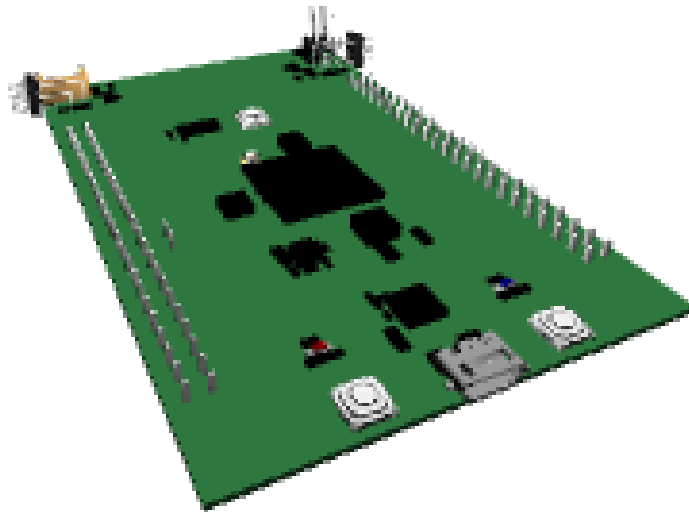


# BBB Rover Cape



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## Board Description

A WiFi and Bluetooth-enabled cape for The BeagleBone Black SOM.

