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G3-ANCX01-v1: Genie Nano-CXP Application Note

Configuring Genie Nano-CXP and Teledyne DALSA CXP Frame Grabbers

For Nano-CXP models with P/N: G3-Xxxx-xxxxx

Overview

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

The Nano-CXP supports the CoaXPress device discovery methodology providing plug and play capability and implements GenICam and associated GenCP allowing compatibility with Teledyne DALSA or third party CoaXPress frame grabbers.

Requirements & Installation

A frame grabber board such as the Teledyne DALSA Xtium-CXP PX8[™] is the recommended computer interface. Follow the installation instructions from the board's User Manual for the computer requirements, installation and updating the board driver, as summarized below.

- Install the board hardware into an available PCI Express x8 Gen2 slot (part number: OR-Y8X0-XPX400). It's required that a computer power cable is connected to the board auxiliary power connector to supply the camera's power via PoCXP.
- Turn on the computer.
- Download and install the Sapera LT Development Library (version 8.41 or later recommended) or only its 'runtime library'.
- Download and install the Xtium-CXP PX8 Sapera board driver (1.30 or later required).
- Reboot the computer.
- Connect the Nano-CXP with 4 camera cables to the CXP frame grabber. The Teledyne DALSA grabber supports PoCXP (power over CoaXPress) for a simple camera power solution. The CoaXPress Link cables are for the DIN 1.0/2.3 connector supporting the CXP-6 maximum speed rating.
- The Nano-CXP status Led will indicate power and the Device / Host connection with a steady green color when the first two CoaXPress are connected. Refer to the section "Camera Status LED Indicator" in the camera manual for a complete list of Status LED indicators.

1. Start Sapera CamExpert

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 & Camera

If there is only one Teledyne DALSA frame grabber the Device Selector drop-down menu automatically has the Xtium-CXP PX8 selected and the connected Nano-CXP is also automatically detected as shown in the image below.

Device Selecto	r		× >> >				
Device:	💵 Xtium-CXP_PX8_1 🍃 CXP M	ono #1	•				
Configuration:	Select a camera file (Optional)		•				
Detection:	Detect Camera Settings						
Parameters							
Category		Parameter	Value				
🗉 Board		Manufacturer Name	Teledyne DALSA				
Basic Timi	ng	Device Family	Genie				
Advanced Control External Trigger		Model Name	Nano-CXP-M5100				
		Device Version	1.00 G3-XM30-5105				
		Manufacturer Part Number					
Image But	fer and ROI	Manufacturer Info	Standard Design				
	Camera - Xtium-CXP_PX8_1	Firmware Version	1CA23.0004				
Camera In	formation	Serial Number	1910P2388 Nostromo				
Sensor Co	ntrol	Device User ID					
I/O Contro	bls	Device Built-In Self Test	Press				
Counter A	nd Timer Control	Device Built-In Self Test Status	Passed 8				
	ced Processing	Device Built-In Self Test Status All					
	ceu i rocessing	Device Reset	Press				
Image For	mat Control	Device Temperature Selector	Internal				
Acquisitio	nControl	Device Temperature	65.147079				
CoaXPress	Transport Layer	Power-up Configuration	Setting				
File Access	s Control	<< Less					

CamExpert also will indicate the status of the four data connections and signal integrity between the camera and frame grabber. The CamExpert lower right area – below the Message window has the connection status flags as shown below.

	Output Mea	ssages									×
	[11:32:08] (Xtium-CXP_PX8_1) CXP Mono #1 [11:32:09] (Xtium-CXP_PX8_1) Loading camera files library [11:32:11] (Xtium-CXP_PX8_1) Camera files library loaded.										
	Output N	lessages									
Video status:	CXP-6 x 4	Lane 1 Lock	Lane 2 Lock	Lane 3 Lock	Lane 4 Lock	Frame Valid	Line Valid	PoCXP	PoCXP 2	PoCXP 3	PoCXP 4
							~	門 🗘	ENG	2:50 PM	

This screen capture shows that the 4 Data Lane signals (i.e. 4 cables) are correct, that Frame and Line Valid signals are active and that cable 1 and 2 carry camera power (POCXP). Cable 3 and 4 do not carry camera power for this Nano model.

If the Camera is not automatically Detected

Verify that the frame grabber has PoCXP enabled to power the camera as show below.

