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Dual MAX9296-GMSL2 Camera Interface Expansion Board

Main Features

- Compatible with TI-TDA series boards (tested with the following boards: tda4vm evaluation kit (EVM), tda4vm-starter-kit (SK)).
- Supports up to 4 camera channels (MAX9296, 2 channels * 2).
- Uses GPIO for power control, allowing individual power supply control for each camera channel.
- Provides reserved multi-camera synchronization trigger interface, capable of synchronizing up to 4 cameras.
- Offers reference drivers for some cameras.

Shipping List

- Expansion board, quantity 1
- Screws, several (SK version: diameter 2.5mm, length 5mm; EVM version: diameter 2.5mm, length 11mm)

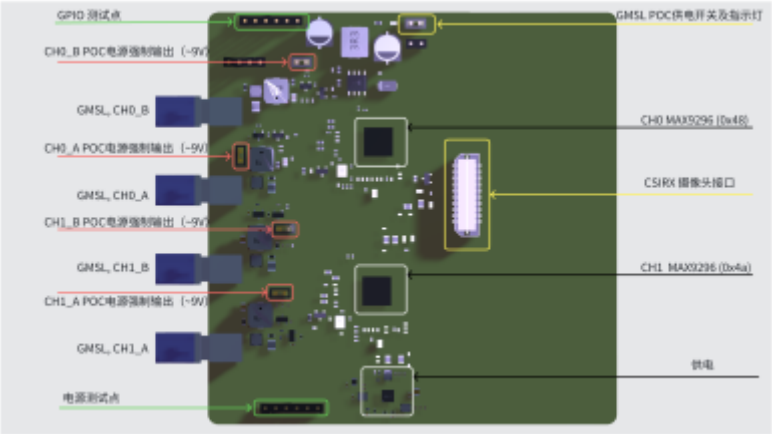
Main Features

- Works with TI-TDA series boards(Test on：tda4vm evaluation kit(EVM)， tda4vm-starter-kit(SK))；
- Connect max. 4 GMSL cameras：MAX9296， 2-channel*2；
- Use GPIOs of serializer to control POC.
- Reserved Fsync input port, can sync 4-camera input
- Provide GMSL RTOS driver.

Shipping list

- Expansion board
- Mounting screws： (SK-board：M2.5,L=5mm; EVM：M2.5mm,L=11cm)

Board Diagram



(may change without prior notice)

Key Parameters

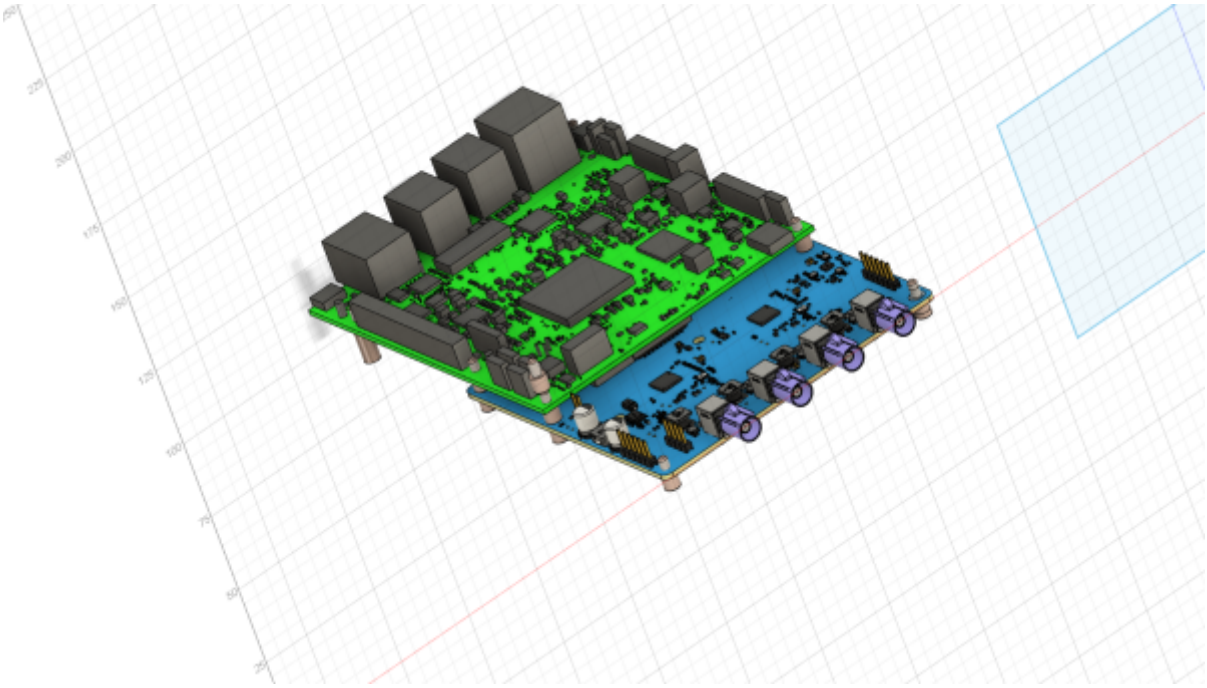
- GMSL channel number: 4 (max)
- Power Supply: 5-20V， USB-c, 45W USB-PD compliant
- GMSL POC voltage 8.8 - 9V， 800mA for each link
- Support internel/external sync
- GMSL Link status indication

