Twin Lake/Amston Lake/Alder Lake-N IPU Bring Up Guide

User Guide

April 2025

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Revision History

Date	Revision	Description
April 2025	1.0	Initial release.

1.0 Introduction

1.1 Terminology

Table 1. Terminology

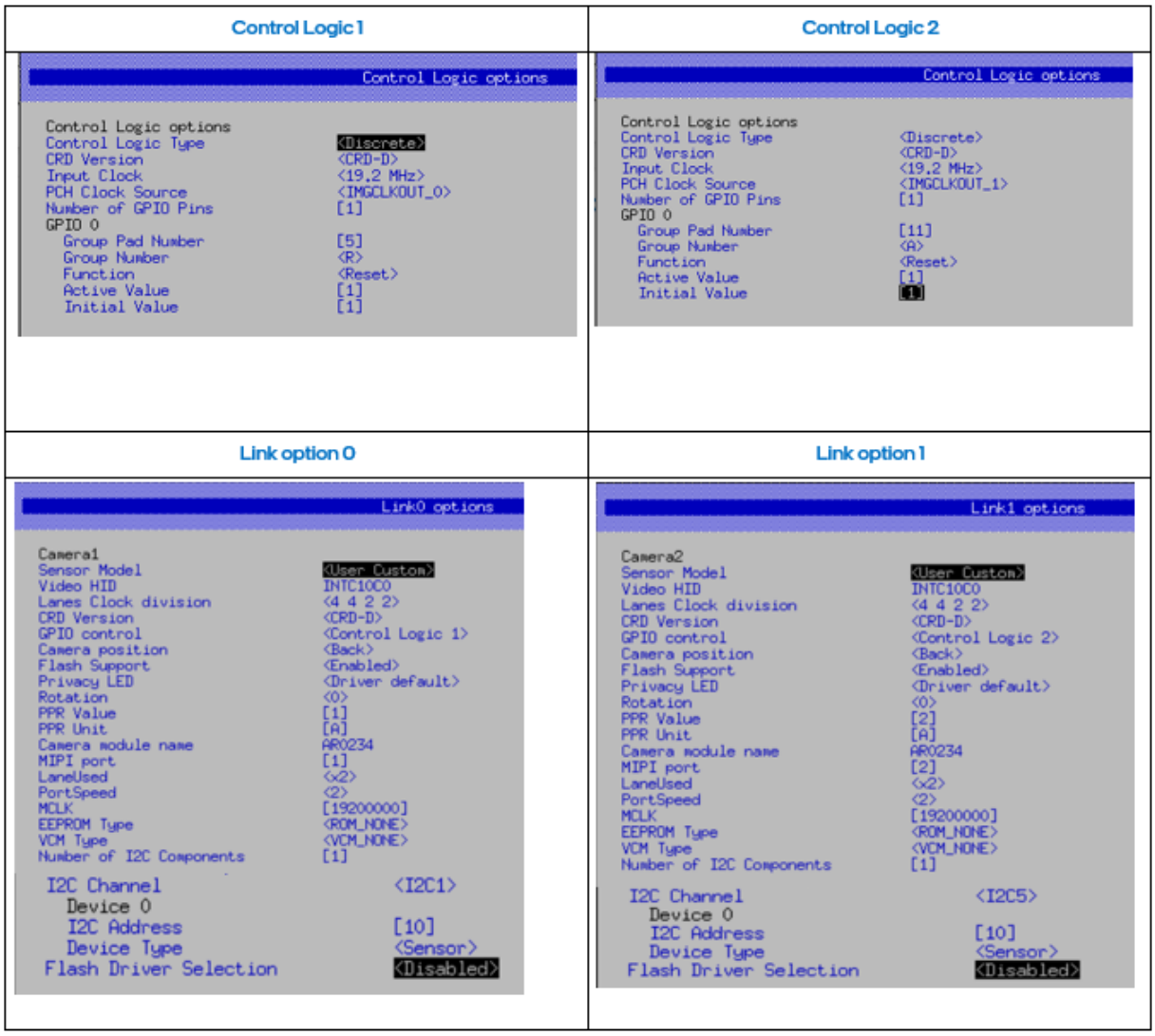
Term	Description
BIOS	Basic Input/Output System
DMABuf	Direct Memory Access Buffer
GPIO	General Purpose Input/Output
IPU	Imaging Process Unit
I2C	Inter-Integrated Circuit
Mmap	Memory-Mapped
OEM	Original Equipment Manufacturer

