Texas Instruments

6-Channel TUSB3200EVM2 for the TUSB3200A USB Streaming Data Controller

User's Guide

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Digital Audio

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Preface

Read This First

About This Manual

This user's guide describes the setup and operation of the TUSB3200EVM2 platform.

How to Use This Manual

This document contains the following chapters:

- Chapter 1—Equipment
- Chapter 2—Detailed Description of the TUSB3200EVM2
- Appendix A—Schematic Diagrams

Related Documentation From Texas Instruments

TUSB3200A	Literature Number SLES018
TLV2362	Literature Number SLOS195A
TPS7233QD	Literature Number SLVS102G
CS4228	www.crystal.com for product detail information

FCC Warning

This equipment is intended for use in a laboratory test environment only. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

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Chapter 1

Equipment

This user's guide describes the setup and operation of the TUSB3200EVM2 platform. This PCB contains two main active parts: TUSB3200A STC (TI USB streaming controller) and crystal CS4228 codec. This PCB is referred to as the TUSB3200EVM2 from this point on. Familiarity with emulator hardware and software is required and assumed throughout this user's guide.

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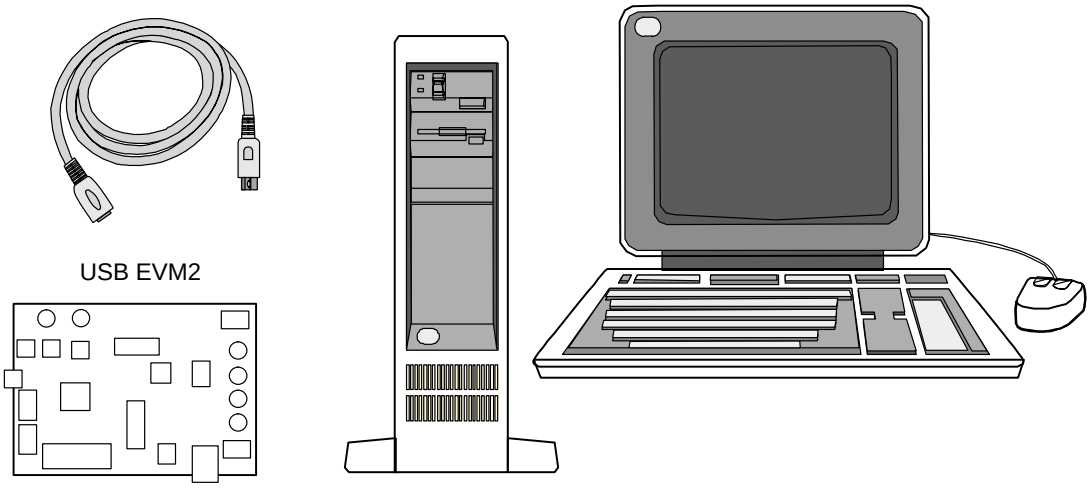
1.1 Hardware

Figure 1–1 shows the equipment necessary to perform evaluation of the TUSB3200EVM2.

Figure 1–1. TUSB3200EVM2 Design Platform Equipment



The TUSB3200EVM2 hardware platform measures 6.0″ X 5.5″ (W × L). Throughout this document text inside of parentheses (ex.) represents reference designators that identify components located on the TUSB3200EVM2.

The hardware setup for the TUSB3200EVM2 can be accomplished by two separate methods—EEPROM evaluation and in-circuit emulator (ICE) evaluation. Use of the EEPROM installed on the board is recommended when performing a quick initial check to verify if the board works properly. The respective evaluation procedures are detailed in the following section.

