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Comimark ICL8038

Comimark ICL8038 Function Signal Generator DIY Kit Instruction Manual

Model: ICL8038

1. Introduction

This manual provides detailed instructions for the assembly, operation, and maintenance of your Comimark ICL8038 Function Signal Generator DIY Kit. This kit is designed for generating sine, triangle, square, and forward/reverse sawtooth waveforms, utilizing the ICL8038 chip and high-speed operational amplifiers for enhanced accuracy. It is an ideal project for hobbyists to develop soldering skills and create a useful test instrument.

2. Product Overview

2.1 Key Features

- Utilizes ICL8038 and high-speed op amp for higher accuracy.
- LCD display for accurate data indication.
- All components are through-hole, facilitating easy installation.
- Capable of outputting sine, triangle, square, and forward/reverse sawtooth waveforms.
- Frequency Range: 5Hz-400kHz (Adjustable).
- Duty Cycle Range: 2%-95% (Adjustable).
- Supports dual power amplifier without blocking capacitors to ensure high and low frequency signal integrity.
- Adjustable frequency and amplitude with coarse and fine tuning options.
- Low Distortion Sine Wave: 1%.
- Low Temperature Drift: 50ppm / °C.
- Output Triangular Wave Linearity: 0.1%.
- DC Bias Range: -7.5V to 7.5V.
- Output Amplitude Range: 0.1V-11VPP (with 12V operating voltage).

2.2 Kit Components

The Comimark ICL8038 Function Signal Generator DIY Kit includes all necessary electronic components, a printed circuit board (PCB), and an acrylic casing for assembly. Please verify all components are present before beginning assembly.

