# TAS5404Q1EVM User's Guide

## 1 Introduction

This user's guide describes the operation of the TAS5404Q1EVM. The TAS5404Q1EVM utilizes the PurePath Console 3 graphical user interface with the TAS5404Q1EVM plugin.

## 2 Hardware Overview

The hardware consists of two pcbs that are soldered together through a dual row connector. The main board incorporates a TAS1020B for the USB interface through a micro USB connector. A 3.3-Vdc linear regulator provides 3.3 Vdc for the system. The TAS1020B converts the USB protocol to the appropriate $I^2C$ address and data. The audio signals are provided through the 3.5-mm female jacks. There are two jumpers, J3 and J4 to short the two 3.5-mm jacks so only one stereo pair is needed to provide signal to all four channels of the TAS5404-Q1. Connect the provided USB cable to J9 and the PC. The USB does not provide audio for this EVM.

The power and speaker connections are through the connectors J8 and J5 with screw terminal that accept #22 awg wire. Use two wires for each power connections.

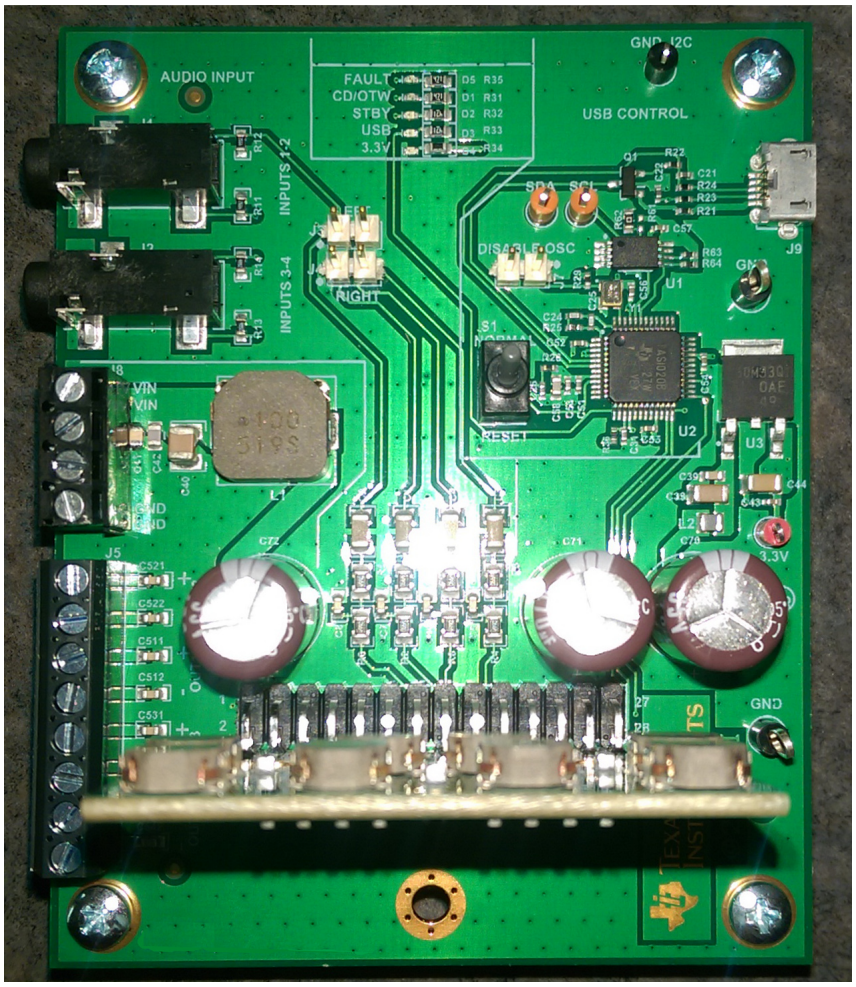


**Figure 1. TAS5404Q1EVM (Heatsink removed for clarity)**

# 3 Graphical User Interface and Connecting

The Graphical User Interface (GUI) utilizes our Purepath Console 3 (PPC3) platform. Download the GUI from http://www.ti.com/tool/PUREPATHCONSOLE.

The TAS5404Q1EVM GUI is downloaded through the PPC3 platform. Any updates will automatically display for download. Connect the PC to the internet to use this function.

Figure 2 displays the GUI. Connect the GUI to the EVM by clicking the “connect” button at the bottom left of interface. Upon a successful connection the small circle will turn green and the “connect” button will disappear.