## Board Dimensions

5.5cm x 8.65cm

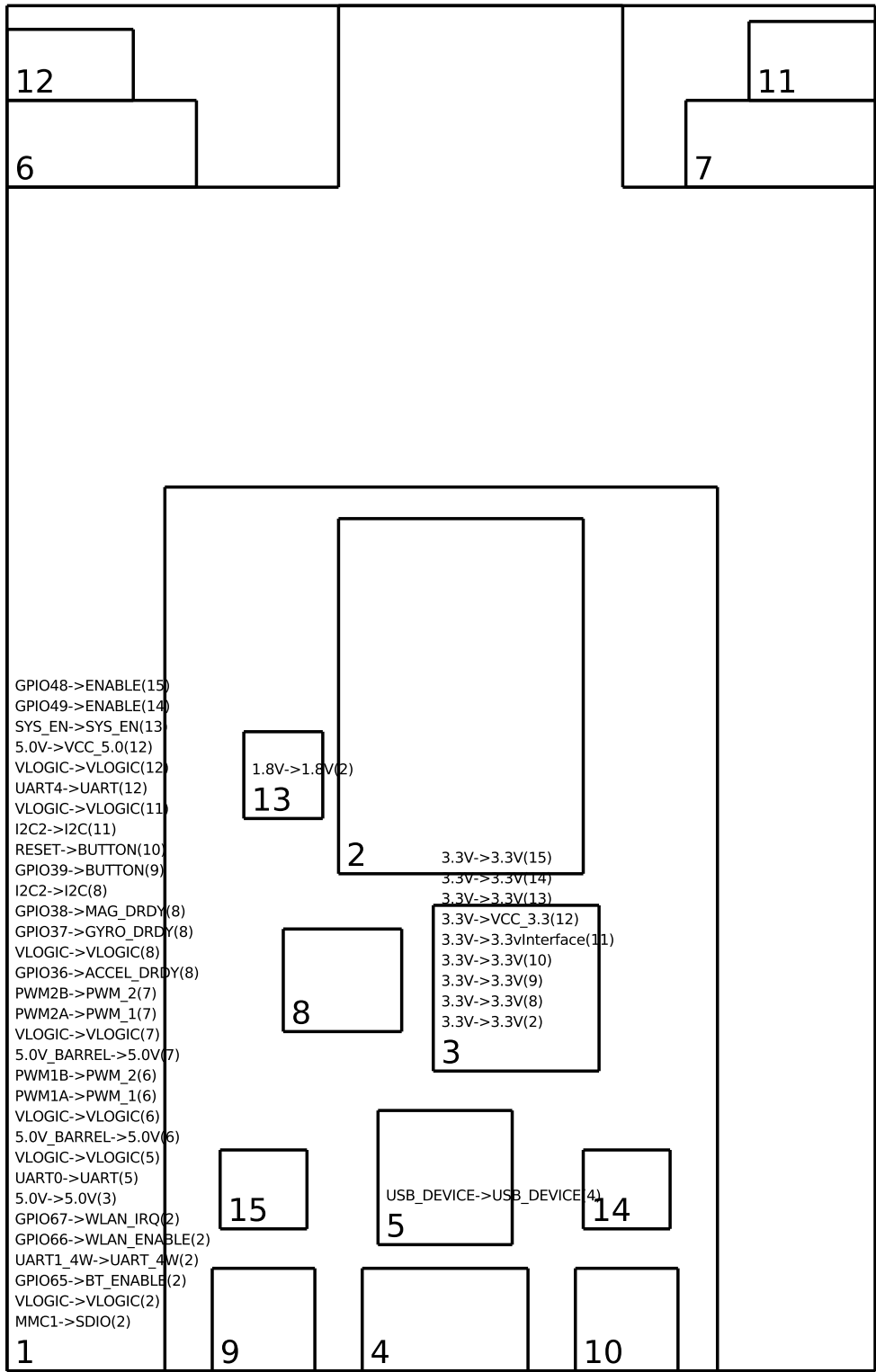


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# 1 Modules on Board



## 1.1 COM Connectors

### 1.1.1 BeagleBone Black COM Connector (v16) (1)

BeagleBone Black is an ARM-based maker board powered by the TI AM335x processor with 256MB RAM.

The Beaglebone Black COM connector uses the “cape” pinout to interface with the BeagleBone Black, providing power and signal transmission for custom Geppetto expansion boards.

Provides:

- RESET to Tactile Switch (10)
- MMC1 to TI WiLink8 (2)
- PWM1B to Dual PWM Header (6)
- PWM1A to Dual PWM Header (6)
- GPIO65 to TI WiLink8 (2)
- GPIO67 to TI WiLink8 (2)
- GPIO66 to TI WiLink8 (2)
- GPIO49 to Blue LED (14)
- GPIO48 to Red LED (15)
- 5.0V\_BARREL to:
  - Dual PWM Header (6)
  - Dual PWM Header (7)
- UART0 to USB-UART (5)
- UART4 to Five-pin GPS Header (12)
- 5.0V to:
  - 3.3V/1.5A Regulator (3)
  - Five-pin GPS Header (12)
- UART1\_4W to TI WiLink8 (2)
- PWM2B to Dual PWM Header (7)
- PWM2A to Dual PWM Header (7)
- SYS\_EN to 1.8V/0.6A Regulator (13)
- GPIO38 to 9-Axis IMU (8)
- GPIO39 to Tactile Switch (9)
- VLOGIC to:
  - TI WiLink8 (2)
  - USB-UART (5)



- Dual PWM Header (6)
- Dual PWM Header (7)
- 9-Axis IMU (8)
- I2C Header (11)
- Five-pin GPS Header (12)
- GPIO36 to 9-Axis IMU (8)
- GPIO37 to 9-Axis IMU (8)
- I2C2 to:
  - 9-Axis IMU (8)
  - I2C Header (11)

## 1.2 Network

### 1.2.1 TI WiLink8 (v14) (2)

The TI WiLink8 module includes BT4.1 and 802.11(a/b/g/n) signals on one antenna.

The module connects to the following buses:

- SDIO from BeagleBone Black COM Connector (1) for 802.11 traffic.
- 4-wire UART from BeagleBone Black COM Connector (1) for BT traffic.
- WiFi Enable from BeagleBone Black COM Connector (1).
- WiFi IRQ from BeagleBone Black COM Connector (1).
- BT Enable from BeagleBone Black COM Connector (1).

To function, the clock on the SDIO bus from BeagleBone Black COM Connector (1) must be run at 32.768kHz which is provided by a dedicated crystal.

