



# **CertusPro-NX Sensor to Ethernet Bridge Board**

## **Evaluation Board User Guide**

FPGA-EB-02069-1.0

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## Abbreviations in This Document

A list of abbreviations used in this document.

Abbreviation	Definition
CMOS	Complementary Metal-Oxide Semiconductor
CSI-2	Camera Serial Interface
DDR	Double Data Rate
DSI	Display Serial Interface
FTDI	Future Technology Devices International
GPIO	General Purpose Input/Output
I2C	Inter-Integrated Circuit
I2S	Inter-IC Sound
JTAG	Joint Test Action Group
LDO	Low Dropout
LED	Light Emitting Diode
LVDS	Low-Voltage Differential Signaling
MIPI	Mobile Industry Processor Interface
ML	Machine Learning
MSPI	Master SPI
PMOD	Peripheral Module
SMA	SubMiniature version A
SPI	Serial Peripheral Interface
SSPI	Slave SPI
VIP	Video Interface Platform
VTT	Tracking Termination Voltage

# 1. Introduction

This user guide document describes the Lattice Semiconductor CertusPro™-NX Sensor to Ethernet Bridge Board. The board's key components are the CertusPro-NX-100 FPGA and CrossLink-NX-17, which receive sensor data and output to the host system over Ethernet. The Sensor Bridge Reference Design, CertusPro-NX Sensor to Ethernet Bridge Board and NVIDIA IGX Orin/AGX Platform allows developers to rapidly design connectivity bridging applications from sensor to compute.

The CertusPro-NX Sensor to Ethernet Bridge Board Kit includes the following:

- CertusPro-NX Sensor to Ethernet Bridge Board
  - Certus-Pro-NX-100 FPGA (LFPCNX-100-9LFG672C)
  - CrossLink-NX-17 FPGA (LIFCL-17-9BG256C)
- USB Type-C to USB Type-C Cable

The contents of this user guide include top-level functional descriptions of the various portions of the CertusPro-NX Sensor to Ethernet Bridge Board, including descriptions of the on-board headers, connectors, status indicators and push buttons. The appendix sections include the BOM of this board.

The CertusPro-NX Sensor to Ethernet Bridge Board includes the following resources to implement various solutions:

- SERDES Channels – CertusPro-NX SERDES Channels are configured to two Ethernet SFP+ Ports and JESD204B Port
- FMC Connector – The board implements a subset of the High Pin Count (HPC) FMC implementation through the CertusPro-NX FPGA device
- SLVS-EC - Compatible pins available for other sensors
- JESD-204B – Four differential JESD-204B lanes are supported between CertusPro-NX and FMC Connector (J1)

Figure 1.1 and Figure 1.2 show the top and bottom views of the CertusPro-NX Sensor to Ethernet Bridge Board and its key components.

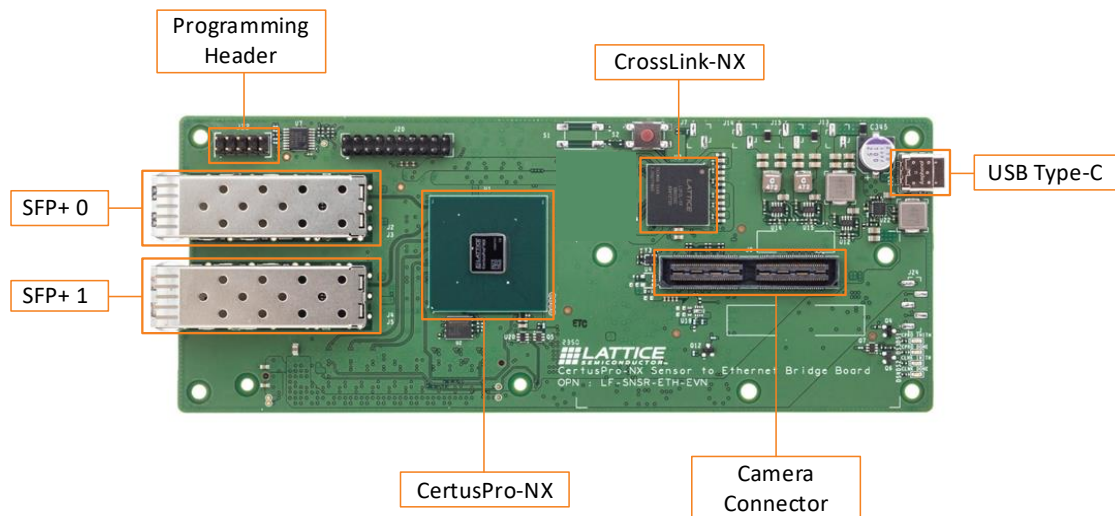


Figure 1.1. Top View of CertusPro-NX Sensor to Ethernet Bridge Board

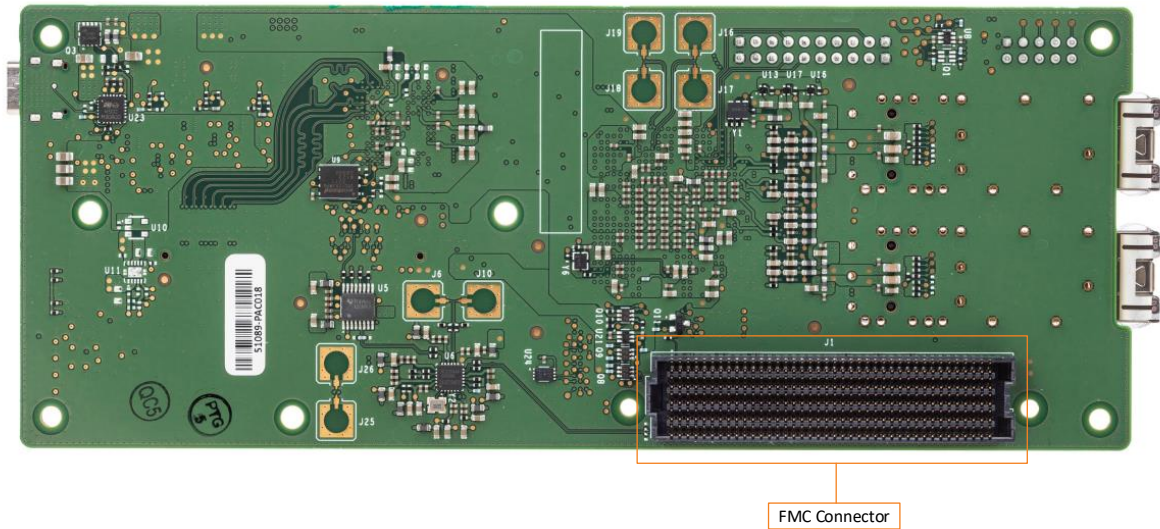


Figure 1.2. Bottom View of CertusPro-NX Sensor to Ethernet Bridge Board

## 1.1. Further Information

The following references provide detailed information on the CertusPro-NX Sensor to Ethernet Bridge Board, CertusPro-NX-100 FPGA and CrossLink-NX-17 FPGA:

- [Appendix A CertusPro-NX Sensor to Ethernet Bridge Board Bill of Materials](#)
- [CertusPro-NX Family Data Sheet \(FPGA-DS-02086\)](#) for details on the CertusPro-NX-100 FPGA.
- [CrossLink-NX Family Data Sheet \(FPGA-DS-02049\)](#) for details on the CrossLink-NX-17 FPGA.
- [Development Kits and Boards for CertusPro-NX](#)
- [Development Kits and Boards for CrossLink-NX](#)
- [Holoscan Sensor Bridge Quick Start Guide \(FPGA-AN-02096\)](#)



## 2. Headers and Jumpers

This section describes the CertusPro-NX Sensor to Ethernet Bridge Board’s headers and jumpers. [Table 2.1](#) lists the headers and jumpers as shown in [Figure 1.1](#) and [Figure 1.2](#). See the [CertusPro-NX I/O Ball Mapping to Connectors](#) section for detailed connections of the headers and jumpers.

**Table 2.1. Headers and Jumpers**

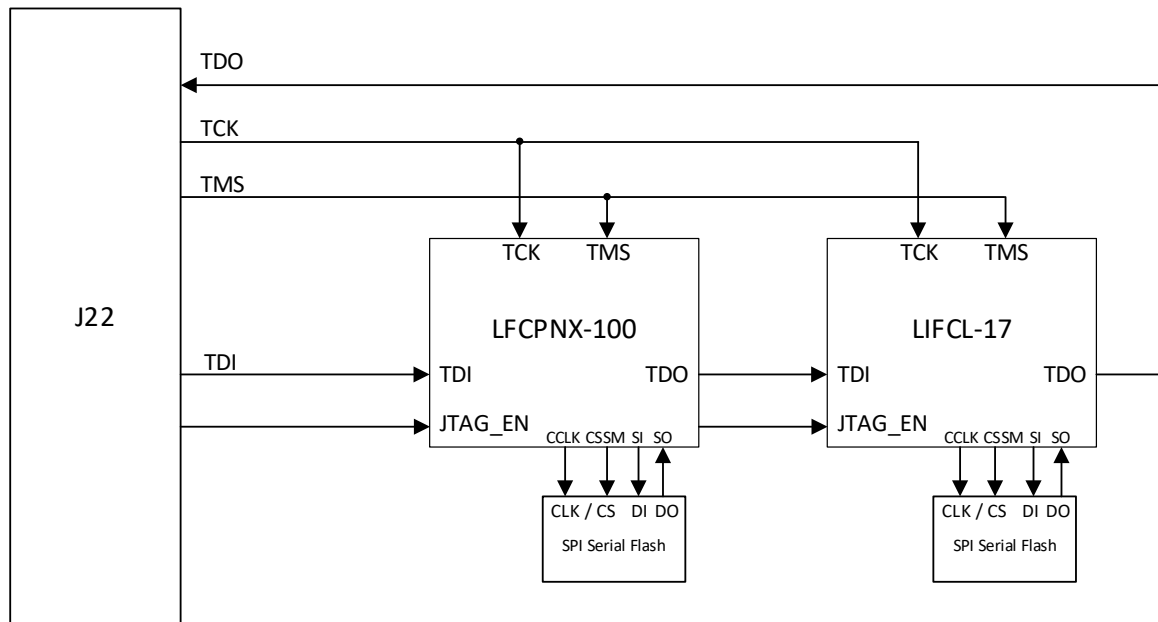
Header Designator	Description	Notes
J1	FMC (FPGA Mezzanine Card) Connector	—
J2/J3	SFP+ (Small Form-Factor Pluggable) Port	—
J4/J5	SFP+ (Small Form-Factor Pluggable) Port	—
J6, J10, J16, J17 J18, J19, J25, J26	50 Ω Surface Mount Plug Connector	May or may not be populated
J7	2-Pin Header for FPGA_JTAG_EN Control	Not Populated
J9	Camera Connector	—
J13	2-Pin Header for Power Measurement of VDD_3V3 Rail	Not Populated
J14	2-Pin Header for Power Measurement of VDD_1V0 Rail	Not Populated
J15	2-Pin Header for Power Measurement of VDD_1V8 Rail	Not Populated
J20	CertusPro-NX Test Point Header	—
J22	FPGA JTAG & I <sup>2</sup> C Header	—
J23	USB Type-C Connector	—
J24	5-Pin Header I2C to USB Controller (U23) & Regulator (U22)	Not Populated

## 3. Board Programming

### 3.1. Programming Circuit

CertusPro-NX-100 and CrossLink-NX-17 can be programmed through J22 header with the [Lattice Programming Cable](#) (OPN: HW-USBN-2B) and Lattice Radiant Programmer Software. You can program the FPGA's SRAM volatile memory or external flash (Winbond W25Q128JWPIQ 128 Mb) connected to each FPGA. The CertusPro-NX-100 and CrossLink-NX-17 FPGAs are connected in a JTAG chain, therefore, both devices can be programmed through the same set of JTAG pins on the J22 header.

