ams

Quick Start Guide

QG000113

NanEye

Fiber Optic Box 2.0

NanEye_Fiber_Optic_Box_2.0

v1-00 • 2017-Dec-01

Content Guide

1 Out of the Box

1.1 General

NanEye Fiber Optic Box 2.0 is a fully embedded all in one image processing unit that interfaces the NanEye® micro camera head signals and provides an output of 1080p/60 format HDMI video signal which can be directly plugged to a HDMI compatible monitor, which in this mode no additional PC or image processing is required.

The USB3 interface allows the connection to the NanEye Viewer running on a PC to get access to the sensor's raw images and control settings.

The demo kit includes a fiber light source, which provides light to the tip of the NanEye® Sensor probe via a 0.5 mm plastic optic fiber. The fiber and NanEye® camera are housed in a 2.3 mm diameter of 1 m cable length that can be plugged and unplugged easily from the processing and illumination unit. The illumination intensity is adjustable by a manual dial. The unit is supplied by 12 V DC. It can interface to any standard monitor with HDMI input. The main body of the demo kit measures only 17 cm x 17 cm x 5.6 cm and provides all necessary video processing and display driving plus the adjustable illumination.

Figure 1:
NanEye Fiber Optic Box 2.0 Demo Kit with NanEye Fiber Connected

Figure 2:
NanEye Fiber Optic Box 2.0 Benefits and Features

Benefits	Features
- Easy to use plug and play solution - Stand alone video output via HDMI (no PC required) - High quality image output - All in one eval kit with illumination - Raw image data access and sensor control via USB3 and NanEye viewer	- Supports up to 2 NanEye® 2D - Integrated adjustabel fiber light source - HDMI 1080p/60 video output - USB3 PC interface to NanEye viewer - Image processing, correction and enhancements

Figure 3:
NanEye Fiber Optic Box 2.0 Pinout Description

NanEye Fiber Optic Box 2.0 Description	
Front Side	**Rear Side**
LEMO Connector 2 x NanEye_2D 1 x High-power LED current source 1 x LEMO F1 connector for internal high power fiber optic light source **JST Connectors** 2 x NanEye_2D 1 x Current source up to 22.7 mA (Channel 1) **Rotary Switch** - Light mode and intensity control **Dual Color Status LED**	**HDMI Output** 1080P60 to display NanEye at LEMO - No additional PC needed **USB3.0** - Display NanEye channel 1&2 with NanEye Viewer software - Adjust light intensity of distal LED ring or fiber optic light source - Adjust image processing **Power Supply** 12 V DC, 1.5 A minimum

! **Attention**

The Fiber Demo Kit is intended solely for evaluation purposes, has no EMI approval and is not advisable for medical use. **ams** therefore is not liable for any damage or harm resulting from its use.
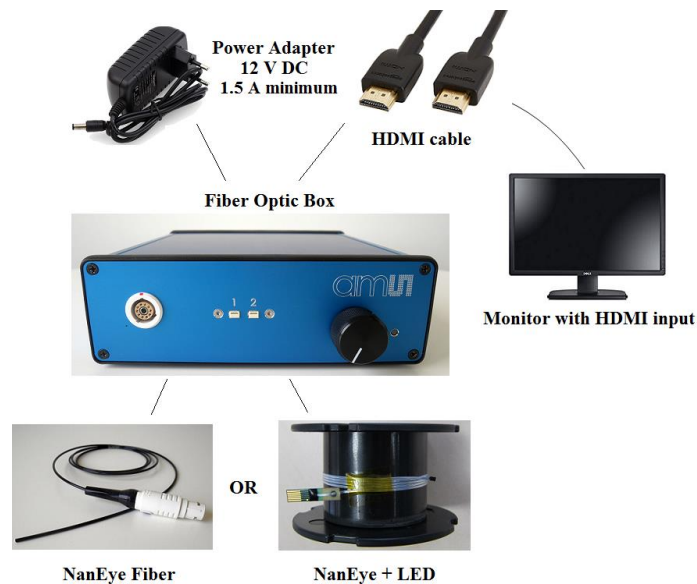
2 Plug and Play

2.1 Connect Hardware

2.1.1 Recommended Equipment

The following image shows the necessary equipment for a direct connection to a monitor.

