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› ASHATA 45W SSB Linear HF/FM/CW/HAM Power Amplifier DIY Kit Instruction Manual

ASHATA B0CH7GM773

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1. INTRODUCTION

This manual provides detailed instructions for the assembly, operation, and maintenance of the ASHATA 45W SSB Linear HF/FM/CW/HAM Power Amplifier DIY Kit. This kit is designed for enthusiasts and is commonly used in SSB, AM linear power amplification, CW, FM, and basic signal amplification applications. Please read these instructions carefully before beginning assembly and operation.

2. PRODUCT OVERVIEW

The ASHATA 45W SSB Linear Power Amplifier is a high-performance, low-noise DIY kit. It offers a total gain exceeding 40dB, which is approximately 10,000 times amplification. For example, an input of 1mW can result in an output of 10W, and an input of 5mW can result in an output of 45W. This amplifier is suitable for various radio communication modes including SSB, AM, CW, and FM across the HF frequency range.

The overall gain exceeds 40db, which is 10,000 times. Input 10W will output 1mW, and input 45W will output 5mW

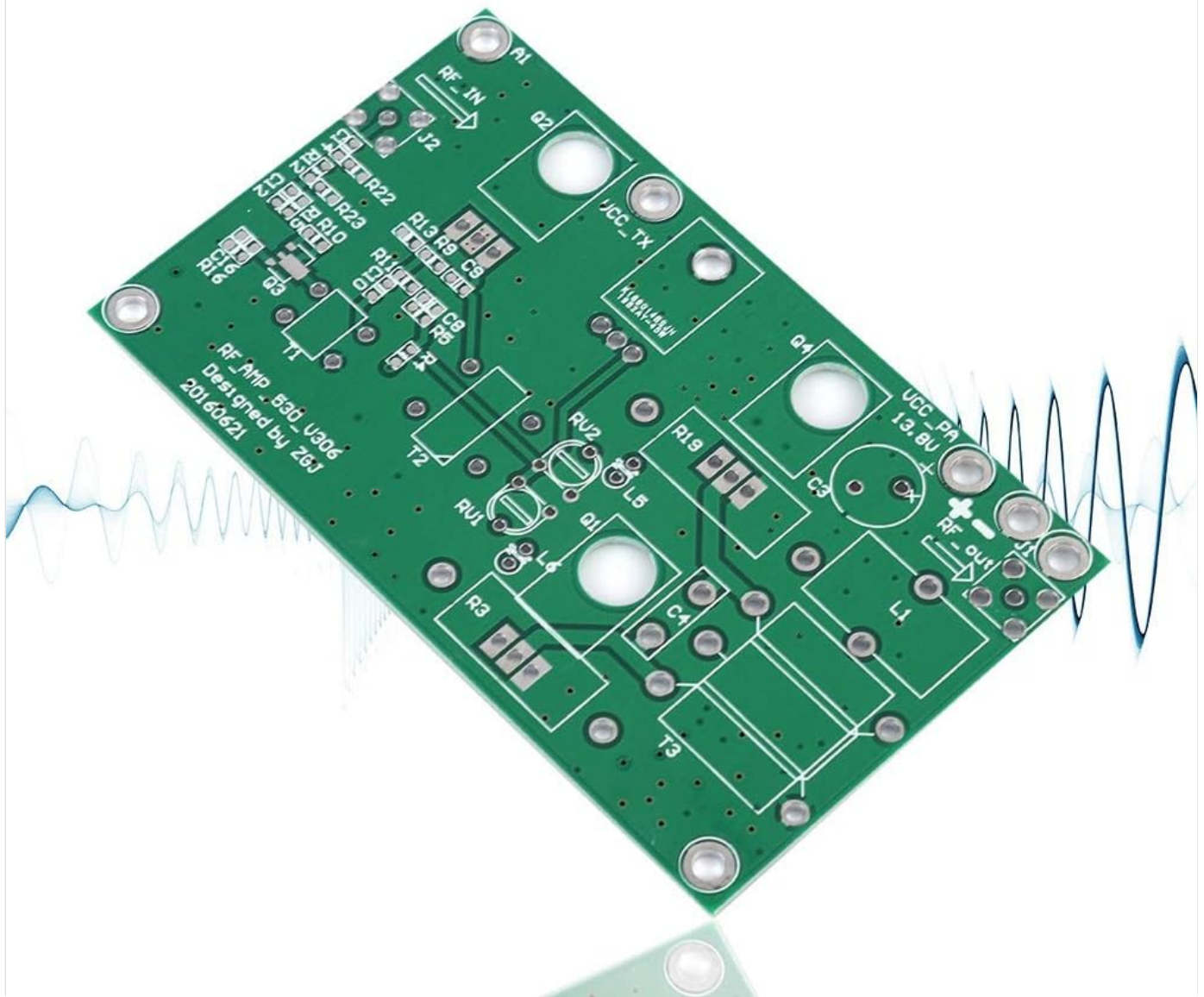


Figure 2.1: Top view of the assembled ASHATA 45W SSB Linear Power Amplifier circuit board.