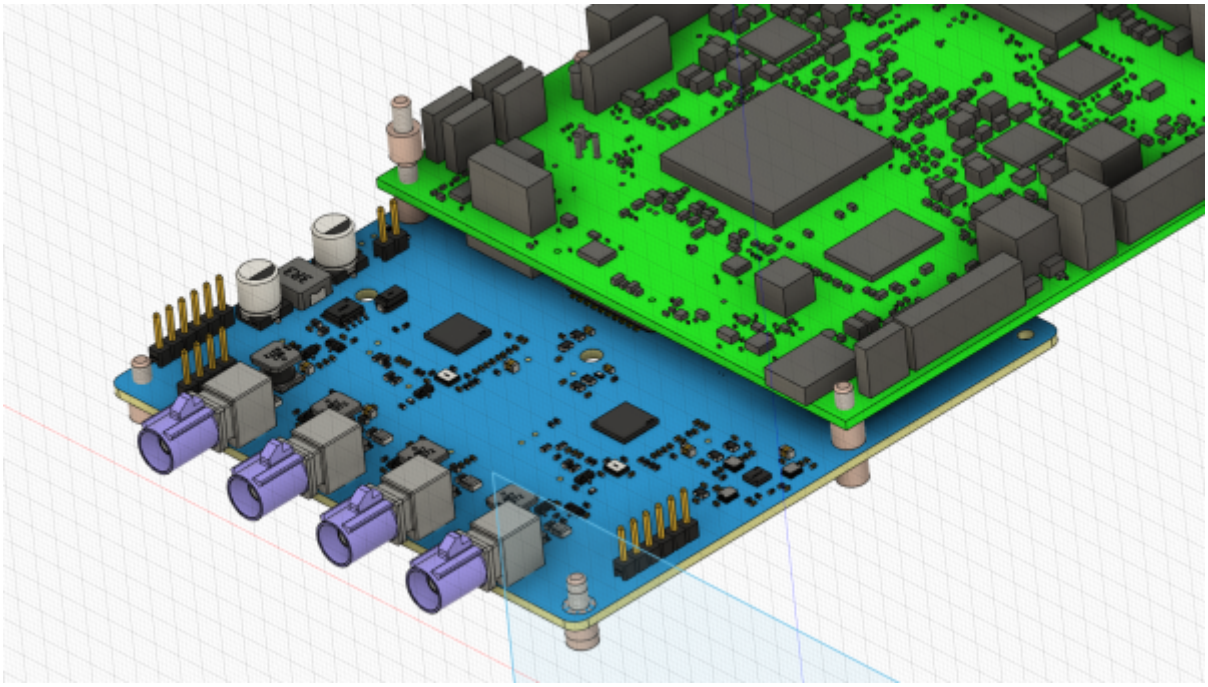
Installation and Connection

Attention: please use components we provided to install and fasten the expansion board, or may affect system stability.