[Figure 3.1](#) shows the programming blocks of CertusPro-NX and CrossLink-NX-17 on the CertusPro-NX Sensor to Ethernet Bridge Board.



**Figure 3.1. Programming Block**

### 3.2. Hardware Setup for Programming

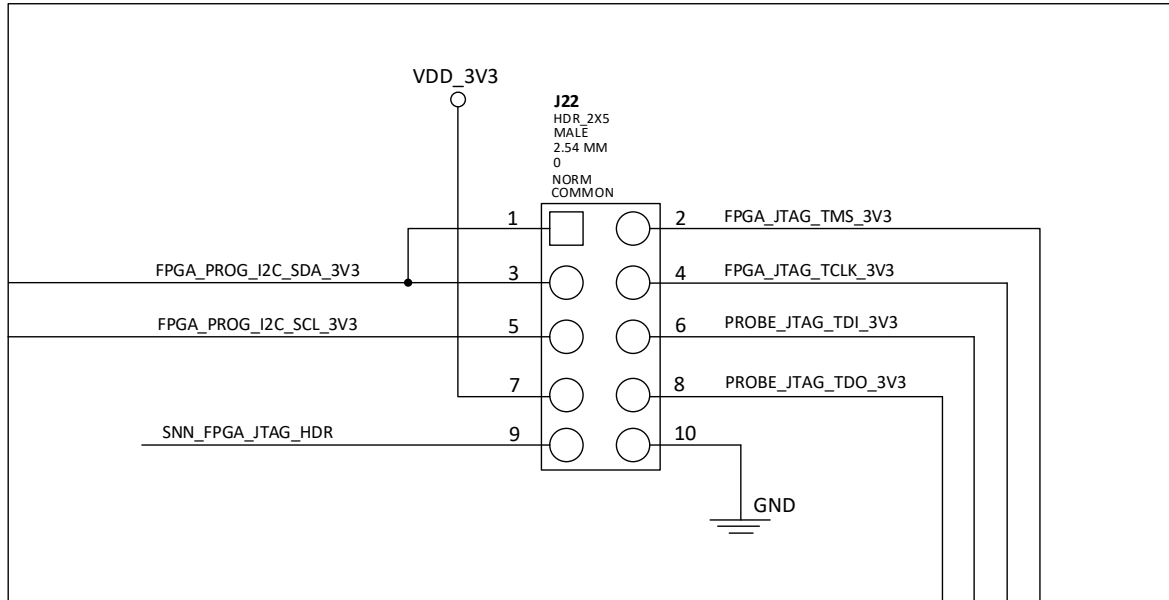
The board is programmed using the Lattice Radiant Programmer Software, which can be started as a stand-alone tool or from a Lattice Radiant project.

To program the board:

1. Connect the Lattice Programming Cable to the board's J22 Header per table ([Table 3.1](#)).

**Table 3.1. Lattice Programming Cable Connections**

LF-SNSR-ETH-EVN	J22 NET NAME	Lattice Programming Cable	Cable Color
J22.2	FPGA_JTAG_TMS_3V3	TMS	Purple
J22.4	FPGA_JTAG_TCLK_3V3	TCK/SCLK	White
J22.6	PROBE_JTAG_TDI_3V3	TDI/SI	Orange
J22.7	VDD_3V3	VCC	Red
J22.8	PROBE_JTAG_TDO_3V3	TDO/SO	Brown
J22.10	GND	GND	Black



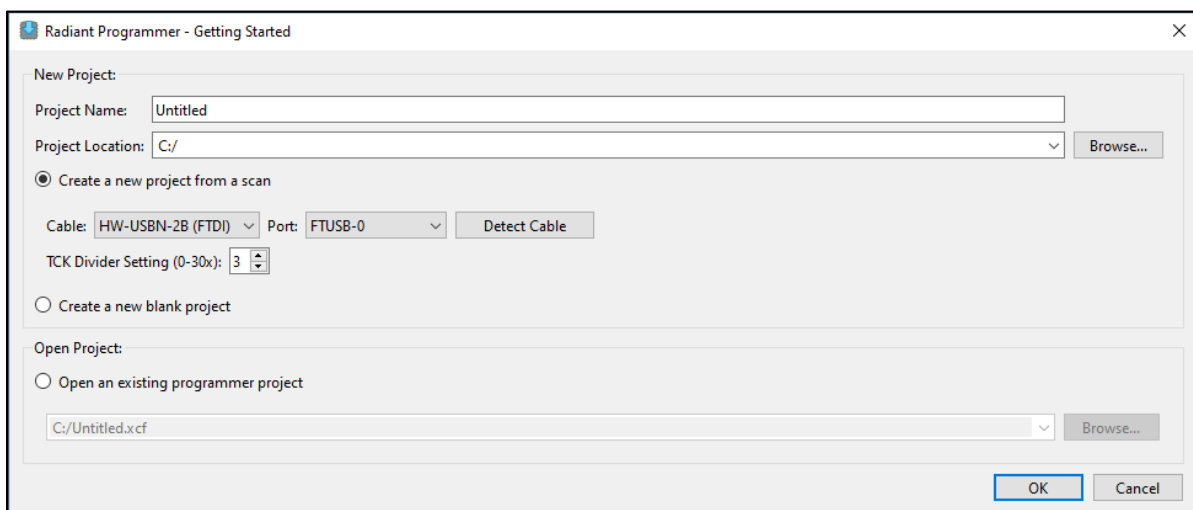
**Figure 3.2. CertusPro-NX Sensor to Ethernet Bridge Board J22 Pinout**

2. Power ON the board by connecting a USB Type-C power source to J23 connector.

### 3.3. Programming the FPGA SRAM

This section describes the procedure for programming bitstream patterns to the SRAM (volatile) configuration memory of CertusPro-NX-100 and CrossLink-NX-17. The bitstreams are programmed through the JTAG interface. For details on FPGA configuration, refer to the [sysCONFIG Usage Guide for Nexus Platform \(FPGA-TN-02099\)](#).

1. Start a programming project by launching the tool and initiating a board scan, as shown in [Figure 3.3](#).



**Figure 3.3. Starting Programmer**

- When the board is successfully scanned, the window shown in [Figure 3.4](#) opens. This interface allows you to enter the file name.

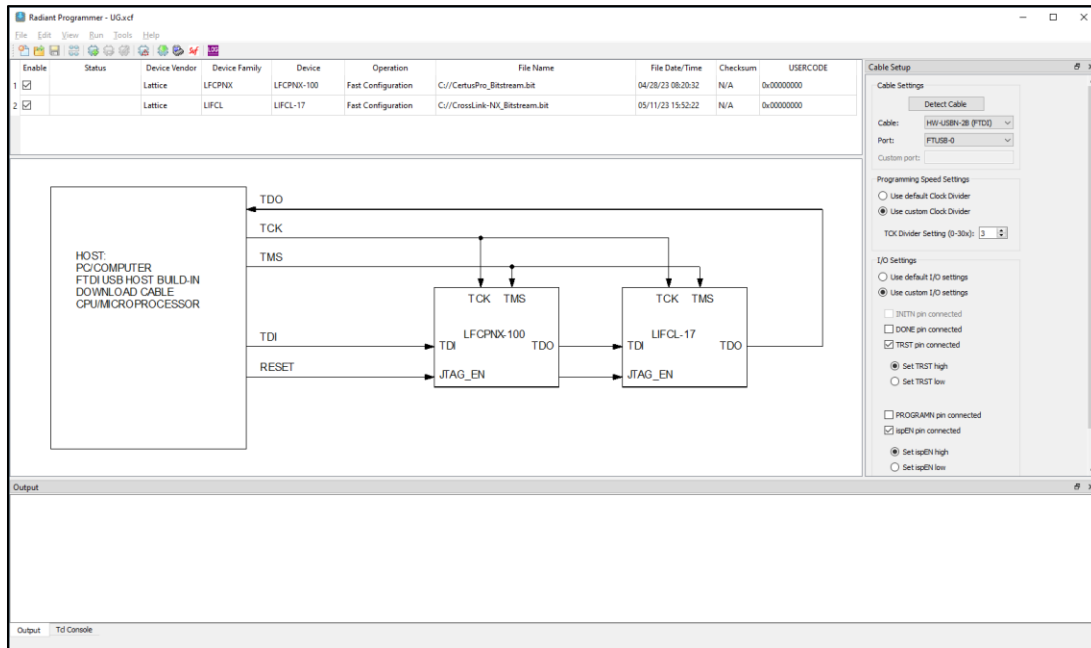


Figure 3.4. Lattice Radiant Programmer SRAM Fast Configuration

- Double-click on the **Operation** field and select the appropriate programming mode. In this example, **Fast Configuration** of **Static Random Access Memory (SRAM)** is selected ([Figure 3.5](#) and [Figure 3.6](#)).

