

## BeagleBone Black Expansion Board User Reference

BeagleBone Black Expansion board designed by ChipSee. It can support Beaglebone and Beaglebone black at the same time. And it has two Versions: Capacitive Touch Version and Resistive Touch Version. Hardware features:

- 1. Display:** 7 Inch LCD,1024\*600 Pixel;
- 2. Touch:** Five Point Capacitive touch, Covered with Amorphous Glass (Or Resistive Touch);
- 3. Audio:** 1 Audio out,1 Mic In(Can change to Line in by change resistor);
- 4. RS232:** 2 Channel;
- 5. RS485:** 2 Channel;
- 6. CAN:** 1 Channel;
- 7. Buzzer:** 1;
- 8. User Key:** 5 ;
- 9. User LED:** 2;
- 10. Three-Axis Digital Accelerometer.**



Figure 1. BeagleBone Black Expansion Board(Capacitive,Android 4.1)

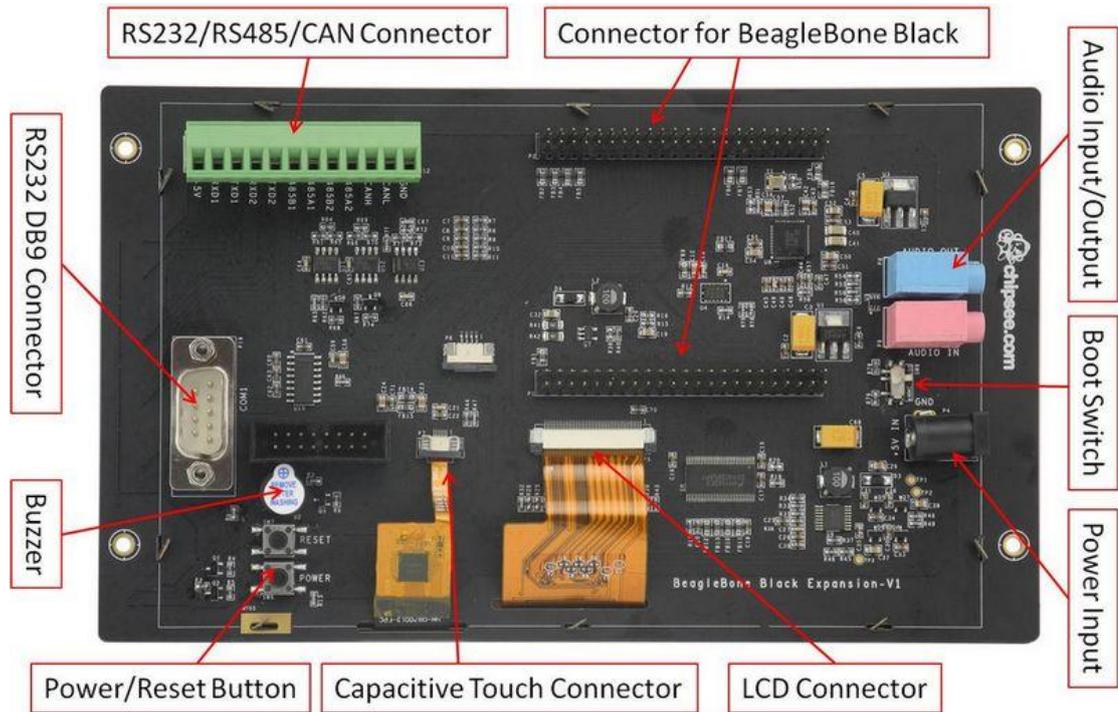


Figure 2. Back-Side View (Capacitive)

### 1. How to connect Expansion board with Beaglebone and BeagleBone Black

When connect the Expansion board with BeagleBone and BeagleBone Black, Figure 3 shows the right connect direction. If connect on the wrong direction, the Beaglebone Black can't be push down to connect tightly: The LAN connector on Beaglebone Black will conflict with the Audio connector on the Expansion board.