SK board installation

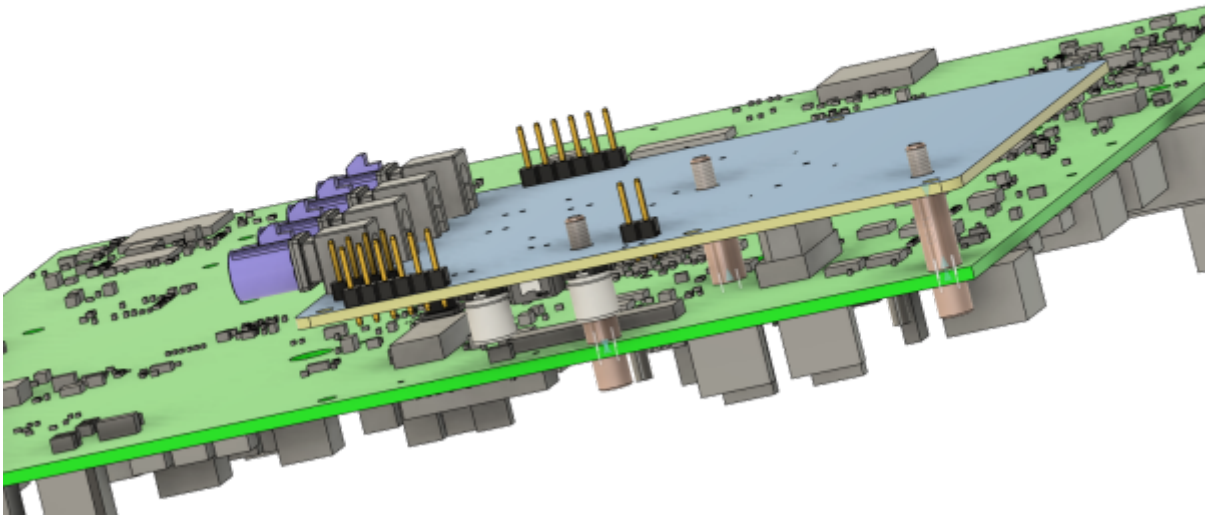
As shown in image below, expansion board and mainboard are connected use three M2.5/L=5mm spacer.

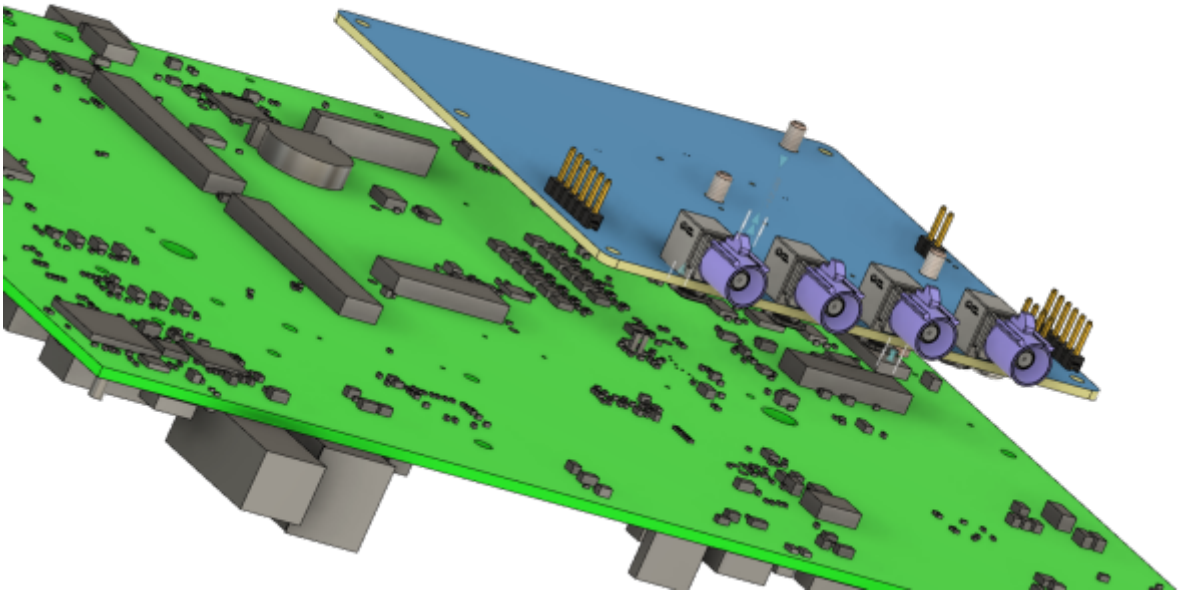




EVM Installation

Expansion board and EVM board are connect with 3 M2.5/L=11mm spacer





Connect Power Supply

Please use offical recommend power supply and ensure sufficient capacity.

