TESTING GUIDELINE

VERSION CHANGE LOG

Version	Description
Version 1.00	Initial release

Product Number : AA-AB32231
Product Name : 2 x 8Watt / 1 x 16Watt Class D Audio Amplifier Board with TPA3110
Hardware Version : V1.00
Firmware Version : V1.00
Submitted by : MOHAMMAD HAZIM BIN AHMAD NASRE
Date : 4 FEBRUARY 2025
Document No. : AA-AB32231-22-01

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Submitted by:	Verfied by:	Countersigned by:
Date:	Date:	Date:

CHAPTER 1
Basic Introduction

Testing Guidelines Statement
1. The project leader must review the following: Ensure the test forms are accurate in both content and format. Confirm that all test preparations are adequately completed. Verify that all labels are properly affixed.
2. These testing guidelines apply exclusively to the 2 x 8W / 1 x 16W Class D Audio Amplifier Board - TPA3110.

1. Test Objective (Device Under Test)
To be inspected: AA-AB32231 2 x 8W Class D Audio Amplifier Board - TPA3110.

2. Purpose of Testing
Inspect the programmatic functional and cosmetic integrity to meet company standards.

3. Test Tools
Please refer to the Bill of Materials for the testing AA-AB32231 2 x 8W Class D Audio Amplifier Board - TPA3110. *(AA-AB32231-22-01)* document for more details about the test tools.

4. Labeling and Form Preparation
i. Each unit must be labeled with a serial number in sequence before testing.
ii. Prepare red arrow labels to indicate problem areas and PASS labels for boards that pass testing.
iii. Create and print test forms with the corresponding product serial numbers.
iv. Boards that pass any test component (marked with 'P') will be marked with a **Black** or **Blue** pen, while boards that fail (marked with 'F') will be marked with a **Red** pen.
v. Use red pens to mark defective parameters and black pens for qualified product parameters on the test forms.

5. Overview of the Test Process

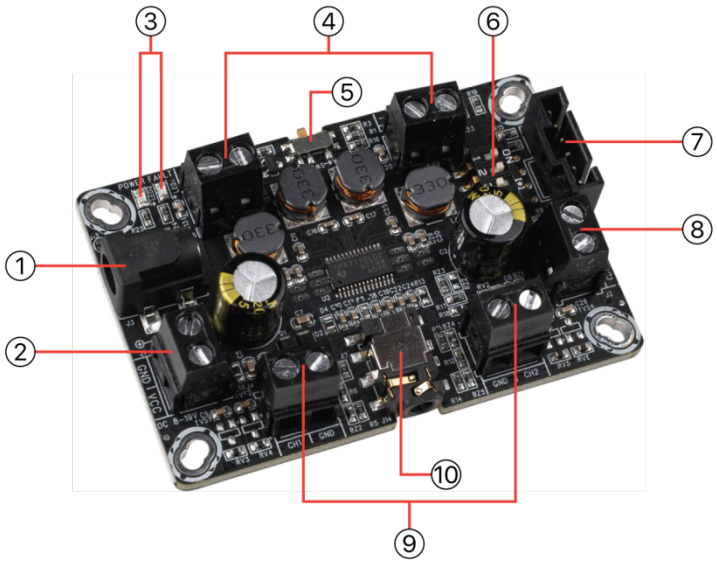
Testing Process

1. Basic Testing
i. Appearance Testing

2. Functional Testing
i. Power Port and Static Current Testing
ii. LED Indicator Testing
iii. PBTL Mode (Mono Channel)
- PBTL Mode Single-Ended Input Test
- PBTL Mode Differential Input Test
iv. BTL Mode (Stereo Channel)
- BTL Mode Single-Ended Input Test
- BTL Mode Differential Input Test
v. SD Testing
vi. Gain Testing

CHAPTER 2
Test Preparation

1. Port(s) Layout and Control



As shown in figure above：
1. Power Input: On-board DC Power Socket (10V - 19V)
2. Power Input: RJ128 Terminal Block 2-Position
3. LED Indicator: Power and Fault Indicator
4. Speaker Output: RJ128 Terminal Block 2-Position
5. Single/Dual Channel Switch: On-board toggle switch