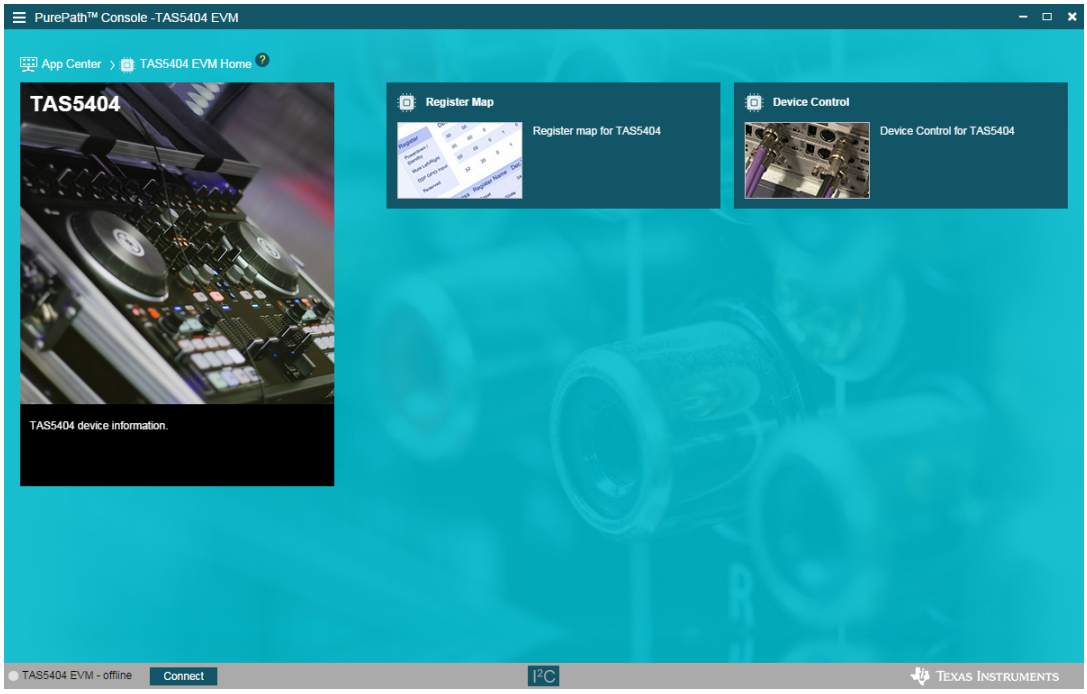


**Figure 2. TAS5404 EVM GUI Home Page**

## *3.1 Register Map Page*

Click on the "Register Map" button on the Home Page to display the register map of the TAS5404-Q1 device. Opening the page reads all registers and populates the registers with the TAS5404-Q1 register defaults.

Figure 3 displays the Register Map Page. Click on the register to display the description in the Fields column. In the Register Map column, the pink values are read only, and the black values can be changed and written to the device. Double click on a black value to change its state and write the value to the device. Reference the TAS5404-Q1 datasheet, SLOS918, for complete descriptions of the registers and their functions.

Click on the “TAS5404 EVM Home” text above the Register Map column to return the Home page.

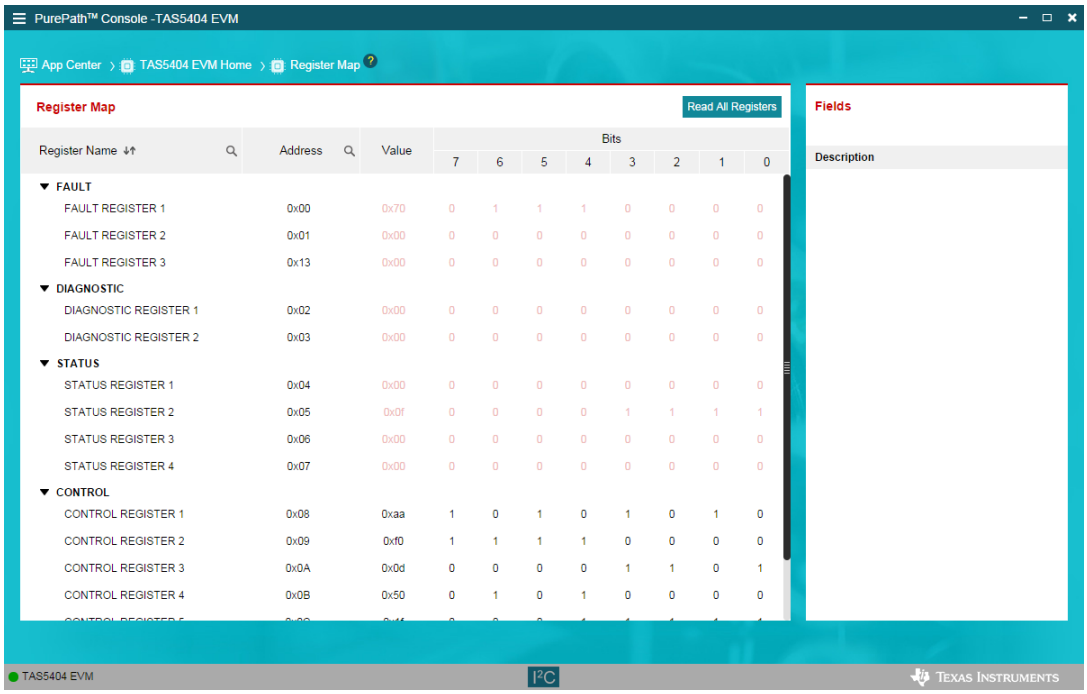


**Figure 3. Register Map Page**

## 3.2 Device Control Page

Enter the Device Control Page by clicking on the Device Control box on the Home Page. The page shown by Figure 4 will display. This page has buttons that control certain functions of the TAS5404-Q1 device.