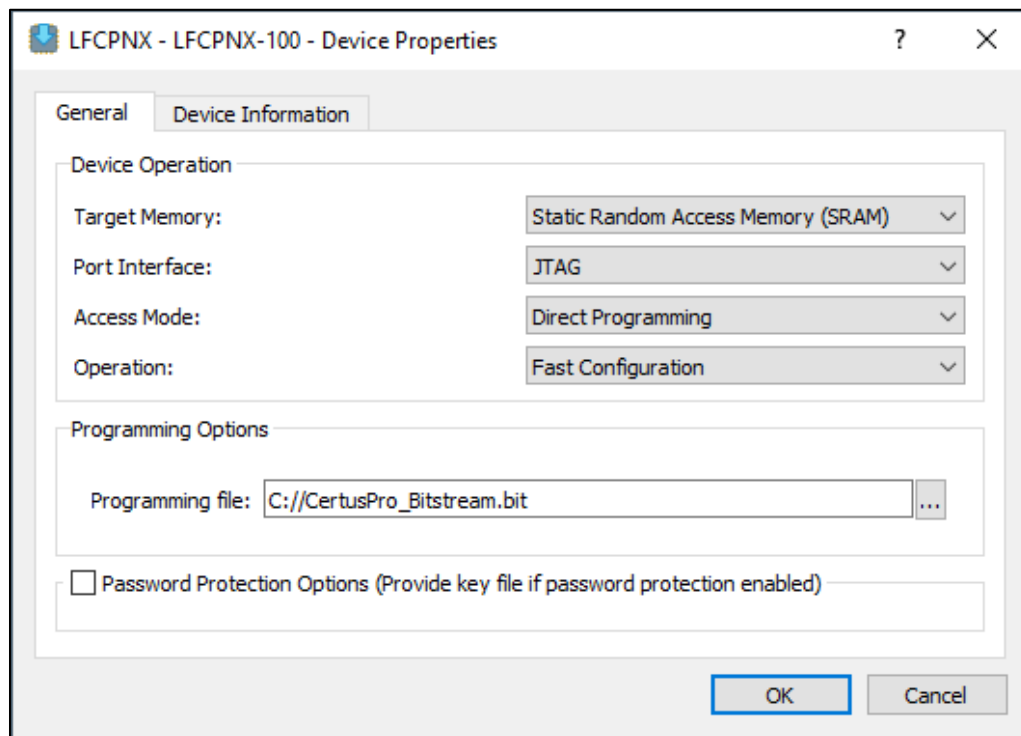


Figure 3.5. SRAM Device Properties Window – CertusPro-NX

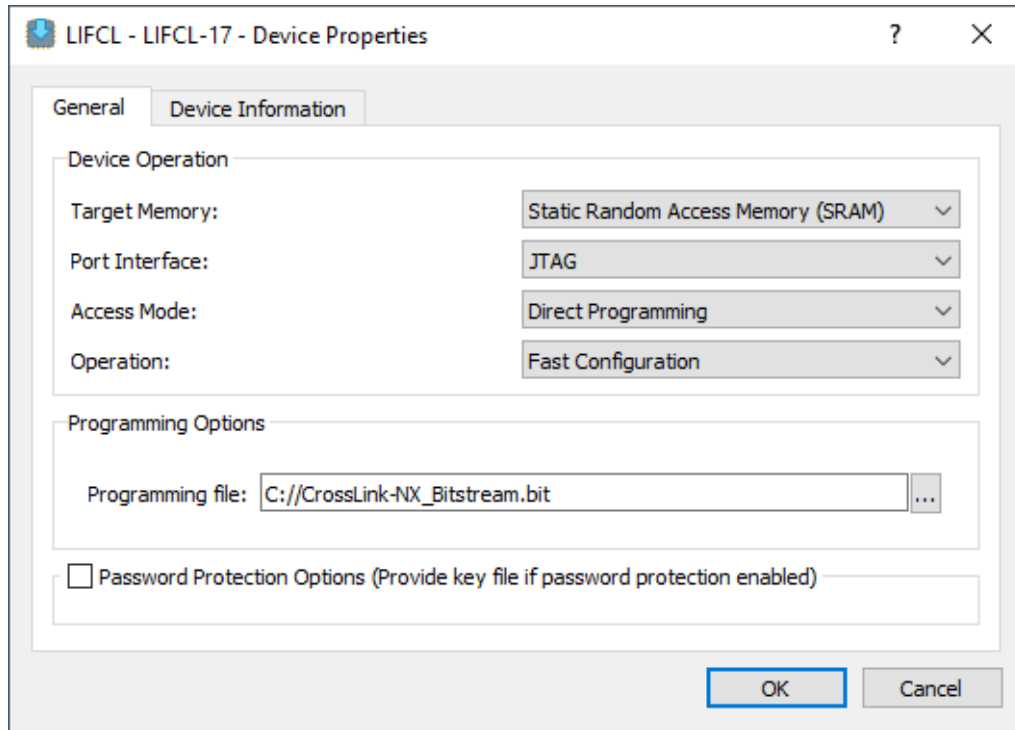


Figure 3.6. SRAM Device Properties Window – CrossLink-NX

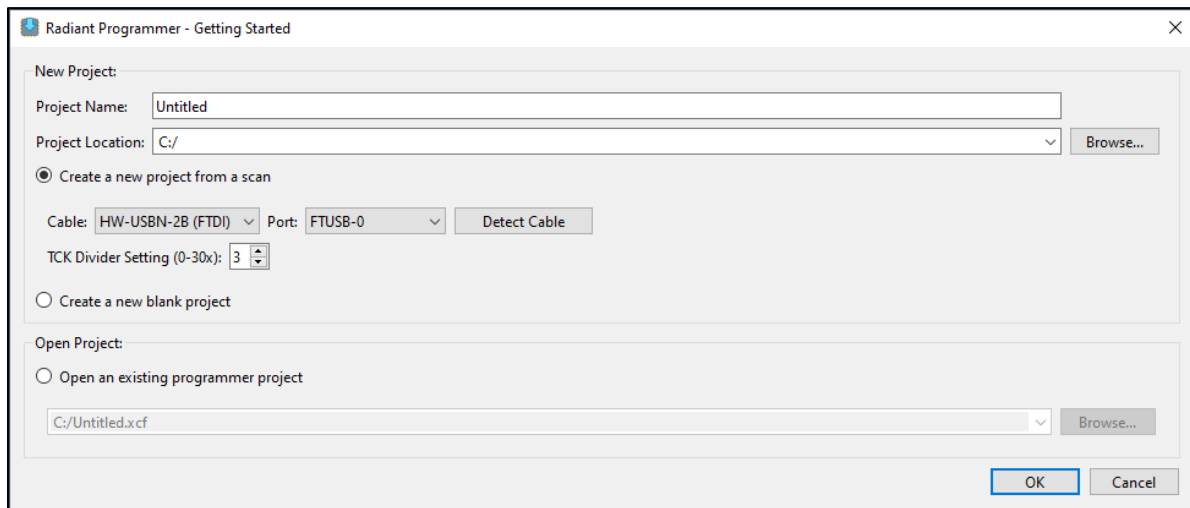
4. Back in the main Window, click the **Program** button to configure the two FPGAs on the CertusPro-NX Sensor to Ethernet Bridge Board.
5. Check the **Output** console at the bottom of Lattice Radiant Programmer for the result of the programming. You should see **Operation: Successful** as shown in Figure 3.7.



Figure 3.7. Lattice Radiant Programmer Output Window

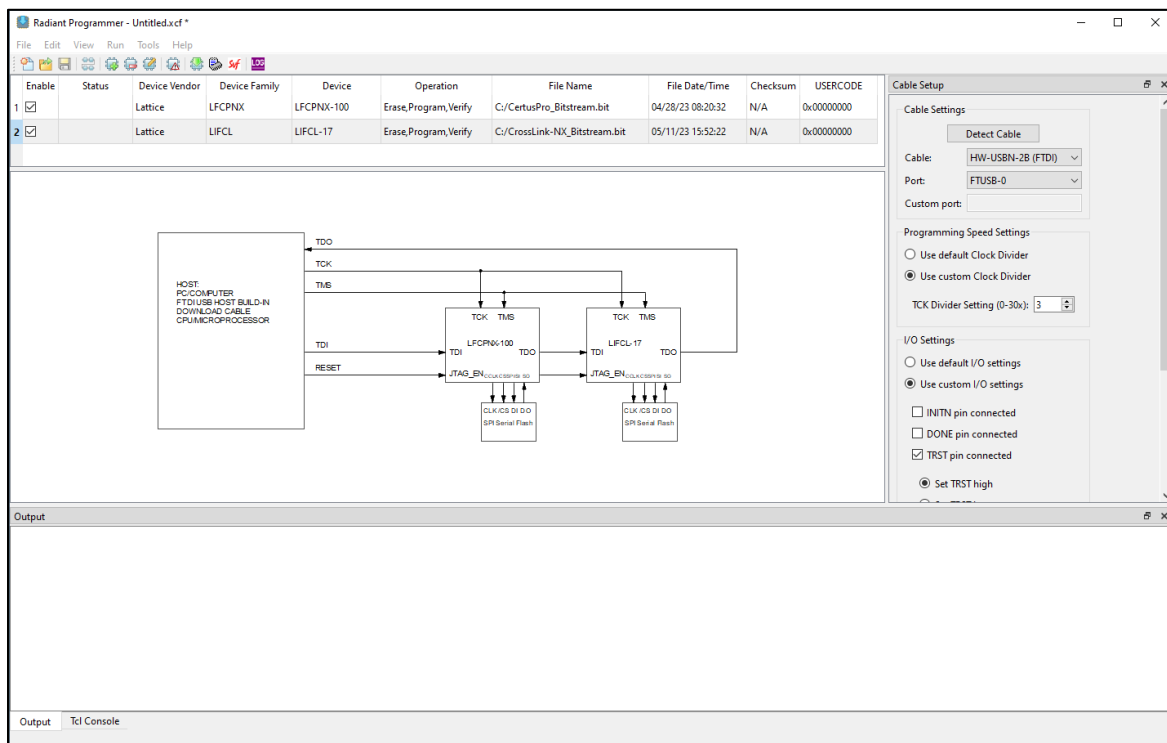
### 3.4. Programming the FPGA external FLASH

1. Start a programming project by launching the tool and initiating a board scan, as shown in [Figure 3.8](#).



**Figure 3.8. Starting Programmer**

2. When the board is successfully scanned, the window shown in [Figure 3.9](#) opens. This interface allows you to enter the file name.



**Figure 3.9. Lattice Radiant Programmer – External Flash Configuration**

3. Double-click on the **Operation** field and select the appropriate programming mode. In this example, **Erase, Program, Verify** of **External SPI Flash Memory (SPI Flash)** is selected (Figure 3.10 and Figure 3.11).

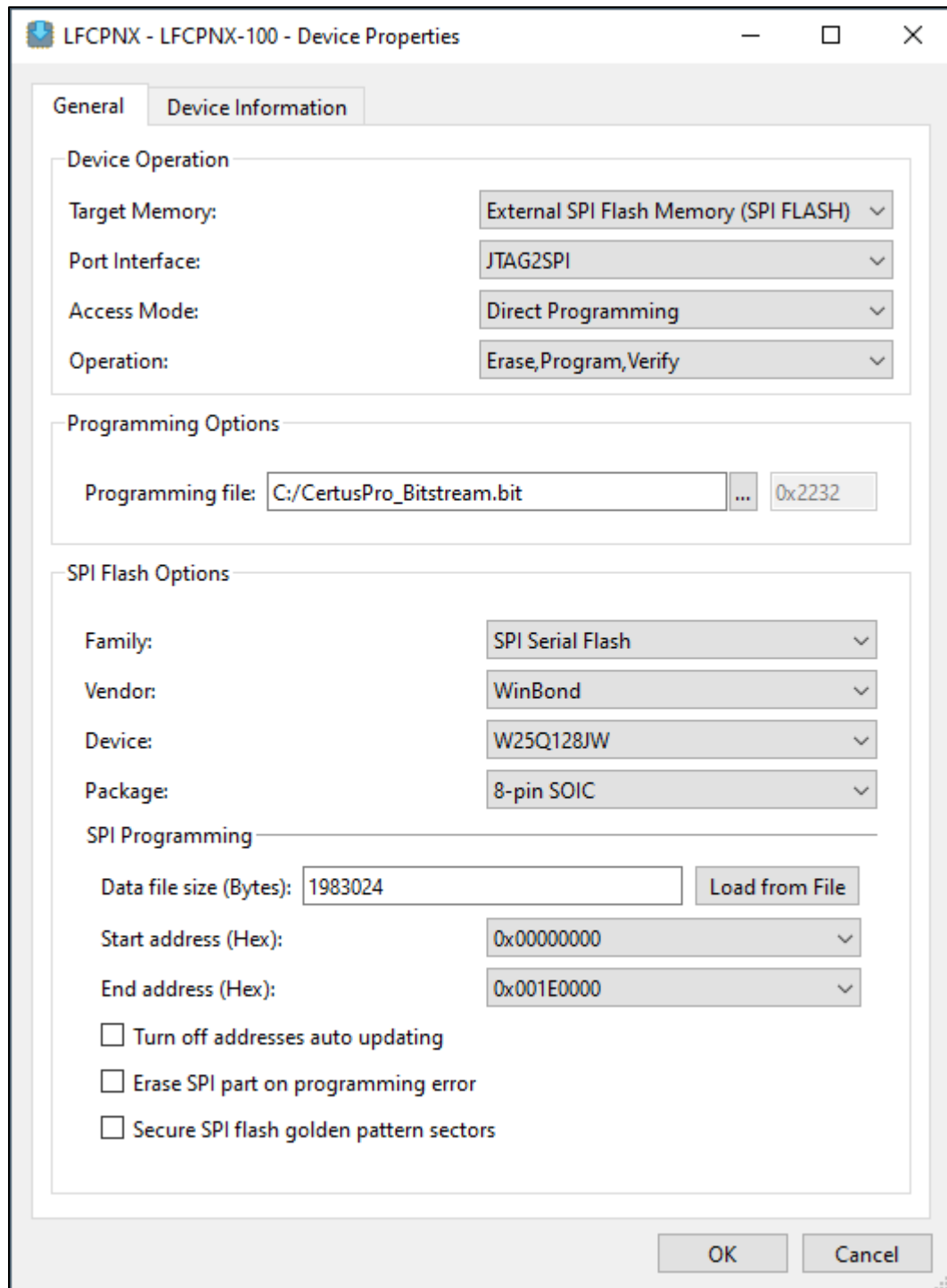


Figure 3.10. External SPI Flash Memory (SPI Flash) Device Properties Window – CertusPro-NX

