CoaXPress 1.1: How to Save Connection Configuration

Abstract:
In CoaXPress (CXP) 1.0, the method for saving a link configuration (called “Link configuration” in CXP 1.0, but called “connection configuration” in CXP 1.1) was not clearly explained. With the release of CXP 1.1, it can now be described in a much more understandable fashion. Using this method, a user can save an expected connection configuration into the camera. Once it is saved, the camera and frame grabber can launch and establish communication by using the saved connection configuration. This document describes a JAI camera which conforms to CXP 1.1 and the method for handling a connection configuration involving a combination of camera and frame grabber.

Note: a connection configuration is a pair consisting of a bit rate and a number of connections. E.g., CXP3_X2 indicates that the bit rate is 3.125 Gbps and the number of connection (or lanes) is 2.

1. Registers used to save a connection configuration:

A) ConnectionConfig (Read/Write)
ConnectionConfig is a legacy register, with which the camera and frame grabber can share actual connection configuration. Using this value, the camera and frame grabber establish a connection.

B) ConnectionConfigDefault (Read Only)
Camera sets a value into this register upon launching. Frame grabber cannot change this value.

C) JAIConnectionConfigDefault (Read/Write)
Upon launching, the camera copies a value from this register **[JAIConnectionConfigDefault]** to the above **ConnectionConfigDefault**.

The user can save an expected connection configuration into the **JAIConnectionConfigDefault** register. The value is then saved into the camera. Upon launching of the camera, the value in the **JAIConnectionConfigDefault** will ultimately be copied to the **ConnectionConfig** register. With this value, the camera and frame grabber establish their connection.

2. Sequence of launching camera and frame grabber to establish connection:
The camera and frame grabber follow the sequence below to establish a connection.

Step 1: Camera launches with **ConnectionConfig** = CXP3_X4 and copies a value from **JAIConnectionConfigDefault** into **ConnectionConfigDefault**.

Step 2: Frame grabber reads the value from **ConnectionConfigDefault** and writes it into **ConnectionConfig**.

Step 3: As a result of Step 2, the camera's connection configuration becomes the value written in **ConnectionConfig**.

Step 4: Frame grabber also changes connection configuration to the value written in **ConnectionConfig**. Then, the camera and frame grabber can establish a connection using the connection configuration shared within **ConnectionConfig**.

3. Method to save an expected connection configuration into the camera:
Through the frame grabber, the user can save an expected connection configuration into the register **JAIConnectionConfigDefault** of camera.

Using this saved value and the sequence of steps in Section 2, the camera and frame grabber launch and establish connection with saved connection configuration.

The following description is an example to save such a connection configuration using the JAI SDK and Control Tool.

Step 1: Before saving the connection configuration. As shown in Figure 1, this example starts with **ConnectionConfig** = CXP3_X4.

