Teledyne DALSA • 880 Rue McCaffrey • St-Laurent, Québec, H4T 2C7 • Canada
http://www.teledynedalsa.com/Genie-Nano

G3-ANCL02-V2: Genie Nano-CL Application Note

Configuring Genie Nano-CL and Teledyne DALSA Frame Grabbers

For Nano-CL models with P/N: G3-Cxxx-xxxxx

Overview

Genie Nano-CL (CameraLink) cameras require a connection to a frame grabber to acquire images. This application note describes how to configure a Genie Nano-CL with a Teledyne DALSA frame grabber.

The Genie Nano-CL is GenCP compliant; its features are defined using an XML file and can be accessed using software that supports the GenCP protocol.

For information on installing and connecting the Genie Nano-CL, refer to the application note G3-ANCL02-V1: Genie Nano-CL Application Note.

Tap Configurations

Tap configurations determine how data is output from the camera and received by the frame grabber; both the frame grabber and the camera must be set to the same tap configuration to enable correct image acquisition. Each tap represents a data communication lane that can transmit one pixel (for example, 8 or 10 bit) per pixel clock tick.

The Genie Nano CL tap configuration is determined by the device firmware; each firmware supports a unique tap configuration. To change the tap configuration, the corresponding firmware must be uploaded to the camera. Currently, 3 firmware versions are available that provide the following tap configurations:

- Base, 8-bit (2 or 3 tap, model dependent)
- 8 tap, 8-bit
- 10 tap, 8-bit (factory default firmware)

For CameraLink devices, the pixel clock is 85MHz, therefore the maximum throughput is:

- 850 MB/s (6.8 Gbit/s) for 10 tap (Deca), 8-bit configurations
- 680 MB/s (5.44 Gbit/s) for 8 tap (Full), 8-bit configurations
- 510 MB/s (4.08 Gbit/s) for 6 tap (Medium), 8-bit configurations
- 255 MB/s (2.04 Gbit/s) for 3 tap (Base), 8-bit configurations

Eight Taps
8 zones in X, 1 zone in Y (8X-1Y)
Left to Right

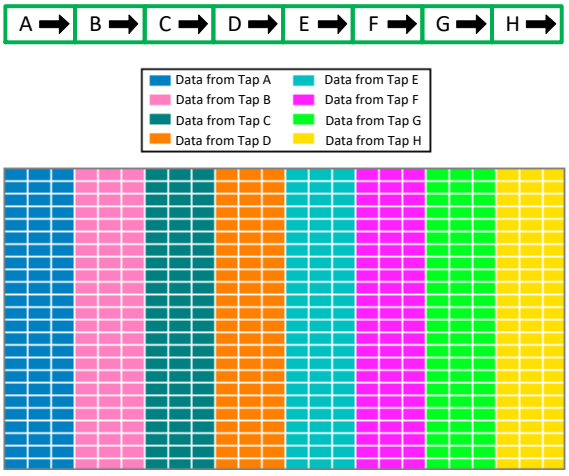


Image Buffer

Ten Taps
10 zones in X, 1 zone in Y (10X-1Y)
Left to Right

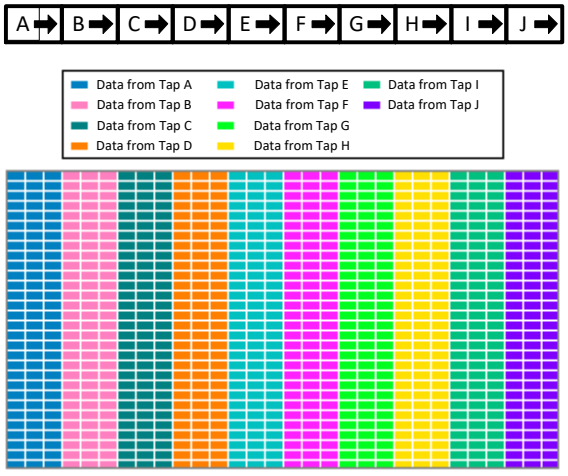
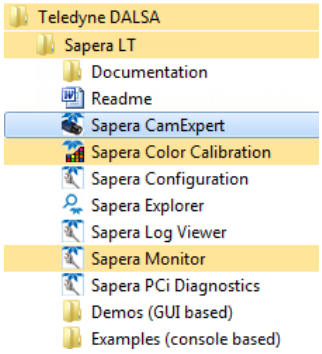
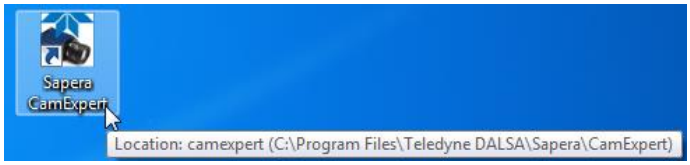