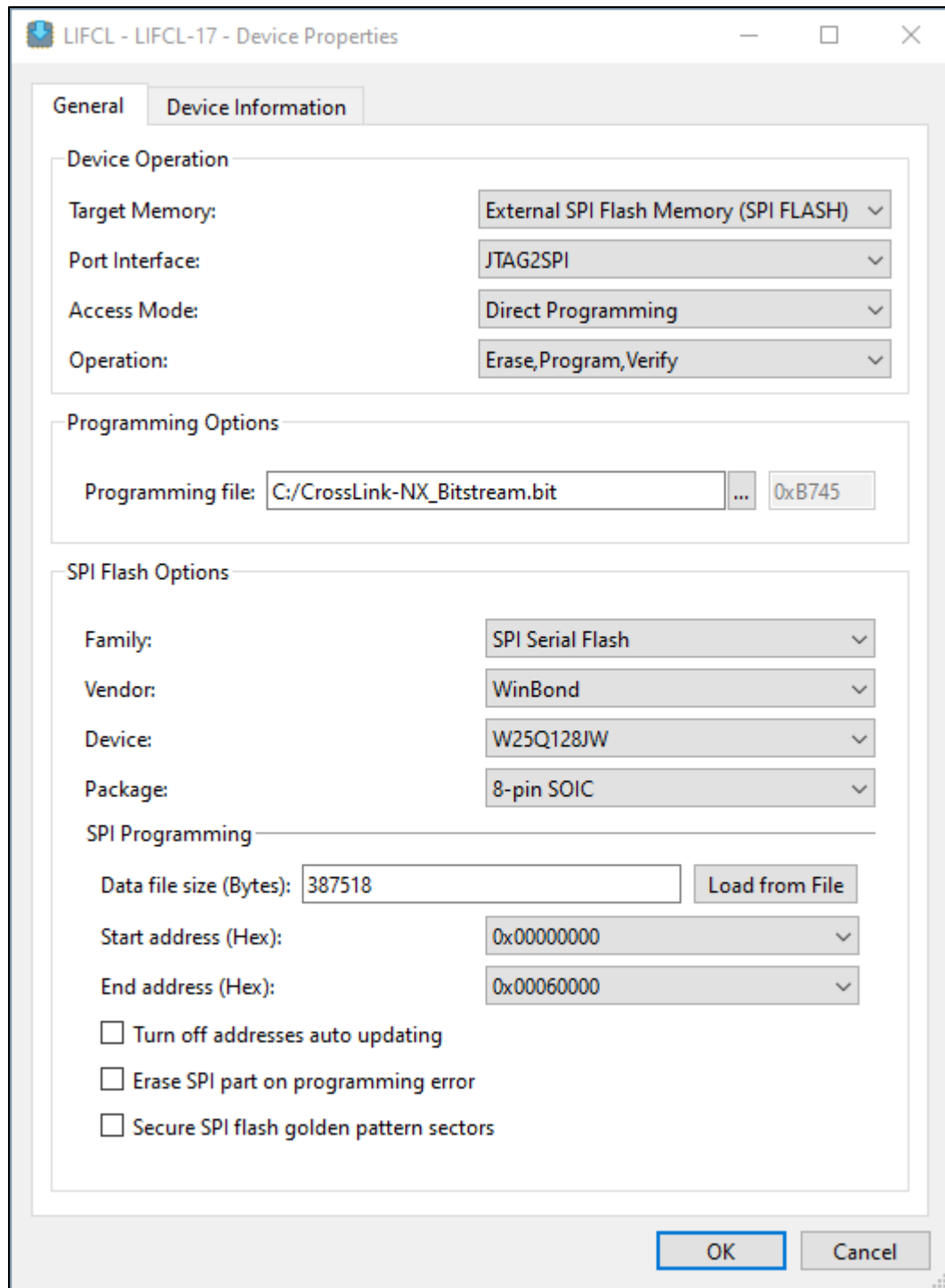


Figure 3.11. External SPI Flash Memory (SPI Flash) Device Properties Window – CertusPro-NX

4. Back in the main Window, click the **Program** button to configure the two flashes on the CertusPro-NX Sensor to Ethernet Bridge Board.
5. Check the **Output** console at the bottom of Lattice Radiant Programmer for the result of the programming. You should see **Operation: Successful** as shown in [Figure 3.12](#).





**Figure 3.12. Lattice Radiant Programmer Output Window**

## 4. CertusPro-NX Sensor to Ethernet Bridge Board Interface Support

The CertusPro-NX Sensor to Ethernet Bridge Board supports various onboard interfaces. The sections below describe key onboard interfaces supported on the board.

### 4.1. Camera Sensor Interface

Figure 4.1 shows the block diagram of the camera sensor interface on the CertusPro-NX Sensor to Ethernet Bridge Board. This connector is used to interface with a camera board to bring MIPI camera data into the CrossLink-NX FPGA device. This 120-Pin connector can support up to 2 MIPI channels with up to 4 data lanes on each MIPI channel.

Example board and camera that can be connected to this connector:

- [Leopard Imaging Camera Adapter Board](#)
- [IMX274 Camera for Leopard Imaging Camera Adapter Board](#)
- [E-con Systems Camera Module with Sony IMX715 Sensor](#)

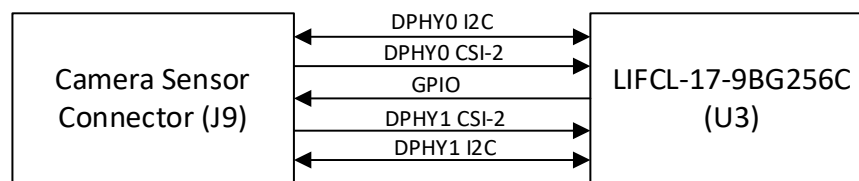


Figure 4.1. Camera Sensor Interface

### 4.2. SFP+ (Small Form-Factor Pluggable) Interface

Figure 4.2 shows the block diagram of the SFP+ ports on the CertusPro-NX Sensor to Ethernet Bridge Board. SFP+ is an enhanced version of the SFP Specification. There are two 10 Gbps Ethernet ports that are connected to the CertusPro-NX FPGA device, connector 0 is on J2/J3 and connector 1 is on J4/J5. See Figure 1.1 for connector 0 and connector 1 locations. These ports are used to send data to the downstream host system.

SFP+ connector 0 and connector 1 each have their own unique MAC Addresses and in sequential order. Connector 0 will have the lower MAC Address of the two. Connector 1's MAC Address will be Connector 0's MAC Address plus one.

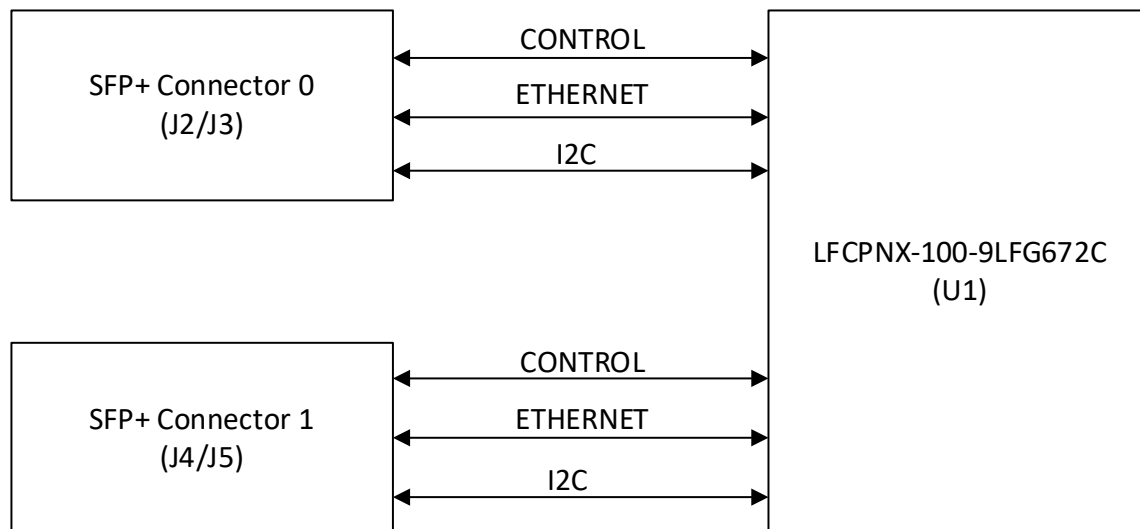


Figure 4.2. SFP+ Interface

### 4.3. FMC Interface

CertusPro-NX Sensor to Ethernet Bridge Board supports the VITA 57 FMC Specification through the J1 connector which uses the Samtec Inc. ASP-134486-01 400-Pin receptacle. The FMC connector allows users to expand the CertusPro-NX's capabilities through connection of 3rd party FMC mezzanine cards. The J1 FMC connector implements a subset of the High Pin Count (HPC) FMC implementation through the CertusPro-NX FPGA device. See [FMC Connector](#) section for details.

- Single Ended / Differential Signals – 64 / 32 Pairs
- Differential Clocks – 6
- Transceiver differential pairs – 8
- Transceiver differential clocks – 2

## 5. Power Supply

The power supply to the CertusPro-NX Sensor to Ethernet Bridge Board is provided from the J23 USB Type-C connector.

Figure 5.1 shows a high-level power distribution on the CertusPro-NX Sensor to Ethernet Bridge Board. 20 V is supplied through the USB Type-C connector and the board converters create the remaining 12.0 V, 3.3 V, 2.5 V, 1.8 V and 1.0 V supplies required by the board components.

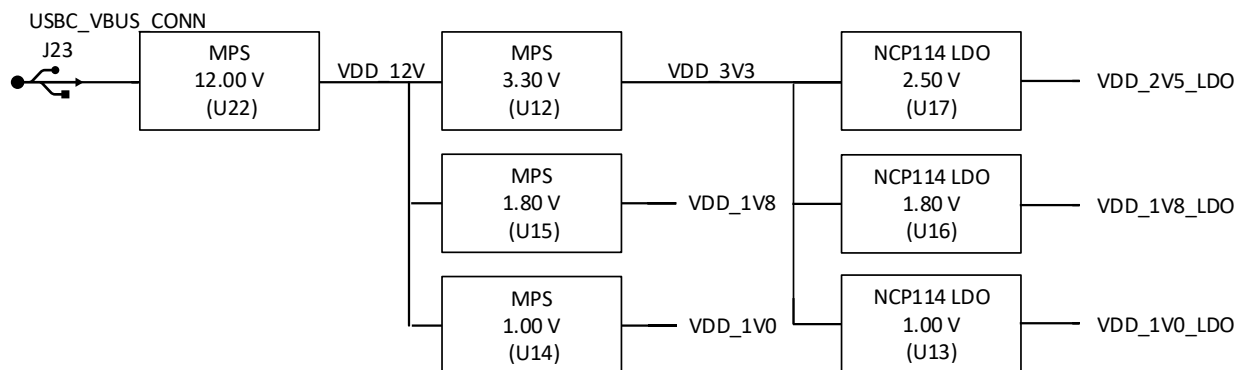


Figure 5.1. Power Supply Block

Table 5.1 lists the board voltage rails including rail source voltage and voltage on net.

