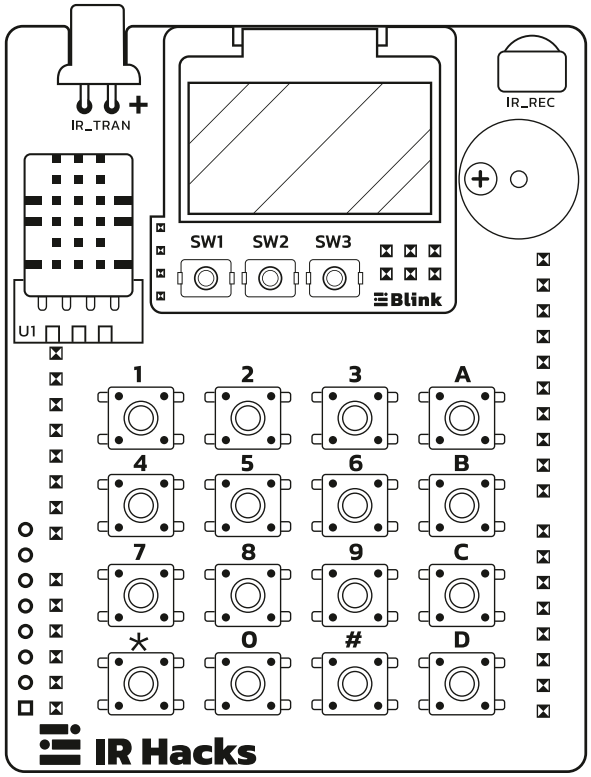
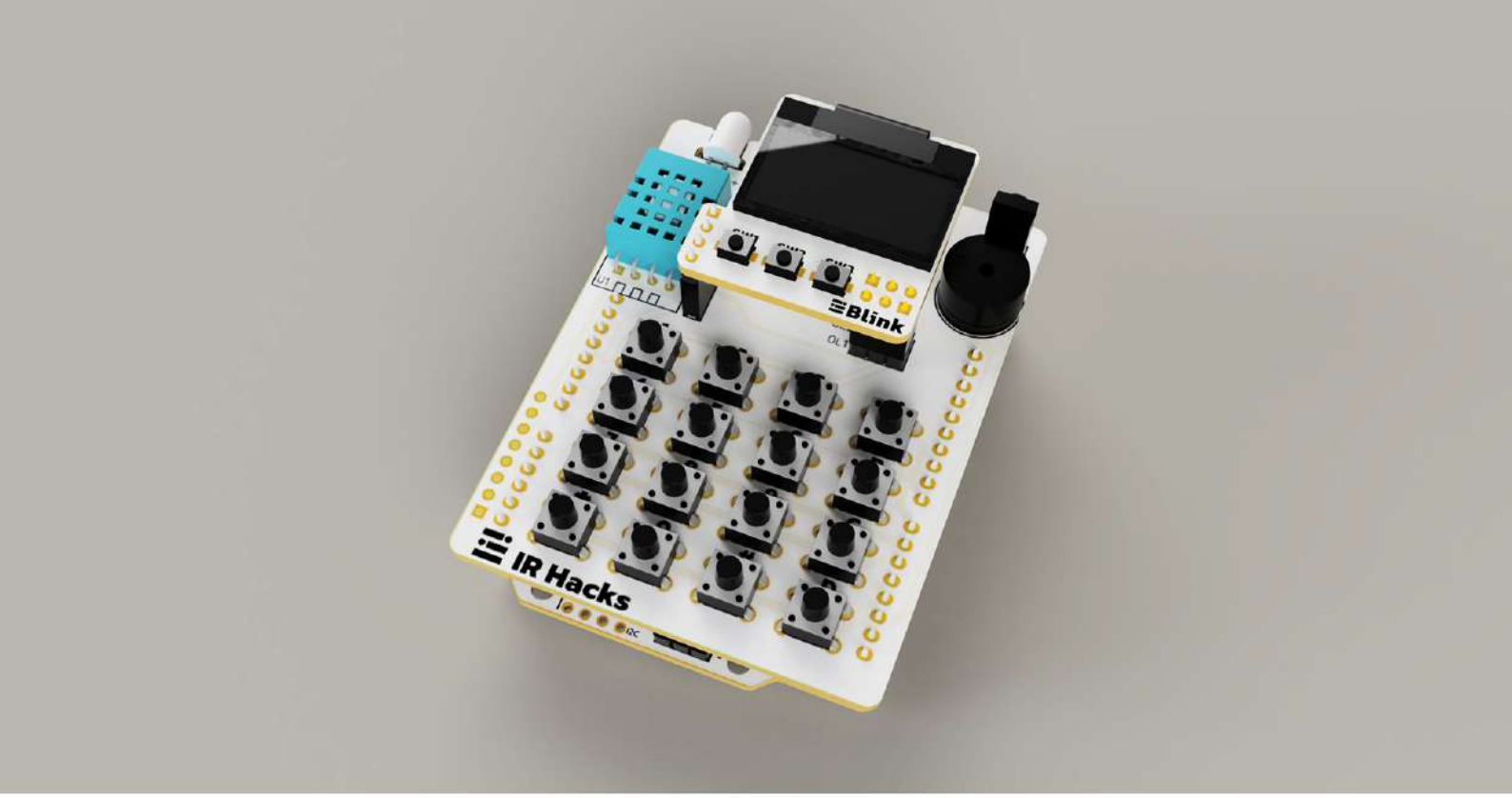
amomii



