

User Guide

ARD-AUDIO-DA7212 Audio Shield

UG-ARD-AUDIO-DA7212

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1 Terms and definitions

| | |
|-------------|--|
| AUX_IN | Auxiliary Input |
| BCLK | Bit Clock |
| BOM | Bill of Materials |
| GND | Ground reference |
| GPIO | General Purpose Input Output |
| I2C | Inter-Integrated Circuit |
| I2S | Inter-Integrated Circuit Sound |
| IC Recorder | Integrated Chip (voice) Recorder |
| MCLK | Master Clock |
| MCU | Micro-controller Unit |
| MEMS | Micro-Electrical Mechanical System (refers to microphones) |
| MIC | Microphone |
| PCB | Printed Circuit Board |
| TRS | Tip-Ring-Sleeve (refers to the connector arrangement of the three-pin audio jack) |
| TRRS | Tip-Ring-Ring- Sleeve (refers to the connector arrangement of the four-pin audio jack) |
| Unpop | Unpopulated |
| WCLK | Word Clock |

2 References

1. ARD-AUDIO-DA7212 schematics, layout & software, Dialog Semiconductor
2. Arduino MCU platform and related material, Arduino
3. Freedom MCU platform and related material, Freescale
4. Galileo MCU platform and related material, Intel

3 Introduction

The ARD-AUDIO-DA7212 is an audio 'Shield' Module that can be used with a number of Arduino compatible MCU platforms. The ARD-AUDIO-DA7212 Shield features the Dialog DA7212 audio codec.

DA7212 is an ultra-low power audio codec ideal for standalone audio/video digital processors, IC recorders and many other portable applications. The audio front-end simultaneously supports stereo FM line input with four analogue (or two analogue and two digital) microphones with two independent microphone biases. Comprehensive analogue mixing and bypass paths to the output drivers are available. The headphone output is true-ground Class G with integrated charge pump. There is also a differential Class AB speaker driver that can serve as a mono lineout.

The features of the ARD-AUDIO-DA7212 Audio Shield are:

- DA7212 two-channel audio codec with capless headphone driver for portable media players
- 3.5mm stereo AUX input jack socket
- Smartphone-compatible HEADSET connection on a 4-pole, 3.5mm jack socket
- Interchangeable GND and MIC routing to the smartphone jack allows multiple headsets to be supported
- Compatible with the *Freescale Freedom Development Platform* (for KL46, KL36, KL26, and KL16)

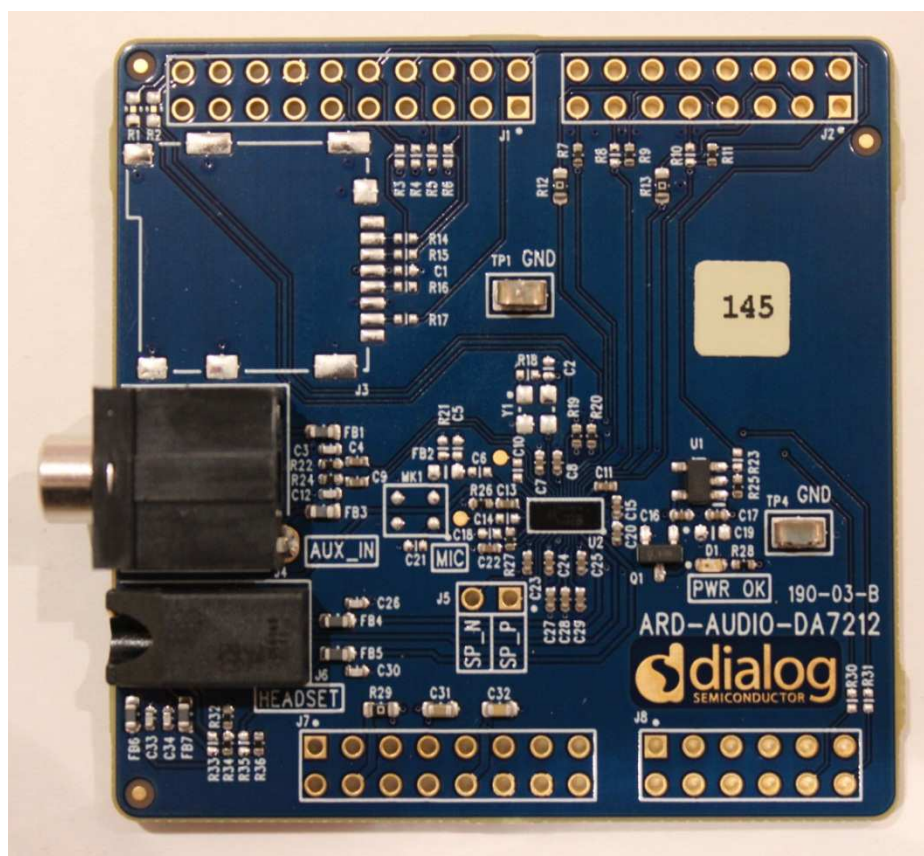


Figure 1: ARD-AUDIO-DA7212

4 Summary

This document provides information about the ARD-AUDIO-DA7212 that will enable you to use it with the many Arduino-compatible MCU platforms available on the market.

- Freescale Freedom Platform:
<http://www.freescale.com/webapp/sps/site/overview.jsp?nodeId=015210045A>
- Arduino platform:
<http://arduino.cc/en/>
- Intel Galileo platform:
<http://www.intel.com/content/www/us/en/intelligent-systems/galileo/galileo-overview.html>

This document is limited to detailing the hardware of the ARD-AUDIO-DA7212 board only. It should be used in conjunction with the DA7212 datasheet and the MCU platform hardware and software User Guide for system level compatibility and operation.

The ARD-AUDIO-DA7212 offers a great flexibility. Please note, however, that there are a number of sections of the board that are not populated by default. The details of the missing components for order and population can be found in the Bill of Materials section (see section 7).