Table 5.1. Device Power Rail Summary

Voltage Rail	Power Source Reference	Input to Power Source Reference (V)	Voltage on Net (V)
USBC_VBUS_CONN	J23	N/A	20.00
VDD_12V	U22	20.00	12.00
VDD_3V3	U12	12.00	3.30
VDD_2V5_LDO	U17	3.30	2.50
VDD_1V8	U15	12.00	1.80
VDD_1V8_LDO	U16	3.30	1.80
VDD_1V0	U14	12.00	1.00
VDD_1V0_LDO	U13	3.30	1.00

Table 5.2. FPGA VCCIO BANK Supplies

FPGA	Reference	VCCIO BANK	Voltage (V)
CertusPro-NX	U1	VCCIO0	1.80
		VCCIO1	1.80
		VCCIO2	1.80
		VCCIO3	1.80
		VCCIO4	1.80
		VCCIO5	1.80
		VCCIO6	1.80
		VCCIO7	3.30

FPGA	Reference	VCCIO BANK	Voltage (V)
CrossLink-NX	U3	VCCIO0	1.80
		VCCIO1	1.80
		VCCIO2	1.80
		VCCIO3	1.80
		VCCIO4	1.80
		VCCIO5	1.80
		VCCIO6	1.80
		VCCIO7	1.80

## 6. CertusPro-NX I/O Ball Mapping to Connectors

### 6.1. FMC Connector

**Table 6.1. FMC (J1 Row A) Pin Connections**

J1 ROW A Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
A2	JESD_RXD1_P	SERDES	C12
A3	JESD_RXD1_N	SERDES	B13
A6	JESD_RXD2_P	SERDES	B16
A7	JESD_RXD2_N	SERDES	C16
A10	JESD_RXD3_P	SERDES	B19
A11	JESD_RXD3_N	SERDES	B20
A14	SNN_FMC_A14	NO CONNECT	
A15	SNN_FMC_A15	NO CONNECT	
A18	SNN_FMC_A18	NO CONNECT	
A19	SNN_FMC_A19	NO CONNECT	
A22	JESD_TXD1_P	SERDES	A11
A23	JESD_TXD1_N	SERDES	A12
A26	JESD_TXD2_P	SERDES	A14
A27	JESD_TXD2_N	SERDES	A15
A30	JESD_TXD3_P	SERDES	A17
A31	JESD_TXD3_N	SERDES	A18
A34	SNN_FMC_A34	NO CONNECT	
A35	SNN_FMC_A35	NO CONNECT	
A38	SNN_FMC_A38	NO CONNECT	
A39	SNN_FMC_A39	NO CONNECT	

**Table 6.2. FMC (J1 Row B) Pin Connections**

J1 ROW B Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
B1	CPRO_FMC_CLK_DIR	BANK 2	W1
B4	SNN_FMC_B4	NO CONNECT	
B5	SNN_FMC_B5	NO CONNECT	
B8	SNN_FMC_B8	NO CONNECT	
B9	SNN_FMC_B9	NO CONNECT	
B12	SNN_FMC_B12	NO CONNECT	
B13	SNN_FMC_B13	NO CONNECT	
B16	SNN_FMC_B16	NO CONNECT	
B17	SNN_FMC_B17	NO CONNECT	
B20	CPRO_FMC_GBTCLK1_P	SERDES	E10
B21	CPRO_FMC_GBTCLK1_N	SERDES	D9
B24	SNN_FMC_B24	NO CONNECT	
B25	SNN_FMC_B25	NO CONNECT	
B28	SNN_FMC_B28	NO CONNECT	
B29	SNN_FMC_B29	NO CONNECT	

J1 ROW B Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
B32	SNN_FMC_B32		NO CONNECT
B33	SNN_FMC_B33		NO CONNECT
B36	SNN_FMC_B36		NO CONNECT
B37	SNN_FMC_B37		NO CONNECT
B40	SNN_FMC_RESO		NO CONNECT

**Table 6.3. FMC (J1 Row C) Pin Connections**

J1 ROW C Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
C2	JESD_TXD0_P	SERDES	A8
C3	JESD_TXD0_N	SERDES	A9
C6	JESD_RXD0_P	SERDES	C10
C7	JESD_RXD0_N	SERDES	B10
C10	CPRO_FMC_LA06_P	BANK 3	W11
C11	CPRO_FMC_LA06_N	BANK 3	W10
C14	CPRO_FMC_LA10_P	BANK 3	AD9
C15	CPRO_FMC_LA10_N	BANK 3	AE9
C18	CPRO_FMC_LA14_P	BANK 3	AF6
C19	CPRO_FMC_LA14_N	BANK 3	AF5
C22	CPRO_FMC_LA18_P	BANK 3	Y6
C23	CPRO_FMC_LA18_N	BANK 3	AA6
C26	CPRO_FMC_LA27_P	BANK 4	AA17
C27	CPRO_FMC_LA27_N	BANK 4	Y17
C30	CPRO_FMC_I2C_SCL	BANK 2	Y4
C31	CPRO_FMC_I2C_SDA	BANK 2	AA4
C34	CPRO_FMC_GA0	BANK 2	W2

**Table 6.4. FMC (J1 Row D) Pin Connections**

J1 ROW D Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
D1	FMC_PG_C2M		N/A
D4	CPRO_FMC_GBTCLK0_P	SERDES	D11
D5	CPRO_FMC_GBTCLK0_N	SERDES	E11
D8	CPRO_FMC_LA01_CC_P	BANK 3	AC4
D9	CPRO_FMC_LA01_CC_N	BANK 3	AB4
D11	CPRO_FMC_LA05_P	BANK 3	Y11
D12	CPRO_FMC_LA05_N	BANK 3	AA11
D14	CPRO_FMC_LA09_P	BANK 3	AD10
D15	CPRO_FMC_LA09_N	BANK 3	AE10
D17	CPRO_FMC_LA13_P	BANK 3	AA7
D18	CPRO_FMC_LA13_N	BANK 3	Y7
D20	CPRO_FMC_LA17_P	BANK 3	AD5
D21	CPRO_FMC_LA17_N	BANK 3	AE5
D23	CPRO_FMC_LA23_P	BANK 5	W22
D24	CPRO_FMC_LA23_N	BANK 5	W21
D26	CPRO_FMC_LA26_P	BANK 4	AF19

J1 ROW D Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
D27	CPRO_FMC_LA26_N	BANK 4	AE19
D29	SNN_FMC_D29	NO CONNECT	
D30	SNN_FMC_D30	NO CONNECT	
D31	SNN_FMC_D31	NO CONNECT	
D33	SNN_FMC_D33	NO CONNECT	
D34	SNN_FMC_D34	NO CONNECT	
D35	CPRO_FMC_GA1	BANK 2	W5

**Table 6.5. FMC (J1 Row E) Pin Connections**

J1 ROW E Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
E2	SNN_FMC_E2	NO CONNECT	
E3	SNN_FMC_E3	NO CONNECT	
E6	SNN_FMC_E6	NO CONNECT	
E7	SNN_FMC_E7	NO CONNECT	
E9	SNN_FMC_E9	NO CONNECT	
E10	SNN_FMC_E10	NO CONNECT	
E12	SNN_FMC_E12	NO CONNECT	
E13	SNN_FMC_E13	NO CONNECT	
E15	SNN_FMC_E15	NO CONNECT	
E16	SNN_FMC_E16	NO CONNECT	
E18	SNN_FMC_E18	NO CONNECT	
E19	SNN_FMC_E19	NO CONNECT	
E21	SNN_FMC_E20	NO CONNECT	
E22	SNN_FMC_E22	NO CONNECT	
E24	SNN_FMC_E24	NO CONNECT	
E25	SNN_FMC_E25	NO CONNECT	
E27	SNN_FMC_E27	NO CONNECT	
E28	SNN_FMC_E28	NO CONNECT	
E30	SNN_FMC_E30	NO CONNECT	
E31	SNN_FMC_E31	NO CONNECT	
E33	SNN_FMC_E33	NO CONNECT	
E34	SNN_FMC_E34	NO CONNECT	
E36	SNN_FMC_E36	NO CONNECT	
E37	SNN_FMC_E37	NO CONNECT	



**Table 6.6. FMC (J1 Row F) Pin Connections**

J1 ROW F Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
F1	FMC_PG_M2C	BANK 2	Y1
F4	SNN_FMC_F4	NO CONNECT	
F5	SNN_FMC_F5	NO CONNECT	
F7	SNN_FMC_F7	NO CONNECT	
F8	SNN_FMC_F8	NO CONNECT	
F10	SNN_FMC_F10	NO CONNECT	
F11	SNN_FMC_F11	NO CONNECT	
F13	SNN_FMC_F13	NO CONNECT	
F14	SNN_FMC_F14	NO CONNECT	
F16	SNN_FMC_F16	NO CONNECT	
F17	SNN_FMC_F17	NO CONNECT	
F19	SNN_FMC_F19	NO CONNECT	
F20	SNN_FMC_F20	NO CONNECT	
F22	SNN_FMC_F22	NO CONNECT	
F23	SNN_FMC_F23	NO CONNECT	
F25	SNN_FMC_F25	NO CONNECT	
F26	SNN_FMC_F26	NO CONNECT	
F28	SNN_FMC_F28	NO CONNECT	
F29	SNN_FMC_F29	NO CONNECT	
F31	SNN_FMC_F31	NO CONNECT	
F32	SNN_FMC_F32	NO CONNECT	
F34	SNN_FMC_F34	NO CONNECT	
F35	SNN_FMC_F35	NO CONNECT	
F37	SNN_FMC_F37	NO CONNECT	
F38	SNN_FMC_F38	NO CONNECT	

**Table 6.7. FMC (J1 Row G) Pin Connections**

J1 ROW G Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
G2	CPRO_FMC_CLK1_M2C_P	BANK 3	AB11
G3	CPRO_FMC_CLK1_M2C_N	BANK 3	AC11
G6	CPRO_FMC_LA00_CC_P	BANK 3	AA5
G7	CPRO_FMC_LA00_CC_N	BANK 3	Y5
G9	CPRO_FMC_LA03_P	BANK 3	AF12
G10	CPRO_FMC_LA03_N	BANK 3	AF11
G12	CPRO_FMC_LA08_P	BANK 3	AF10
G13	CPRO_FMC_LA08_N	BANK 3	AF9
G15	CPRO_FMC_LA12_P	BANK 3	AC7
G16	CPRO_FMC_LA12_N	BANK 3	AB7
G18	CPRO_FMC_LA16_P	BANK 3	AB6
G19	CPRO_FMC_LA16_N	BANK 3	AC6
G21	CPRO_FMC_LA20_P	BANK 3	AD4
G22	CPRO_FMC_LA20_N	BANK 3	AE4

J1 ROW G Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
G24	CPRO_FMC_LA22_P	BANK 4	AF21
G25	CPRO_FMC_LA22_N	BANK 4	AF20
G27	CPRO_FMC_LA25_P	BANK 4	W17
G28	CPRO_FMC_LA25_N	BANK 4	W18
G30	CPRO_FMC_LA29_P	BANK 4	AF15
G31	CPRO_FMC_LA29_N	BANK 4	AF16
G33	CPRO_FMC_LA31_P	BANK 4	Y14
G34	CPRO_FMC_LA31_N	BANK 4	AA14
G36	CPRO_FMC_LA33_P	BANK 4	Y12
G37	CPRO_FMC_LA33_N	BANK 4	W12

