

Application Note

Specim FX cameras Application Note

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Author: Matthias Karl

How to start using Specim FX series cameras

This application note describes the necessary steps to configure Specim FX cameras and to grab images from them using Teledyne Dalsa CameraLink frame grabbers or Common Vision Blox..

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1. Hardware

Currently there are two different interfaces available for the Specim FX cameras. Camera Link and GigE Vision. In this application note handling of both interface versions will be explained.

Camera Link Interface:

Specim FX10:

Spectral range: 400 nm - 1000 nm

Spectral bands: 224

Spatial sampling: 1024 pixel

Camera Link Base

Specim FX17

Spectral range: 900 nm - 1700 nm

Spectral bands: 224

Spatial sampling: 640 pixel

Camera Link Base

GigE Vision Interface:

Specim FX10E

Spectral range: 400 nm - 1000 nm

Spectral bands: 224

Spatial sampling: 1024 pixel

GigE Vision Interface

Specim FX17E

Spectral range: 900 nm - 1700 nm

Spectral bands: 224

Spatial sampling: 640 pixel

GigE Vision Interface

USB Memory Stick provided

With each Specim FX camera a USB stick is provided. This USB stick contains:

Spectral Report PDF:

This document provides information about the Spectral Calibration.

Spectral Calibration Files:

WLC-Files provide wavelength calibration information. The calibration files with the _FX_ must be used with the Automatic Image Enhancement -option. Without the Automatic Image Enhancement the individual ID-files must be used.

SCP-Files are intended to be used with Specims own LUMO software (which is not part of this documentation)

Camera and other Manuals

Software and drivers to work with the camera

GigE-Vision versions of the Specim FX cameras bought through STEMMER IMAGING will include Common Vision Blox on the provided USB stick.

Common Vision Blox can be used to configure the cameras and acquire images. A Common Vision Blox CameraSuite license is provided free of charge with each GigE-Vision camera sold from STEMMER IMAGING.

2. Specim FX 10/17 Camera Link Version

In order to work with the Camera Link version of the FX cameras, it is necessary to use a Camera Link framegrabber.

In this documentation, we will exemplarily use a Teledyne Dalsa frame grabber.

Connecting the camera

It is important to first connect framegrabber and camera using a Camera Link cable. Afterwards connect the power supply.

3. FX Configurator

The tool to configure the Specim Camera Link cameras is “FX Configurator”. FX Configurator needs to be installed on the PC system first. You will find the setup file on the delivered Stemmer Imaging USB stick.

Find and Open

When starting up, FX Configurator will search all possible serial ports on the host PC.

If a FX camera is powered on and connected correctly, the FX Configurator will show it like in Figure 1 - Specim FX Configurator

