Overview

This firmware is for LI-USB30-IMX390-GW5400-GMSL2 camera.
This firmware supports 1920 x 1080 @ 60 fps.
This camera outputs YUV data.

Platform	Camera
1 x LI-GMSL2-FP-USB-BOX	1 x LI-IMX390-GW5400-GMSL2

Cable	Adapter/Carrier Board
1 x USB 3.0 Micro-B cable 1 x FAK-SMZSMZ Fakra cable	1 x 12VDC power supply

Revision	SVN version	Release Date	Author	Tested By
2024_05_01		05/01/2024		Shelby Hache
Updates				
Revision	Description			Release Date
2020_05_01	First Release			05/01/2024
Known bugs				

Setup Procedure 1/3

- Hardware:

1. LI-IMX390-GW5400-GMSL2 x 1
2. LI-GMSL2-FP-USB-BOX Tester x 1
3. FAK-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 below software:

1. Camera tool (Windows OS)

The Camera tool can be downloaded from the link below:
https://www.dropbox.com/s/8daqfypyhnubjr5/CameraUSB30_3_2_20190622.7z?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/6uswl40z8rqh2et/vcredist_x86.exe?dl=0

If needed, you can also download the camera tool SDK:
https://www.dropbox.com/s/j6ccl8cvt75gu2g/USB30_CameraTool_SDK_rev1440_20190622.7z?dl=0

Note: Since this is a YUV camera, you can also use AMcap or other regular software on Windows OS.

2. Linux Camera tool (Linux OS)

The Linux camera tool can be downloaded from link below:
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/

Note: Since this is a YUV camera, you can also use guvcview or other regular software on Linux OS.
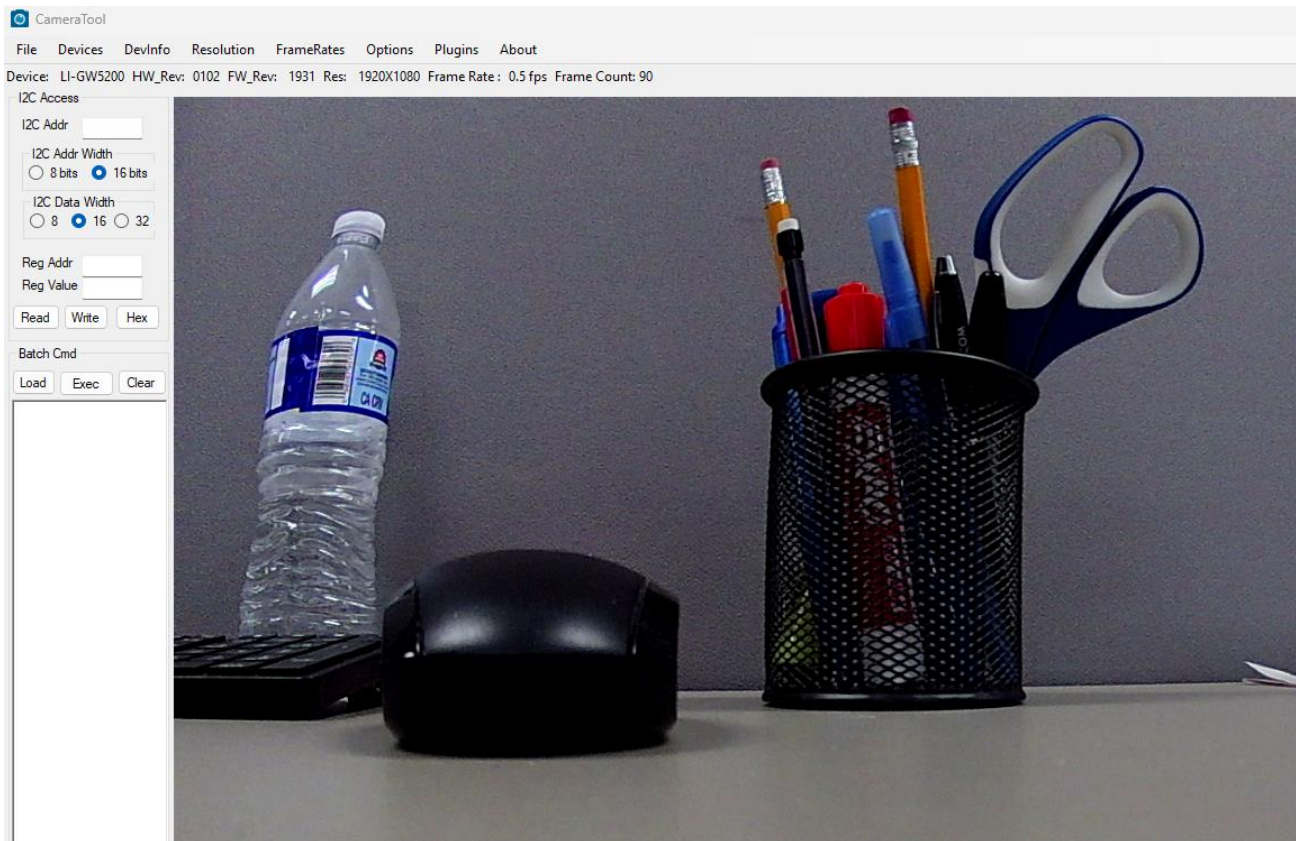

Run Camera 1/2

- Camera Tool (Windows OS)

1. Connect the camera to port RINA of USB 3.0 Tester. (refer to picture in page 1)
2. Plug in the 12V power supply to 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. <u>Steps 2 and 3 cannot be reversed.</u>

Color Matrix Function (NOT SUPPORTED):
This camera doesn't support the configuration of the color matrix.