3. PACKAGE CONTENTS

The ASHATA 45W SSB Linear Power Amplifier is shipped as a DIY kit, meaning all components are provided separately for user assembly. Please verify that all parts are present before starting the assembly process. The package typically includes:

- Printed Circuit Board (PCB)
- Various electronic components (resistors, capacitors, transistors, inductors, etc.)
- Connectors (e.g., SMA interface)
- Other necessary small parts for assembly

Note: Heatsinks are **not** included in the kit and must be sourced separately by the user. Proper heat dissipation is crucial for the amplifier's performance and longevity.

Commonly used in SSB, AM linear power amplifier, CW, FM, power amplifier, and the most basic signal amplification

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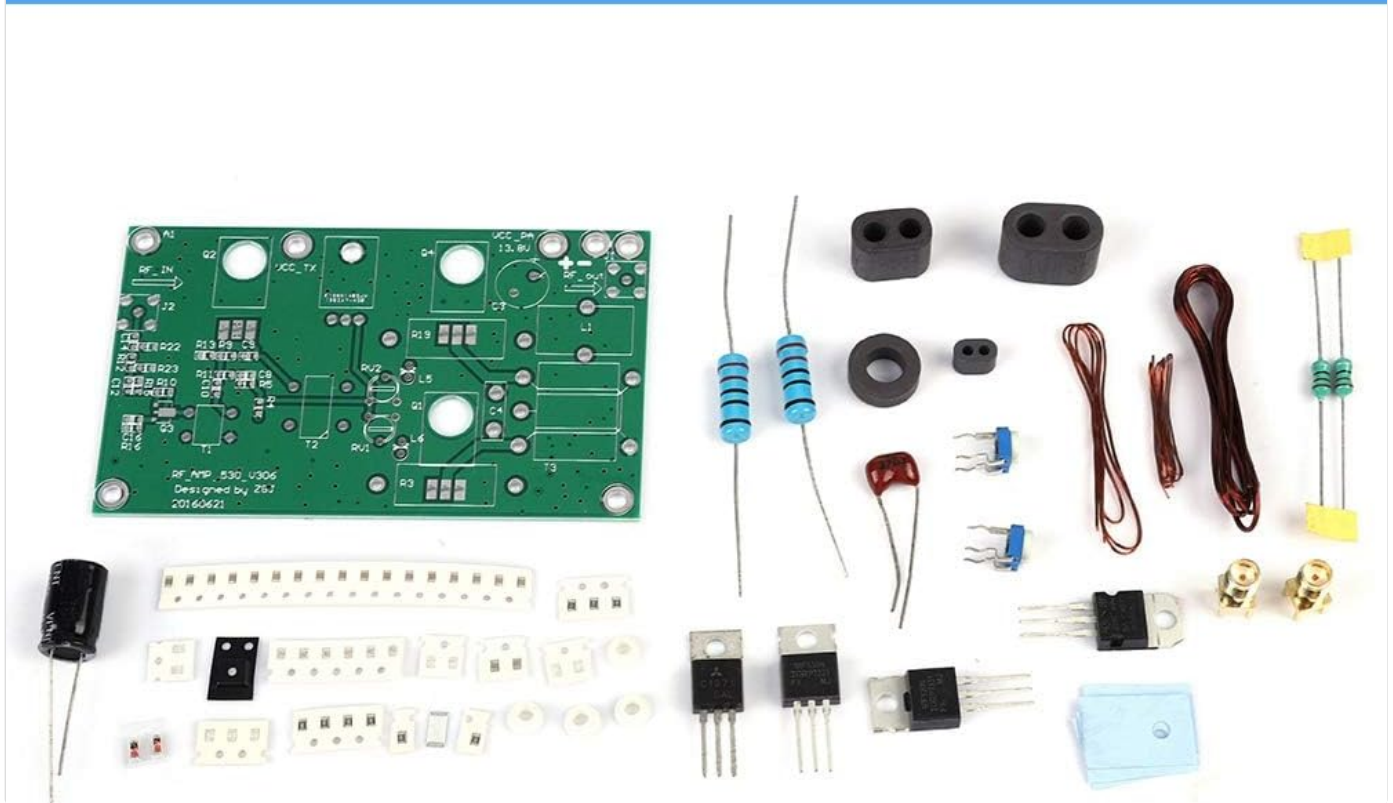


Figure 3.1: Overview of the components included in the DIY kit.

