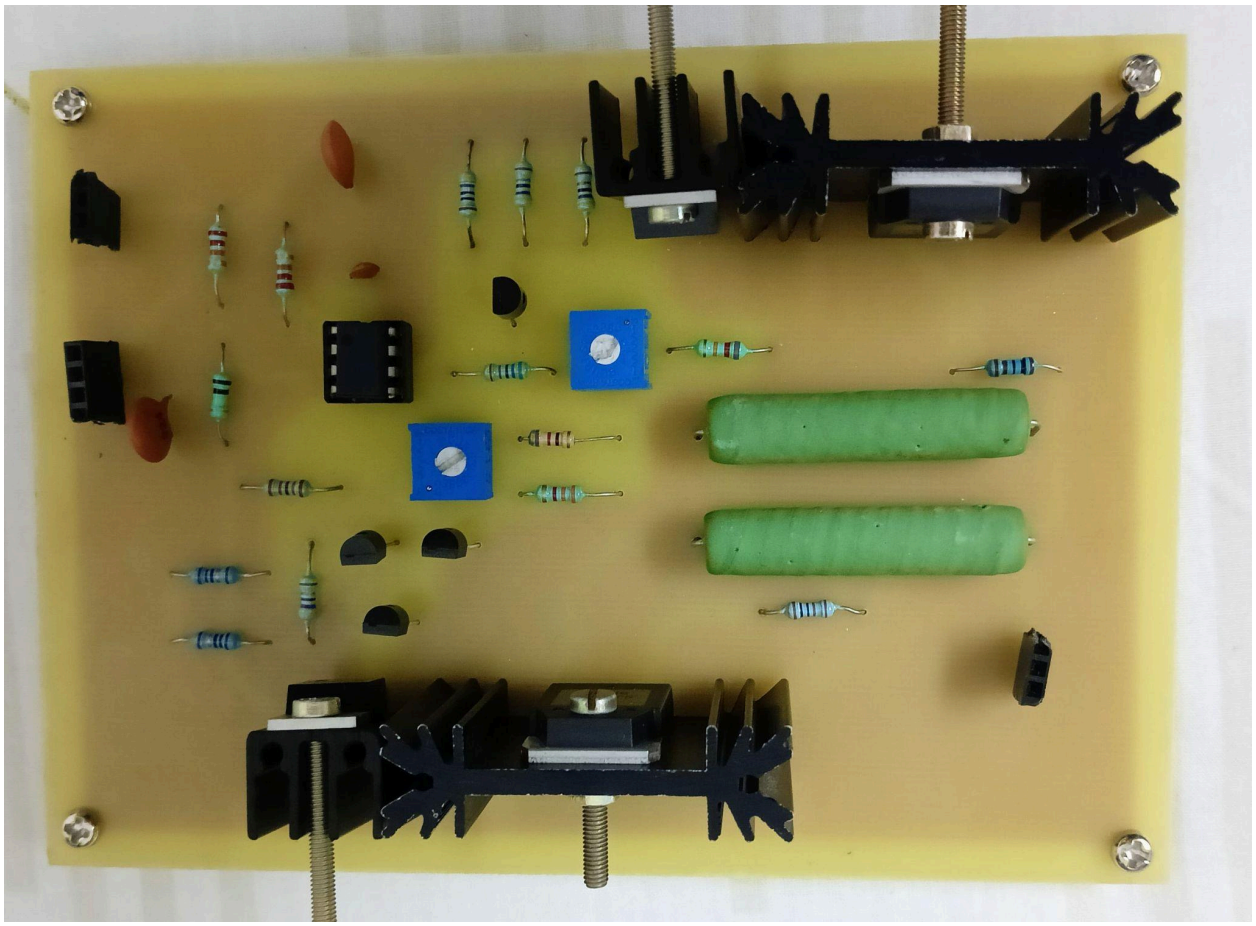
USER MANUAL

HIGH BANDWIDTH POWER AMPLIFIER

The amplifier possesses a voltage gain of 4.6 (13.2 dB)



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INTRODUCTION

The High Bandwidth Power Amplifier is a device for magnetic materials engineers to obtain B-H characterization of magnetic materials at low as well as high frequencies. This is a transformer-less multi-stage direct-coupled linear power amplifier for the characterization of magnetic cores at various frequencies.

This document is the user manual of the multistage direct-coupled linear power amplifier for the characterization of magnetic cores at wide frequency range.

