

General Description

The EV0030 is a 20W stereo evaluation board featuring MPS' MP7720 Class D Single Ended Audio Amplifier. The EV0030 can deliver 20W into a 4Ω load with a 25V input supply.

The MP7720 is a mono 20W Class D Audio Amplifier. It is one of MPS's second generation of fully integrated audio amplifiers which dramatically reduces solution size by integrating the following:

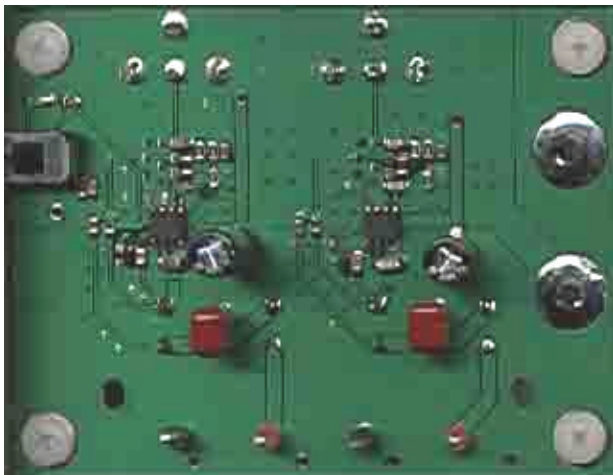
- 180mO power MOSFETs
- Start up / shut down pop elimination
- Short circuit protection circuits
-

The MP7720 utilizes a single ended output structure capable of delivering 20W into 4Ω speakers. As in all other MPS Class D Audio Amplifiers, this device exhibits the high fidelity of a Class A/B amplifier at efficiencies greater than 90%.

Ordering Information

| Board Number | MPS IC Number |
|--------------|---------------|
| EV0030 | MP7720DS |

Figure 1: EV0030 Evaluation Board



Absolute Maximum Ratings

| | |
|-------------------------|------------|
| Supply Voltage V_{DD} | 28V |
| Signal Input Voltage | ±2V p-p |
| Enable Voltage | -0.3 to 6V |

Recommended Operating Conditions

| | |
|-------------------------|---------------|
| Input Voltage V_{DD} | 7.5V to 24V |
| Signal Input Voltage | ±1V rms |
| Signal Input Frequency | 20Hz to 20kHz |
| Signal Source Impedance | =600Ω |
| External Enable Input | 0V to 5V |
| Speaker Resistance | 4Ω to 8Ω |

Performance

| | |
|--|-------|
| Maximum Output Power (10% THD, 4Ω) | 20W |
| Maximum Output Power (10% THD, 8Ω) | 10W |
| THD (1kHz, 1W) | 0.06% |
| Power Efficiency ($P_{OUT}=20W$, 4Ω) | 90% |

Features

- 20W Output at 24V Input Into a 4Ω Load
- 0.06% THD+N @ 1W, 1KHz Into 8Ω Load
- 90% Efficiency at 20W
- 600kHz Oscillation Frequency
- Integrated Start-Up and Shut-Down Pop Elimination Circuit
- Thermal Protection
- Undervoltage Lockout
- Integrated 180mΩ Power Switches
- Mute / Standby Mode (Sleep)

Applications

- 5+1 Surround Home Theater Systems
- Televisions
- Home Stereo Systems
- Monitors