IR Hacks

DATASHEET SKU : IH01V1S



Description

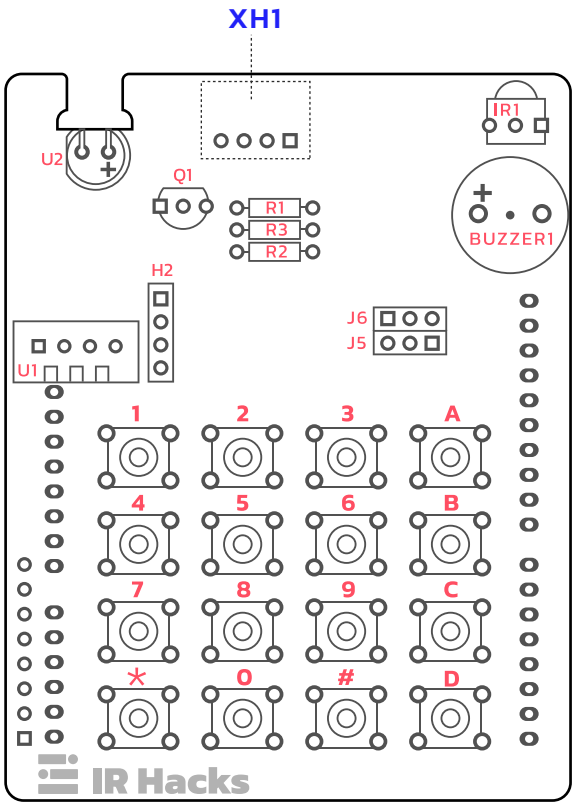
The IR Hacks is a versatile microcontroller shield designed for learners, hobbyists, and makers interested in exploring infrared technology and creating innovative projects. This feature-packed kit includes a 4 x 4 keys array, an OLED screen, a buzzer, an IR reader, and an IR transmitter, providing a wide range of functionalities for various applications.

Designed to connect directly to the amomii UNO and other Arduino UNO-style boards, the IR Hacks shield simplifies the process of integrating infrared capabilities into your projects. The shield supports multiple example projects, such as cloning remote controls, playing simple video games like Snake, and functioning as a calculator, showcasing its diverse applications.

The IR Hacks shield also serves as an excellent soldering practice kit, helping users develop their soldering skills while assembling a functional and engaging device. The comprehensive set of components and straightforward assembly process make it an ideal educational tool for beginners and advanced users alike.

Overall, the IR Hacks is a powerful and adaptable DIY gadget that offers endless opportunities for learning, experimentation, and creativity in the realm of infrared technology.