Figure 4:
Fiber Optic Box Plug and Play Equipment Connection

2.1.2 Recommended Connection

- Firstly connect the NanEye, NanEye fiber or NanEye LED module to the box
- Then connect the box to the monitor using a HDMI cable
- Plug in the 12 V power adapter and wait for the Fiber Box to power up

> **⚠ Attention**
>
> Please be aware to not connect NanEye Fiber and the NanEye+LED simultaneously. When it comes to the sensor connections, they share the same hardware input, therefore if connected at the same time, may cause irreversible damage. This situation applies for Plug & Play mode as well as when using NanEye Viewer through USB3 connection.

2.2 Fiber Optic Box Operation

Dual Color Status LED

- Constant Green → Status ok, no sensor connected, test pattern output via HDMI
- Blinking Green → Sensor data transmission
- Yellow → (pulse > 1 second), at least one error during sensor data decoding detected

Rotary Switch

- Push Button
  - Select high-power fiber optic light source → White balance optimized for fiber light color temp
  - Select current source LED ring → White balance optimized for LED ring color temp
  - All off → Neutral color temp, no tuning of white balancing
- Rotate
  - Adjusts light intensity

2.3 Image Viewing

The following image shows the Fiber Optic Box layout on the Monitor. The coloured screensaver represents the mode when there is no NanEye module or fiber module connected, where the status LED is constant green.

Figure 5:
Fiber Optic Box Plug and Play Layout
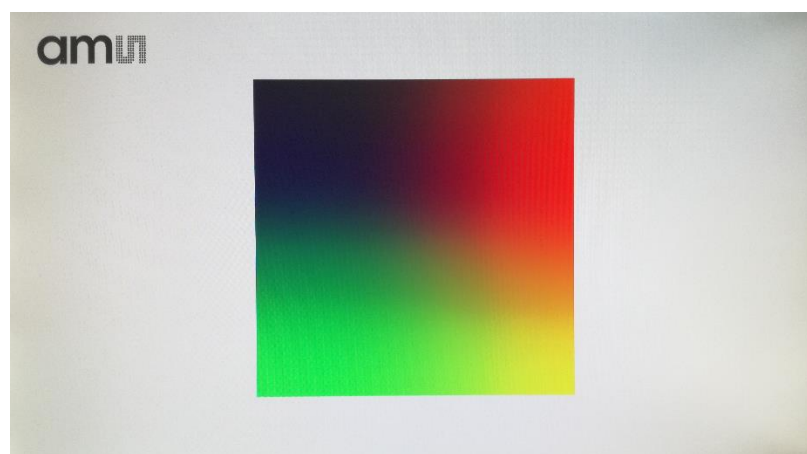
3   Operation with PC

3.1   Software Installation

This section describes how to install the NanEye Viewer software.

NanEye Viewer is compatible with Windows XP, 7, 8, 8.1 and 10. Please download the software from https://download.ams.com/CMOS-IMAGE-SENSORS.

The FGPA files can be found in **C:\ProgramData\ams\NanEye Viewer\Fpga Files** folder, after installing the viewer.

For the boards to be recognized in the Windows Operative System, a specific driver is required which is installed with the NanEye Viewer. The drivers are located in **Program Data/ams/NanEye Viewer/driver**.

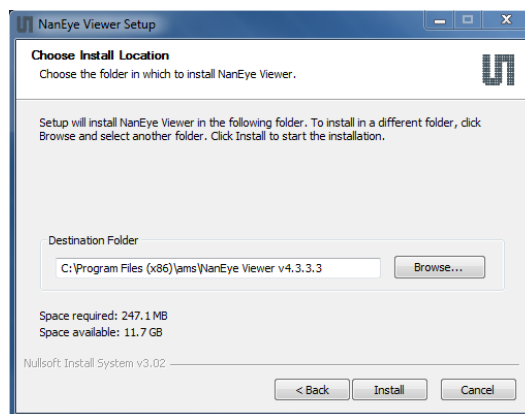For a correct installation, please perform the following steps:

1. Start the setup-NanEye Viewer_Vx.x.x.x.exe:
2. Choose the most suitable language between the following options:
    a. English/Japanese/Korean
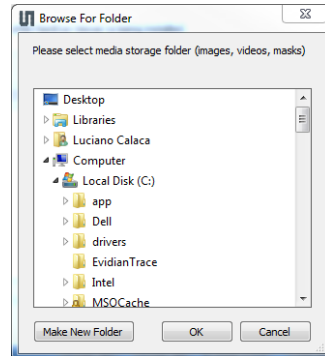
Figure 6:
NanEye Viewer Installer Language
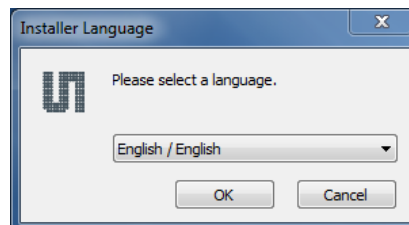
3. Select the installation folder.

Figure 7:
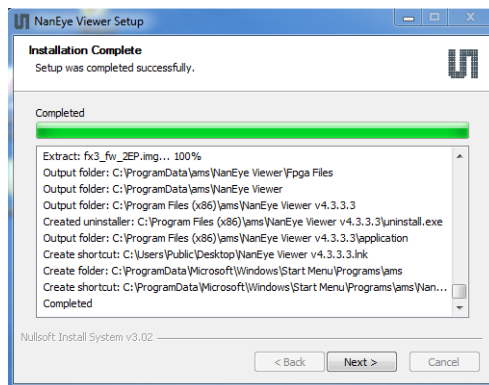**NanEye Viewer Installation Folder**

4. Select the media folder (where correction masks, screenshots and videos will be saved).
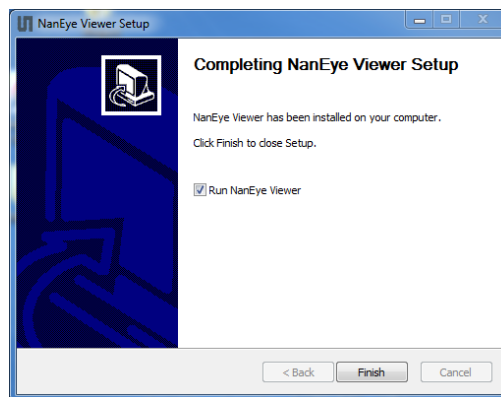
Figure 8:
NanEye Viewer Media Folder Selection

5. Installs the drivers for all the boards.

Figure 9:
NanEye Viewer Installing

6. Installation completed.

Figure 10:
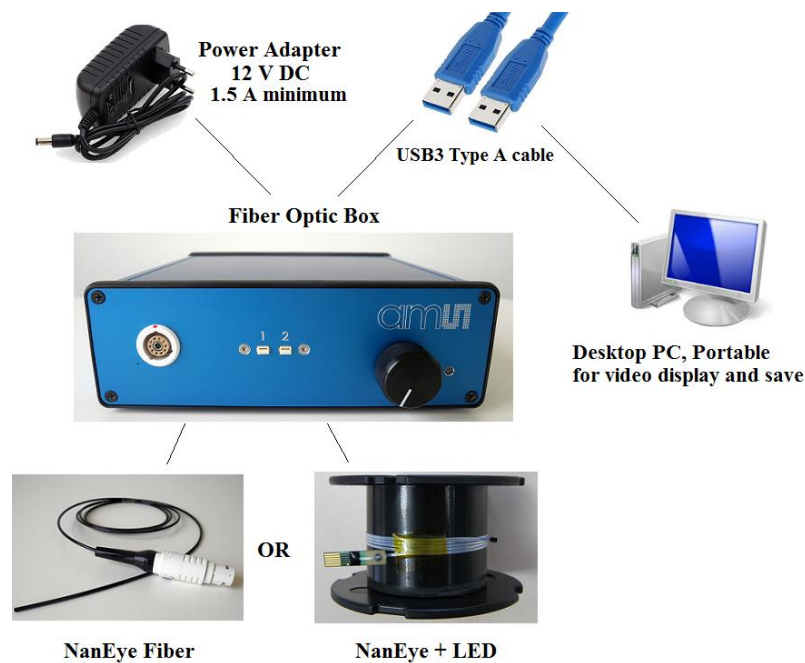**NanEye Viewer Completed Installation**

