

## **FPIX Cross Calibration Procedure**

### **Safety**

Proper ESD safety procedures should be followed at all times. An ESD wrist strap should be worn at all time while handle the module. Exposure to moisture can damage the silicon crystal lattice in the sensor. Modules should be stored in dry boxes when not in use. Modules should be handled with latex or nitrile gloves. Testers should where masks to limit the moisture exposure to the module. Modules should be kept safe from road salt. The combination of salt and water can be catastrophic for the silicon sensor. So the testing area should be free of road salt.

### **Test Setup**

Connect the DTB to a SCSI cable and connected the SCSI cable to the v2.X adapter card. Only a v2.X adapter card should be used. Do not use a v1.X adapter card with a Rev C. or Rev D. HDI as it shorts a voltage line to ground and may damage your setup.

To connect the module to the adapter card, simply slide the non-connected end of the copper flex cable into the black SMK connector on the adapter card. When closing the SMK connector make sure both sides of the SMK connector click shut.

Then connect the DTB to the PC with a USB cable and finally power up the DTB. The USB cable does not pose a safety risk to the module. However, the DTB should always be unpowered when connecting and disconnecting a module. Do not connect a module to a DTB that is connected to a power source.

### **pXar Release**

A specific pXar release has been tagged for the cross-calibration. Here are instructions on how to build it, and generate the initial configuration files.

```
git clone git@github.com:drberry85/pxar pxar_crosscalibrate_v1.1
cd pxar_crosscalibrate_v1.1
git checkout crosscalibrate_v1.1
mkdir build
cd build
cmake ..
```

```
make -j 4 install
cd ..
main/mkConfig -d crosscalibrate -t TBM08b -r digv2 -f -m -p 's/hubld
31/hubld 15/'
```

The DTB needs to be running FW4.0. To install this on a DTB do:  
git clone git@github.com:psi46/pixel-dtb-firmware ~/pixel-dtb-  
firmware

```
bin/pXar -f ~/pixel-dtb-firmware/FLASH/dtb_v4.0.flash
```

Once the lights go out on the rear of the DTB, reset it.

To run pXar with the newly generated config files do:

```
bin/pXar -d crosscalibrate -g -v DEBUG -r crosscalibrate.root
```

Place the module in a 17°C environment. The cold box is the best environment. Allow the module to settle to 17°C, this can be checked with the RTD on the module. Set the bias voltage to -150V.

The cross-calibration testing procedure goes as follows:

Go to the Pretest tab

Press “doTest”

Go to the PixelAlive tab

Press “doTest”

Go to the Trim tab

Press “doTest”

Go to the PhOptimization tab

Press “doTest”

Go to the GainPedestal tab

Press “doTest”

Go to the BB tab

Press “doTest”

Go to the Scurves tab

Press “doTest”

Change ntrig from 50 to 200 and press “Set”

Change the dac from VthrComp to Vcal and press “Set”

Change the dachi from 200 to 70 and press “Set”

Change dacs/step from 10 to 1 and press “Set”

Press “doTest”

All the tests results should be saved in the crosscalibrate.root file.