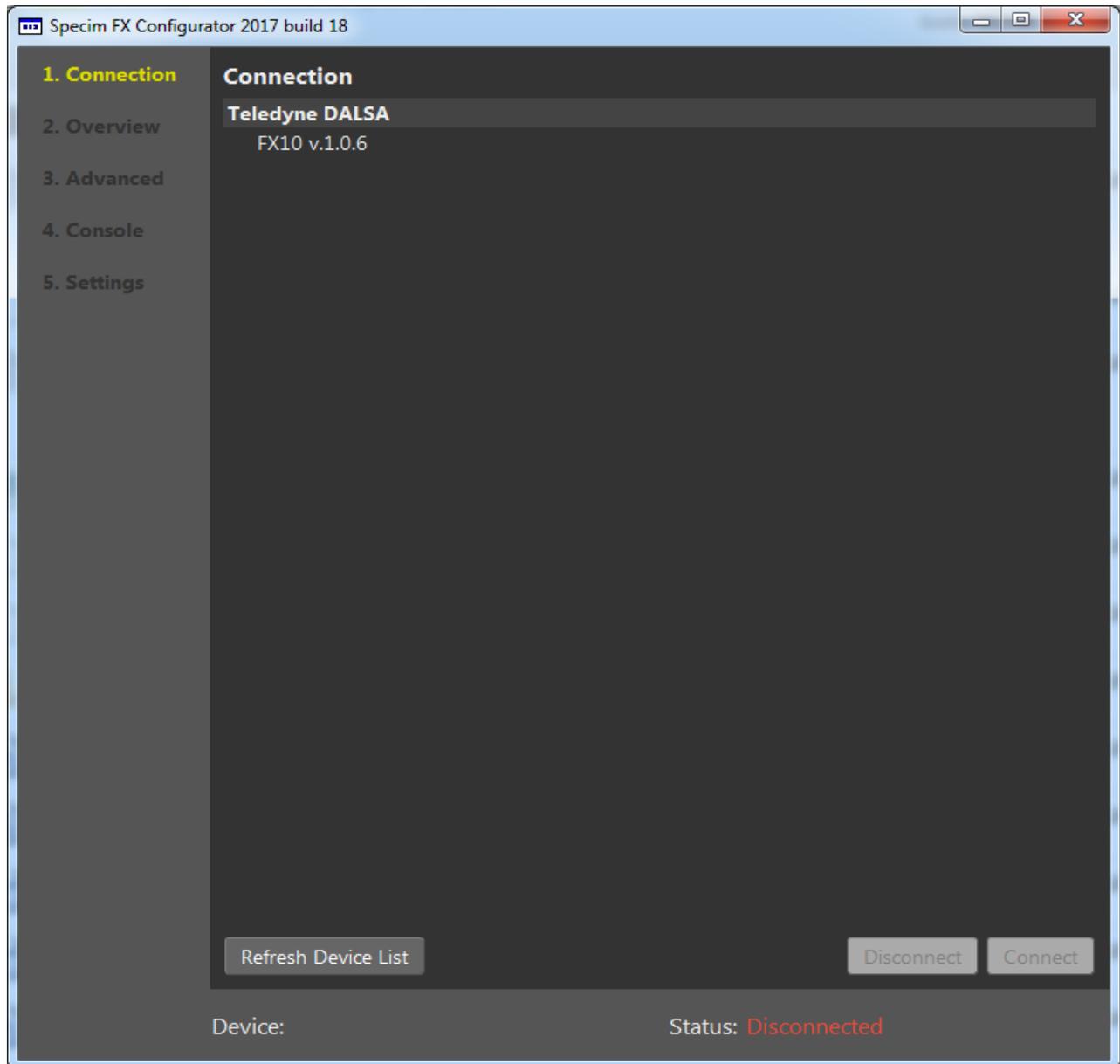


Figure 1 - Specim FX Configurator

With the button “Connect” the chosen camera is opened and all parameters will be loaded from the camera once.

Overview/Advanced

With “2. Overview” the current settings of the camera can be checked

Changing parameters is better done using “3.Advanced”. See Figure 2 – FX Configurator Advanced