## 1.3 Power

### 1.3.1 3.3V/1.5A Regulator (v9) (3)

This DC to DC step down regulator provides a 3.3V DC output at 1.5A needed by certain components on this board. It is capable of accepting an input voltage between 3.1 to 16V DC. Currently, its input is 5V from BeagleBone Black COM Connector (1).

This regulator provides 3.3V to:

- TI WiLink8 (2)
- 9-Axis IMU (8)
- Tactile Switch (9)
- Tactile Switch (10)



- I2C Header (11)
- Five-pin GPS Header (12)
- 1.8V/0.6A Regulator (13)
- Blue LED (14)
- Red LED (15)

### 1.3.2 1.8V/0.6A Regulator (v6) (13)

This DC-DC regulator has an integrated inductor and tiny footprint. It provides power to modules that need a 1.8V input.

- 3.3V from 3.3V/1.5A Regulator (3)
- SYS\_EN from BeagleBone Black COM Connector (1)

The following modules receive 1.8V DC from this regulator:

- TI WiLink8 (2)

## 1.4 USB

### 1.4.1 Micro-B Jack (v8) (4)

A USB micro-B port allows your design to connect as a USB device to a USB host.

This module is connected to USB\_DEVICE on USB-UART (5).

## 1.5 Connectivity

### 1.5.1 USB-UART (v14) (5)

Also known as an FTDI, this USB to UART converter allows a USB connection to the board to behave as a virtual RS232 serial connection. It offers direct and complete access to the system from a development machine.

This USB to UART converter connects a host machine from Micro-B Jack (4) to UART0 on BeagleBone Black COM Connector (1).

## 1.6 Headers

### 1.6.1 Dual PWM Header (v7) (6)

This header offers two PWM outputs for driving servo or other PWM-controlled motors.

This module connects:





- PWM\_1 to PWM1A on BeagleBone Black COM Connector (1)
- PWM\_2 to PWM1B on BeagleBone Black COM Connector (1)

### 1.6.2 Dual PWM Header (v7) (7)

This header offers two PWM outputs for driving servo or other PWM-controlled motors.

This module connects:

- PWM\_1 to PWM2A on BeagleBone Black COM Connector (1)
- PWM\_2 to PWM2B on BeagleBone Black COM Connector (1)

### 1.6.3 I2C Header (v12) (11)

This header breaks out I2C2 on BeagleBone Black COM Connector (1) .

### 1.6.4 Five-pin GPS Header (v6) (12)

The off-board GPS header provides a 2-wire UART interface alongside power and ground pins for use with the Gumstix PRE-GO GNSS board. It also works with some third party positioning modules.

This module is connected to the UART4 bus on BeagleBone Black COM Connector (1).

## 1.7 Sensors

### 1.7.1 9-Axis IMU (v16) (8)

This module provides 3-axis acceleration, 3-axis rotational rates and 3-axis magnetic field information. It is connected via a SPI bus. Data-ready pins are provided.

Its I2C bus is connected to I2C2 on BeagleBone Black COM Connector (1)

It has the following data ready signals:

- ACCEL\_DRDY to GPIO36 on BeagleBone Black COM Connector (1)
- GYRO\_DRDY to GPIO37 on BeagleBone Black COM Connector (1)
- MAG\_DRDY to GPIO38 on BeagleBone Black COM Connector (1)



## 1.8 IO

### 1.8.1 Tactile Switch (v9) (9)

This 4.9 sq. mm light touch switch provides a user input for the signal GPIO39 on BeagleBone Black COM Connector (1).

### 1.8.2 Tactile Switch (v9) (10)

This 4.9 sq. mm light touch switch provides a user input for the signal RESET on BeagleBone Black COM Connector (1).

### 1.8.3 Blue LED (v14) (14)

This 1608 standard size blue LED provides an indicator for the signal GPIO49 on BeagleBone Black COM Connector (1).