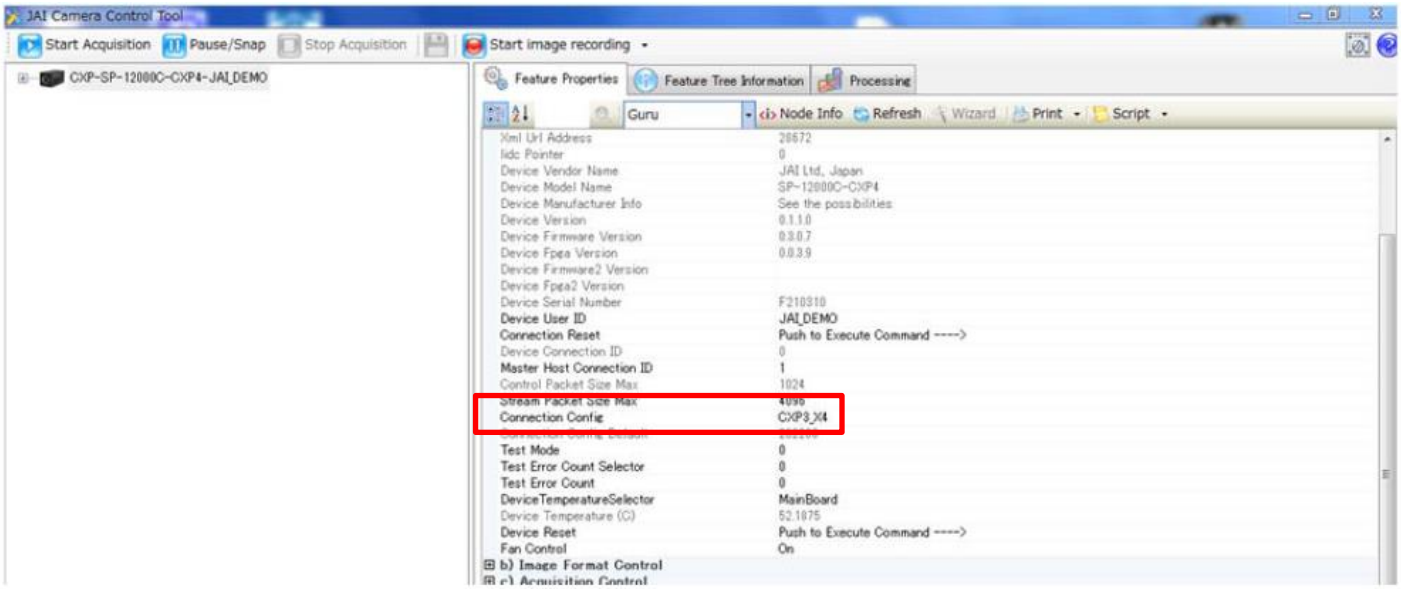

Figure 1: Before saving connection configuration

Step 2: Set an expected connection configuration value into **JAIConnectionConfigDefaut**.

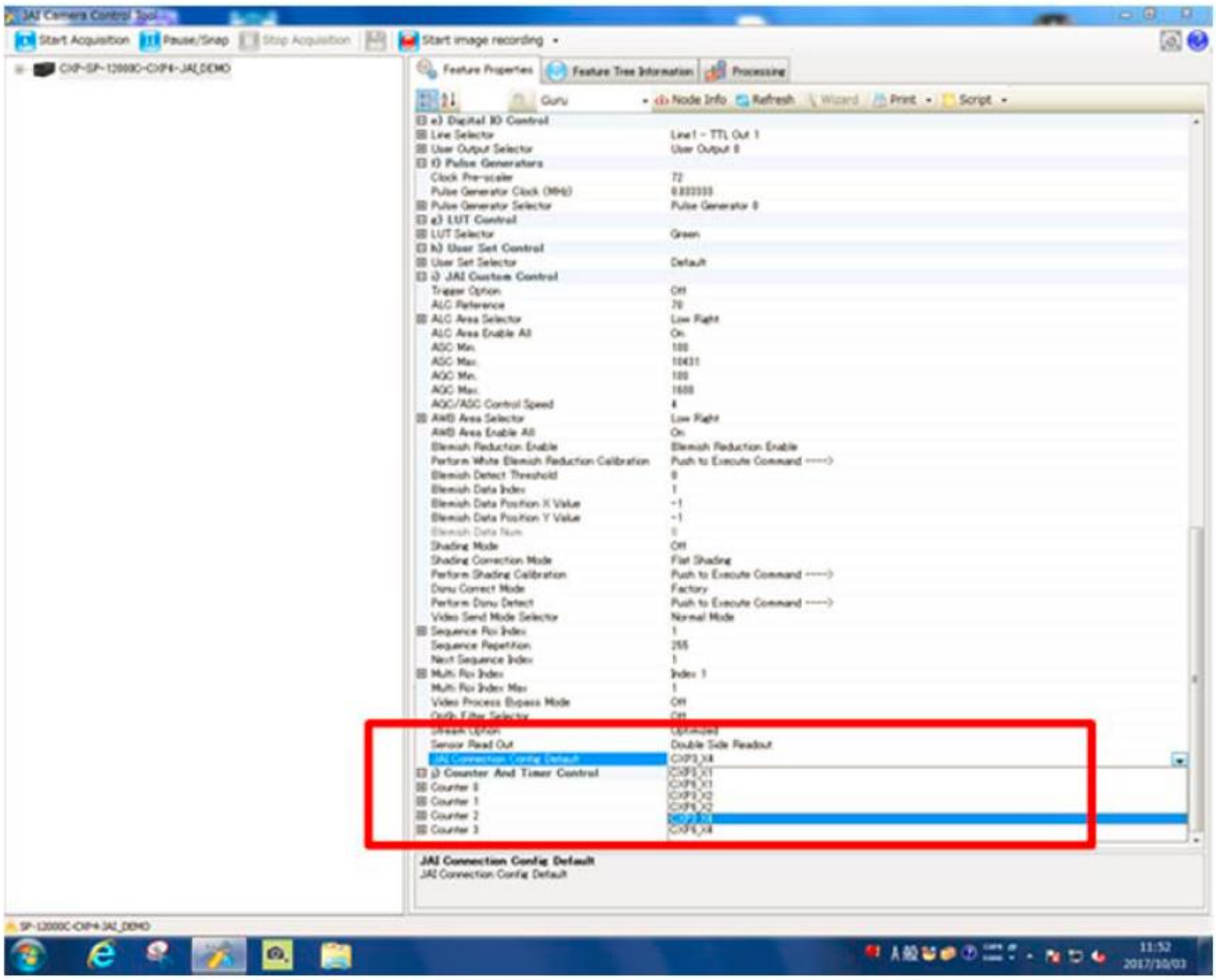

Figure 2: Set an expected connection configuration value

Step 3: The expected value is set in **JAIConnectionConfigDefault**. In this example, the value is CXP6_X4.