5 ARD-AUDIO-DA7212 Hardware Description

The ARD-AUDIO-DA7212 is an audio shield featuring the DA7212 audio codec that can be used with multiple Arduino-compatible MCU platforms.

5.1 DA7212 Audio Codec

The DA7212 audio codec is controlled via the MCU platform processor over the I2C serial communication interface. Digital audio is transmitted and received over the I2S interface.

The default I2C device addresses for the DA7212 are:

- Write = 0x34h
- Read = 0x35h

The I2S interface digital audio transfer between the processor and the DA7212 can be done in Slave or Master mode (in Slave mode, the DA7212 receives BCLK and WCLK; in Master mode, the DA7212 generates BCLK and WCLK).

5.2 Power Supply

There is one regulator (U1) on the ARD-AUDIO-DA7212 driven by the +3.3 V supply sourced from the Arduino-compatible connector J7 (pin 8).

The regulator U1 generates a +1.8 V supply.

There are three supplies used to power the circuitry on the ARD-AUDIO-DA7212:

- +1.8 V from U1 used for VDD_A / VDD_CP on the DA7212
- +3.3 V from J7 (pin 8) used for U1 input, VDD_IO and VDD_MIC on the DA7212 and the optional 11.2896 MHz oscillator (Y1)
- +5.0 V from J7 (pin 10) used for the VDD_SP supply on the DA7212

The regulator U1 has an Enable (EN) pin, which is connected to a GPIO (PTA13; J1 pin 2) of the MCU on the development platform. As default this signal connection is open due to the series resistor R23 being Unpopulated ('Unpop'). The EN pin is pulled to +3.3 V via a 10K Ω resistor (R25).

5.3 MCLK Source

The default MCLK source is from the MCU on the development platform supplied to the DA7212 via J2, pin7.

Alternatively, an on-board oscillator circuit can be populated and used as the MCLK source. The suggested component (Y1) is a fixed frequency 11.2896 MHz TXC oscillator (AW-11.2896MBE-T). The DA7212 PLL can be used to generate other internal MCLK frequencies as required.

5.4 Interfaces

5.4.1 I2S

The I2S interface is used to receive and transmit the audio data between the DA7212 and the processor used on the chosen development platform.

The I2S interface consists of a Word Clock (WCLK), a data clock (BCLK), a serial data input (DI) and a serial data output (DO).

These signals are connected directly between the DA7212 and the Processor on the development platform with all logic running at +3.3 V.

5.4.2 I2C

The I2C interface is used to transmit the DA7212 control data as well as to read back the settings as required.

The I2C interface consists of a data clock (SCL) and a serial data input/output (SDA).

The pull-up resistors required for correct operation of the I2C interface are situated on the ARD-AUDIO-DA7212 module.

5.5 I/O Connectors

5.5.1 AUX_IN

Analogue signals are applied to the auxiliary inputs AUX1_L and AUX_R via the 3.5 mm jack socket J4.

The DA7212 analogue inputs are DC biased so a series DC blocking capacitor is added to the input path.

5.5.2 HEADSET

A standard headset (headphones + microphone) can be attached to the ARD-AUDIO-DA7212 via the 3.5 mm, 4-pole (TRRS) socket J6.

There are two options available for pole allocation depending on headset manufacturer and region. R34 and R36 (default) or R33 and R35 can be used to route the MIC and GND signals for the two implementations. Headphone Left and Right remain fixed.

The DC bias for the headset microphone is sourced from MICBIAS1. The microphone signal is input to the DA7212 on MIC1_R.



Figure 2 Headset Jack Configuration Options

Table 1 Headset Jack Configuration Options (See Figure 2)

| Component | Functionality | Setting | Description |
|------------------------|----------------------------|---------------|--|
| R34 & R36 R33 & R35 | Headset jack signal select | Short Open | 1=MIC, 2=GND, 3=HPR, 4=HP (Default) |
| R34 & R36 R33 & R35 | Headset jack signal select | Open Short | 1=GND, 2=MIC, 3=HPR, 4=HPL |

A 3-pole (TRS) headphone can also be attached to the connector J6.

5.5.3 MIC (on-board)

The on-board Micro-Electrical Mechanical System (MEMS) microphone (MK1) is input to MIC2_R. The VDD supply for the microphone is sourced from MICBIAS2.

5.6 Quick Reference

The board component placement is shown in Figure 3. A summary of the connection options is listed in [Table 2](#).