2.0 BIOS Configuration

The values of GPIO pads and I2C buses are determined from the board schematic design. Please refer to OEM board schematic design to obtain these values.

2.1 AR0234 BIOS Configuration

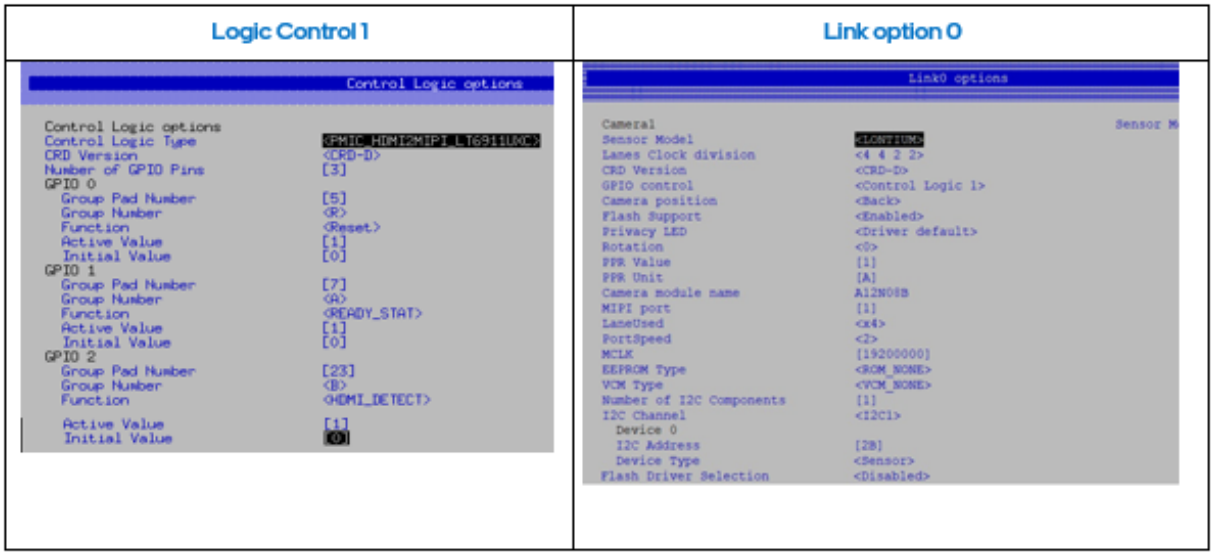
Figure 1. AR0234 Control Logic & Camera Configuration



2.2 LT6911UXC BIOS Configuration

2.2.1 1x4K30 Configuration

Figure 2. LT6911UXC Control Logic & Camera Configuration



3.0 IPU User Space Libraries

3.1 Github Build

3.1.1 Ipu6-camera-bins

Clone this repository, ipu6-camera-bins and check out to the following build tag, TWL PV.

```
git clone https://github.com/intel/ipu6-camera-bins.git
cd ipu6-camera-bins && git checkout v1.0.0-twl-pv-v6.12
```

Copy over binaries to target file path:

```
cp -r ipu6-camera-bins/include/* /usr/include/
cp -r ipu6-camera-bins/lib/* /usr/lib/
```

