SmartAmp Learning Board 2

This user's guide describes the characteristics, operation, and use of the SmartAmp Learning board 2. The boards connections and the examples setup are included in this document.

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Trademarks

PurePath is a trademark of Texas Instruments.

1 Description

The SmartAmp Learning Board 2 (LB2) is an accessory board for TI SmartAmp products like the TAS2555, TAS2557, and TAS2562 amplifiers which is required for speaker characterization. LB2 includes a digital audio generator, several inputs (microphone, laser, amplifier, SPDIF (optical and coaxial)), and precision circuitry to measure speaker parameters.

The LB2 is intended for use with a TI SmartAmp EVM.

2 Specifications

Table 1 lists the LB2 specifications:

Table 1. SmartAmp Learning Board 2 Specifications

Parameter	Specification
Power supply	3.3-V via SmartAmp EVM
Digital IO / Connectivity	34-pin, 100-mil dual header

3 Software

The LB2 requires PurePath™ Console 3 with a compatible SmartAmp plug-in (for example, TAS2555EVM plug-in, TAS2557EVM plug-in, TAS2562EVM plug-in, etc).

The audio plug-ins can be requested in the device product folders. On the main window of each product folder, there is an information box as shown below. It is just necessary to click on the "Request now" option from the information box and fill in all the requested information.

Figure 1. Software Request

The product folder links are listed below:

TAS2562 Product Folder: http://www.ti.com/product/TAS2562—
TAS2559 Product Folder: http://www.ti.com/product/TAS2559—
TAS2557 Product Folder: http://www.ti.com/product/TAS2557—
TAS2555 Product Folder: http://www.ti.com/product/TAS2555—

4 Connections

Figure 2 illustrates the LB2.