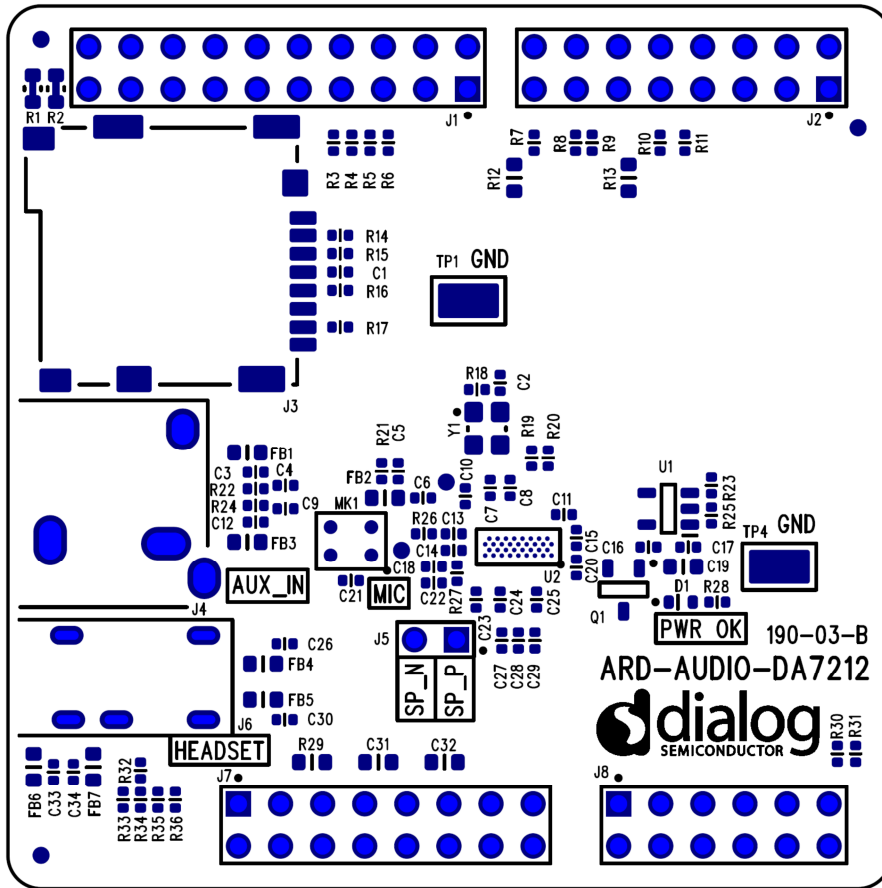


Figure 3 ARD-AUDIO-DA7212 Summary

Table 2 Connector Summary

| Connector | Functionality | Description |
|-----------|---|---|
| J1 | Interconnect (I2C) to the MCU board | Pin 2 = GPIO used to enable regulator U1 <i>[option]</i> Pin 6 = I2S WCLK <i>[option]</i> Pin 8 = I2S DI <i>[option]</i> Pin 10 = I2S DO <i>[option]</i> Pin 12 = I2S BCLK <i>[option]</i> Pin 18 = I2C SDA Pin 20 = I2C SCL Note: All other pins have no connection |
| J2 | Interconnect (I2S) to the MCU board | Pin 1 = I2S BCLK Pin 3 = I2S WCLK Pin 5 = I2S DI Pin 7 = MCLK Pin 9 = I2S BCLK <i>[option]</i> Pin 13 = I2S WCLK <i>[option]</i> Pin 15 = I2S DO Note: All other pins have no connection |
| J7 | Interconnect (PWR) to the MCU board | Pin 4 = +3V3 Pin 8 = +3V3 Pin 10 = +5V0 Pin 12 = 0 V Pin 14 = 0 V Note: All other pins have no connection |
| J8 | Interconnect to the MCU board | Pin 10 = I2C SDA <i>[option]</i> Pin 12 = I2C SCL <i>[option]</i> Note: All other pins have no connection |
| J3 | MicroSD card socket <i>[Population Option]</i> | Pin 2 = I2S WCLK <i>[option]</i> Pin 3 = I2S DI <i>[option]</i> Pin 4 = +3V3 Pin 5 = I2S BCLK <i>[option]</i> Pin 6 = 0 V Pin 7 = I2S DO <i>[option]</i> Pins 9 to 15 = 0 V Pins 1 & 2 = no connect |
| J4 | AUX IN | Analogue stereo input |
| J6 | Headset | Analogue stereo output and mic input |
| MK1 | On-board analogue MEMS microphone <i>[Population Option]</i> | Analogue microphone |
| J5 | Speaker Output | Pin 1 = + Speaker terminal Pin 2 = - Speaker terminal |

5.7 Inter-board Connections

The ARD-AUDIO-DA7212 connects to the development platform via four header-type connectors.

Refer to [Figure 5](#) (J1, J2, J7 and J8) for the signal connections used between the ARD-AUDIO-DA7212 and the development platform.