A	Single Channel
B	Dual Channel

6. DIP Switch

Switch 3, 4		Switch 1, 2	
Switch to ON	Single Channel	Switch to ON	Single-ended
Switch to OFF	Dual Channel	Switch to OFF	Differential

7. Differential Input: Molex 6-Position 2.54mm Connector

J6	DIFF1_N
	SGND
	DIFF1_P
	DIFF2_N
	SGND
	DIFF2_P

8. SD: RJ128 Terminal Block 2-Position
9. Audio Input: RJ128 Terminal Block 2-Position
10. Audio Input: On-board 3.5mm Audio Input

2. Appearance Inspection
Ensure the audio amplifier board is in good condition by inspecting all components for proper soldering and verifying that all switches function correctly, including pressability. Check that both LEDs (POWER and FAULT) are functional. Additionally, examine the PCB for copper leakage, ensure surface mount solder joints are free from cold soldering and bridging, and verify that through-hole solder joints comply with IPC-A-610 standards.

CHAPTER 3
Functional Testing

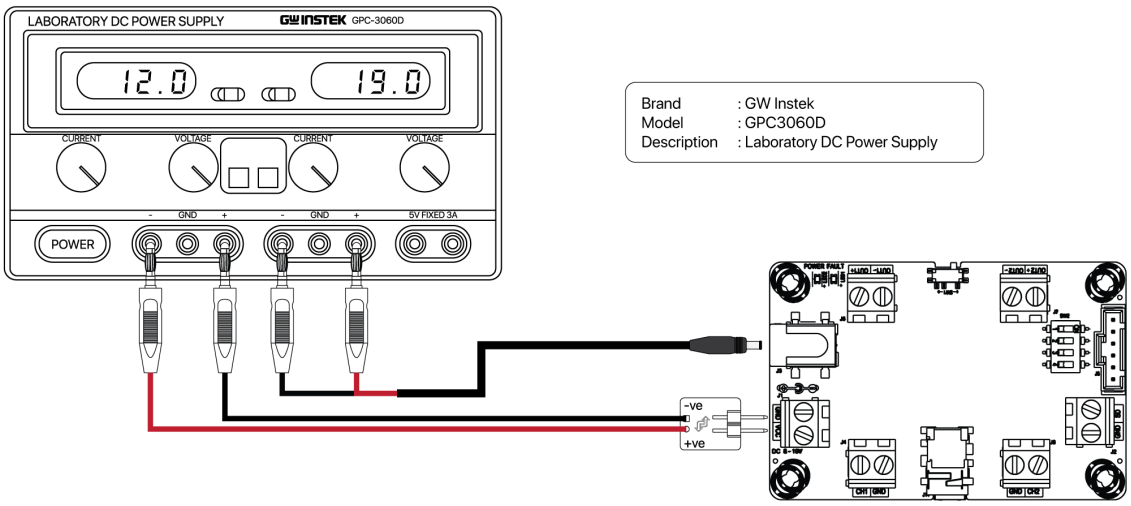
1. Power Input
1.1 Static Current Measurement and Power Supply Port Testing

1.1.1 Power Port 1 Testing
Procedure: Connect the power cable to Power Port 1 and power on the GW Instek GPC-3060D Laboratory DC Power Supply, setting it to 19V. Press the OUTPUT switch; the LED2 on the amplifier board should illuminate, indicating proper function (see illustration below). After activation, press the voltage/current toggle button. The current should read 0.10 A (range: 0.05–0.10 A).

Criteria for Judgment:
- Pass Condition: Voltage is set to 19V, output activates successfully, and current reading is within 0.05–0.10 A.
- Fail Condition: Voltage cannot be set to 19V, output fails to activate, or current reading is outside 0.05–0.10 A.

1.1.2 Power Port 2 Testing
Procedure: Connect the power supply to Power Port 2 using the conversion board's 2-pin header to connect to the RJ12 8 Terminal Block (Power Input), and power on the GW Instek GPC-3060D Laboratory DC Power Supply, setting it to 12V. If LED2 is lit, the port is functioning properly (see figure above).

