Quick*START* — MachXO2™ SensorExtender Card Set

This document describes how to run a basic video transmission demonstration with the Lattice SensorExtender Card (SEC) set. This demonstration requires an HDR-60 base board and a 9MT024 Nanovesta sensor board, which are available separately from Lattice. A 720p (or higher) compatible monitor will be required for output display.

The SEC set consists of two boards; a Transmit board labeled "Tx" and a Receive board labeled "Rx". The 9MT024 Nanovesta sensor board should be connected to the Tx board. During the demonstration, this board will transmit video data over a CAT5E cable to the Rx board, which is connected to the HDR-60 board.

More details are in the SEC user guide, available at www.latticesemi.com/sensorextender
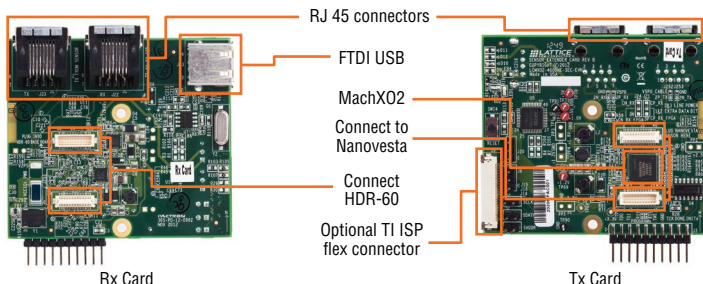
1 Check Kit Contents

The SEC box should contain the following items:

- Two SEC boards, one labeled Rx, one labeled Tx
- A CAT5E Ethernet cable
- A USB cable for programming
- *QuickSTART Guide*

- *Storage and Handling Tips:*

Static electricity can shorten the lifespan of electronic components. Please observe these tips to prevent any damage that could occur from electro-static discharge:

- Use anti-static precautions such as operating on an anti-static mat and wearing an anti-static wristband.
- Store the SEC in the ESD bag.
- Touch the metal USB housing to equalize voltage potential between you and the board.

2 SEC Overview

RJ 45 connectors
FTDI USB
MachXO2
Connect to Nanovesta
Connect HDR-60
Optional TI ISP flex connector

Rx Card

Tx Card

3 Putting the SEC together with the HDR-60 & Nanovesta sensor board

a. Connect SEC RX board to HDR-60 via Hirose connector. Ensure Ethernet connectors are on the bottom.
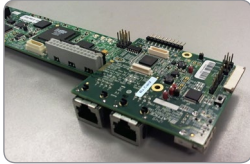

b. Connect Ethernet cable to RX port of the RX board

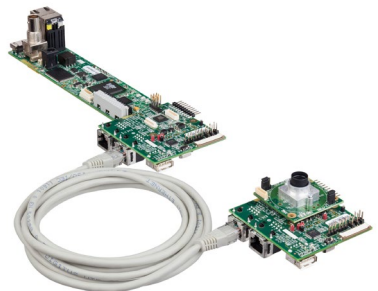c. Connect M024 Nanovesta board to TX board via Hirose connector. Ensure Ethernet connectors are on the bottom.

d. Connect Ethernet Cable to TX port of TX board

e. Ensure proper jumper settings
  • No jumpers on HDR-60 Board
  • No jumpers on SensorExtender RX or TX boards
  • Two Jumpers on 9MT024 Nanovesta Board
   1. J3 – pins 1&2
   2. J2 – pins 1&2
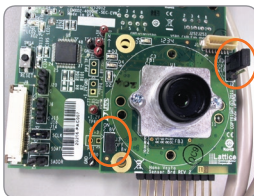
f. Complete Setup:

4 ## LatticeECP3 Bitstream Programming:

1. The LatticeECP3 FPGA on the HDR-60 base board must be programmed with the SEC demo bitstream. This file is called SEC_demo_ECP3.bit available at www.latticesemi.com/sensorextender.

2. Plug one end of the USB cable to the computer and the other to the upper USB port on the HDR-60. Program the LatticeECP3 FGPA with the SEC_demo_ECP3.bit file, using the Diamond Programmer software, available at www.latticesemi.com/latticediamond/downloads

3. Use Lattice Diamond Programmer software to program the SPI Flash device on the HDR-60 base board, which in-turn will program the ECP3 FPGA. Diamond Programmer is available at: www.latticesemi.com/latticediamond/downloads
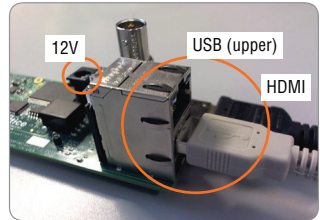
    Use the following parameters in the programming software dialog box.
    Access Mode: SPI Flash Background Programming
    Operation: SPI Flash Erase, Program, Verify
    Programming File: Choose programming file
    Family: SPI Serial Flash
    Vendor: STMicro or Numonyx
    Device: SPI-M25P64
    Package: 16-lead SOIC
    Data File Size: Click "Load Size from Programming File" button
    Click OK, then GO to program the LatticeECP3 SPI Flash.
   Ensure that the SPI Flash is successfully programmed
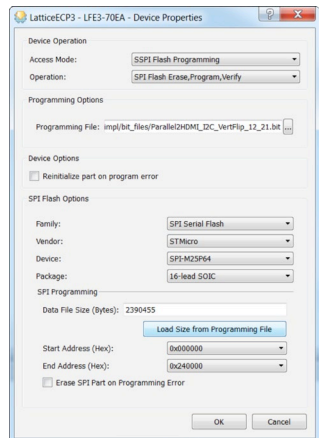
5 ## Running the SEC Demo

1. Remove USB cable from the HDR-60 base board. Attach an HDMI cable from the HDR-60 board to a 720p or higher compatible monitor. Recycle power by disconnecting and reconnecting 12V DC supply on the HDR-60 base board.

2. The SEC Tx and Rx boards will each have two lit LEDs. One will be lit constantly and the other will be flashing.

3. A 1280x720p60 image should display on the compatible monitor.

Demo Running:

HDMI/DVI Cable
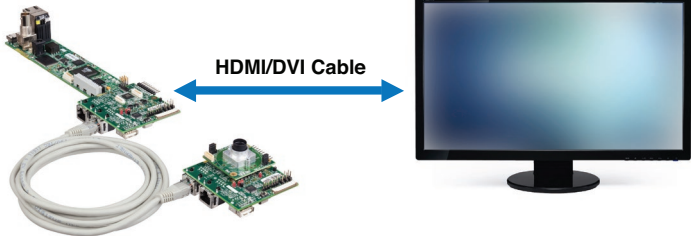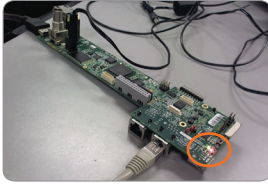
Other SEC Features

- The SEC board also has the Texas Instruments ISP flex connector populated at location J9. One could connect the SEC Rx board to a TI ISP camera via a flex cable. Visit www.leopardimaging.com for details on available TI cameras.

6 Done

Congratulations! You have successfully demonstrated the SEC. Please refer to the SEC User's Guide available on the Lattice web site at http://www.latticesemi.com/sensorextender for the following:

- Schematic details
- Gerber PCB layout artwork

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