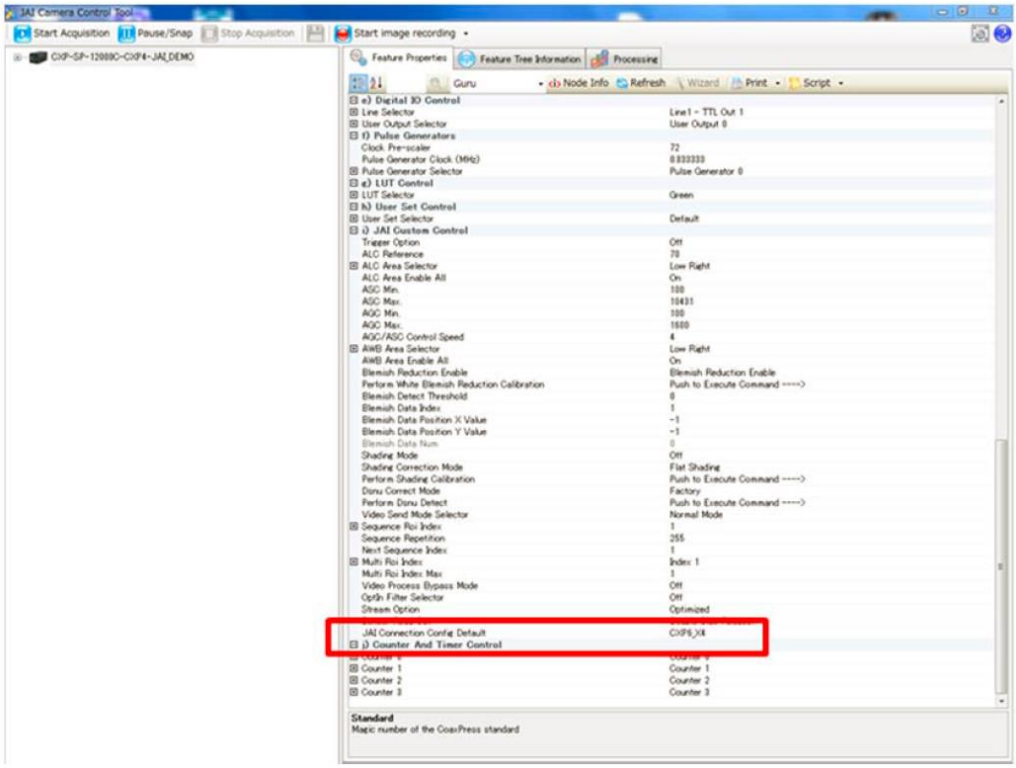

Figure 3: The expected value is set in the camera

Step 4: After Power Off and On, **ConectionConfig** becomes the value saved in **JAIConnectionConfigDefault**. In this example, the value is CXP6_X4.

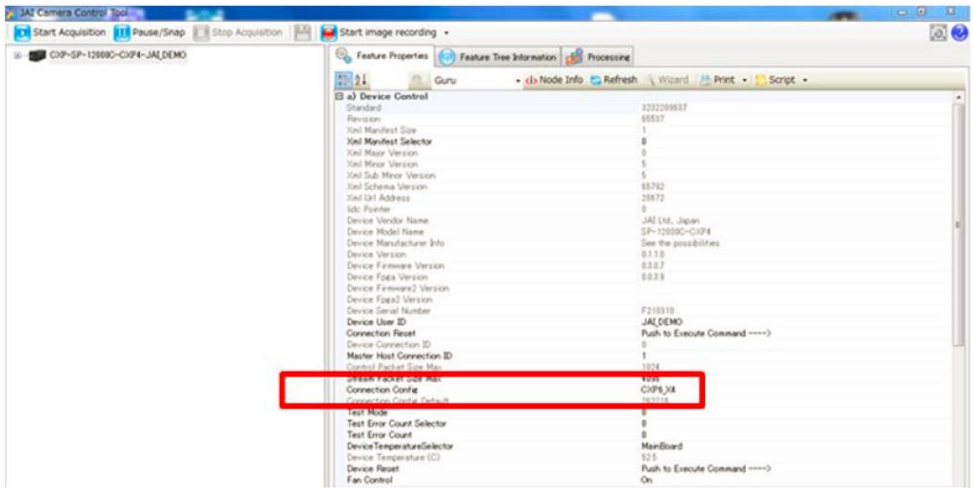

Figure 4: Camera and frame grabber launch and establish connection with saved connection configuration.

