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# VEGA

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User Manual

February 1, 2022





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# 1 INTRODUCTION

Important information: Read the manual carefully before using the device.

Inappropriate utilization may cause damage to the device, to the DUT (device under test), and/or other components of your setup.

Keep these instructions in a safe place and pass them on to any future user.

## 1.1 Conformity

We, Image Engineering GmbH & Co. KG, hereby declare that the Vega corresponds to the essential requirements of the following EC directive:

- Electromagnetic Compatibility - 2014/30/EU
- Photobiological safety of lamps and lamp systems - IEC 62471:2009

## 1.2 Intended use

Vega is a high-intensity illuminator for transparent charts based on LED technology. It is capable of flicker generation with variable frequency and variable duty cycle. The device can be controlled with the Vega Software and the optional Vega C++ API.

- Only suitable for indoor use.
- Place your system in a dry, constant tempered environment without light interference.
- The optimal ambient temperature range is 22 to 26 degrees Celsius. The maximum ambient temperature range is 18 to 28 degrees Celsius.
- The system has an internal temperature management system. If there is an error regarding the internal temperature, the status LED will indicate an error, and the system automatically turns off to avoid any damage.

## 1.3 General safety information

**Do not** open the device without instructions from the Image Engineering support team and when connected to the power supply.

### 1.3.1 Photosensitive epilepsy



A small number of users with pre-existing conditions may experience seizures while using the flicker mode of Vega. Certain frequency and intensity combinations may trigger attacks with no prior medical history. Refrain from using the device and consult a doctor immediately if you experience sickness while using Vega.

### 1.3.2 Eye safety

The LEDs used in this product can be classified as belonging to the exempt group or risk group 1, according to IEC 62471:2009.

## 2 GETTING STARTED

### 2.1 Scope of delivery

The scope of delivery depends on the selected kit. The following kits are available.

Vega Starter Kit:

- 1 x Vega controller
- 1 x Vega illumination unit
- 1 x CAN cable (screw-in connector to plug-in connector)
- 1 x Low voltage power cable (screw-in connector to plug-in connector)
- 1 x Power supply cable (according to destination)
- 1 x 2 m USB cable (A to B)
- 2 x Spare fuses (6.3A)
- 1 x Flight case
- Control software
- User manual
- Acceptance protocol

Vega 3 Kit:

- 1 x Vega controller
- 3 x Vega illumination unit
- 1 x CAN cable (screw-in connector to plug-in connector)
- 2 x CAN cable (plug-in connector to plug-in connector)
- 3 x Low voltage power cable (screw-in connector to plug-in connector)
- 1 x Power supply cable (according to destination)
- 1 x 2 m USB cable (A to B)
- 2 x Spare fuses (6.3A)
- 1 x Flight case
- Control software
- User manual
- Acceptance protocol

#### Vega 7 Kit:

- 1 x Vega controller
- 7 x Vega illumination unit
- 1 x CAN cable (screw-in connector to plug-in connector)
- 6 x CAN cable (plug-in connector to plug-in connector)
- 7 x Low voltage power cable (screw-in connector to plug-in connector)
- 1 x Power supply cable (according to destination)
- 1 x 2 m USB cable (A to B)
- 2 x Spare fuses (6.3A)
- 2 x Flight case
- Control software
- User manual
- Acceptance protocol

#### Vega add-on:

- 1 x Vega illumination unit
- 1 x CAN cable (plug-in connector to plug-in connector)
- 1 x Low voltage power cable (screw-in connector to plug-in connector)
- User manual
- Acceptance protocol

#### Optional:

- Vega C++ API.

## 2.2 Commissioning

Keep all ventilation slits of the Vega illumination unit free of foreign objects. The minimum clearance is 10 cm.

