



**gumstix**  
**cameras**

# **Gumstix Caspa HD and 4K Cameras**

## **Quickstart Guide for the Intel® Joule™ module**

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# *Gumstix® Caspa HD and 4K Cameras – Quickstart Guide for the Intel® Joule™ module*

Keith Lee  
Gumstix®, Inc.  
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## **1 Introduction**

The following document provides setup instructions for the Gumstix Caspa HD and Caspa 4K MIPI CSI-2 cameras with the Intel® Joule™ module. Following these directions will ensure that you have the correct firmware and software installed on your device and that the cameras are properly and securely attached to the Intel® Joule™ module.

### **1.1 Overview: Caspa HD**

The Gumstix® Caspa HD camera module is a 5 megapixel(MP) OmniVision OV5670 CMOS sensor designed for embedded devices. Its features include:

- 5MP( $2592 \times 1944$ ) and Quad-HD( $2560 \times 1440$ ) stills and video at 30 FPS
- 1080p( $1920 \times 1080$ ) and 720p( $1280 \times 720$ ) stills and video at 60 FPS
- 10-bit RGB RAW output
- 1- or 2-lane MIPI CSI-2 data bus
- Ultra-Low Power Mode (ULPM)
- Interleave-row HDR support

### **1.2 Overview: Caspa 4K**

The Gumstix® Caspa 4K camera module is a 13 MP Sony IMX214 CMOS sensor and auto-focus lens unit. The sensor is primarily targeted at mobile device applications. Its features include:

- 13MP ( $4208 \times 3120$ ) and 4K( $3840 \times 2160$ ) stills and video at 30 FPS
- 1080p ( $1920 \times 1080$ ) stills and video at 60 FPS
- 'HDR Video' mode – SME-HDR stills and 4K video output at 30 FPS (60 FPS at 1080p)





- 10-bit RGB RAW output
- 2- to 4-lane MIPI CSI-2 data bus
- Mechanical auto-focus lens

## 2 Setting Up

**NOTE:** The following instructions are written for the Intel® Joule™ 570x compute module. All links to software and external resources may not be accurate for other models. Please ensure that you download the appropriate firmware and OS releases for your model.

Use of the Gumstix® Caspa HD and 4K cameras require at least version 193 of the BIOS firmware and release 1702 of the 'Reference Operating System for IoT,' both provided by Intel's Developer Zone. You can find the latest versions of these resources at:

<https://software.intel.com/en-us/iot/hardware/joule/downloads>

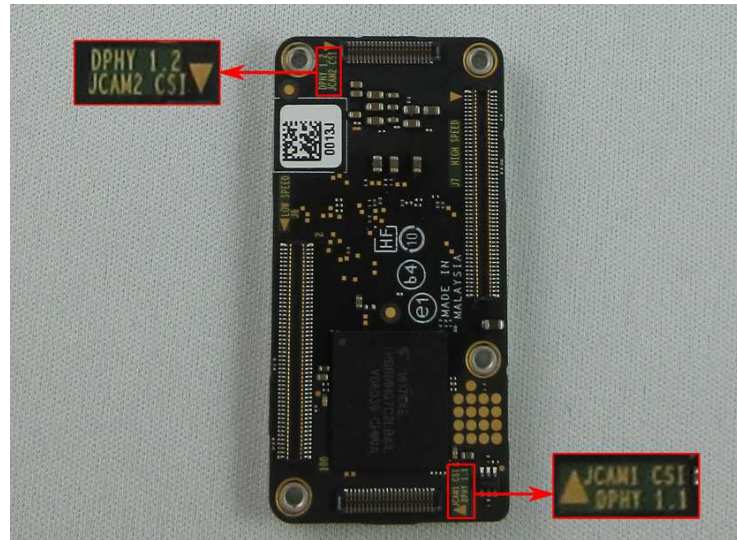
At the time of publication, the most recent version of the BIOS is **1D1** and the current OS release is **1703**. Download and install the BIOS and OS following the instructions provided by Intel.

- **BIOS:**
  - Download:  
<https://downloadmirror.intel.com/26206/eng/joule-firmware-2017-03-20-1d1-public.zip>
  - Instructions:  
<https://software.intel.com/en-us/flashing-the-bios-on-joule>
- **OS:**
  - Download:  
<https://download.01.org/ref-os-iot/releases/1703/>
  - Instructions:  
<https://software.intel.com/en-us/node/721477>

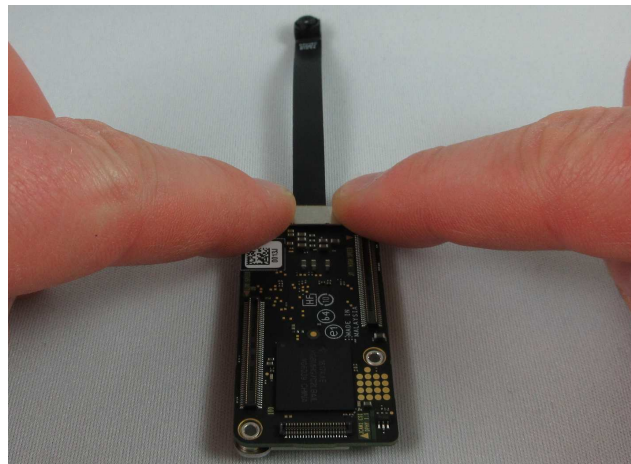
Next, attach your camera to the Intel® Joule™ module.

1. Remove the module from expansion board and flip it over so that the connectors are facing up.
2. Locate the camera connector compatible with your model:
  - Caspa 4K: JCAM1 (*located directly below WiFi/BT module*)
  - Caspa HD: JCAM2





3. Align the camera's connector with that of the Intel® Joule™ module such that its ribbon extends outward from the module.



4. With a finger on each side of the camera's connector, gently press down until you feel the connector click into place.
5. Re-attach the Joule module to your expansion board.

### 3 Test Camera

In order to test the connected camera module, connect your expansion board to a display and connect a power adapter. Wait until the XFCE4 interface initializes and open a console window. At the command line, enter the command below associated with your camera model:

- Caspa HD:





```
$ gst-launch-1.0 icamerasrc device-name=1 io-mode=3 ! \  
video/x-raw,format=NV12,width=1920,height=1080 ! \  
vaapisink dmabuf-alloc-tiled=true
```

- Caspa 4K:

```
$ gst-launch-1.0 icamerasrc device-name=0 io-mode=3 ! \  
video/x-raw,format=NV12,width=3840,height=2160 ! \  
vaapisink dmabuf-alloc-tiled=true
```

In both cases a window will open displaying the live stream from the camera sensor.





## External Links

<https://download.01.org/ref-os-iot/releases/1703/>, 2  
[https://downloadmirror.intel.com/26206/eng/  
joule-firmware-2017-03-20-1d1-public.zip](https://downloadmirror.intel.com/26206/eng/joule-firmware-2017-03-20-1d1-public.zip), 2  
<https://software.intel.com/en-us/flashing-the-bios-on-joule>, 2  
<https://software.intel.com/en-us/iot/hardware/joule/downloads>, 2  
<https://software.intel.com/en-us/node/721477>, 2