Image Buffer

1. Start the Sapera CamExpert Application

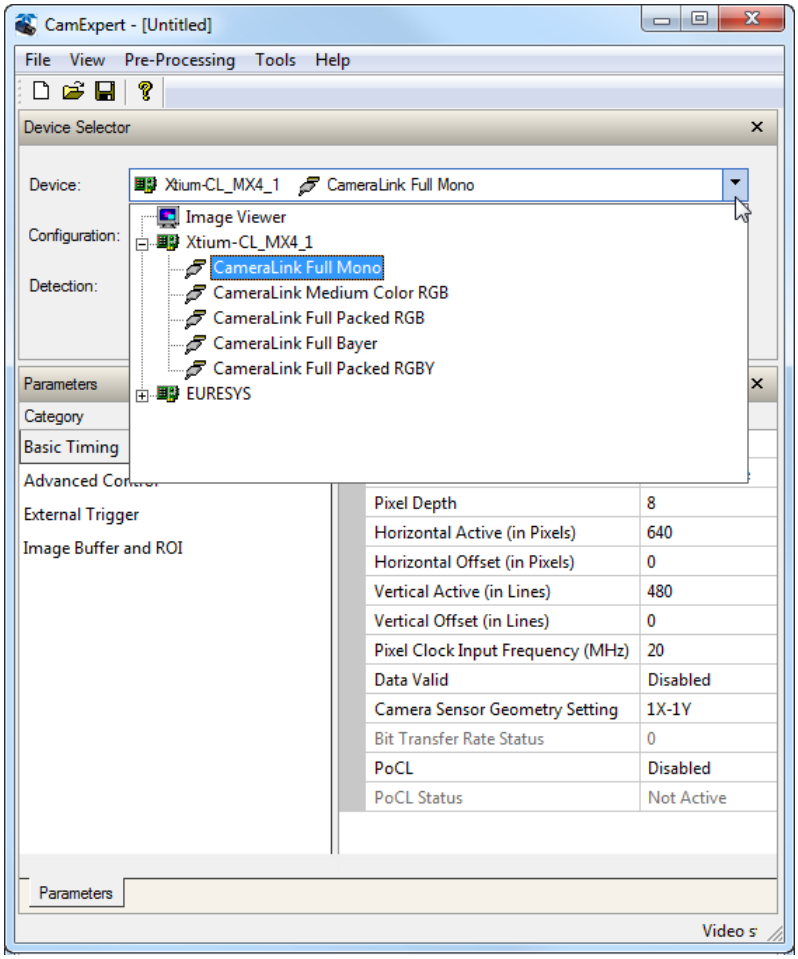
The Sapera CamExpert application is included as part of the Sapera LT SDK. It is Teledyne DALSA's camera and frame grabber interfacing tool that allows you to quickly validate hardware setup, change parameter settings, and test image acquisition. It is available from the Windows Start Menu or desktop shortcut.





2. Select the Frame Grabber

In the Device Selector panel, use the Device drop-down menu to select the Teledyne DALSA frame grabber the Genie Nano-CL is connected to.



