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Overview

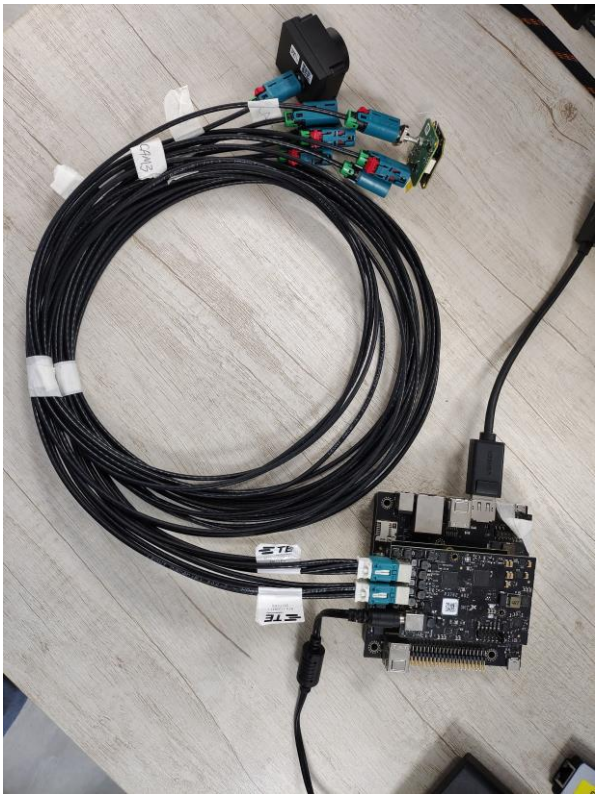
This driver is for LI-IMX530-GMSL2 camera kit with Nvidia Jetson AGX Orin Developer kit.
This driver supports six IMX530 cameras (J1 and J2).
This driver supports 5312X4608@15fps raw12.
This driver is based on R35.4.1(JP5.1.2).

Download link

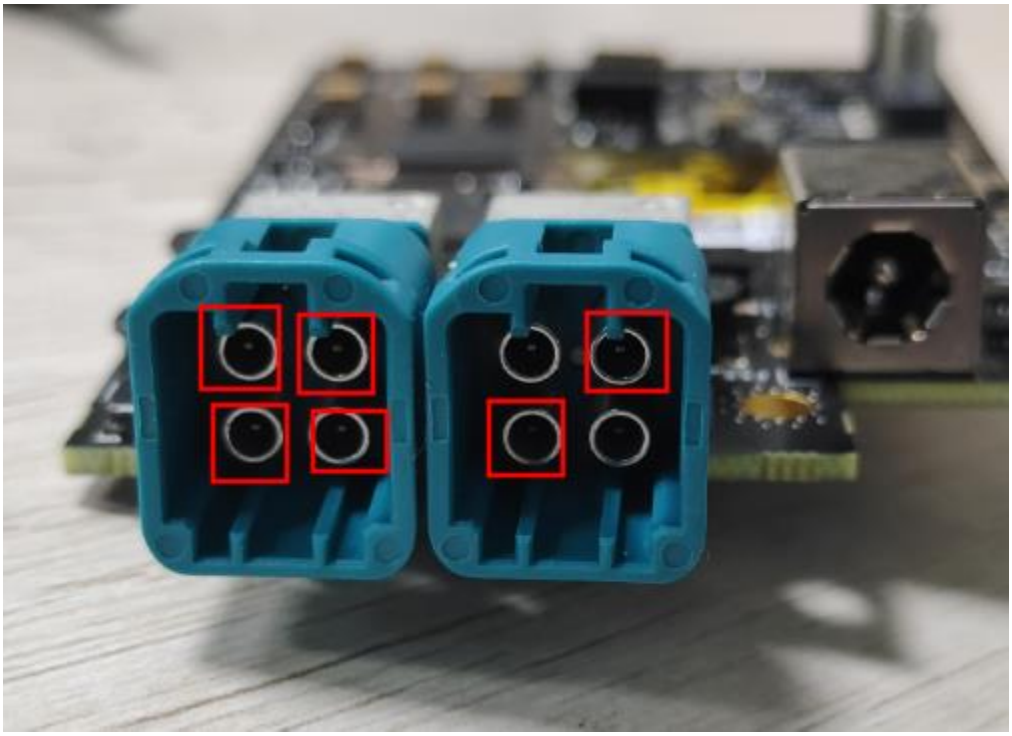
https://www.dropbox.com/scl/fo/p1m377ipq9ll6ua6bmfrs/h?rlkey=xl0ji07vaoaz5302tp4wuulp8&dl=0

Platform	Camera
Nvidia Jetson AGX Orin Developer kit	6 x LI-IMX530-GMSL2
Cable	**Adapter/Carrier Board**
2 x 4-in-1 Fakra cable	1 x LI-JAG-ADP-GMSL2-8CH V1.0(P3762_A02) 1 x 12VDC power supply 1 x 19VDC power supply

Hardware connection:



Please make sure all cameras connected in the red square in below picture.
System will auto detect and probe them. Only support 2cam streaming simultaneously from separate FKR connectors (FKR A and FKR B)



Revision	SVN version	Release Date	Author	Tested by
20231123		11/23/2023	Guoxin Wu	Junjie Feng

Updates

Revision	Description	Release Date
20231123	First Release based on R35.4.1	11/23/2023

Known bugs

Setup Procedure

Driver installation:

1. Download the R35.4.1 OS Image (from the release package) to your Ubuntu OS on Intel x64 Host PC (we are using Ubuntu 18.04, virtual machine is fine) and follow the l4t_quick_start_guide to flash the OS image to Orin.
R35.4.1 OS Image: https://www.dropbox.com/sh/w9sqruh4kgt799h/AAB2fKvTpdyj9BDCXZ6AxI9ba?dl=0

2.After boot up Orin, copy “Image” to /boot on Orin and copy “tegra234-p3701-0000-p3737-0000.dtb” to /boot/dtb/kernel_tegra234-p3701-0000-p3737-0000.dtb,then reboot.

```
$ sudo cp Image /boot/
$ sudo cp tegra234-p3701-0000-p3737-0000.dtb /boot/dtb/kernel_tegra234-p3701-0000-p3737-0000.dtb
$ reboot
```

```
nvidia@nvidia-desktop:~/Documents$ sudo cp Image /boot/
nvidia@nvidia-desktop:~/Documents$ sudo cp tegra234-p3701-0000-p3737-0000.dtb /boot/dtb/kernel_tegra234-p3701-0000-p3737-0000.dtb
```

3. After boot up Orin ,Open a terminal and do below commands.

```
sudo insmod max929x.ko
sudo insmod  imx530.ko
```

Note: Please insmod two .ko files for each reboot.

4. Do "nvgstcapture-1.0”. You will get live video output.

```
$  nvgstcapture-1.0 --framerate=15 --sensor-id X
```

X is 0-5

Run Camera

1. v4l2-ctl capture raw

v4l2-ctl -V --set-fmt-video=width=5312,height=4608,pixelformat=RG12 --set-ctrl bypass_mode=0 --stream-mmap --stream-count=1 --stream-to=imx530_X.raw -d /dev/videoX

X is 0-5

2.Gstreamer
Open a terminal and use below command to open a video

gst-launch-1.0 nvarguscamerasrc sensor-id=0 ! 'video/x-raw(memory:NVMM), width=(int)5312,height=(int)4608, framerate=15/1' ! nvvidconv flip-method=0 ! 'video/x-raw, format=(string)I420' ! xvimagesink -e

3.Use argus_camera to capture image/video.

Download the Multimedia package from link below and copy it to Orin.

https://www.dropbox.com/scl/fi/6nzkpy92soj1kj172cm2g/Jetson_Multimedia_API_R35.4.1_aarch64.bz2?rlkey=2ygkdpuwd88f47827f6sh0wg2&dl=0

Open a terminal, do

```
sudo apt-get update
sudo apt-get install cmake build-essential pkg-config libx11-dev libgtk-3-dev libexpat1-dev libjpeg-dev libgstreamer1.0-dev
```

Uncompress the tgz file.

```
tar -jxvf Jetson_Multimedia_API_R35.4.1_aarch64.bz2
```

