KNACRO ICL8038

KNACRO ICL8038 Signal Generator Module User Manual

Model: ICL8038 | Brand: KNACRO

1. Introduction

This manual provides detailed instructions for the setup, operation, and maintenance of the KNACRO ICL8038 Signal Generator Module. The ICL8038 is a precision oscillating integrated circuit capable of generating sine, triangular, and square waveforms. It is designed for various electronic applications requiring stable and adjustable signal sources.

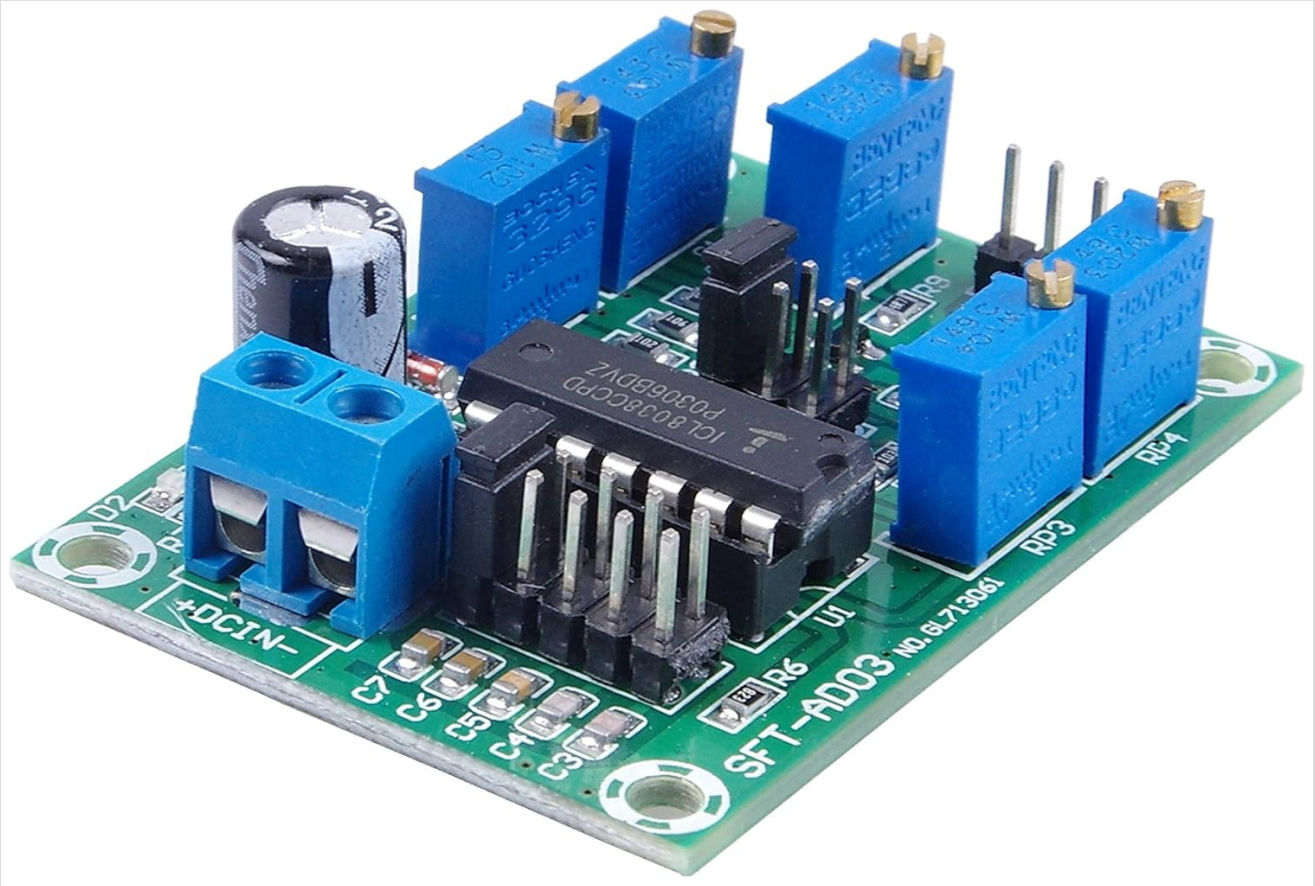

Figure 1.1: An overview of the KNACRO ICL8038 Signal Generator Module, showcasing its compact design and main components.