Included Components

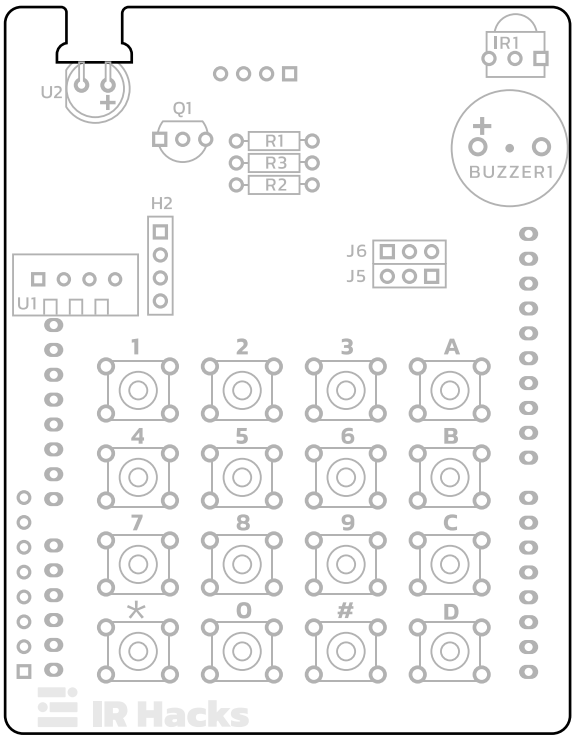


Label on the upper side of the PCB

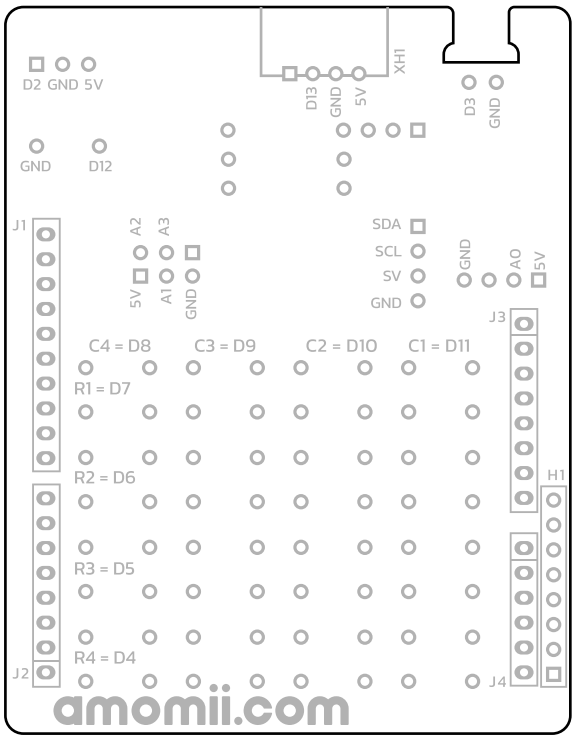
Label on the under side of the PCB

Image	Name	PCB Label	Datasheet
	XH Connector (4 Pin)	XH1	
	Transistor (2N2222A)	Q1	
	DHT11 Sensor	U1	
	IR Receiver	IR1	
	IR Transmitter	U2	
	Buzzer (Passive)	BUZZER1	
	Male Header (40 Pin)	J1, J2, J3, J4 & J2, J6	
	Resistor (10K Ω)	R2	
	Resistor (39 Ω)	R3	
	Resistor (510 Ω)	R1	
	Female Header (4 Pin)	H2	
	Tactile Push Button (6x6xH7mm)	0, 1, 2, 3, 4, 5, 6, 7, 8, 9 C, D, #, *	