Criteria for Judgment:
- Pass Condition: Voltage is set to 12V, output activates successfully, and current reading is within 0.05–0.10 A.
- Fail Condition: Voltage cannot be set to 12V, output fails to activate, or current reading is outside 0.05–0.10 A.



2. LED Indicator Testing
Procedure: LED2 of the power supply was tested in the previous step.

Criteria for Judgment:
- If LED2 is illuminated, the test is passed.
- If LED2 is off or in any other state, the product is considered non-compliant.

FAULT LED1: FAULT LED1 should remain off under normal conditions. If it is illuminated, the product is deemed non-compliant.

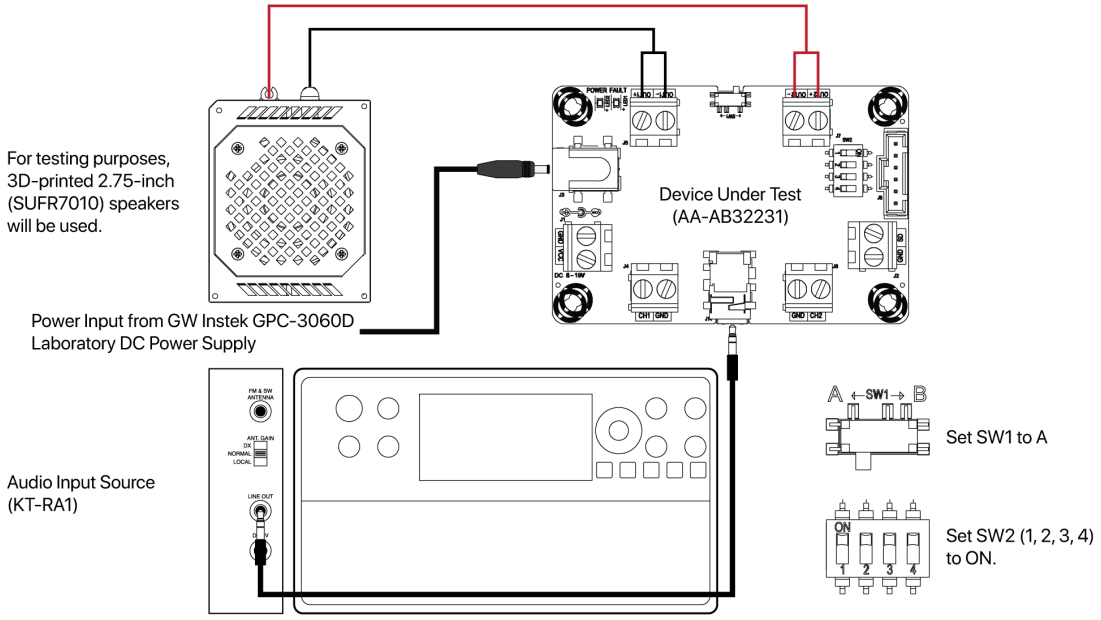
3. PBTL Mode (Mono Channel)

3.1 PBTL Mode Single-Ended Input Test:

Procedure: Connect as shown in illustration below. Set SW1 to A and turn SW2 (1, 2, 3, 4) to ON. Connect the MP3 player to the 3.5mm audio input and the output to a single speaker. Power on and play the "Left and Right Channel Test" audio.

Criteria for Judgment:

- If left sound is emitted from the speaker, the test is passed.
- No sound or any other issue indicates non-compliance.