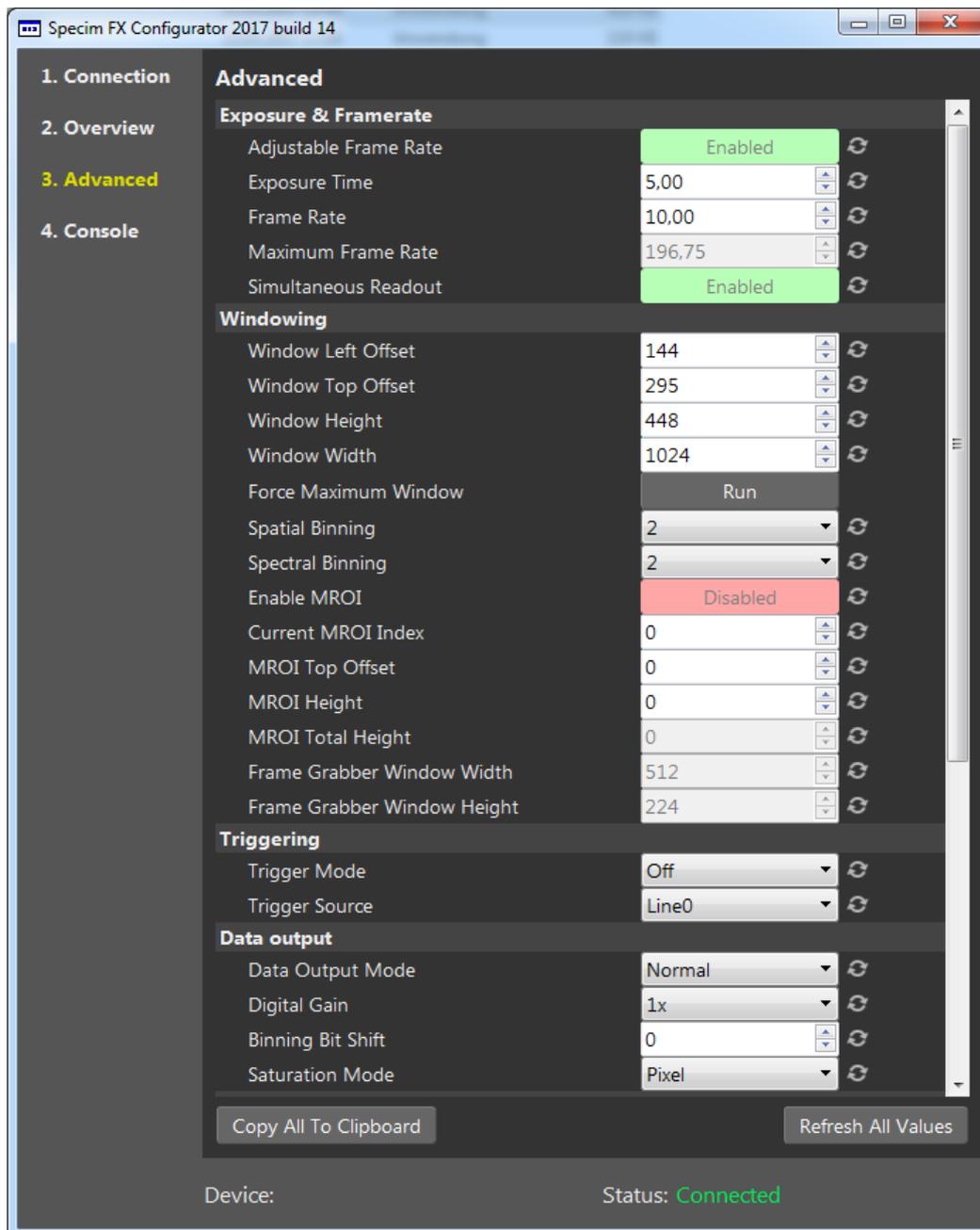


Figure 2 – FX Configurator Advanced

In addition to controlling parameters of the camera, when using the Camera Link version, the used frame grabber needs to be setup too. This is usually done with a control tool provided by the frame grabber vendor.