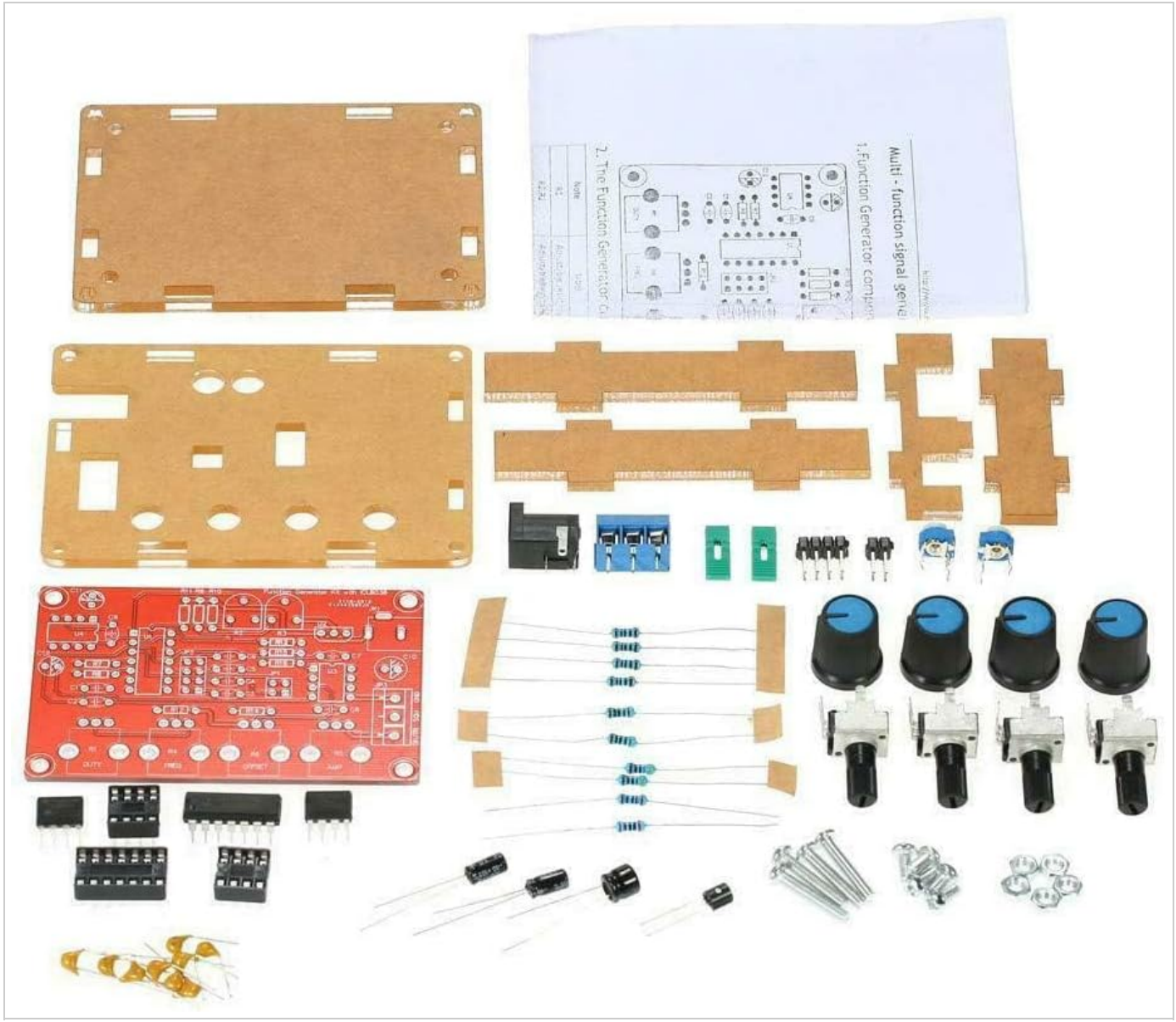


Image 1: All components of the Comimark ICL8038 Function Signal Generator DIY Kit, including the PCB, acrylic casing parts, resistors, capacitors, integrated circuits, potentiometers, and connectors.

3. Assembly Instructions

This kit requires soldering and basic electronics assembly skills. Ensure you have appropriate tools such as a soldering iron, solder, wire cutters, and a multimeter. Follow the provided circuit diagram and component placement guide carefully.

1. **Prepare the PCB:** Inspect the printed circuit board for any defects.
2. **Solder Resistors and Diodes:** Begin by soldering the lowest profile components first, such as resistors and diodes. Pay attention to resistor values and diode polarity.
3. **Solder Capacitors:** Install ceramic and electrolytic capacitors. Ensure correct polarity for electrolytic capacitors.
4. **Solder IC Sockets:** Solder the sockets for the integrated circuits (ICL8038 and op-amp). This allows for easier replacement if needed.
5. **Solder Potentiometers and Switches:** Install the potentiometers (for DUTY, FREQ, OFFSET, AMP) and frequency range switches.
6. **Solder Connectors:** Solder the power input jack and output terminals.
7. **Install ICs:** Carefully insert the ICL8038 and op-amp ICs into their respective sockets, ensuring correct orientation.
8. **Assemble Acrylic Casing:** Once all components are soldered and verified, assemble the acrylic casing around the PCB using the provided screws and nuts.