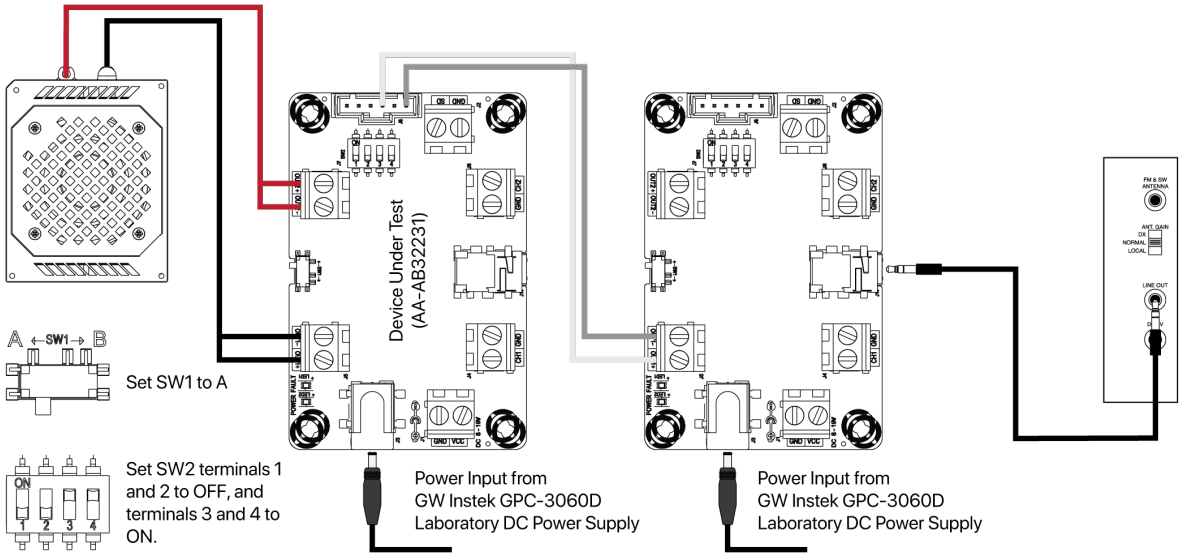


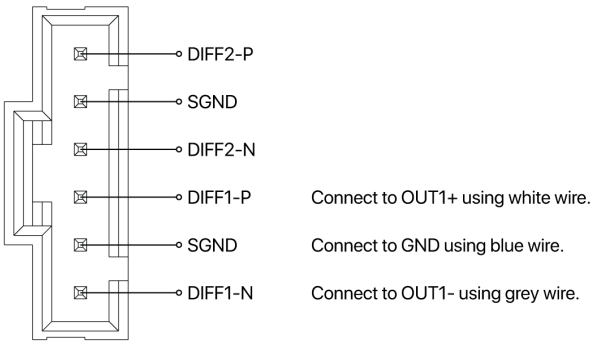
3.2 PBTL Mode Differential Input Testing

Procedure: Refer to illustration below. Set SW1 to A, switch SW2 terminals 1 and 2 to OFF, and terminals 3 and 4 to ON. Connect the MP3 player to the audio interface board and the output to a single speaker. Power the amplifier board and play the "Left and Right Channel Test" audio.

Criteria for Judgment:

- If the speaker outputs left sound, the differential input test is successful.
- No sound or any other issues indicate non-compliance.