4. Teledyne Dalsa Sopera LT CamExpert

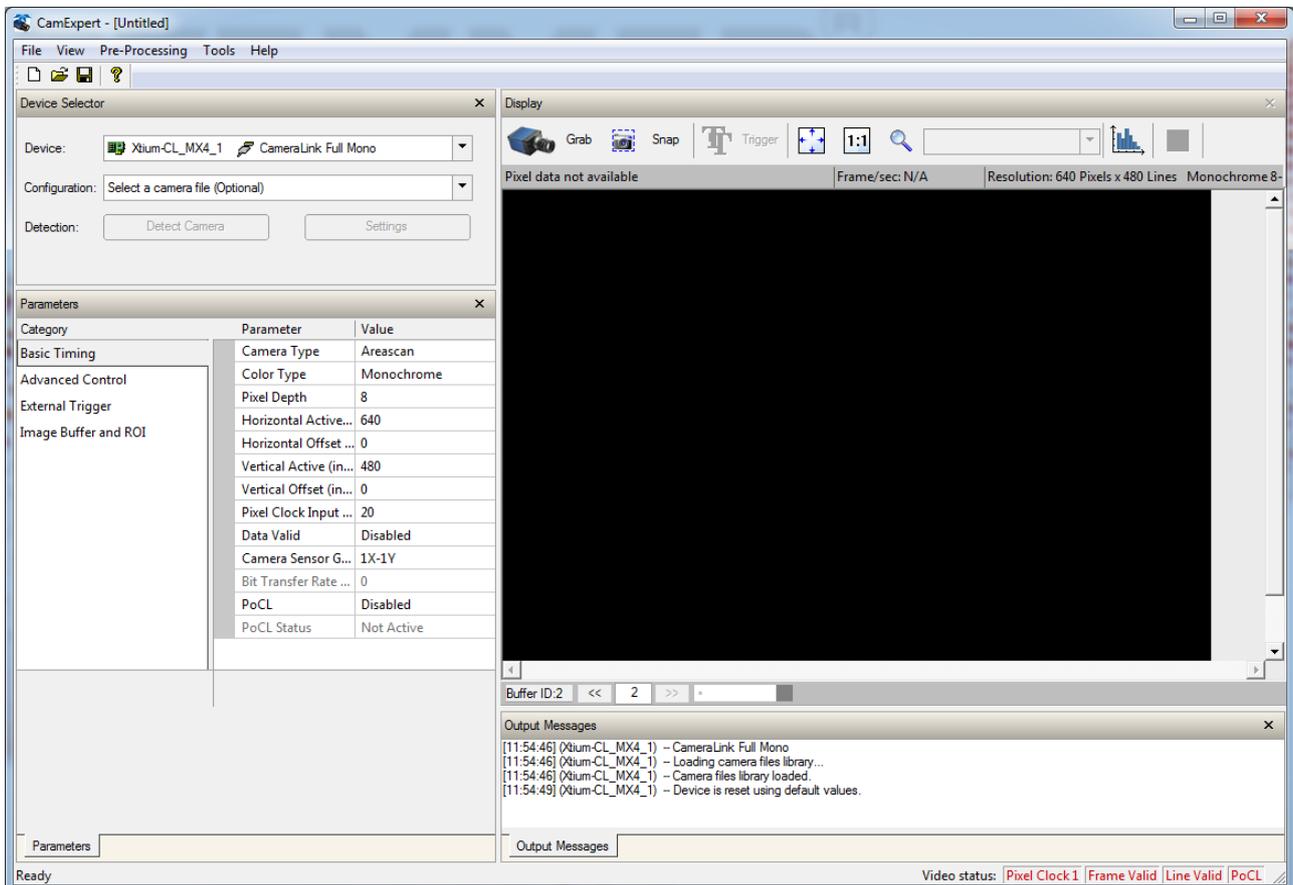


Figure 3 - CamExpert

CamExpert is the main tool to change parameters of all Teledyne Dalsa framegrabber.

CamExpert can be used to Grab and display images and to configure your framegrabber.

Using CamExpert “Configuration Files” can be created or edited.

A Configuration File stores a set of framegrabbers parameters. This is needed in order to adjust the framegrabber to work with the currently attached camera. When using Camera Link the camera and the framegrabber do not communicate with each other about their settings.

Usually we ship previously created Configuration Files for the cameras we sell. These files can be found in the “Configuration” drop-down menu.

Acquire images

Following these steps, you will be able to acquire live images from a connected Specim FX camera:

FX Configurator:

1. Open access to the camera using FX Configurator
2. Make sure the Motor Shutter is opened using the “Pulse REV” command. In order for the shutter to open a value of “200” need to be set and confirmed. Closing the shutter can be done using “Pulse FWD = 200”. A distinct mechanical sound can be heard when the shutter state changes.

CamExpert:

1. Chose the used frame grabber under “Device”. Make sure to choose the correct Camera Link port.
2. Load a correct camera configuration file using the “Configuration” tab or the menu.
3. Press the “Grab” button over the image. A live image should appear.

FAQ

No Live Images seen?