6 ARD-AUDIO-DA7212 Schematic

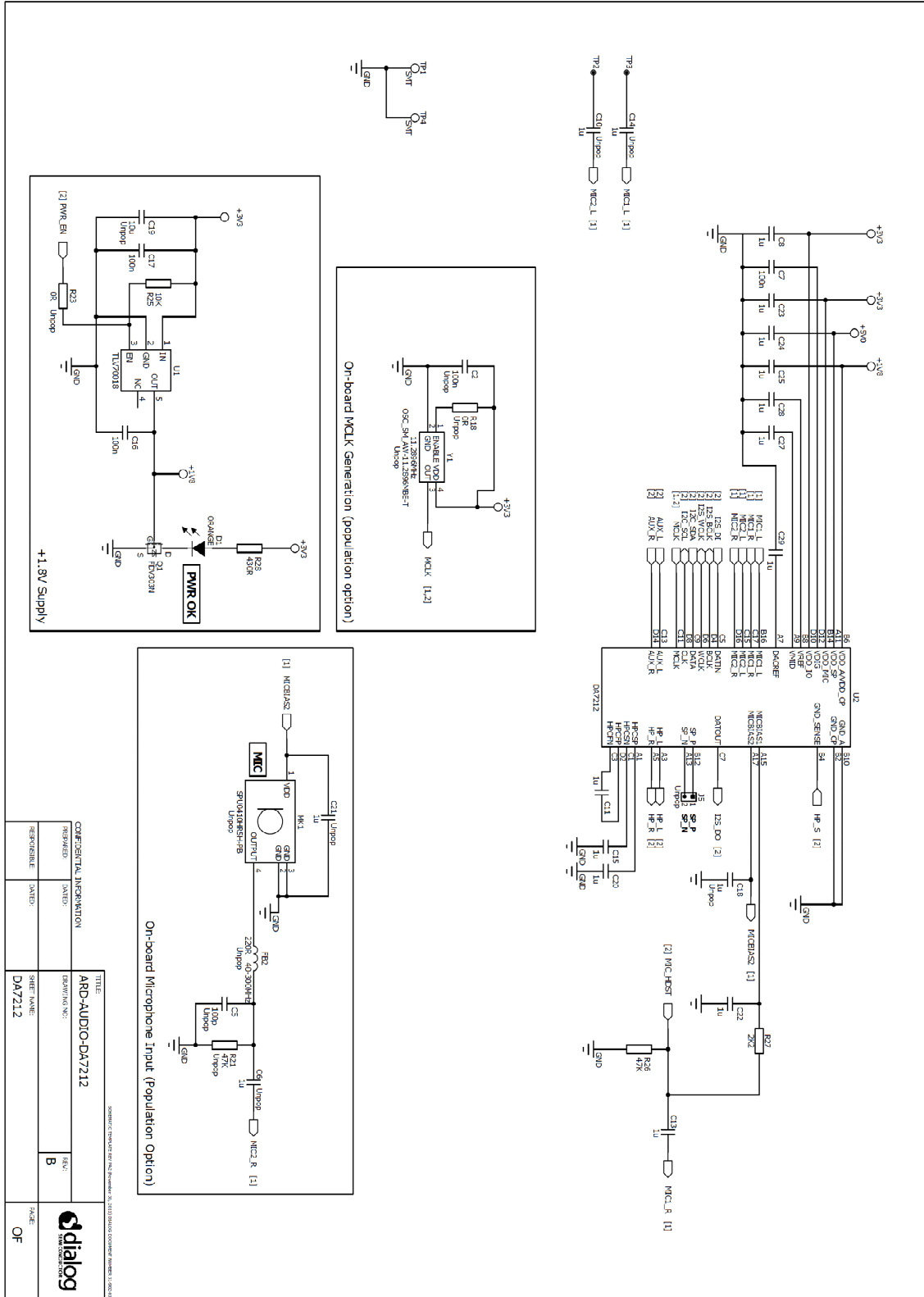


Figure 4 DA7212 Audio Codec

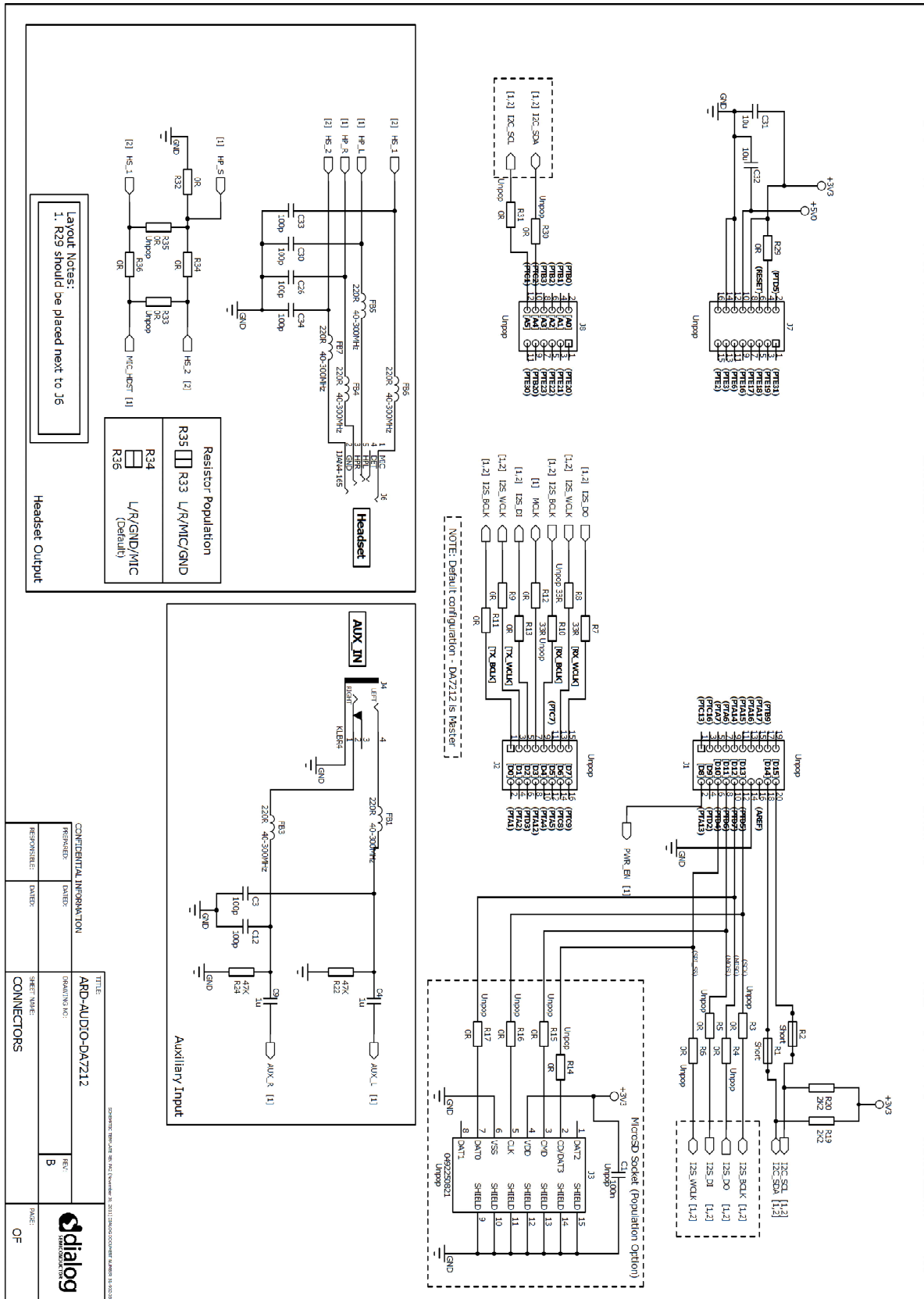


Figure 5 Connectors

7 ARD-AUDIO-DA7212 BOM (Bill of Materials)

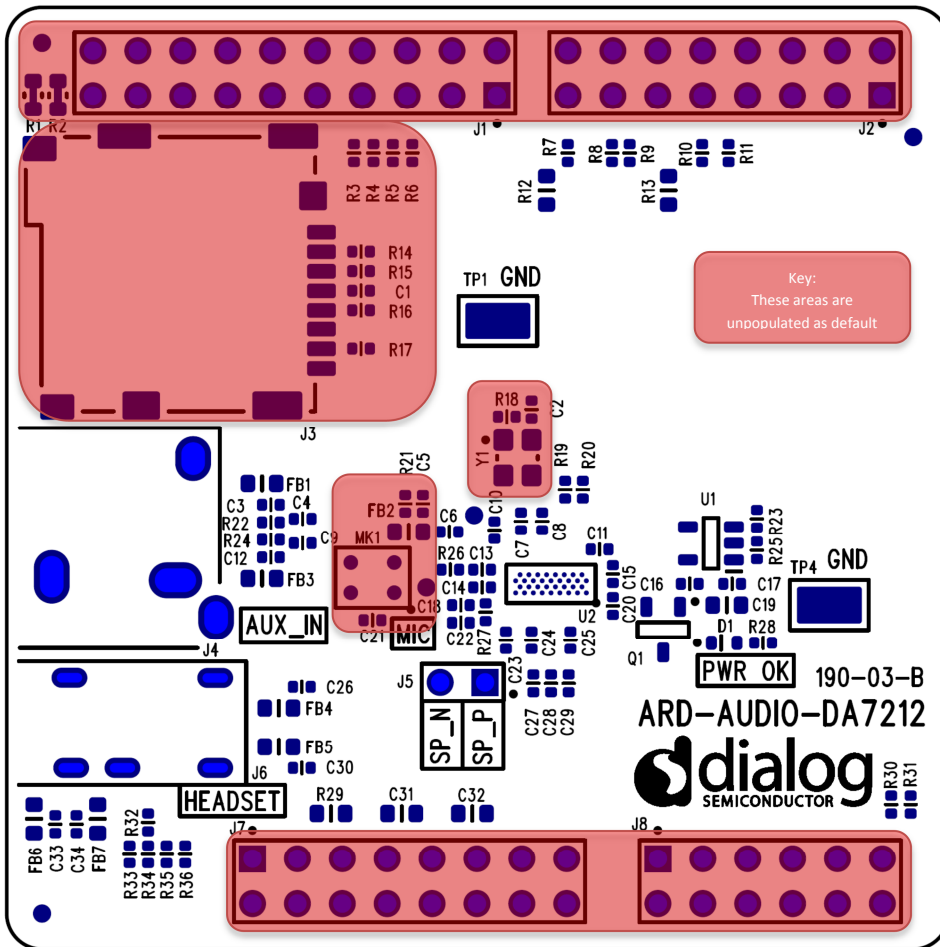


Figure 6 Default Build Overview

7.1 Order BOM

Table 3 Order BOM – populated components

| Qty | Order Qty | Part Description | Value | Manufacturer | Part Number | Supplier | Supplier Order Code |
|-----|-----------|--|-----------|-------------------------|--------------------|----------------------|---------------------|
| 1 | 1 | 3.5mm 4-Pole Right Angle PCB Jack Socket with Detect | IJAN4-165 | Inchang Electronics | IJAN4-165 | | |
| 1 | 1 | Caitlin WLCSP34 ASSP Variant | DA7212 | Dialog Semiconductor | DA7212 | Dialog Semiconductor | |
| 1 | 1 | TLV70018 1.8V 200mA Low-IQ Low-Dropout Regulator | TLV70018 | Texas Instruments | TLV70018DDCT | Digi-Key | 296-25270-1-ND |
| 3 | 3 | 0603 (1608 Metric) SMD Resistor | 0R | Yageo | RC0603JR-070RL | Digi-Key | 311-0.0GRCT-ND |
| 5 | 5 | 0402 (1005 Metric) SMD Resistor | 0R | Yageo | RC0402JR-070RL | Digi-Key | 311-0.0JRCT-ND |
| 1 | 1 | 0402 (1005 Metric) SMD Resistor | 10K | Yageo | RC0402FR-0710KL | Digi-Key | 311-10.0KLRCT-ND |