Color Printing Requirement

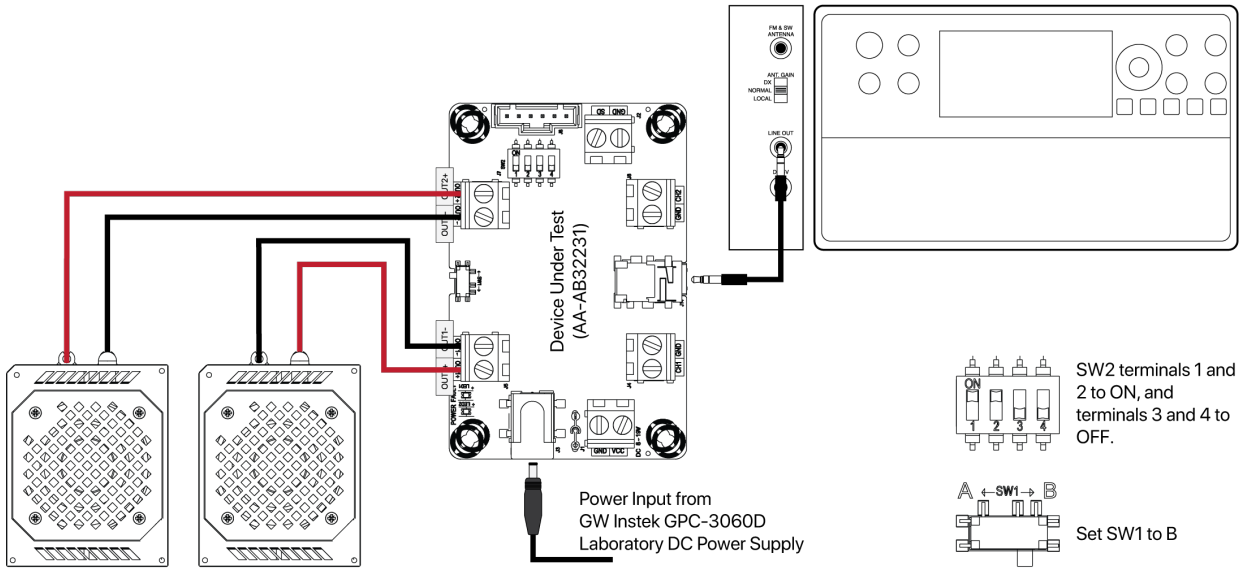
Please ensure this page is printed in color. Failure to do so will result in the wire color codes in the illustration above being unclear or invisible.

4. BTL Mode (Stereo Channel)

4.1 BTL Mode Single-Ended Input Test

Procedure: Connect as shown in illustration below. Set SW1 to B, switch SW2 terminals 1 and 2 to ON, and terminals 3 and 4 to OFF. Connect the MP3 player and speakers. Power the amplifier board and play the "Left and Right Channel Test" audio.

Criteria for Judgment:
- If the left and right channel audio is heard from both speakers, the dual channel test is successful.
- No sound or any other issues indicate non-compliance.

