CC3200 SimpleLink™ Wi-Fi® and IoT Solution with MCU – Camera BoosterPack

User's Guide

Literature Number: SWRU384
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Getting Started

1.1 Introduction

The SimpleLink™ Wi-Fi® CC3200 Camera BoosterPack (CC3200CAMBOOST) enables evaluation and development with the camera peripheral present on the SimpleLink Wi-Fi CC3200 device. When used with the SimpleLink Wi-Fi CC3200 Launchpad (CC3200-LAUNCHXL) Rev 3.1 or higher, the BoosterPack interfaces with JPEG image sensors to capture still camera images. The board supports Omnivision and Aptima JPEG sensors for higher resolution. The camera is capable of up to 6 FPS with VGA JPEG compressed images. The maximum PIXCLK between the CC3200CAMBOOST and the CC3200-LAUNCHXL is 2 MHz. Applications include: Wi-Fi CCTV, doorbell camera, security camera, toys, and drone camera.

All references in this document are with respect to the CC3200CAMBOOST Rev4.x. This board does not have an onboard Camera Sensor [(1)].

1.2 Key Features

- Onboard camera sensor interfaces:
  - Flexi module connector for Aptina sensors (Verified with MT9D111 sensor module)
  - PCB Module connector for Aptina sensors (Verified with MT9D111 sensor module)
  - Flexi module connector for Omnivision sensors (Verified with OV3660 Sensor module)

  The camera sensors [(1)] need to be purchased for the respective interfaces.
- The maximum PIXCLK of the CC3200-LAUNCHXL is 2 MHz.
- LDOs on the board to power the different blocks of the camera module.
- LED indicators for power

1.3 What's Included

- CC3200CAMBOOST
- Quick Start guide

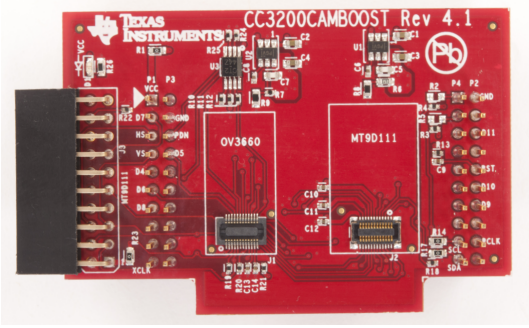

Figure 1-1. CC3200CAMBOOST

(1) The camera sensors can be purchased from: http://www.uctronics.com/mega-pixel-camera-module-mt9d111-jpeg-out-p-227.html

2.1 Connectors

P1		P3	
Ref	Signal	Signal	Ref
1	VCC	NC	1
2	D7	GND	2
3	HSYNC	PWRDN	3
4	VSYNC	D5	4
5	D4		5
6	D6		6
7	D8		7
8	NC		8
9	NC		9
10	XCLK		10

P4		P2	
Ref	Signal	Signal	Ref
1	NC	GND	1
2	NC	NC	2
3		D11	3
4		NC	4
5		RESET	5
6		D10	6
7		D9	7
8		NC	8
9	I2C_SCL	pCLK	9
10	I2C_SDA	NC	10