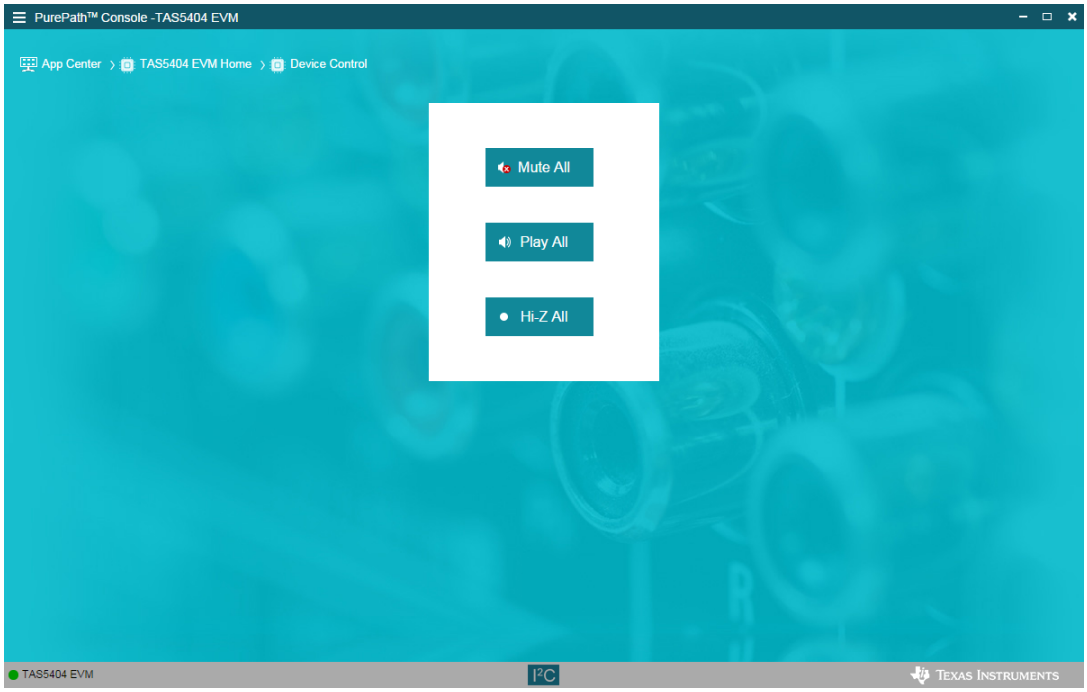


**Figure 4. Device Control Page**

# 4 Board Layouts and Schematics

## 4.1 Main Board Layout

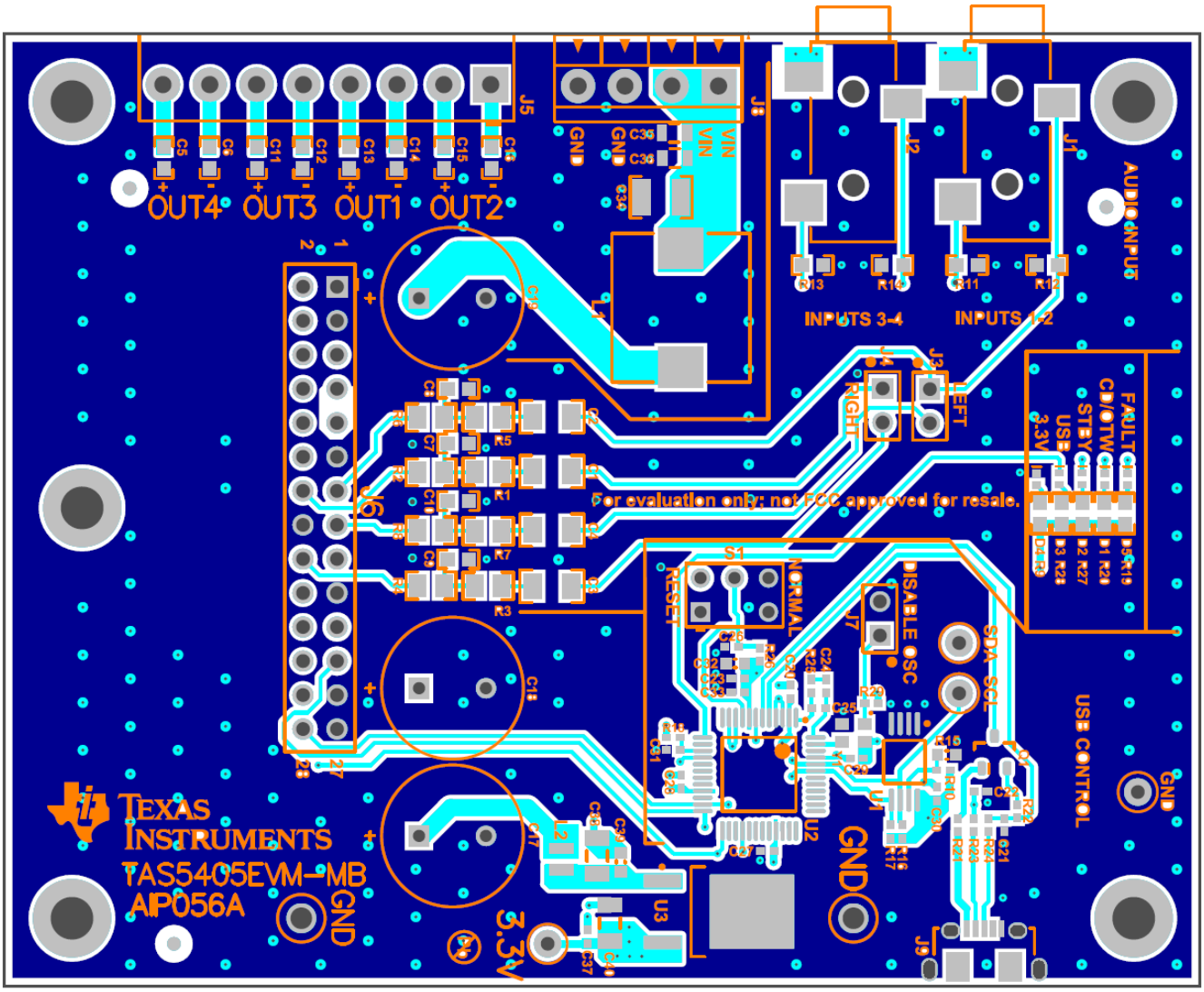


**Figure 5. Main PCB Layout, Top View**

### 4.2 TAS5404 Board Layout

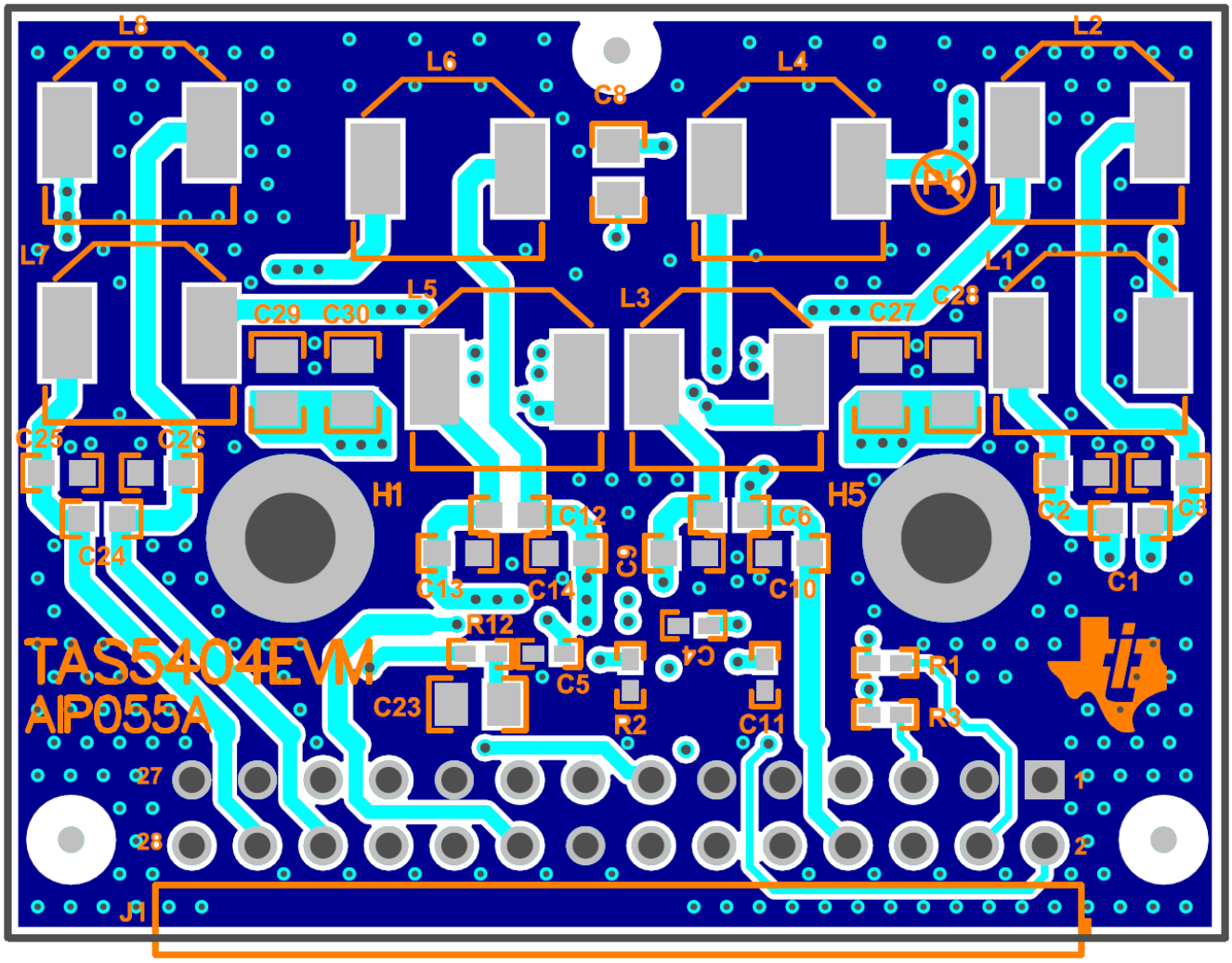


**Figure 6. Amplifier PCB Layout, Top View**

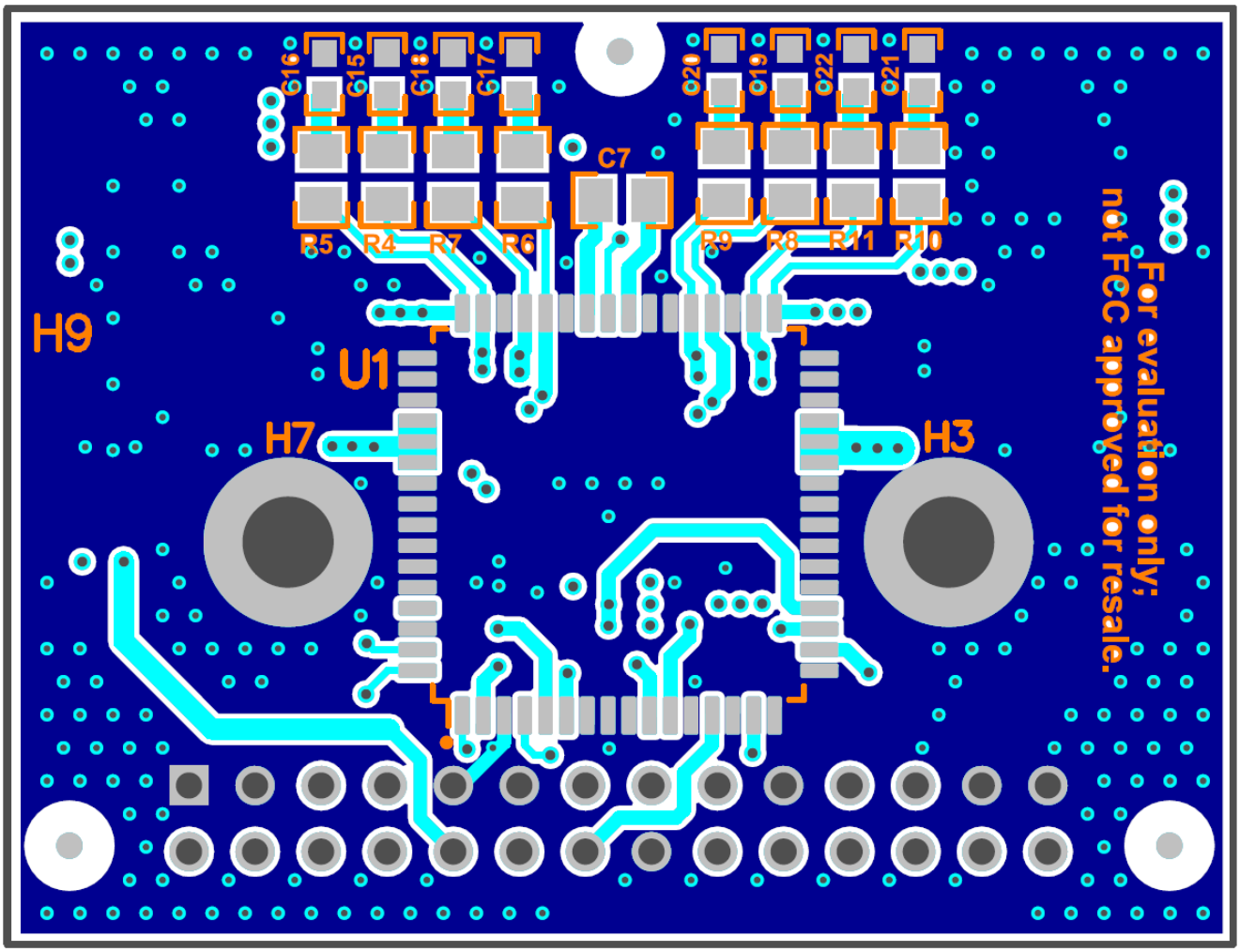


**Figure 7. Amplifier PCB Layout, Bottom View**

## 4.3 Main Board Schematic

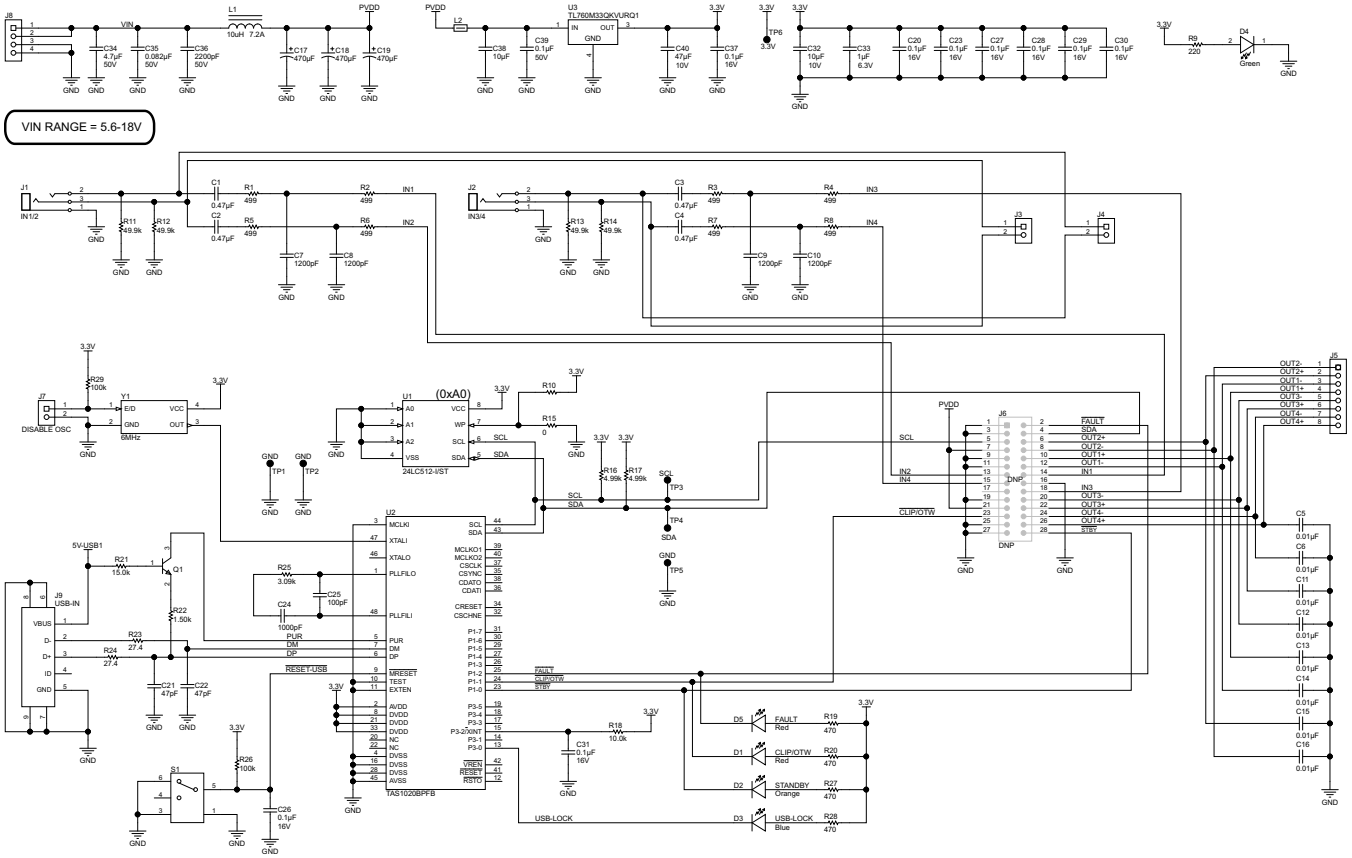


**Figure 8. Main PCB Schematic**

## 4.4 TAS5404 Board Schematic

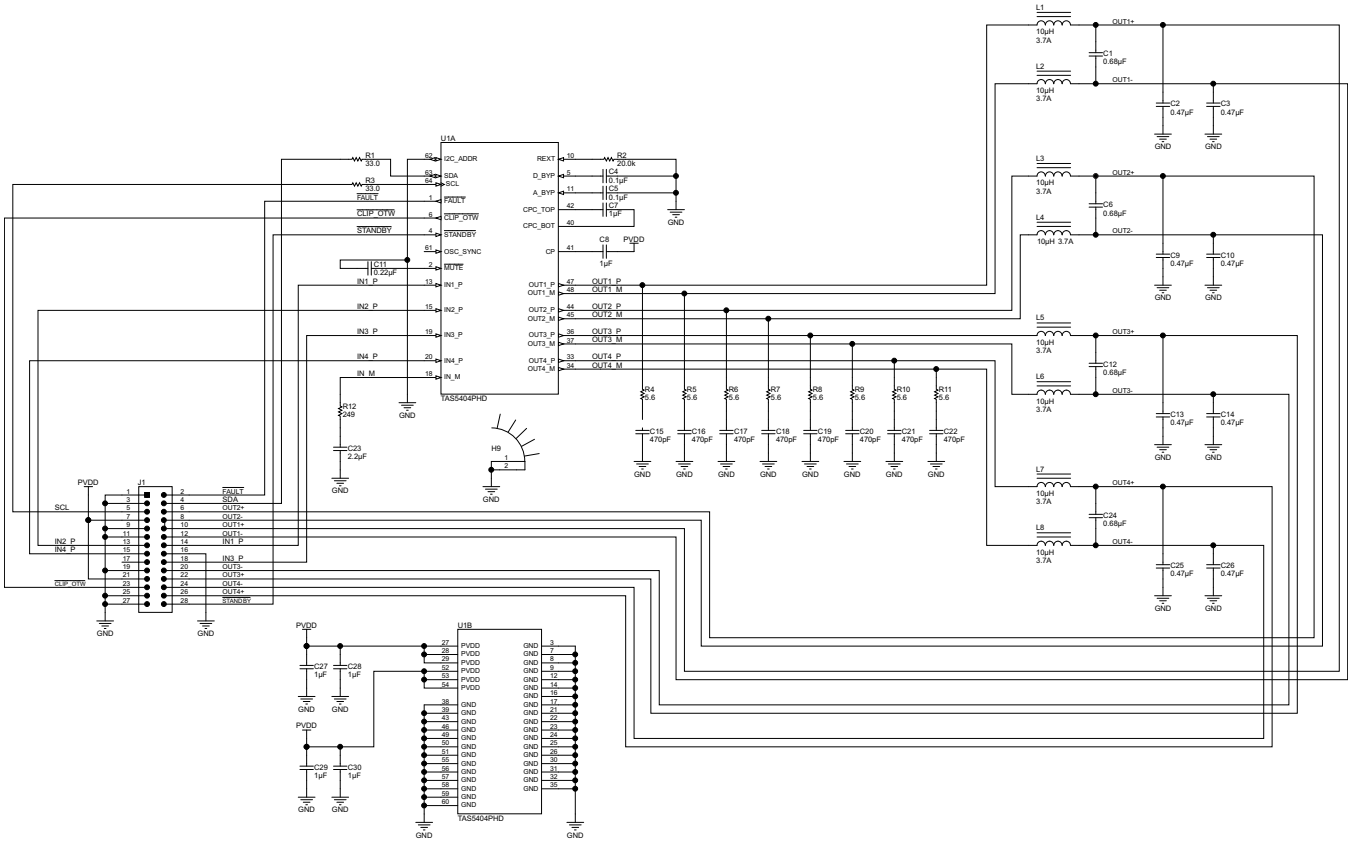


**Figure 9. Amplifier PCB Schematic**

# 5 Bill of Materials

**Table 1. Main PCB, Bill of Materials**

| Designator | Quantity | Value | Description | Package Reference | Part Number | Manufacturer |
|---|---|---|---|---|---|---|
| !PCB | 1 | | Printed Circuit Board | | AIP056 | Any |