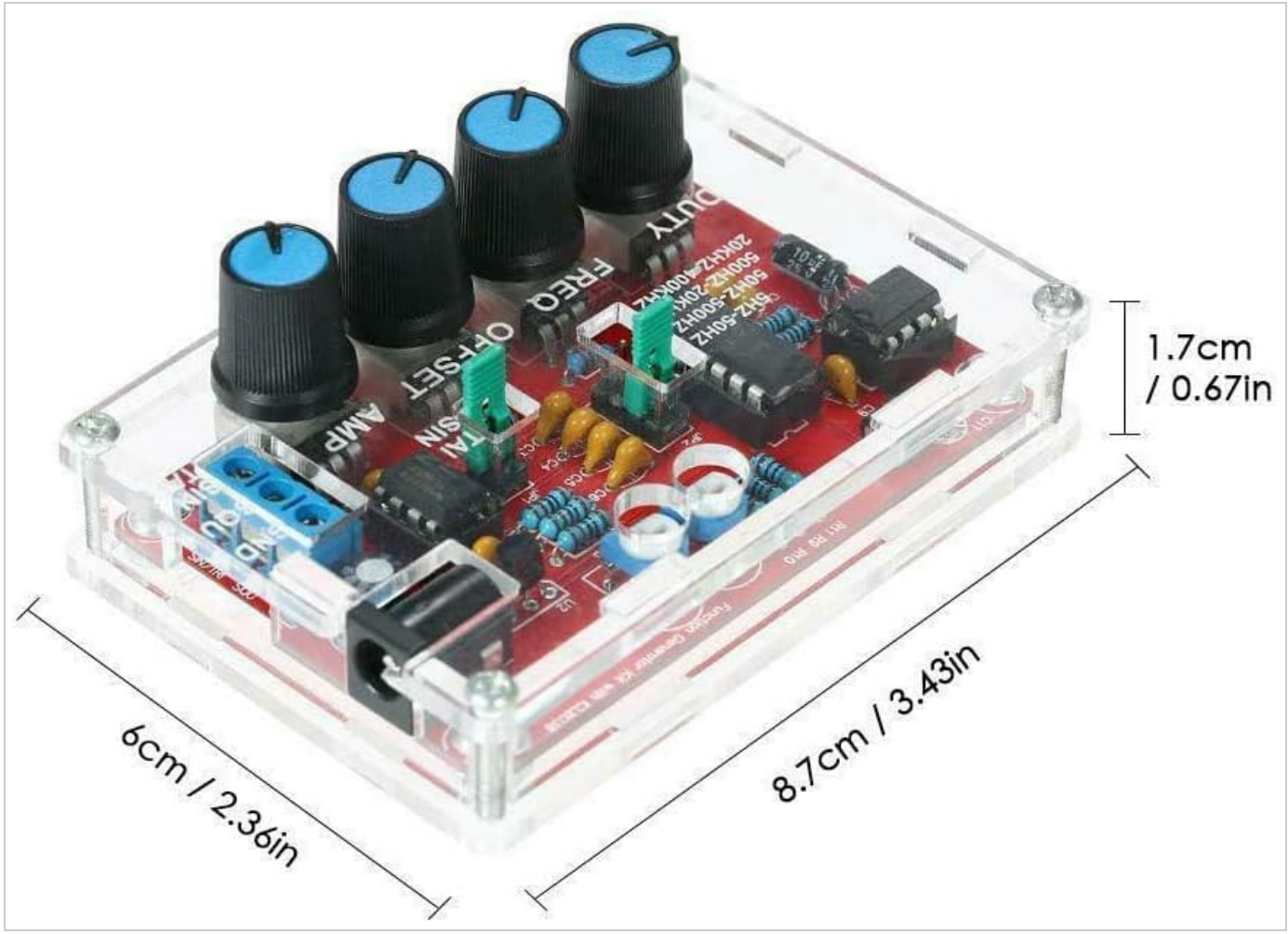


Image 2: The fully assembled Comimark ICL8038 Function Signal Generator, enclosed in its clear acrylic case, with dimensions indicated.