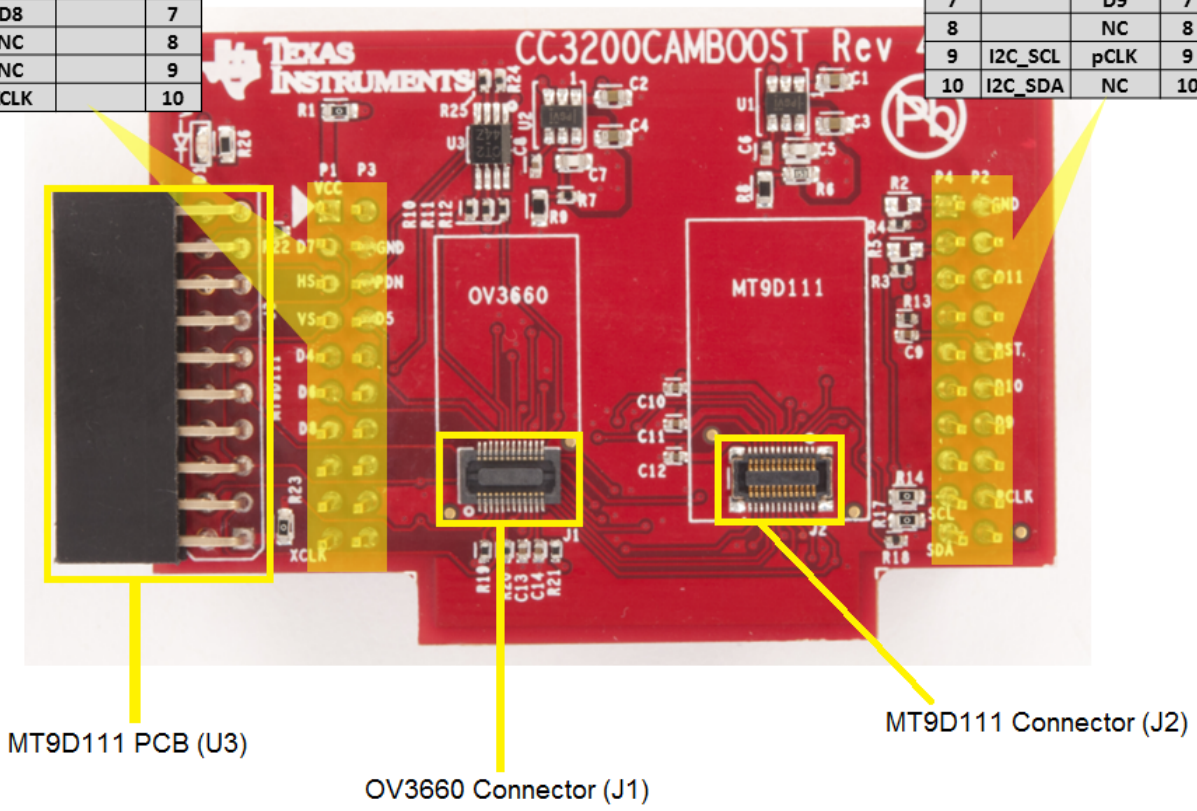

Figure 2-1. Connectors

2.1.1 20 Pin Launchpad Headers (P1, P2, P3, P4)

The 20 pin connector connects the CC3200CAMBOOST board to the CC3200-LAUNCHXL. The CAMBOOST is compatible only with the CC3200-LAUNCHXL as it does not adhere to any standard BoosterPack connector definition.

2.1.2 MT9D111 Flexi Module Connector (J2)

The connector connects a flexi module for the MT9D111 camera sensor. Ensure that the camera is mounted with the lens facing the user and the body of the module within the white boundary marked.

The physical connector on the board is the WP3-S024VA1-R500 from JAE Electronics. The mating camera module must be physically and electrically compatible with the connector on the CC3200CAMBOOST.

The connector definition is given in Figure 2-2.

