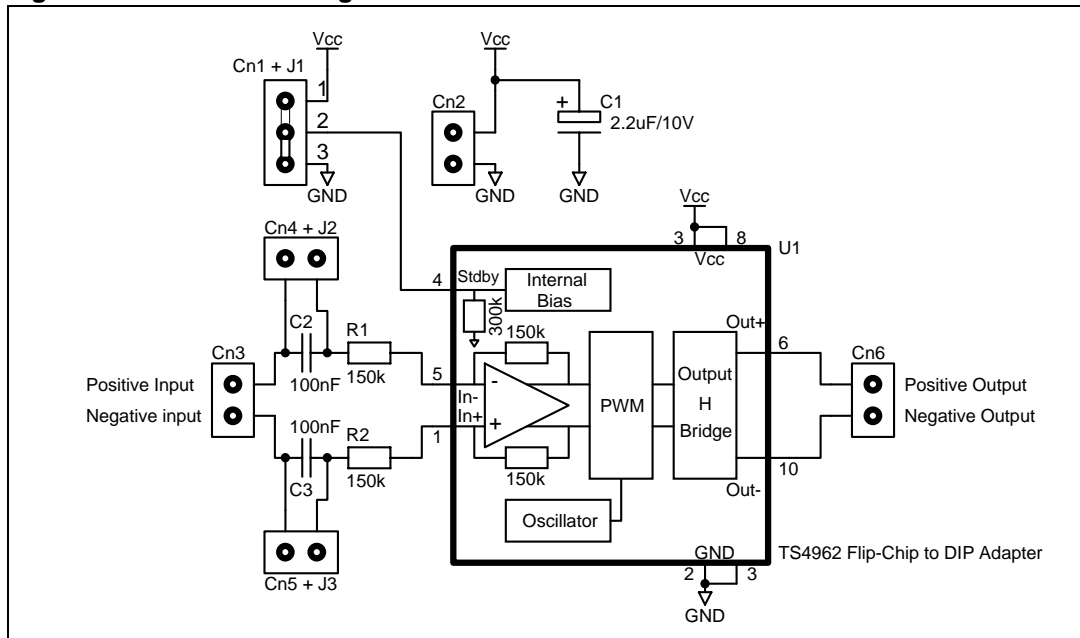


Introduction

The mono class D demo board is designed for the TS4962M class D audio amplifier. The TS4962M device, in a flip-chip package, is mounted on an adapter board with DIP connectors (see [Section 5: Flip-chip to DIP adapter on page 5](#)) which is, in turn, mounted on the demo board. [Figure 1](#) shows the schematic diagram of the demo board, including the flip-chip to DIP adapter.

Figure 1. Schematic diagram of mono class D demo board



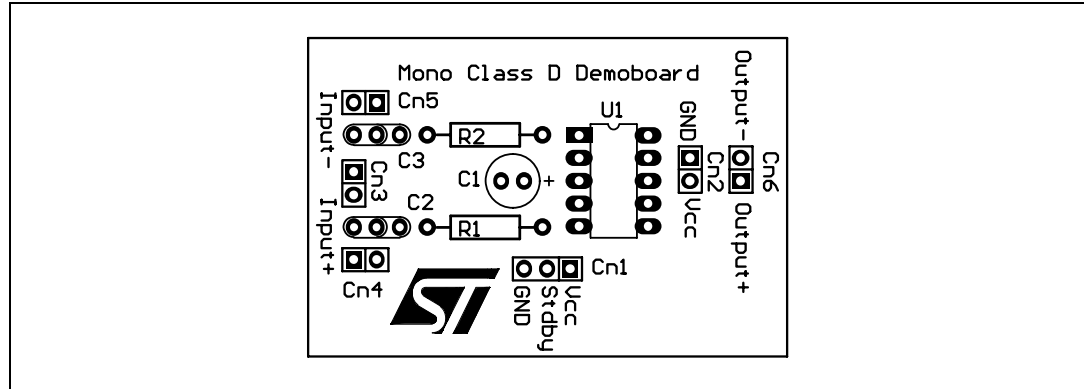
About the TS4962M

- Low voltage class D differential audio power amplifier with standby mode
- Operating range from $V_{CC}=2.4V$ to $5.5V$
- $2.3W$ output power @ $V_{CC}=5V$, THD=1%, $F=1kHz$, with 4Ω load
- $1.4W$ output power @ $V_{CC}=5V$, THD=1%, $F=1kHz$, with 8Ω load
- Ultra low power consumption in standby mode (10nA)
- 63dB PSRR @ 217Hz in grounded mode ($A_V=2V/V$)
- Low pop & click
- Fast startup time 5ms
- Module gain set at $2V/V$
- Thermal and short-circuit protection

1 Description of the demo board

Figure 2 shows the top view of the demo board PCB, with the location of all connectors.

Figure 2. Mono class D demo board - top view



A list of components mounted on the demo board is given in Table 1.