### 3 OPERATING INSTRUCTIONS HARDWARE

#### 3.1 Overview

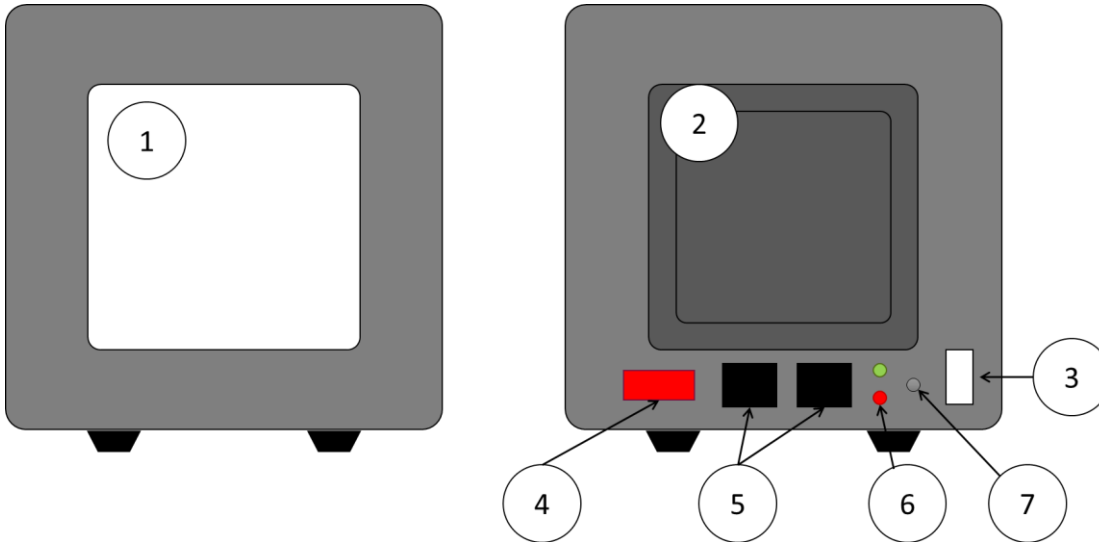


Figure 1: Hardware Overview

1. Output window (diffuser)
2. Fan guard
3. 12 V power input
4. CAN ID selector (DIP switch)
5. CAN IN/OUT (interchangeable)
6. Status LEDs
7. Test button

### 3.2 Connecting the Hardware

Before you connect the hardware, check if the CAN IDs are correctly set. The CAN ID can be set with the DIP switch on the back of the Vega modules. The DIP switches are set according to binary calculation, meaning that every DIP switch can feedback only the values 0 and 1. The calculation is comparably simple: Every DIP switch has the value  $2^n$ , where  $n$  is the number of the DIP switch. The first DIP switch is 0 (Switch 1 in Figure 2b - computers start counting from 0, not from 1), so in our case, when the first DIP switch is switched on, it has a CAN ID value of  $2^0 = 1$ .

It is a requirement that the CAN ID is unique. The last module in the CAN chain needs TR (switch 8) switched to “on.”

Example for seven modules:

CAN ID 1 = 10000000

CAN ID 2 = 01000000

CAN ID 3 = 11000000

...

