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CC256x Audio Source User Guide

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Contents

Getting Started

TI's Bluetooth + MSP430 Audio source reference design can be used by customers to create a variety of applications for low end, low power audio solutions. Some application possibilities - toys, low end bluetooth speakers, audio streaming accessories. This reference design is a cost effective audio implementation and with full design files provided allows you to focus your efforts on application and end product development. Software supported on this reference design includes TI's Bluetooth stack (certified and royalty free).

· 💡**Note:**

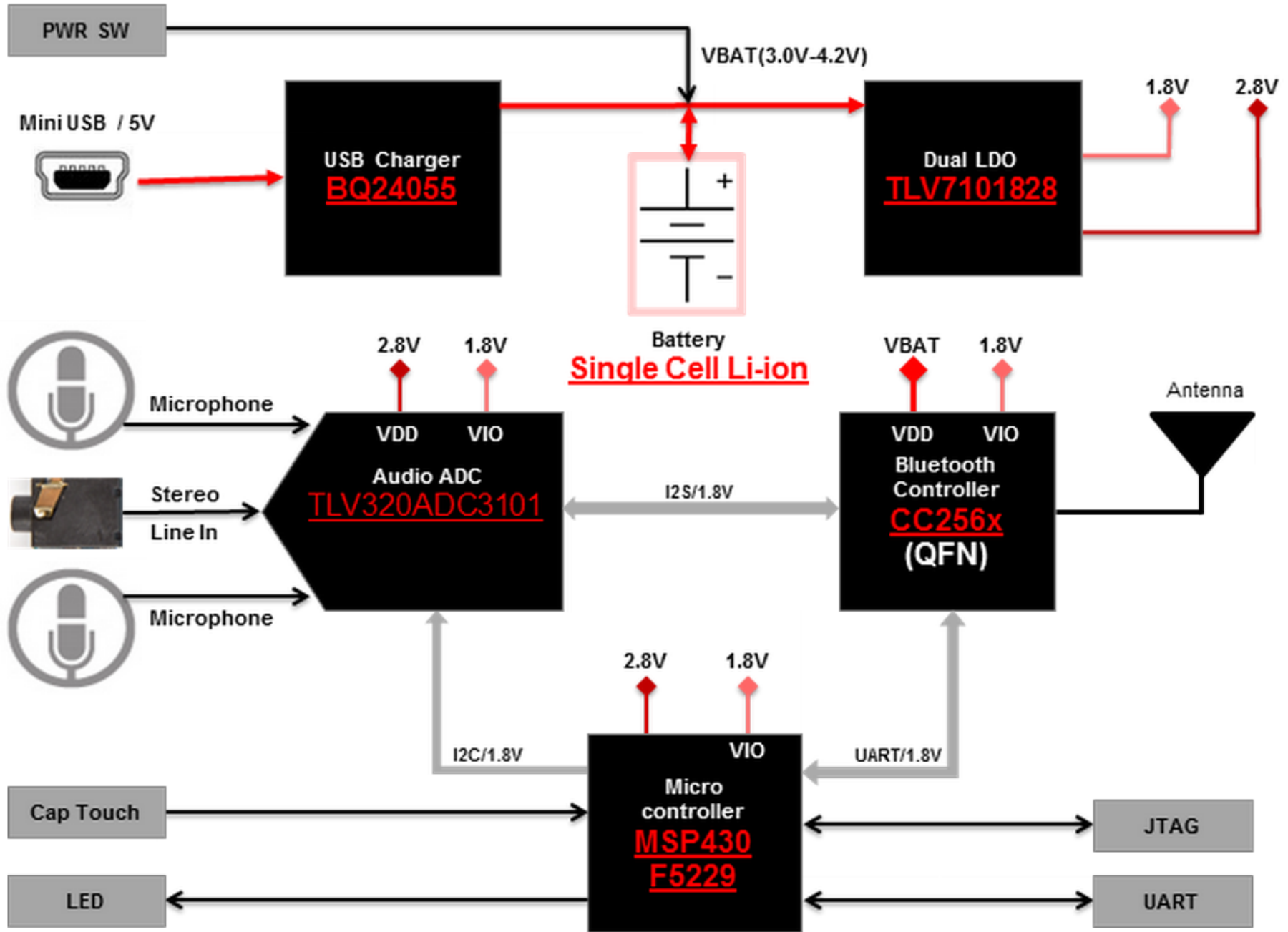> FCC/IC Regulatory Compliance
> FCC Part 15 Class A Compliant
> IC ICES-003 Class A Compliant

