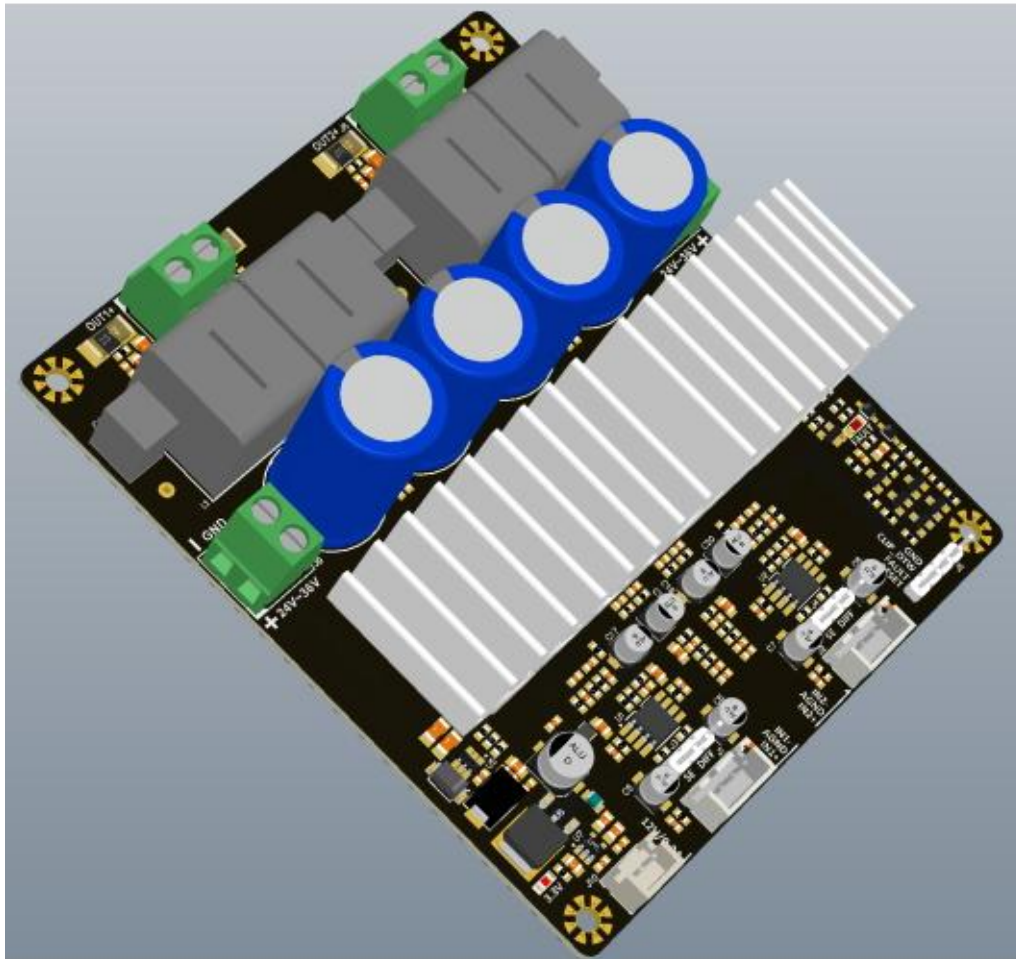


140W x 2 Channel Class D Audio Amplifier Module



Disclaimer

All products, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.

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1. General Description

EAUMT-0140-2-A is a 2 channel (BTL) high quality class D audio amplifier module base on TPA3251 with customized design and mainly suit for both consumer and professional project.

TPA3251 is a high performance class-D power amplifier that enables true premium sound quality with class-D efficiency. It features an advanced integrated feedback design and proprietary high speed gate driver error correction (PurePath™ Ultra-HD). This technology allows ultra low distortion across the audio band and superior audio quality. The device can drive up to 2 x 175 W into 4-Ω load and 2 x 220 W into 3-Ω load.

In addition to excellent audio performance, TPA3251 achieves both high power efficiency and very low power stage idle losses below 1 W. This is achieved through the use of 60 mΩ MOSFETs and an optimized gate driver scheme that achieves significantly lower idle losses than typical discrete implementations.

With improved design to obtain highest performance and lowest noise and distortion, this module provide an excellent audio solution that highly compact and efficiency with state-of-the-art performance.

