

Audio Mini:

Terasic DE10-Nano Expansion Card

--- Description:

- Intel Cyclone V SE - 5CSEBA6U23I7NDK
- AD1939 Audio Codec
- Audio Output: Line Out - TPA6120
- Audio Input: Digital Microphones - INMP621 - Not Populated by Default
- Audio Output: Headphone Out - TPA6130
- User Switches and LEDs

---Errata:

1. June 2018 - First release, production-level prototype. Rev: 1P0
2. September 2020 - Updated Schematics, PCB to AudioLogic - Rev 1P1



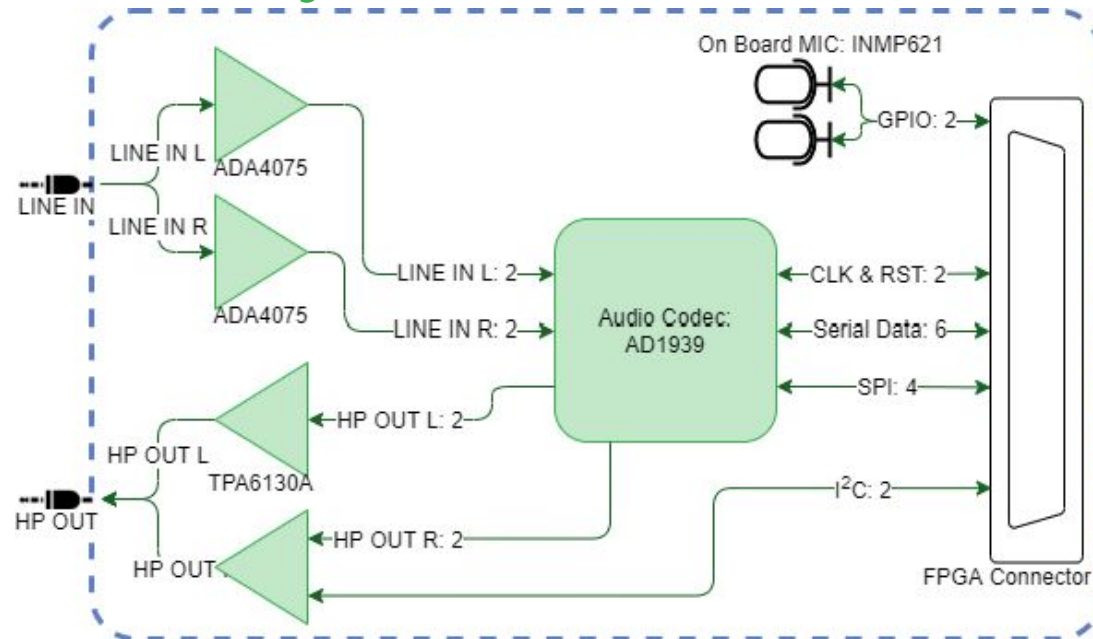
Title: Audio Mini			Rev: 1P1
Errata and Table of Contents			
	Sheet: 1 of 11	Size: 11 x 8.5 Inches	 AudioLogic
Table of Contents	Date: 9/10/2020	Time: 1:46:28 PM	
System Architecture	Engineer: Connor Dack		
Connection Diagram	File: Description+Errata.SchDoc		
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System Architecture