| 3 | 3 | 0402 (1005 Metric) SMD Resistor | 2K2 | Yageo | RC0402FR-072K2L | Digi-Key | 311-2.20KLRCT-ND |
| 1 | 1 | 0402 (1005 Metric) SMD Resistor | 33R | Yageo | RC0402FR-0733RL | Digi-Key | 311-33.0LRCT-ND |
| 1 | 1 | 0402 (1005 Metric) SMD Resistor | 430R | Yageo | RC0402FR-07430RL | Digi-Key | 311-430LRCT-ND |
| 3 | 3 | 0402 (1005 Metric) SMD Resistor | 47K | Yageo | RC0402FR-0747KL | Digi-Key | 311-47.0KLRCT-ND |
| 3 | 3 | 0402 (1005 Metric) SMD Capacitor | 100n | Murata | GRM155R61A104KA01D | Digi-Key | 490-1318-1-ND |
| 14 | 14 | 0402 (1005 Metric) SMD Capacitor | 1u | Murata | GRM155R61A105KE15D | Digi-Key | 490-3890-1-ND |
| 2 | 2 | 0603 (1608 Metric) SMD Capacitor | 10u | Murata | GRM188R60J106ME47D | Digi-Key | 490-3896-1-ND |
| 1 | 1 | N-Channel MOSFET SOT-23 | FDV303N | Fairchild Semiconductor | FDV303N | Digi-Key | FDV303NCT-ND |
| 2 | 2 | SMT PCB Test Terminal | SMT | Harwin | S1751-46 | Farnell | 1022338 |
| 1 | 1 | 3.5mm Right Angle PCB Jack Socket with Chassis | KLBR4 | Lumberg | KLBR4 | Farnell | 1217016 |
| 6 | 6 | 0603 (1608 Metric) SMD Inductor | 220R | TDK | MPZ1608S221ATA00 | Farnell | 1301677 |
| 1 | 1 | 0603 (1608 Metric) SMD LED | ORANGE | Kingbright | KPG-1608SEKC-T | Farnell | 1686058 |
| 6 | 6 | 0402 (1005 Metric) SMD Capacitor | 100p | Murata | GRM1555C1H101JA01D | Farnell | 2218836 |