1.1 Key Features:

- < 65uV Output Noise (AES17,A-weighted)
- 140W @ 1% THD+N, 1kHz, 4Ω
- 175W @ 10% THD+N, 1kHz, 4Ω
- 111dBA dynamic range
- THD+N < 0.01%, 0.2W – 125W, 4Ω
- 90% Efficient Class-D Operation (4 Ω)
- Fully differential layout design for lowest noise and distortion
- Very Compact size(105mm*90mm*36.5mm – L*W*H)
- Additional power ON/OFF reset circuit for Pop noise suppression
- BTL configuration only for best audio performance
- AUX Power Supply Output(12V/0.2A) for DSP Pre Amplifier
- Single supply voltage range 24V~36V(UVP:24V)

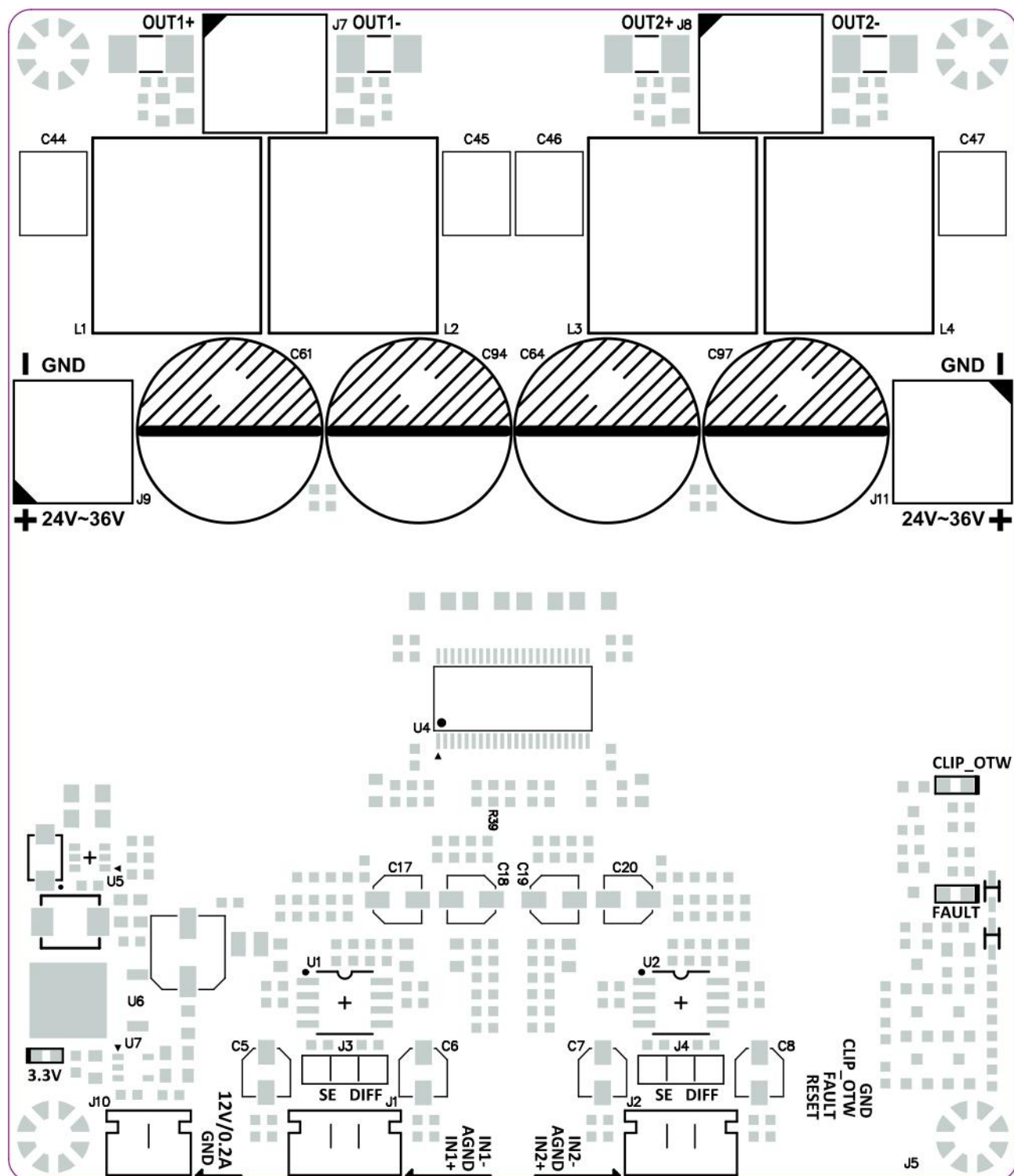
1.2 Applications:

- Active Loudspeakers and Power Subwoofers
- Installation audio products
- High-end stereo and multi-channel amplifiers
- Bluetooth & Wi-Fi Audio Product
- Sound bars, Docking, Radios
- Home Theater System & AVR's