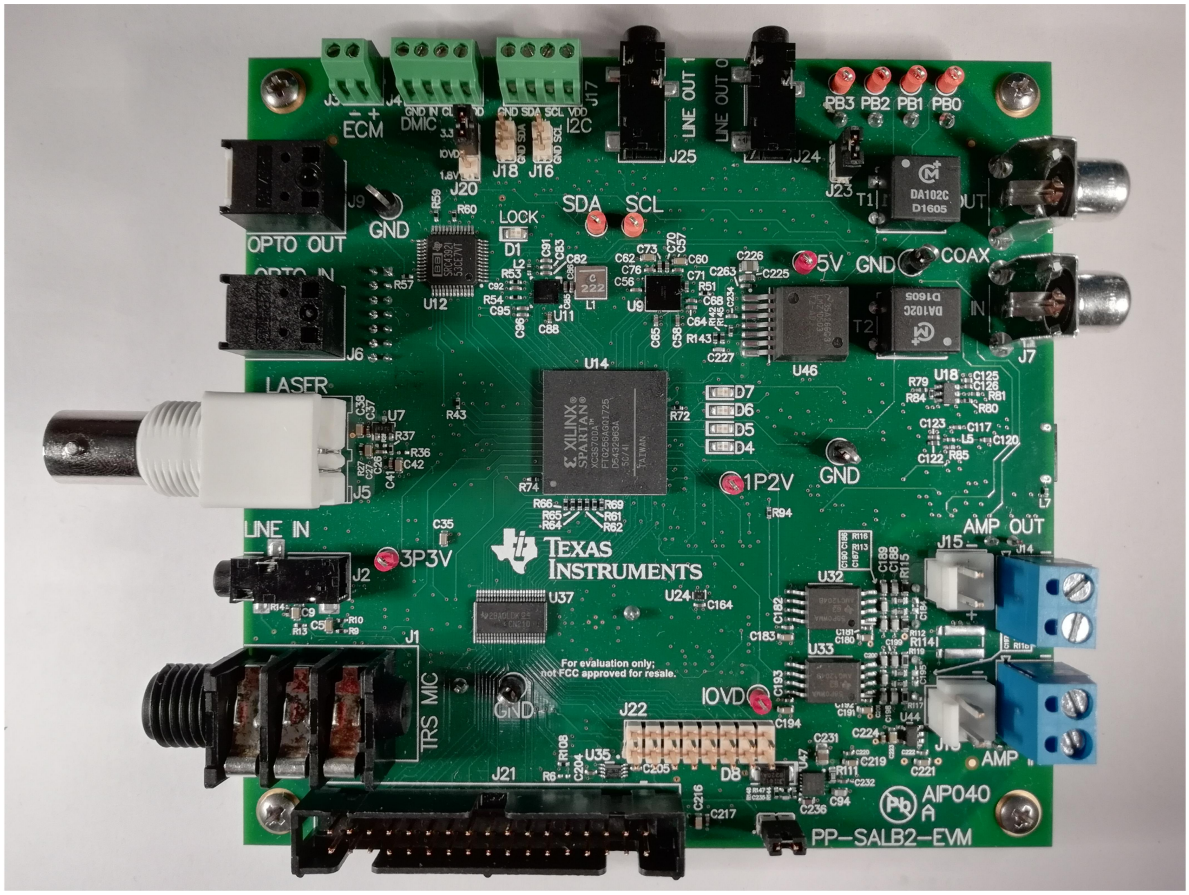

Figure 2. Learning Board 2

J21:	Digital Interface to SmartAmp EVM
J1:	5-mm TRS MIC connection with microphone bias
J2:	Line in
J5:	Laser voltage input (10 V/mm), BNC
J6:	Optical SPDIF input
J9:	Optical SPDIF output
J4:	Digital microphone input (select voltage with J20)
J17:	I2C interface
J24, J25:	Line out
J8:	Coax SPDIF output
J7	Coax SPDIF input
J14, J15:	Speaker connection
J12, J13:	Amplified audio input
J22:	FPGA programming header (TI internal use only)

5 Example Setups

5.1 TAS2562 Setup

Figure 3 shows the LB2 with a TAS2562 EVM.