**Table 6.8. FMC (J1 Row H) Pin Connections**

J1 ROW H Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
H1	VREF_B_M2C_H1	NO CONNECT	
H2	CPRO_FMC_PRSNT_N	BANK 2	W3
H4	CPRO_FMC_CLK0_M2C_P	BANK 3	AC12
H5	CPRO_FMC_CLK0_M2C_N	BANK 3	AD12
H7	CPRO_FMC_LA02_P	BANK 3	AA12
H8	CPRO_FMC_LA02_N	BANK 3	AB12
H10	CPRO_FMC_LA04_P	BANK 3	AD11
H11	CPRO_FMC_LA04_N	BANK 3	AE11
H13	CPRO_FMC_LA07_P	BANK 3	Y10
H14	CPRO_FMC_LA07_N	BANK 3	AA10
H16	CPRO_FMC_LA11_P	BANK 3	AB9
H17	CPRO_FMC_LA11_N	BANK 3	AC9
H19	CPRO_FMC_LA15_P	BANK 3	AD6
H20	CPRO_FMC_LA15_N	BANK 3	AE6
H22	CPRO_FMC_LA19_P	BANK 3	AF4
H23	CPRO_FMC_LA19_N	BANK 3	AF3
H25	CPRO_FMC_LA21_P	BANK 3	AD3
H26	CPRO_FMC_LA21_N	BANK 3	AE3
H28	CPRO_FMC_LA24_P	BANK 4	Y16
H29	CPRO_FMC_LA24_N	BANK 4	W16
H31	CPRO_FMC_LA28_P	BANK 4	W15
H32	CPRO_FMC_LA28_N	BANK 4	W14
H34	CPRO_FMC_LA30_P	BANK 4	W13
H35	CPRO_FMC_LA30_N	BANK 4	Y13
H37	CPRO_FMC_LA32_P	BANK 5	V23
H38	CPRO_FMC_LA32_N	BANK 5	V22

**Table 6.9. FMC (J1 Row J) Pin Connections**

J1 ROW J Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
J2	CPRO_FMC_CLK3_BIDIR_P	BANK 5	W24
J3	CPRO_FMC_CLK3_BIDIR_N	BANK 5	W23
J6	SNN_FMC_J6	NO CONNECT	
J7	SNN_FMC_J7	NO CONNECT	
J9	SNN_FMC_J9	NO CONNECT	
J10	SNN_FMC_J10	NO CONNECT	
J12	SNN_FMC_J12	NO CONNECT	
J13	SNN_FMC_J13	NO CONNECT	
J15	SNN_FMC_J15	NO CONNECT	
J16	SNN_FMC_J16	NO CONNECT	
J18	SNN_FMC_J18	NO CONNECT	
J19	SNN_FMC_J19	NO CONNECT	
J21	SNN_FMC_J21	NO CONNECT	
J22	SNN_FMC_J22	NO CONNECT	
J24	SNN_FMC_J24	NO CONNECT	
J25	SNN_FMC_J25	NO CONNECT	
J27	SNN_FMC_J27	NO CONNECT	
J28	SNN_FMC_J28	NO CONNECT	
J30	SNN_FMC_J30	NO CONNECT	
J31	SNN_FMC_J31	NO CONNECT	
J33	SNN_FMC_J33	NO CONNECT	
J34	SNN_FMC_J34	NO CONNECT	
J36	SNN_FMC_J36	NO CONNECT	
J37	SNN_FMC_J37	NO CONNECT	
J39	VIO_B_M2C_J39	NO CONNECT	

**Table 6.10. FMC (J1 Row K) Pin Connections**

J1 ROW K Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
K1	VREF_B_M2C_K1	NO CONNECT	
K4	FMC_CLK2_C2M_P	NO CONNECT	
K5	FMC_CLK2_C2M_N	NO CONNECT	
K7	SNN_FMC_K7	NO CONNECT	
K8	SNN_FMC_K8	NO CONNECT	
K10	SNN_FMC_K10	NO CONNECT	
K11	SNN_FMC_K11	NO CONNECT	
K13	SNN_FMC_K13	NO CONNECT	
K14	SNN_FMC_K14	NO CONNECT	
K16	SNN_FMC_K16	NO CONNECT	
K17	SNN_FMC_K17	NO CONNECT	
K19	SNN_FMC_K19	NO CONNECT	
K20	SNN_FMC_K20	NO CONNECT	
K22	SNN_FMC_K22	NO CONNECT	

J1 ROW K Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
K23	SNN_FMC_K23		NO CONNECT
K25	SNN_FMC_K25		NO CONNECT
K26	SNN_FMC_K26		NO CONNECT
K28	SNN_FMC_K28		NO CONNECT
K29	SNN_FMC_K29		NO CONNECT
K31	SNN_FMC_K31		NO CONNECT
K32	SNN_FMC_K32		NO CONNECT
K34	SNN_FMC_K34		NO CONNECT
K35	SNN_FMC_K35		NO CONNECT
K37	SNN_FMC_K37		NO CONNECT
K38	SNN_FMC_K38		NO CONNECT
K40	VIO_B_M2C_K40		NO CONNECT

## 6.2. SFP+ Connector

Table 6.11. SFP+ (J2/J3) Pin Connections

Connector	Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
J2	1 – 20	GND	N/A	
J3	1, 10, 11, 14, 17, 20	GND	N/A	
J3	2	SFPO_TX_FAULT	BANK 7	H20
J3	3	SFPO_TX_DISABLE	BANK 7	H21
J3	4	SFPO_I2C_SDA	BANK 7	H22
J3	5	SFPO_I2C_SCL	BANK 7	H23
J3	6	SFPO_ABS	BANK 7	H26
J3	7	SFPO_RS0	NO CONNECT	
J3	8	SFPO_LOS	BANK 7	J26
J3	9	SFPO_RS1	NO CONNECT	
J3	12	ETH_RXD0_N	SERDES	B23
J3	13	ETH_RXD0_P	SERDES	C24
J3	15, 16	VDD_3V3	N/A	
J3	18	ETH_TXD0_N	SERDES	A24
J3	19	ETH_TXD0_P	SERDES	A25

**Table 6.12. SFP+ (J4/J5) Pin Connections**

Connector	Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
J4	1 – 20	GND	N/A	
J5	1, 10, 11, 14, 17, 20	GND	N/A	
J5	2	SFP1_TX_FAULT	BANK 7	J25
J5	3	SFP1_TX_DISABLE	BANK 7	J24
J5	4	SFP1_I2C_SDA	BANK 7	J23
J5	5	SFP1_I2C_SCL	BANK 7	J22
J5	6	SFP1_ABS	BANK 7	J21
J5	7	SFP1_RS0	NO CONNECT	
J5	8	SFP1_LOS	BANK 7	J20
J5	9	SFP1_RS1	NO CONNECT	
J5	12	ETH_RXD1_N	SERDES	C22
J5	13	ETH_RXD1_P	SERDES	C21
J5	15, 16	VDD_3V3	N/A	
J5	18	ETH_TXD1_N	SERDES	A22
J5	19	ETH_TXD1_P	SERDES	A21

### 6.3. Camera Connector

**Table 6.13. Camera Connector (J9) Pin Connections**

J9 Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
1	DPHY0_DATA0_P	MIPI	E1
2	DPHY0_DATA2_P	MIPI	F1
3	DPHY0_DATA0_N	MIPI	E2
4	DPHY0_DATA2_N	MIPI	F2
5, 6, 11, 12, 17, 18, 23, 24, 29, 30, 35, 36, 41, 42, 47, 48, 53, 54, 63, 64, 69, 70, 79, 80, 99, 100, 115, 116, 121, 122, 123, 124, 125, 126, 127, 128	GND	N/A	
7	DPHY0_DCLK_P	MIPI	D1
8	SNN_CAM_8	NO CONNECT	
9	DPHY0_DCLK_N	MIPI	D2
10	SNN_CAM_10	NO CONNECT	
13	DPHY0_DATA1_P	MIPI	C1
14	DPHY0_DATA3_P	MIPI	B1
15	DPHY0_DATA1_N	MIPI	C2
16	DPHY0_DATA3_N	MIPI	B2
19	DPHY1_DATA0_P	MIPI	A4
20	DPHY1_DATA2_P	MIPI	A3
21	DPHY1_DATA0_N	MIPI	B4
22	DPHY1_DATA2_N	MIPI	B3
25	DPHY1_DCLK_P	MIPI	A5
26	SNN_CAM_26	NO CONNECT	

J9 Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
27	DPHY1_DCLK_N	MIPI	B5
28	SNN_CAM_28	NO CONNECT	
31	DPHY1_DATA1_P	MIPI	A6
32	DPHY1_DATA3_P	MIPI	A7
33	DPHY1_DATA1_N	MIPI	B6
34	DPHY1_DATA3_N	MIPI	B7
37	SNN_CAM_37	NO CONNECT	
38	SNN_CAM_38	NO CONNECT	
39	SNN_CAM_39	NO CONNECT	
40	SNN_CAM_40	NO CONNECT	
43	SNN_CAM_43	NO CONNECT	
44	SNN_CAM_44	NO CONNECT	
45	SNN_CAM_45	NO CONNECT	
46	SNN_CAM_46	NO CONNECT	
49	SNN_CAM_49	NO CONNECT	
50	SNN_CAM_50	NO CONNECT	
51	SNN_CAM_51	NO CONNECT	
52	SNN_CAM_52	NO CONNECT	
55	SNN_CAM_55	NO CONNECT	
56	SNN_CAM_56	NO CONNECT	
57	SNN_CAM_57	NO CONNECT	
58	SNN_CAM_58	NO CONNECT	
59	SNN_CAM_59	NO CONNECT	
60	SNN_CAM_60	NO CONNECT	
61	SNN_CAM_61	NO CONNECT	
62	SNN_CAM_62	NO CONNECT	
65	SNN_CAM_63	NO CONNECT	
66	SNN_CAM_64	NO CONNECT	
67	SNN_CAM_67	NO CONNECT	
68	SNN_CAM_68	NO CONNECT	
71	SNN_CAM_71	NO CONNECT	
72	SNN_CAM_72	NO CONNECT	
73	SNN_CAM_73	NO CONNECT	
74	SNN_CAM_74	NO CONNECT	
75	CPRO_CAM_I2C0_SCL	BANK 6	P22
76	CPRO_CAM_GPIO_0	BANK 6	T25
77	CPRO_CAM_I2C0_SDA	BANK 6	P21
78	CPRO_CAM_GPIO_1	BANK 6	T24
81, 82, 83	VDD_2V8_LDO (Not Connected)	N/A	
84	CPRO_CAM_GPIO_2	BANK 6	T23
85	CPRO_CAM_GPIO_3	BANK 6	T21
86	CPRO_CAM_UART_RTS	BANK 6	R26
87	CPRO_CAM_I2C1_SCL	BANK 6	R20
88	CAM_MCLK_1	N/A	
89	CPRO_CAM_I2C1_SDA	BANK 6	R21
90	CPRO_CAM_GPIO_4	BANK 6	T20
91	CAM_MCLK_0	N/A	

J9 Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
92	CPRO_CAM_GPIO_5	BANK 6	T19
93	CPRO_CAM_UART_CTS	BANK 6	T26
94	CAM_MCLK_2	N/A	
95	CPRO_CAM_UART_TX	BANK 6	R25
96	CPRO_CAM_GPIO_6	BANK 6	T18
97	CPRO_CAM_GPIO_7	BANK 6	U19
98	CPRO_CAM_GPIO_8	BANK 6	U18
101	SNN_CAM_101	NO CONNECT	
102	VDD_1V8_CAM	N/A	
103	CPRO_CAM_SPI_MOSI	BANK 6	P25
104	CPRO_CAM_SPI_MCS_N	BANK 6	P23
105	CPRO_CAM_I2C2_SCL	BANK 6	R19
106	CPRO_CAM_SPI_MISO	BANK 6	P24
107	CPRO_CAM_I2C2_SDA	BANK 6	R18
108, 110, 118, 120	VDD_3V3_CAM	N/A	
109	SNN_CAM_109	NO CONNECT	
111	SNN_CAM_111	NO CONNECT	
112	SNN_CAM_112	NO CONNECT	
113	SNN_CAM_113	NO CONNECT	
114	SNN_CAM_114	NO CONNECT	
117	CPRO_CAM_SPI_MSCK	BANK 6	P26
119	CPRO_CAM_GPIO_9	BANK 6	U22