2. Audio Specifications

| Symbol | Parameter | Conditions | Min | Type | Max | Unit |
|---|---|--------------------------------|-----|--------|-------|------|
| P_o.Max | Output power @ 10%THD+N 20Hz < f < 20kHz (AES17 measurement filter) | RL = 3Ω | - | 220 | - | W |
| | | RL = 4Ω | - | 175 | - | |
| | | RL = 8Ω | - | 95 | - | |
| P_o.Type | Output power @ 1%THD+N 20Hz < f < 20kHz (AES17 measurement filter) | RL = 3Ω | - | 175 | - | W |
| | | RL = 4Ω | - | 140 | - | |
| | | RL = 8Ω | - | 75 | - | |
| THD+N | THD+N in 4Ω | f = 1kHz, P _o = 1W | - | 0.005 | 0.007 | % |
| V_{noise} | Output referenced idle noise | A-weighted 20Hz < f < 20kHz | - | 60 | 70 | uV |
| A_v | Nominal voltage gain | f = 1kHz | 19 | 20 | 21 | dB |
| F_r | Frequency response | 20Hz - 20kHz | | +/-0.5 | +/-1 | dB |
| Z_{in} | Input impedance | Balance | - | 20 | - | kΩ |
| | | Unbalance | - | 10 | - | |
| Z_o | Output impedance | f = 1kHz | | 40 | | mΩ |
| Z_L | Load impedance range | | 3 | 4 | 8 | Ω |
| D_y | Dynamic range | 140W@4Ω,A-weighted | 109 | 111 | 112 | dB |
| <i>*An Audio Precision AES17 20 kHz 7th order measurement filter is used for measurements. The frequency 6.67 kHz corresponds to the worst-case situation where both 2nd and 3rd harmonics are within the audio band.</i> | | | | | | |