Figure 2: EV0030 Stereo Single Ended Schematic

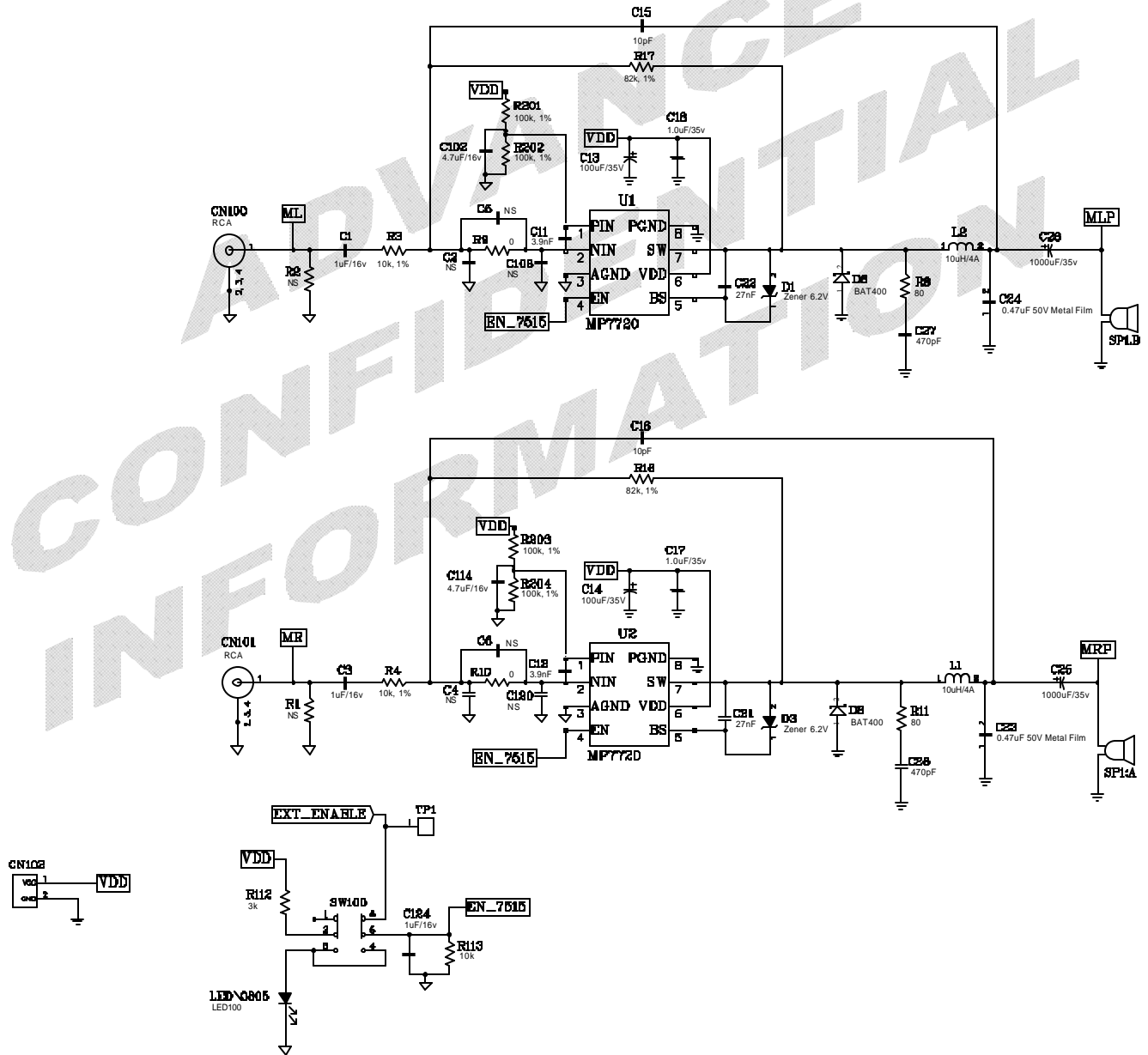


Table 1: EV0030 Bill of Materials

| Component | Part Number | Package | Qty |
|------------------------------|-----------------------------------|--------------|-----------|
| U1, U2 | MP7720DS | SOIC8 | 2 |
| C1, C3 | 1 μ F, 16V, X5R | 0805 | 2 |
| C11, C12 | 5.6nF, 50V, X7R | 0805 | 2 |
| C13, C14 | 100 μ F, 35V, Electrolytic | Radial | 2 |
| C15, C16 | 10pF, 50V, Metal Film | 0805 | 2 |
| C17, C18 | 1 μ F, 35V | 1206 | 2 |
| C21, C22 | 27nF, 50V, X7R | 0805 | 2 |
| C23, C24 | 0.47 μ F, 50V Film | Radial | 2 |
| C25, C26 | 1000 μ F, 35V, Electrolytic | Radial | 2 |
| C102, C114 | 4.7 μ F, 16V | 0805 | 2 |
| R3, R4 | 10K Ω , 1% | 0805 | 2 |
| R17, R18 | 120K Ω , 1% | 0805 | 2 |
| R201, R202, R203, R204 | 100K Ω , 1% | 0805 | 4 |
| L1, L2 | 10 μ H, 4A, Toko 13BHB-A7502H | Radial | 2 |
| D1, D3 | BZT52C6V2S -7, 6.2V | SOD323 | 2 |
| D6, D8 | BAT400D-7 | SOT23 | 2 |
| | | Total | 34 |
| * Optional Components | | | |
| SW100 | Double-Pole, Double-Throw | Through-Hole | |
| R8, R11 | 80 Ω , 5% | 0805 | |
| R112 | 3k Ω , 5% | 0805 | |
| R113 | 10k Ω , 5% | 0805 | |
| C27, C28 | 470pF, 50V, X7R | 0603 | |
| C124 | 1 μ F, 16V, X7R | 0805 | |
| LED100 | Red LED | 0605 | |
| CN100, CN101 | RCA Jack | Through-Hole | |
| SP1 | Stereo Speaker Connector | Through-Hole | |

