

FREENOVE FNK0101

FREENOVE Universal Breakout Board FNK0101 Instruction Manual

Model: FNK0101

Brand: FREENOVE

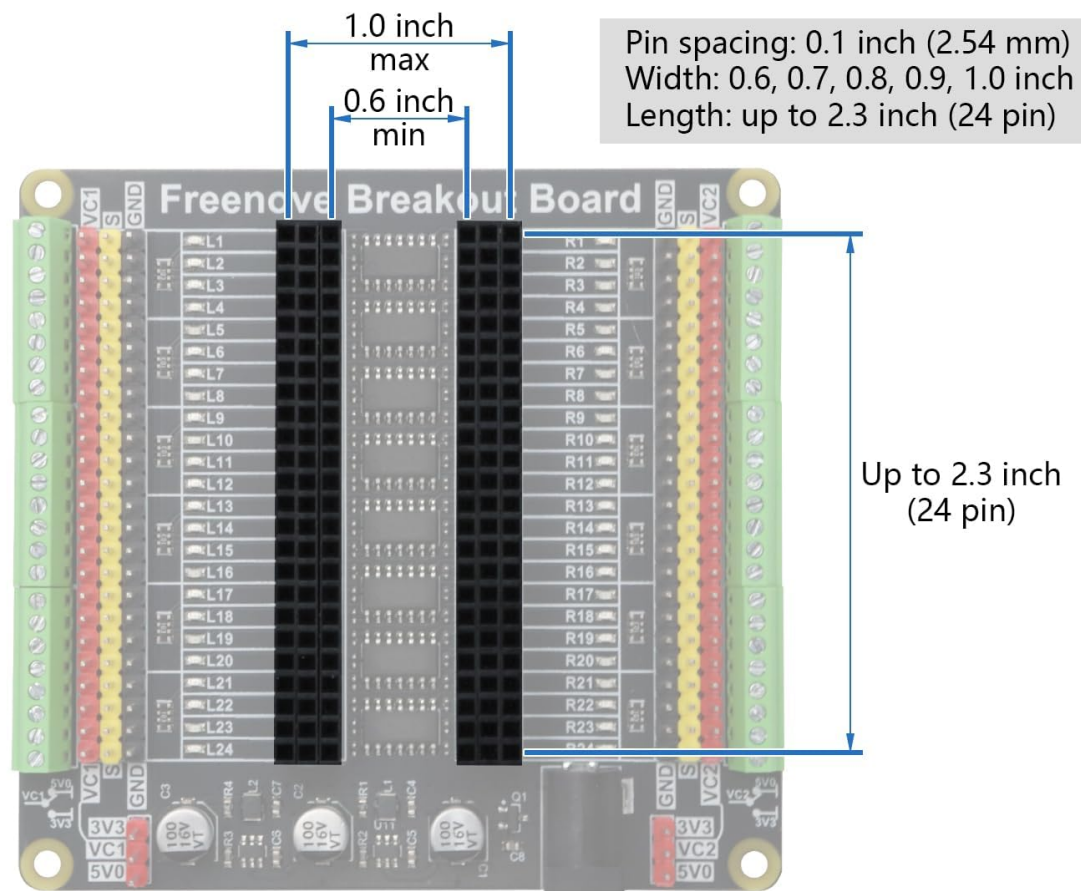
1. PRODUCT OVERVIEW

This FREENOVE Universal Breakout Board is designed to simplify wiring and monitor the status of General Purpose Input/Output (GPIO) pins for various development boards. It provides a convenient interface for connecting your microcontroller to external components. Simply plug in your compatible board and connect the necessary power pins to begin.

This board is compatible with a wide range of microcontrollers, including Arduino Nano, Arduino Micro, Raspberry Pi Pico 1/2 (W), ESP32, and ESP8266. It supports boards operating at either 5V or 3.3V, with a standard pin spacing of 0.1 inch (2.54 mm). The board accommodates widths of 0.6, 0.7, 0.8, 0.9, 1.0 inch and lengths up to 2.3 inch (24 pins).