1.1.1 EEPROM Evaluation (Internal Mode)

The TUSB3200EVM2 comes with a preprogrammed EEPROM. This EEPROM is inserted in the 8-pin DIP socket. The jumper configuration for the internal mode is listed in Table 1–1. Use the following procedure for EEPROM evaluation:

- ❑ Set J8 to position 1–2 to bus-power the TUSB3200EVM2; set J8 to 2–3 to put the TUSB3200EVM2 in self-powered mode (a power supply is required).
- ❑ In self-powered mode, a single 9-V dc at 500-mA supply must be connected to the power terminals 9V and ground (GND) of the TUSB3200EVM2. Once the board is powered, GPIO, and the LEDs should turn on, and the power drawn from the supply should not exceed the USB specification of 500 mA.
- ❑ Connect a USB cable from the root hub of the PC to type-B connector J1 on the EVM. This should start the USB enumeration on a host PC. Enumeration signals that a USB (audio) device has been detected by the

host PC and the device is ready to stream audio via a USB. A speaker icon should show up once the enumeration is complete. Double click this icon to confirm that the USB is the preferred device for audio output; if not, reconfigure the PC for USB audio output.

Table 1–1. Jumpers Set Up for Internal Mode

Jumper	Position
JP1	Open
JP2	Open
JP3	Position 2–3
JP4	Open
JP5	Open
JP6	Open
JP7	Open
JP8	Position 2–3
JP9	Position 2–3
JP10	Position 2–3
JP11	Position 2–3
JP12	Position 2–3
JP13	Position 2–3
JP14	Open
JP15	Close
JP16	Open
JP17	Open
JP18	Open

1.1.2 In-Circuit Emulator (ICE) Evaluation

Use the following procedure for in-circuit emulator evaluation:

- ❑ Install the emulator. Refer to the respective ICE user's guide for the emulator.
- ❑ Attach emulator POD to TUSB3200EVM2 ICE Socket (J3). A 40-pin extension adapter may be required to allow enough clearance for access to the buttons, jumpers, and connectors. Pin 1 is designated by a triangle on the opposite side of the J3 reference designator.

Chapter 2

Detailed Description of the TUSB3200EVM2

This chapter presents a detailed description of the TUSB3200EVM2.

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2.1 TUSB3200EVM2 Setup

The TUSB3200EVM2 is designed to allow development and evaluation of the TUSB3200A for multichannel applications. The USB controller (U1) accepts USB data streams and generates output at the C-port, I2C port, and/or GPIO port. A full explanation of how to configure the TUSB3200A to control the streaming data and set up the interface ports and registers is contained in the TUSB3200A data manual. A standard USB cable is required to connect the EVM platform to a downstream port. The EVM uses a standard type-B connector. Set JP8 to position 2–3 to send the MCLKO to the codec. Set JP3 to position 2–3 for normal mode operation; this action disables the external interrupt signal to the TUSB3200A. Note that an arrow always designates position 1 of any jumper. The TUSB3200A must be set to external mode to use the in-circuit emulator. The TUSB3200EVM2 board is shipped in internal mode. For internal mode, JP4 is open and JP15 is closed. To switch to external mode, simply move the jumper from JP15 to JP4.

2.2 Interfaces and Ports

The USB port interface is the only connection required for full operation. The in-circuit emulator is required for the external emulator pad. All other connections are used to increase further development and evaluation functionality. The USB connector has four pins defined as VBUS (pin 1), D+ (pin 2), D– (pin 3), and GND (pin 4).

2.3 Power Supplies

The TUSB3200EVM2 board can be self-powered, or can use USB bus power (when J8 is set to position 2–3). In the self-powered mode, the TUSB3200EVM2 PCB requires a single positive 9-V dc supply at 500 mA. An LM317EMP regulator is used to generate a steady 5-V dc supply. This 5-V dc supply is connected to an onboard, low-dropout regulator to generate a 3.3-V dc supply. In the USB bus-powered mode, connect one end of a USB cable to the EVM board and another end of the cable to a PC root port.

2.4 Light Emitting Diode (LED)

A set of green and yellow LEDs is installed on the TUSB3200EVM2 board for quick and easy GPIO evaluation. The green LEDs are connected to port 1 bits 0 through 7 of the in-circuit emulator for external mode. The yellow LEDs are connected to port 1 bits 0 through 7 and port 3 bits 0, 1, and 3–5 of the TUSB3200A for normal mode. Note that yellow LEDs illuminate in external mode but are not GPIO functions and should not be treated as such.