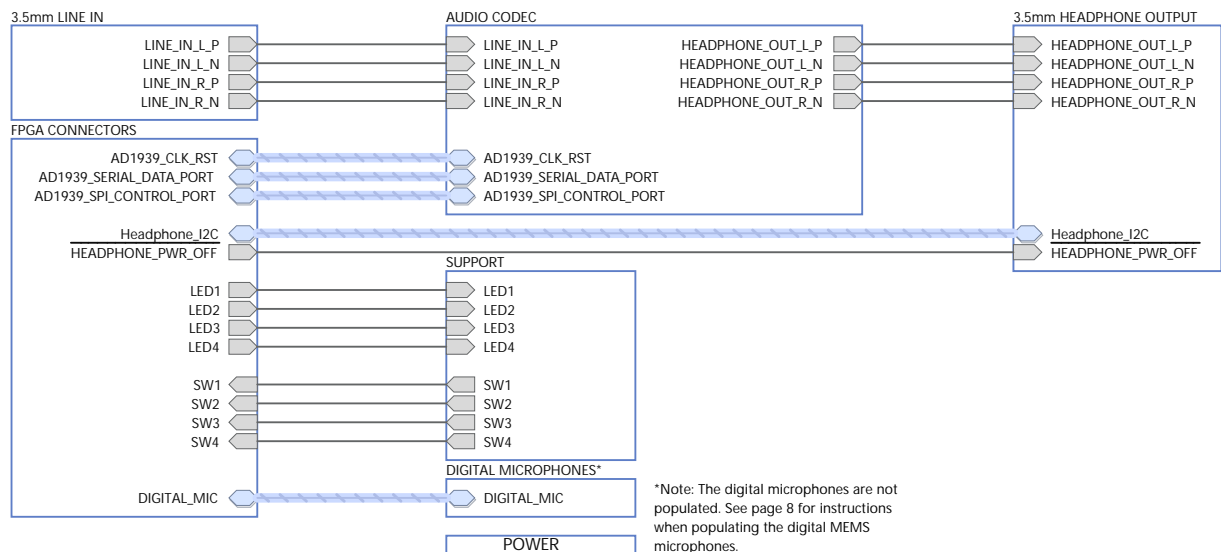



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System Architecture		 AudioLogic	
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Audio Mini - Top Level Hierarchy