The design files are available publicly [**TO DO**]. For Audio Source Quick Start User Guide go here (http://processors.wiki.ti.com/index.php/CC256x_Audio_Source_Quick_Start_User_Guide)
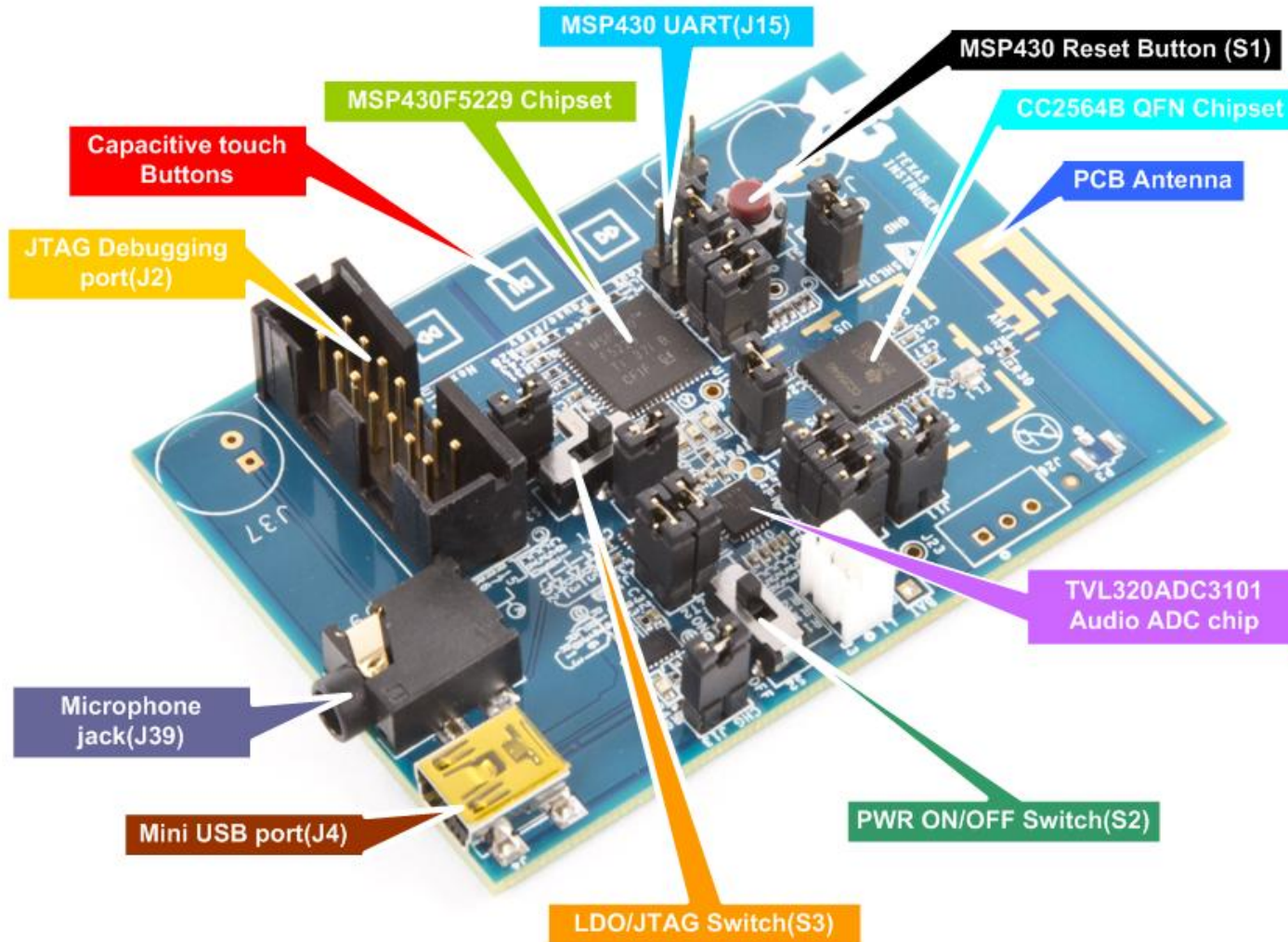
CC256x Audio Source Board