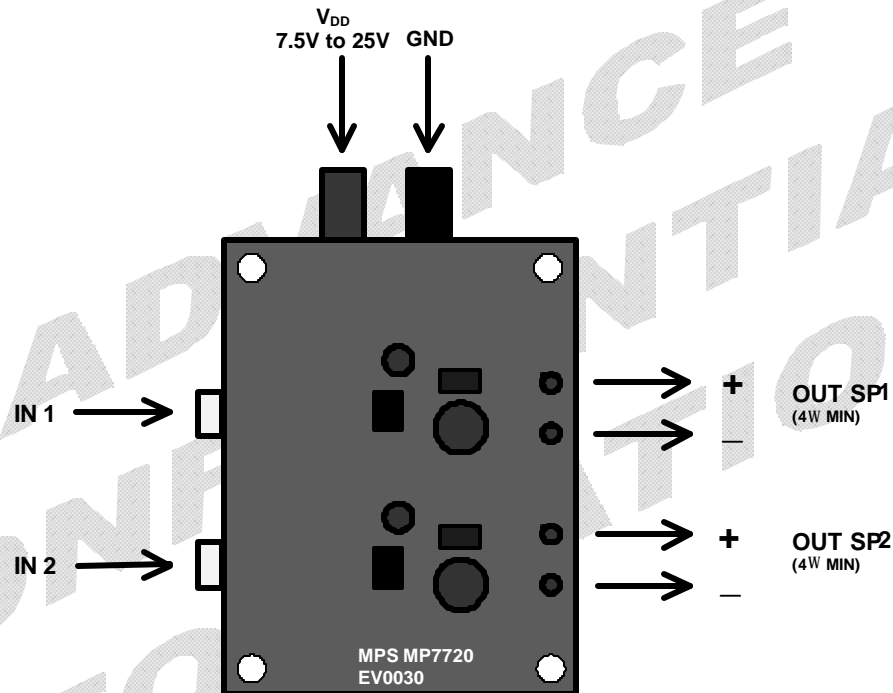
*** Optional Components:**

SW100, R112, R113, C124, and LED100 are used for the Enable/Disable switch function. In a typical system this function comes from another source within the system.

R8, R11, C27, and C28 are used to improve the THD. Without these components mid-power THD increases to between 0.05% and 0.1%.

CN100, 101, and SP1 are input/output connectors and may or may not be required on a per-system basis.

Figure 3: EV0030 Connection Diagram



Evaluation Board Operation

Power Requirements

1. Power supply: 7.5V to 24V, 6A maximum
2. 0V to 1V_{RMS} (max) audio signal source, $\leq 600\Omega$.
3. Speaker: 4 Ω or 8 Ω .

Setup Condition for 24V Operation

1. Connect the outputs to the external speaker.
2. Adjust the power supply to $7.5 \leq V_{DD} \leq 24V$, (do not turn on).
3. Connect the power supply to the V_{DD} terminals.
4. Set the enable switch to the DISABLE position.
5. Connect the audio input signal source to the amplifier inputs (IN1, IN2).
6. Turn on the power supply to apply power to the board.

Music Turn-On Sequence

1. Set the enable switch to the ENABLE position.
2. Audio should be heard from the speaker(s)

Music Turn-Off Sequence

1. Set the enable switch to the DISABLE position.