PCB Layout



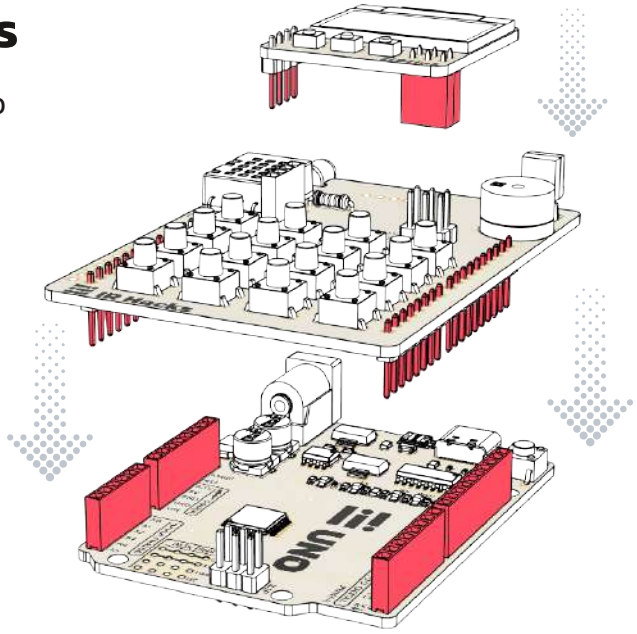
Top

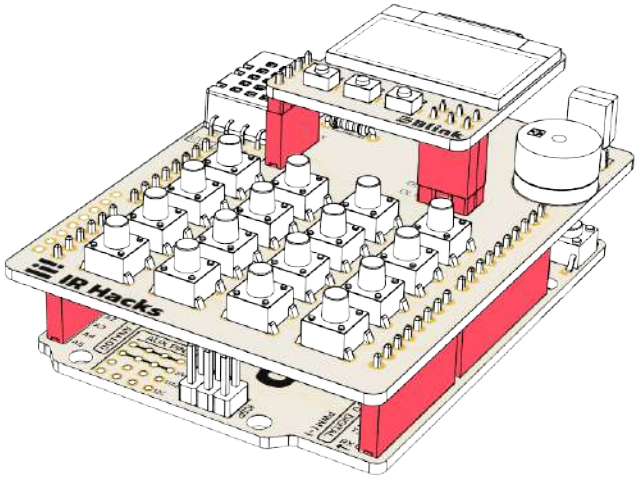


Bottom

Microcontroller Connections

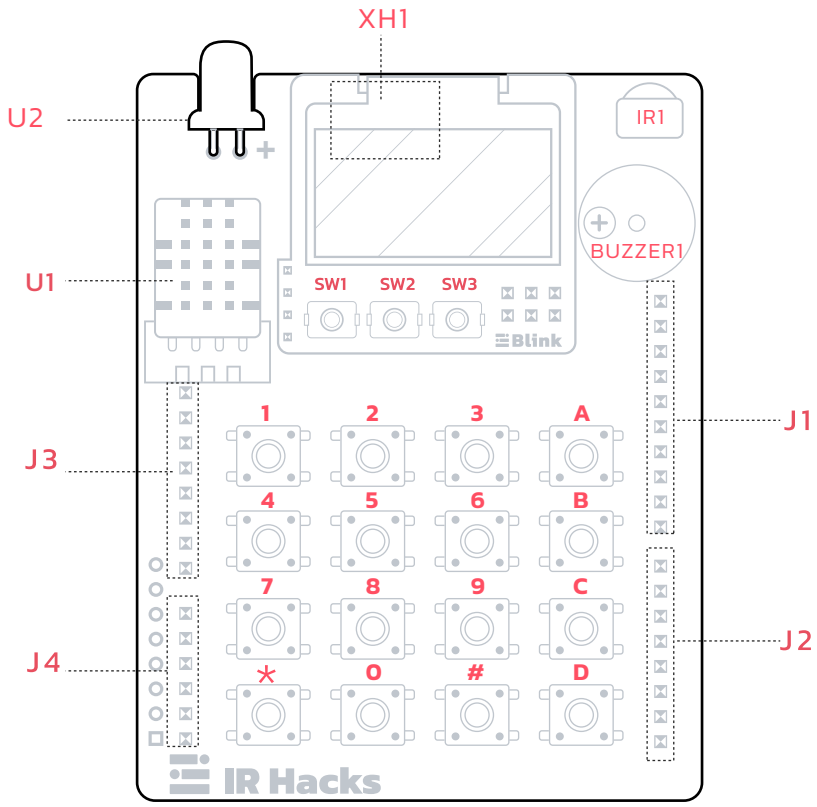
The IR Hacks shield is specifically designed to connect seamlessly on the amomii UNO or any other microcontroller configured in the Arduino UNO style.





Connection Diagram (Active Components)

The diagram and table below illustrate which UNO data pin each of the IR Hacks components are connected to.



PCB Label	Component	UNO Data Pin
1	Tactile Push Button	D7 and D11
2	Tactile Push Button	D7 and D10
3	Tactile Push Button	D7 and D9
4	Tactile Push Button	D6 and D11
5	Tactile Push Button	D6 and D10
6	Tactile Push Button	D6 and D9
7	Tactile Push Button	D5 and D11
8	Tactile Push Button	D5 and D10
9	Tactile Push Button	D5 and D9
*	Tactile Push Button	D4 and D11
0	Tactile Push Button	D4 and D10
#	Tactile Push Button	D4 and D9
A	Tactile Push Button	D7 and D8