TECHNICAL SPECIFICATIONS

- ➔ Voltage Gain: 4.6 (13.2 dB)
- ➔ Rated voltage/Max Power Input Voltage: ±60 V
- ➔ Rated current: 3 A
- ➔ Frequency range: 50 Hz to 250 kHz
- ➔ Max Input Signal Voltage: 13V
- ➔ Max safe power dissipation for driver BJTs (MJE15034 and MJE15035) : 2 W
- ➔ Max safe power dissipation for main BJTs (NJW3281 and NJW1302) : 3.125 W

The amplifier is designed to operate from 50 Hz to 250 kHz and is intended for experimental B-H characterizations of ferrite cores. The gain of the amplifier is approximately 4.6 (13.2 dB). The input power voltage can be increased up to ±60 V, hence the input (reference) signal can be given up to 12-13 V. The current rating of this amplifier is up to 2.5 to 3 A.

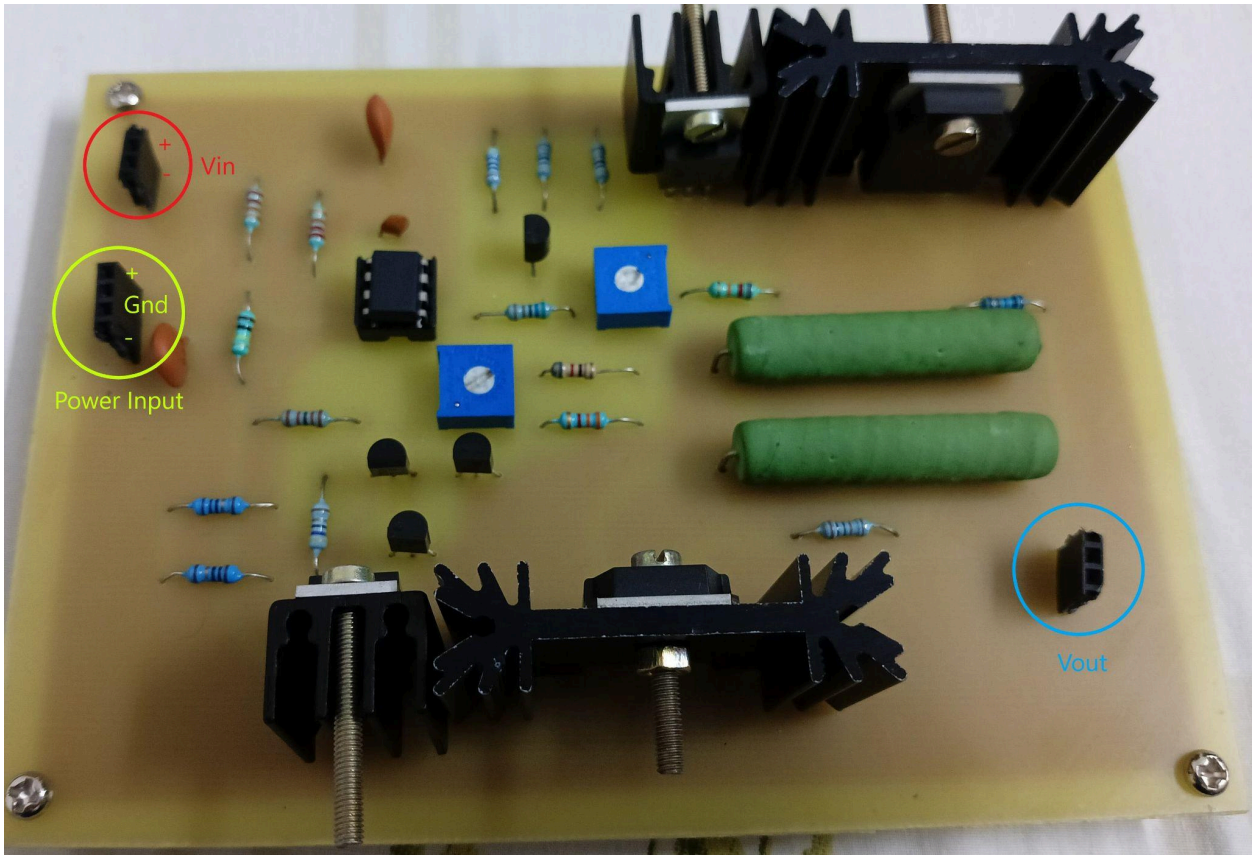
OPERATING INSTRUCTIONS

To operate the amplifier follow these steps (also refer to the following images):

1. Powering on the amplifier:
    - Ensure that the power supply is set to less than rated voltage and also ensure that it is turned off before connecting the amplifier.
    - Connect the power supply to the *Power Input* port of the amplifier.
    - Turn on the power supply.
2. Setting input signals:

- Connect the input signal source to the Reference/*Input Signal (Vin)* port on the amplifier.
- Adjust the input signal level based on the requirements of the experiment or test.
- Use the AFG to vary the frequency accordingly.

