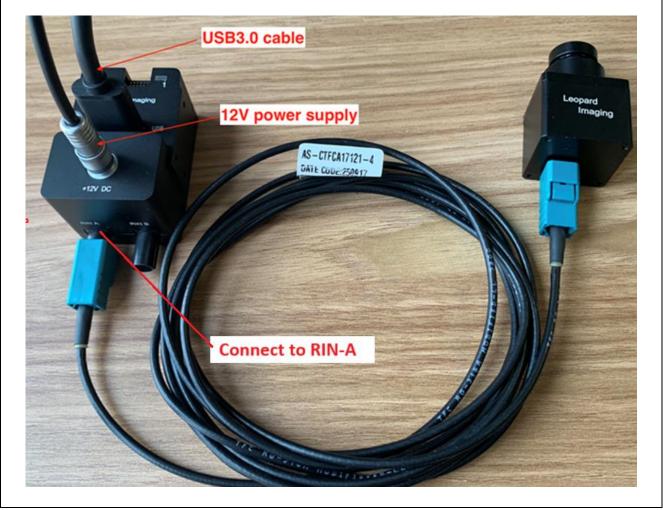


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Overview

This firmware is for LI-USB30-IMX490-NVP2670-GMSL2 camera. This firmware supports 2848 x 1772 @ 30 fps. This camera includes Nextchip NVP2670 ISP and outputs YUV422 8-bit data.

Platform	Camera
1 x LI-GMSL2-FP-USB-BOX	1 x LI-IMX490-NVP2670
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_10		05/10/2024		Shelby Hache
Updates				
Revision		Description		Release Date
2024_05_10	First Release			05/10/2024
Known bugs				



Setup Procedure 1/3

- Hardware:

- 1. LI-IMX490-NVP2670 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: <u>http://www.7-zip.org/download.html</u>

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

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.learnopency.com/install-opency-3-4-4-on-ubuntu-18-04/

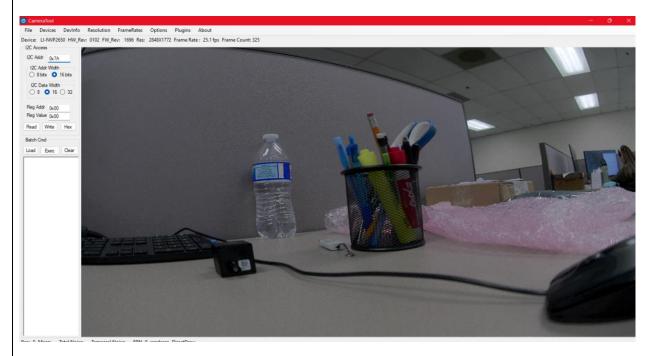


Run Camera 1/3

- Camera Tool (Windows OS)

- 1. Connect the camera to port RIN-A 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. Steps 2 and 3 cannot be reversed.



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 2/3

Capture Image:

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

Options	Plugins	About	
Cam	eraPropert	Y	
Cam	eraPropWi	n	
Capt	turelmage		
Trigg	erMode		,
Soft	Trigger		
Auto	Trigger		
SetTr	riggerDelay		
Pixe	Order		,
Mon	oSensor		

.

For raw image, it's YUV data encapsulated in RAW format. This camera cannot output raw data.



Run Camera 3/3

- Camera Tool (Linux OS)

- 1. Connect the camera to port RIN-A of USB 3.0 Tester. (refer to picture in page 1)
- 2. Connect the camera to PC (USB3.0 port) through USB 3.0 cable.
- 3. Open a terminal and use the command "leopard_cam" to open the camera.

Set the camera as below to get better image quality.

	Camera Control	00	
ile Help			
Device: Leopard Imaging - LI-NVP2650	Firmware Rev: 1696	EXIT	
Sensor Datatype:	○ RAW10 ○ RAW12 ○ YU		
Raw Camera Pixel Format:	OBGGR ○ GBBR ○ RGGB		
Enable auto exposure	Enable auto white balance	Enable auto brightness&contrast	
Exposure:	0		
Gain:	0		
I2C Addr:		Just sensor read/write	
Register Addr Width:	🔿 8-bit 🗿 16-bit		
Register Value Width:	🔿 8-bit 🗿 16-bit		
Reg Addr:		Read	
Reg Value:		Write	
Capture:	Capture bmp	Capture raw	
Gamma Correction:	1	Apply	
Trigger Sensor:	🗆 Enable	Shot 1 Trigger	
Black Level Correction:	0	Apply	

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 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/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 install the driver, please update the firmware again.



Note 2/3

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

V_3.3V V_3.3V R13 10K SDA D24 R14 10K SCL D26	J2 20021311-00010T4LF 1 2 SCK D19 3 4 SDO D18 6 SPI CS N 7 8 SDI D20 9 10 CRESET B	TCK/SCLK* PC: SCL MOUT TC: SDA DONE GND* * Indicates flywere connections required for most basic JTAG programming.



Note 3/3				
Note 3/3 3) Connect the USB3.0 Tester to your PC via 4) Open LP_USB3_FirmwareUpdateTool in 5) Open Lattice software (which you installed settings of "Operation" as below and click "O Device from Programmer - Untitled File Edit View Design Help Table Status Device Family Device Fast Program UFMD UFMD - UF-MD6000 - D? General Device Information Device Operation Access mode: PI Flash Program.Wei	n the camera tool folder and click "Erase" I in 1). The Device name should be "LIF-M K". File Name Cable Settings Detect Cable Programming Speed S Programming Speed S			
Contput Console Console Contput Console C	V Use custom Clo. TCK Div 1 : VO Settings VO			
6) Click program icon.				
File Edit View Design Help The Edit View Design Help The Enable Status Device Family 7) It may take 9s to program the FPGA. Dutput				
Disabling	î			
Verifying Finalizing				
INFO - Execution time: 00 min : 09 sec				
INFO - Elapsed time: 00 min : 09 sec				
INFO - Operation: successful.				
an o roperation addression				
Output Tcl Console	v			
8) Refer to the "Firmware Update" section to install the firmware.				
of Kerei to the Fillinware Opdate section to	instan uie ininwaie.			