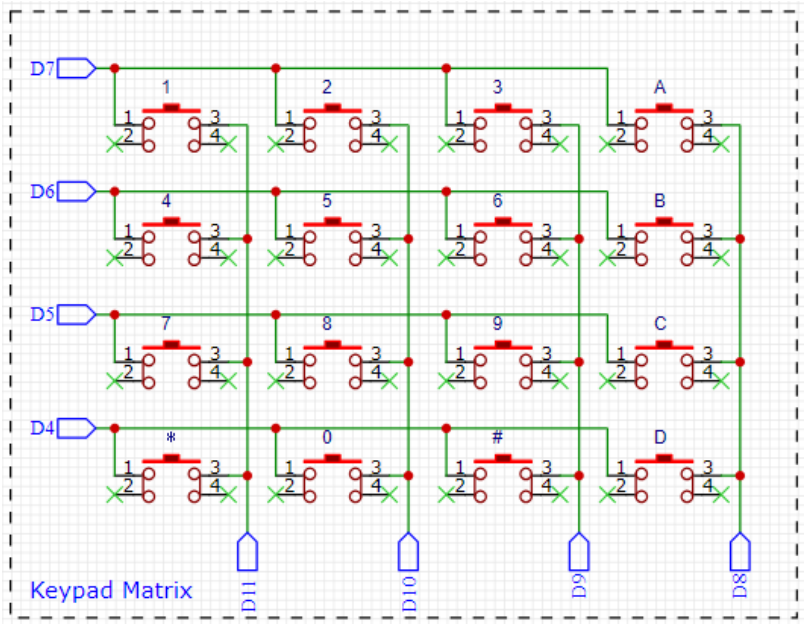
PCB Label	Component	UNO Data Pin
B	Tactile Push Button	D6 and D8
C	Tactile Push Button	D5 and D8
D	Tactile Push Button	D4 and D8
amomii Blink (Screen)	OLED Screen on the amomii Blink	A4 and A5 (I2C Address 0x3C)
amomii Blink (SW1)	Tactile Push Button on the amomii Blink	A1
amomii Blink (SW2)	Tactile Push Button on the amomii Blink	A2
amomii Blink (SW3)	Tactile Push Button on the amomii Blink	A3
U1	Digital Temperature and Humidity Sensor	A0
IR1	IR Receiver	D2
U2	IR Transmitter	D3
BUZZER1	Passive Buzzer	D12
XH1	XH Connector (4 Pin)	D13

Circuitry Details

While some of the components are connected directly to the microcontroller in a conventional manner, others need more of an explanation.

Circuitry Details: Keypad

The IR Hacks shield features a 4x4 matrix keypad designed to provide a simple and efficient way to input data. The keypad is arranged in a grid with the following layout:



Wiring Overview:

- Rows: The rows of the keypad are connected to the Arduino pins D7 through D4, with the top row (1, 2, 3, A) connected to D7 and the bottom row (*, 0, #, D) connected to D4.
- Columns: The columns are connected to the Arduino pins D11 through D8, with the leftmost column (1, 4, 7, *) connected to D11 and the rightmost column (A, B, C, D) connected to D8.

How It Works:

The 4x4 matrix keypad operates by scanning the rows and columns to detect key presses. Here's a basic overview of the process:

1. Initialization:
The microcontroller sets all column pins (D11 to D8) as inputs with pull-up resistors enabled.
Row pins (D7 to D4) are set as outputs, initially set to high.

2. Scanning:
The microcontroller sequentially sets each row pin low one at a time and checks the state of the column pins. If a key is pressed, it will create a connection between a row and a column, allowing the microcontroller to detect a low signal on the corresponding column pin.

3. Key Detection:
The microcontroller identifies the specific row and column intersection to determine which key was pressed.

4. Processing:
The detected key press is processed according to the programmed logic.

This method of wiring and scanning is efficient and allows for the detection of multiple key presses with minimal pin usage, making it ideal for compact and feature-rich designs like the IR Hacks shield.

See IR Hacks datasheet

OLED Screen (amomii Blink)

The IR Hacks shield features the amomii Blink module, an advanced OLED screen solution designed for seamless integration with Arduino UNO and compatible boards. This module offers a high-quality display and convenient user input through its built-in buttons.

IR Hacks Wiring Overview

- **amomii Blink OLED Screen:** The OLED screen is controlled via I2C, using the address 0x3C. It connects to the UNO's I2C pins (A4 for SDA and A5 for SCL).
- **Buttons:** The module includes three buttons (SW1, SW2, SW3) connected to the analog pins A1, A2, and A3. These buttons must be set as input pull-ups in your code, as they do not have pull-down resistors. Note that although these buttons are connected to analog pins, they are used as digital inputs.