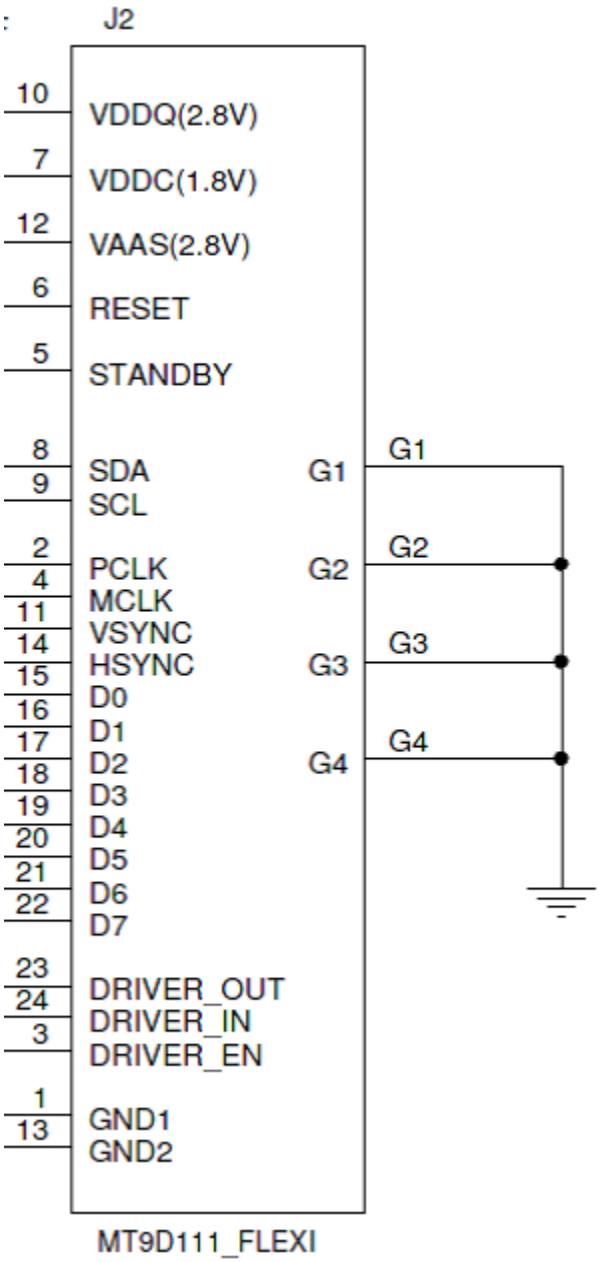

Figure 2-2. Pin Assignment of the Aptina MT9D111 Module

2.1.3 MT9D111 PCB (J3)

This connector connects a rigid PCB module housing the MT9D111 sensor. The PCB module should be aligned correctly as shown in Figure 2-1 to prevent board failure.

The connector on the CC3200CAMBOOST is the PPPC102LJBN-RC from Sullins Corp. The connecting camera module must be physically and electrically compatible with the connector on the CC3200CAMBOOST.

The connector definition is shown in Table 2-1.

Table 2-1. Connector Definition

Signal Name	Pin #	Pin #	Signal Name
VCC	1	2	GND
I2C_SCL	3	4	I2C_SDA
pVS	5	6	pHS
pCLK	7	8	pXCLK
pDATA_07	9	10	pDATA_06
pDATA_05	11	12	pDATA_04
pDATA_03	13	14	pDATA_02
pDATA_02	15	16	pDATA_00
NC	17	18	pPWRDN
NC	19	20	NC

2.1.4 OV3660 connector (J1)

The connector connects a flexi module for the OV3660 camera sensor. Ensure that the camera is mounted with the lens facing the user and the body of the module within the white boundary marked.

The connector on the CC3200CAMBOOST is the DF30FC-24DS-0.4V(82) from Hirose. The mating camera module must be physically and electrically compatible with the connector on the CC3200CAMBOOST. The connector definition is provided in Figure 2-3.

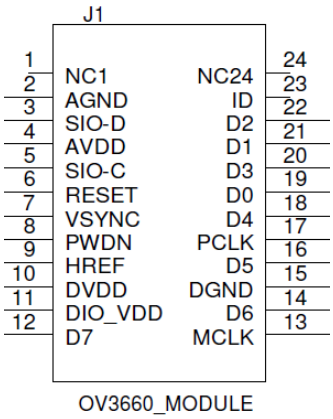

Figure 2-3. Pin Assignment of the Omnivision OV3660 Module

2.1.5 Power connection

The CAMBOOST board is powered directly from the 3.3 V sourced from the Launchpad. No special care is needed when the Launchpad board is powered from the USB supply, but when powered from a 2xAA battery, ensure that the battery does not drop below 2.6 V.

Connecting to the CC3200-LAUNCHXL Board

3.1 Jumper Configuration Needed on the CC3200-LAUNCHXL

The following jumper changes must be made on the CC3200-LAUNCHXL for the CC3200CAMBOOST board to work correctly.