Compatible Models

Most boards (5 V or 3.3 V) with a pin spacing of 0.1 inch (2.54 mm).



The pin spacing of this breakout board is the same as that of common breadboards.

Image: FREENOVE Universal Breakout Board, showing its layout with terminal blocks and pin headers.

2. PACKAGE CONTENTS

- 1 x FREENOVE Universal Breakout Board
- 1 x Slotted Screwdriver
- 5 x Jumper Cap (Red, Short)
- 5 x Jumper Cap (Red, Long)
- 5 x Jumper Cap (Black, Short)
- 5 x Jumper Cap (Black, Long)

Package



Image: Contents of the FREENOVE Universal Breakout Board package, including the board, screwdriver, and various jumper caps.

3. KEY FEATURES

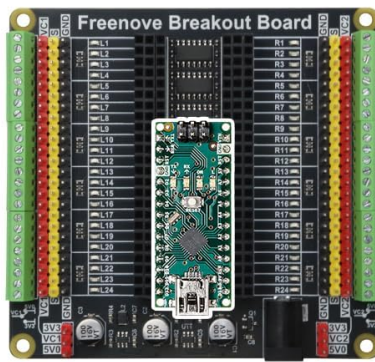
- **Compatible Models:** Designed for boards (5V or 3.3V) with 0.1 inch (2.54 mm) pin spacing, widths of 0.6, 0.7, 0.8, 0.9, 1.0 inch, and lengths up to 2.3 inch (24 pins). This includes Arduino Nano/Micro, Raspberry Pi Pico 1/2 (W), ESP32, and ESP8266.
- **Power Supply Options:** Can provide 5V and 3.3V power (up to 3A via DC-DC circuit) when using a 6-24V DC input. Alternatively, it can utilize power from the main board. Jumper caps must be configured according to the tutorial for proper power selection.
- **GPIO Status LED:** Each GPIO pin features an LED indicator. The LED illuminates when the GPIO outputs or inputs a high logic level and turns off for a low logic level.
- **Independent LED Drive:** The status LEDs are driven by a dedicated chip, ensuring that the LEDs do not draw current directly from the GPIO pins and thus do not affect the performance or signal integrity of your microcontroller.
- **Terminal Block and Header:** Provides both screw terminal blocks and pin headers for connecting to all pins of the main board, with a 2.54 mm (0.1 inch) pitch.

4. COMPATIBLE BOARDS

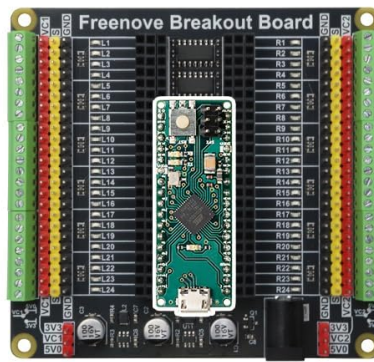
The FREENOVE Universal Breakout Board is designed for broad compatibility with popular microcontroller development boards. Below are examples of compatible boards and how they integrate with the breakout board.

Model Examples

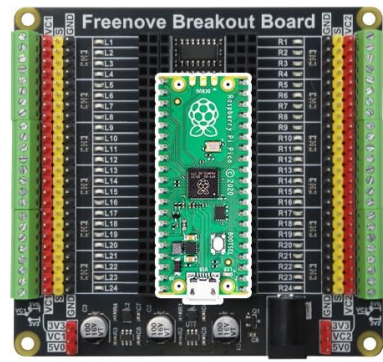
Compatible with Arduino Nano / Micro, Raspberry Pi Pico 1 / 2 (W), ESP32, ESP8266.