3. Board Drawing



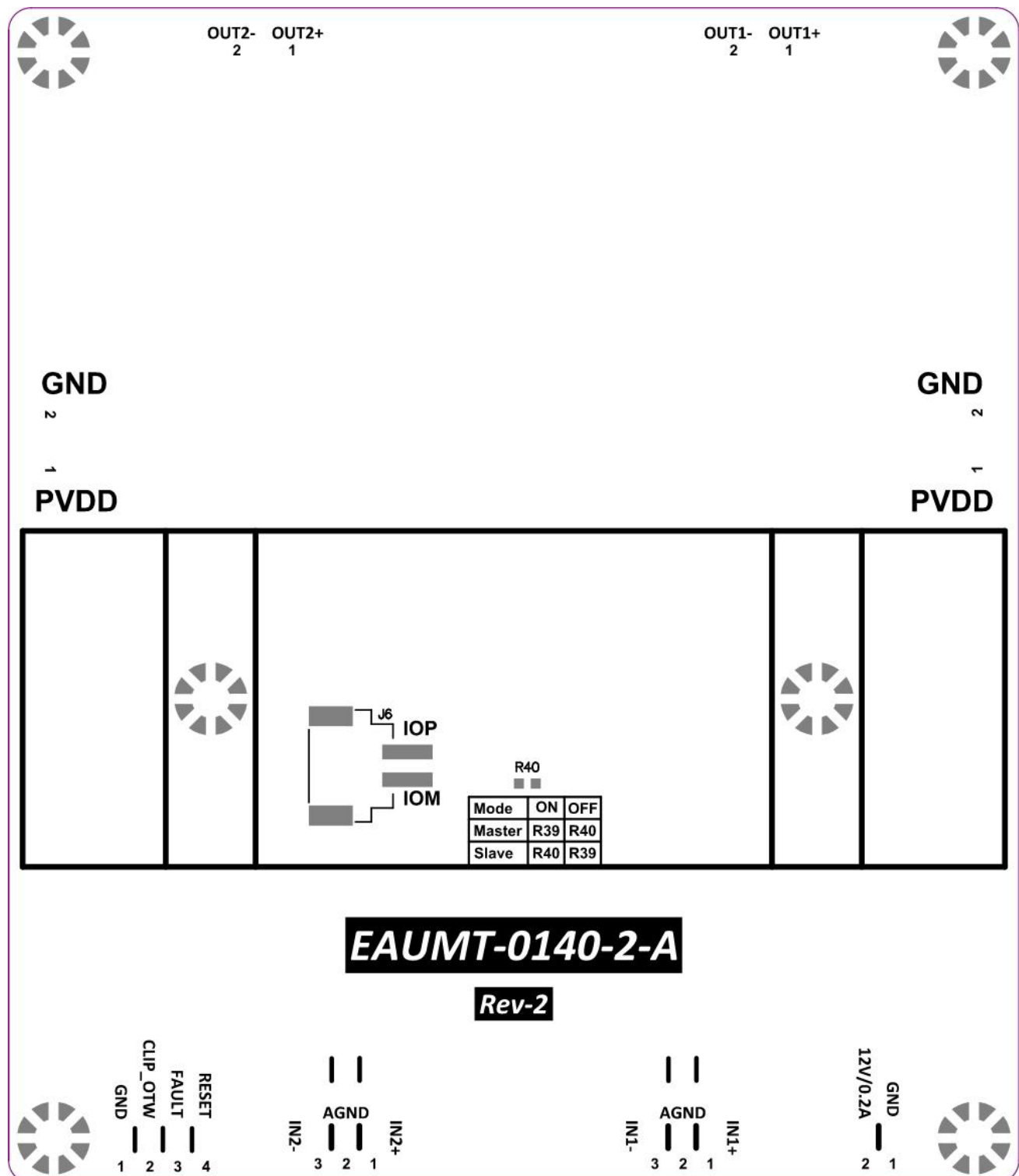


Figure 2: Board Bottom view

4. Connection Diagram

4.1 Input Signal Connector Specification (J1&J2)

| Type: JST2.5-3PIN | | | |
|--|-------------------|---|-------------|
| PIN | Function | Description | I/O Type |
| 1 | IN _x + | Positive input (balanced input or single-end input) | Audio Input |
| 2 | AGND | Ground of the input signal | GND |
| 3 | IN _x - | Negative input (balanced input) | Audio Input |
| <i>*x – mean the channel 1~2,same as below</i> | | | |

4.2 Output Speaker Connector Specification (J7&J8)

| Type: JST5.0-2PIN | | | |
|-------------------|--------------------|------------------------------------|----------|
| PIN | Function | Description | I/O Type |
| 1 | OUT _x + | Positive output of power amplifier | Output |
| 2 | OUT _x - | Negative output of power amplifier | Output |

4.3 Power Supply Input connector Specification (J9&J11)

| Type: JST5.0-2PIN | | | |
|---|---------------|---------------------|----------|
| PIN | Function | Description | I/O Type |
| 1 | PVDD (24~36V) | Power supply Input | Input |
| 2 | GND | Power supply ground | GND |
| <i>*Both J9&J11 are same electrical connection and can be used for multi-board in series connection</i> | | | |

4.4 AUX DC 12V Connector Specification (J10)

| Type: JST2.5-2PIN | | | |
|-------------------|----------------|---------------------|----------|
| PIN | Function | Description | I/O Type |
| 1 | GND | Power supply ground | GND |
| 2 | VCC (12V/0.2A) | Power supply output | Output |

4.5 Control Signal Connector Specification (J5)

| Type: JST2.54-4PIN | | | |
|-------------------------|----------|---|-----------|
| PIN | Function | Description | I/O Type |
| 1 | GND | Control signal ground | GND |
| 2 | CLIP_OTW | Clipping and Over-temperature warning, active low | Output/OD |
| 3 | FAULT | Shutdown signal, active low | Output/OD |
| 4 | RESET | Device reset Input; active low | Input |
| <i>*OD – Open Drain</i> | | | |

4.6 Oscillator Synchronization Interface (J6)

| Type: JST2.5-2PIN | | | |
|---|----------|-------------------------------------|--------------|
| PIN | Function | Description | I/O Type |
| 1 | IOP | Oscillator synchronization positive | Input/Output |
| 2 | IOM | Oscillator synchronization negative | Input/Output |
| <i>*Detail configuration refer to datasheet 10.2.1.2.4 and section 6.Multi Board Configuration</i> <i>*J6 isn't populated default, user should add if multi board are used for setting Master&Slave mode</i> | | | |