4. SPECIFICATIONS

Feature	Specification
Input Power	1-5 mW
Output Power (Maximum)	45 W (with proper heatsink)
Maximum Output Power (without heatsink)	57 W (Warning: Not recommended for sustained operation without heatsink)
Input Voltage	DC 13.8 V (10 A or higher recommended)
Output Impedance	50 ohms (adjustable between 10 and 200 ohms)
Input Frequency Range	3 MHz - 30 MHz (HF channel)
Input/Output Interface	Standard SMA interface (external threaded hole)
Weight	Approx. 62g

Frequency Range Output Power:

- 3.500 MHz: 54 W
- 7.050 MHz: 56 W

- 10.000 MHz: 57 W
- 14.270 MHz: 55 W
- 21.400 MHz: 41 W
- 24.000 MHz: 37 W
- 28.100 MHz: 25 W
- 29.600 MHz: 20 W

5. SETUP AND ASSEMBLY

This product is a DIY kit and requires assembly. Basic soldering skills and knowledge of electronic components are necessary. Follow these general steps for assembly:

1. **Component Identification:** Carefully identify all components against the provided parts list (if available) or by their markings.
2. **PCB Preparation:** Inspect the Printed Circuit Board (PCB) for any defects.
3. **Component Placement:** Begin by soldering smaller components (resistors, diodes) first, then move to larger components (capacitors, transistors, inductors, connectors). Pay close attention to component polarity where applicable (e.g., electrolytic capacitors, diodes, transistors).
4. **Soldering:** Ensure clean, strong solder joints. Avoid cold solder joints or solder bridges.
5. **Heatsink Installation:** After assembling the main circuit, it is critical to install an appropriate heatsink on the power transistors. The kit does not include a heatsink, and operating the amplifier without one will lead to overheating and potential damage.
6. **Power Supply Connection:** Connect a stable DC 13.8V power supply capable of providing 10A or more. Ensure correct polarity.
7. **Input/Output Connections:** Connect your RF input signal to the SMA input interface and your antenna or load to the SMA output interface.

Important Safety Note: Always disconnect power before making or changing any connections. Improper assembly or operation can lead to component damage or personal injury.

