

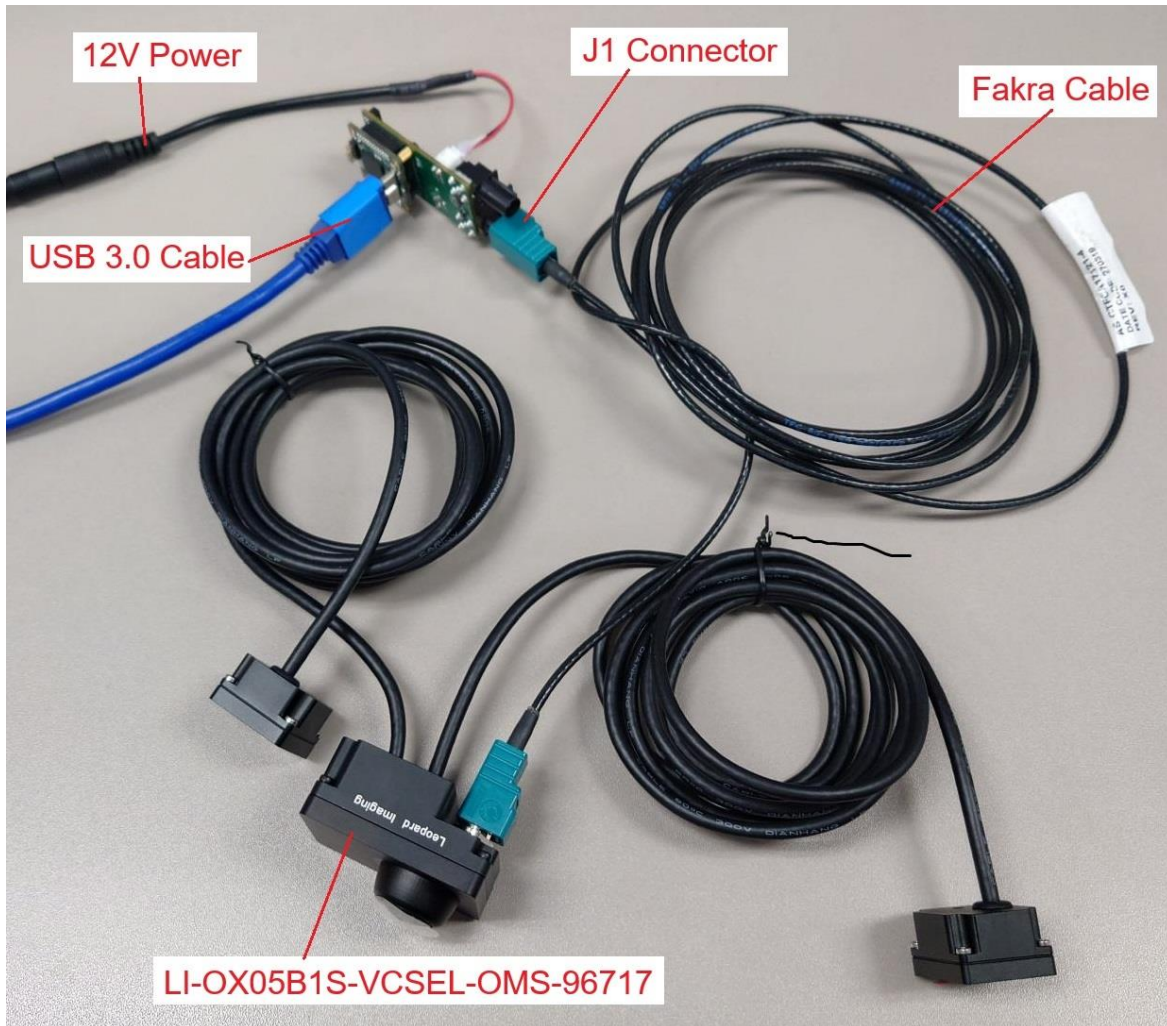


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Overview

This User Guide is for the LI-USB30-OX05B1S-VCSEL-OMS-96717 camera
The Firmware in this guide supports 2592 x 1944 @ 30 fps
This camera doesn't include ISP and does RAW RGB-IR data output

Platform	Camera
1 x LI-GMSL2-USB	1 x LI-OX05B1S-VCSEL-OMS-96717
Cable	Adapter/Carrier Board
1 x USB 3.0 Micro-B cable 1 x FAW-SMZSMZ Fakra cable	1 x 12VDC Power Supply