## 6.4. Test Pointer Connector

Table 6.14. Test Point Connector (J20) Pin Connections

J20 Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
1, 2, 19, 20	GND	N/A	
3	CPRO_TEST_POINT_0	BANK 7	J19
4	CPRO_TEST_POINT_8	BANK 7	K26
5	CPRO_TEST_POINT_1	BANK 7	K20
6	CPRO_TEST_POINT_9	BANK 7	L26
7	CPRO_TEST_POINT_2	BANK 7	K18
8	CPRO_TEST_POINT_10	BANK 7	L25
9	CPRO_TEST_POINT_3	BANK 7	K19
10	CPRO_TEST_POINT_11	BANK 7	L24
11	CPRO_TEST_POINT_4	BANK 7	K21
12	CPRO_TEST_POINT_12	BANK 7	L23
13	CPRO_TEST_POINT_5	BANK 7	L21
14	CPRO_TEST_POINT_13	BANK 7	L22
15	CPRO_TEST_POINT_6	BANK 7	K24
16	CPRO_TEST_POINT_14	BANK 7	L20
17	CPRO_TEST_POINT_7	BANK 7	K25
18	CPRO_TEST_POINT_15	BANK 7	L19

## 6.5. FPGA JTAG and I2C Connector

Table 6.15. FPGA JTAG & I2C Connector (J22) Pin Connections

J22 Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
1, 3	FPGA_PROG_I2C_SDA_3V3	BANK 1	M6
2	FPGA_JTAG_TMS_3V3	BANK 1	L7
4	FPGA_JTAG_TCLK_3V3	BANK 1	M5
5	FPGA_PROG_I2C_SCL_3V3	BANK 1	M7
6	PROBE_JTAG_TDI_3V3	BANK 1	L9
7	VDD_3V3	N/A	
8	PROBE_JTAG_TDO_3V3	BANK 1	M8
9	SNN_FPGA_JTAG_HDR	NO CONNECT	
10	GND	N/A	

## 6.6. USB Type-C Connector

Table 6.16. USB Type-C Connector (J23) Pin Connections

J23 Pin	Net Name	CertusPro-NX Bank	CertusPro-NX Ball Location
A1, A12, B1, B12, 25, 26, 27, 28	GND	N/A	
A2	SNN_USBC_TX1P	NO CONNECT	
A3	SNN_USBC_TX1N	NO CONNECT	
A4, A9, B4, B9	VBUS	N/A	
A5	CC1	N/A	
A6	SNN_USBC_D1P	NO CONNECT	
A7	SNN_USBC_D1N	NO CONNECT	
A8	SNN_USBC_SBU1	NO CONNECT	
A10	SNN_USBC_RX2N	NO CONNECT	
A11	SNN_USBC_RX2P	NO CONNECT	
B2	SNN_USBC_TX2P	NO CONNECT	
B3	SNN_USBC_TX2N	NO CONNECT	
B5	CC2	N/A	
B6	SNN_USBC_D2P	NO CONNECT	
B7	SNN_USBC_D2N	NO CONNECT	
B8	SNN_USBC_SBU2	NO CONNECT	
B10	SNN_USBC_RX1N	NO CONNECT	
B11	SNN_USBC_RX1P	NO CONNECT	



## 7. Clocks

Table 7.1. Clocks to FPGA

Clock Reference	Net Name	Frequency	I/O Standard	FPGA	BANK	BALL
Y1	CPRO_ETH_REFCLK_P CPRO_ETH_REFCLK_N	161.132813 MHz	HCSL	CertusPro-NX	SERDES	F20/E20
Y2	XIN_SYNTH XOUT_SYNTH	50.00 MHz		N/A	N/A	N/A
Y3	CLNK_PCLK_R	125.00 MHz	LVC MOS18	CrossLink-NX	1	F16
Y6	CPRO_PCLK_R	125.00 MHz	LVC MOS18	CertusPro-NX	1	R4

## 8. Status Indicators

The LED status indicators on the board show the application status. [Table 8.1](#) lists the status LED I/O map.

The INITN pin is a status pin and one of the functions is to indicate an error during configuration.

The DONE pin is asserted after configuration has successfully completed and the FPGA goes into User Mode.

See [sysCONFIG User Guide for Nexus Platform \(FPGA-TN-02099\)](#) for details.

**Table 8.1. Status LED I/O Map**

Label	LED	FPGA	Bank	Pin	Color
CPRO INITN	DS1	CertusPro-NX	0	G2	Red
CLNK INITN	DS2	CrossLink-NX	0	D11	Red
CPRO DONE	DS3	CertusPro-NX	0	G5	Green
CLNK DONE	DS4	CrossLink-NX	0	B16	Green

## 9. Pushbuttons

Table 9.1 lists the pushbuttons available on the CertusPro-NX Sensor to Ethernet Bridge Board. Pushbutton S2 allow you to assert a reset to both FPGA devices.

**Table 9.1. Pushbutton I/O Map**

Pushbutton	FPGA	Bank	Pin	Note
S1	Not Populated			
S2	CertusPro-NX	1	N9	Reset to CertusPro-NX
	CrossLink-NX	1	F15	Reset to CrossLink-NX

## 10. Ordering Information

This board is included as part of a kit, and not available as a separate item. The part number in [Table 10.1](#) is for reference only, so it is clear which board is described in this document. Visit [www.latticesemi.com/boards](http://www.latticesemi.com/boards) for the latest ordering information.

**Table 10.1. Reference Part Number**

Description	Ordering Part Number
CertusPro-NX Sensor to Ethernet Bridge Board	LF-SNSR-ETH-EVN

## Appendix A. CertusPro-NX Sensor to Ethernet Bridge Board BOM

Item no.	Reference	Description	Qty	Part Number	Manufacturer
1	C49,C247,C248,C254,C318, C319,C320,C353,C354,C355	CAP NCS X7R 0402 1 $\mu$ F $\pm$ 10% 6.3 V	10	CC0402KRX7R5BB105	Yageo Corporation
2	C6,C7,C8,C9,C11,C15,C16,C17,C18,C21, C24,C25,C26,C27,C29,C30,C32,C34,C36, C37,C38,C40,C41,C50,C51,C52,C53,C54, C55,C56,C58,C59,C62,C63,C66,C67,C68, C69,C70,C71,C74,C75,C78,C79,C80,C81, C82,C83,C86,C87,C90,C91,C92,C93,C94, C95,C99,C103,C105,C107,C108,C109, C111,C112,C113,C115,C116, C117,C119,C120,C121,C123,C124,C125, C127,C128,C129,C131,C132,C133, C135,C136,C137,C139, C140,C141,C142,C143,C144,C145, C146,C147,C148,C149,C150,C151,C152, C154,C155,C157,C158,C160,C162,C164, C165,C167,C168,C176,C177,C178,C197, C198,C199,C200,C201,C202,C211,C212, C213,C214,C215,C216,C217,C218,C219, C220,C222,C231,C232,C233,C234,C240, C242,C243,C244,C250,C251,C252,C255, C264,C265,C266,C267,C275,C276,C277, C284,C285,C286,C287,C298,C299, C306,C307,C308,C309,C336,C337,C341, C342,C358	CAP NCS X7R 0402 0.1 $\mu$ F 10% 16 V	161	C0402C104K4RACTU	KEMET Corporation
3	C288,C297,C304,C305,C332,C344,C348, C349,C350,C351,C352,C362	CAP NCS X5R 0805 22 $\mu$ F $\pm$ 20% 25 V	12	C2012X5R1E226M125AC	TDK Corporation of America
4	C345	CAP AL-Polymer SMD_D80 100 $\mu$ F $\pm$ 20% 25 V 24 m $\Omega$ 7mm Silver	1	25VPPF100M	Panasonic Corporation
5	C10,C12,C13,C14,C19,C20,C22,C23,C28, C31,C33,C35,C43,C44,C46,C47,C57, C60,C61,C64,C65,C72,C73,C76,C77, C84,C85,C88,C89,C96,C97,C98,C100, C101,C102,C104,C106,C110,C114,C156, C163,C170,C171,C173,C174,C179,C180,	CAP NCS X5R 0603 10uF $\pm$ 20% 6.3V	87	C0603C106M9PAC	KEMET Corporation

Item no.	Reference	Description	Qty	Part Number	Manufacturer
	C181,C182,C183,C184,C203,C204,C205,C206,C207,C208,C209,C210,C221,C223,C224,C227,C228,C229,C230,C239,C241,C245,C246,C253,C268,C269,C270,C271,C278,C279,C280,C281,C282,C283,C321,C322,C323,C331,C333,C343				
6	C360,C361	CAP COG 0402 82 pF ±5% 50 V	2	KGM05ACG1H820JH	KYOCERA Corporation
7	C256,C257,C258,C259,C260,C261,C262,C263,C272,C273,C274	CAP X7R 0402 47 nF ±10% 16 V	11	C1005X7R1C473K050BC	TDK Corporation of America
8	C356,C357	CAP X7R 0402 22 nF ±10% 25 V	2	C0402C223K3RAC	KEMET Corporation
9	C1,C2,C3,C4,C5	CAP NCS X5R 0402 0.47 µF ±10% 6.3 V	5	GRM155R60J474KE19D	Murata Manufacturing Co., Ltd.
10	C235,C236,C237,C238,C300,C301,C302,C303,C310,C311,C312,C313,C314,C315,C316,C317	CAP NCS X5R 0805 22 µF ±20% 6.3 V	16	CC0805MKX5R5BB226	Yageo Corporation
11	C118,C122,C130,C134,C138,C126,C153,C159,C161	CAP NCS X5R 0402 2.2 µF ±20% 6.3 V	9	CL05A225MQ5NNNC	Samsung Electro-Mechanics Co., Ltd.
12	C339,C340,C346,C347	CAP NCS X5R 0402 0.1 µF ±20% 25 V	4	CC0402MRX5R8BB104	Yageo Corporation
13	074-0119-000	HDR THRU HI-TEMP DUAL ROW 2X5 MALE VERT 2.54 mm PITCH	1	67997-210HLF	Amphenol ICC (FCI)
14	J20	Header NCS (TH High Temp) 2X10 ST 2.54 mm PITCH	1	PH2-20-UA	Astron Connectivity Co., Ltd.
15	J1	HDR SMD SOCKET ARRAY ASSEMBLY FEMALE VERT 400 POS 1.27 mm PITCH	1	ASP-134486-01	Samtec, Inc.
16	J9	Interconnect (SMD) CONN 2X60 HI-SPEED SOCKET HEAVY GOLD 0.50 mm PITCH WITH ALIGN PIN SMD	1	QSH-060-01-H-D-A-K-TR	Samtec, Inc.
17	J23	CONNECTOR SMD USB3.1 TYPE C FEMALE RA 24 POS 0.5 mm PITCH	1	12401826E412A	Amphenol Interconnect Products Corporation
18	J3,J5	Interconnect (SMD) SFP+ SMD20 RA 0.8 mm pitch BLACK	2	1888247-1	TE Connectivity Ltd.
19	Y2	XTAL SMD_25X20 50 MHz 20 ppm Fundamental 10 pF S2M50.0000F10M22	1	830108208809	Würth Elektronik
20	Y3,Y6	OSC SMD 125 MHz 25 ppm 1.62 V 1.98 V 0 pF SIT8009BC-12-18E-125.000000E	2	SIT8009BC-12-18E-125.000000E	SiTime Corporation
21	Y1	OSC HCSL_SMD_B 161.132813 MHz 25 ppm 2.25 V 3.63 V 9999 pF SIT9375A-B240005	1	SIT9375A-B240005	SiTime Corporation