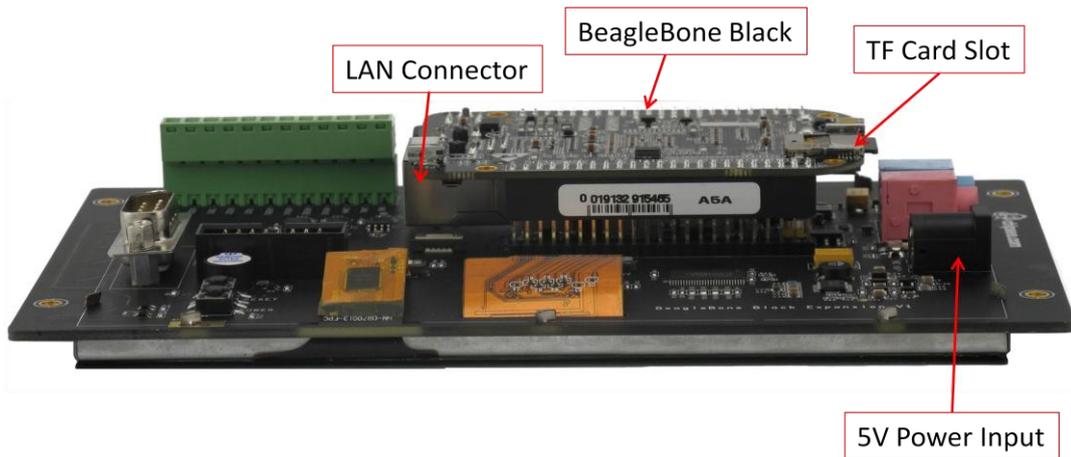


Figure 3

### 2. How to connect Power to the System

BeagleBone and BeagleBone Black use 5V DC power Input, the expansion board use 5V DC power also. When the Expansion board connect with the the BeagleBone

and Beaglebone black, the Power connector on BeagleBone black will be hidden by the RS485 connector. Customer can provide 5V power to the power connector on the Expansion board connector **P4 ONLY** as Figure 4 shows. This 5V power will be connect to Beaglebone Black on the Expansion board. **5V/2A** power adapter will be necessary.

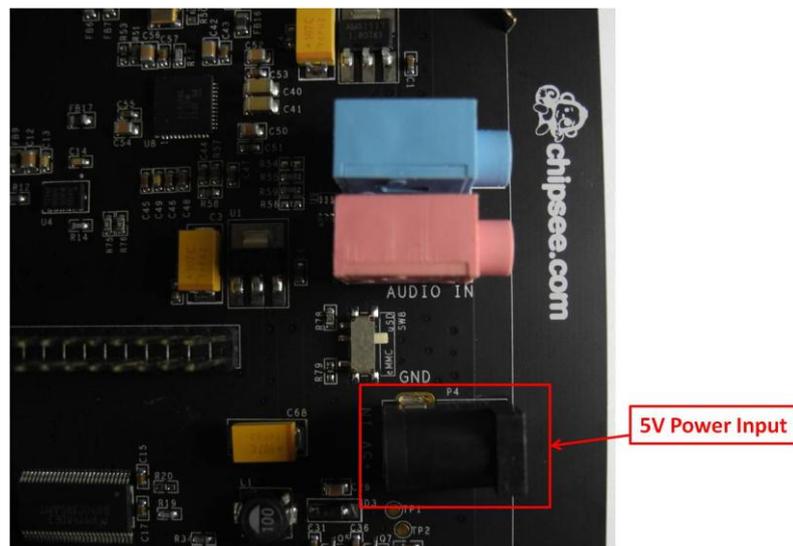


Figure 4

### 3. How to change Boot Method

Beaglebone Black can be changed boot method by push the Button **S2**. When pushed button **S2** when system power on, BeagleBone Black will boot from uSD card, or it will boot from eMMC by default.