LI-USB30-OX05B1S-VCSEL-OMS-96717_User_Guide_20250117

Revision	SVN version	Release Date	Author	Tested By
2025_01_17		01/17/2025	Shelby Hache	Shelby Hache
Updates				
Revision	Description			Release Date
2025_01_17	First Release			01/17/2025
Known bugs				



Setup Procedure 1/3

- Hardware:

1. LI-OX05B1S-VCSEL-OMS-96717 Camera Module x 1
2. LI-GMSL2-USB Tester x 1
3. FAW-SMZSMZ Fakra Cable x 1
4. USB 3.0 Micro-B cable x 1
5. LI-PS12-01 x 1

- Hardware Setup:

Connect the camera and USB 3.0 Tester board as the picture on the first page.

- Software:

This camera kit can be tested with any one of the software below:

1. Camera tool (Windows OS)

The Camera tool can be downloaded from the link below:

<https://www.dropbox.com/scl/fi/o71xt7qf1fdqfkn8e44qt/Release.7z?rlkey=zijdtjnub3mo6b0v8ar55hyrm&dl=0>

It's better to use the 7-zip to uncompress the package:

<http://www.7-zip.org/download.html>

And install the software below on your PC:

https://www.dropbox.com/s/bgdrf547k3kkjff/vcredist_x86.exe?dl=0

2. Linux Camera tool (Linux OS)

The Linux camera tool can be downloaded from link below. (Tested on Ubuntu 18.04 and 20.04)

https://www.dropbox.com/s/4m2efo696px9739/linux_camera_tool-master_20190624.zip?dl=0

For how to install it, please refer to the README.md in below link. (the latest version of Linux camera tool may have an issue, so please use above Linux camera tool)

https://github.com/LI01/linux_camera_tool

Please follow the README.md in GitHub to install the Linux camera tool.

There are instructions online for how to install the OpenCV on Ubuntu OS.

Below is an example:

<https://www.learnopencv.com/install-opencv-3-4-4-on-ubuntu-18-04/>

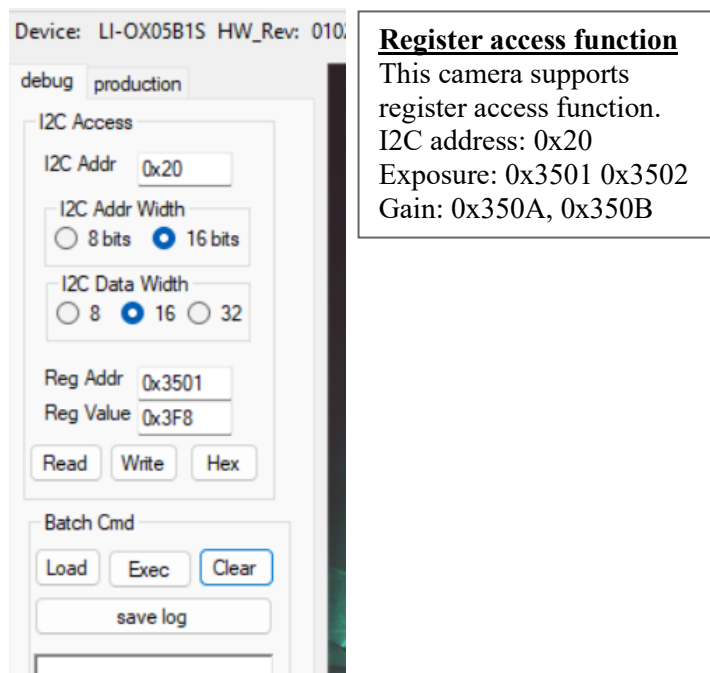
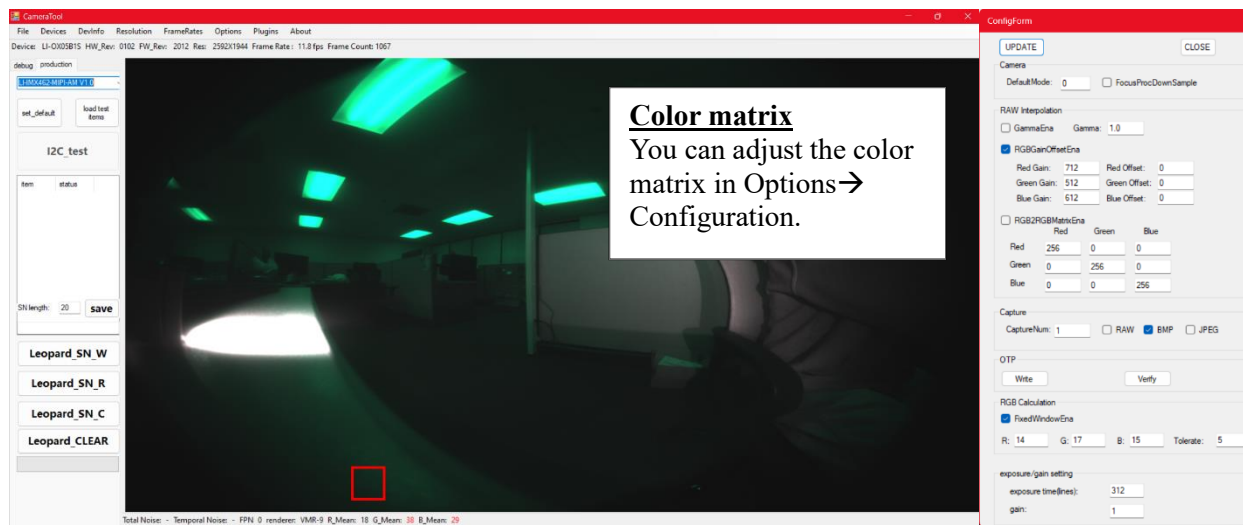