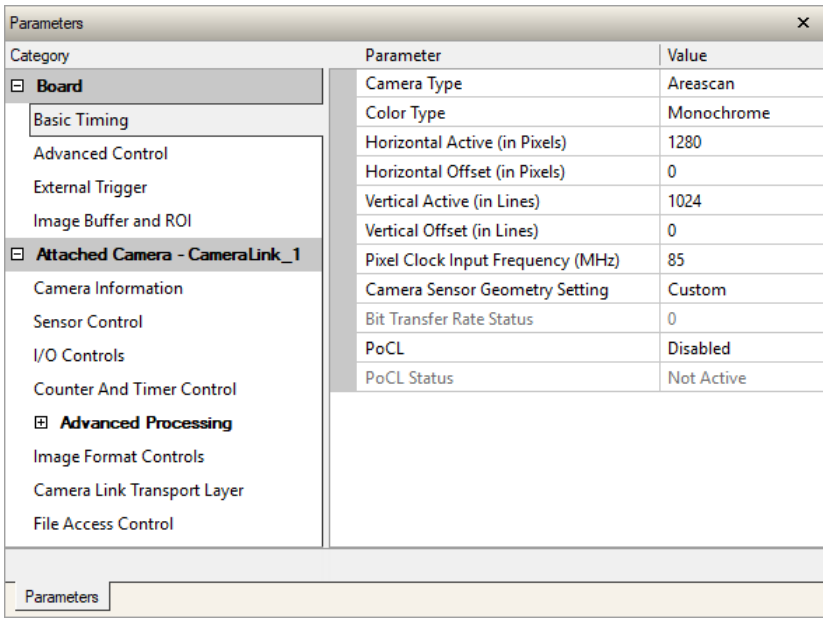
The available servers for the frame grabber are determined by its currently loaded firmware (default firmware is 8 tap 8-bit (Camera Link Full)

	Note, Genie Nano CL 10-tap models require the frame grabber firmware configuration to be *80-Bits Camera Link.* If necessary, use the Teledyne DALSA Device Manager tool to change the firmware configuration; refer to Performing a Frame Grabber Firmware Update.

The Video Status bar indicates if the pixel clock, frame valid, and line valid signals are present by being displayed in green:

The number of available pixel clock signals depend on the tap configuration (Base, Medium, Full or Deca); the number of PoCL signals is camera dependent.

If the camera detection parameter are properly configured, both the frame grabber and camera parameters are displayed.



3. Verify the Camera Settings

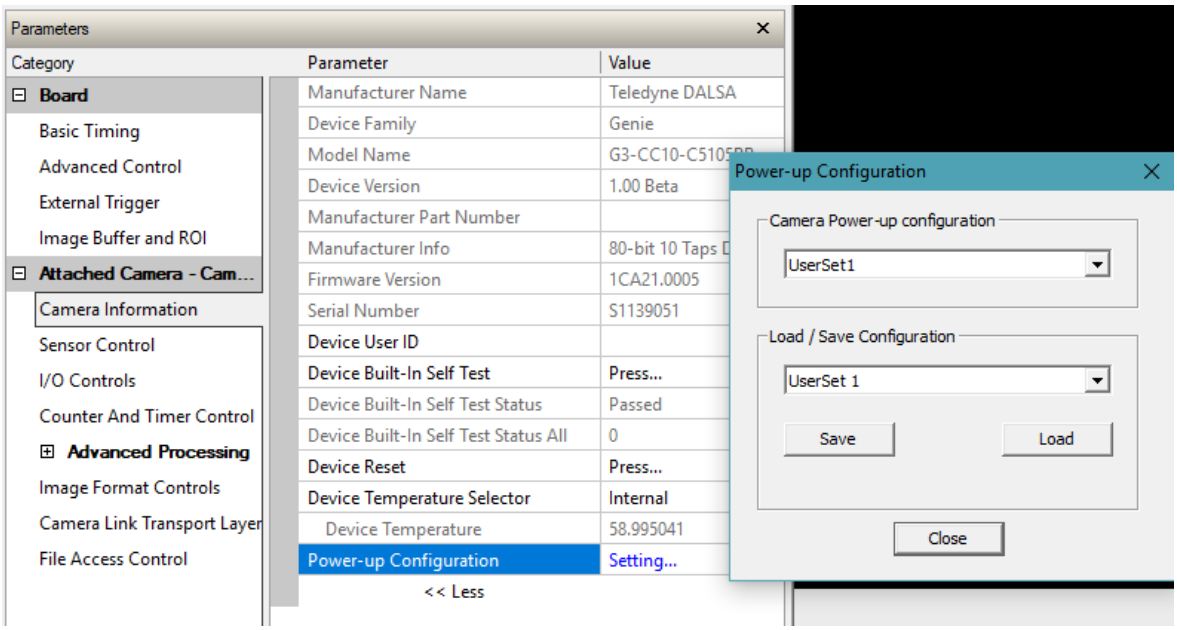
In the Camera Information category, the *Feature Manufacturer Info* feature in the Camera Information displays the configuration (for example, 80-bit 10 Taps Design). The *Feature Model Name* feature displays the camera model which identifies if the camera is monochrome or color (for example, M5100 (monochrome) or C5100 (color)).