When connect with expansion board, the Button **S2** on the Beaglebone black will be hidden and not easy to touch. The Expansion board connects this boot signal to switch **SW8** as Figure 5 shows. When user switches it to upside, the system will boot from uSD card, when user switches it to downside, the system will boot from eMMC.

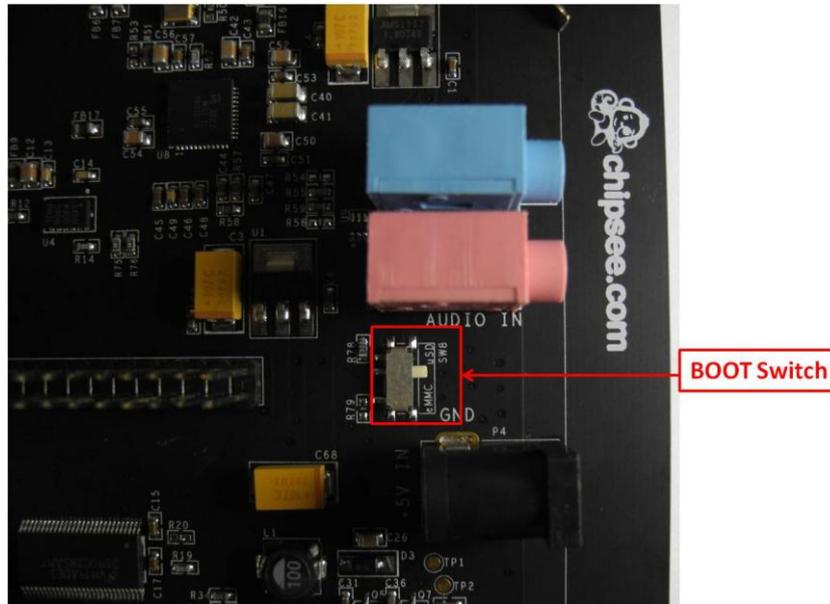


Figure 5

#### 4. Power and Reset Button

BeagleBone Black use Button **S3** as Power button, Expansion board connect this signal to Button **SW6** as Figure 6 shows. So the Expansion board button SW6 will have the same effect with S3 on the BeagleBone Black.

BeagleBone Black use Button **S1** as Reset button, Expansion board connect this signal to Button **SW7** as Figure 5 shows. So the Expansion board button SW7 will have the same effect with S1 on the BeagleBone Black.

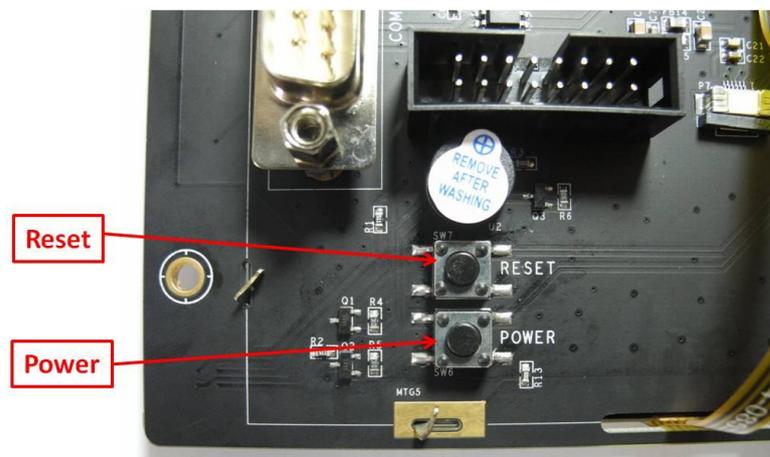


Figure 6

#### 5. Use Keys and user LED

BeagleBone Black Expansion board have add 5 user keys as **SW1** to **SW5** as Figure 6 shows, User can define the key function in software, ChipSee have define it

in Android 4.1 as “HOME”, “BACK”, “MENU”, “VOLUME UP”, “VOLUME DOWN”.

BeagleBone Black Expansion Board add two user LEDs as Figure 7 shows. User can define its function in software.