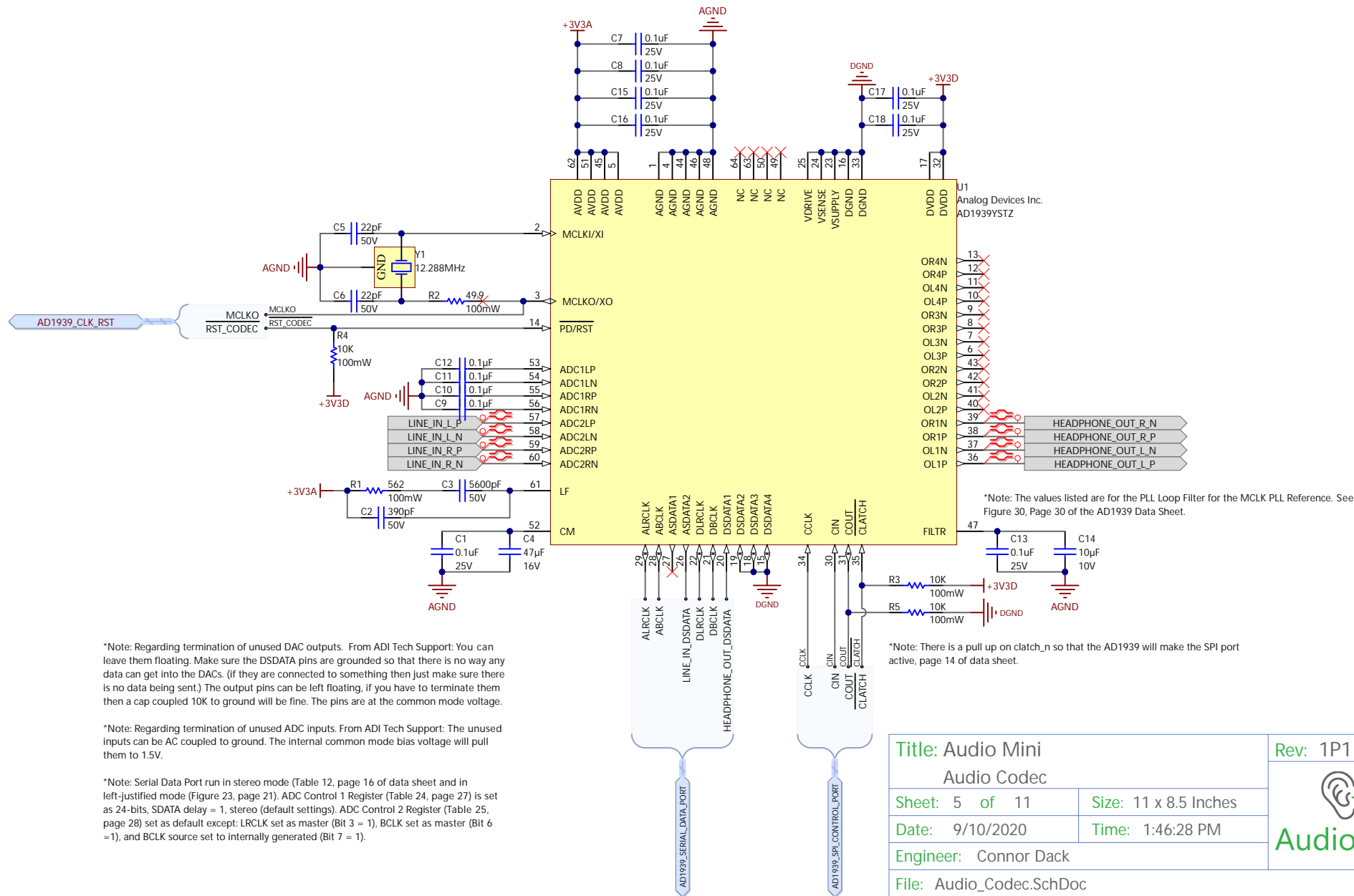



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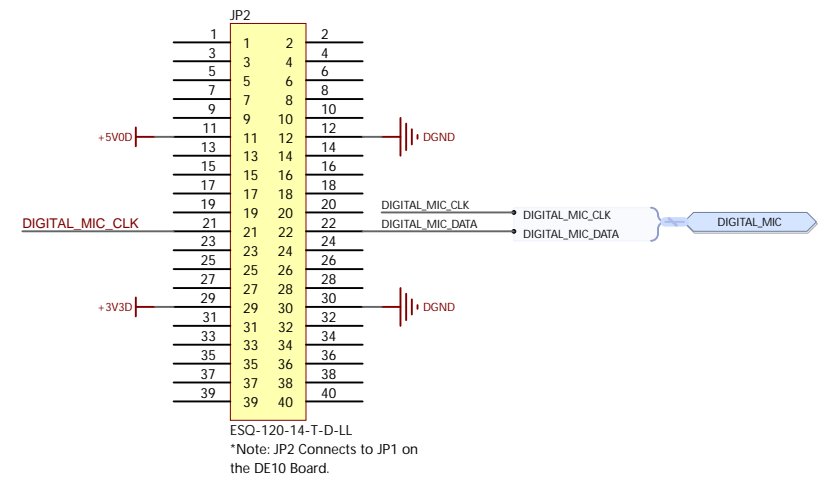