2. Product Features

- Utilizes the ICL8038 precision oscillating integrated circuit.
- Generates sine, triangular, and square waveforms.
- Frequency and duty cycle of output waveforms are controllable via current or resistance.
- Features an FM signal input for low-frequency signal control.
- Low frequency drift, typically not exceeding 50ppm / °C.
- Sine wave output distortion is less than 1%.
- Triangular wave output exhibits 0.1% high linearity.
- Wide adjustable duty cycle range from 2% to 98%.
- Designed for a frequency range of 10 Hz to 450 KHz.
- Applications include test signals, drive signals, carrier frequency signals, switching signals, trigger signals, and scanning signals.

3. Specifications

Parameter	Value
Operating Voltage	DC 12-15V
Output Waveforms	Sine wave, Triangular wave, Square wave
Sine Wave Distortion	Less than 1%
Frequency Drift	Less than 50ppm / °C
Triangular Wave Linearity	0.1% high linearity
Operating Temperature	0 ~ 70 °C
Product Dimensions (L x W x H)	53.8 x 37.7 x 15 mm (2.12 x 1.48 x 0.59 inches)
Net Weight	18 g (0.04 lbs)
Frequency Range	10 Hz ~ 450 KHz

4. Setup

Before operating the ICL8038 module, ensure all connections are made correctly. Refer to the diagram below for component identification and connection points.

