

# 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)

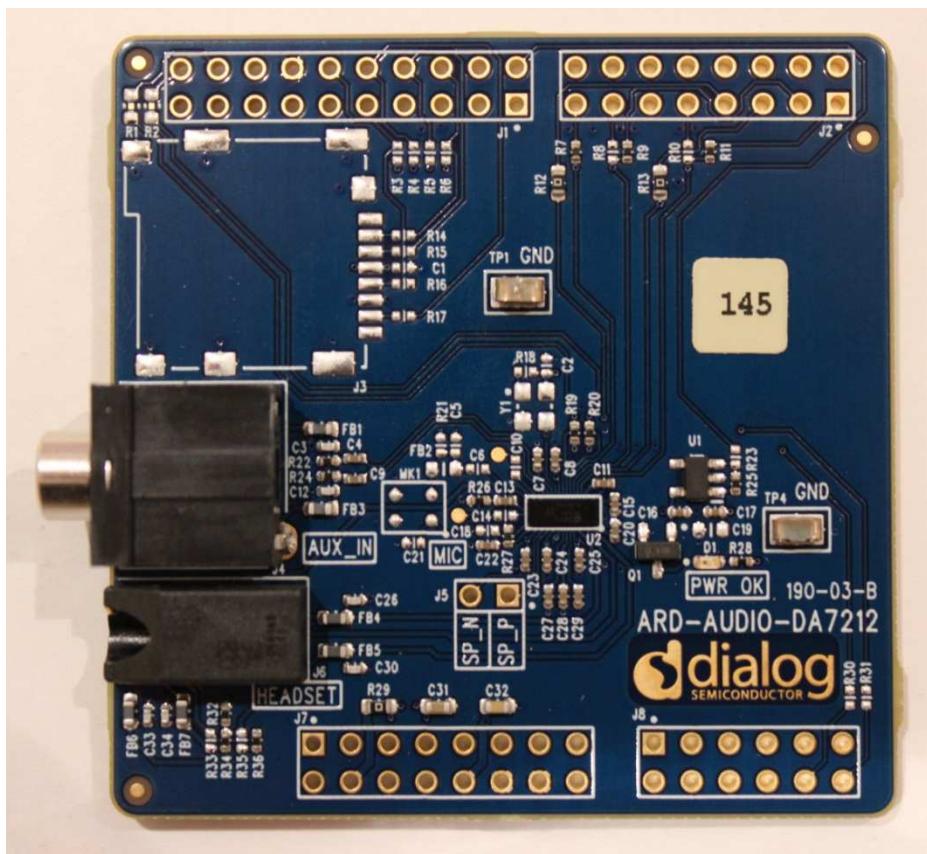


Figure 1: ARD-AUDIO-DA7212

## 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 10KΩ 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](#).

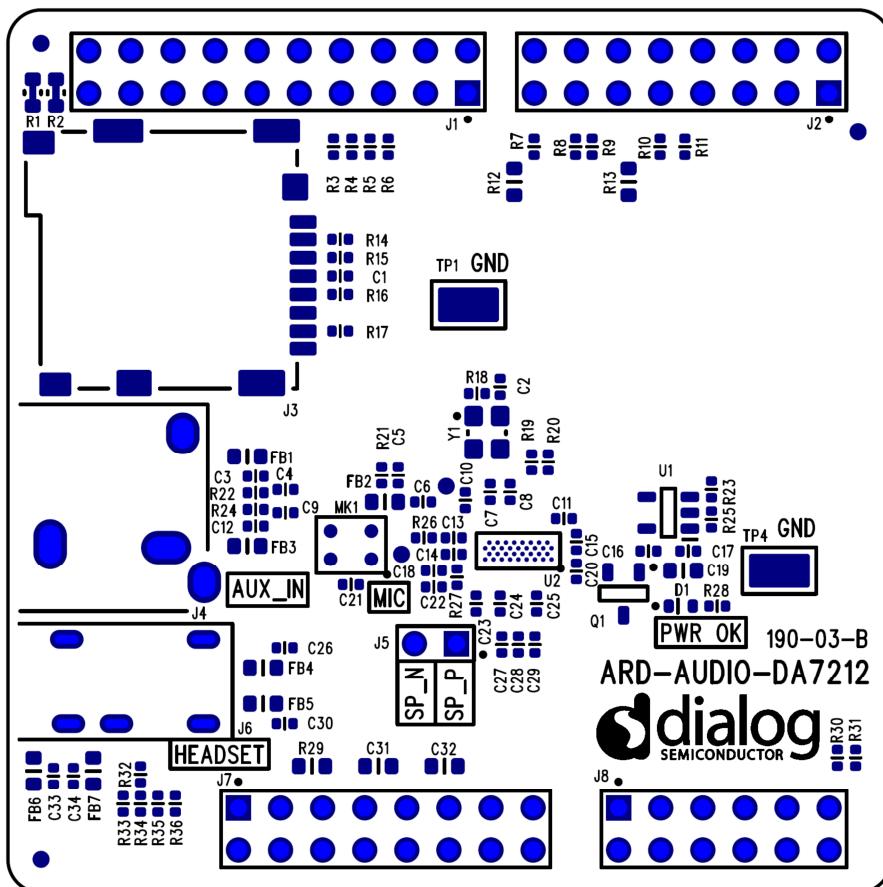


Figure 3 ARD-AUDIO-DA7212 Summary

**Table 2 Connector Summary**

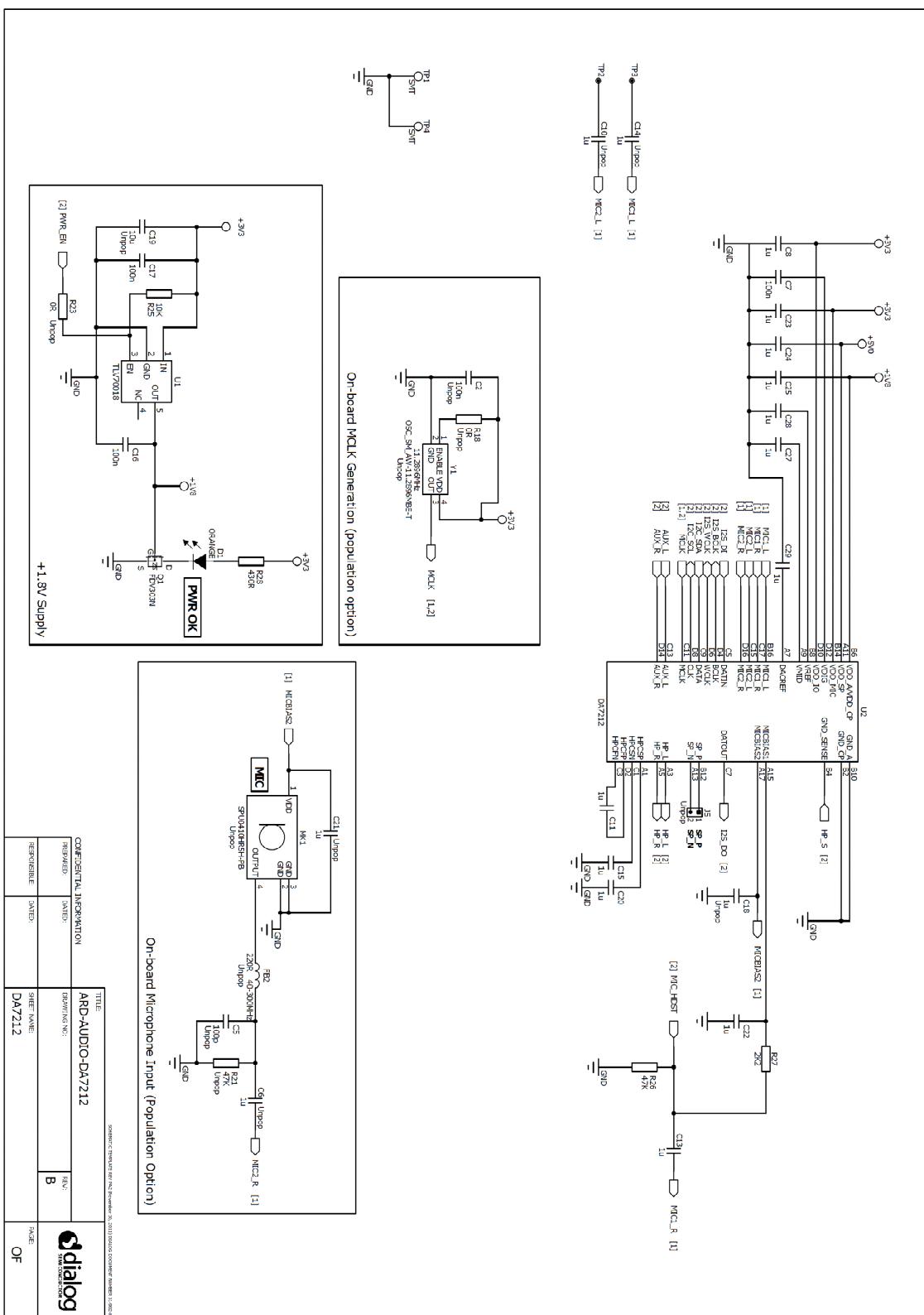
Connector	Functionality	Description
J1	Interconnect (I2C) to the MCU board	Pin 2 = GPIO used to enable regulator U1 [option] Pin 6 = I2S WCLK [option] Pin 8 = I2S DI [option] Pin 10 = I2S DO [option] Pin 12 = I2S BCLK [option] <b>Pin 18 = I2C SDA</b> <b>Pin 20 = I2C SCL</b> Note: All other pins have no connection
J2	Interconnect (I2S) to the MCU board	<b>Pin 1 = I2S BCLK</b> <b>Pin 3 = I2S WCLK</b> <b>Pin 5 = I2S DI</b> <b>Pin 7 = MCLK</b> Pin 9 = I2S BCLK [option] Pin 13 = I2S WCLK [option] 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 [option] Pin 12 = I2C SCL [option] Note: All other pins have no connection
J3	MicroSD card socket <i>[Population Option]</i>	Pin 2 = I2S WCLK [option] Pin 3 = I2S DI [option] Pin 4 = +3V3 Pin 5 = I2S BCLK [option] Pin 6 = 0 V Pin 7 = I2S DO [option] 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**