Run Camera 1/3

- Camera Tool (Windows OS)

1. Connect the camera to port J1 of USB 3.0 Tester. (refer to example setup in page 1)
2. Plug in the 12V power supply to the USB 3.0 Tester.
3. Connect the camera to your PC (**USB3.0 port**) using the USB 3.0 cable.
4. Open camera Tool.

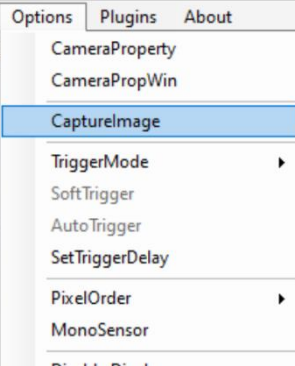
Please make sure to complete these steps in numerical order. Steps 1 and 2 should always be taken before connecting the USB cable.





You can also use BatchCmd.txt file to write/read register.

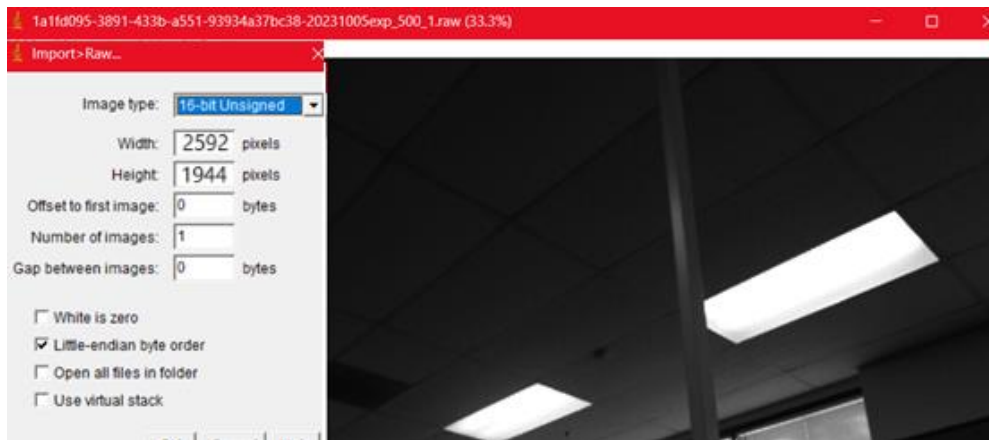
Run Camera 2/3



Capture Image

The images can be captured by clicking Options → CaptureImage. Two images (RAW and BMP) will be saved to PC

The raw image can be viewed by ImageJ.
<https://www.dropbox.com/s/fsvfmdy6s9ft03i/ImageJ.7z?dl=0>



Note: This camera tool supports Raw-to-RGB function which will reduce the display frame rate. You can click Options → DisableDisplay to get actual frame rate from the sensor. You can also use other regular software (like [AMcap](#)) to get higher frame rate, but the video will be green (like example on left) due to lack of Raw-to-RGB conversion function.