5. Typical Performance Characteristics

5.1 Frequency Response

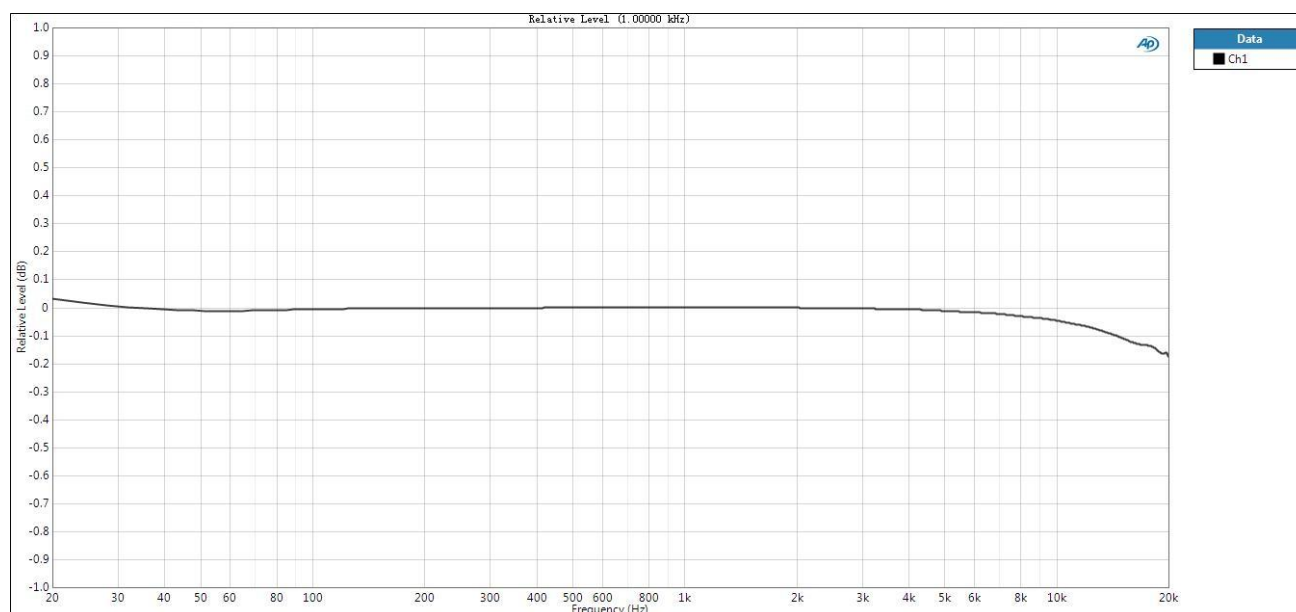


Figure 3: Frequency response in 4Ω

5.2 Output Impedance

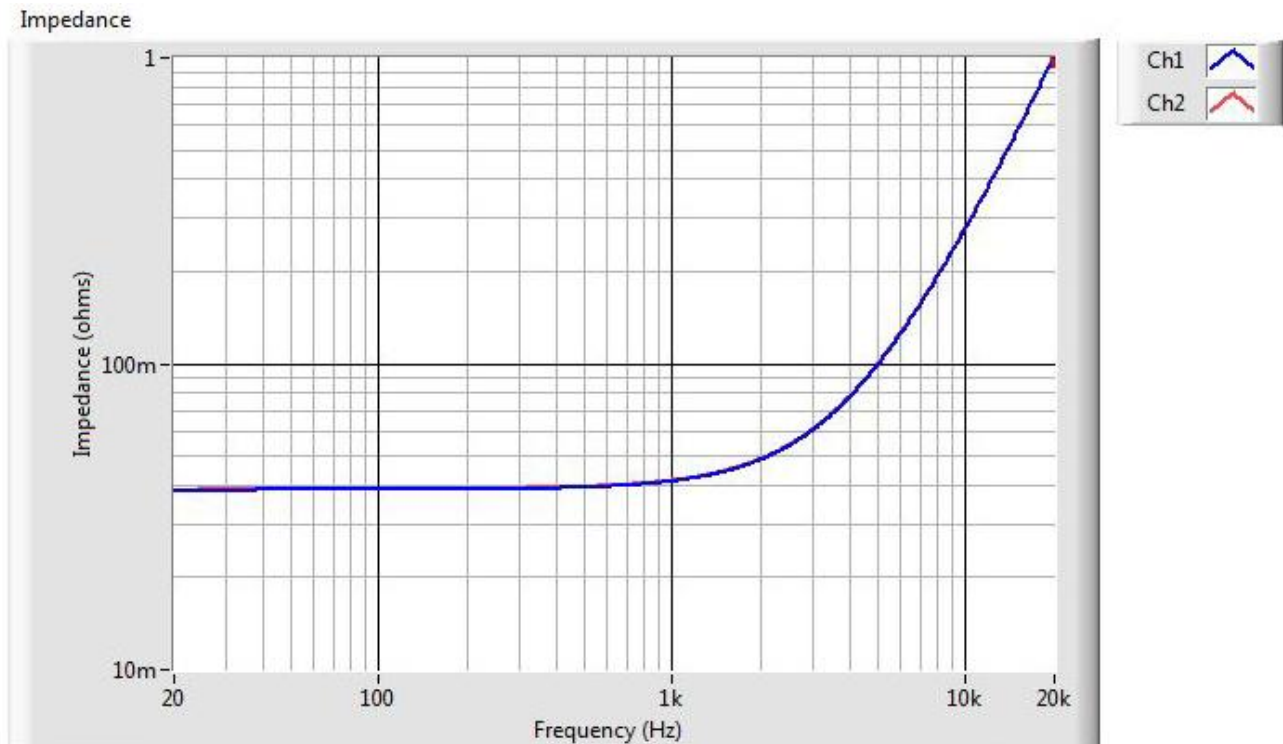


Figure 4: Output Impedance

5.3 Damping Factor