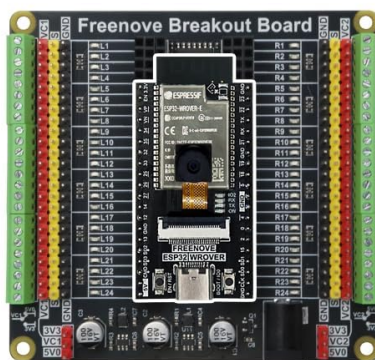
Arduino
Nano



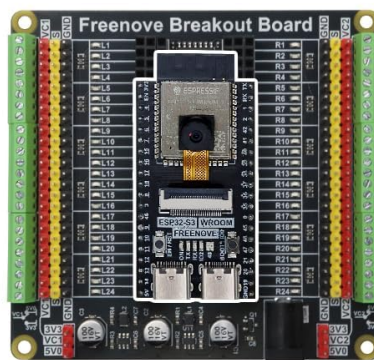
Arduino
Micro



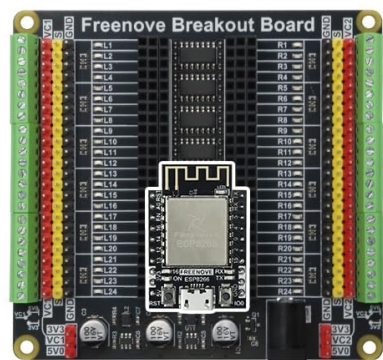
Raspberry Pi Pico
1 / 1 W / 2 / 2 W



Freenove
ESP32



Freenove
ESP32-S3



Freenove
ESP8266

Compatible with more boards, only a few common ones are listed here.

Image: Examples of compatible boards such as Arduino Nano, Arduino Micro, Raspberry Pi Pico, ESP32, ESP32-S3, and ESP8266 mounted on the FREENOVE Breakout Board.

For a visual demonstration of a compatible board, watch the video below featuring the Freenove Raspberry Pi Pico Board.

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Video: A brief overview of the Freenove Raspberry Pi Pico Board, demonstrating its features and form factor, which is compatible with this universal breakout board.

5. SETUP INSTRUCTIONS

5.1. Board Installation

Carefully align the pins of your compatible microcontroller board (e.g., Arduino Nano, Raspberry Pi Pico, ESP32) with the central pin headers on the FREENOVE Universal Breakout Board. Gently press down until the board is securely seated. Ensure all pins are correctly aligned to prevent damage.

5.2. Power Configuration

The breakout board offers flexible power options. You can either power it externally or use the power from your main microcontroller board.

5.2.1. External Power Supply

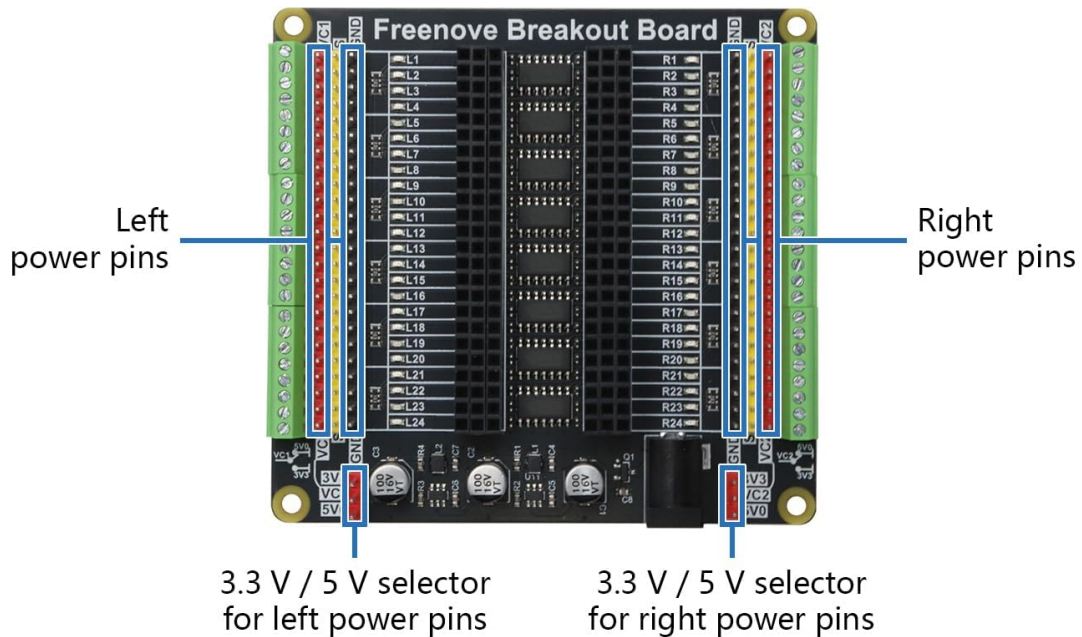
For external power, connect a DC power source (6-24V) to the DC jack on the breakout board. This configuration allows the board to provide up to 3A of 5V and 3.3V power to connected components. Ensure the jumper caps are set to enable external power, as detailed in the comprehensive tutorial available for download.