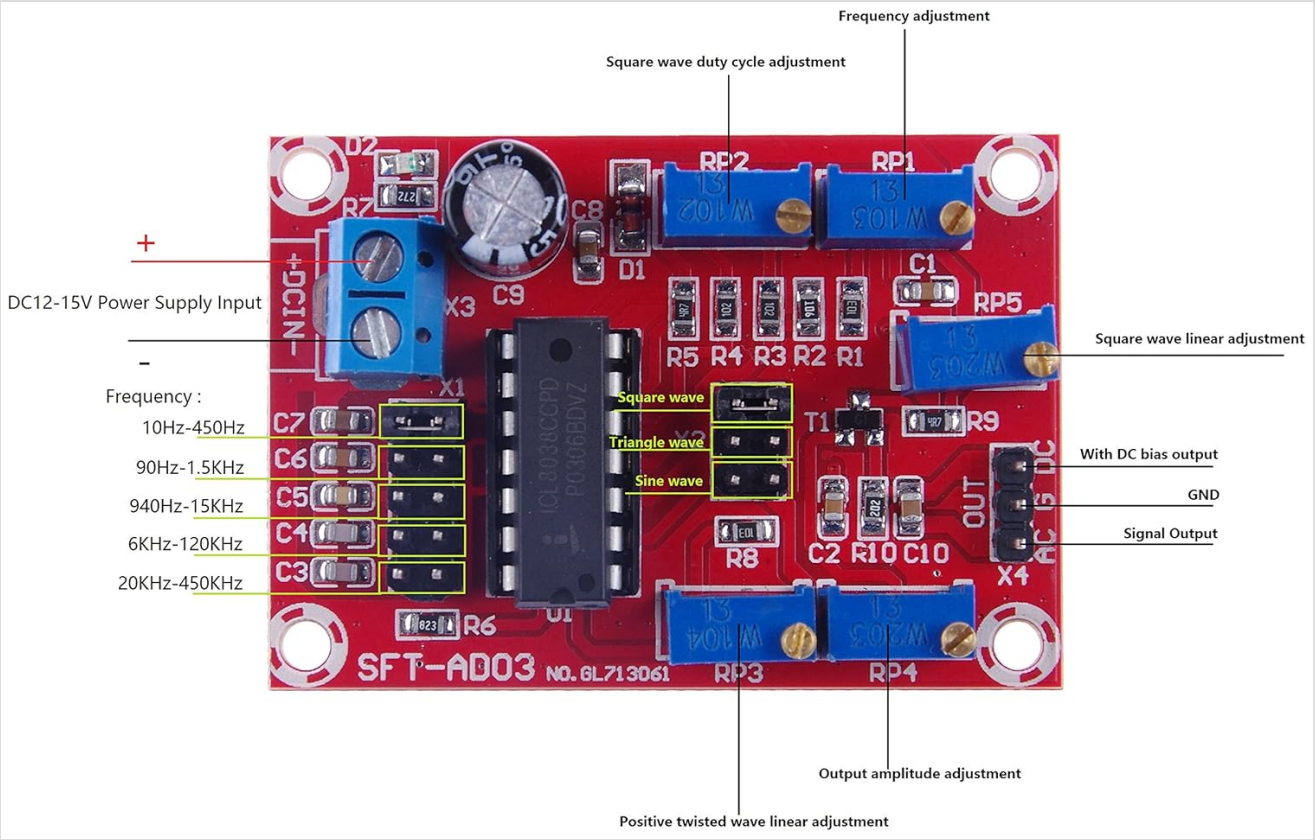

Figure 4.1: Top view of the ICL8038 module with key components and connection points labeled. This image shows the DC power input (+DCIN-), signal output (OUT), ground (GND), DC bias output, frequency adjustment, square wave duty cycle adjustment, square wave linear adjustment, positive twisted wave linear adjustment, and output amplitude adjustment potentiometers (RP1-RP5). It also indicates the frequency range selection points (C3-C7).

4.1 Power Connection

- Connect a DC power supply (12-15V) to the **+DCIN-** terminal block. Ensure correct polarity: positive to '+' and negative to '-'.
- The module requires a stable power source for optimal performance.

4.2 Signal Output

- The main signal output is available at the **OUT** pin.
- Connect the ground of your measuring device or circuit to the **GND** pin.
- A DC bias output is also available for specific applications.

5. Operating Instructions

The ICL8038 module allows for adjustment of frequency, waveform type, duty cycle, and output amplitude. Use the onboard potentiometers and frequency selection points as described below.

5.1 Frequency Adjustment

- **Frequency Potentiometer:** Adjust the potentiometer labeled "Frequency adjustment" (RP2 in Figure 4.1) to fine-tune the output frequency within the selected range.
- **Frequency Range Selection:** The module supports multiple frequency ranges. These are typically selected by connecting specific capacitor points (C3-C7 in Figure 4.1). The ranges are:
  - 10Hz-450Hz
  - 90Hz-1.5KHz
  - 940Hz-15KHz

- 6KHz-120KHz
- 20KHz-450KHz

Note: The exact method for selecting these ranges (e.g., jumpers, switches) may vary. Refer to the module's silkscreen for specific instructions if not immediately apparent.

5.2 Waveform Selection

The module can generate sine, triangular, and square waveforms. The selection points for these waveforms are indicated on the module (see Figure 4.1). Typically, these are jumper pins where you can select the desired waveform output.

- **Square Wave:** Select the square wave output.
- **Triangle Wave:** Select the triangle wave output.
- **Sine Wave:** Select the sine wave output.

5.3 Duty Cycle Adjustment (Square Wave)

For square wave output, the duty cycle can be adjusted from 2% to 98% using the potentiometer labeled "Square wave duty cycle adjustment" (RP1 in Figure 4.1).

5.4 Output Amplitude Adjustment

The amplitude of the output signal can be adjusted using the potentiometer labeled "Output amplitude adjustment" (RP3 in Figure 4.1).

5.5 Waveform Linearity Adjustments

- **Square Wave Linear Adjustment:** Use the potentiometer labeled "Square wave linear adjustment" (RP5 in Figure 4.1) to optimize the linearity of the square wave.
- **Positive Twisted Wave Linear Adjustment:** Use the potentiometer labeled "Positive twisted wave linear adjustment" (RP4 in Figure 4.1) for fine-tuning the linearity of the positive portion of the waveform, particularly for sine and triangle waves.