Register Access Function (NOT SUPPORTED):
This camera doesn't support the register action function. It will include a pre-loaded ISP binary which will control the camera automatically.

Run Camera 2/2

- Camera Tool (Linux OS)

1. Connect the camera to RINA of USB 3.0 Tester. (refer to picture in page 1)
2. Plug in the 12V power supply to USB 3.0 Tester.
3. Connect the camera to PC (USB3.0 port) through USB 3.0 cable.
4. Open a terminal and use the command "leopard_cam" to open the camera.

Please make sure to complete these steps in numerical order. Steps 2 and 3 cannot be reversed.

Set the camera as YUYV to get the best quality.
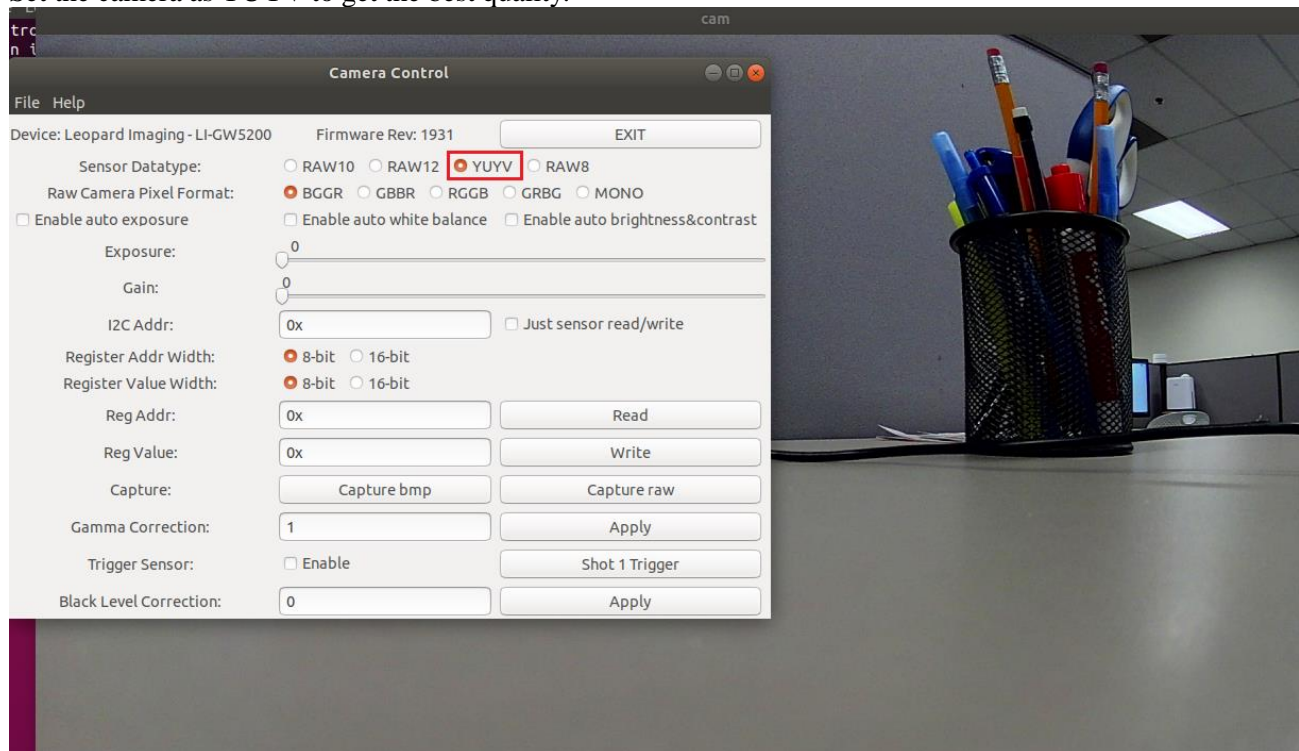
Note: This camera includes ISP and output YUYV, the image quality should be good without changing any settings.

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 below instructions 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/4yx2p31b7qo2gjx/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.