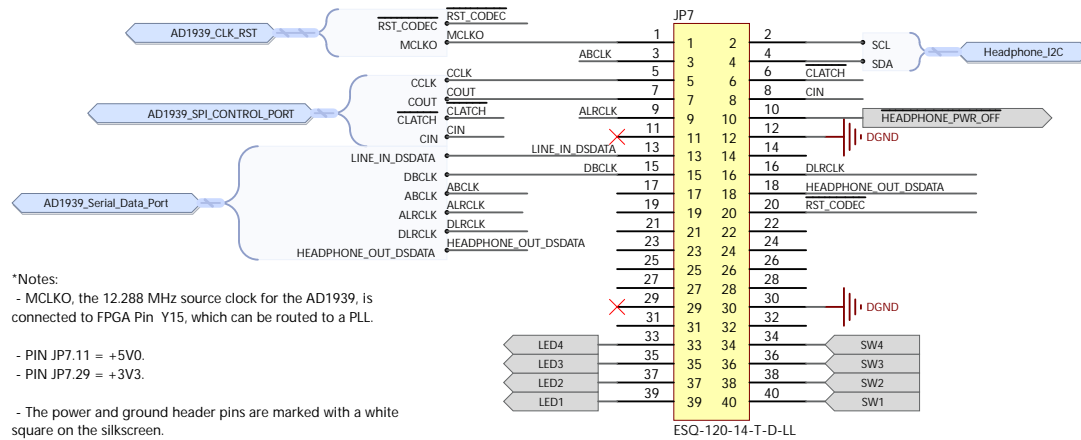
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Audio Codec: AD1939