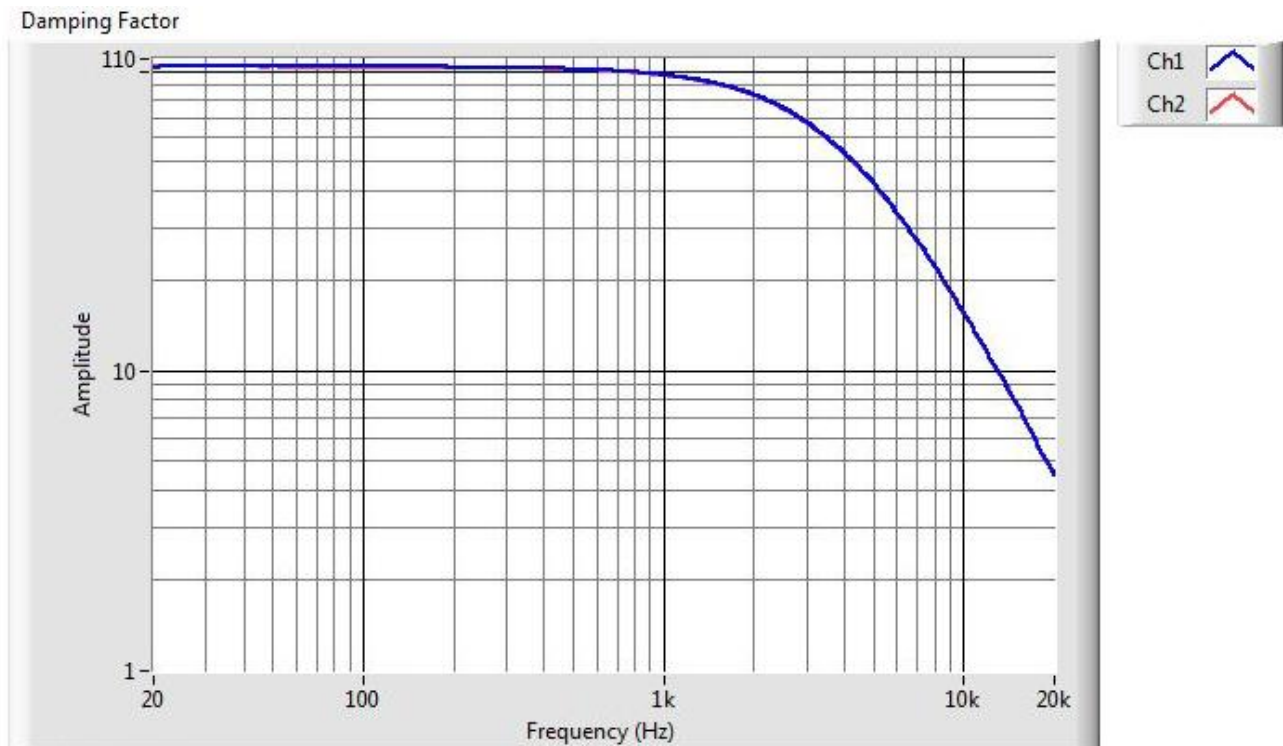


Figure 5: Damping Factor

5.4 THD+N vs Output Power

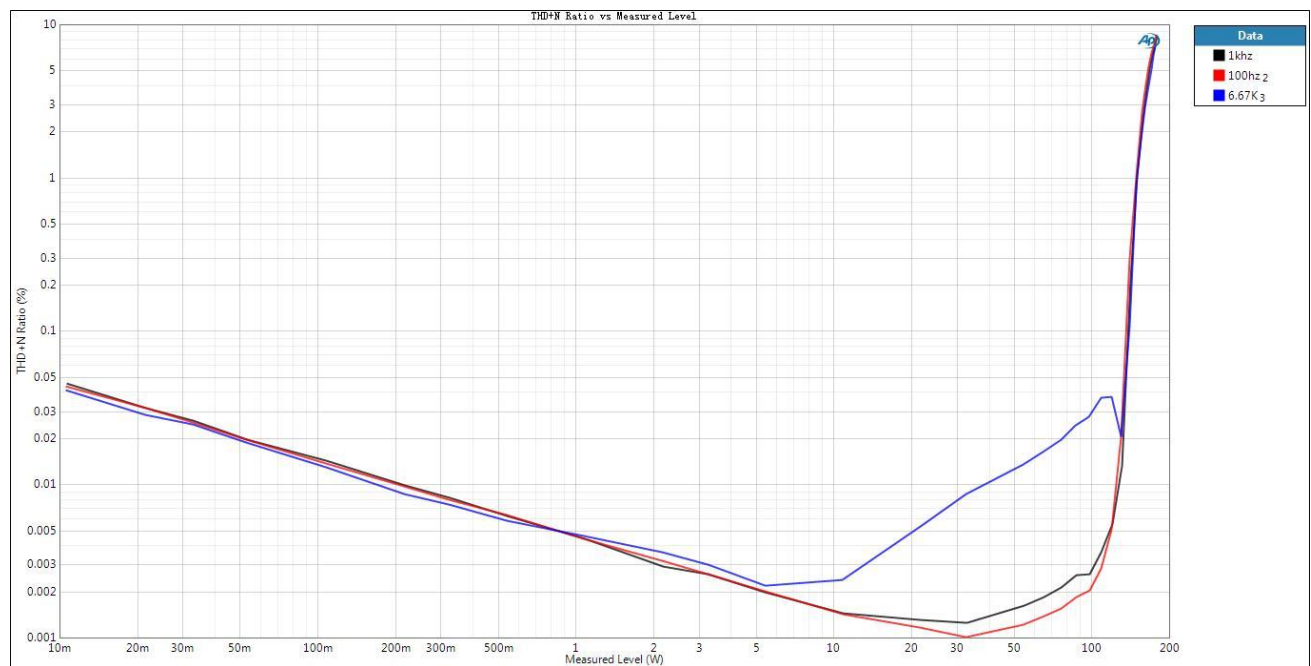


Figure 6: THD+N vs Output Power in 4ohm

5.5 THD+N vs Frequency

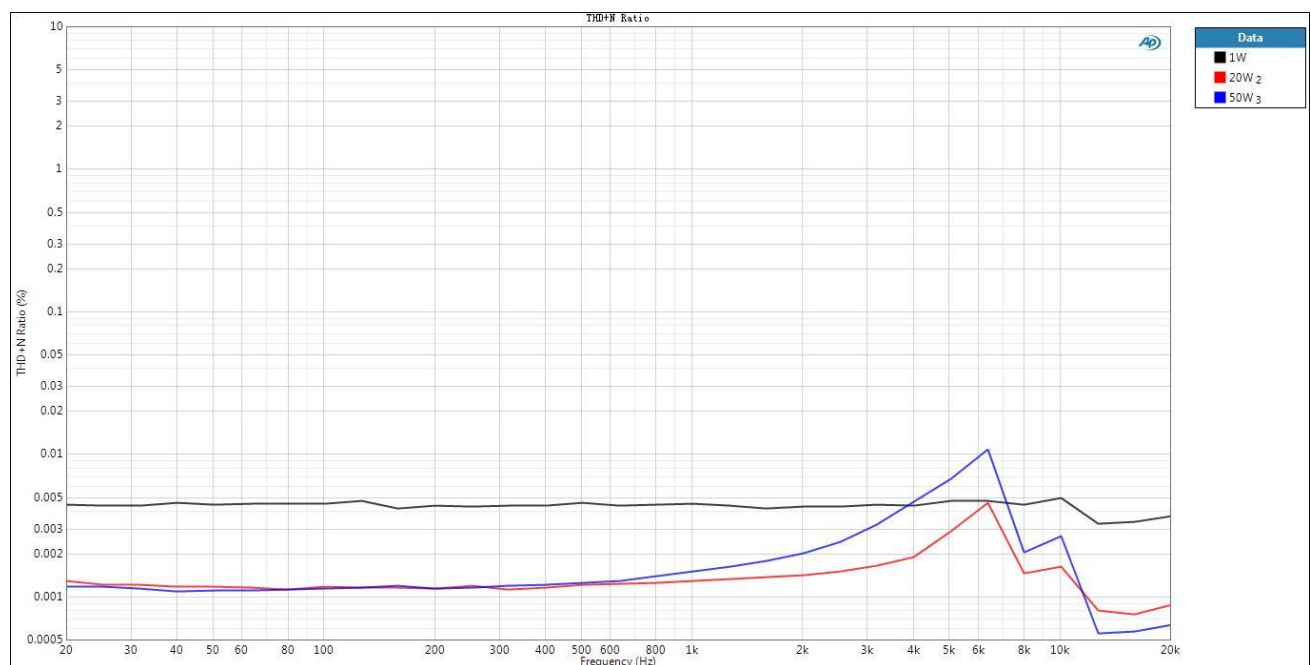


Figure 7: THD+N vs Frequency

6. Multi Board Configuration

It is recommend to set the master/slave mode when doing multi boards configuration, it can reduce interference problems while using radio receiver tuned within the AM band, detail description can refer to datasheet section 10.2.1.2.4.