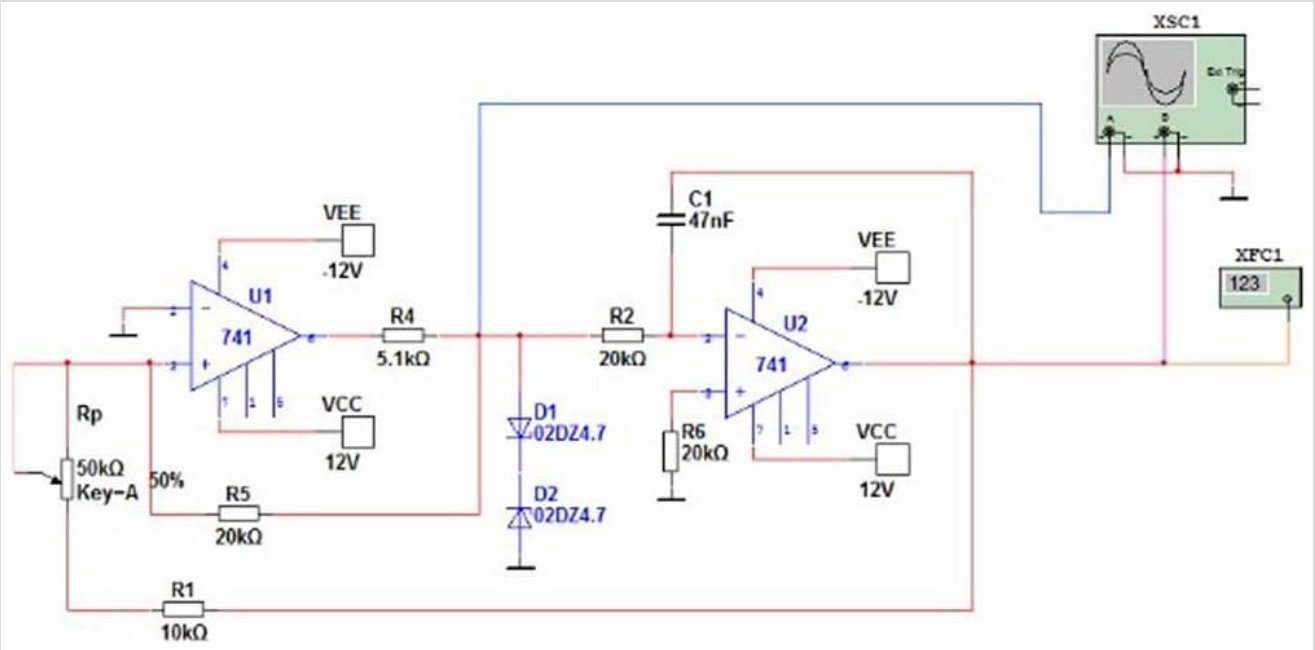

Figure 5.1: Simplified circuit diagram illustrating the internal connections and operational principles of a typical ICL8038 based signal generator. This diagram provides a conceptual overview for advanced users understanding the signal path and control mechanisms.

6. Maintenance

Proper maintenance ensures the longevity and reliable operation of your ICL8038 module.

- **Cleaning:** Keep the module clean and free from dust and debris. Use a soft, dry cloth for cleaning. Avoid using liquids or abrasive cleaners.
- **Storage:** Store the module in a dry, cool environment, away from direct sunlight and extreme temperatures.
- **Handling:** Handle the module with care to avoid physical damage to components or solder joints. Avoid static discharge.
- **Power Supply:** Always use a stable and correctly rated DC 12-15V power supply. Incorrect voltage can damage the module.

7. Troubleshooting

If you encounter issues with your ICL8038 module, refer to the following troubleshooting steps:

Problem	Possible Cause	Solution
No output signal	◦ Incorrect power connection or no power. ◦ Output connection error. ◦ Potentiometers set to minimum output.	◦ Verify DC 12-15V power supply and correct polarity. ◦ Ensure signal output (OUT) and ground (GND) are correctly connected. ◦ Adjust the "Output amplitude adjustment" potentiometer (RP3).
Incorrect or distorted waveform	◦ Incorrect waveform selection. ◦ Linearity potentiometers (RP4, RP5) misadjusted. ◦ Power supply instability.	◦ Confirm the correct waveform is selected via jumpers. ◦ Adjust "Square wave linear adjustment" (RP5) and "Positive twisted wave linear adjustment" (RP4). ◦ Ensure a stable power supply.
Unstable frequency	◦ Unstable power supply. ◦ Loose connections. ◦ Environmental factors (temperature).	◦ Use a regulated and stable DC 12-15V power supply. ◦ Check all connections for secure contact. ◦ Operate within the specified temperature range (0 ~ 70 °C).

8. Warranty and Support

For warranty information or technical support regarding your KNACRO ICL8038 Signal Generator Module, please contact your retailer or the manufacturer directly. Keep your purchase receipt as proof of purchase.