2.5 Jumpers

Table 2–1 provides jumper configurations for different modes of operation.

Table 2–1. Jumpers and Switches

Jumper/ Switch	Description	
JP1	Position 1–2 on: Ground CRESET;	JP1.1 CRESET
JP2	Position 1–2 on: Ground CDATI;	JP2.1 CDATI
JP3	Position 1–2:external interrupt enabled;	Position 2–3:no external interrupt
JP4	Position 1–2 on:external mode;	Position 1–2 off: internal mode
JP5	Position 1–2 on: Ground CDATO;	JP5.1 CDATO
JP6	Position 1–2 on: Ground CSCHNE;	JP6.1 CSCHNE
JP7	Position 1–2 on: Ground CSCLK;	JP7.1 CSCLK
JP8	Position 1–2: MCLK to JP16.1;	Position 2–3: MCLKO to CS4228
JP9	Position 1–2: CRESET to JP1.1;	Position 2–3: CRESET to CS4228
JP10	Position 1–2: CDATI to JB2.1;	Position 2–3: CDATI to CS4228
JP11	Position 1–2: CDATO to JP5.1;	Position 2–3: CDATO to CS4228
JP12	Position 1–2: CSYNC to JP14.1;	Position 2–3: CSYNC to CS4228
JP13	Position 1–2: CSCLK to JP7.1;	Position 2–3: CSCLK to CS4228
JP14	Position 1–2: Ground CSYNC;	JP14.1 CSYNC
JP15	Position 1–2 on: internal mode;	Position 1–2 off: external mode
JP16	Position 1–2 on: Ground MCLKO;	JP16.1 MCLKO
JP17	**Do not jumper** position 1–2;	JP17.1 SDA
JP18	**Do not jumper** position 1–2;	JP18.1 SCL
S1A	GPIO P3.3 general-purpose momentary button internal MCU mode	
S2A	GPIO P3.4 general-purpose momentary button internal MCU mode	
S3A	GPIO P3.5 general-purpose momentary button internal MCU mode	
S1B	GPIO P3.3 general-purpose momentary button external MCU mode	
S2B	GPIO P3.4 general-purpose momentary button external MCU mode	
S3B	GPIO P3.5 general-purpose momentary button external MCU mode	
J8	Position 1–2: Self-powered mode;	Position 2–3: Bus-powered mode
Reset	Reset EVM platform and in-circuit emulator (external mode)	

2.6 Complete Analog Stage

A complete analog output stage is provided on the TUSB3200EVM2 platform to eliminate the need for back-end development for evaluation purposes. The analog stage includes a crystal CS4228 codec and line output amplifiers with second-order low-pass filters for all six channels. A line input and a line output are also provided.

2.7 EEPROM

The EEPROM is used to set up the TUSB3200EVM2. The EEPROM is recommended to be 8K bytes to match the RAM memory size. Firmware for the TUSB3200EVM2 must be loaded for correct operation. An 8-pin DIP socket allows easy installation and removal of the EEPROM. TUSB3200A automatically downloads the data from the EEPROM into memory and begins executing code once the board is powered up and connected to the host via the USB.

2.8 TUSB3200A Development Tool Recommendations

Check the following websites for TUSB3200A development tool recommendations:

8051/8052 Emulators

http://www.nohau.com	EMUL51-PC/E128–16 and POD–C32–HF–42
http://www.signum.com	USP–51E and POD51FX
http://www.phyton.com	PICE–51 and P051–RX/FA and A051–D40

8051/8052 Code Development Tools

http://www.keil.com/c51/default.htm	PK51 or DK51 or CA51 (price varies with package)

2.9 TUSB3200EVM2 Design Platform Schematic/Layout

An electronic copy of the TUSB3200EVM2 schematic is available on the TUSB3200EVM2 CD.