| C1, C2, C3, C4 | 4 | 0.47 µF | CAP, CERM, 0.47 µF, 16 V, ± 10%, X7R, 1206 | 1206 | GRM319R71C474KA01D | MuRata |
| C5, C6, C11, C12, C13, C14, C15, C16 | 8 | 0.01 µF | CAP, CERM, 0.01 µF, 25 V, ± 10%, X7R, 0603 | 0603 | GRM188R71E103KA01D | MuRata |
| C7, C8, C9, C10 | 4 | 1200 pF | CAP, CERM, 1200 pF, 50 V, ± 10%, X7R, 0603 | 0603 | GRM188R71H122KA01D | MuRata |
| C17, C18, C19 | 3 | 470 µF | CAP, AL, 470 µF, 35 V, ± 20%, TH | 10 mm × 16 mm | EEU-FR1V471B | Panasonic |
| C20, C23, C26, C27, C28, C29, C30, C31, C37 | 9 | 0.1 µF | CAP, CERM, 0.1 µF, 16 V, ±10%, X7R, 0402 | 0402 | GRM155R71C104KA88D | MuRata |
| C21, C22 | 2 | 47 pF | CAP, CERM, 47 pF, 25 V, ± 5%, C0G/NP0, 0402 | 0402 | GRM1555C1E470JA01D | MuRata |
| C24 | 1 | 1000 pF | CAP, CERM, 1000 pF, 50 V, ± 5%, C0G/NP0, 0402 | 0402 | GRM1555C1H102JA01D | MuRata |