Table 4 Order BOM - unpopulated components

| Components shown in this table are unpopulated by default | | | | | | | |
|---|-----------|--|----------------|-------------------|--------------------|----------|---------------------|
| Qty | Order Qty | Part Description | Value | Manufacturer | Part Number | Supplier | Supplier Order Code |
| 2 | | Unpop 1.00mm Round SMT Test Point | SMT Pad 1.00mm | | | | |
| 2 | | Unpop Shorted 0603 Footprint | Short | | | | |
| 14 | | 0402 (1005 Metric) SMD Resistor | 0R | Yageo | RC0402JR-070RL | Digi-Key | 311-0.0JRCT-ND |
| 2 | | 0402 (1005 Metric) SMD Resistor | 33R | Yageo | RC0402FR-0733RL | Digi-Key | 311-33.0LRCT-ND |
| 1 | | 0402 (1005 Metric) SMD Resistor | 47K | Yageo | RC0402FR-0747KL | Digi-Key | 311-47.0KLRCT-ND |
| 1 | | "Ultra Mini" SiSonic Microphone | SPU0410HR5H-PB | Knowles Acoustics | SPU0410HR5H-PB | Digi-Key | 423-1138-1-ND |
| 2 | | 0402 (1005 Metric) SMD Capacitor | 100n | Murata | GRM155R61A104KA01D | Digi-Key | 490-1318-1-ND |
| 5 | | 0402 (1005 Metric) SMD Capacitor | 1u | Murata | GRM155R61A105KE15D | Digi-Key | 490-3890-1-ND |
| 1 | | 0603 (1608 Metric) SMD Capacitor | 10u | Murata | GRM188R60J106ME47D | Digi-Key | 490-3896-1-ND |
| 1 | | Crystal Oscillator 11.2896MHz 3.3V SMD | 11.2896MHz | TXC | AW-11.2896MBE-T | Digi-Key | 887-1652-1-ND |
| 1 | | 1x2 2.54mm pitch PCB Pin Header VERTICAL (2.54mm tail) | TSW-102-07-G-S | Samtec | TSW-102-07-G-S | Digi-Key | SAM1029-02-ND |
| 1 | | 2x6 2.54mm pitch PCB Female Socket VERTICAL (10mm tail) | SSQ-106-03-G-D | Samtec | SSQ-106-03-G-D | Digi-Key | SAM1196-06-ND |
| 2 | | 2x8 2.54mm pitch PCB Female Socket VERTICAL (10mm tail) | SSQ-108-03-G-D | Samtec | SSQ-108-03-G-D | Digi-Key | SAM1196-08-ND |
| 1 | | 2x10 2.54mm pitch PCB Female Socket VERTICAL (10mm tail) | SSQ-110-03-G-D | Samtec | SSQ-110-03-G-D | Digi-Key | SAM1196-10-ND |
| 1 | | Secure Digital - microSD™ Memory Card Socket | 0492250821 | Molex | 0492250821 | Digi-Key | WM3295CT-ND |
| 1 | | 0603 (1608 Metric) SMD Inductor | 220R | TDK | MPZ1608S221ATA00 | Farnell | 1301677 |
| 1 | | 0402 (1005 Metric) SMD Capacitor | 100p | Murata | GRM1555C1H101JA01D | Farnell | 2218836 |

7.2 Build BOM

Table 5 Build BOM – populated components

| Ref Des | Part Description | Value | Pop/Unpop | Manufacturer | Part Number |
|---------|----------------------------------|-------|-----------|--------------|--------------------|
| C12 | 0402 (1005 Metric) SMD Capacitor | 100p | Populated | Murata | GRM1555C1H101JA01D |
| C26 | 0402 (1005 Metric) SMD Capacitor | 100p | Populated | Murata | GRM1555C1H101JA01D |
| C3 | 0402 (1005 Metric) SMD Capacitor | 100p | Populated | Murata | GRM1555C1H101JA01D |
| C30 | 0402 (1005 Metric) SMD Capacitor | 100p | Populated | Murata | GRM1555C1H101JA01D |
| C33 | 0402 (1005 Metric) SMD Capacitor | 100p | Populated | Murata | GRM1555C1H101JA01D |
| C34 | 0402 (1005 Metric) SMD Capacitor | 100p | Populated | Murata | GRM1555C1H101JA01D |
| C16 | 0402 (1005 Metric) SMD Capacitor | 100n | Populated | Murata | GRM155R61A104KA01D |
| C17 | 0402 (1005 Metric) SMD Capacitor | 100n | Populated | Murata | GRM155R61A104KA01D |
| C7 | 0402 (1005 Metric) SMD Capacitor | 100n | Populated | Murata | GRM155R61A104KA01D |
| C11 | 0402 (1005 Metric) SMD Capacitor | 1u | Populated | Murata | GRM155R61A105KE15D |
| C13 | 0402 (1005 Metric) SMD Capacitor | 1u | Populated | Murata | GRM155R61A105KE15D |
| C15 | 0402 (1005 Metric) SMD Capacitor | 1u | Populated | Murata | GRM155R61A105KE15D |
| C20 | 0402 (1005 Metric) SMD Capacitor | 1u | Populated | Murata | GRM155R61A105KE15D |
| C22 | 0402 (1005 Metric) SMD Capacitor | 1u | Populated | Murata | GRM155R61A105KE15D |
| C23 | 0402 (1005 Metric) SMD Capacitor | 1u | Populated | Murata | GRM155R61A105KE15D |
| C24 | 0402 (1005 Metric) SMD Capacitor | 1u | Populated | Murata | GRM155R61A105KE15D |
| C25 | 0402 (1005 Metric) SMD Capacitor | 1u | Populated | Murata | GRM155R61A105KE15D |
| C27 | 0402 (1005 Metric) SMD Capacitor | 1u | Populated | Murata | GRM155R61A105KE15D |
| C28 | 0402 (1005 Metric) SMD Capacitor | 1u | Populated | Murata | GRM155R61A105KE15D |
| C29 | 0402 (1005 Metric) SMD Capacitor | 1u | Populated | Murata | GRM155R61A105KE15D |
| C4 | 0402 (1005 Metric) SMD Capacitor | 1u | Populated | Murata | GRM155R61A105KE15D |
| C8 | 0402 (1005 Metric) SMD Capacitor | 1u | Populated | Murata | GRM155R61A105KE15D |
| C9 | 0402 (1005 Metric) SMD Capacitor | 1u | Populated | Murata | GRM155R61A105KE15D |
| C31 | 0603 (1608 Metric) SMD Capacitor | 10u | Populated | Murata | GRM188R60J106ME47D |
| C32 | 0603 (1608 Metric) SMD Capacitor | 10u | Populated | Murata | GRM188R60J106ME47D |
| R12 | 0603 (1608 Metric) SMD Resistor | 0R | Populated | Yageo | RC0603JR-070RL |
| R13 | 0603 (1608 Metric) SMD Resistor | 0R | Populated | Yageo | RC0603JR-070RL |
| R29 | 0603 (1608 Metric) SMD Resistor | 0R | Populated | Yageo | RC0603JR-070RL |
| R7 | 0402 (1005 Metric) SMD Resistor | 33R | Populated | Yageo | RC0402FR-0733RL |