5.2.2. Main Board Power

If you prefer to use the power from your main microcontroller board, configure the jumper caps accordingly. Refer to the downloadable tutorial for specific jumper settings to ensure correct operation and prevent power conflicts.

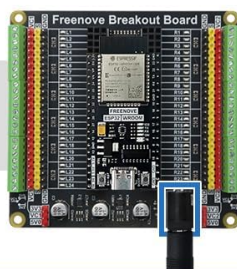
Power Circuit

Provide selectable 3.3 V or 5 V power outputs.



Use external power

5 V + 3.3 V:
Up to 3A



Use main board power

Depends on
the main board



Note: If only 3.3 V main board power is connected, the breakout board cannot provide 5 V. (Refer to the tutorial for details.)

Image: Diagram illustrating the power circuit of the FREENOVE Breakout Board, showing selectable 3.3V or 5V power outputs and options for external or main board power.

6. OPERATING INSTRUCTIONS

6.1. Connecting Components

Use the provided screw terminal blocks or pin headers to connect your external sensors, actuators, or other electronic components to the GPIO pins of your microcontroller. The 2.54 mm (0.1 inch) pitch ensures compatibility with standard jumper wires and breadboards.

6.2. Monitoring GPIO Status

The breakout board features individual LED indicators for each GPIO pin. These LEDs provide real-time visual

feedback on the logic level of each pin:

- **LED On:** Indicates that the GPIO pin is outputting or inputting a high logic level (e.g., 5V or 3.3V).
- **LED Off:** Indicates that the GPIO pin is outputting or inputting a low logic level (e.g., 0V or Ground).

GPIO Status LED

LED on / off based on GPIO high / low level.