CAN ID 7 = 11100001

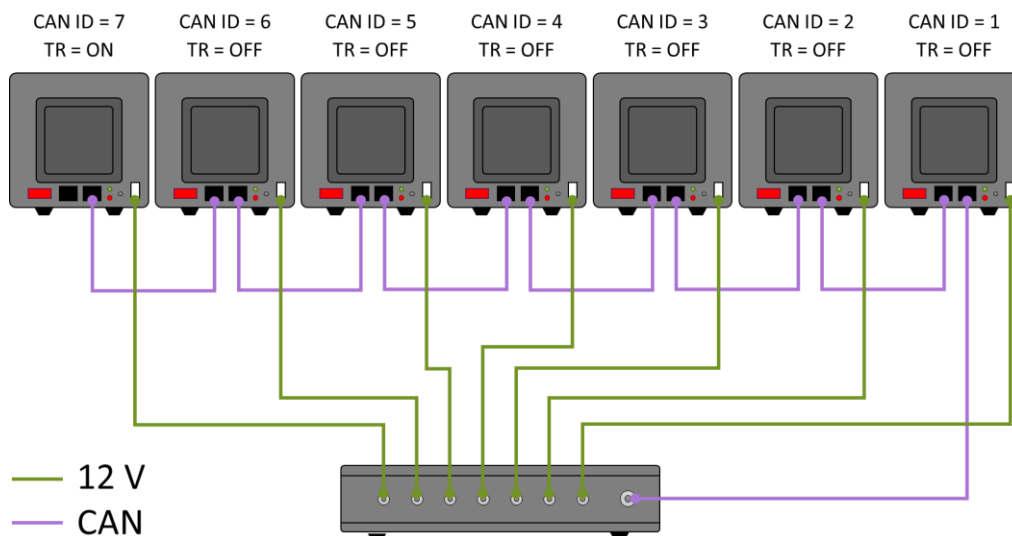


Figure 2a: Connecting the Vega hardware

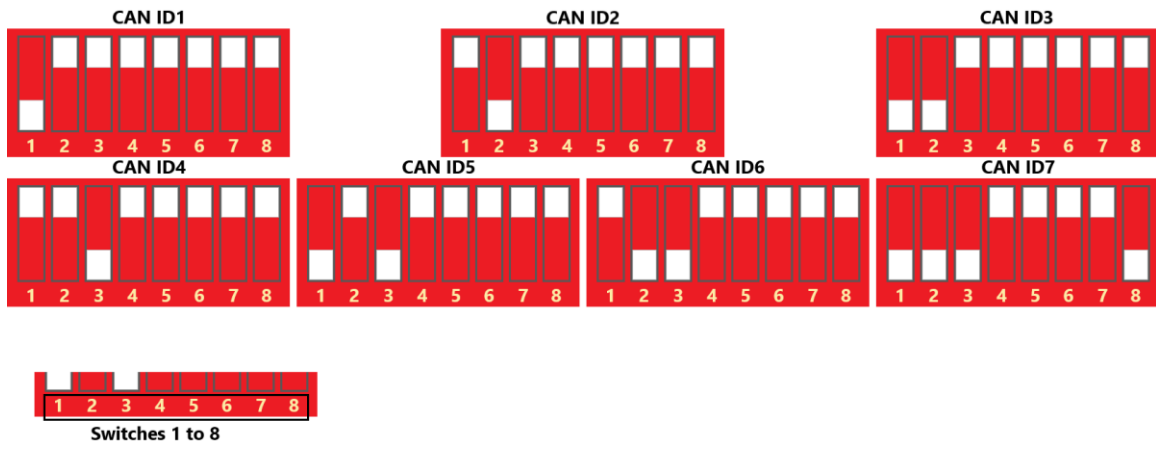


Figure 2b: Setting the DIP Switches



## 4 VEGA CONTROL SOFTWARE

The Vega control software is convenient for controlling multiple Vega modules from Image Engineering.

### 4.1 Installation

The Vega control software is available in 32bit and 64bit. Please make sure to install a suitable version. Start the installer 'setup\_vega\_winXX\_1.0.0.exe' and follow the instructions.

### 4.2 Connection

Turn on the Vega controller, connect it to the PC via USB and start the software. If no Vega device is found, the following panel is displayed.