- Is the mechanical shutter open? Use FX Configurator to open it. You will hear a click if the shutter state changes
- Is the camera powered on and is it connected to the correct frame grabber port? You can check that by the status signals display in CamExpert, right under the Live View.
- Remember the camera outputs 12 bit. The CamExpert display is only 8 Bit. You can open a slide which lets you chose the 8 Bit to be shown. CamExpert does not scale the image data from 12 to 8 bit.

5. Specim FX 10E/17E GigE Vision Version

GigE Vision

GigE Vision is an interface standard introduced in 2006 for high-performance industrial cameras. It provides a framework for transmitting high-speed video and related control data over Ethernet networks.

In order to be able to configure a Specim FX GigE Vision camera a GigE Vision compatible software on the receiving side is needed.

In this documentation, Common Vision Blox is used for accessing the camera. The following assumes that Common Vision Blox is already installed on a PC.

Licensing CameraSuite Common Vision Blox

The Common Vision Blox CameraSuite is a Licensing Model designed for users who want to use Common Vision Blox as a versatile SDK for their image acquisition hardware.

Technically speaking, CameraSuite Licenses present themselves as a license with the Common Vision Blox Serial Number 0 that is available as soon as the hardware to which the license refers has been plugged in (and – in some cases – an activation key has been entered).

With a Common Vision Blox CameraSuite license the **whole functionality of the Common Vision Blox Image Manager may be used without any restrictions.**

It is, however, not possible to license the Foundation Package or any of the Common Vision Blox tools with a CameraSuite – for this, a Common Vision Blox Image Manager or Foundation Package license must be available on the system.

If you have an image acquisition device that has been supplied with a CVB CameraSuite Activation Code, it can be used to activate the Common Vision Blox CameraSuite functionality.

The activation code for activation are to be found as follows:

- The activation code will be also **retrieved automatically, if the camera is connected to the system and the system has access to the internet.**
- If the system is not connected to the internet, you can retrieve the activation code from the license sticker on the package of your GigE Vision or USB3 Vision camera from STEMMER IMAGING.
- Or on our website <https://www.stemmer-imaging.de/en/licence-key-request/>, through entering the MAC address of the GigE cameras and the serial number of USB3 cameras.

Please use the [CVB License Manager](#) or [CVB Management Console](#) to activate your license.



Requirements

- Ethernet Cable with minimum Cat 5e standard required. Cat 6 is preferred for long distances. Unshielded cables must not be used in general. (CAT6 cables can be used for frequencies up to 250 MHz, whereas CAT6a cables can be used up to 500 MHz, fulfilling the bandwidth requirements of 10-Gigabit-Ethernet.)
- Network Interface Card (NIC) supporting 1000Mb/s and Jumbo Packets. It has to be configured with optimal Performance Settings.
- If a switch is used the switch has to support 1000Mb/s and Jumbo Packets (Frames) too.
- To establish a connection to any GigE Vision device, both the Network Interface Card **NIC** and the GigE Vision device must have a valid IP in the same subnet range.
-

For more detailed information about GigE Vision, Network Configurations, Topologies etc. please take a look into the “CVB User Guide for the GeniCam Driver” in the Common Vision Blox documentation folder.

Common Vision Blox GeniCam Browser

The GeniCam Browser is used to detect connected devices over available Transport Layers and configure them.

GenIcam Browser can be opened with:

- Windows: Start Menu STEMMER IMAGING Common Vision Blox and under *%CVB%Applications*
- Linux: */opt/cvb/bin* Run the GeniCamBrowser with *./GeniCamBrowser*

After detection and configuration the specific device and driver data have to be saved as Configured Devices.

In Figure 4 – GeniCam Browser a correctly found and configured Specim FX10e is shown as an example.

