

# Product Document



## Quick Start Guide

QG000155

# NanoBerry

## NanEyeC Eval Kit

Ordering Code: Nanoberry\_mono\_EK

Nanoberry\_color\_EK

v3-01 • 2020-Dec-03

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# Content Guide

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# 1 Out of the Box

NanEyeC is a miniature image sensor with a resolution of 320 x 320 pixels designed for space-constrained vision applications. This quick start guide focuses on the NanoBerry Eval Kit, which runs the NanEyeC sensor via Single-Ended Interface Mode (SEIM).



**For further information on the NanEyeC, please refer to the following document:**

- NanEyeC datasheet – DS000503
- Tripod & adapter (use the supplied screws to mount the adapter on the PCB)

Figure 1 shows how the eval kit is delivered to its final user. The box comes with the following material:

- NanoBerry eval board (please remove the protection cap)
- NanEyeC soldered on the adapter board
- USB type A to type A cable
- Tripod & adapter (use the supplied screws to mount the adapter on the PCB)

**Figure 1:**  
**Eval Kit Content**

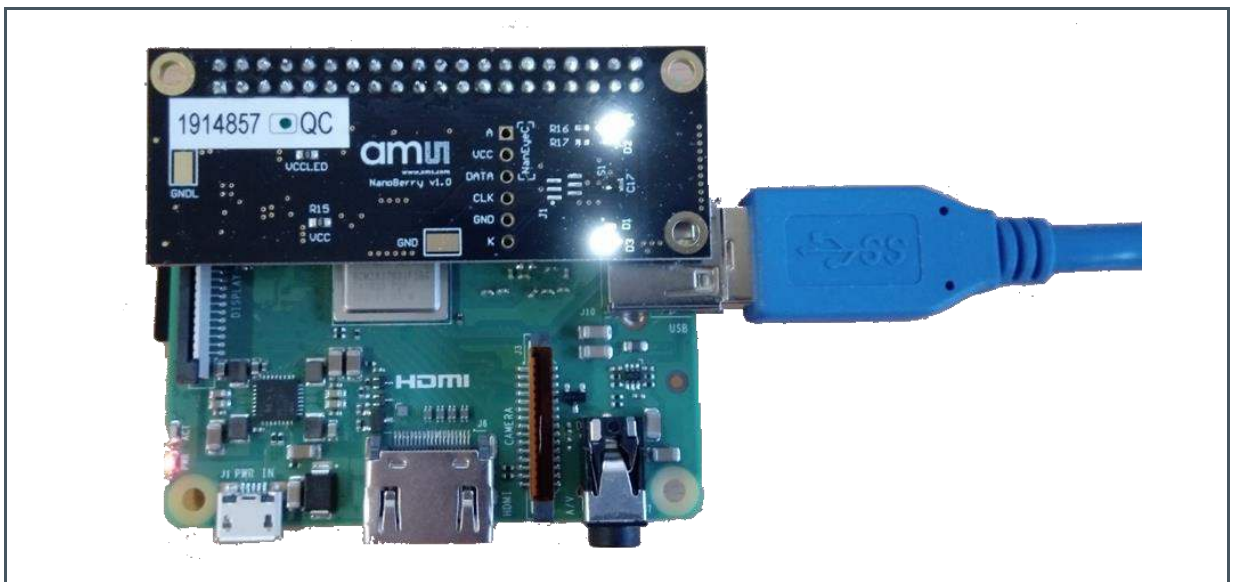


## 2 Running the Application

This section helps the user to operate the eval kit, configuring the sensor registers and processing algorithms. Plug in the USB cable into the USB type A plug on the side as well as on the computer.

The board starts booting automatically, and the green status LED on the Raspberry board keeps flashing during the boot process. Also, the LEDs on the adapter boards next to the camera module will remain on until the booting is finished.

**Figure 2:**  
NanoBerry Kit USB Connection



After the LEDs turn off, open up the file explorer on the computer and locate the newly mounted drives.

Further help and instructions are in the Release\_Notes file.md. (it can be opened in any text editor).

**Figure 3:**  
Drives Mounted on PC



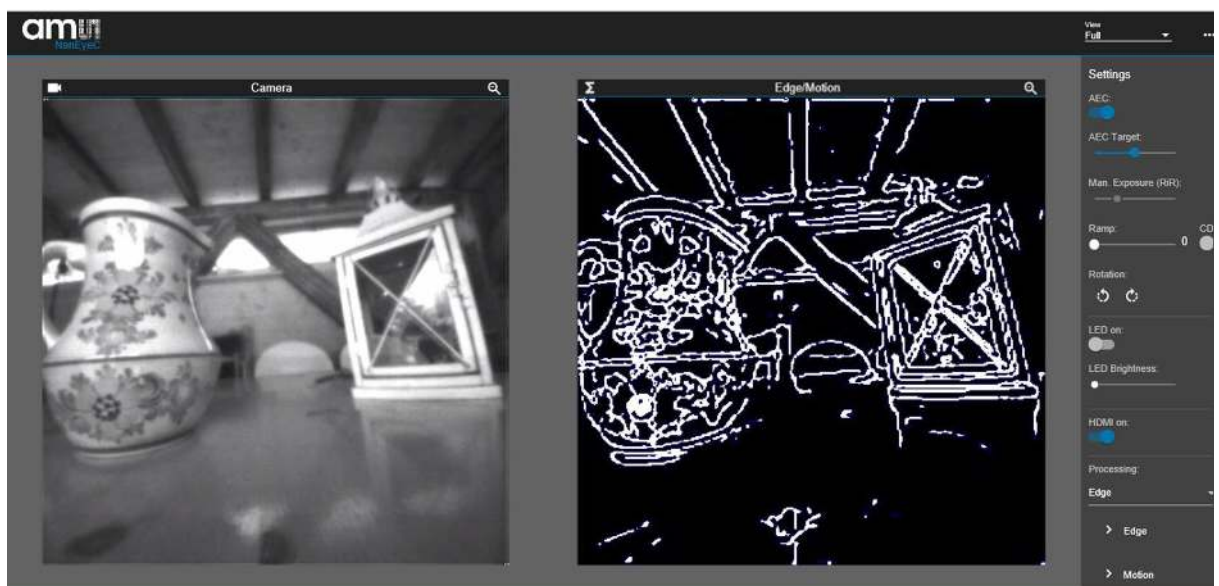
## 2.1 Installing the Driver (only for first connection)