4. Implementation status of camera and frame grabbers:

As of March 2018, the following camera and frame grabbers are supporting CXP1.1 with the ability to save a connection configuration:

Camera: SP-12000x-CXP4, device version 0.1.1.0 or later
Frame Grabbers: The following frame grabbers are confirmed to handle connection configuration.

Vendor	Frame Grabber Board	Frame Grabber Software	Frame Grabber Board Firmware
Active Silicon	AS-FBD-4XCXP6-2PE8	as-fbd-cxp-win64-v01-04-01	b.6.7
Aval Data	APX-3664 (4 Port)	AZP-ACAPTF-01_V151(*1)	1.70
Euresys	Coaxlink Quad	coaxlink-win-6.2.2.21	202
Silicon Software	microEnable5-AQ8-CXP6B	RuntimeSetup_v5.4.4_Win64	2.9
Matrox	Radient eV-CXP	MIL-Lite10 R2 (build2995) 64-bit	Mon Jul 06 09: 27:46 2015

*1) v1312 does not work for saving connection configuration. V151 works the feature.

5. SP-4500x-CXP4x series implementation information:
JAI's 45-megapixel SP-4500x-CXP4x series also supports the link configuration function as described in this technical note. However, since SP-4500x-CXP4x cameras follow SFNC 2.5 which standardizes CXP naming rules, some terminologies are different than those listed for SP-12000x-CXP4 cameras.

The following table maps the parameter names used in the SP-12000x-CXP4 to those in SP-4500x-CXP4x cameras. By substituting the names as shown below and as illustrated in the figure on the next page, this technical note can be applied to SP-4500x-CXP4x series cameras.

SP-12000x-CXP4 series	SP-4500x-CXP4x series
ConnectionConfig	Cxp Link Configuration
ConnectionConfigDefault	Cxp Link Configuration Preferred
JAIConnectionConfigDefault	JAI Cxp Link Configuration Preferred

Technical Note

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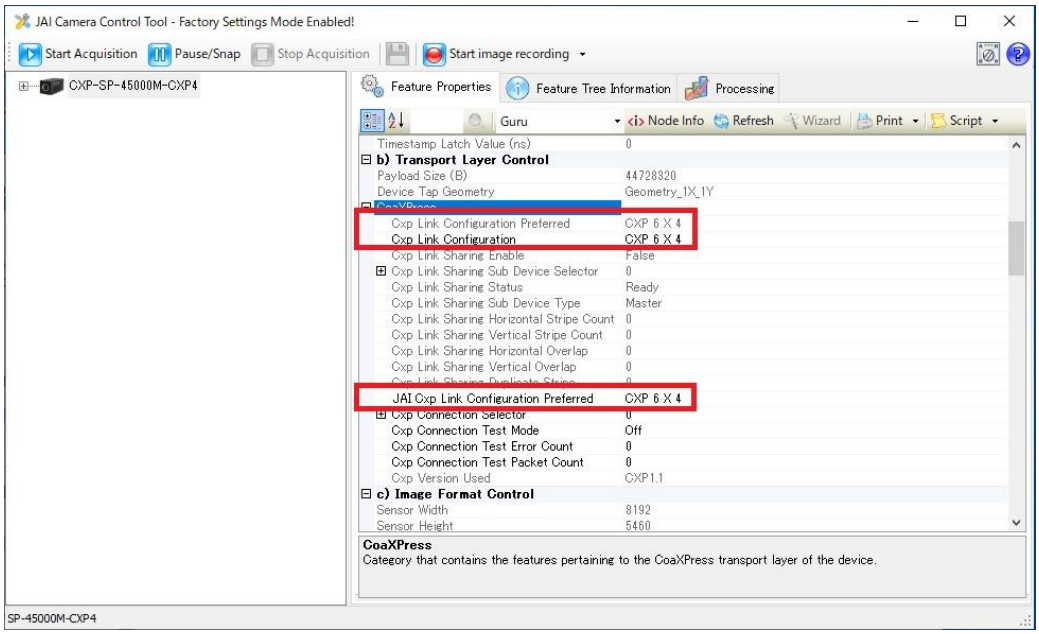

Figure 5: CXP Link Configuration parameters of SP-4500x-CXP4x

End.

Revision History

Revision	Date	Changes
1	2018/03/02	New release
2	2020/10/27	Added SP-4500x-CXP4x series