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Audio Codec			
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FPGA Headers



FPGA Pin Assignment Table

Schematic Signal Group	Schematic Net Name	Device Signal Name	Device / Part Number	DE10 Header Post / Pin Number	FPGA Pin	Quartus Top Level Signal Name
AD1939_SPI_CONTROL_PORT	CIN	CIN	AD1939 / 30	JP7 / 8	AF27	AD1939_spi_CIN
	CLATCH_n	CLATCH_n	AD1939 / 35	JP7 / 6	AF28	AD1939_spi_CLATCH_n
	CCLK	CCLK	AD1939 / 34	JP7 / 5	AG28	AD1939_spi_CCLK
	COUT	COUT	AD1939 / 31	JP7 / 7	AE25	AD1939_spi_COUT
AD1939_SERIAL_DATA_PORT	ABCLK	ABCLK	AD1939 / 28	JP7 / 3	AA15	AD1939_ADC_ABCLK
	ALRCLK	ALRCLK	AD1939 / 29	JP7 / 9	AG26	AD1939_ADC_ALRCLK
	LINE_IN_DSDATA	ASDATA2	AD1939 / 26	JP7 / 13	AG25	AD1939_ADC_ASDATA2
	DBCLK	DBCLK	AD1939 / 21	JP7 / 15	AH24	AD1939_DAC_DBCLK
	DLRCLK	DLRCLK	AD1939 / 22	JP7 / 16	AF25	AD1939_DAC_DLRCLK
AD1939_CLK_RST	HEADPHONE_OUT_DSDATA	DSDATA1	AD1939 / 20	JP7 / 18	AF23	AD1939_DAC_DSDATA1
	MCLK0	MCLK0	AD1939 / 3	JP7 / 1	Y15	AD1939_MCLK
HEADPHONE_I2C	RST_CODEC_n	PD/RST_n	AD1939 / 14	JP7 / 20	AH22	AD1939_RST_CODEC_n
	SCL	SCL	TPA6130A2 / 8	JP7 / 2	AC24	TPA6130_i2c_SCL
HEADPHONE_PWR_OFF	SDA	SDA	TPA6130A2 / 7	JP7 / 4	AD26	TPA6130_i2c_SDA
	HEADPHONE_PWR_OFF_n	SD_n	TPA6130A2 / 6	JP7 / 10	AH27	TPA6130_power_off
DIGITAL_MIC	DIGITAL_MIC_CLK	CLK	INMP621 / 1	JP1 / 21	C12	INMP621_mic_CLK
	DIGITAL_MIC_DATA	DATA	INMP621 / 5	JP1 / 22	AG21	INMP621_mic_DATA
LEDS	LED1			JP7 / 39	AE19	Audio_Mini_LEDs[0]
	LED2			JP7 / 37	AG15	Audio_Mini_LEDs[1]
	LED3			JP7 / 35	AF18	Audio_Mini_LEDs[2]
	LED4			JP7 / 33	AG18	Audio_Mini_LEDs[3]
SWITCHES	SW1			JP7 / 40	AE17	Audio_Mini_SWITCHES[0]
	SW2			JP7 / 38	AE20	Audio_Mini_SWITCHES[1]
	SW3			JP7 / 36	AF20	Audio_Mini_SWITCHES[2]
	SW4			JP7 / 34	AH18	Audio_Mini_SWITCHES[3]