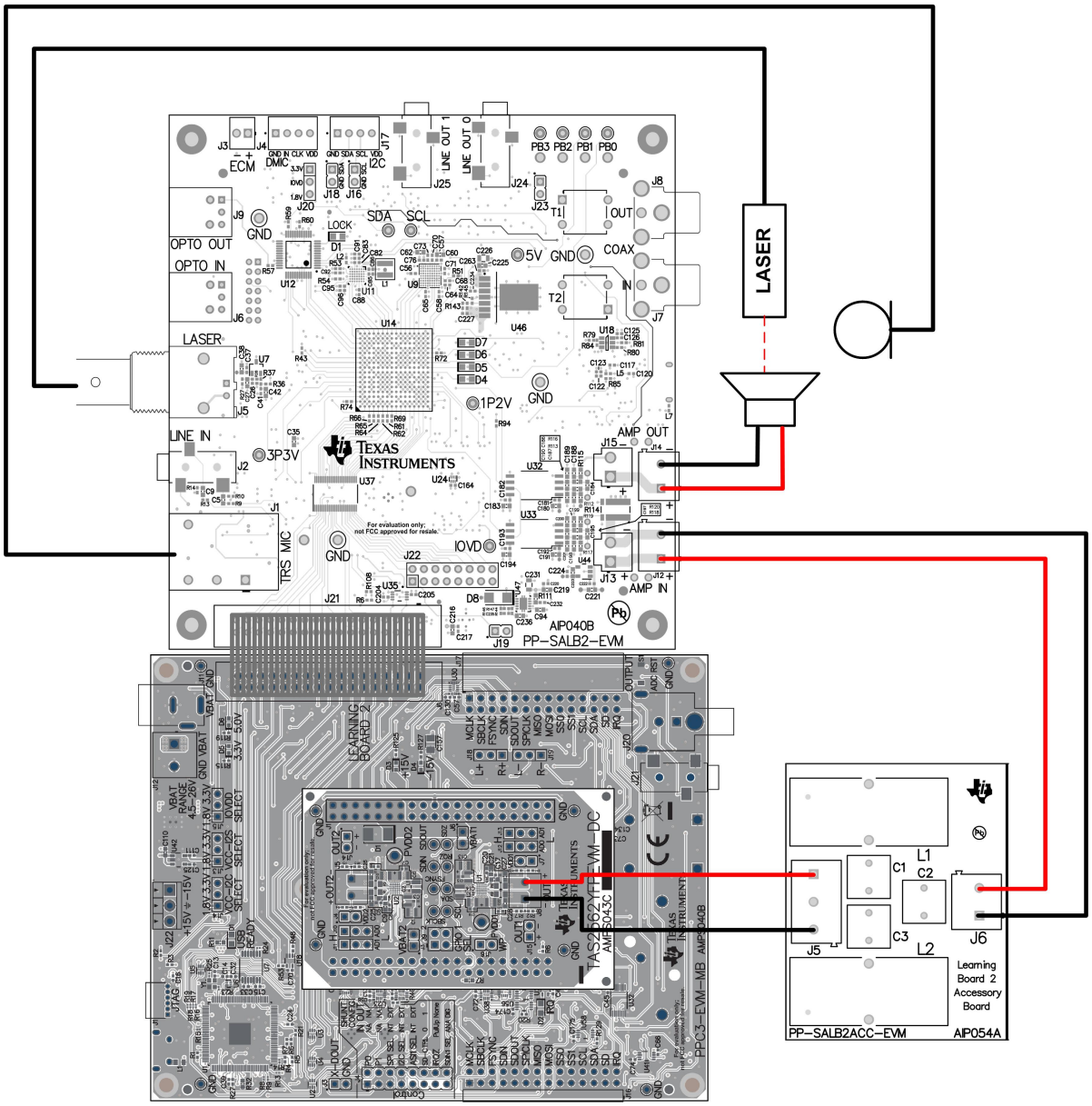

Figure 3. Learning Board 2 with a TAS2562 EVM

The LB2 is connected to a TAS2562 EVM with a ribbon cable, which supplies power to the Learning Board 2 as well as control (I^2C) and digital audio (several I^2S instances). TAS2562 EVM must be using the default jumper settings found in the *TAS2562 EVM User's Guide*. Alternatively, J3 can be also disconnected from the TAS2562EVM since only one amplifier output will be used.

In this example, the LB2 uses the following IOs:

1. Digital interface to EVM: ribbon cable
2. AMP IN (J12): Amplified audio signal from EVM (J8):
   - The LB2 measures the voltage from this signal
3. AMP OUT (J14): Amplified audio to the speaker
   - The LB2 measures the current for this signal
4. Laser (J5)
   - The laser measures the excursion of the speaker membrane. The excursion data is converted to an electrical signal 10 V / mm. The LB2 has a BNC connector for this signal.
5. Microphone (J1)
   - This uses a 5-mm TRS jack (internal mic bias)

The LB2 is fully controlled through PPC3. There is no direct user input required.

5.2 TAS2559 Setup

Figure 4 shows the LB2 with a TAS2559 EVM.