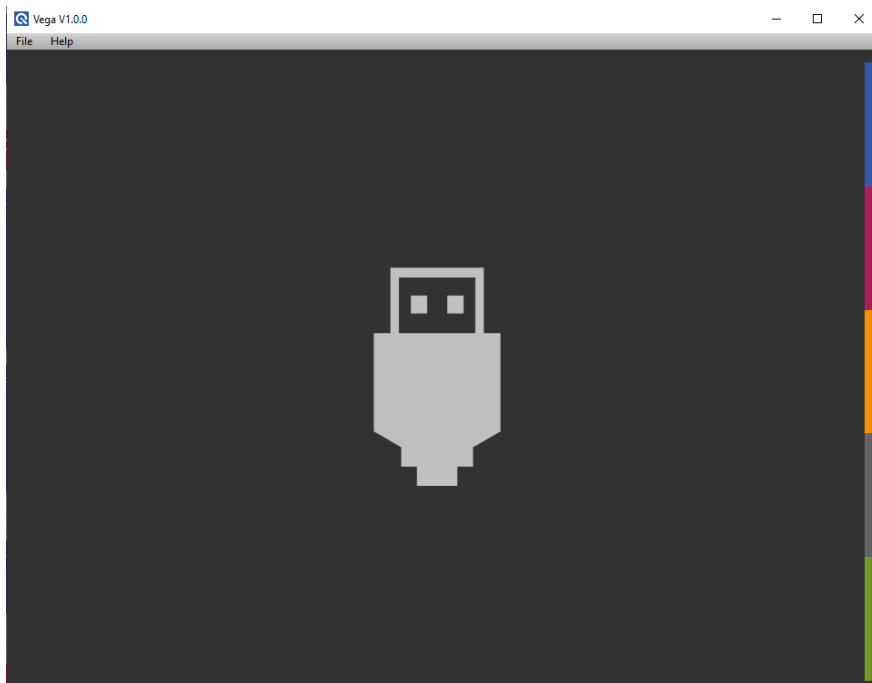


Figure 3: No Device Connected

If the software cannot detect the devices, you can try to add them manually. Choose the option "Find connected devices" from the "File" menu or press "Ctrl + F" to scan USB ports and update the display that shows the devices. If a device is found, it shows up in the devices list.