3.1.2 ipu6-camera-hal & icamerasrc

Clone these repositories, ipu6-camera-hal , icamerasrc and check out the following build tag respectively, ipu6-camera-hal-v1.0.0-twl-pv-v6.12 and icamerasrc-v1.0.0-twl-pv-v6.12.

```
git clone https://github.com/intel/ipu6-camera-hal.git
cd ipu6-camera-hal && git checkout v1.0.0-twl-pv-v6.12
cd .. && git clone https://github.com/intel/icamerasrc.git
cd icamerasrc && git checkout v1.0.0-twl-pv-v6.12
```

Copy the build.sh one directory level above, the same as ipu6-camera-hal repo and ipu6-icamerasrc repo.

```
cp ipu6-camera-hal/build.sh .. && cd ..
```

Run the following command to build libcamhal and icamerasrc libraries,

```
./build.sh -d --board ipu_adl
```

Install libraries to the target filepath:

```
cp -r ./out/<target>/install/etc* /etc/
cp -r ./out/<target>/install/usr/include/* /usr/include/
cp -r ./out/<target>/install/usr/lib/* /usr/lib/
```

4.0 System Environment

4.1 Wayland System Environment

Add the following configuration in **~/.bashrc** under user mode and root mode respectively:

```
export DISPLAY=:0;xhost +     ;    source /etc/profile
```

Add the following environment variables into /etc/profile:

```
export LIBVA_DRIVERS_PATH=/usr/lib/x86_64-linux-gnu/dri
export LIBVA_DRIVER_NAME=iHD
export
PKG_CONFIG_PATH=/usr/local/lib/pkgconfig:/usr/lib64/pkgconfig:/us
r/lib/pkgconfig
export
LD_LIBRARY_PATH=/usr/local/lib:/usr/lib64:/usr/lib:/usr/lib/x86_6
4-linux-gnu
export GST_PLUGIN_PATH=/usr/lib/gstreamer-1.0
export GST_GL_PLATFORM=egl
export GST_GL_API=gles2
export logSink=terminal
rm -rf ~/.cache/gstreamer-1.0
```

5.0 IPU Workloads

5.1 AR0234 with mmap Pipeline

```
gst-launch-1.0 icamerasrc num-buffers=-1 scene-mode=normal
device-name=ar0234-1 printfps=true io-mode=1 ! 'video/x-raw,
format=NV12, width=1280,height=960' ! glimagesink sync=false
gst-launch-1.0 icamerasrc num-buffers=-1 scene-mode=normal
device-name=ar0234-2 printfps=true io-mode=1 ! 'video/x-raw,
format=NV12, width=1280,height=960' ! glimagesink sync=false
```

5.2 AR0234 with DMABuf Pipeline

```
gst-launch-1.0 icamerasrc num-buffers=-1 scene-mode=normal
device-name=ar0234-1 printfps=true io-mode=4 ! 'video/x-
raw(memory:DMABuf), drm-format=NV12, width=1280,height=960' !
glimagesink sync=false
gst-launch-1.0 icamerasrc num-buffers=-1 scene-mode=normal
device-name=ar0234-2 printfps=true io-mode=4 ! 'video/x-
raw(memory:DMABuf), drm-format=NV12, width=1280,height=960' !
glimagesink sync=false
```

5.3 LT6911UXC mmap Pipeline

```
gst-launch-1.0 icamerasrc num-buffers=-1 scene-mode=normal
device-name=lt6911uxc-1 printfps=true io-mode=1 ! 'video/x-raw,
format=UYVY, width=<width>,height=<height>' ! glimagesink
sync=false
```

5.4 LT6911UXC with DMABuf Pipeline

```
gst-launch-1.0 icamerasrc num-buffers=-1 scene-mode=normal
device-name=lt6911uxc-1 printfps=true io-mode=4 ! 'video/x-
raw(memory:DMABuf), drm-format=UYVY,
width=<width>,height=<height>' ! glimagesink sync=false
```

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