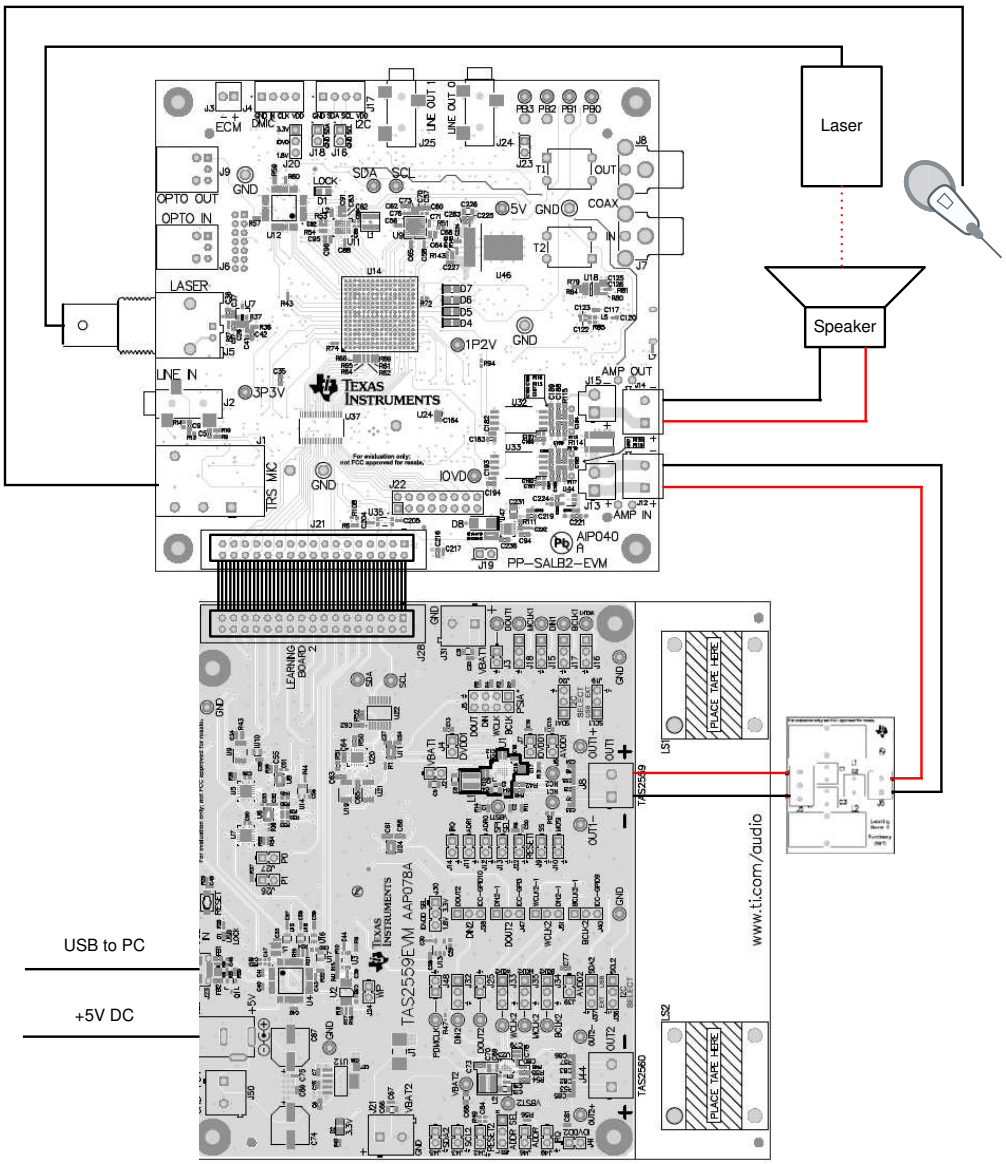

Figure 4. Learning Board 2 with a TAS2559 EVM

The LB2 is connected to a TAS2559 EVM with a ribbon cable, which supplies power to the Learning Board 2 as well as control (I^2C) and digital audio (several I^2S instances). TAS2559 EVM must be using the default jumper settings found in the *TAS2559 EVM User's Guide*.

In this example, the LB2 uses the following IOs:

1. Digital interface to EVM: ribbon cable
2. AMP IN (J12): Amplified audio signal from EVM (J8):
   - The LB2 measures the voltage from this signal
3. AMP OUT (J14): Amplified audio to the speaker
   - The LB2 measures the current for this signal
4. Laser (J5)
   - The laser measures the excursion of the speaker membrane. The excursion data is converted to an electrical signal 10 V / mm. The LB2 has a BNC connector for this signal.
5. Microphone (J1)
   - This uses a 5-mm TRS jack (internal mic bias)

The LB2 is fully controlled through PPC3. There is no direct user input required.

5.3 TAS2557 Setup

Figure 5 shows the LB2 with a TAS2557 EVM.