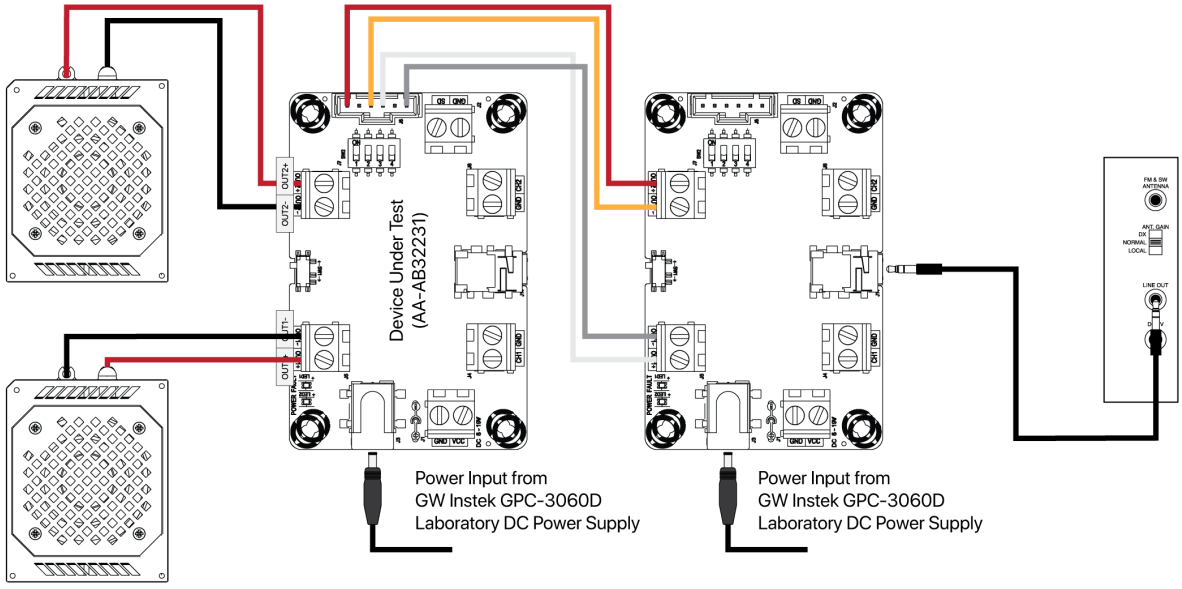


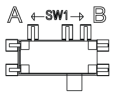
4.2 BTL Mode Differential Input Testing

Procedure: Connect as shown in illustration below. DIFF1-P (white wire) to OUT1+; connect DIFF2-N (yellow wire) to OUT2-, and DIFF2-P (red wire) to OUT2+. Connect SGND (blue and black wires) to the GND of the STBY port. Connect the MP3 player to a separate amplifier board, with the output going to two speakers. Power both amplifier boards and play the "Left and Right Channel Test" audio.

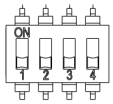
Criteria for Judgment:

- If the left and right channel audio can be heard from both speakers, the differential input test is successful.
- No sound or any other issues indicate non-compliance.

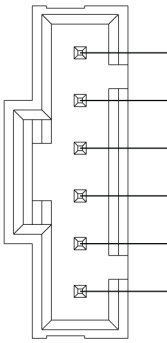




Set SW1 to B



Set SW2 (1, 2, 3, 4) to OFF.