Please make sure all of these change have been done before power up the boards.

Since the board default setting is master mode, so what you should do is set the other one board in slave mode, you can set slave mode 1 or slave mode 2 with just inverse the polarity.

Besides, remove the resistor **R39** (top side, remove heat-sink) and solder **R40** with one 0ohm 0603 resistor, this also marked on the bottom of the board show as below.

Slave mode 1:(Figure 8)

Connect the master OSC_I/O to the slave OSC_I/O with same polarity (IOP to IOP and IOM to IOM).

Slave mode 2:

Inverse the polarity of OSC_I/O (IOP to IOM and IOM to IOP)

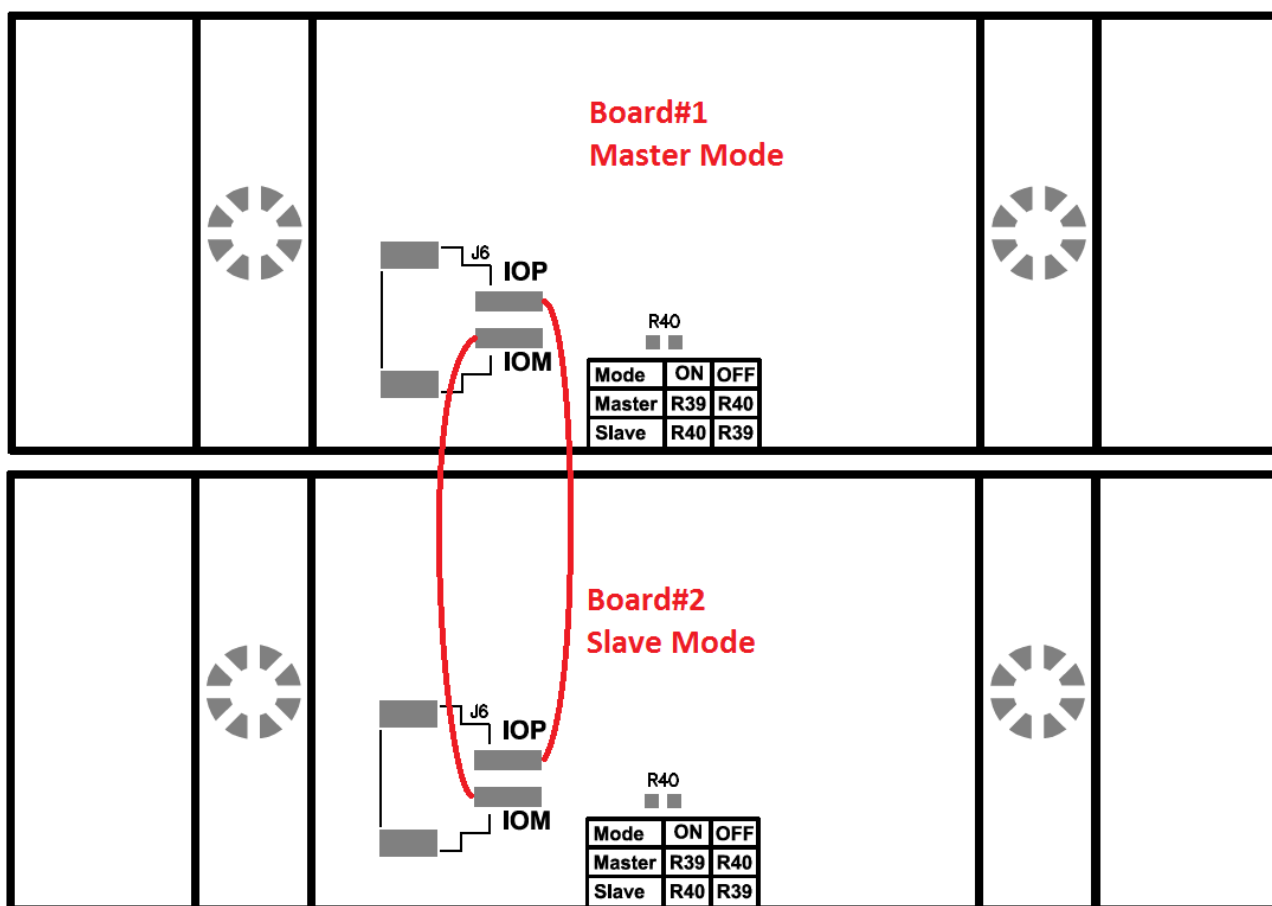


Figure 8: Master/Slave Mode setting

7. Revisions

| Revision | Change Logs | Date |
|----------|-----------------|----------|
| 1.0 | Initial version | Jun,2018 |
| | | |
| | | |
| | | |
| | | |