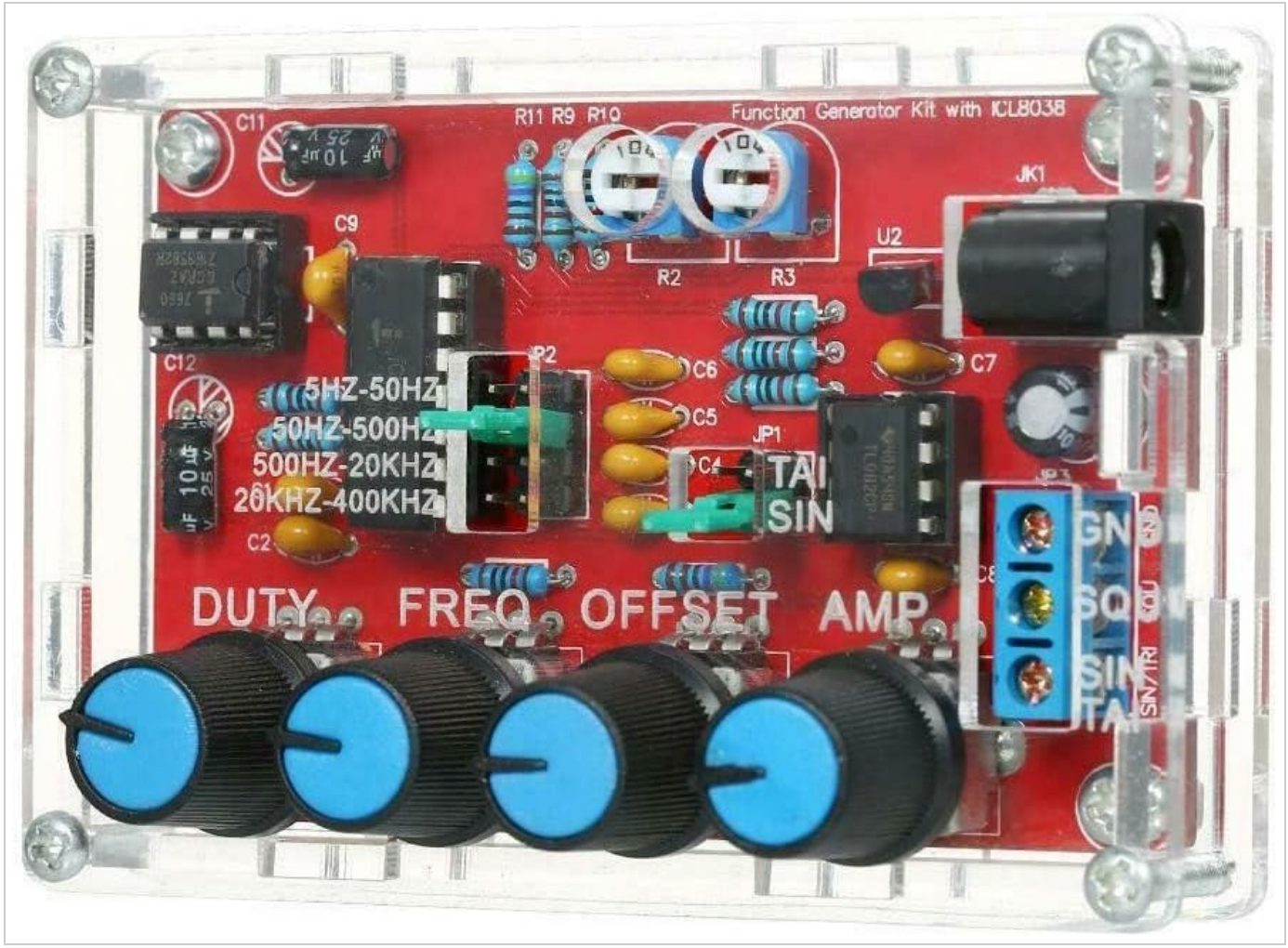


Image 3: A detailed top view of the assembled circuit board within the acrylic casing, highlighting the ICL8038 chip, op-amp, potentiometers, and frequency selection switches.

4. Operating Instructions

The Comimark ICL8038 Function Signal Generator can be used to generate various waveforms and also features measurement capabilities for voltage, current, logic level, and circuit continuity.

4.1 Power Supply Connection

Connect a 12V-15V DC power supply to the power input jack. Ensure correct polarity. The device will power on and the LCD display will activate.

4.2 Waveform Generation

Adjust the output waveform parameters using the control knobs and switches:

- **Frequency Adjustment:** Use the "FREQ" knob for fine-tuning and the frequency range switches (5Hz-50Hz, 50Hz-500Hz, 500Hz-20KHz, 20KHz-400KHz) for coarse adjustment.
- **Duty Cycle Adjustment:** Use the "DUTY" knob to adjust the duty cycle of the output waveform (2%-95%).
- **Amplitude Adjustment:** Use the "AMP" knob to control the output amplitude (0.1V-11VPP).
- **Offset Adjustment:** Use the "OFFSET" knob to adjust the DC bias of the output signal (-7.5V to 7.5V).
- **Waveform Selection:** Select the desired waveform (Sine, Triangle, Square) using the appropriate switches or jumpers on the board.