| C25 | 1 | 100 pF | CAP, CERM, 100 pF, 50 V, ± 5%, C0G/NP0, 0402 | 0402 | GRM1555C1H101JA01D | MuRata |
| C32 | 1 | 10 µF | CAP, CERM, 10 µF, 10 V, ± 20%, X5R, 0603 | 0603 | C1608X5R1A106M | TDK |
| C33 | 1 | 1 µF | CAP, CERM, 1 µF, 6.3 V, ± 20%, X5R, 0402 | 0402 | C1005X5R0J105M | TDK |
| C34 | 1 | 4.7 µF | CAP, CERM, 4.7 µF, 50 V, ± 10%, X7R, 1210 | 1210 | GRM32ER71H475KA88L | MuRata |
| C35 | 1 | 0.082 µF | CAP, CERM, 0.082 µF, 50 V, ± 10%, X7R, 0805 | 0805 | 08055C823KAT2A | AVX |
| C36 | 1 | 2200 pF | CAP, CERM, 2200 pF, 50 V, ± 5%, C0G/NP0, 0805 | 0805 | GRM2165C1H222JA01D | MuRata |
| C38 | 1 | 10 µF | CAP, CERM, 10 µF, 35 V, ± 10%, X7R, 1206 | 1206 | GMK316AB7106KL | Taiyo Yuden |
| C39 | 1 | 0.1 µF | CAP, CERM, 0.1 µF, 50 V, ± 10%, X7R, 0603 | 0603 | GCM188R71H104KA57D | MuRata |
| C40 | 1 | 47 µF | CAP, CERM, 47 µF, 10 V, ± 10%, X5R, 1206 | 1206 | GRM31CR61A476KE15L | MuRata |