Connect GMSL Camera

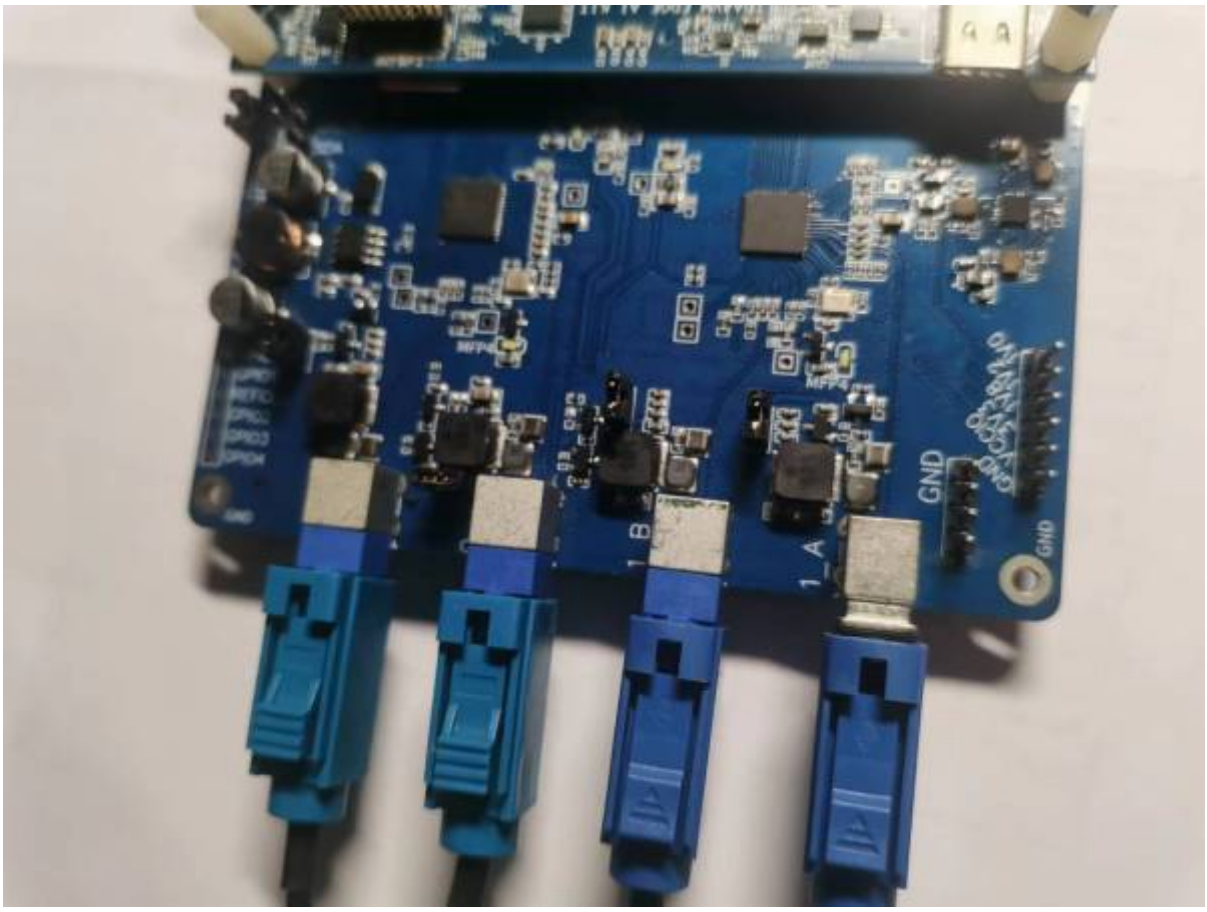
- Confirm that the POC voltage matches camera norminal working voltage.
- If POC control is not necessary, please install 'force-power-on' jumpper.

