Reference Manual

DOC. REV. 03/13/2015

VL-ADR-01

USB to Audio Adapter

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Overview

The VL-ADR-01 is a USB-to-audio adapter board. The board uses a Texas Instruments PCM2906C codec to bring audio capabilities to embedded single board computers lacking audio capabilities. As shown in Figure 3, the board provides the following controls and outputs:

- Three volume control switches (Volume Up, Volume Down, and Mute)
- Two 3.5 mm line-level audio connectors (stereo line input and stereo line output)
- One 12-pin (2x6) 2 mm connector for off-board routing of controls, inputs, and outputs

Integrator's Note:

The stereo line level output is limited to driving a 10 kΩ impedance load. This output should be connected to an external amplifier to drive either headphones or speakers.

Ordering Information

- VL-ADR-01S, temperature range of -25 ºC to +85 ºC

Accessories

The board connects to a host using a 0.5 m, USB 2.0 A plug to Micro-B plug cable, VersaLogic part number VL-CBR-0503.

Dimensions

Figure 1 shows the dimensions of the VL-ADR-01.

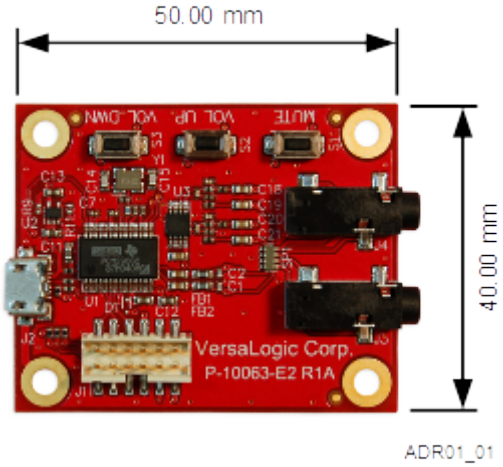

Figure 1. Board Dimensions

Operating System Support

The VL-ADR-01 is compatible with standard USB audio driver code, typically embedded within an operating system. No additional driver software is needed or supplied with the VL-ADR-01.

Audio Signaling Characteristics

Table 1 lists the characteristics of the audio line-level signals on the audio jacks as well as the auxiliary connector. For information on the audio characteristics of the PCM2906C codec, refer to the following datasheet: http://www.ti.com/product/PCM2906C.

Table 1: Line-Level Signal Characteristics

Parameter	Description
Audio input signal level	2 Vp-p (typical)
Input Impedance	30 kΩ (typical)
Output voltage level	2 Vp-p (typical)
Minimum output load impedance	10 kΩ

Transient Voltage Suppression (TVS) Devices

The ADR-01 circuitry is protected from spike and surge damage by on-board Transient Voltage Suppression (TVS) devices on the audio line input and audio line output signals. Figure 2 provides a schematic view of the connection of the TVS devices.

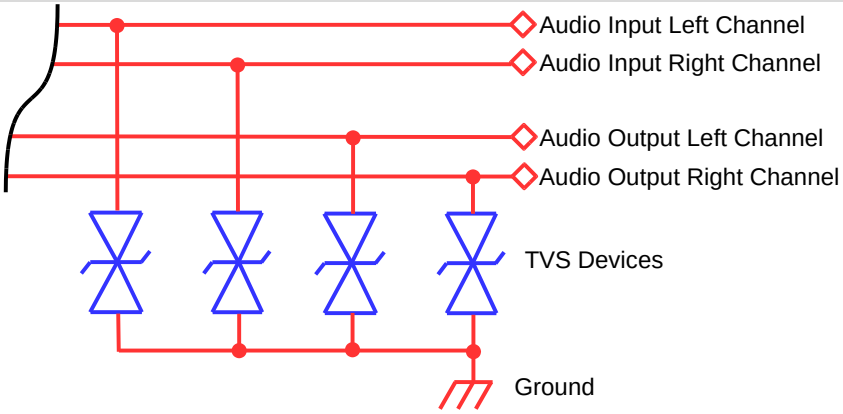

Figure 2. Schematic of TVS Circuitry

Connectors and Switches

Figure 3 shows the locations of the connectors and switches.