Title: Audio Mini
FPGA Connectors

Rev: 1P1

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Size: 11 x 8.5 Inches

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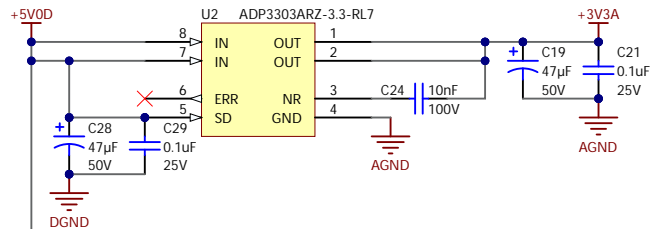
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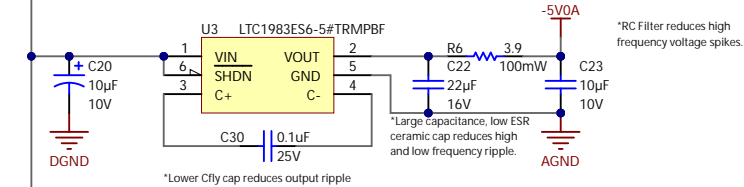


Power Regulation & Indicator LEDs

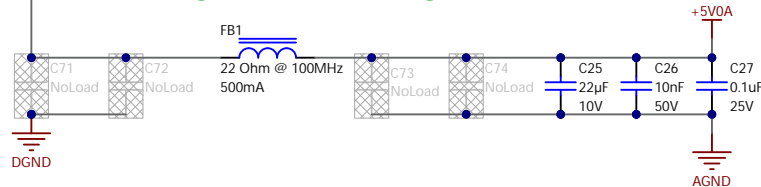
+5V Digital to +3.3V Analog



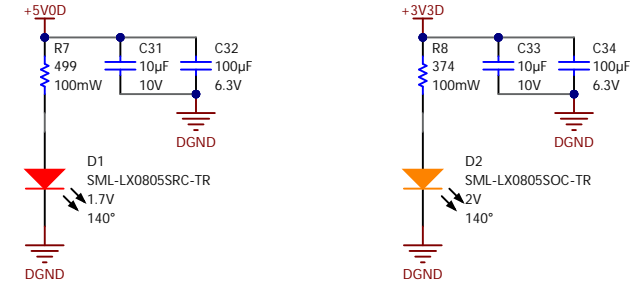
+5V Digital to -5V Analog



+5V Digital to +5V Analog Filter



Power Indicator LEDs



Title: Audio Mini

Power Regulation

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Size: 11 x 8.5 Inches

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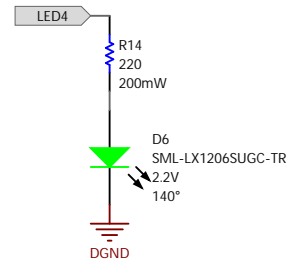
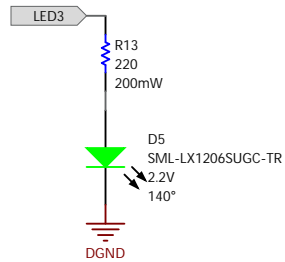
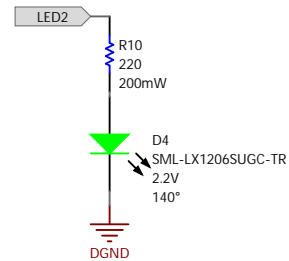
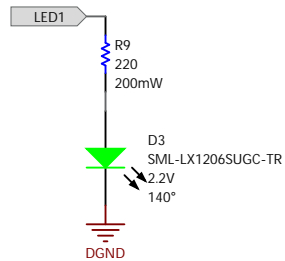
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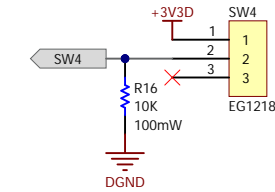
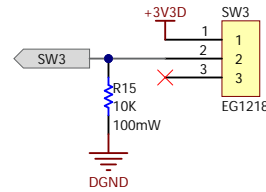
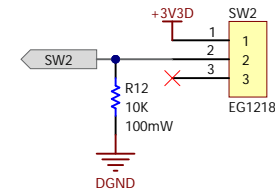
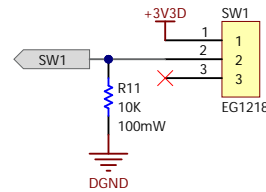
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Peripherals