A3DP Source Reference Design

A3DP Source Reference Design - Block Diagram

Key Features

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- Enables Bluetooth audio (SBC encode/decode) with low cost, low power MSP430F5229.
- USB-enabled MSP430F5229 Up to 25-MHz System Clock, 1.8-V to 3.6-V operation and 128KB flash, 8KB RAM.
- Design offloads audio processing from MCU to the Bluetooth device which enables low power audio.
- Cost effective low end wireless audio solution for under with a 4 layer layout and QFN packages.
- Core of the solution is TI's CC2564B which is best in class Bluetooth performance (+12dBm output power).
- 4-layer PCB (25mm x 50mm incl. antenna)
- CC2564B On-chip SBC for audio processing.
- Royalty-free SW examples and certified profiles: Assisted A2DP (A3DP), AVRCP
- Design also uses TI's low power stereo audio analog-to-digital converter (ADC) (TLV320ADC3101) & USB charge management device (BQ24055).
- CC256x and TI's Bluetooth stack both have Bluetooth Subsystem QDIDs allowing you to only need a Bluetooth End Product Listing.

Kit Contents

- 1x Audio kit with jumpers populated
- Quick Start Guide

NOTE: For downloading the sample demo to the EVM, you require MSP430 USB Debugging Interface (http://www.ti.com/tool/msp-fet430uif). This needs to be purchased separately.

Out of The Box Experience

Step 0: Verify Jumper/Switch positions

Make sure all jumpers are on, except for J15 (RX/TX), J22 (BAT), J25 (SPK):

Jumper	Name	Description
J15	TX/RX	MSP430 debug UART
J22	BAT	External power supply

Default switch positions:

Default Switches

Switch	Name	Description
SW1	RST	Resets MSP430
SW2	ON/OFF	Turns on/off power to entire board
SW3	LDO/JTAG	MSP430 power supply

		option from LDO or JTAG

Step 1: Power

Plug in the USB cable to USB connector (J4). Toggle switch 2 to ON position to power up the board. Remove jumper ISET2 (J14) and connect it in again, this toggling will enable higher current draw through USB.

💡 **Note:** The board also has options to be powered using alkaline batteries or rechargeable batteries which can be purchased separately.

Step 2: Microphone

Make sure Microphone is connected to J39.

Step 3: Remote sink device

Make sure that the remote sink device is ready to connect.

Step 4: Connect the board to PC

Connect J15 connector (Rx & Tx) with a UART-2-USB cable to get access to the MSP430's UART, A Virtual Serial Port (COM x) under Ports (COM & LPT) will be enumerated . Attach a Terminal program like Tera Term to the serial port x for the board. The serial parameters to use are 9600 Baud, 8,n,1 and no flow control. Once connected, reset the device using Reset button and you should see the stack getting initialized on the terminal

Step 5: Connect to Sink

Scan and connect to the sink device.

Step 6: Transmit audio

You can now transmit audio from the source device. Speak something through the Mic and you should hear the output from the sink device.