### 1.8.4 Red LED (v11) (15)

This 1608 standard size red LED provides an indicator for the signal GPIO48 on BeagleBone Black COM Connector (1).



## 2 Module Connections Graph

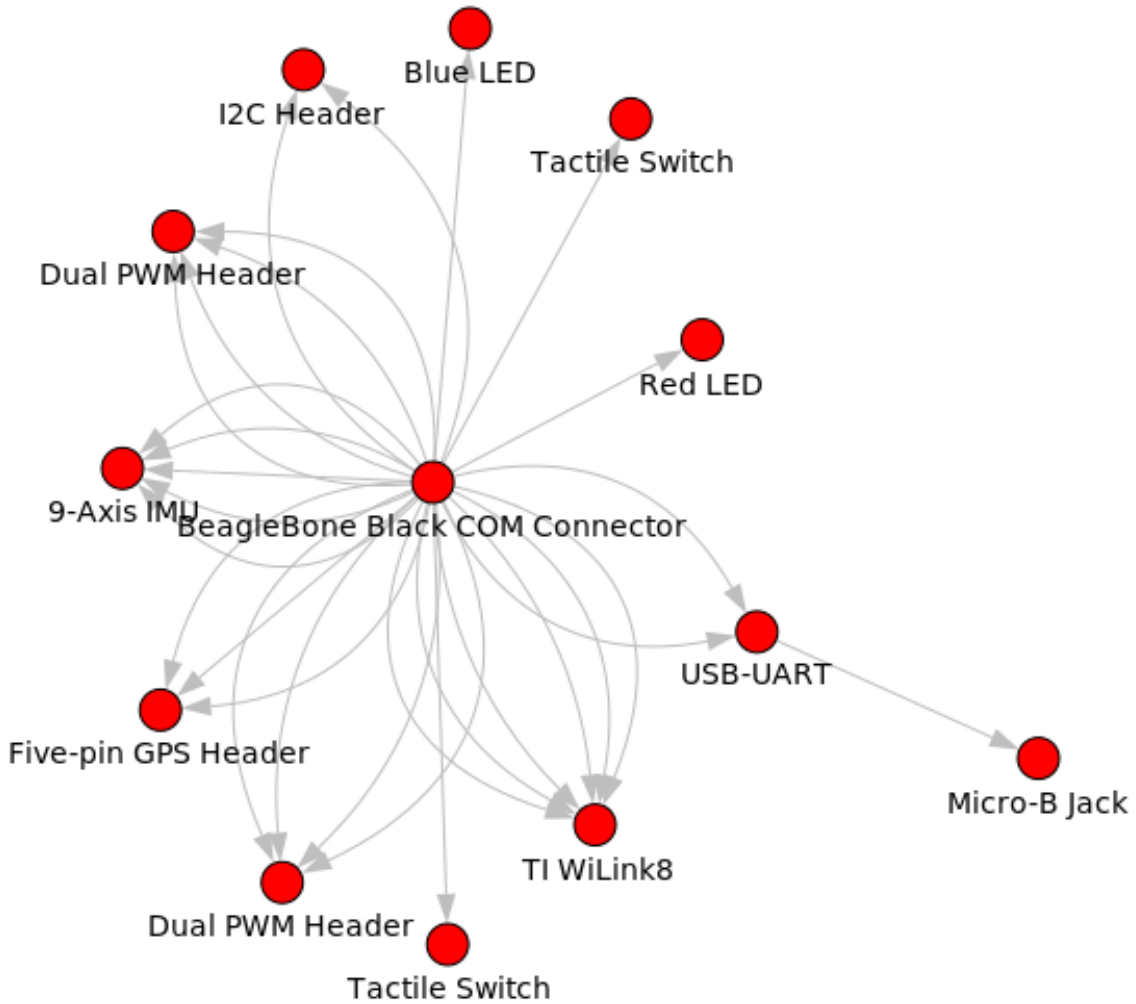


Figure 1: excludes power modules



### 3 Module Power Graph