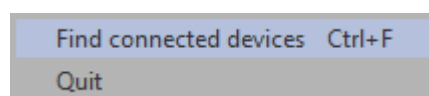


Figure 4: Find Connected Devices

## 4.3 Operation

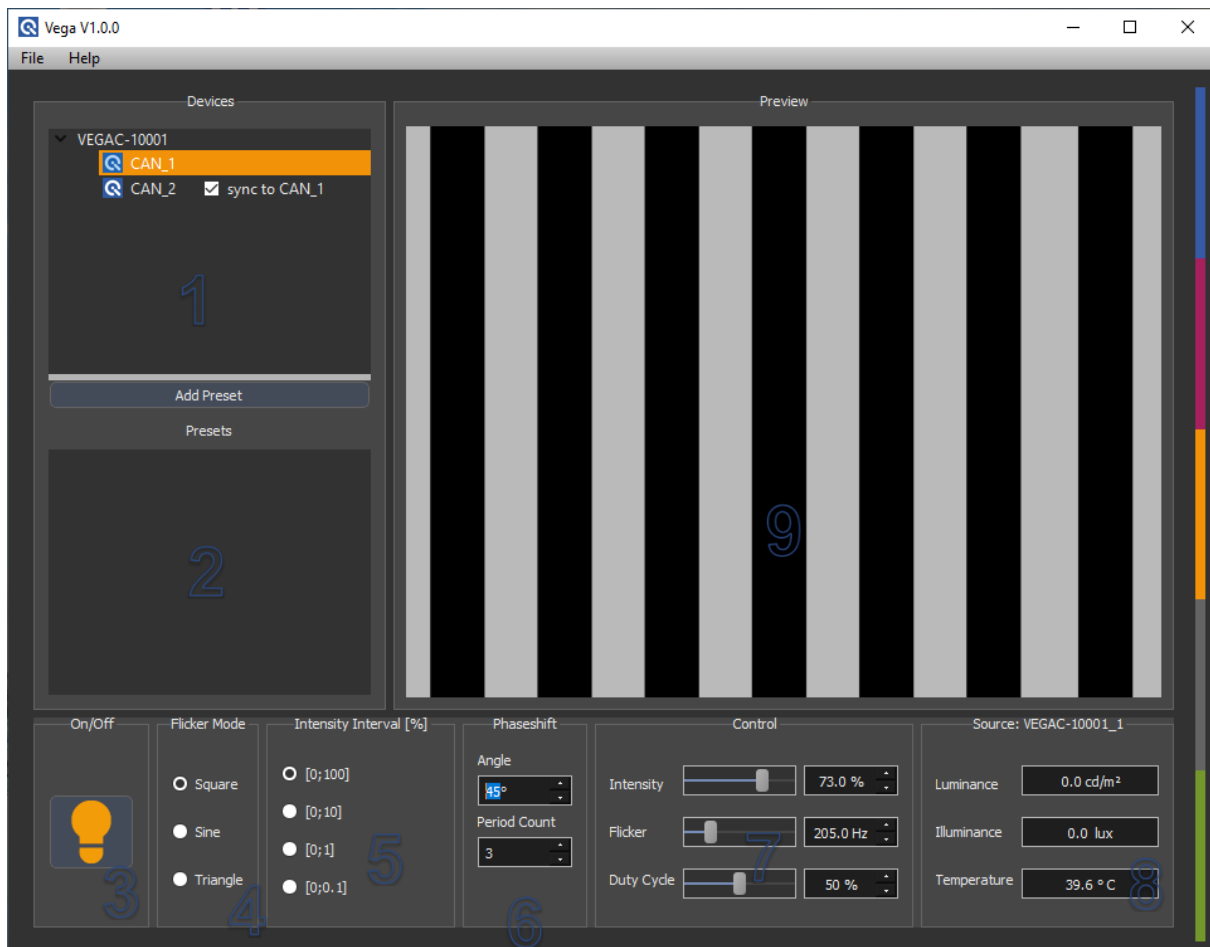


Figure 5: Vega

The Vega controller and the modules are displayed in the devices list ① with the corresponding serial numbers and CAN IDs. Select a device to make it manageable in the control panels at the bottom. The Vega modules can work in flicker or continuous mode. If you want to work in continuous mode, set the “Flicker” slider to 0.0Hz. If not, set them to your desired flicker frequency by adjusting the slider or entering the value directly. If you are working in flicker mode with multiple modules, you can synchronize them. In this case, the master module is CAN\_1. Synchronize the frequency of the modules to CAN ID 1 by checking the box next to the module. This synchronization also overwrites the previously set Flicker, Duty Cycle, Angle, Period Count, and Flicker Mode with the settings of the CAN\_1 module. All Vega modules are set to synchronize by default.

### 4.3.1 Module Controls

The following controls can be set individually for each module.

- **ON/Off state:** Each module can set the On/Off state, Flicker Mode, Intensity Interval, Phaseshift, Intensity, Flicker, and Duty Cycle. To switch a module on or off, select it and click on the light bulb ③.
- **Flicker Mode:** The Flicker Mode can be changed in the Flicker Mode Panel ④. You can choose between square, sine, and triangle waveshape.
- **Phaseshift:** To change the Phaseshift of the module, you can enter the Angle and Period Count ⑥. The Period Count is the number of periods the module goes through before it adds the Phaseshift with the angle defined. Note that the Phaseshift will be turned off if the intensity is changed.
- **Intensity Interval:** The Intensity Interval under ⑤ sets the range of the Intensity slider in a percent. The intensity is divided into decades to match the human perception better.
- **Flicker Controls:** Change the intensity, the flicker frequency, or the duty cycle value with the sliders or enter the desired values into the edit field ⑦. When an edit field is selected, you can use the “up” and “down” arrows on the keyboard to change the value. If “Flicker” is set to 0.0Hz, the module lights continuously, and the “Duty Cycle” slider is inactive.

If the selected module is calibrated and in continuous mode, the current luminance/illuminance values are shown in the source panel ⑧. It also shows the temperature of the modules.

The preview panel ⑨ provides a graphical representation of the current Intensity, Flicker, and Phaseshift settings. The width of the preview represents one second.

All connected Vega modules are stored for the current session and will be restored the next time the software is executed.

### 4.3.2 Presets

Add presets of all connected modules by clicking the “Add Preset” button. The added presets show up in the “Presets” list ②. Clicking on the presets will immediately switch to it. Rename or delete presets via the context menu. Alternatively, press “F2” to rename or press the “del” button to delete a preset.

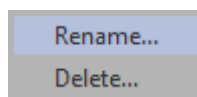


Figure 6: Presets Context Menu

Right-clicking into the free space of ② provides the following options:

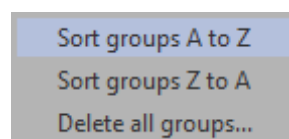


Figure 7: Presets Free Line Context Menu

### 4.3.3 Calibration

The Vega has a stabilized intensity output, but the system needs to calibrate the output feedback in  $\text{cd/m}^2$  or lux. The Vega provides two calibration modes.

- **Luminance calibration:** Luminance is a measurement of the emission or reflection from a flat surface in  $\text{cd/m}^2$ . For Vega, the chart surface is measured. The diffuser plate, however, is measured when doing a shading measurement. It, therefore, measures the emission in the direction of the device under test (e.g., a camera system). Choose a reference point on the chart for the calibration. When using an OECF chart, we recommend the field with the lowest density.
- **Illuminance calibration:** Illuminance is a measurement in lux of how much light illuminates a surface. In other words, it is a measure of the illumination in the direction of the light source and is not suitable for a measurement on the chart.