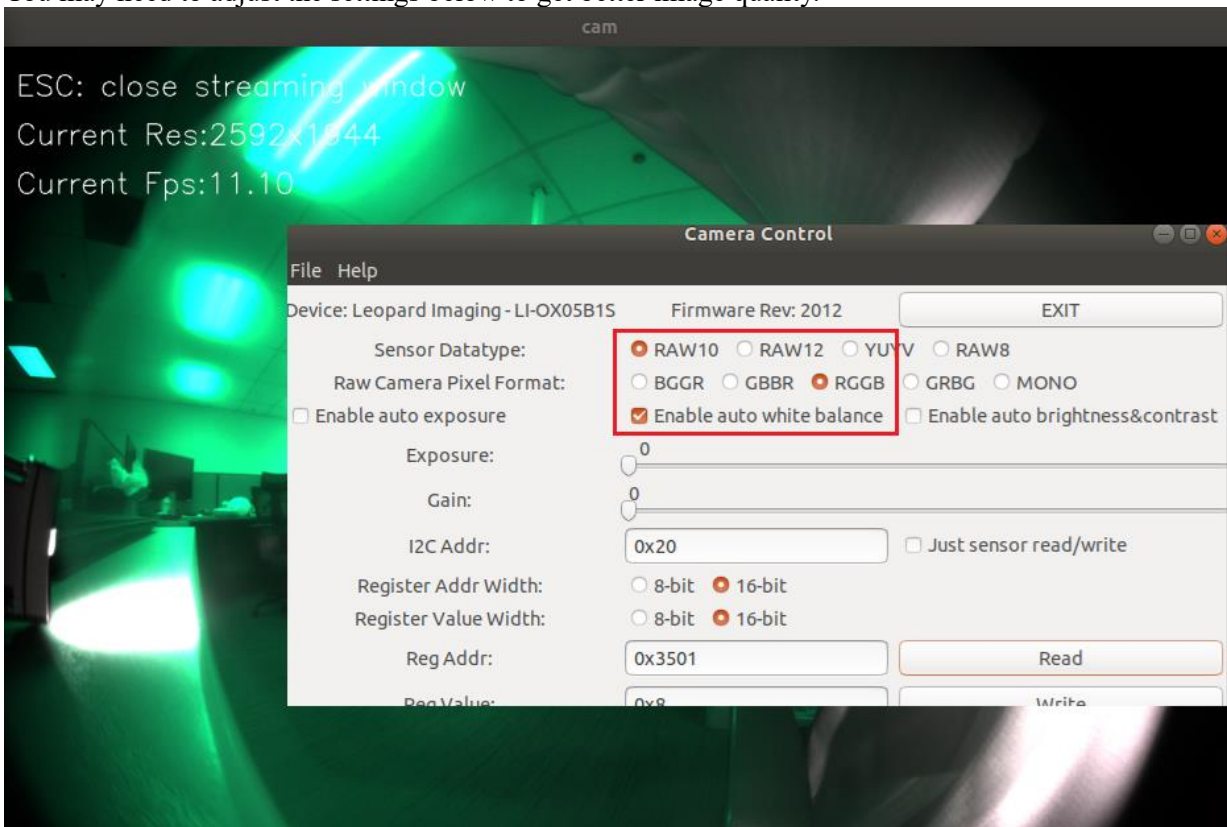
Run Camera 3/3

- Camera Tool (Linux OS)

1. Connect the camera to J1 of USB 3.0 Tester. (refer to example setup in page 1)
2. Plug in the 12V power supply to the USB 3.0 Tester.
3. Connect the camera to your PC (USB3.0 port) using the USB 3.0 cable.
4. Open a terminal and use the command “leopard_cam” to open the camera tool software.

Please make sure to complete these steps in numerical order. Steps 1 and 2 should always be taken before connecting the USB cable.

You may need to adjust the settings below to get better image quality.