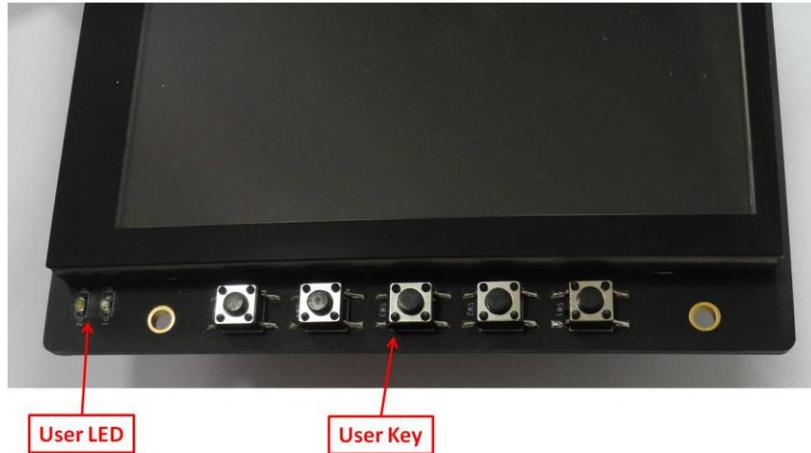


Figure 7

## 6. Audio Input and Output

BeagleBone Black Expansion board have audio input and output as Figure 8 shows. The expansion board use standard 3.5mm connector. Blue connector **P8** is output, Pink Connect **P9** is input.

User can connect the output to any other speaker. As for the Input, it's “MIC in”, NOT “Line In”, that means user can connect Microphone to the connector directly.

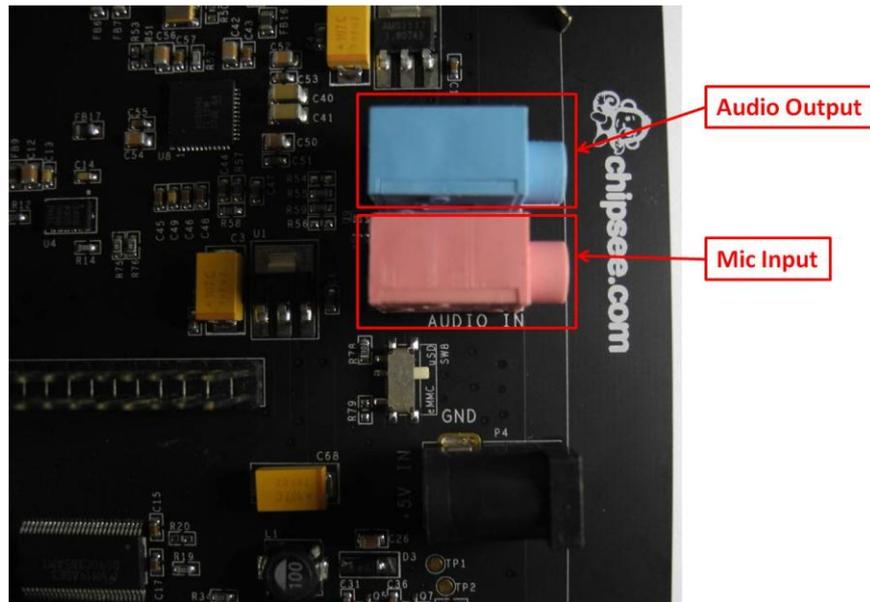


Figure 8

## 7. About the RS232 , RS485 and CAN on Expansion board.

The Expansion board have add RS232 ,RS485, CAN function to the connector

**P10** and **P12** as Figure 2 shows.

DB9 Connector **P10** connect to the CPU UART1:

Pin Number	Definition	CPU Function
2	TXD	UART1, CPU PIN D15 and D16
3	RXD	
5	GND	
1,4,6,7,8,9	Not Connected	

Connector **P12** definition:

Pin Number	Definition	CPU Function
1	GND	
2	CAN0_L	DCAN0, CPU PIN D17 and D18
3	CAN0_H	
4	RS485_2+	UART4, CPU PIN T17 and U17
5	RS485_2-	
6	RS485_1+	UART2, CPU PIN A15 and B17
7	RS485_1-	
8	RS232_2_TXD	
9	RS232_2_RXD	
10	RS232_1_TXD	UART1, CPU PIN D15 and D16
11	RS232_1_RXD	
12	+5V	

Be Attention:

- a) The RS232\_1 signal have been connect to the DB9 connector P10 and connector P12 Pin 10 and Pin 10 at the same time. As for this function, you can use one connector one time.
- b) The RS232\_2 signal and RS485\_1 signal use the same UART2 signal from CPU, so these two functions User can use only one at one time. That means, if user used RS232\_2 function,user can't use RS485\_1,if user used RS485\_1 function, user can't use RS232\_2 function.
- c) BeagleBone black use UART0 as the default DEBUG signal output, but it's TTL signal output. ChipSee Software changed the Debug signal to UART1 by default. So this can make user very easy to use the Debug.

## 8. Mechanical Dimension:

As Figure 9 shows. The mounting hole is 3mm Inner diameter.

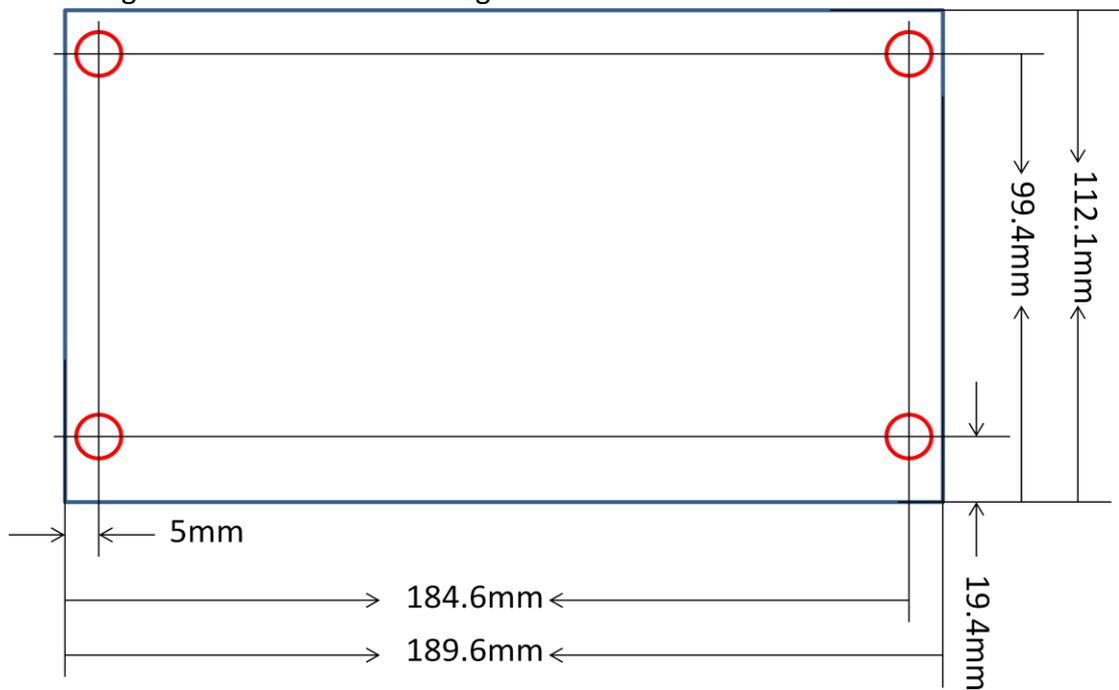


Figure 9

## 9. Product Video

Android 4.1 <http://youtu.be/FebYqMws0g4>

Windows CE 6.0 <http://youtu.be/S2Ttujf6cWU>

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