💡 **Note:** If previously paired to the device before, try forgetting it and then connect if having trouble connecting.

Hardware Features

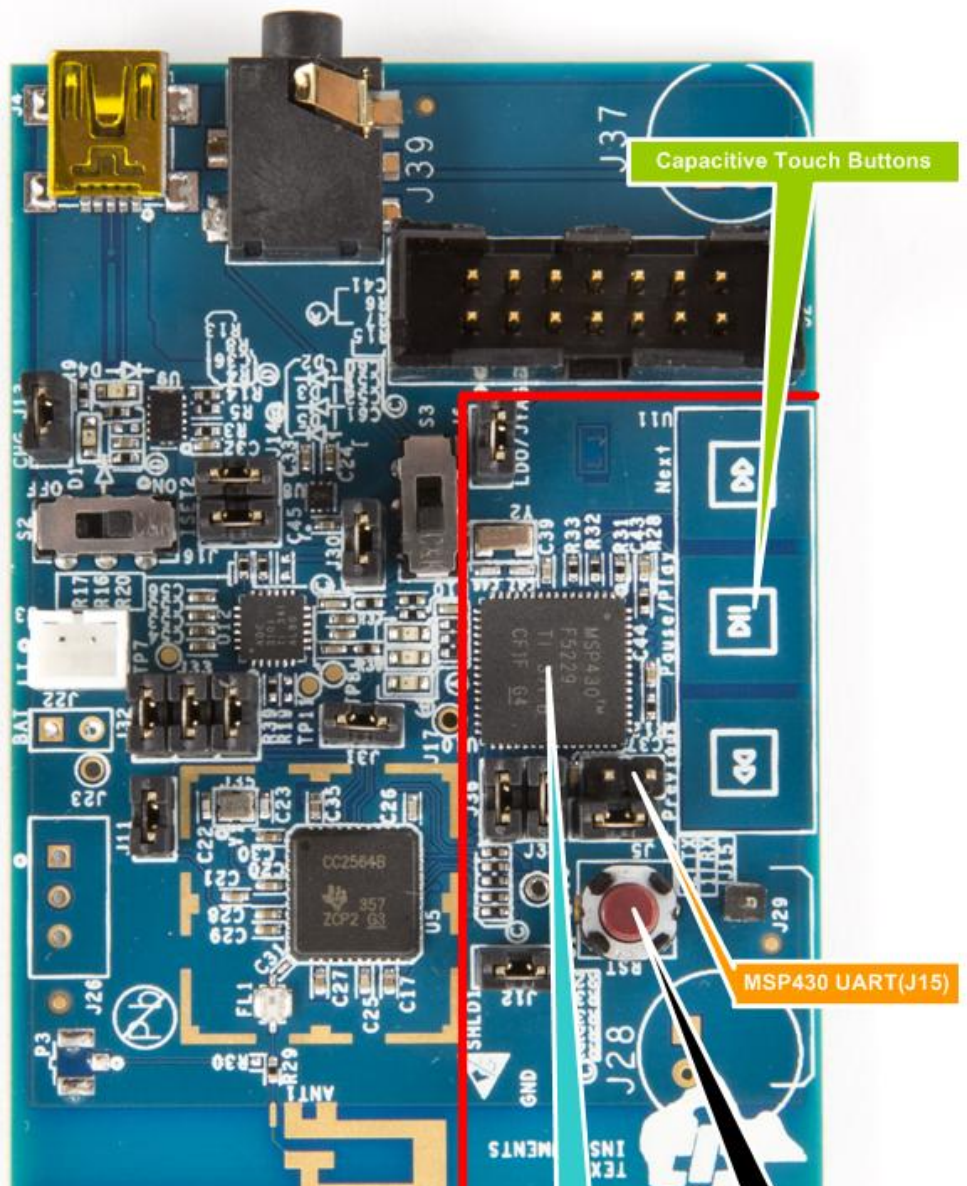This