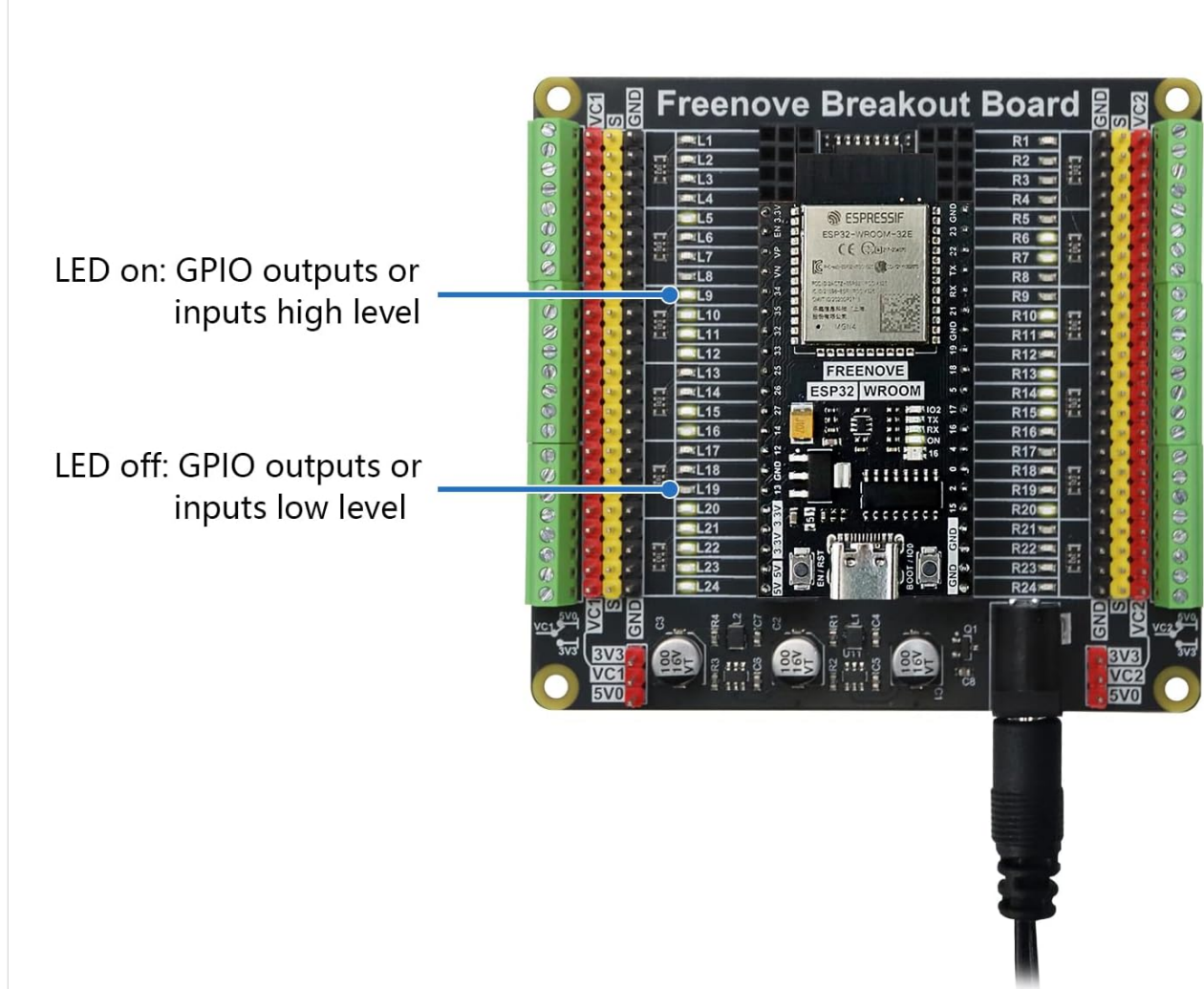


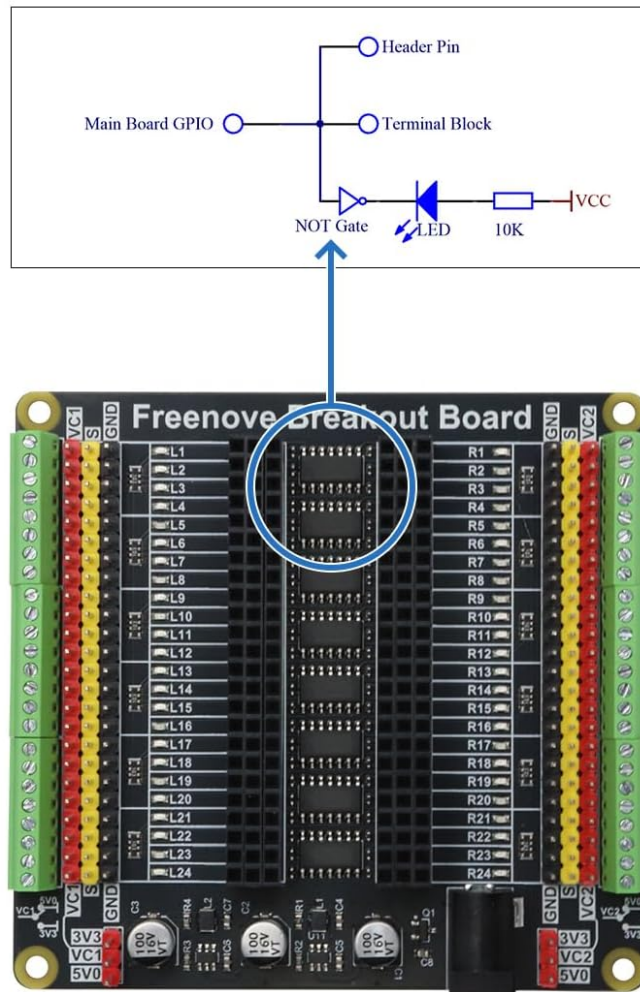
Image: Close-up view of the FREENOVE Breakout Board highlighting the GPIO status LEDs, showing how they indicate high or low logic levels.