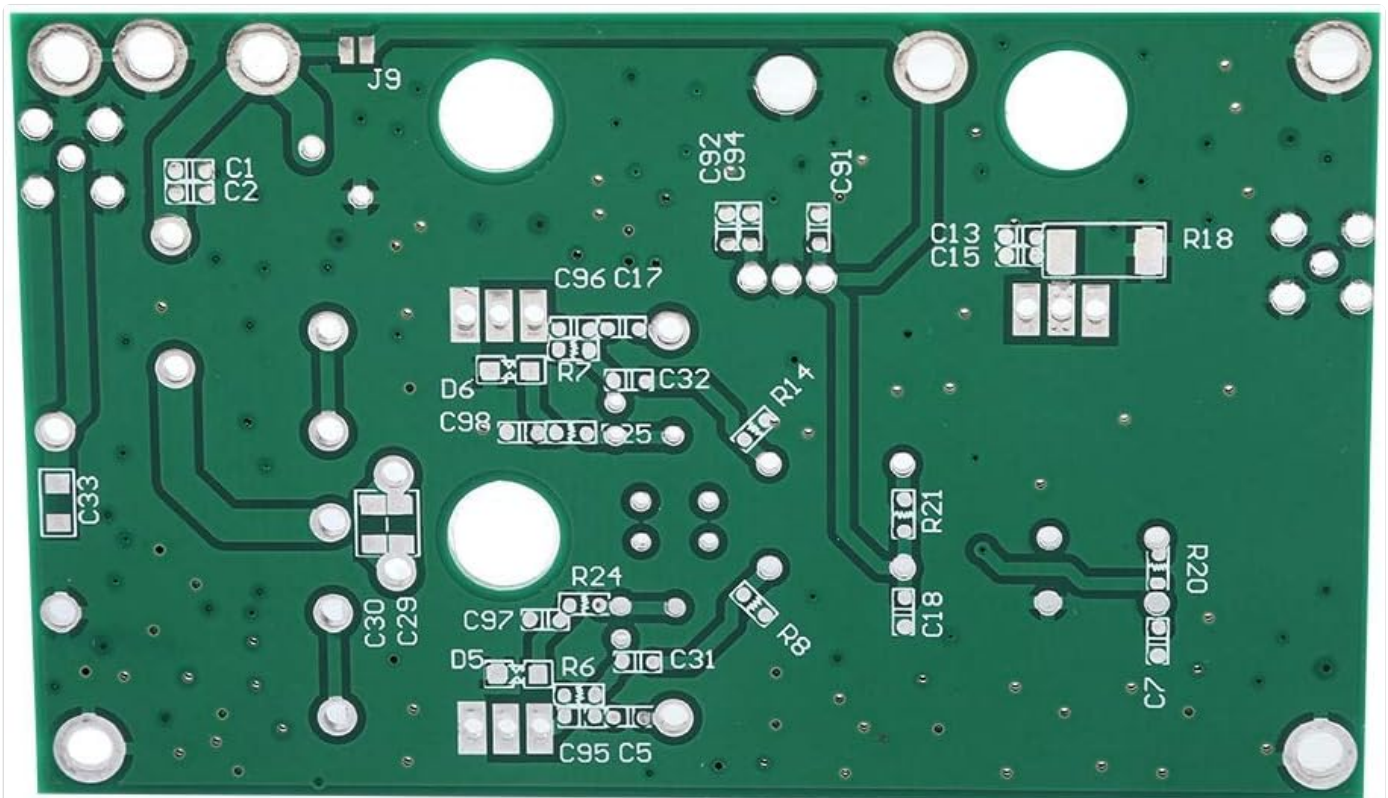


Figure 5.1: Bottom view of the PCB, showing solder pads and traces.

6. OPERATING INSTRUCTIONS

Once assembled and connected, follow these steps to operate the amplifier:

1. **Initial Check:** Before applying power, double-check all connections, especially power supply polarity and RF input/output. Ensure a proper 50-ohm load or antenna is connected to the output.
2. **Power On:** Apply DC 13.8V power to the amplifier.
3. **Input Signal:** Apply a low-power RF signal (1-5 mW) from your transceiver or signal generator to the RF_IN port.
4. **Monitor Output:** Use an RF power meter to monitor the output power at the RF_OUT port. Ensure the output power is within the specified limits (up to 45W).
5. **Frequency Range:** Operate within the specified frequency range of 3 MHz to 30 MHz for optimal performance.
6. **Impedance Matching:** If necessary, adjust the output impedance (variable between 10 and 200 ohms) to achieve optimal power transfer and minimize SWR.
7. **Heat Management:** Continuously monitor the heatsink temperature during operation. If it becomes excessively hot, reduce input power or improve cooling.

Caution: Exceeding the maximum input power or operating without a proper load can damage the amplifier.

7. MAINTENANCE

To ensure long-term performance and reliability of your ASHATA Power Amplifier, consider the following maintenance guidelines:

- **Keep Clean:** Regularly clean the PCB and components to prevent dust buildup, which can lead to overheating or short circuits. Use a soft brush or compressed air.
- **Inspect Solder Joints:** Periodically inspect solder joints for any signs of cracking or corrosion, especially after prolonged use or if the unit has been subjected to vibrations.
- **Heatsink Check:** Ensure the heatsink remains securely attached and free of obstructions. Clean any dust from the heatsink fins to maintain efficient heat dissipation.
- **Environmental Conditions:** Operate and store the amplifier in a dry, cool environment, away from direct sunlight, moisture, and extreme temperatures.
- **Power Supply:** Use a stable and clean power supply to prevent voltage fluctuations that could stress components.

8. TROUBLESHOOTING

If you encounter issues with your amplifier, consider the following troubleshooting steps:

- **No Output Power:**
 - Check power supply connections and ensure it's providing 13.8V.
 - Verify input RF signal presence and level (1-5 mW).
 - Inspect all solder joints for continuity and shorts.
 - Check for incorrectly oriented components (e.g., diodes, electrolytic capacitors, transistors).
- **Low Output Power:**
 - Ensure the input power is sufficient.
 - Check output impedance matching.

- Verify that the heatsink is properly installed and not overheating.
- Inspect for any damaged components.

- **Overheating:**

- Ensure a suitable heatsink is installed and making good thermal contact with power transistors.
- Verify adequate ventilation around the amplifier.
- Reduce input power if operating at maximum output for extended periods.
- Check for short circuits or excessive current draw.

- **Distorted Output:**

- Ensure the input signal is clean and not overdriving the amplifier.
- Check for proper biasing of active components.
- Inspect for faulty components.

For complex issues, consulting with experienced electronics hobbyists or referring to online forums dedicated to amateur radio and DIY electronics may be beneficial.

9. WARRANTY INFORMATION

This ASHATA product comes with a **1 Year Warranty Against Manufacturer Defects**. This warranty covers defects in materials and workmanship under normal use. It does not cover damage resulting from improper assembly, misuse, neglect, unauthorized modification, or operation outside of specified parameters (e.g., without a heatsink). As this is a DIY kit, successful assembly and operation are dependent on user skill and care.

10. SUPPORT

For technical assistance or inquiries regarding your ASHATA 45W SSB Linear Power Amplifier DIY Kit, please refer to the seller's support channels or the manufacturer's official website. When contacting support, please provide your product model number (B0CH7GM773) and a detailed description of the issue you are experiencing.

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Question

Example: How do I reset this device or fix this error?

Details

Model number, symptoms, what you tried, or the section of the manual you are using.

Submit question