section describes the Bluetooth (CC256XB) and MSP430 Audio Source hardware.
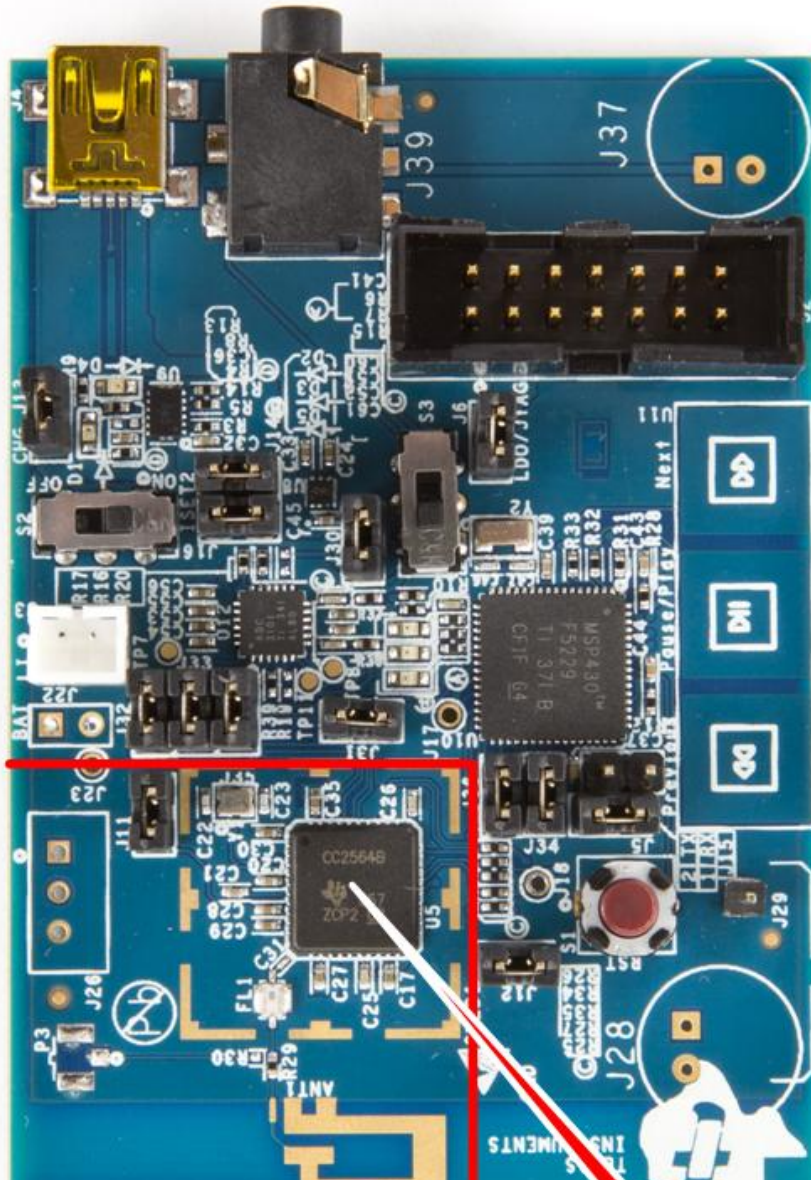
CC2564B Audio Source Board Section 1