> No GMSL camera? check out our GMSL cameras or video inject devices: yCamSim-basic, yCamSim-pro, yCamSim-ultra

Quick Start

Step 1: Connect hardware

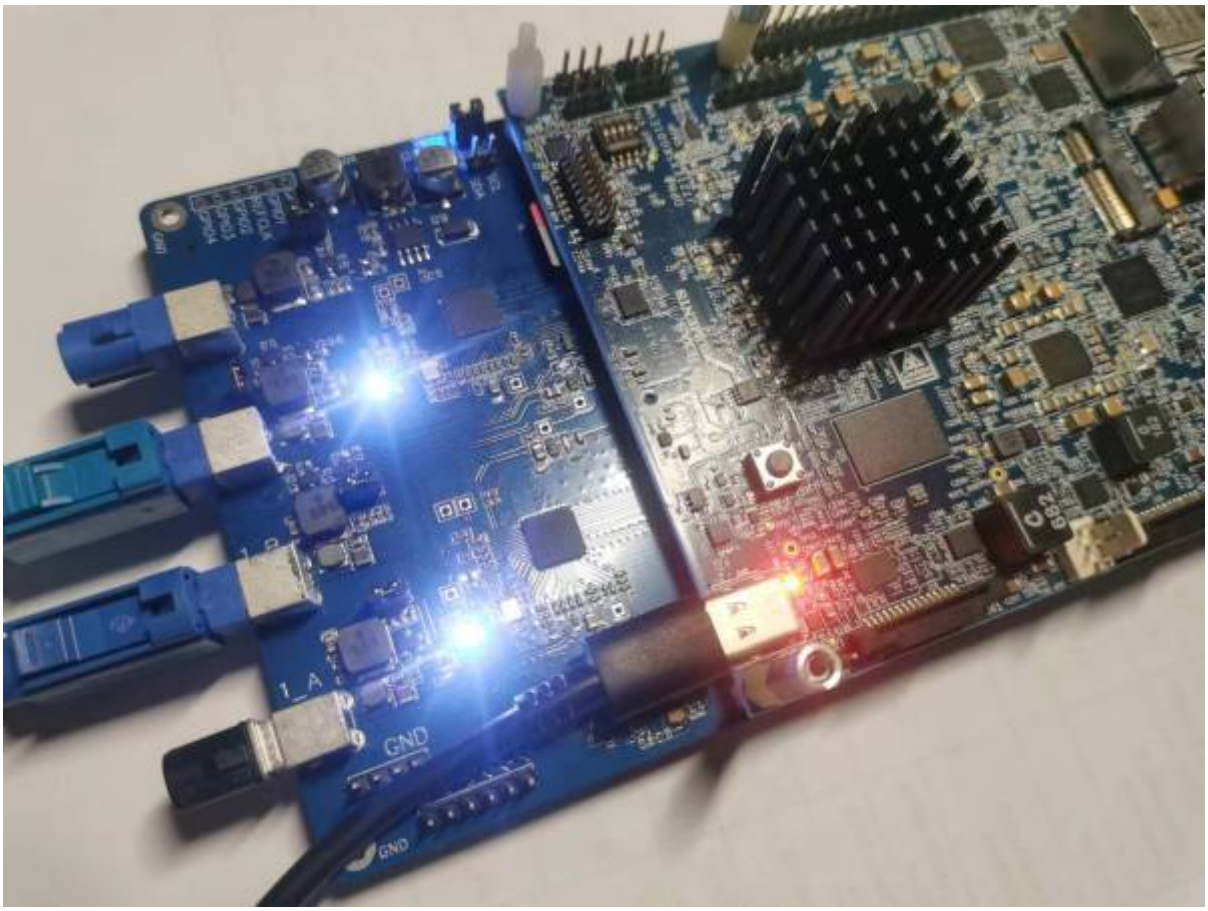
Please connect main board and expansion board according to description above. Please ensure reliable connection or cause improper operation or even damage to the hardware.



Step 2: Connect Camera(s)

With provides firmware, we add support of two GMSL cameras:

- GW5200-IMX390-GMSL2 from sensing world.
- HDMI to GMSL2 video convertor:yCamSim-basic



For other cameras, please checkout our guide of porting drivers. **Please pay attention to camera supply voltage**

Step 3: Main board setup

Insert TF card we provide. currently, we provide Images of SK board only. Compare with officail Image, we made following changes:

- Display controlled by R5, instead of Linux;
- Camera driver/config by RTOS, instead of linux.
- NNET use openvx framework.