4.3 Measuring Voltage and Current

The device can display both voltage and current. The upper segment of the LCD shows voltage, and the lower segment shows current. For the first current measurement, calibration is required: long press the button (SW2) until the digital tube flashes.
To measure voltage, connect the negative probe to the negative terminal of the power source and the positive probe to the positive terminal of the circuit or component. To measure current, connect the device in series with the load. For example, connect the negative of the measuring interface to the negative of the power supply, and the positive of the measuring interface to the negative of the motor. Then connect the positive of the motor to the positive of the power supply.



Video 1: This video demonstrates how to measure voltage and current using the device. It shows the connection methods for both measurements and the display of readings on the LCD.

4.4 Measuring Logic Level and Circuit Continuity

Short press the SW2 button to cycle through measurement modes. One mode allows for logic level measurement. Connect the negative of the measuring interface to the negative of the power supply. Connect the positive probe to the point on the circuit board where you want to measure the logic level. The display will indicate if the interface is in a low or high level state. If the display shows "---", it means the voltage is not measured or the circuit is not powered.
Another mode is for circuit on/off (continuity) measurement. Connect the two measurement points of the circuit to the negative and positive terminals of the measurement interface. If the buzzer sounds, it indicates a short circuit (continuity). If there is no sound, the circuit is open (off).



Video 2: This video demonstrates how to measure logic levels and check circuit continuity (on/off) using the device. It shows the display indications for high/low levels and the buzzer sound for continuity.

5. Maintenance

- **Cleaning:** Keep the device clean and free from dust. Use a soft, dry cloth for cleaning. Avoid using liquids or abrasive cleaners.
- **Storage:** Store the kit in a dry environment, away from direct sunlight and extreme temperatures.
- **Component Check:** Periodically inspect soldered joints for any signs of corrosion or cold solder joints.
- **Power Supply:** Always use a stable and appropriate power supply (12V-15V DC) to prevent damage to the components.

6. Troubleshooting

- **No Power/Display:**
  - Check power supply connection and ensure it provides 12V-15V DC.
  - Verify power input jack and associated solder joints.
- **Incorrect Waveform Output:**
  - Ensure all ICs are correctly seated in their sockets and oriented properly.
  - Check all component values (resistors, capacitors) against the circuit diagram.
  - Verify connections to the output terminals.
- **Unstable Frequency/Signal Distortion:**
  - Ensure all potentiometers are functioning correctly and adjusted appropriately.

- Check for any loose connections or cold solder joints, especially around the ICL8038 chip and op-amp.
- Verify the stability of your power supply. External interference can affect signal quality, particularly at higher frequencies.

- **Display Issues:**
  - Check connections to the LCD display.
  - Ensure the device is powered correctly.

- **Difficulty with Assembly Instructions:**
  If the printed instructions are unclear, search online for "ICL8038 Function Generator DIY Kit assembly guide" or similar terms. Many community resources and videos are available for this common kit.

7. Specifications

Parameter	Value
Supply Voltage	12V-15V DC
Frequency Range	5Hz-400KHz (Adjustable)
Duty Cycle Range	2%-95% (Adjustable)
Low Distortion Sine Wave	1%
Low Temperature Drift	50ppm / °C
Output Triangular Wave Linearity	0.1%
DC Bias Range	-7.5V to 7.5V
Output Amplitude Range	0.1V-11VPP (at 12V operating voltage)
Board Size	Approx. 7.8 x 5 cm
Item Weight	4.8 ounces (approx. 136g)

8. Warranty and Support

As a DIY kit, the warranty typically covers manufacturing defects of individual components upon receipt. Due to the nature of self-assembly, proper functioning after assembly depends on the user's soldering and assembly skills. For support regarding missing or defective components, please contact your retailer. For assembly guidance, refer to online community resources and tutorials.

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