Hardware Features

- **CC2564B QFN chipset**
- **PCB Antenna:**This audio source board has an integrated PCB antenna
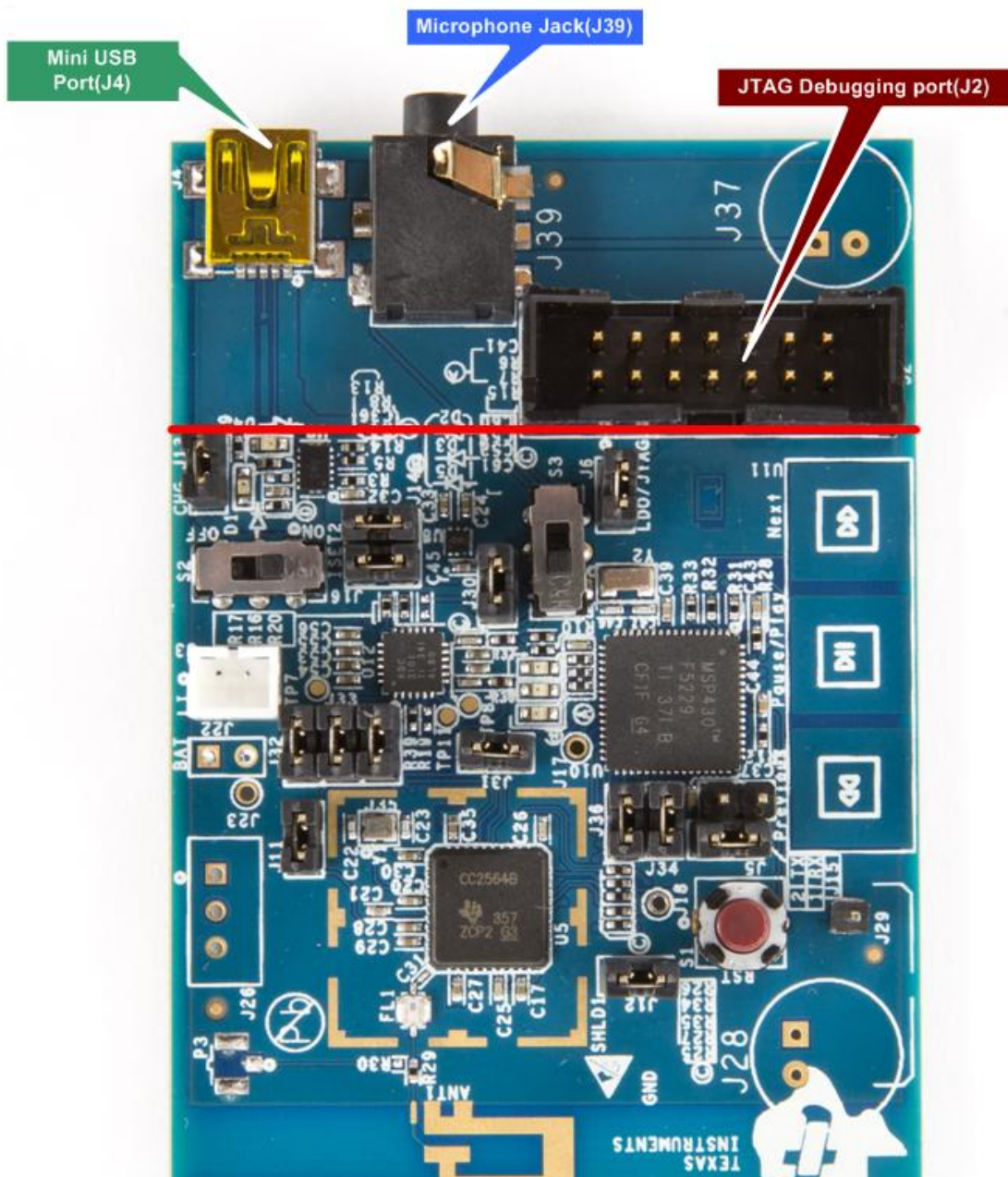
CC2564B Audio Source Board Section 2