| D1, D5 | 2 | Red | LED, Red, SMD | LED, 1 mm × 0.2 mm × 0.6 mm | SML-P12UTT86 | Rohm |
| D2 | 1 | Orange | LED, Orange, SMD | Orange LED | SML-P12DTT86 | Rohm |
| D3 | 1 | Blue | LED, Blue, SMD | Blue LED | SMLP12BC7TT86 | Rohm |
| D4 | 1 | Green | LED, Green, SMD | LED, 1 mm × 0.2 mm × 0.6 mm | SML-P12PTT86 | Rohm |
| H1, H2, H3, H4 | 4 | | MACHINE SCREW PAN PHILLIPS 4-40 | Machine Screw, 4-40, 1/4" | PMSSS 440 0025 PH | B&F Fastener Supply |
| H5, H6, H7, H8, H10 | 5 | | HEX STANDOFF 4-40 ALUMINUM 1/4" | HEX STANDOFF 4-40 ALUMINUM 1/4" | 2201 | Keystone |
| H9 | 1 | | MACHINE SCREW PAN PHILLIPS 4-40x1/2" SS | Machine Screw, 4-40, 1/2" | PMS 440 0050 PH | B&F Fastener Supply |
| J1, J2 | 2 | | Audio Jack, 3.5 mm, Stereo, R/A, SMT | Audio Jack SMD | SJ-3523-SMT | CUI Inc. |
| J3, J4, J7 | 3 | | Header, 100 mil, 2 × 1, Tin, TH | Header, 2 PIN, 100 mil, Tin | PEC02SAAN | Sullins Connector Solutions |