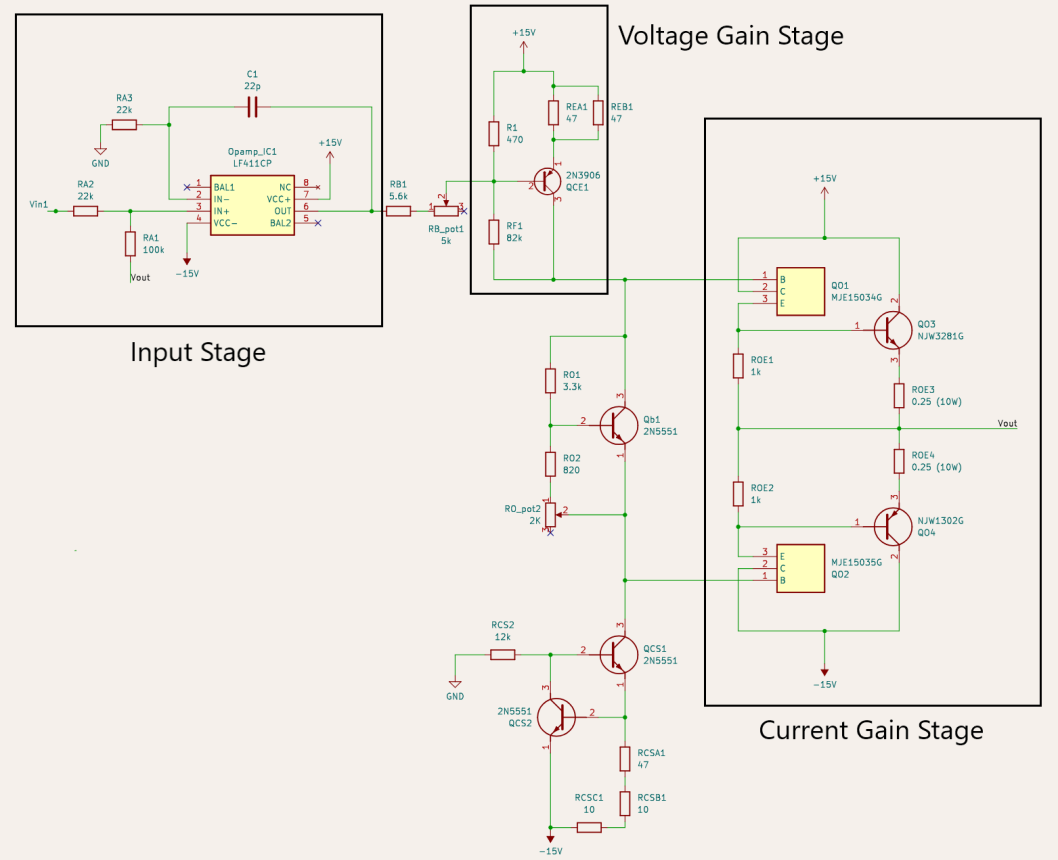
3. Caution:
    - To get the desired results, always calculate your load characteristics and ensure that the current flowing through the load at any point in time is below 3A.



Ports on the PCB

TROUBLESHOOTING

- If the output waveform is deformed and the frequency is within the rated value then it might be the case that the output is saturated. Hence check if the {max voltage of the input signal} * {Amplifier Gain (4.6)} is less than the voltage applied to the power input.
- When working with the toroid core if the DCR of the toroid is very low it will draw very large current and may damage the amplifier or the power supply. When a load with very low DCR is connected, the power supply may act as if it is shorted. To solve this problem, always ensure that the current is within the rated limit of the power supply by connecting a resistor in series with the load/toroid. Choose the value of the resistor as low as possible while making sure that the current is just below rated value. This is so that the voltage across the toroid core remains high for the low frequencies also and it will enable us to measure the b-h characteristics at low frequencies too.



Circuit Diagram