Hardware Features

- **MSP430F5229 Chipset**
- **Capacitive touch buttons:** Used to pause/play/next/previous
- **MSP430 UART (J15):** Used for User interface to MSP430 UART see (http://processors.wiki.ti.com/index.php/CC256x_Audio_Sink_User_Guide#User_interface_MSP430_UART)
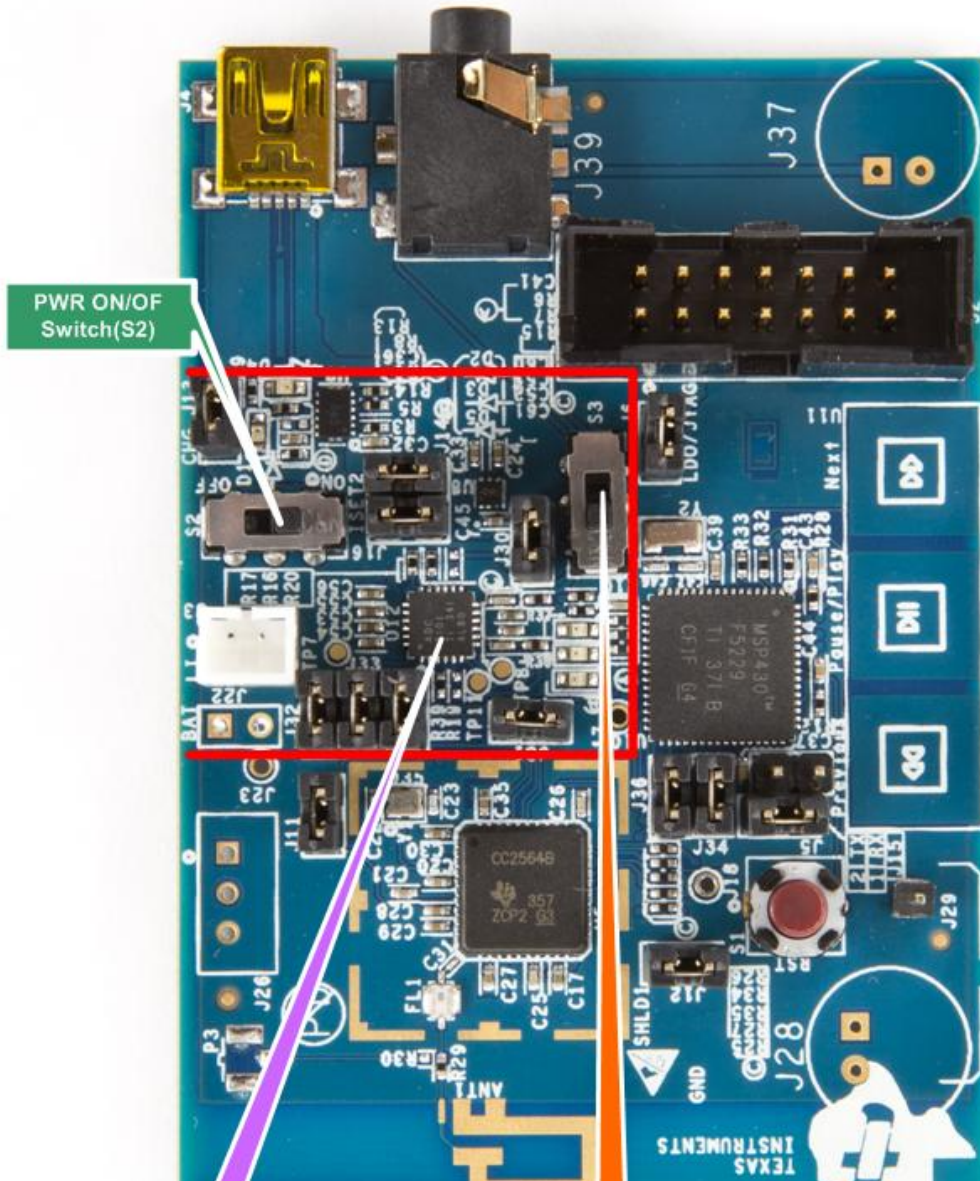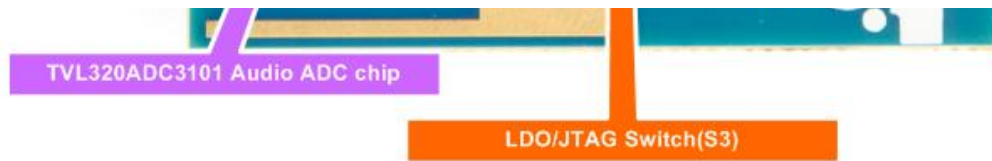- **MSP430 Reset Button (S1):** Used to reset the board.