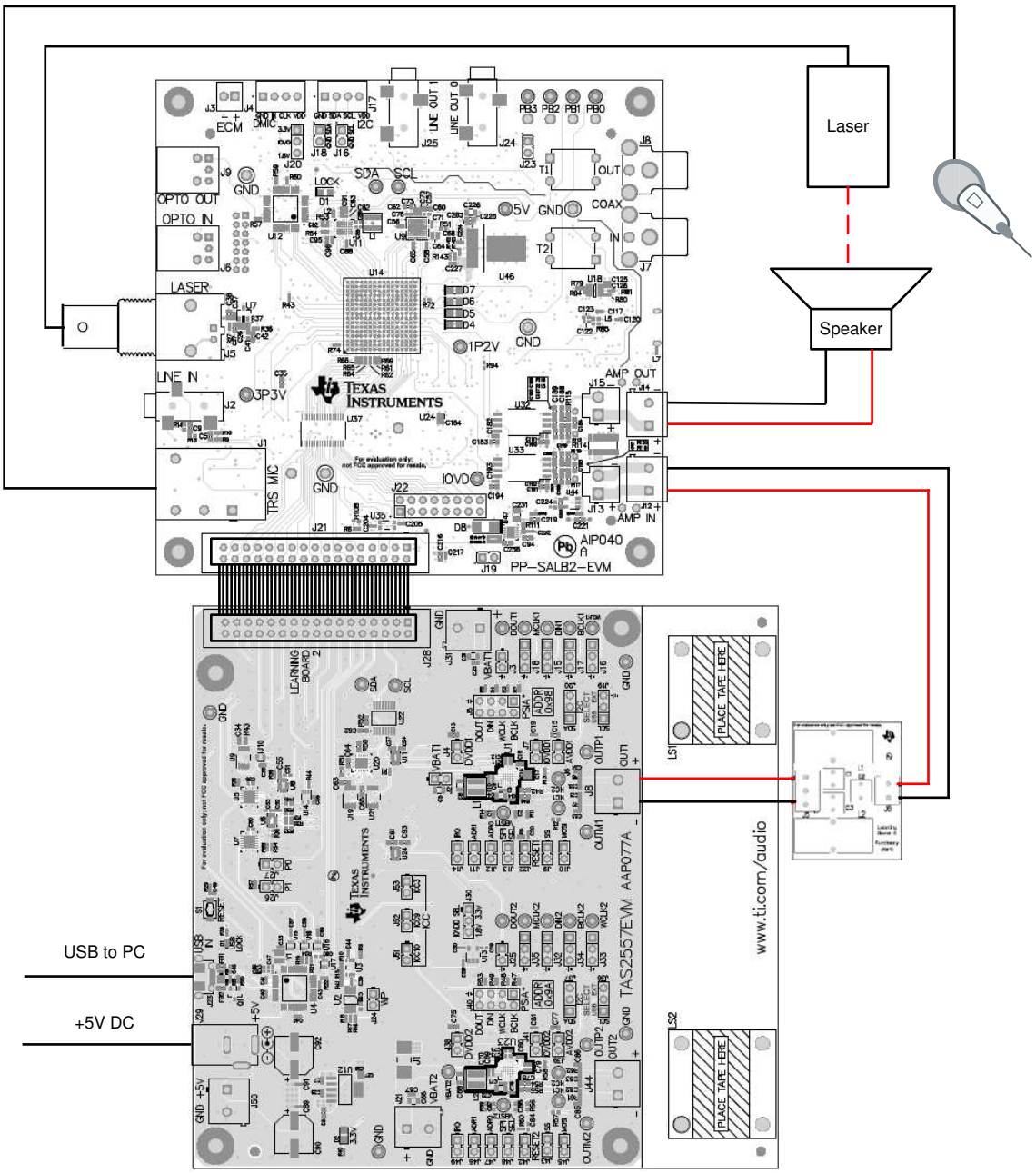

Figure 5. Learning Board 2 with a TAS2557 EVM

The LB2 is connected to a TAS2557 EVM with a ribbon cable, which supplies power to the Learning Board 2 as well as control (I^2C) and digital audio (several I^2S instances). TAS2557 EVM must be using the default jumper settings found in the *TAS2557 EVM User's Guide*.

In this example, the LB2 uses the following IOs:

1. Digital interface to EVM: ribbon cable
2. AMP IN (J12): Amplified audio signal from EVM (J8):
   - The LB2 measures the voltage from this signal
3. AMP OUT (J14): Amplified audio to the speaker
   - The LB2 measures the current for this signal
4. Laser (J5)
   - The laser measures the excursion of the speaker membrane. The excursion data is converted to an electrical signal 10 V / mm. The LB2 has a BNC connector for this signal.
5. Microphone (J1)
   - This uses a 5-mm TRS jack (internal mic bias)

The LB2 is fully controlled through PPC3. There is no direct user input required.

5.4 TAS2555 Setup

Figure 6 shows the LB2 with a TAS2555 EVM.