3.2 Computer Connection with NanEye Viewer

3.2.1 Recommended Equipment

The following image shows the necessary equipment for a direct connection to a PC.

Figure 11:
**Fiber Optic Box NanEye Viewer Equipment Connection**

3.2.2 Recommended Connection

Please take the following steps to perform the correct connection:

1. Please confirm that the NanEye Viewer software has been correctly installed, refer to section 3.1
2. Plug the USB3 type A cable to the Fiber Optic Box and the PC
3. Plug in the 12V power adapter and wait for the Fiber Box to power up
4. Wait for it to be automatically recognized. Please check on the **Device Manager** if your device is recognized as **Cypress FX3 USB StreamerExample Device** as shown in Figure 12

Figure 12:
Fiber Optic Box Device Connection
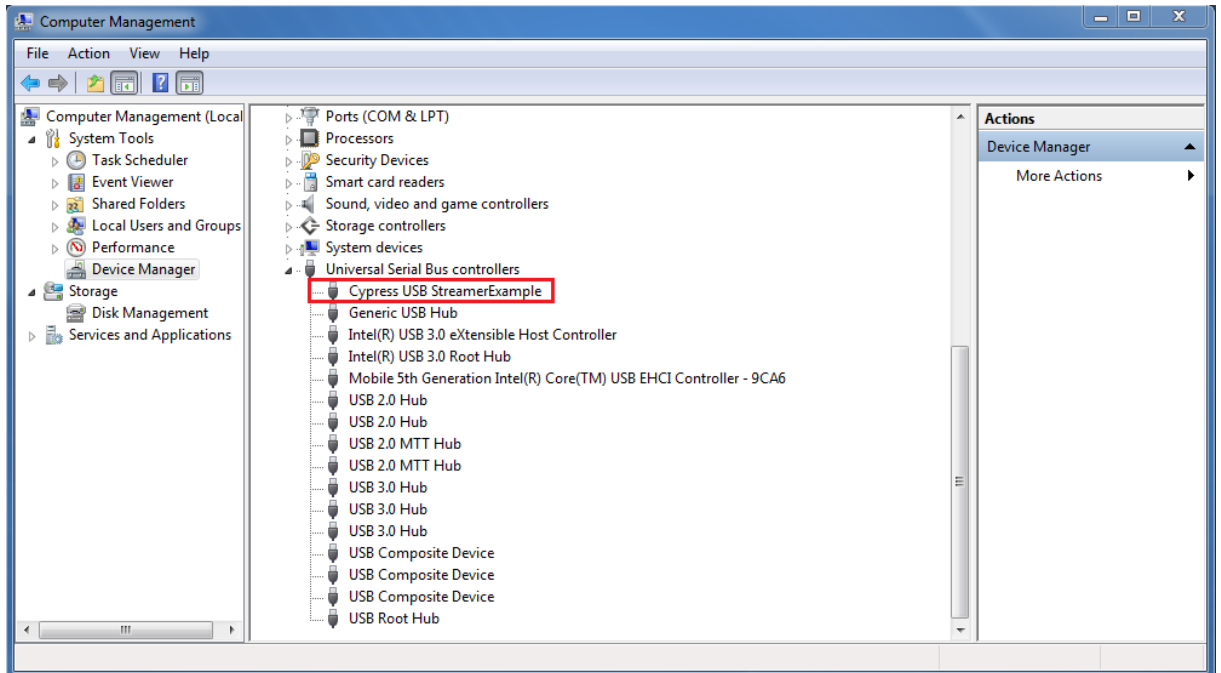
3.3 Installing FX3 Driver Manually

If the driver is not correctly installed after installing NanEye Viewer, please go to:

- **Program Files\ams\NanEye Viewer vX.X.X.X\driver\FX3_Driver**

Then, according to the operating system, run the respective Drive Package Installer (**dpinst_x86/x64**).