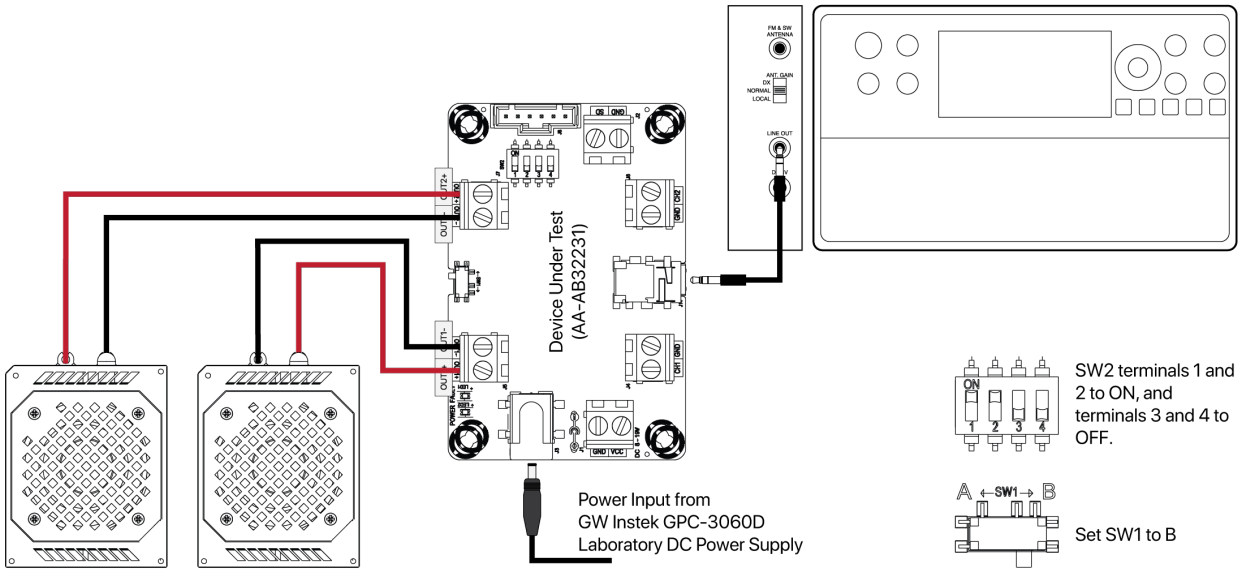


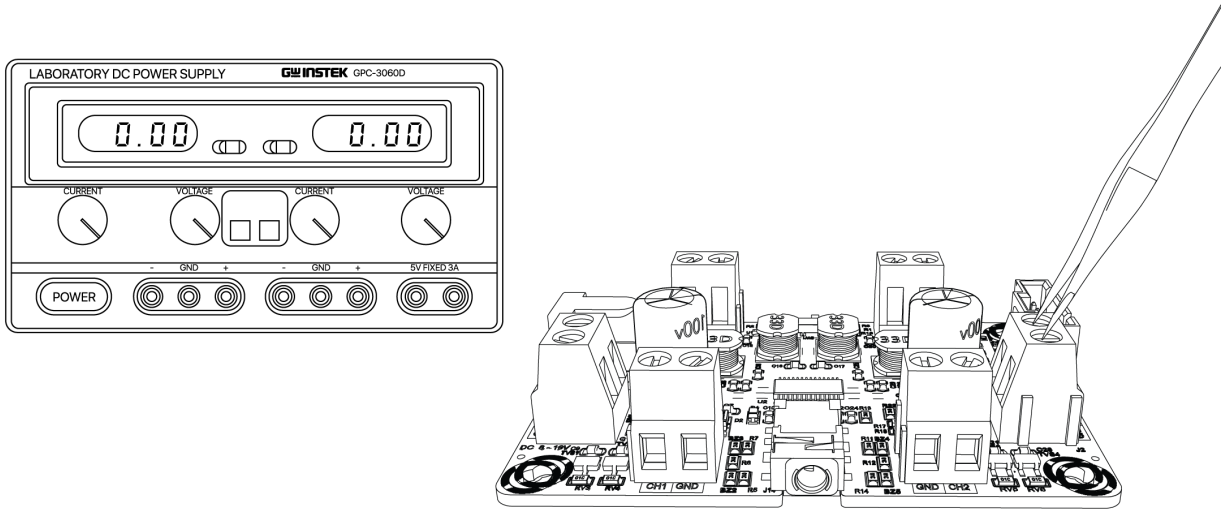
DIFF2-P	Connect to OUT2+ using red wire.
SGND	Connect to GND using black wire.
DIFF2-N	Connect to OUT2- using yellow wire.
DIFF1-P	Connect to OUT1+ using white wire.
SGND	Connect to GND using blue wire.
DIFF1-N	Connect to OUT1- using grey wire.

Color Printing Requirement
Please ensure this page is printed in color. Failure to do so will result in the wire color codes in the illustration above being unclear or invisible.

5. SD Testing
Procedure: Connect as shown in illustration below. Use tweezers to short the SD terminal to GND. Play any music.

Criteria for Judgment:
- The SD function is normal if there is no sound from the speakers, the power indicator remains lit, and the current reads zero.
- Any failure to meet these conditions indicates non-compliance.