Pa	rameters		×
Ca	tegory	Parameter	Value
Board		Camera Type	Areascan
	Basic Timing	Color Type	Monochrome
	Advanced Control	Pixel Depth	8
	External Trigger	Data Lanes	4
	External Ingger	Horizontal Active (in Pixe	5120
L	Image Buffer and ROI	Vertical Active (in Lines)	5120
Ξ	Attached Camera - Xtium-CXP_P	Bit Transfer Rate	6.250 Gb/s
	Camera Information	PoCXP	Enable
	Sensor Control	PoCXP Status	Active

3. Uploading New Camera Firmware

With the Nano-CXP detected the user should upload new firmware if available. Using CamExpert, check the current camera firmware by selecting the "Camera Information" category and checking the "Firmware Version" feature.

		External Trigger		mover manne	11010 070 110100	
				Device Version	1.00 Beta	
		Image Butter and ROI		Manufacturer Part Nu	G3-XM30-5105	
	Ξ	Attached Camera - Xtium-CX		Manufacturer Info	Standard Design	
		Camera Information		Firmware Version	1CA23.0004	
		Sensor Control		Serial Number	1910P2388	
				Device User ID	Nostromo	
					-	

New firmware versions are available in the file download area of the Teledyne DALSA web site. Download the latest release to the computer used with the Nano-CXP.

Upload New Firmware

Pa	rameters			File Access Control			×		
Category			arameter	Value					
Board		Upload/Download File Setti		Setting	Select the type of file to upload or download from the device.				
	Basic Timing		<< Less						
	Advanced Control				Tupe	Davias E			
	External Trigger				Type.	Device F	imware	<u> </u>	
	Image Buffer and ROI				File selector:	Firmware		•	
⊡	Attached Camera - Xtium-CXP_P						e		
Camera Information					Description:	Upload new firmware to the camera which will execute on the next camera reboot			
	Sensor Control					cycle. Select the DeviceReset feature after the upload completes.			
	I/O Controls								
	Counter And Timer Control				Note: Depend	Note: Depending on the file size and communication speed, the transfer could take many minutes but must not be aborted			
	Advanced Processing					take many in	infaces, par mast not be aborte	J .	
	Image Format Control				File path:			-	
	AcquisitionControl							Browse	
	CoaXPress Transport Layer				Upload (to Ca	ameral	Download (from Camera)	Delete	
	File Access Control					(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		00000	
							Close		

- Select "File Access Control" and click on Setting.
- On the new menu verify the file type is Device Firmware and click Browse to select the downloaded firmware file.
- Click the Upload button and restart the camera when prompted.
- Important: File upload rates are fixed (as per the CXP standard) at 20Mbits/s. As an example, a firmware file upload process will take about 2¹/₂ minutes.

4. Verify Basic Acquisitions

With frame grabber and camera factory defaults the Nano-CXP is set to output a test pattern which is acquired by CamExpert.

Select the Test Image output – Diagonal Moving Ramp

	ventical Onset	v		
Sensor Control	Width	5120		
I/O Controls	Height	5120		
Counter And Timer Control	Test Image Selector	Grey Diagonal Ramp Moving		
Advanced Processing	<< Less			
Image Format Control				
AcquisitionControl				

• Set CamExpert so that you view the complete acquisition in the display window (the actual acquisition data is unmodified).

Display								
To	Grab	Ø	Snap	T	Trigger	• •	1:1	٩ [
Pixel data not available								Frame/

• Click on the CamExpert "Grab" button to view the continuously moving ramp acquisition.



Video status: CXP-6 x 4 Lane 1 Lock Lane 2 Lock Lane 3 Lock Lane 4 Lock Frame Valid Line Valid PoCXP PoCXP 2 PoCXP 2

5. When FVAL & LVAL Flags turn RED

Typically the camera is constantly in acquisition mode and clicking the CamExpert "Grab" button instructs the frame grabber to transfer the image frames to the computer buffers. Changing camera features will stop the acquisition and then restart it automatically.

Under certain setup conditions with complex feature changes the camera will not automatically restart acquiring. This state is indicated with the FVAL and LVAL status flags turning red.

In such a case go to the Acquisition Control camera feature group and manually click on the acquisition start command. The Frame Valid and Line Valid flags will turn green again.



Nano-CXP and the Frame Grabber Work – Now What

- Use CamExpert to explore the Nano-CXP camera feature set and the Xtium-CXP PX8 parameter set.
- Use the individual product's User Manuals to explore the capabilities of this imaging system pair.
- Develop your custom imaging application with the Sapera LT API.