3.4 How to Debug USB3 Board

If the NanEye Viewer does not run, this section can help to debug the board.

When the viewer is installed, inside the folder **Program Files\ams\NanEye Viewer vX.X.X.X\application\debug\Usb3**, are included programs that can be used to debug occurring issues.

In order to reprogram the FPGA, start FPGA Configuration Utility (Template), following the instructions on that window and using the bit file (for instance, **fob_fpga.bin**) that can be found at **C:\ProgramData\ams\NanEye Viewer\Fpga Files\NanEye_USB3**.

When this task is completed, the information is displayed as in the image 13. This means that the FPGA is programming correctly.

Figure 13:
Fiber Optic Box FPGA Configuration
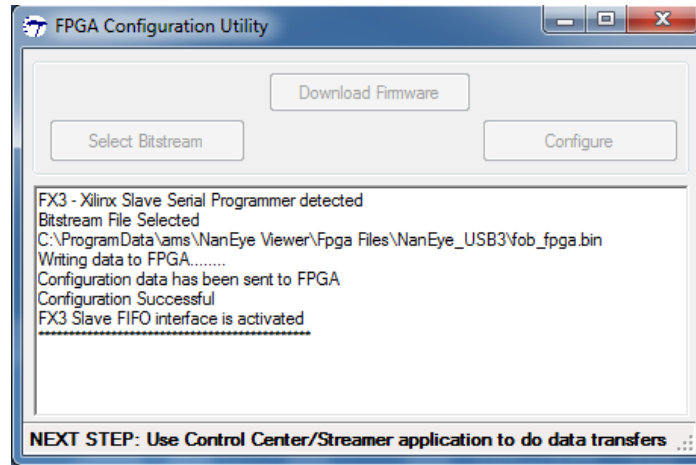
If the NanEye Viewer still does not open, please reinstall the software.

4 Start the Application

4.1 NanEye Viewer

4.1.1 General Description

NanEye Viewer is a software that allows the user to grab data from the sensors and evaluate the board.

The **Viewer Software** has the following features:

- Possibility to save directly to .avi streams of the processed image, or save the raw data in the awvideo format;
- Possibility to save snapshots in PNG and in PGM (saving the 10 bit raw data);
- Possibility to display the pixel graphic;
- Dynamic gain, offset and exposure switching;
- Possibility to acquire black and white gain masks;
- Possibility to apply the algorithm automatic exposure control;
- Possibility to adjust white balance automatically;

This software also contains some image processing algorithms:

- Colour Reconstruction;
- Adjust colour saturation;
- Gamma Correction (only for colour version);
- Adjust brightness.

4.1.2 Choosing the Sensor

If the board is correctly recognised, as shown in the previously section, then the NanEye Viewer can be started choosing the **Sensor**, **Board** and **Viewer,** following the suitable combination available on Figure 14. If the board is not recognised correctly please check section 3.
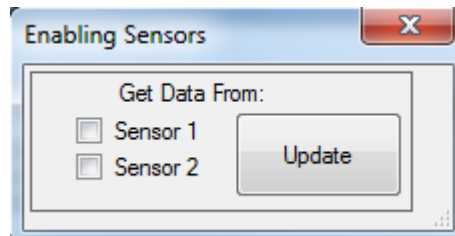
Figure 14:
NanEye Viewer Sensor Selection

Sensor	Board	Viewer	Connector
NanEye2D	FiberDemoUsb3	NanEye Viewer	Sensor 1, Sensor 2
		Stereo Viewer	