I2C Addr: Just sensor read/write

Register Addr Width: 8-bit 16-bit

Register Value Width: 8-bit 16-bit

Reg Addr:

Reg Value:

Register access function
 This camera supports register access function.
 I2C address: 0x20
 Exposure: 0x3501 0x3502
 Gain: 0x350A, 0x350B



Note 1/3

This camera kit is pre-loaded with Firmware (in USB 3.0 Tester) and FPGA (in USB 3.0 Tester). If there is any new firmware and/or FPGA binary from Leopard Imaging, you can refer to the instructions below to update them.

1. Firmware Update:

Please use the **LP_USB3_FirmwareUpdateTool** in the camera tool folder to update the firmware.

- 1) Click “Erase” to erase the old firmware.
- 2) Click “FW Update” button to select the lif file. (If the “FW_Update is unavailable, please install the WestBridge driver, check below)
- 3) The update process may take about 15 seconds.
- 4) If the process takes too long, please disconnect the USB and reconnect it to PC. Then try the update tool again.

——Install WestBridge:

If the camera cannot be recognized after you update the firmware, and there is a device name “WestBridge” on the Device Manager, please download the driver from the link below and install it.

https://www.dropbox.com/s/4yx2p31b7qo2gix/WestBridge_driver.zip?dl=0

- 1) Right click on “WestBridge” and select Update Driver Software.
- 2) Choose browse my computer for driver software.
- 3) Click Browse, locate the driver at the downloaded and unzipped folder. (C:\temp\driver\bin\ for example) If your PC has Win7 or later version, please select the folder “win7”.
- 4) Click next and complete the installation process.

After installing the driver, please update the firmware again.



Note 2/3

2. FPGA Update:

FPGA Binary: mipi2cmos_4lane_raw10_v1.3_reverse.rbt

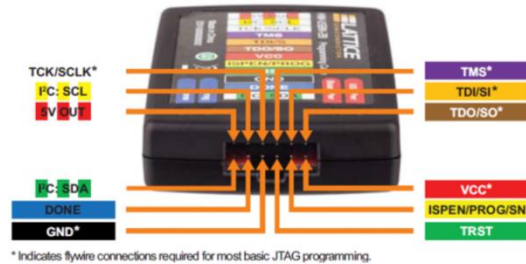
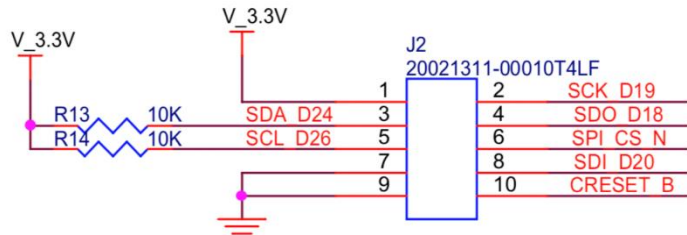
1) Download the Lattice programmer tool software **Programmer Standalone 3.10 64-bit for Windows** from link below and install it to your PC.

<http://www.latticesemi.com/programmer>

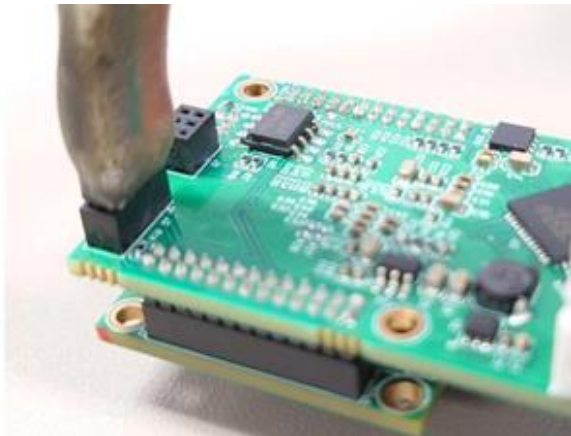
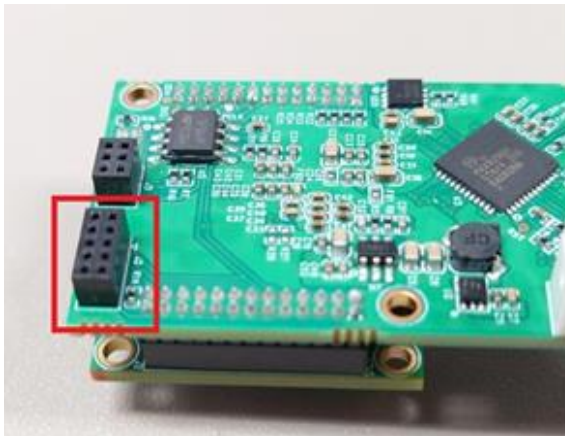
2) Connect the HW-USBN-2A or HW-USBN-2B to J2 of LI-MAX9296-DESER board. Below is the pinout. You may need to build an adapter cable for the programmer tool and J2. J2 is a 1.27mm pitch interface.