Adjust any camera settings as required and save the settings to the camera; it is recommended that the camera Power-Up Configuration be set to use this user set.

Verifythe Width and Height feature settings; the default values for the Genie Nano-CL M25 and M16 camera models are 5120 (5K) and 4096 (4K), respectively.

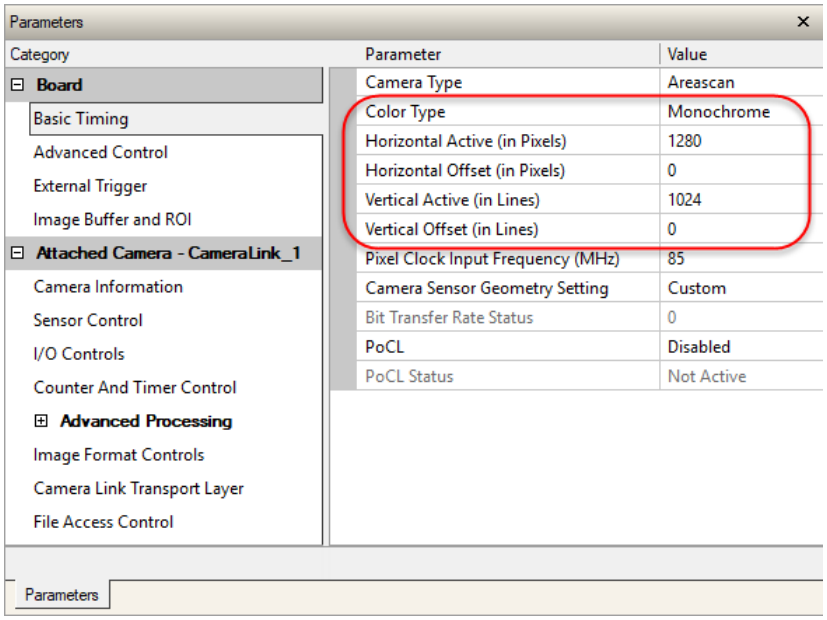
4. Save the Genie Nano-CL Camera Settings

Current Genie Nano-CL camera settings can be saved a User Set that can be loaded when the camera is reset or power on. Use the Power-Up Configuration dialog, available through the Camera Information category, to specify feature settings.

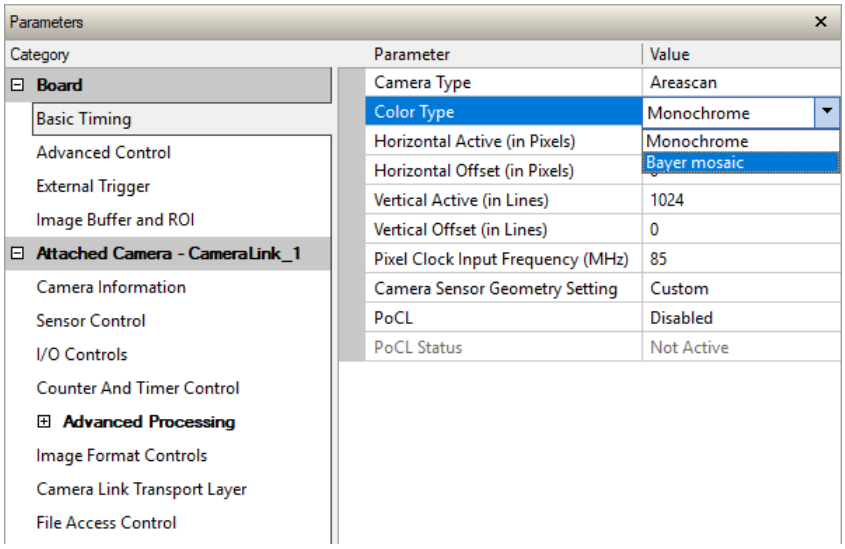


5. Verify the Frame Grabber Settings

Adjust any frame grabber settings as required. Verify that the Color Type, Horizontal Active, Horizontal Offset, Vertical Active and Vertical Offset parameters correspond to those output by the camera.