Table 1. Mono class D demo board bill of materials

| Name | Quantity | Description |
|----------|----------|-----------------------------------|
| C1 | 1 | 2.2μF/10V, electrolytic capacitor |
| C2 | 1 | 100nF/63V |
| C3 | 1 | 100nF/63V |
| Cn1 | 1 | 3 pins header 2.54mm pitch |
| Cn2 | 1 | 2 pins header 2.54mm pitch |
| Cn3 | 1 | 2 pins header 2.54mm pitch |
| Cn4 | 1 | 2 pins header 2.54mm pitch |
| Cn5 | 1 | 2 pins header 2.54mm pitch |
| Cn6 | 1 | 3 pins header 2.54mm pitch |
| J1 to J3 | 4 | Jumper, 2.54mm pitch |
| R1 | 1 | 150kΩ, 1/4W 1% resistor |
| R2 | 1 | 150kΩ, 1/4W 1% resistor |
| U1 | 1 | TS4962M flip-chip to DIP adapter |

Table 2 gives the list of the connectors on the demo board, with a description and configuration information for each one.

2 Demo board connectors

Table 2. Demo board connectors

| Connectors | Description |
|-------------|---|
| Cn4 | Input signal connector (active input signal positive and negative) |
| Cn4 and Cn5 | Connectors to modify input configuration (from capacitor-coupled = no jumper to common mode feedback = short-circuit) |
| Cn6 | Output signal connector (Vo+ and Vo-) |
| Cn1 | Standby control connector (GND, Standby, V _{CC}). |
| Cn2 | Power connector (V _{CC} and GND). Power supply voltage from 2.4V to 5.5V. |
| U1 | Socket connector for flip-chip to DIP adapter |

Caution: When you apply the power supply through Cn2, **do not** invert the polarity because it would destroy the amplifier U1.

3 Demo board layout

Figure 3 and *Figure 4* show the bottom and top layers of the demo board PCB.

Figure 3. PCB bottom layer

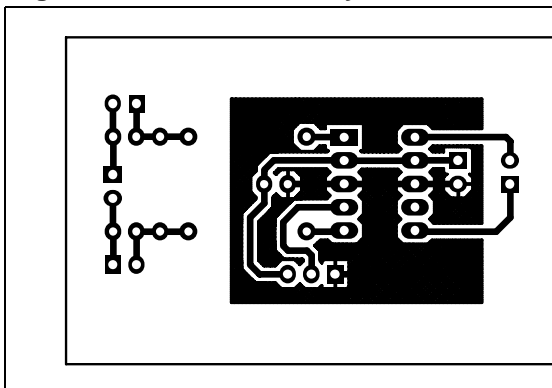
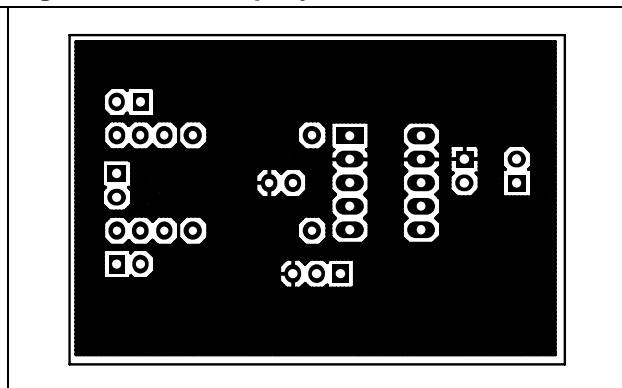


Figure 4. PCB top layer



4 Configuring the demo board characteristics

4.1 Differential gain

The demo board is set up with the differential gain, A_v , set to 2V/V.

If necessary, the differential gain can be adapted by modifying the values of resistors R1 and R2, in accordance with the following relation:

$$A_v = \frac{300\text{k}\Omega}{R_1} \text{ or } A_v = \frac{300\text{k}\Omega}{R_2}$$

where $R_1=R_2$ in $\text{k}\Omega$

4.2 Input configuration

On the demo board, the Cn4 and Cn5 jumpers allow you to change the input configuration. You can select either **capacitor-coupled** or **common-mode feedback**.

In the **capacitor-coupled** configuration, the -3dB cut-off frequency in Hz is:

$$\frac{1}{2\pi \times R_1 \times C_2} = \frac{1}{2\pi \times R_2 \times C_3}$$

with R in Ohms, C in Farads and where $C_2=C_3$.