1. **UART pins:**
   - J6 (Short pins 1-2): Selecting the BP option
   - J7 (Short pins 1-2): Selecting the BP option

   This disconnects the GPIO_01 and GPIO_02 from the FTDI and connects them to the 2x20 pin headers.
2. **JTAG TDI/TDO pins**: Remove jumpers J10 and J11 to cut off the TDI and TDO from the FTDI.
3. **SWD Mode (SOP)**: Set the debug mode to SWD by setting SOP 2:0 = [001].
4. **I2C Pins**: Remove CC3200-LAUNCHXL jumpers J2, J3, and J4. This disconnects the GPIO from the on-board sensors.

A CC3200-LAUNCHXL with all the above modifications is shown in Figure 3-1.

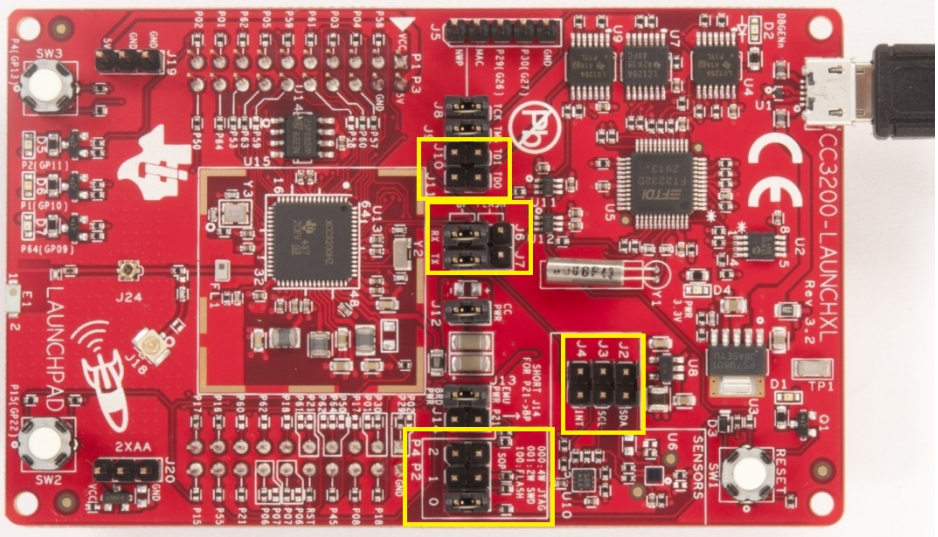

Figure 3-1. Modified CC3200-LAUNCHXL

3.2 Interfacing with the CC3200-LAUNCHXL

The CC3200CAMBOOST board can be directly connected to a CC3200-LAUNCHXL using the 2x20 pin header connectors. A white triangle marked on the board indicates the pin-1: this must be aligned with the white triangle on the CC3200-LAUNCHXL. Failure to align the boards correctly before power-up can damage the boards. The correctly mated board is shown in Figure 3-2 and Figure 3-3. Note the alignment of the white triangles on the boards in Figure 3-3.