6.3. Independent LED Functionality

The status LEDs are designed to operate independently of the GPIO pins. They are driven by a dedicated NOT gate chip, ensuring that the LEDs do not draw current directly from the GPIO pins and thus do not affect the performance or signal integrity of your microcontroller.

Independent LED

The GPIO will not be affected by the status LED.



The status LED is driven by the NOT gate chip instead of the GPIO.

Image: Diagram illustrating the independent LED circuit on the FREENOVE Breakout Board, showing the NOT gate chip driving the LEDs without affecting GPIO pins.

For a general overview of the product, watch the video below.

Your browser does not support the video tag.

Video: An official Freenove video providing a general overview and demonstration of the Universal Breakout Board.

7. PRODUCT SPECIFICATIONS

Feature	Detail
Model Name	FNK0101
Brand	FREENOVE
Product Dimensions	3.54 x 0.98 x 4.92 inches
Item Weight	3.17 ounces

Color	Universal
Pin Spacing	0.1 inch (2.54 mm)
Compatible Board Width	0.6, 0.7, 0.8, 0.9, 1.0 inch
Compatible Board Length	Up to 2.3 inch (24 pin)
Power Input (DC)	6-24 V
Power Output (DC-DC)	5 V and 3.3 V (up to 3A)

8. TROUBLESHOOTING

8.1. No Power to Components

- **Check Jumper Caps:** Ensure that the power selection jumper caps are correctly configured for either external power or main board power. Refer to the tutorial for the correct settings.
- **Verify External Power Source:** If using external power, confirm that the DC power source is connected and providing the correct voltage (6-24V).
- **Inspect Main Board Power:** If using main board power, ensure your microcontroller is powered on and supplying sufficient voltage and current.

8.2. GPIO LEDs Not Functioning

- **Check Connections:** Verify that your microcontroller is correctly seated on the breakout board and that the GPIO pins are making proper contact.
- **Test GPIO Output:** Confirm that the GPIO pins on your microcontroller are actually changing state (high/low) as expected through your code or a multimeter.
- **Power Supply:** Ensure the breakout board is receiving power, as the LEDs require power to operate, even if driven independently.

8.3. Board Not Fitting

- **Verify Dimensions:** Double-check that your microcontroller board's pin spacing, width, and length match the compatible dimensions specified in Section 1. Product Overview.
- **Pin Alignment:** Ensure that the pins are perfectly aligned with the headers before applying pressure. Misalignment can bend or damage pins.

9. MAINTENANCE

- **Cleaning:** Keep the board clean and free from dust and debris. Use a soft, dry brush or compressed air to remove any accumulation.
- **Storage:** Store the breakout board in a dry, anti-static environment when not in use to prevent damage from static discharge or moisture.
- **Handling:** Always handle the board by its edges to avoid touching the electronic components, which can be sensitive to static electricity or oils from your skin.

10. WARRANTY AND SUPPORT

FREENOVE provides free technical support for any questions or problems you may encounter with this product. Please refer to the product packaging for information on how to access the downloadable tutorial and support resources.

For detailed warranty information, please consult the official FREENOVE website or the documentation provided with your purchase.