '1/2', '1/3', '1/4', '1/5', '1/6', '1/8', '1/10',  
'1/13', '1/15', '1/20', '1/25', '1/30', '1/40', '1/50', '1/60', '1/80',  
'1/100', '1/125', '1/160', '1/200', '1/250', '1/320', '1/400', '1/500',  
'1/640', '1/800', '1/1000', '1/1250', '1/1600', '1/2000', '1/2500', '1/3200',  
'1/4000', '1/5000', '1/6400', '1/8000' }
```

Start taking images from the camera by using:

```
[ok, im] = D850_driver_v2('capture_mem'); //Set two output variables!
```

If an image has been successfully captured and transferred, it is stored in the “im” variable as a RGB matrix. Otherwise, you can use the next command to save it as a file:

```
[ok] = D850_driver_v2('capture_file', 'C:\\folder\\image1');
```

Note that you have to use double dash and you do not have to specify the file extension.

For live imaging, set the camera into Live View mode by calling:

```
ok = D850_driver_v2('live_on');
```

And then use the following command to get and RGB matrix of a live image:

```
[ok, im] = D850_driver_v2('live_get');
```

When finishing, close the live view mode:

```
ok = D850_driver_v2('live_off');
```

Finally, use the “close” command to release driver resources:

```
ok = D850_driver_v2('close');
```

## Examples

See “test\_01.m” MATLAB script.