Under usr/src/jetson_multimedia_api/argus/cmake, do

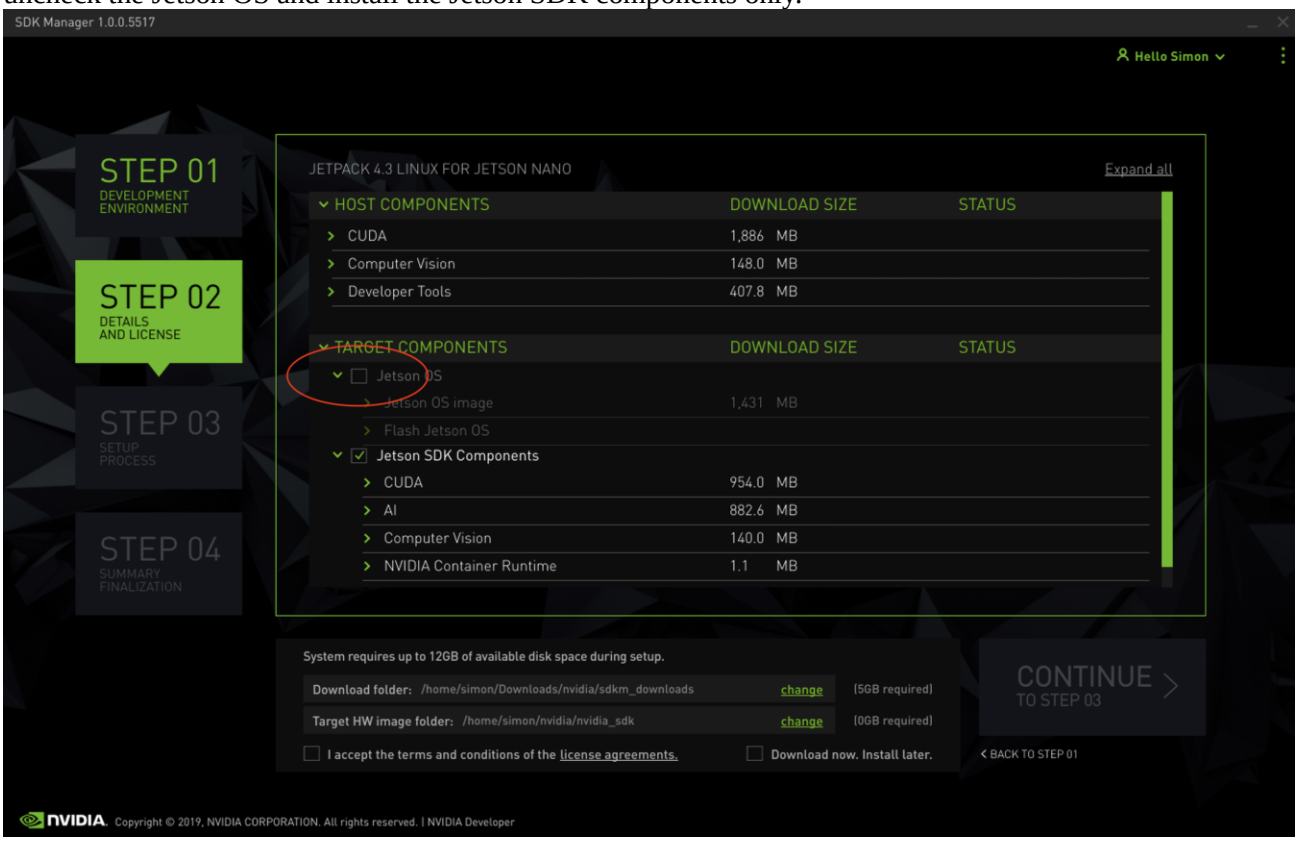
```
cmake ..
make
sudo make install
```

Do "argus_camera --device=0" to get the video.

Note:
1) Please use below commands to install v4l2.
sudo apt-get update
sudo apt-get install v4l-util

Note 1/2

1. If you would like to install the Jetpack 5.1.2 but don't want to re-flash the whole OS image, you can uncheck the Jetson OS and install the Jetson SDK components only.



Note 2/2

2. Compile the driver

If you would like to re-compile the driver, please follow below steps.
Download the driver code and Tool chain from links below.

Kernel code:
https://www.dropbox.com/scl/fi/l0hfaw3twlyi356x273em/kernel_src_R35.4.1.tbz2.tbz2?rlkey=bukoduzj78baj2zdxnimthjfp&dl=0
GCC ToolChain:
https://www.dropbox.com/sh/m6qq5vqxjqvlkxn/AAAsNdqs4f30iGfcKp2R-hVOa?dl=0

Compile the kernel under 64 bit Ubuntu OS on Intel x64 PC. (Virtual machine is fine. We are using Ubuntu 18.04 64 bit OS)

1) Create a new folder aarch64--glibc--stable-final in the/opt directory
   sudo mkdir aarch64--glibc--stable-final

2) Copy compile tool aarch64--glibc--stable-final.tar.gz to /opt/aarch64--glibc--stable-final, and open it
   sudo tar xpf aarch64--glibc--stable-final.tar.gz

3) Copy kernel_src_JXAV_R35.4.1.tbz2 and two patch files to /usr/src
   sudo tar xpf kernel_src_JXAV_R35.4.1.tbz2
   sudo chown -R <user_name> kernel
   sudo chown -R <user_name> hardware
   patch -p0 < R35.4.1_ORIN_IMX530_96712_GM2A_6cam_20231121_dtb.patch
   patch -p0 < R35.4.1_ORIN_IMX530_96712_GM2A_6cam_20231121_kernel.patch
Note: <user_name> is the user name of your Ubuntu OS. For example: sudo chown -R leopard kernel

4) To install the tool in the currently open window, execute
   sudo apt-get install flex
   sudo apt-get install bison
   sudo apt-get install libssl-dev

5) Compile in the currently open window, execute
   export CROSS_COMPILE_AARCH64_PATH=/opt/aarch64--glibc--stable-final
   ./nvbuild.sh -o $PWD/kernel_out/
   Note: /opt/ is the installation path where the compiler is decompressed

You can get the following files at the following paths
1) Image under $PWD/kernel_out/arch/arm64/boot/Image
2) tegra234-p3701-0000-p3737-0000.dtb under $PWD/kernel_out/arch/arm64/boot/dts/nvidia/tegra234-p3701-0000-p3737-0000.dtb
You will get Image under /home/work/Orin/kernel/kernel_out/arch/arm64/boot, get tegra234-p3701-0000-p3737-0000.dtb under /home/work/Orin/kernel/kernel_out/arch/arm64/boot/dts.
And you can get max929x.ko, imx530.ko under $PWD/kernel_out/drivers/media/i2c