Be sure to perform the calibration in a fully darkened room. Any foreign light pollution will result in measurement errors, and an external measurement device is needed to calibrate the Vega. We recommend using a Class L Luminance meter/Illuminance meter.

Open the context menu of the module you want to calibrate to start the calibration process.

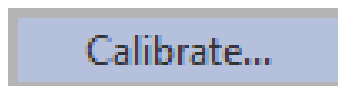


Figure 8: Module Context Menu

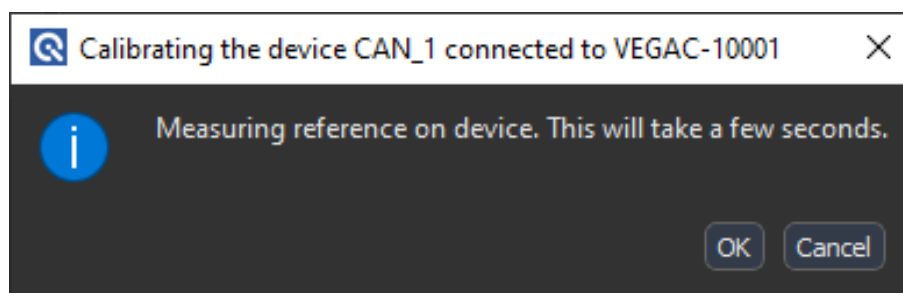


Figure 9: Calibration - Reference

The internal Sensors of the Vega perform a reference measurement. This measurement can take up to a minute.

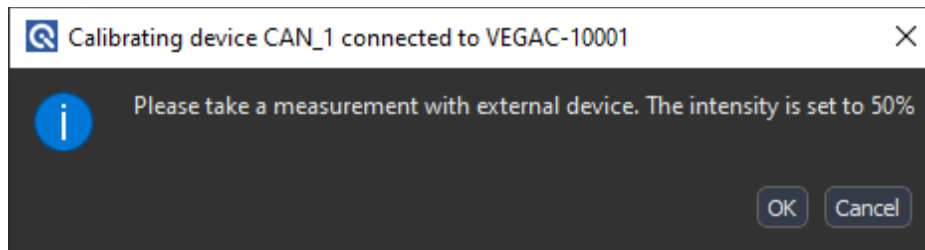


Figure 10: External Measurement Device needed

Take your reference measurement on a suitable region with your external measurement device and select OK. You can set the measured luminance or illuminance value in the following dialog.

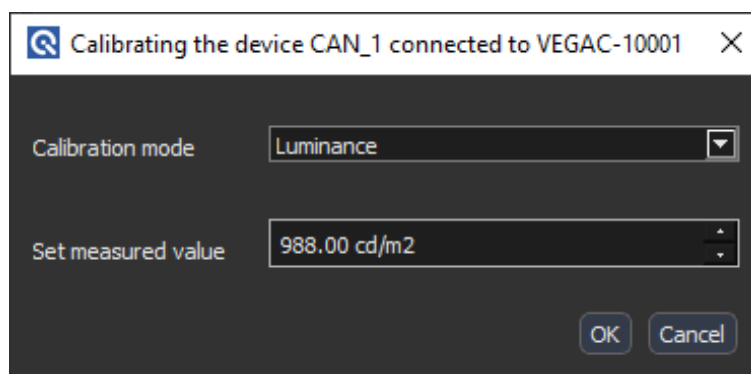


Figure 11: Set Measured Value

Cancel the calibration to retain the old calibration. Press OK to accept your calibration.

Note that luminance or illuminance only shows if “Flicker” is set to 0.0Hz continuous mode.

## 5 ADDITIONAL INFORMATION

### 5.1 Maintenance

- Do not touch, scratch, or pollute the diffuser.  
If there is any dust on the diffuser, clean it with compressed air or an air blower.

### 5.2 Storage and Transport

- Store and transport the Vega only in the delivered hard case.



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### 5.3 Disposal Instructions

The Vega must be disposed of properly after the service life is over. Vega includes electrical and electromechanical components. Observe your national regulations and ensure that third parties cannot use Vega after disposing of it.

Contact Image Engineering if assistance for disposal is required.

## 6 TECHNICAL DATASHEET

See the website of Image Engineering: <https://image-engineering.de/support/downloads>.