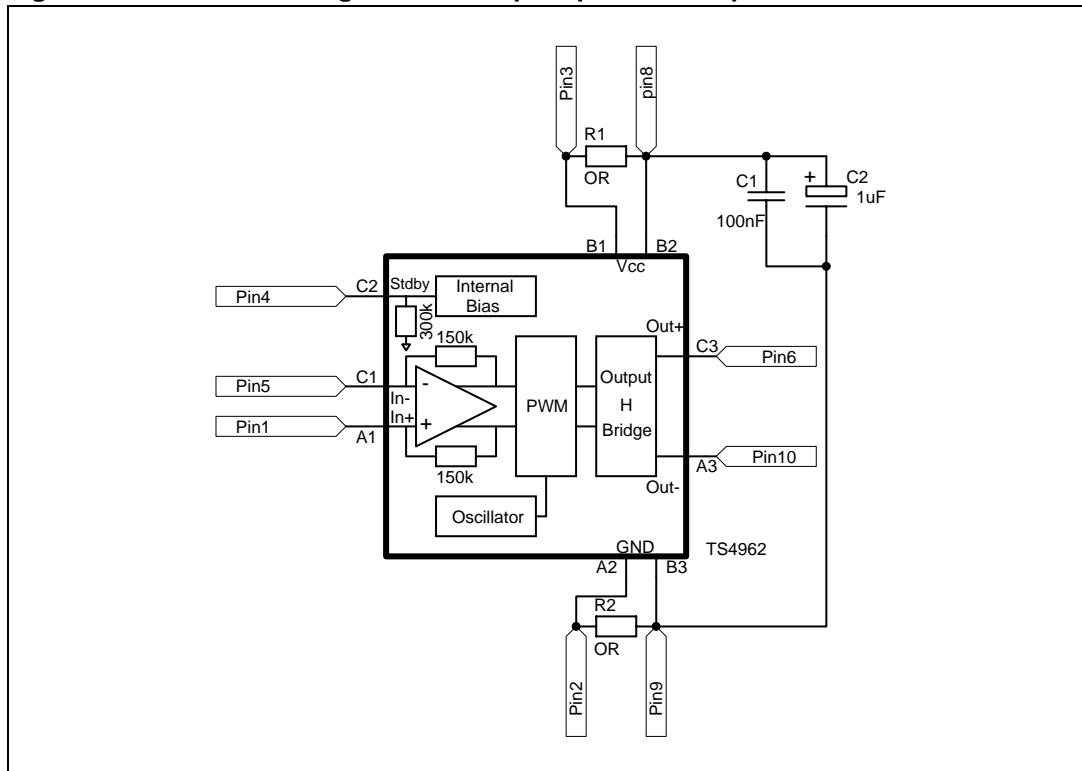
More information about component calculations is available in the TS4962M datasheet.

5 Flip-chip to DIP adapter

The TS4962M is available in a flip-chip package which, while offering the advantages of excellent thermal dissipation and maximum space-savings, is difficult to manipulate for test or evaluation purposes.

For this reason, the TS4962M device is pre-mounted onto a flip-chip to DIP adapter, shown schematically in [Figure 5](#).

Figure 5. Schematic diagram of the flip-chip to DIP adapter

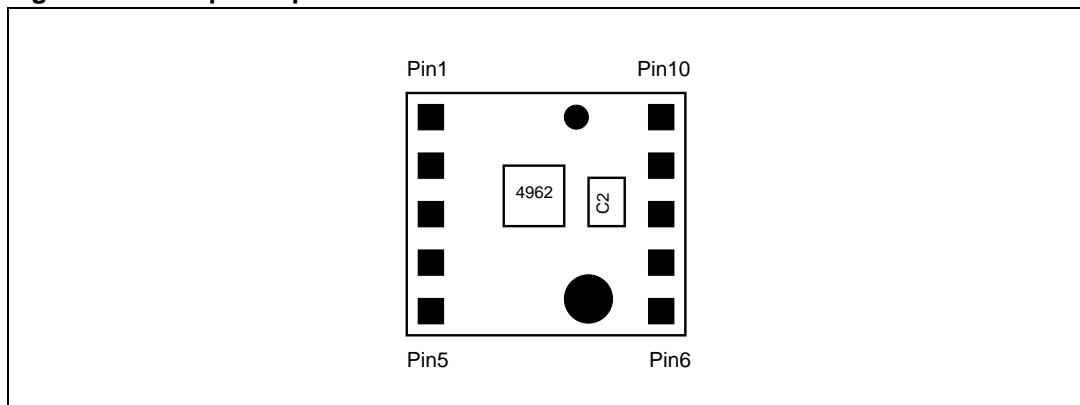


A component list for this adapter is given in [Table 3](#) below. The top-view of the adapter is shown in [Figure 6](#).

Table 3. Flip-chip to DIP adapter bill of materials

| Designation | Quantity | Description |
|-------------|----------|--|
| C1 | 1 | 100nF/10V, ceramic capacitor, 0603 |
| C2 | 1 | 1 μ F/6.3V, Tantalus capacitor, 0805 |
| R1 | 1 | 0R resistor, 0603 |
| R2 | 1 | 0R resistor, 0603 |
| U1 | 1 | TS4962MIJ |

Figure 6. Adapter top view



6 Revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 1-Mar-2005 | 1 | Initial release. |
| 1-Dec-2005 | 2 | Format updated. |
| 6-Feb-2007 | 3 | Updated document structure and format. |
| 27-Feb-2007 | 4 | Removed draft banner, added this revision history. |

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