This configuration ensures that the amomii Blink module can be easily integrated into your projects, providing both display capabilities and user input options with minimal wiring complexity.
For more information on the amomii Blink module, please see the amomii Blink datasheet.


See amomii Blink datasheet

IR Transmitter

- **Wiring:** The IR transmitter is connected to digital pin D3 on the UNO.
- **Reasoning:** The IR library used for transmitting signals requires the use of pin D3 due to its timer-specific functions. This ensures that the timing of the transmitted IR signals is precise, which is critical for compatibility with standard remote control protocols.

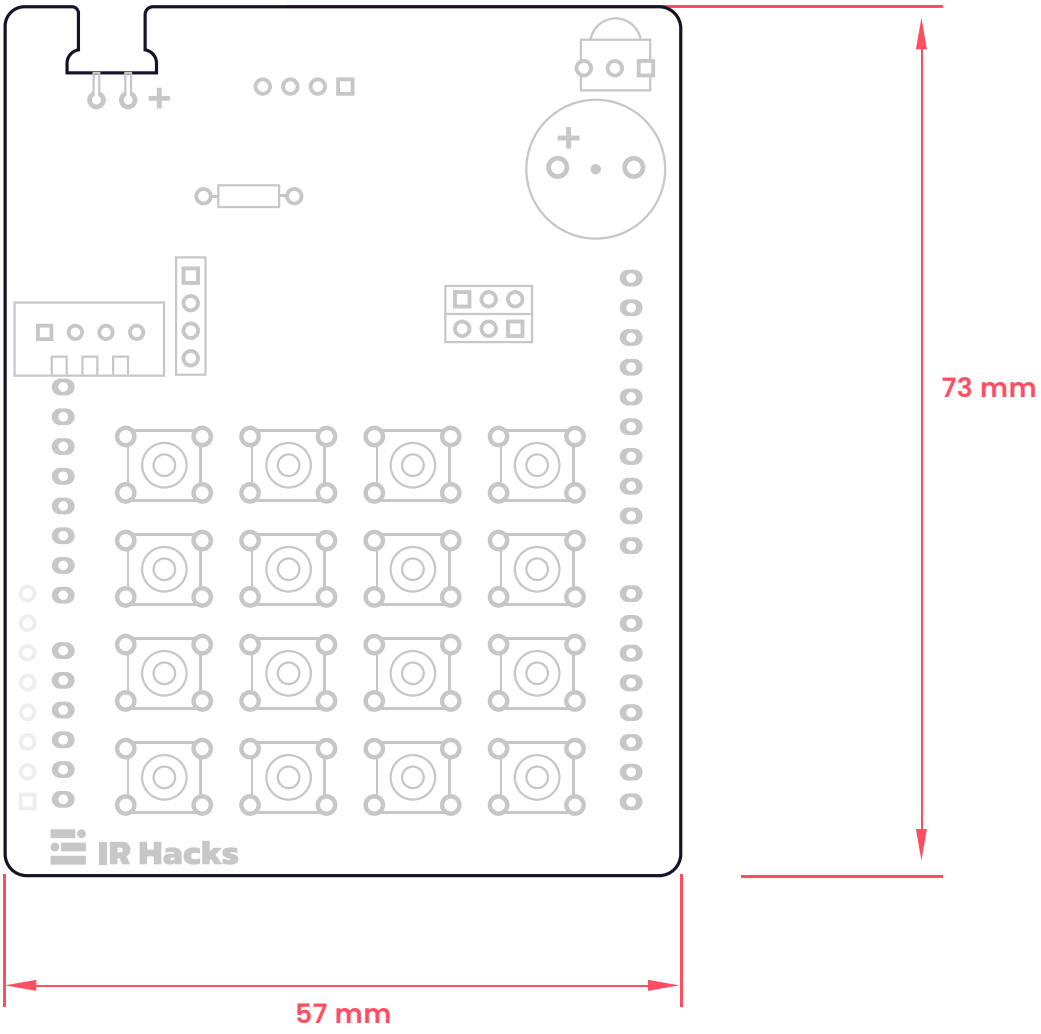
By utilizing these specific pins, the IR Hacks shield maximizes the performance and reliability of both the IR receiver and transmitter, enabling effective remote control applications and signal cloning capabilities.

Getting Started Guide

For a detailed explanation of how to implement this in your projects, including example code, please refer to the Getting Started Guide.


See IR Hacks Getting Started Guide

Board Dimensions



Revision History

Date	Revision	Changes
July. 01. 2024	1	First release

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