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CC2564B Audio Source Board Section 3

Hardware Features

- **Microphone jack (J39)**
- **Mini USB port (J4):** Used to charge/power the board.
- **JTAG Debugging port (J2):** Connected to the MSP430 USB Debugging Interface (MSP-FET430UIF) for flashing and debugging.

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CC2564B Audio Source Board Section 4

Hardware Features

- **TVL320ADC3101 Audio ADC chip**
- **LDO/JTAG switch (S3)**
- **PWR ON/OFF (S2):** Used to power ON and OFF the board.

Software

This demo utilizes new audio features of the CC256xB dual mode Bluetooth controller, a new ROM spin of the CC256xA device. Apart from the device label, you can verify the correct part number by making sure the LMP subversion for CC256xB is 0x1B90 (instead of 0x1B0F for CC256xA) by issuing the HCI_Read_Local_Version_Information standard HCI command before loading the Service Pack.

Bluetooth Stack

TI's Bluetooth stack is provided along with the A3DP Source for the Audio Source device - CC256xB. This is provided royalty free.

The Assisted A2DP (A3DP) source software can be downloaded from here (http://www.ti.com/tool/tibluetoothstack-sdk).

To use the CC256XB module, the patch CC256XB.h has to be included. "__SUPPORT_CC256XB_PATCH__" should already be defined in the preprocessor definitions. This will make sure that the CC256XB patch is loaded and the CC256XB module can be used without issues.

Programming

There are basically two ways to program the board. You can flash the board with the binary or compile and download the source code to the board.

NOTE: Connect the FET USB Debugging Interface to JTAG debugging port (J2) of the Audio Source device, and connect the other end to the PC.

Binary

The binary can be in various format. For IAR binaries, it is in .d43 file format.

1. After getting the binary, use the FET programmer (http://focus.ti.com/docs/toolsw/folders/print/msp-fet430uif.html) to program the board using the 14-pin JTAG interface. There should be only one way to plug it in.

- **Source**

  The project file contains the source code. For now, only IAR is supported. Simply compile and download the code to the board after opening the project file.

  The detailed flashing procedure is mentioned here (http://processors.wiki.ti.com/index.php/CC256x_MSP430_Bluetopia_Basic_Demo_APPS#IAR_2)

  NOTE: Open "A3DPDemo_SRC.eww", and in the workspace tab, select "Debug - A3DP SRC Board (Line-In)".

Debugging Interface

For downloading the sample demo to the Audio Source Device and to debug, you require MSP430 USB Debugging Interface (http://www.ti.com/tool/msp-fet430uif). This needs to be purchased separately.

The software for downloading the binary is available here (http://processors.wiki.ti.com/index.php/Binary_Download_Using_FETPRO430)

IAR Embedded Workbench (http://processors.wiki.ti.com/index.php/IAR_Embedded_Workbench_for_TI_MSP430) is the supported development tool

Running the Demo Application

Please visit [1] (http://processors.wiki.ti.com/index.php/CC256x_MSP430_Bluetopia_Basic_AssistedA2DPSourceDemo_APP) for detailed steps on how to run the demo application

Additional Information

Command Line Interface to Audio Source Device

The J15 connector (Rx & Tx) can be used with a UART-2-USB cable to get access to the MSP430's UART

To Attach a Terminal program like Tera Term to the serial port x for the board see here (http://processors.wiki.ti.com/index.php/CC256x_MSP430_Bluetopia_Basic_AssistedA2DPSourceDemo_APP).

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1. switchcategory:MultiCore=

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This page was last edited on 23 April 2015, at 09:11.