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| Ref Des | Part Description | Value | Pop/Unpop | Manufacturer | Part Number |
|---------|--|-----------|-----------|-------------------------|------------------|
| R28 | 0402 (1005 Metric) SMD Resistor | 430R | Populated | Yageo | RC0402FR-07430RL |
| R19 | 0402 (1005 Metric) SMD Resistor | 2K2 | Populated | Yageo | RC0402FR-072K2L |
| R20 | 0402 (1005 Metric) SMD Resistor | 2K2 | Populated | Yageo | RC0402FR-072K2L |
| R27 | 0402 (1005 Metric) SMD Resistor | 2K2 | Populated | Yageo | RC0402FR-072K2L |
| R25 | 0402 (1005 Metric) SMD Resistor | 10K | Populated | Yageo | RC0402FR-0710KL |
| R22 | 0402 (1005 Metric) SMD Resistor | 47K | Populated | Yageo | RC0402FR-0747KL |
| R24 | 0402 (1005 Metric) SMD Resistor | 47K | Populated | Yageo | RC0402FR-0747KL |
| R26 | 0402 (1005 Metric) SMD Resistor | 47K | Populated | Yageo | RC0402FR-0747KL |
| R11 | 0402 (1005 Metric) SMD Resistor | 0R | Populated | Yageo | RC0402JR-070RL |
| R32 | 0402 (1005 Metric) SMD Resistor | 0R | Populated | Yageo | RC0402JR-070RL |
| R34 | 0402 (1005 Metric) SMD Resistor | 0R | Populated | Yageo | RC0402JR-070RL |
| R36 | 0402 (1005 Metric) SMD Resistor | 0R | Populated | Yageo | RC0402JR-070RL |
| R9 | 0402 (1005 Metric) SMD Resistor | 0R | Populated | Yageo | RC0402JR-070RL |
| FB1 | 0603 (1608 Metric) SMD Inductor | 220R | Populated | TDK | MPZ1608S221ATA00 |
| FB3 | 0603 (1608 Metric) SMD Inductor | 220R | Populated | TDK | MPZ1608S221ATA00 |
| FB4 | 0603 (1608 Metric) SMD Inductor | 220R | Populated | TDK | MPZ1608S221ATA00 |
| FB5 | 0603 (1608 Metric) SMD Inductor | 220R | Populated | TDK | MPZ1608S221ATA00 |
| FB6 | 0603 (1608 Metric) SMD Inductor | 220R | Populated | TDK | MPZ1608S221ATA00 |
| FB7 | 0603 (1608 Metric) SMD Inductor | 220R | Populated | TDK | MPZ1608S221ATA00 |
| D1 | 0603 (1608 Metric) SMD LED | ORANGE | Populated | Kingbright | KPG-1608SEKC-T |
| Q1 | N-Channel MOSFET SOT-23 | FDV303N | Populated | Fairchild Semiconductor | FDV303N |
| J4 | 3.5mm Right Angle PCB Jack Socket with Chassis | KLBR4 | Populated | Lumberg | KLBR4 |
| J6 | 3.5mm 4-Pole Right Angle PCB Jack Socket with Detect | IJAN4-165 | Populated | Inchang Electronics | IJAN4-165 |
| TP1 | SMT PCB Test Terminal | SMT | Populated | Harwin | S1751-46 |
| TP4 | SMT PCB Test Terminal | SMT | Populated | Harwin | S1751-46 |
| U1 | TLV70018 1.8V 200mA Low-IQ Low-Dropout Regulator | TLV70018 | Populated | Texas Instruments | TLV70018DDCT |
| U2 | Caitlin WLCSP34 ASSP Variant | DA7212 | Populated | Dialog Semiconductor | DA7212 |