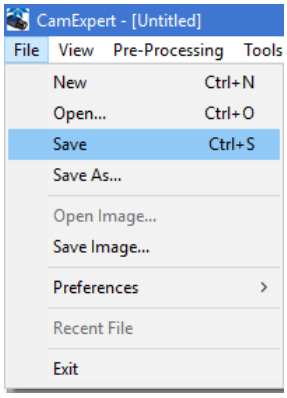


For Bayer cameras, set the Color Type to "Bayer Mosaic".

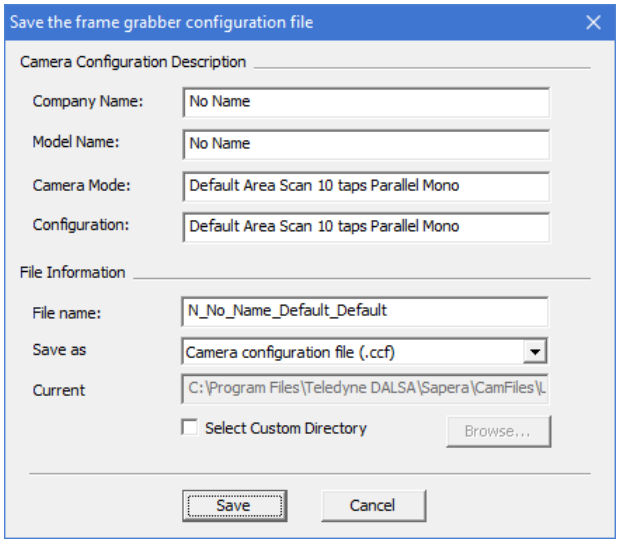


6. Save the Frame Grabber Settings

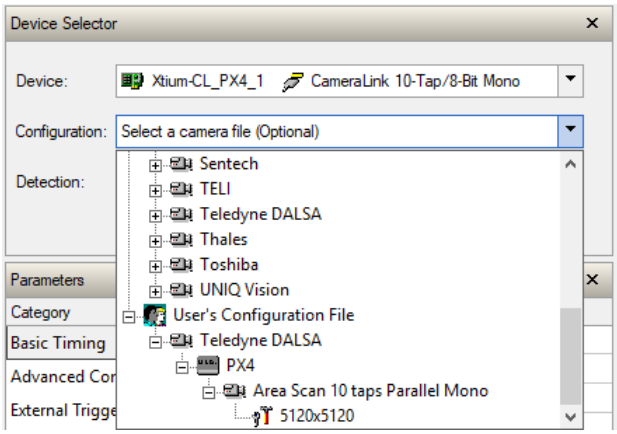
Use the CamExpert **File > Save** menu command to save these settings as a *.ccf* (camera configuration file).



The save dialog allows you to provide descriptive information relevant to the particular .ccf file.



This file is then available in the CamExpert Configuration drop-down list to load the camera file parameter settings to the frame grabber.



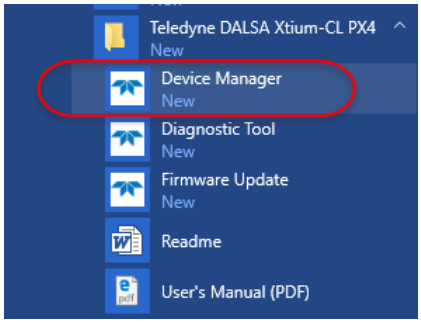
In the Sapera LT API, this configuration file can be referenced by the SapAcquisition constructor when creating a SapAcquisition object for the frame grabber.

	Note, if the frame grabber is reset, power-cycled, or the connected application restarted, the frame grabber intializes with default settings; to restore saved settings a configuration file must be reloaded.