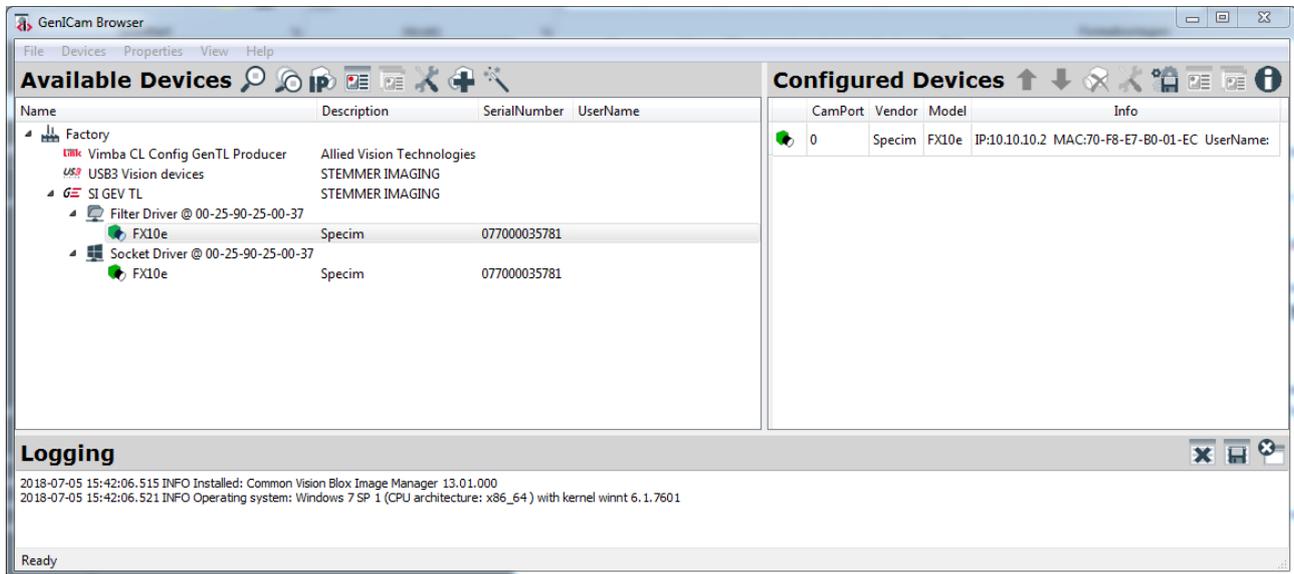


Figure 4 – GenICam Browser

To open the Common Vision Blox (CVB) *.vin driver (CVB video interface) at least one device has to be stored and accessible in Configured Devices (green camera icon).

To test the correct device settings close the device in GenICam Browser and open a Common Vision Blox application (e.g. CVB Viewer or one of the Image Manager tutorials)

- Open the application
- Select 'File'
- Select 'Open...'
- Select the vin file from %CVB%Drivers (Windows) or /opt/cvb/drivers (Linux)
- To access the devices and load the *.vin device driver all CVB tools and tutorials can be used in the same way.

Common Vision Blox Viewer

After the GenICam driver has been configured correctly to use the attached Specim FX, the camera can be opened with any Common Vision Blox application.

In this document “Common Vision Blox Viewer” is used as an example application.

Open the CVB Viewer and choose the GenICam.vin explained above. You should not see any error messages and the screen will show a black image. Go to “GenICam->Device Nopemap” to open access to the cameras parameters. Figure 5 - CVB Viewer shows how this typically looks like.