Figure 15:
NanEye Viewer Initial Interface
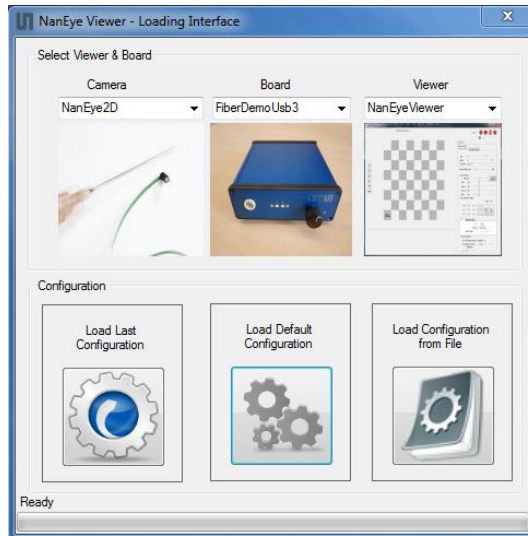
Depending if the user chooses NanEye Viewer or Stereo Viewer, is possible to choose one or both sensors, respectively.

Figure 16:
NanEye Viewer Sensor Option

4.1.3   Interface Description

After choosing **Load Default Configuration,** the Viewer interface is displayed as exemplified in Figure 17.

Figure 17:
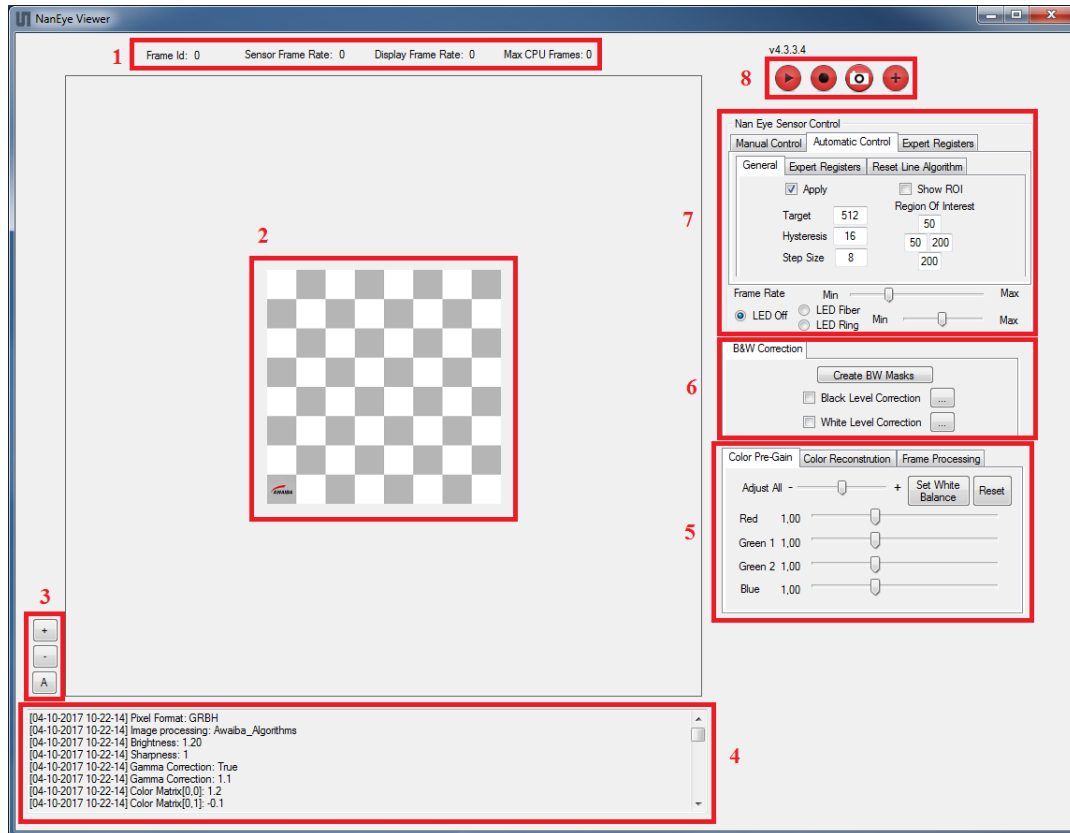**NanEye Viewer Layout**

Figure 18 shows the description of each NanEye Viewer interface sections (layout may change pending on software version).