Only below pins in red need to be connected:

TI954 Board ← → HW-USBN-2B	TI954 Board ← → HW-USBN-2B
Pin1: V_3.3V ← → VCC	Pin2: SCK_D19 ← → TCK/SCLK
Pin3: N/A	Pin4: SDO_D18 ← → TDO/SO
Pin5: N/A	Pin6: SPI_CS_N ← → ISPEN/PROG
Pin7: GND ← → GND	Pin8: SDI_D20 ← → TDI/SI
Pin9: N/A	Pin10: CRESET_B ← → TRST



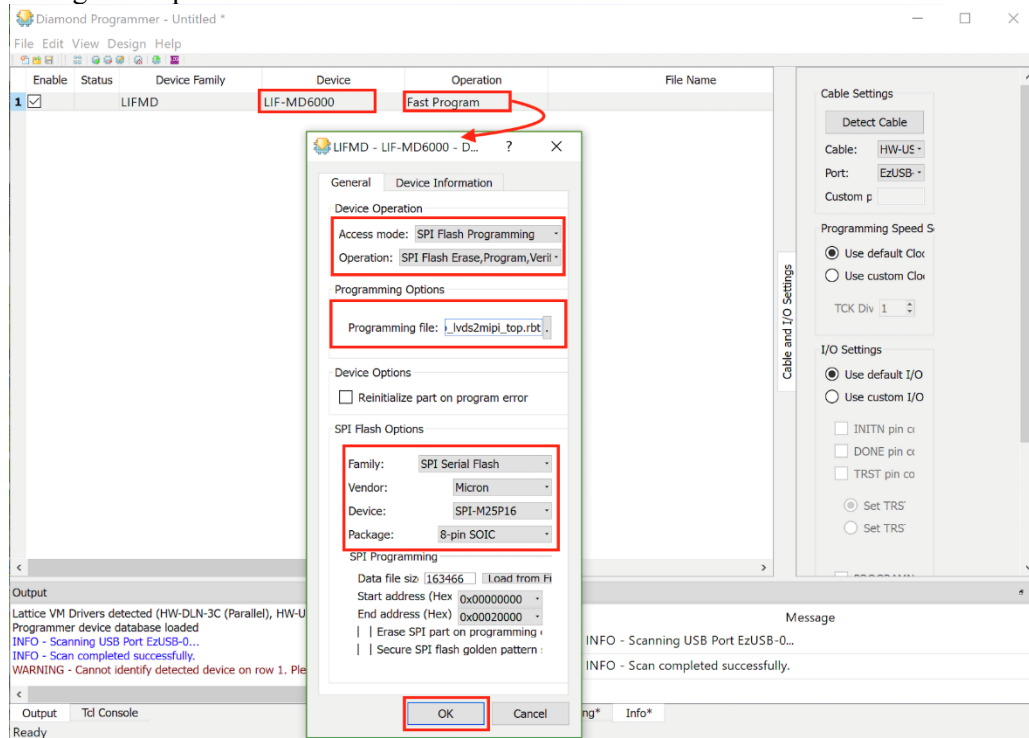
* Indicates flywire connections required for most basic JTAG programming.



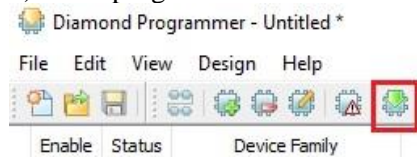


Note 3/3

- 3) Connect the USB3.0 Tester to your PC via USB 3.0 cable.
- 4) Open **LP_USB3_FirmwareUpdateTool** in the camera tool folder and click “Erase” to erase the firmware.
- 5) Open Lattice software (which you installed in 1). The Device name should be “LIF-MD6000”. Set the settings of “Operation” as below and click “OK”.



- 6) Click program icon.



- 7) It may take 9s to program the FPGA.



- 8) Refer to the “Firmware Update” section to install the firmware.