Item no.	Reference	Description	Qty	Part Number	Manufacturer
22	DS1,DS2	LED 0603 SML-D12U1W 2.2 V 20 mA Red 620 nm 63 mcd	2	SML-D12U1WT86	ROHM Co., Ltd.
23	DS3,DS4	LED 0603 150060VS75000 2.5 V 30 mA Green 5 V VER	2	150060VS75000	Würth Electronics Midcom, Incorporated
24	LB1,LB2,LB3,LB4,LB5,LB6,LB7,LB8,LB9, LB10,LB11,LB12,LB13,LB16,LB17,LB18, LB19,LB20,LB21,LB22,LB23,LB24,LB25, LB26,LB27,LB38,LB39,LB42,LB43	FERRITE BEAD BEAD_0603 Ferrite 220 Ω 25% 40 mΩ -1 mA	29	BLM18KG221SN1D	Murata Electronics
25	LB28,LB29,LB30,LB31,LB32,LB33,LB34, LB35,LB36,LB37	FERRITE BEAD BEAD_0603 Ferrite 600 Ω 25% 200 mΩ 0.8 A	10	PBY160808T-601Y-N	Yageo Corporation
26	U8,U20,U21	IC GENERAL Level Shifter SC70_6 74AVC1T45GW	3	74AVC1T45GW,125	NEXPERIA
27	U23	IC CONTROLLER USB STUSB4500QTR QFN24 USB PD SINK CONTROLLER	1	STUSB4500QTR	STMicroelectronics
28	U6	IC GENERAL Clock Generator NBG24 RC32504A000GNK	1	RC32504A000GNK#BB0	Renesas Technology America, Inc.
29	U7	IC GENERAL Level Shifter TSSOP16 74AVCH4T245PW 4-bit Dual Supply	1	74AVCH4T245PW,118	NEXPERIA
30	U1	IC GENERAL FPGA BGA672 LFCPNX-100- 9LFG672C CERTUSPRO-NX	1	LFCPNX-100-9LFG672C	LSCC
31	U5	IC GENERAL Clock Multiplexor TSSOP16 LMK00804BPW	1	LMK00804BPWR	Texas Instruments, Inc.
32	U3	IC GENERAL FPGA BGA256 LIFCL-17-9BG256C CROSSLINK-NX	1	LIFCL-17-9BG256C	LSCC
33	L2,L3	IND SMD_4X4 IRON 4.7uH 20.0% 5.0A 57.4mΩ 0.0Hz 0.0decibel	2	XFL4020-472MEC	Coilcraft
34	L1,L4	IND 7_6X7_6 Alloy Powder 4.7 uH 20% 6.5 A 24 mΩ 56 300 KHz -1 MHz	2	ECS-MPIL0630-4R7MC	ECS Inc.
35	U2,U9	IC SERIAL FLASH 133MHz WSON_5X6 W25Q128JWPIQ	2	W25Q128JWPIQ TR	Winbond Electronics Corporation
36	U24	IC SERIAL EEPROM 400.0KHz DFN08 AT24C02C- MAHM-T 2Kbit 1.7 V to 5.5 V	1	AT24C02C-MAHM-T	Microchip Technology, Inc.
37	R91,R100,R103,R188	RES 0402 10 Ω 1% 62.5 mW	4	RC0402FR-0710RL	Yageo Corporation
38	R39	RES 0402 100 Ω 1% 62.5 mW	1	RK73H1ETTP1000F	KOA Speer Electronics, Inc.
39	R80,R164,R186,R199,R200, R204,R205	RES 0402 1kΩ 1% 62.5 mW	7	ERJ-2RKF1001X	Matsushita Electric Works, Ltd.

Item no.	Reference	Description	Qty	Part Number	Manufacturer
40	R42,R43,R44,R48,R73,R74,R75,R76,R77, R78,R79,R127,R132,R136,R139,R140, R146,R147,R169,R170,R173,R196	RES 0402 10 kΩ 1% 62.5 mW	22	RK73H1ETTP1002F	KOA Speer Electronics, Inc.
41	R88,R94,R113,R115,R167	RES 0402 100 kΩ 1% 62.5 mW	7	ERJ-2RKF1003X	Matsushita Electric Works, Ltd.
42	R5,R6,R7,R8,R9,R10,R11,R12	RES 0402 1.15 kΩ 1% 62.5 mW	8	CRCW04021K15FKED	Vishay Americas Inc.
43	R105	RES 0402 118 kΩ 1% 62.5 mW	1	ERJ-2RKF1183X	Matsushita Electric Works, Ltd.
44	R128,R133	RES 0402 133 Ω 1% 62.5 mW	2	RC0402FR-07133RL	Yageo Corporation
45	R101,R104	RES 0402 147 kΩ 1% 62.5 mW	2	RC0402FR-07147KL	Yageo Corporation
46	R114,R116,R118	RES 0402 17.4 kΩ 1% 62.5 mW	3	ERJ-2RKF1742X	Matsushita Electric Works, Ltd.
47	R125,R130	RES 0402 182 Ω 1% 62.5 mW	2	ERJ-2RKF1820X	Matsushita Electric Works, Ltd.
48	R93	RES 0402 20 kΩ 1% 62.5 mW	1	RK73H1ETTP2002F	KOA Speer Electronics, Inc.
49	R83	RES 0402 200 kΩ 1% 62.5 mW	1	CRCW0402200KFKED	Vishay Americas Inc.
50	R82,R197	RES 0402 21.5 kΩ 1% 62.5 mW	2	CRCW040221K5FKED	Vishay Americas Inc.
51	R182	RES 0402 34 Ω 1% 62.5 mW	2	RC0402FR-0734RL	Yageo Corporation
52	R190	RES 0402 39.2 kΩ 1% 62.5 mW	1	NRC04F3922TRF	NIC COMPONENTS CORP.
53	R49,R50,R51,R52,R61,R62,R65,R66	RES 0402 43.2 Ω 1% 62.5 mW	8	CRCW040243R2FKED	Vishay Americas Inc.
54	R189,R198	RES 0402 432 kΩ 1% 62.5 mW	2	RC0402FR-07432KL	Yageo Corporation
55	R2,R4,R18,R19,R20,R21R22,R24,R26, R27,R28,R30R32,R33,R34,R35,R36, R37,R46,R47,R71,R72,R124,R126,R129, R131,R137,R138,R148,R149,R150 R151,R152,R153,R155,R156,R180,R191, R192,R193,R194	RES 0402 4.75 kΩ 1% 62.5 mW	41	ERJ-2RKF4751X	Matsushita Electric Works, Ltd.
56	R183,R184	RES 0402 49.9 Ω 1% 62.5 mW	2	RC0402FR-0749R9L	Yageo Corporation
57	R92	RES 0402 61.9 kΩ 1% 62.5 mW	1	RC0402FR-0761K9L	Yageo Corporation
58	R102	RES 0402 619 kΩ 1% 62.5 mW	1	RC0402FR-07619KL	Yageo Corporation
59	R187	RES 0402 787 kΩ 1% 62.5 mW	1	RK73H1ETTP7873F	KOA Speer Electronics, Inc.
60	R17,R145	RES SCD 0603 0R0 JUMPER Rmax R05 1/10 W	2	RC0603JR-070RL	Yageo Corporation



Item no.	Reference	Description	Qty	Part Number	Manufacturer
61	R1,R53,R54,R55,R56,R57,R58,R59,R60, R81,R89,R90,R96,R97,R98,R99,R121, R122,R123,R157,R162,R163,R168, R175,R178,R181,R185,R195,R207,R208	RES SCD 0402 0 OHM 1 AMP	30	ERJ-2GE0R00X	Panasonic Electric Works Co. Ltd.
62	R67,R68,R69,R70	RES 0402 1 Ω 1% 62.5 mW	4	RC0402FR-071RL	Yageo Corporation
63	RS1,RS2,RS3	RES SENSE 0805W_VIRTUAL_4PIN 0805 10 mΩ 1% 100 ppm 0.25 W RLM-1220-3F-R010-FNH ASR	3	SCSF0805SF-R010F	Delta Electronics/Cyntec
64	S2	SWITCH SMD TACTILE WASHABLE TYPE BROWN 9.00X6.30X3.80 mm	1	ADTSMW69NVTR	APEM Inc.
65	Q4,Q6,Q11,Q12	XSTR PWR DMOS FET N-CH 25 V 220 mA 4 Ω MAX @ 4.5 V SOT-23	4	FDV301N	ON Semiconductor Corporation
66	Q3	P-CH MOSFET DFN3X3 -10 A -25 V 2.6 W AONR21321	1	AONR21321	Alpha and Omega Semiconductor Incorporated
67	Q5,Q7,Q8,Q9,Q10	DUAL N-CH MOSFET NCS SOT363 0.2 A 0.2 A 20 V 20 V 0.2 W 0.2 W BSS138	5	BSS138DW-7-F	Diodes Incorporated
68	U13	VREG LINEAR DFN1x1 LowDrop Out/Fixed 460 V 1.0 V 1.0 V 2.0% NCP114AMX100TCG	1	NCP114AMX100TCG	ON Semiconductor Corporation
69	U16	VREG LINEAR UDFN4_NOVR Low Drop Out/Fixed 0.33 V 1.8 V 1.8 V 1% NCP114AMX180TCG	1	NCP114AMX180TCG	ON Semiconductor Corporation
70	U17	VREG LINEAR UDFN4_NOVR Low Drop Out/Fixed 0.23 V 2.5 V 2.5 V 2% NCP114BMX250TCG w/o active discharge	1	NCP114BMX250TCG	ON Semiconductor Corporation
71	U12,U14,U15	VREG CONTROLLER/DRIVER/FET SOT23_8_NOVR SOT23_8 Buck 1 Ph 500 KHz 0.807 V 5 V 2.5% MP1475DJ	3	MP1475DJ-LF-Z	Monolithic Power Systems, Inc.
72	U22	VREG CONTROLLER/DRIVER/FET QFN16_VAR Buck/Boost 1 Ph 500 KHz 1 V 20.47 V 1.5% MP28167GQ-A	1	MP28167GQ-A-Z	Monolithic Power Systems, Inc.
73	J2,J4	EMI Shield SFP+ 1X1 Cage Assembly Press Fit	2	2007198-1	TE Connectivity Ltd.

## References

- [CertusPro-NX webpage](#)
- [CrossLink-NX webpage](#)
- [CertusPro-NX Family Data Sheet \(FPGA-DS-02086\)](#)
- [CrossLink-NX Family Data Sheet \(FPGA-DS-02049\)](#)
- [Development Kits & Boards for CertusPro-NX](#)
- [IP and Reference Designs for CertusPro-NX](#)
- [Development Kits & Boards for CrossLink-NX](#)
- [IP and Reference Designs for CrossLink-NX](#)
- [sysCONFIG Usage Guide for Nexus Platform \(FPGA-TN-02099\)](#)
- [Holoscan Sensor Bridge Board Quick Start Guide \(FPGA-AN-02096\)](#)
- [Lattice Programming Cable](#)
- [Lattice Radiant FPGA design software](#)
- [Lattice Insights](#) for Lattice Semiconductor training courses and learning plans

## Technical Support Assistance

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For frequently asked questions, please refer to the Lattice Answer Database at [www.latticesemi.com/Support/AnswerDatabase](http://www.latticesemi.com/Support/AnswerDatabase).

## Revision History

### Revision 1.0, October 2024

Section	Change Summary
All	Initial release.



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