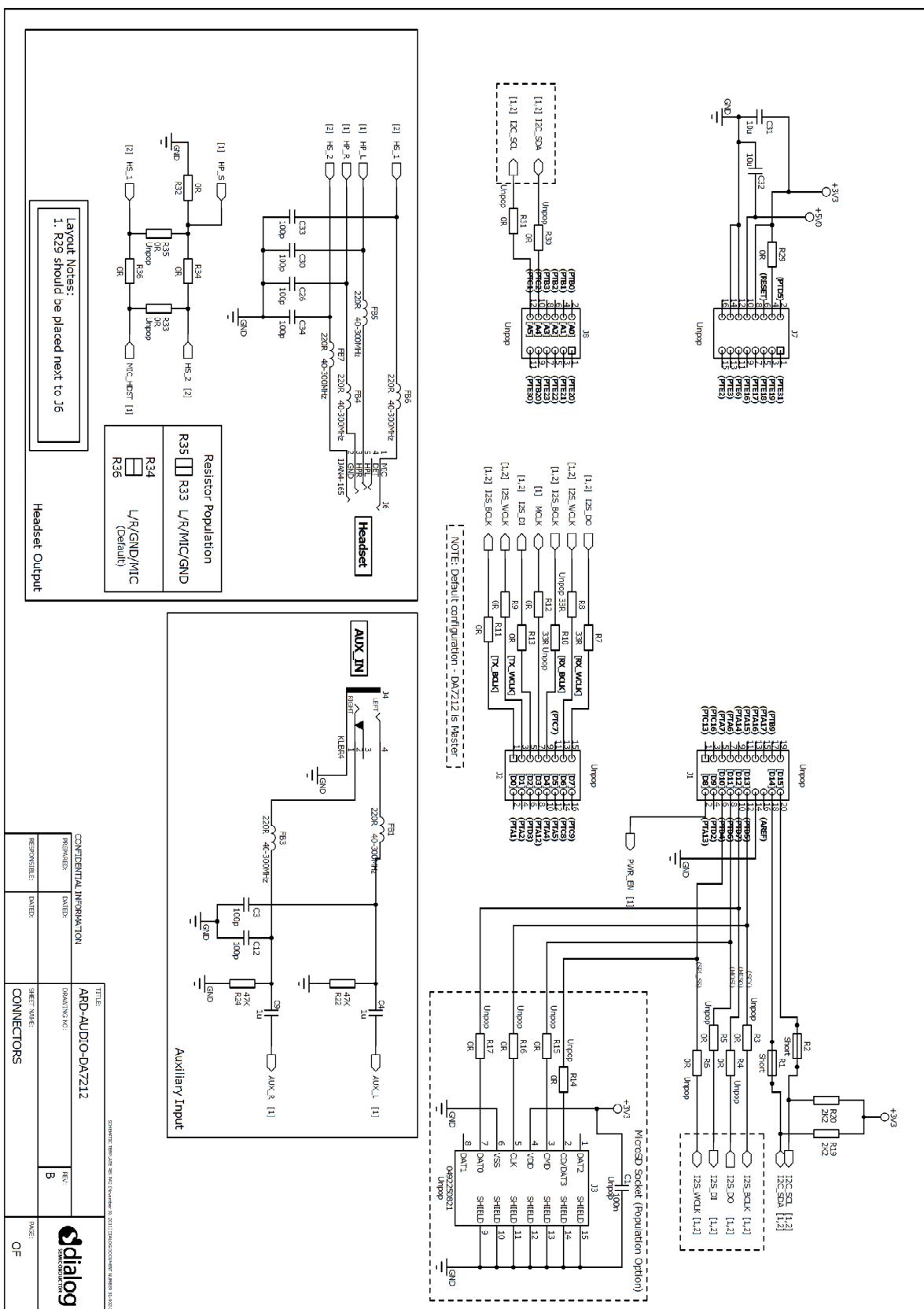


Figure 5 Connectors

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

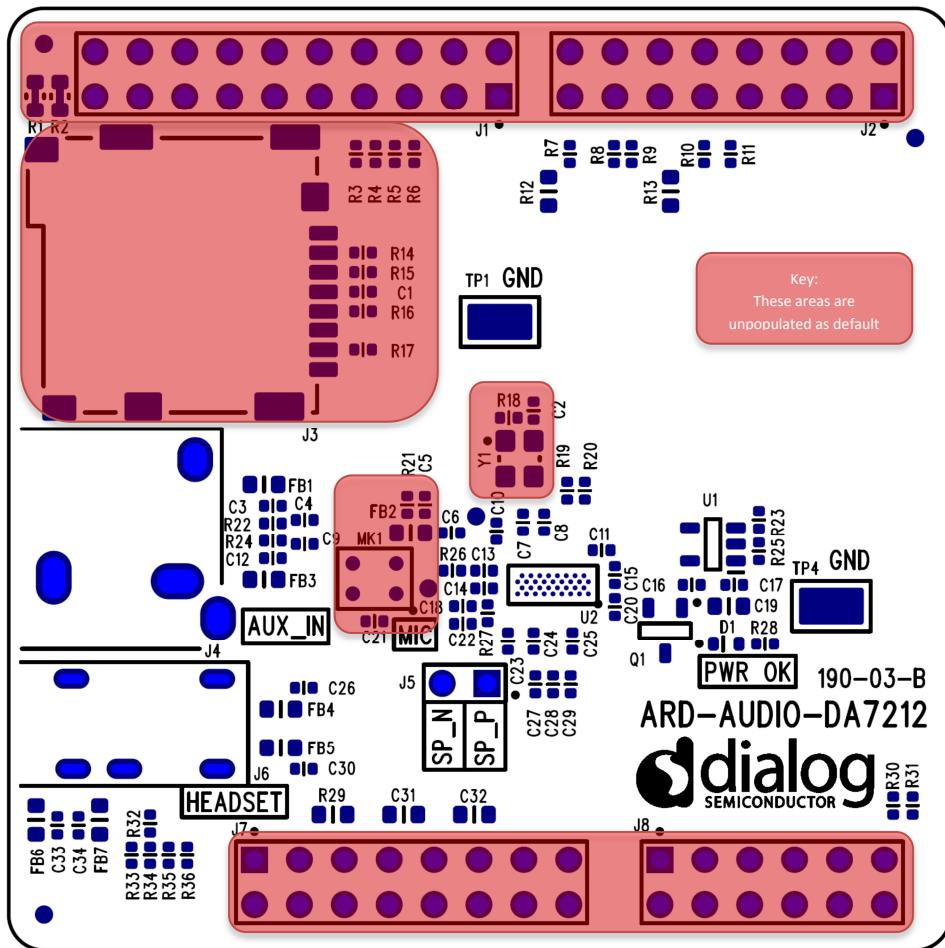


Figure 6 Default Build Overview

## 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

## ARD-AUDIO-DA7212 Audio Shield

Company confidential

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	OR	Unpop	Yageo	RC0402JR-070RL
R15	0402 (1005 Metric) SMD Resistor	OR	Unpop	Yageo	RC0402JR-070RL
R16	0402 (1005 Metric) SMD Resistor	OR	Unpop	Yageo	RC0402JR-070RL
R17	0402 (1005 Metric) SMD Resistor	OR	Unpop	Yageo	RC0402JR-070RL
R18	0402 (1005 Metric) SMD Resistor	OR	Unpop	Yageo	RC0402JR-070RL
R23	0402 (1005 Metric) SMD Resistor	OR	Unpop	Yageo	RC0402JR-070RL
R3	0402 (1005 Metric) SMD Resistor	OR	Unpop	Yageo	RC0402JR-070RL
R30	0402 (1005 Metric) SMD Resistor	OR	Unpop	Yageo	RC0402JR-070RL
R31	0402 (1005 Metric) SMD Resistor	OR	Unpop	Yageo	RC0402JR-070RL
R33	0402 (1005 Metric) SMD Resistor	OR	Unpop	Yageo	RC0402JR-070RL
R35	0402 (1005 Metric) SMD Resistor	OR	Unpop	Yageo	RC0402JR-070RL
R4	0402 (1005 Metric) SMD Resistor	OR	Unpop	Yageo	RC0402JR-070RL
R5	0402 (1005 Metric) SMD Resistor	OR	Unpop	Yageo	RC0402JR-070RL
R6	0402 (1005 Metric) SMD Resistor	OR	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

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
1.1	20-Jan-2022		Updated logo, disclaimer, copyright.

### 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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### Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,  
Koto-ku, Tokyo 135-0061, Japan  
[www.renesas.com](http://www.renesas.com)

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