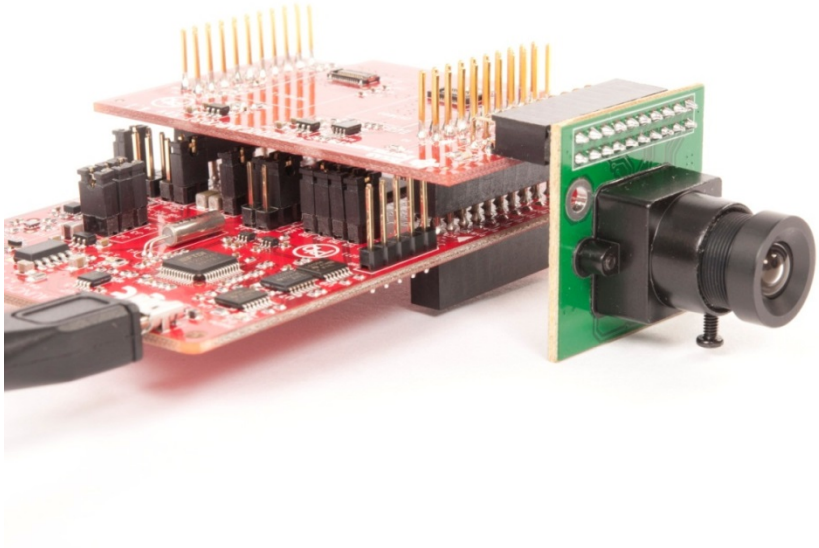

Figure 3-2. CC3200CAMBOOST and MT9D111 PCB Module Connected to the CC3200-LAUNCHXL

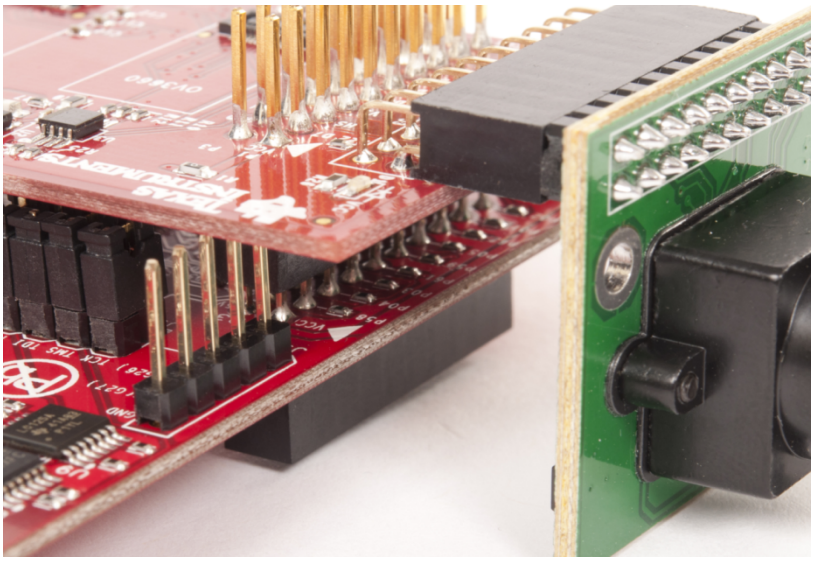

Figure 3-3. Close up View

Additional Resources

4.1 Schematics and board files

The latest design files, which include the gerber files, schematic, bill of materials, PCB layout, and assembly drawings, can be obtained from http://www.ti.com/tool/tidc-cc3200camboost.

4.2 Software Examples

Updated information is available on the CC3200CAMBOOST Wiki page. The camera application is located in the CC3200 SDK at the following location: *$INSTALL_DIR\cc3200-sdk\example\camera_application*.

4.3 The TI E2E Community

Search the forums at e2e.ti.com. If you cannot find your answer, post your question to the community.

Known Limitations

5.1 Hardware Limitations

- Only one camera module can be connected to the CC3200CAMBOOST at a given time.
- The CC3200 cannot be flashed over the UART when the CAMBOOST board is working. This is due to the UART lines being used for the camera interface. The J6 and J7 jumpers must be set to default condition (shorting 2-3) to flash the CC3200 application.
- When the CC3200LAUNCHXL board is powered from a 2xAA battery, the overall working range is limited to 2.6 V, as the camera module needs 2.5 V to operate with some head-room for the LDO powering it.
- The Launchpad must be configured in SWD mode (SOP 2:0 = [001]) to work with the CC3200CAMBOOST, as it uses the TDI and TDO lines as I2C.
- The MT9D111 PCB Module cannot be reset from the CC3200LAUNCHXL. This is due to non-availability of this pin on the connector. To reset the camera module, power cycle the CC3200LAUNCHXL board completely.

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STANDARD TERMS AND CONDITIONS FOR EVALUATION MODULES (continued)

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