2. FPGA Update:

FPGA Binary: Radar_USB3_top_top_Radar_USB3_top_top.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. Below pins in red need to be connected.
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
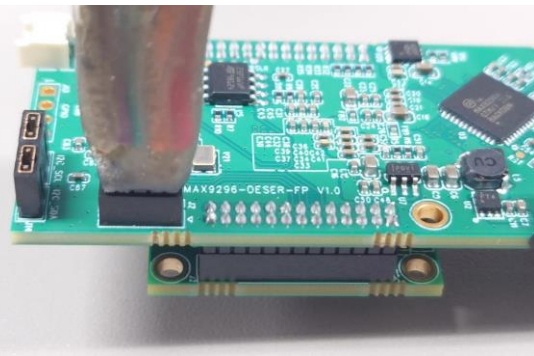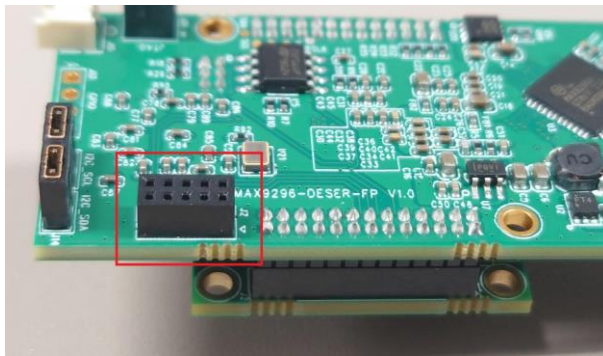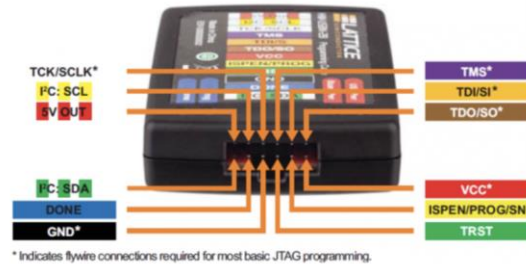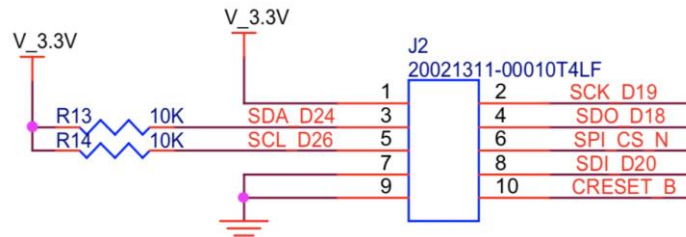
Note 3/3

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".
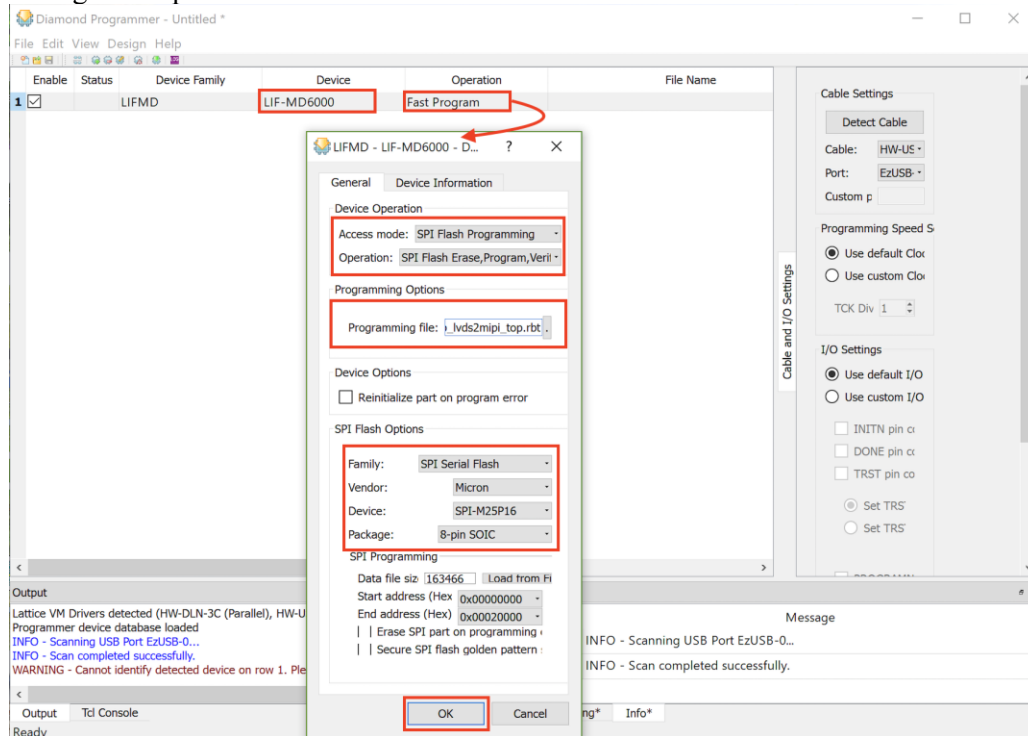
6) Click program icon.
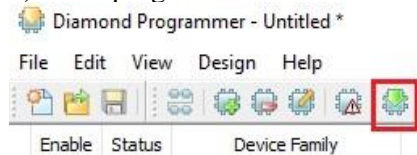
7) It may take 9s to program the FPGA.

8) Refer to the "Firmware Update" section to install the firmware.