Table 6 Build BOM – unpopulated components

| Components shown in this table are unpopulated by default | | | | | |
|---|--|------------|-----------|--------------|--------------------|
| Ref Des | Part Description | Value | Pop/Unpop | Manufacturer | Part Number |
| C5 | 0402 (1005 Metric) SMD Capacitor | 100p | Unpop | Murata | GRM1555C1H101JA01D |
| C1 | 0402 (1005 Metric) SMD Capacitor | 100n | Unpop | Murata | GRM155R61A104KA01D |
| C2 | 0402 (1005 Metric) SMD Capacitor | 100n | Unpop | Murata | GRM155R61A104KA01D |
| C10 | 0402 (1005 Metric) SMD Capacitor | 1u | Unpop | Murata | GRM155R61A105KE15D |
| C14 | 0402 (1005 Metric) SMD Capacitor | 1u | Unpop | Murata | GRM155R61A105KE15D |
| C18 | 0402 (1005 Metric) SMD Capacitor | 1u | Unpop | Murata | GRM155R61A105KE15D |
| C21 | 0402 (1005 Metric) SMD Capacitor | 1u | Unpop | Murata | GRM155R61A105KE15D |
| C6 | 0402 (1005 Metric) SMD Capacitor | 1u | Unpop | Murata | GRM155R61A105KE15D |
| C19 | 0603 (1608 Metric) SMD Capacitor | 10u | Unpop | Murata | GRM188R60J106ME47D |
| R10 | 0402 (1005 Metric) SMD Resistor | 33R | Unpop | Yageo | RC0402FR-0733RL |
| R8 | 0402 (1005 Metric) SMD Resistor | 33R | Unpop | Yageo | RC0402FR-0733RL |
| R21 | 0402 (1005 Metric) SMD Resistor | 47K | Unpop | Yageo | RC0402FR-0747KL |
| R14 | 0402 (1005 Metric) SMD Resistor | 0R | Unpop | Yageo | RC0402JR-070RL |
| R15 | 0402 (1005 Metric) SMD Resistor | 0R | Unpop | Yageo | RC0402JR-070RL |
| R16 | 0402 (1005 Metric) SMD Resistor | 0R | Unpop | Yageo | RC0402JR-070RL |
| R17 | 0402 (1005 Metric) SMD Resistor | 0R | Unpop | Yageo | RC0402JR-070RL |
| R18 | 0402 (1005 Metric) SMD Resistor | 0R | Unpop | Yageo | RC0402JR-070RL |
| R23 | 0402 (1005 Metric) SMD Resistor | 0R | Unpop | Yageo | RC0402JR-070RL |
| R3 | 0402 (1005 Metric) SMD Resistor | 0R | Unpop | Yageo | RC0402JR-070RL |
| R30 | 0402 (1005 Metric) SMD Resistor | 0R | Unpop | Yageo | RC0402JR-070RL |
| R31 | 0402 (1005 Metric) SMD Resistor | 0R | Unpop | Yageo | RC0402JR-070RL |
| R33 | 0402 (1005 Metric) SMD Resistor | 0R | Unpop | Yageo | RC0402JR-070RL |
| R35 | 0402 (1005 Metric) SMD Resistor | 0R | Unpop | Yageo | RC0402JR-070RL |
| R4 | 0402 (1005 Metric) SMD Resistor | 0R | Unpop | Yageo | RC0402JR-070RL |
| R5 | 0402 (1005 Metric) SMD Resistor | 0R | Unpop | Yageo | RC0402JR-070RL |
| R6 | 0402 (1005 Metric) SMD Resistor | 0R | Unpop | Yageo | RC0402JR-070RL |
| FB2 | 0603 (1608 Metric) SMD Inductor | 220R | Unpop | TDK | MPZ1608S221ATA00 |
| Y1 | Crystal Oscillator 11.2896MHz 3.3V SMD | 11.2896MHz | Unpop | TXC | AW-11.2896MBE-T |
| J3 | Secure Digital - microSD™ Memory Card Socket | 0492250821 | Unpop | Molex | 0492250821 |

ARD-AUDIO-DA7212 Audio Shield

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| Components shown in this table are unpopulated by default | | | | | |
|---|--|----------------|-----------|-------------------|----------------|
| Ref Des | Part Description | Value | Pop/Unpop | Manufacturer | Part Number |
| J5 | 1x2 2.54mm pitch PCB Pin Header VERTICAL (2.54mm tail) | TSW-102-07-G-S | Unpop | Samtec | TSW-102-07-G-S |
| J8 | 2x6 2.54mm pitch PCB Female Socket VERTICAL (10mm tail) | SSQ-106-03-G-D | Unpop | Samtec | SSQ-106-03-G-D |
| J2 | 2x8 2.54mm pitch PCB Female Socket VERTICAL (10mm tail) | SSQ-108-03-G-D | Unpop | Samtec | SSQ-108-03-G-D |
| J7 | 2x8 2.54mm pitch PCB Female Socket VERTICAL (10mm tail) | SSQ-108-03-G-D | Unpop | Samtec | SSQ-108-03-G-D |
| J1 | 2x10 2.54mm pitch PCB Female Socket VERTICAL (10mm tail) | SSQ-110-03-G-D | Unpop | Samtec | SSQ-110-03-G-D |
| MK1 | "Ultra Mini" SiSonic Microphone | SPU0410HR5H-PB | Unpop | Knowles Acoustics | SPU0410HR5H-PB |
| R1 | Unpop Shorted 0603 Footprint | Short | Unpop | | |
| R2 | Unpop Shorted 0603 Footprint | Short | Unpop | | |
| TP2 | Unpop 1.00mm Round SMT Test Point | SMT Pad 1.00mm | Unpop | | |
| TP3 | Unpop 1.00mm Round SMT Test Point | SMT Pad 1.00mm | Unpop | | |

8 Revision history

| Revision | Date | Originator | Change |
|----------|-------------|------------|-----------------|
| 1.0 | 30-JAN-2014 | WF | Initial Release |

Status definitions

| Status | Definition |
|----------------------|--|
| DRAFT | The content of this document is under review and subject to formal approval, which may result in modifications or additions. |
| APPROVED or unmarked | The content of this document has been approved for publication. |

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Contacting Dialog Semiconductor

Germany Headquarters

Dialog Semiconductor GmbH
Phone: +49 7021 805-0

United Kingdom

Dialog Semiconductor (UK) Ltd
Phone: +44 1793 757700

The Netherlands

Dialog Semiconductor B.V.
Phone: +31 73 640 88 22

Email:

enquiry@diasemi.com

North America

Dialog Semiconductor Inc.
Phone: +1 408 727 3200

Japan

Dialog Semiconductor K. K.
Phone: +81 3 5425 4567

Taiwan

Dialog Semiconductor Taiwan
Phone: +886 226 580 388

Web site:

www.dialog-semiconductor.com

Singapore

Dialog Semiconductor Singapore
Phone: +65 64845419

China

Dialog Semiconductor China
Phone: +852 2607 4271

Korea

Dialog Semiconductor Korea
Phone: +82 2 569 2301

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