Connect display, ethernet cable, UART cable. Please use HDMI display.

Step 4: Power on

Connect power supply to Type-C port of main board, ensure that the LED status is normal, and confirm:

- Type-C USB has sufficient capability.
- Camera POC jumpper is installed. (if it is control by GPIO, jumps are not necessary)

Step 5: Run test application

Use SSH/UART to login to a terminal, run below script to setup environment:

```
cd /opt/vision_apps
source ./vision_apps_init.sh
./run_app_single_cam.sh
```

注意，注意，如果摄像头连接的是CH1□需要运行针对CSIRX2_1编译的程序。

```
./run_app_single_cam_ch1.sh
```

正常运行时的log [采购后可查看]

其它注意事项

软件开发环境建立

使用EVM板

可以直接使用，具体使用方法，请参考官方文档。

使用SK板

需要对SDK进行一些修改，请参考文档 利用starter-kit开发板开发rtos应用

解串的地址

MAX9296的默认地址

- * CH0: 0x48
- * CH1: 0x4a

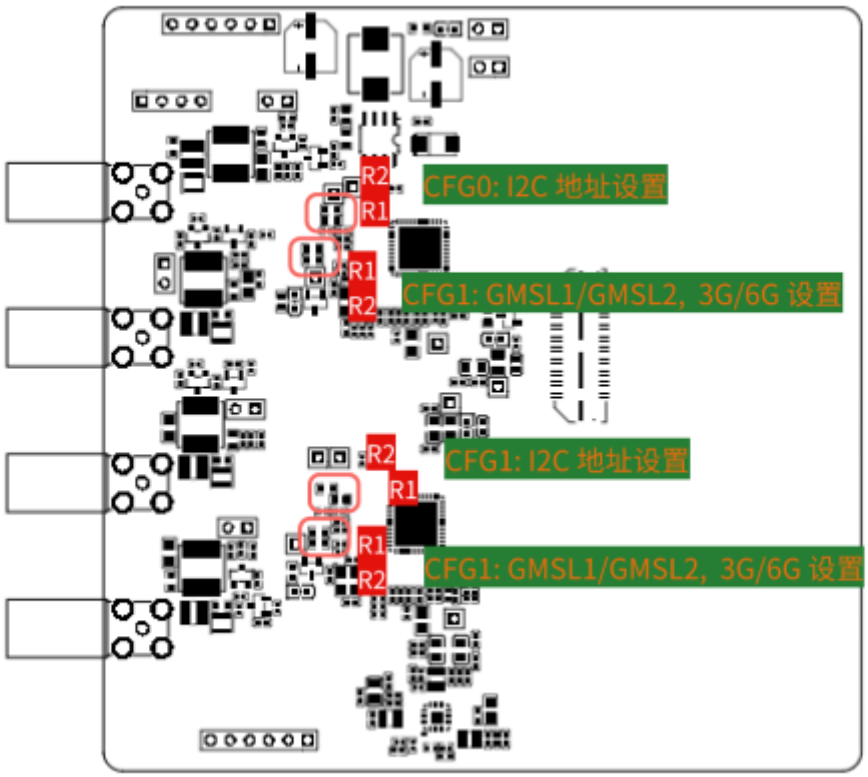
默认工作模式及修改

默认工作模式

CH0, CH1的MAX9296的默认工作模式均为GMSL2, 6Gbps.

通过硬件跳线修改默认工作模式

Max9296 支持GMSL1/GMSL2, 3G/6G coax/stp i2c/uart 等在上电时通过分压电阻进行配置。这些配置不建议修改，但如需修改，推荐使用I2C修改寄存器的方式修改。如果确需要修改硬件，参考下图：



电阻的选择请参考 美信 数据手册。

通过软件I2C配置工作模式

使用I2C修改GMSL模式，参考如下代码，可以在不变更硬件的情况下，在GMSL1/GMSL2模式下切换。 具体操作，请参考：软件修改MAX9296的模式及速率

配置帧同步信号

使用多个摄像头需要进行同步。当MAX9296工作于GMSL1或GMSL2模式时，其同步配置是不同的。 具体的操作及配置，请参考：MAX9296的多相机FSYNC配置.