**Table 1. Main PCB, Bill of Materials (continued)**

| Designator | Quantity | Value | Description | Package Reference | Part Number | Manufacturer |
|---|---|---|---|---|---|---|
| J5 | 1 | | Terminal Block, 3. 5 mm, 8-Pos, TH | Terminal Block, 3.5 mm, 8-Pos, TH | ED555/8DS | On-Shore Technology |
| J8 | 1 | | Terminal Block, 6 A, 3.5 mm Pitch, 4-Pos, TH | 14 mm × 8.2 mm × 6.5 mm | ED555/4DS | On-Shore Technology |
| J9 | 1 | | Connector, Receptacle, Micro-USB Type AB, R/A, Bottom Mount SMT | Connector, USB Micro AB | DX4R205JJAR1800 | JAE Electronics |
| L1 | 1 | 10 uH | Inductor, Shielded, 10 µH, 7.2 A, 0.027 Ω, SMD | 10.8 mm × 10 mm | DFEG10040D-100M | Toko |
| L2 | 1 | 300 Ω | Ferrite Bead, 300 Ω @ 100 MHz, 3.1 A, 0806 | 0806 | NFZ2MSM301SN10L | MuRata |
| Q1 | 1 | 0.3 V | Transistor, NPN, 40V, 0.15A, SOT-23 | SOT-23 | MMBT2222A | Fairchild Semiconductor |
| R1, R2, R3, R4, R5, R6, R7, R8 | 8 | 499 | RES, 499, 1%, 0.125 W, 0805 | 0805 | CRCW0805499RFKEA | Vishay-Dale |
| R9 | 1 | 220 | RES, 220, 5%, 0.1 W, 0603 | 0603 | CRCW0603220RJNEA | Vishay-Dale |
| R10, R26, R29 | 3 | 100 k | RES, 100k Ω, 1%, 0.063 W, 0402 | 0402 | CRCW04021000KFKED | Vishay-Dale |
| R11, R12, R13, R14 | 4 | 49.9 k | RES, 49.9 k, 1%, 0.1 W, 0603 | 0603 | CRCW060349K9FKEA | Vishay-Dale |
| R15 | 1 | 0 | RES, 0, 5%, 0.1 W, 0603 | 0603 | CRCW060300000Z0EA | Vishay-Dale |
| R16, R17 | 2 | 4.99 k | RES, 4.99k Ω, 1%, 0.063 W, 0402 | 0402 | CRCW04024K99FKED | Vishay-Dale |
| R18 | 1 | 10.0 k | RES, 10.0 k, 1%, 0.063 W, 0402 | 0402 | CRCW040210K0FKED | Vishay-Dale |
| R19, R20, R27, R28 | 4 | 470 | RES, 470, 5%, 0.1 W, 0603 | 0603 | CRCW0603470RJNEA | Vishay-Dale |
| R21 | 1 | 15.0 k | RES, 15.0k Ω, 1%, 0.063 W, 0402 | 0402 | CRCW040215K0FKED | Vishay-Dale |
| R22 | 1 | 1.50 k | RES, 1.50k Ω, 1%, 0.063 W, 0402 | 0402 | CRCW04021K50FKED | Vishay-Dale |
| R23, R24 | 2 | 27.4 | RES, 27.4 Ω, 1%, 0.063 W, 0402 | 0402 | CRCW040227R4FKED | Vishay-Dale |
| R25 | 1 | 3.09 k | RES, 3.09k Ω, 1%, 0.063 W, 0402 | 0402 | CRCW04023K09FKED | Vishay-Dale |
| S1 | 1 | | Switch, SPDT, On-On, 2 Pos, TH | Switch, 7 mm × 4.5 mm | 200USP1T1A1M2RE | E-Switch |
| SH1, SH2 | 2 | 1 × 2 | Shunt, 100 mil, Gold plated, Black | Shunt | 969102-0000-DA | 3M |
| TP1, TP2 | 2 | Black | Test Point, Multipurpose, Black, TH | Black Multipurpose Testpoint | 5011 | Keystone |
| TP3, TP4 | 2 | Orange | Test Point, Miniature, Orange, TH | Orange Miniature Testpoint | 5003 | Keystone |
| TP5 | 1 | Black | Test Point, Miniature, Black, TH | Black Miniature Testpoint | 5001 | Keystone |
| TP6 | 1 | Red | Test Point, Miniature, Red, TH | Red Miniature Testpoint | 5000 | Keystone |
| U1 | 1 | | EEPROM, 512 KBIT, 400 KHZ, 8TSSOP | TSSOP-8 | 24LC512-I/ST | Microchip |
| U2 | 1 | TAS1020BPFB | IC, USB Streaming Controller | PQFP48 | TAS1020BPFB | TI |