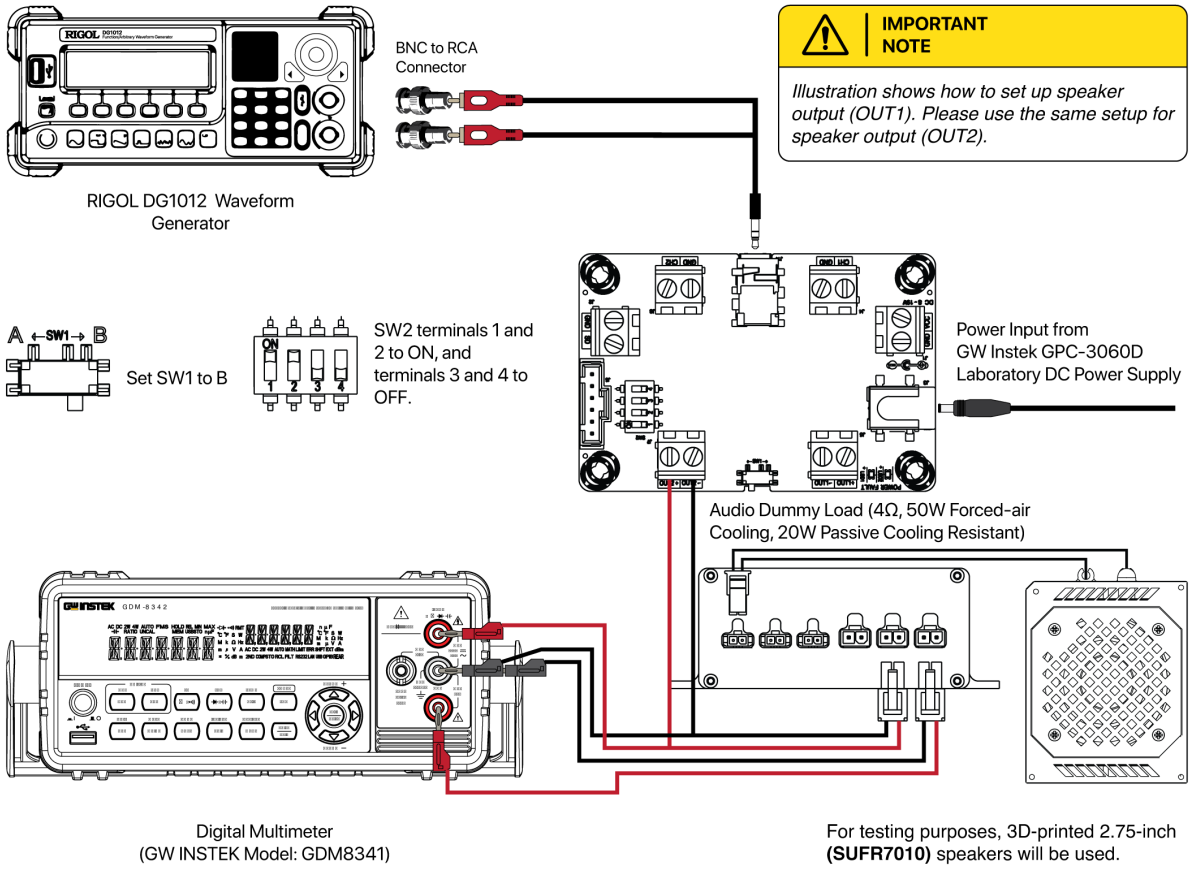


6. Gain Test

Procedures:
Set SW1 to B, switch SW2 terminals 1 and 2 to ON, and terminals 3 and 4 to OFF. Connect RIGOL DG1012. Set the Digital Multimeter (GW INSTEK GDM8341) to V~ mode and measure the voltage at the speaker terminals with the probes.
Test Frequencies:
- Left Channel: 1kHz
- Right Channel: 1.2kHz
- Input signal:1kHz 400mVrms

Criteria for Judgment:
Read the value on the multimeter and it should be within this range: 8V±5% (7.6V-8.4V).
If the voltage exceeds this range, the product is considered defective.

Connect as shown in illustration below.



7. Switch Positions for Storage
- Set SW1 to position B.
- Set SW2 to the designated position.

1	2	3	4
ON	ON	OFF	OFF

Test Report Marking Guidelines
In the test report, mark "P" in the relevant section if conditions are met. If not, mark "NG" in red, label the issue on the test board, and place it in the repair area.

CHAPTER 4
End of Testing

Cleanup Steps:
1. Turn off the power.
2. Disconnect all electrical devices.
3. Organize and return tools to their proper places.
4. Clean and tidy the workspace.

Product Handling Procedures
1. Re-inspect non-conforming products using IPC-A-610. Record the serial numbers from the initial inspection in the "First Test Non-Conformance Report." Perform necessary repairs as outlined in this report. If approved by PIZZICS's production management and project leaders, combine the repaired conforming products with the compliant inventory.
2. Transfer non-conforming products to the R&D department for repairs. Work with R&D to complete the "Second Test Non-Conformance Report." After repairs, fill out the "Non-Conformance Transfer Report" to officially transfer the items to R&D.
3. Deliver conforming products to the finished goods warehouse and obtain the "Finished Goods Entry Form."
4. Settle processing fees with the project's production supervisor based on the "Non-Conformance Transfer Report" and the "Finished Goods Entry Form."

Website
https://www.pizzics.com

Customer support
+604 438 0119 | info@pizzics.com

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Document No.: AA-AB32231-22-01
Language: en-US
Modified: 2025-02-06
Formatted: 2025-02-06