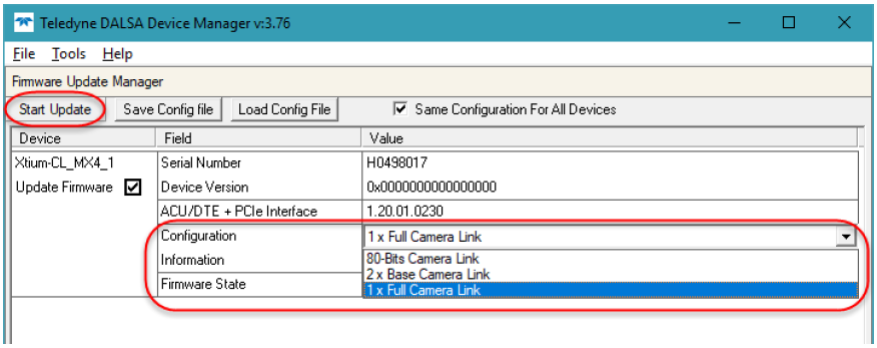
For more information, refer to the Sapera LT 8.30 Getting Started Manual for Frame Grabbers.

Performing a Frame Grabber Firmware Update

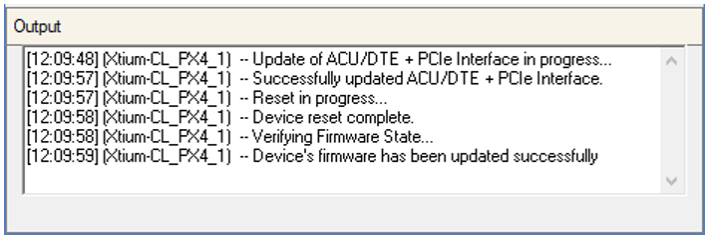
Start the Teledyne DALSA Device Manager application, available through the start menu:



On the Firmware Update tab, select the required configuration and click **Start Update**. Refer to the frame grabber documentation for information on supported user programmable firmware configurations.

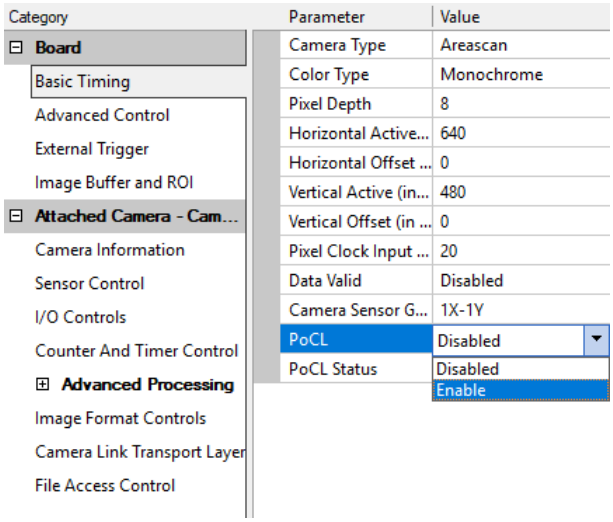


The Output window displays if the update was successful.



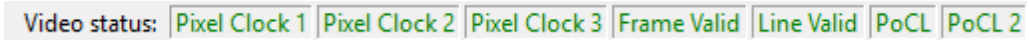
POCL

If using Power-over-CameraLink to power the Genie Nano-CL, enable PoCL on the frame grabber (by default, it is disabled) using the PoCL parameter, available in the frame grabber's Basic Timing category.



The PoCL Status parameter can be used to verify if PoCL is active:

The CamExpert video status bar displays the PoCL signals in green:



When PoCL is enabled and the PoCL Status is "Not active" (that is, false), this indicates that the camera is not PoCL compliant, the wrong cable is used, or the camera is not connected.

	External power must be provided to the frame grabber to use PoCL; if not the following status message is displayed when attempting to enable PoCL on the frame grabber: [14:41:30] (Xtium-CL_PX4_1) Error: "CorAcqSetPrms" <Acq module> - External power not present ()

Refer to the frame grabber documentation for information on how to connect power to the frame grabber to use PoCL.

Frame Grabber Image Width Considerations

Depending on the camera/frame grabber pair, each may have different image width increments. With certain camera image width settings, the frame grabber may not be able to exactly match the same width due to a different increment step. In this case, the frame grabber width can be set to the next smaller/larger increment step to either crop the camera image output, or pad the image outpu from the frame grabber with extra pixels.

That is, when setting the frame grabber Horizontal Active, the line may contain cropped or padded pixels if the multiple of increment does not coincide with the camera horizontal width.