**Table 1. Main PCB, Bill of Materials (continued)**

| Designator | Quantity | Value | Description | Package Reference | Part Number | Manufacturer |
|---|---|---|---|---|---|---|
| U3 | 1 | | Single Output Automotive LDO, 500 mA, Fixed 3.3 V Output, 3.8 to 26 V Input, 3-pin PFM (KVU), –40 to 125 degC, Green (RoHS& no Sb/Br) | KVU0003A | TL760M33QKVURQ1 | Texas Instruments |
| Y1 | 1 | | Oscillator, 6 MHz, 3.3 V, SMD | 2.5 mm × 1 mm × 2.5 mm | 625L3I006M00000 | CTS Electrocomponents |
| FID1, FID2, FID3 | 0 | | Fiducial mark. There is nothing to buy or mount. | Fiducial | N/A | N/A |
| J6 | 0 | | Receptacle, 2.54 mm, 14 × 2, Tin, TH | Receptacle, 2.54 mm, 14 × 2, TH | PPTC142LFBN-RC | Sullins Connector Solutions |

**Table 2. Amplifier PCB, Bill of Materials**

| Designator | Quantity | Value | Description | Package Reference | Part Number | Manufacturer |
|---|---|---|---|---|---|---|
| !PCB1 | 1 | | Printed Circuit Board | | AIP055 | Any |
| C1, C6, C12, C24 | 4 | 0.68 µF | CAP, CERM, 0.68 µF, 10 V, ± 10%, X7R, 0603 | 0603 | GRM188R71A684KA61D | MuRata |
| C2, C3, C9, C10, C13, C14, C25, C26 | 8 | 0.47 µF | CAP, CERM, 0.47 µF, 25 V, ± 10%, X7R, 0603 | 0603 | GRM188R71E474KA12D | MuRata |
| C4, C5 | 2 | 0.1 µF | CAP, CERM, 0.1 µF, 16 V, ± 10%, X7R, 0402 | 0402 | GRM155R71C104KA88D | MuRata |
| C7, C8, C27, C28, C29, C30 | 6 | 1 µF | CAP, CERM, 1 µF, 50 V, ± 10%, X7R, 0805 | 0805 | C2012X7R1H105K125AB | TDK |
| C11 | 1 | 0.22 µF | CAP, CERM, 0.22 µF, 16 V, ± 10%, X7R, 0402 | 0402 | GRM155R71C224KA12D | MuRata |
| C15, C16, C17, C18, C19, C20, C21, C22 | 8 | 470 pF | CAP, CERM, 470 pF, 50 V, ± 5%, C0G/NP0, 0603 | 0603 | GRM1885C1H471JA01D | MuRata |
| C23 | 1 | 2.2 µF | CAP, CERM, 2.2 µF, 10 V, ± 10%, X7R, 0805 | 0805 | GRM21BR71A225KA01L | MuRata |
| H1, H5 | 2 | | MACHINE SCREW PAN PHILLIPS 4-40 × 1/2" SS | Machine Screw, 4-40, 1/2" | PMS 440 0050 PH | B&F Fastener Supply |
| H2, H6 | 2 | | Nut, Hex, 1/4" Thick, #4-40 | | HNSS440 | B&F Fastener Supply |
| H3, H7 | 2 | | Flat Nylon Washer #4 120 mil x 250 mil | Keystone_3348 | 3348 | Keystone |
| H4, H8 | 2 | | Lock Washer, Internal Tooth, #4, Steel | | INTLWSS 004 | B&F Fastener Supply |
| H9 | 1 | | Aluminum Heat Sink Bar for TAS54xxEVM Board | Aluminum Heat Sink Bar for TAS54xxEVM Boards | HEATSINK_TAS54XXPHD | Texas Instruments |
| H10 | 1 | | TAS5404Q1EVM-MB (AIP055), Mother Board for TAS5404Q1EVM | Used in PnP output and some BOM reports | TAS5404Q1EVM-MB | Texas Instruments |
| J1 | 1 | | Header, 2.54 mm, 14 × 2, Gold, R/A, TH | Header, 2.54 mm, 14 × 2, R/A, TH | PRPC014DBAN-M71RC | Sullins Connector Solutions |
| L1, L2, L3, L4, L5, L6, L7, L8 | 8 | 10 uH | Inductor, Shielded, Metal Composite, 10 µH, 3.7 A, 0.07 Ω, SMD | 7 mm × 6.6 mm | DFEG7030D-100M | Toko |
| R1, R3 | 2 | 33 | RES, 33, 5%, 0.063 W, 0402 | 0402 | CRCW040233R0JNED | Vishay-Dale |
| R2 | 1 | 20.0 k | RES, 20.0 k, 1%, 0.063 W, 0402 | 0402 | CRCW040220K0FKED | Vishay-Dale |
| R4, R5, R6, R7, R8, R9, R10, R11 | 8 | 5.6 | RES, 5.6, 5%, 0.125 W, 0805 | 0805 | CRCW08055R60JNEA | Vishay-Dale |
| R12 | 1 | 249 | RES, 249, 1%, 0.063 W, 0402 | 0402 | CRCW0402249RFKED | Vishay-Dale |
| U1 | 1 | | Four-Channel Automotive Digital Amplifiers, PHD0064B | PHD0064B | TAS5404PHD | Texas Instruments |
| FID1, FID2, FID3, FID4, FID5, FID6 | 0 | | Fiducial mark. There is nothing to buy or mount. | Fiducial | N/A | N/A |

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