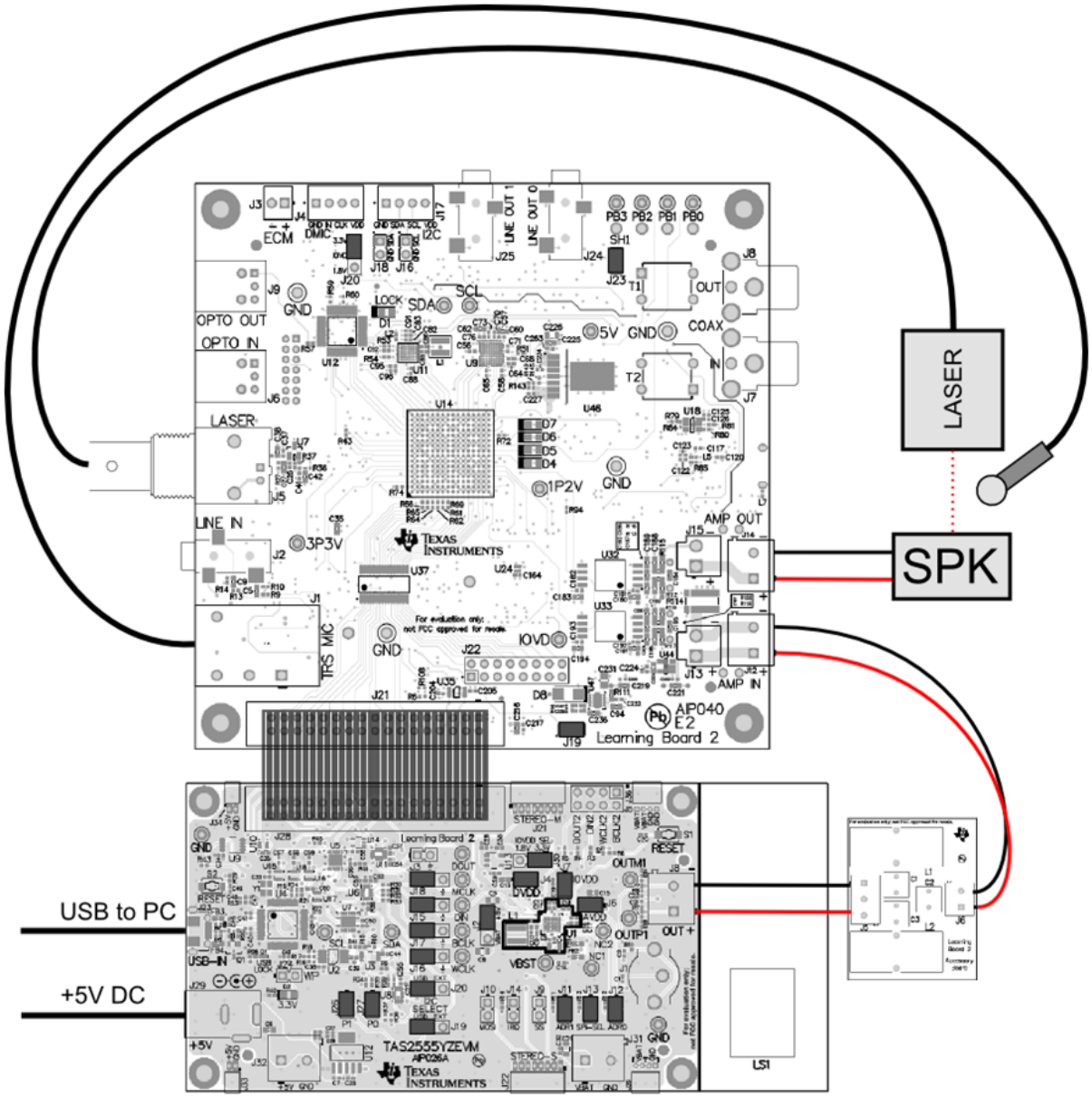

Figure 6. Learning Board 2 With a TAS2555 EVM

The LB2 is connected to a TAS2555 EVM with a ribbon cable, which supplies power to the Learning Board 2 as well as control (I^2C) and digital audio (several I^2S instances). TAS2555 EVM must be using the default jumper settings found in the *TAS2555 EVM User's Guide*.

In this example, the LB2 uses the following IOs:

1. Digital interface to EVM: ribbon cable
2. AMP IN: Amplified audio signal from EVM (J8):
   - The LB2 measures the voltage from this signal
3. AMP OUT: Amplified audio to the speaker
   - The LB2 measures the current for this signal
4. Laser
   - The laser measures the excursion of the speaker membrane. The excursion data is converted to an electrical signal 10 V / mm. The LB2 has a BNC connector for this signal.
5. Microphone
   - This uses a 5-mm TRS jack (internal mic bias)

The LB2 is fully controlled through PPC3. There is no direct user input required.

Please refer to the respective tuning guide (for example, *Smart Amp Tuning Guide* for detailed information about speaker characterization and tuning with the LB2.

Revision History

Changes from Original (August 2015) to A Revision **Page**

- Changed Abstract 1
- Changed Description 2
- Added plug-ins to Software section paragraph 2
- Changed J7 to J9 in Connections section 3
- Added Section 5.1 4
- Added Section 5.2 6
- Added Section 5.3 8

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