User LEDs



User Switches



Title: Audio Mini
Support

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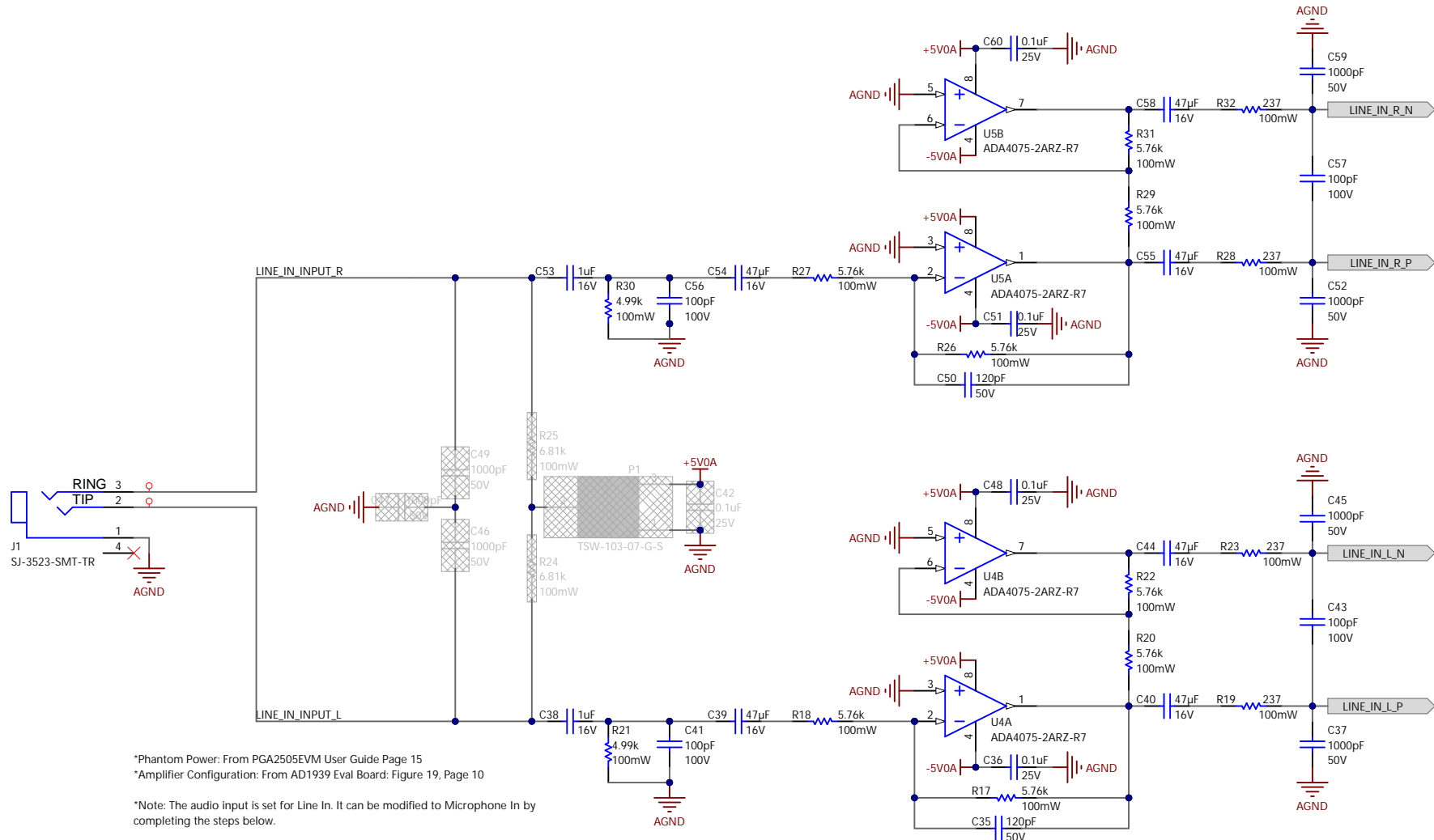
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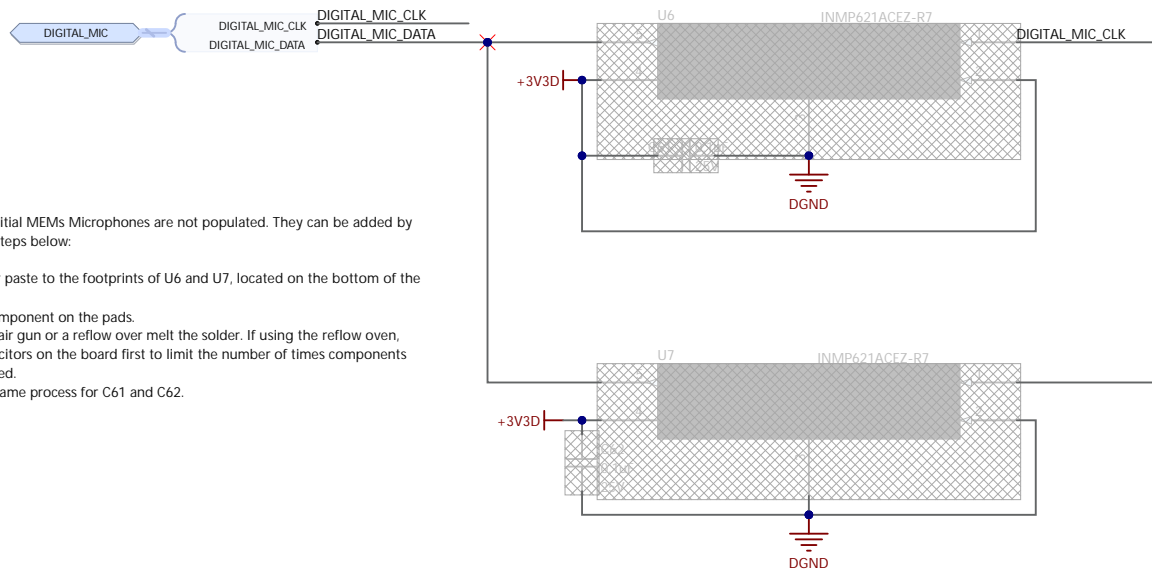
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Line-In: Single-Ended to Differential Input




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Digital Microphones: INMP621