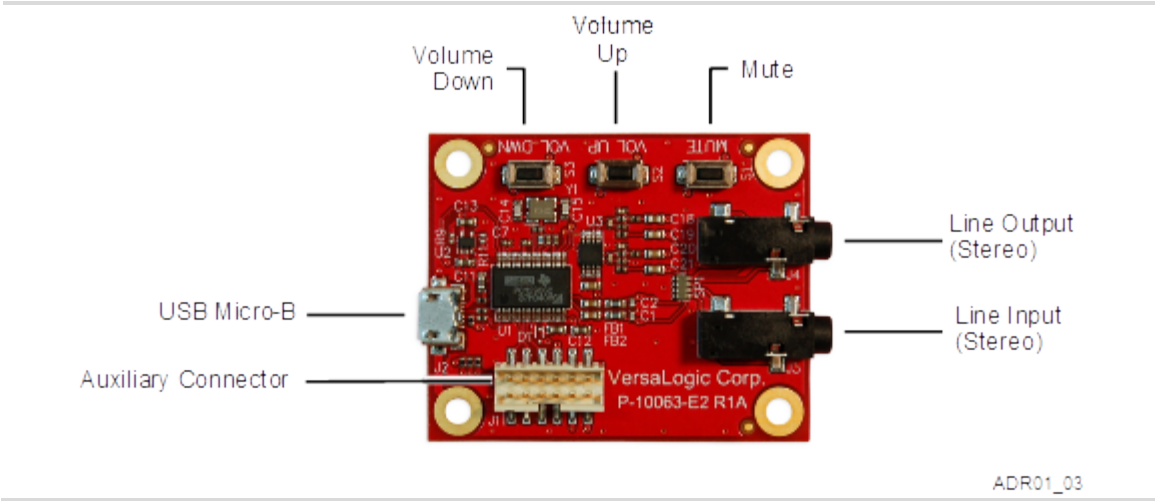

Figure 3. VL-ADR-01 Connectors and Switches

Table 2: VL-ADR-01 Connectors

Reference Designator	Connector	Description
J1	Auxiliary	12-pin (2x6) 2 mm connector Can be used for remote cabling of audio in/out signals and volume control switches. Refer to Table 4 and Figure 4 for additional information.
J2	USB Micro-B	Connects the ADR-01 to a host/CPU board through a USB interface
J3	Line Input	Stereo line-level input
J4	Line Output	Stereo line-level output

Table 3: VL-ADR-01 Switches

Reference Designator	Silkscreen Legend	Description
S1	MUTE	Mute
S2	VOL UP	Volume up
S3	VOL DWN	Volume down

Table 4: Auxiliary Connector Pin Description

Pin	Signal	Pin	Signal
1	Mute switch (Note 1)	2	Mute input to codec (Note 2)
3	Volume Up switch (Note 1)	4	Volume Up input to codec (Note 2)
5	Volume Down switch (Note 1)	6	Volume Down input to codec (Note 2)
7	GND	8	Line input left
9	Line input right	10	GND
11	Line output right	12	Line output left

Notes:

1. This signal connects to a 1.5 kΩ pull-up resistor to either 3.3 V (when operating) or to 0 V (in USB suspend mode.
2. The optional inputs to pins 2, 4, and 6 must be pulled up to 3.3 V using a 1.5 kΩ resistor (pins 1, 3, and 5 are intended for this use but are not required to be used). They connect directly to the HID0, HID1 and HID2 inputs on the PCM2906C. These inputs are intended to be driven by either a push-button switch or an open-drain driver.

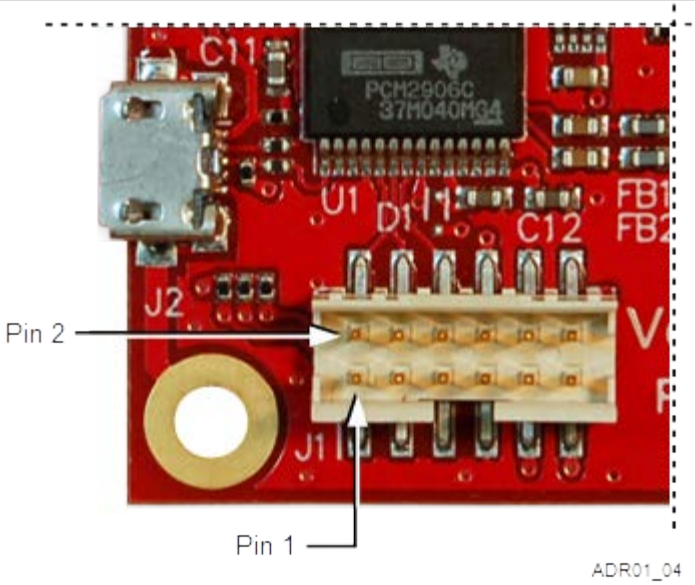

Figure 4. Pin Orientation of J1 Auxiliary Connector