Please open the NEYE APP\drivers directory and install the driver appropriate for your system.

## 2.2 Starting the GUI

For starting the GUI please double click on NEYE APP\NanoBerryApp.html. The GUI should startup in your default browser.

**Figure 4:**  
NanoBerry GUI



The magnification icon on the top right-hand corner can be used to magnify or shrink the image size.

## 2.3 GUI Operations

The right side of the GUI shows the control elements for adjusting the sensor and processing settings. The functionality is described below.

- **Automatic Exposure Control (AEC)**
  - This algorithm controls the sensor's exposure (Rows in Reset – RiR) automatically, according to the illumination conditions
  - Rows in Delay are set to the minimum
  - While AEC is on, exposure is not manually configurable
- **AEC Target**
  - Defines the desired digital value for which the algorithm will converge
    - Between 0 and 255 DN
- **AEC Region Selection:**
  - Limits the auto exposure adjustment to the selected region of interest. You can select a region by simply drawing a rectangle in the camera output window.
- **Man. Exposure (RiR)**
  - AEC needs to be disabled first to make this control active
  - This allows to manually configure the sensor Rows in Reset (rows\_in\_reset[7:0])
    - Slider minimum value defines the minimum Rows in Reset value, which provides higher exposure and vice-versa
- **Ramp**
  - Defines the ADC ramp gain value (ramp\_gain[1:0])
    - With higher values the image gets brighter
- **CDS**
  - Defines the CDS gain value (cds\_gain[0])
    - When enabled image gets brighter
- **SPI Speed / fps**
  - Changes the interface clock speed and so the frame rate
- **Temporal Mean**
  - Enables running average of the last frames to reduce the noise.
- **Color Reconstruction**
  - Enables the de-bayer algorithm for color sensors.
- **Pre-Color gain**
  - Enables manual adjustment of the color channel weighting for color adjustment
  - Use a white target in front of the camera for the "White Balance" to automatically derive the individual color channel correction factors.



- **Color Adjustment Matrix**
  - Sets the color cross talk correction to fine tune the color reproduction.
- **Gamma**
  - With the gamma correction, the luminance value of the image can be adjusted in a non linear way to better match the human perception of brightness. This can be used to e.g. enhance dark parts of the image.
- **Sharpness**
  - A post-processing algorithm to sharpen the images, setting it too high can generate quite harsh edges in the image.
- **Rotation**
  - Click on the “rotate right” or “rotate left” icon to rotate the image output.
- **LED Enable**
  - Enables the sensor LED
- **LED Brightness**
  - The slider adjusts the LED intensity
- **HDMI on**
  - Enables the HDMI output of the image to e.g. an external monitor
- **Processing**
  - Edge
    - Enables standard open CV algorithm for edge detection.  
[https://docs.opencv.org/2.4/modules/imgproc/doc/feature\\_detection.html?highlight=canny#canny](https://docs.opencv.org/2.4/modules/imgproc/doc/feature_detection.html?highlight=canny#canny)
  - Motion
    - Enables standard open CV algorithm for motion detection.  
[https://docs.opencv.org/2.4/modules/imgproc/doc/structural\\_analysis\\_and\\_shape\\_descriptors.html?highlight=findcontours#cv2.findContours](https://docs.opencv.org/2.4/modules/imgproc/doc/structural_analysis_and_shape_descriptors.html?highlight=findcontours#cv2.findContours)
- **Reset Sensor**
  - This is power cycling the sensor to re-establish an “in-sync” data transfer. When observing image artefacts, try this option to get the sensor back in sync. The chosen register settings are re-applied after the re-boot.
- **Update Firmware**
  - This menu point offers the possibility to perform incremental firmware updates. Please follow the instructions and select a suitable firmware update file (update\_nanoberry\_x.x.x.zip). This is only working for incremental upgrades not for major releases changes.
  - The latest firmware can be found on:  
<https://ams.sharefile.com/d-s595c6604fb1643d99aff6cebdfd14429>



- **Upload Custom Configuration**
  - Opens a file browser to select a custom configuration file and sends it to the sensor.
- **Save Custom Configuration**
  - Saves the current settings in the GUI to the Raspberry board. These are then also the new settings used when re-booting the system (disconnect – reconnect power).
- **Reset to Default Configuration**
  - Resets the settings in the GUI and deletes a saved custom configuration if existing.

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## 2.4 Direct Access to the Video Stream

Please refer to the NEYE APP\doc\MQTT\_Topics.md file for the definition of the MQTT interface as well as NEYE APP\examples for a Python implementation example.

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## 2.5 Other Documentation

Datasheet, SEIM application note as well as schematics and 3D view of the eval kit can be found in the NEYE APP\doc\ directory.

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