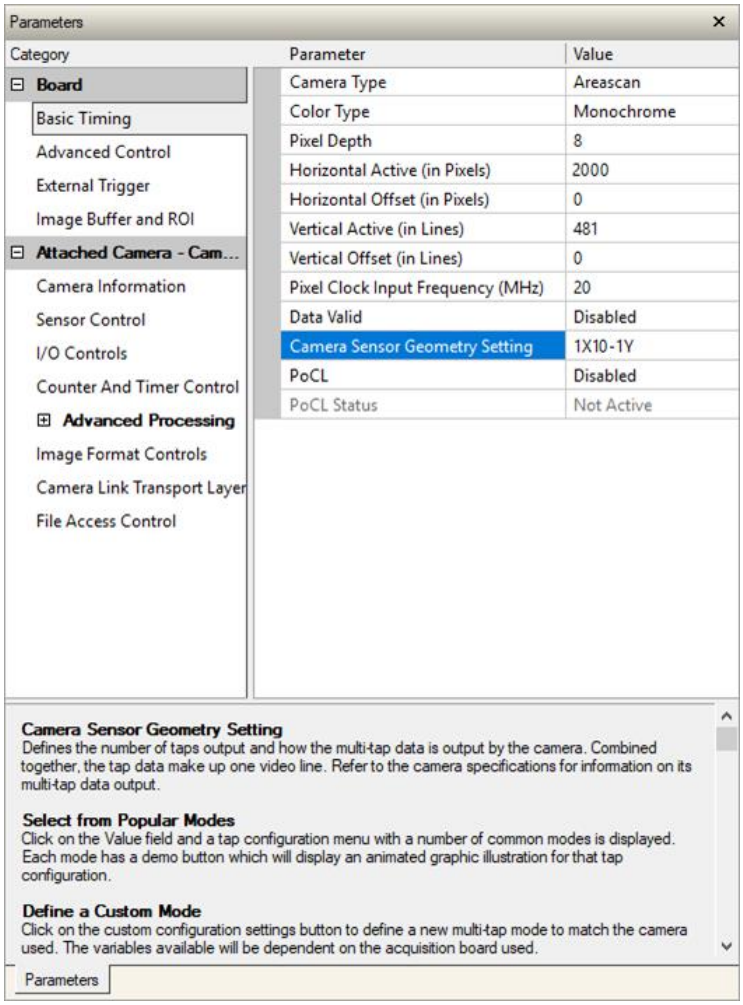
The following table provides the possible values for image and width height features for the Genie Nano-CL 16M and 25M (Monochrome and Bayer) cameras:

Feature	Minimum Value	Maximum Value	Increment in Pixels
Height	256	4096 (Genie Nano-CL 16M) 5120 (Genie Nano-CL 25M)	16
Width	16	4096 (Genie Nano-CL 16M) 5120 (Genie Nano-CL 25M)	16

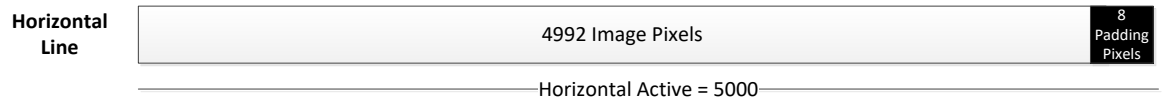
The following table provides the possible values for Horizontal Active and Vertical Active parameters for a typical Teledyne DALSA frame grabber, such as the Xtium-CL PX4:

Parameter	Minimum Value	Maximum Value	Increment in Pixels
Horizontal Active	40	8-bits/pixel x 64k Pixels 16-bits/pixel x 32k Pixels 32-bits/pixel x 16k Pixels 64-bits/pixel x 8k Pixels	10 (10-tap configuration) 8 (8-tap configuration)
Vertical Active	1	16777215	1

The frame grabber tap configuration setting can be verified using the Camera Sensor Geometry Setting parameter.



For example, when in 10-tap configuration, the frame grabber receives 10 pixels per clock, therefore the increment for the Horizontal Active is also 10. If the camera width is set to 4992, the frame grabber Horizontal Active is set to 5000 to capture the entire line, resulting in 8 padded pixels.



	Note, padded pixels contain any data that was previously written in the image buffer memory location.