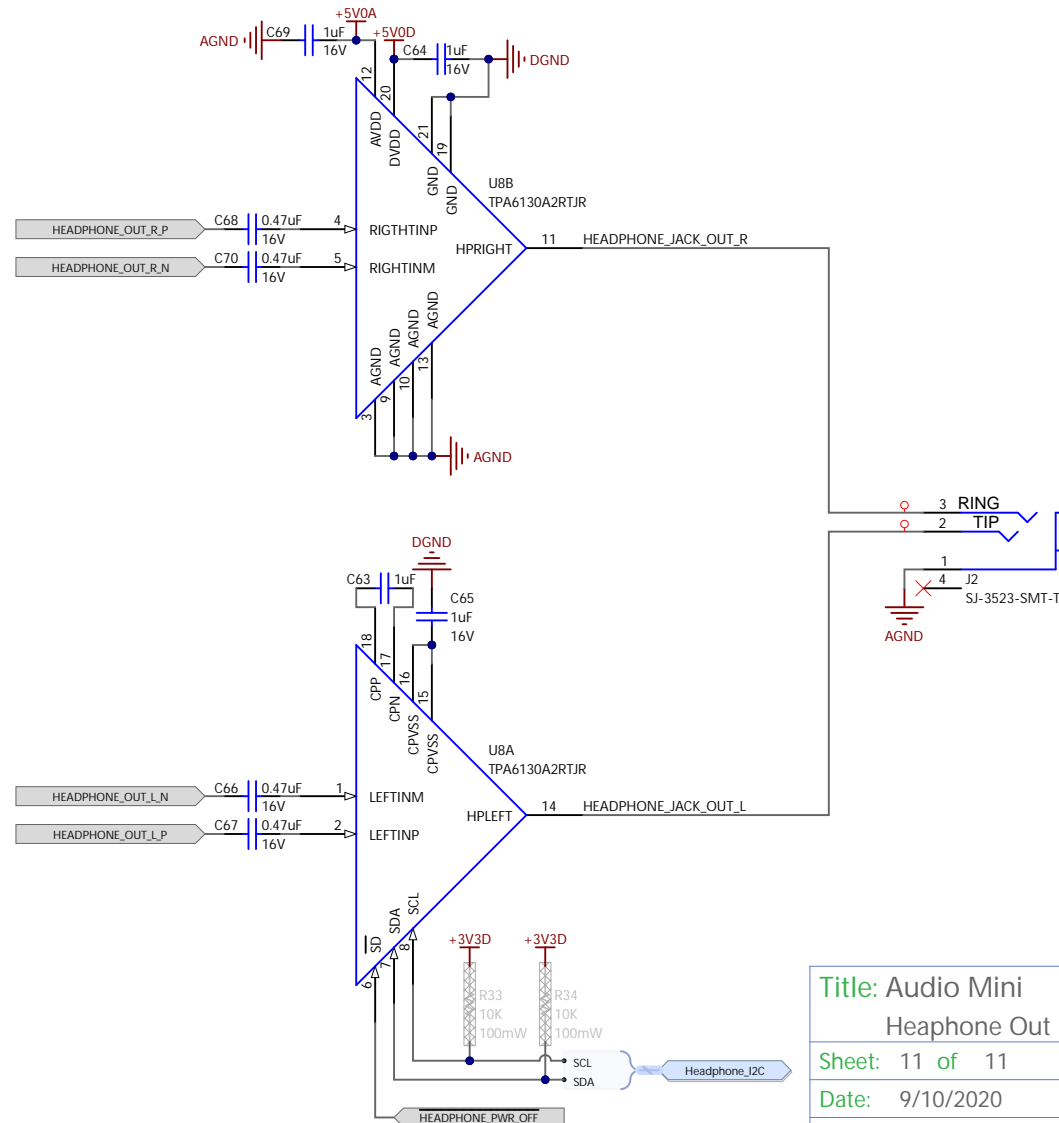



*Note: The Digital MEMs Microphones are not populated. They can be added by following the steps below:

1. Apply solder paste to the footprints of U6 and U7, located on the bottom of the board.
2. Place the component on the pads.
3. Using a hot air gun or a reflow oven melt the solder. If using the reflow oven, place the capacitors on the board first to limit the number of times components are being heated.
4. Repeat the same process for C61 and C62.

Title: Audio Mini MEMS Microphones		Rev: 1P1
Sheet: 10 of 11	Size: 11 x 8.5 Inches	 AudioLogic
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Stereo Headphone Amplifier: TPA6130



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