Figure 18:
NanEye Viewer Interface Description

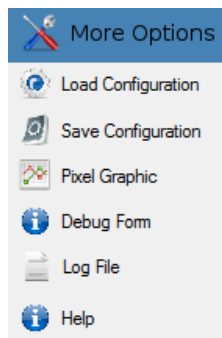| Legend:	
1. Frame Rate	**5.** Image Processing
2. Display Image	**6.** FPN Correction
3. Zoom	**7.** Sensor Registers
4. History	**8.** Fast Menu

Figure 19:
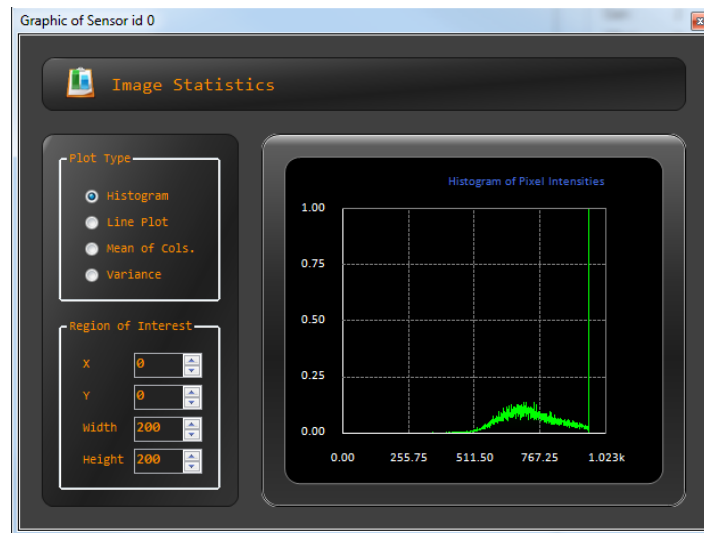**NanEye Viewer Fast Menu**

From left to right:

- Play/Stop Grabbing Images;
- Record Videos;
- Take Snapshots;
- Menu More Options (figure 20).

**Figure 20:**
NanEye Viewer More Options Menu

The pixel intensity can be analyzed through the histogram in figure 21, choosing Pixel Graphic from More Options menu.

Figure 21:
NanEye Viewer Histogram Pixel Graphic

When the user selects record a video, a message is displayed (figure 22) to choose Raw Images or Processed Images.

Figure 22:
NanEye Viewer Images Record Type
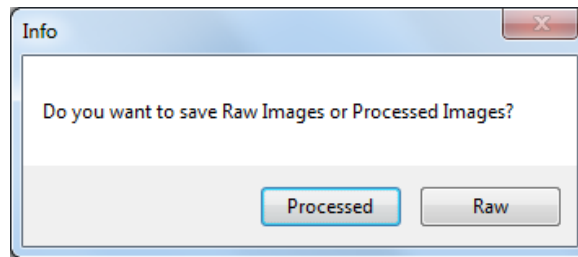
Processed Video:

- Saves in **AVI** format;
- Recommendation**:** use **VLC** program to open it.

Raw Video:

- Saves in **awvideo** format;
- Saves raw 10 bit pixels.

To watch the raw video, in awvideo format, the user can use the **AwVideo Visualizer.** Please download the software from https://download.ams.com/CMOS-IMAGE-SENSORS.

The videos are saved in user data folder (the folder chosen when installing the viewer) in the Videos folder.

When saving a snapshot, it will save the Raw Image (10 bits) as it comes from the sensor and also the Processed Image (the image as the user see on your screen, after all the algorithms applied).

Processed Image:

- PNG format;
- 24 bits per pixel.

Raw Image:

- PGM format;
- 10 bit raw pixels.

The images are saved in user data folder (the folder chosen when installing the viewer) in the Snapshots folder. It saves as **Raw_Sen[0]** for the Raw Image and as **Processed_Sen[0]** to the Processed Image. The "0" is the sensor ID.

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