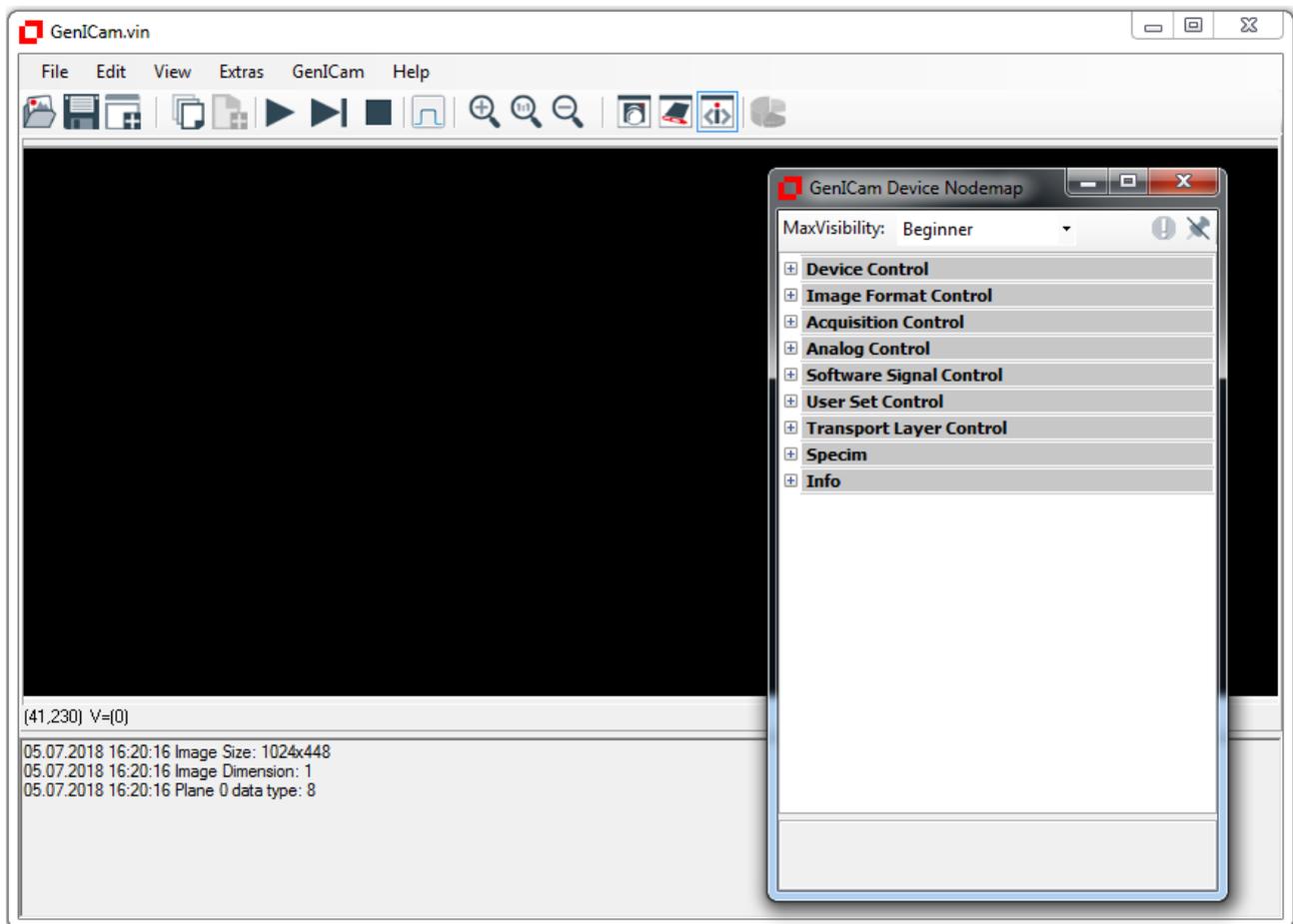


Figure 5 - CVB Viewer

Now it is possible to acquire images from the camera and change parameters using the “GenICam Device Nodemap”.

FAQ:

Acquired images are black although all other settings are correct and illumination is turned on:

Remember that Specim FX cameras do have a mechanical shutter which sits in front of the entrance slit. If this shutter is closed all images coming from the camera will be black.

Goto the parameters Specim->Motor Shutter. Make sure that the new value is really written by changing the value up or down one number. It might not be sufficient to press enter without having changed the value.

If the shutter state changes a mechanical noise can be heard easily.

- Motor Shutter Pulse Fwd: Values 200-203 **closes** the mechanical shutter.
- Motor Shutter Pulse Rev: Values 200-203 **opens** the mechanical shutter.

Binning Problem:

In early versions of the cameras firmware, “Device Version = 0.3”. Binning in either direction does not work properly. The image from the camera is correctly binned but the image size properties (width or height) do not change correctly. If the user tries to manually change the width or height in the camera the camera will apply the binning to the new value again. That means when binning is enabled the camera does output a smaller image than the receiving software side expects.