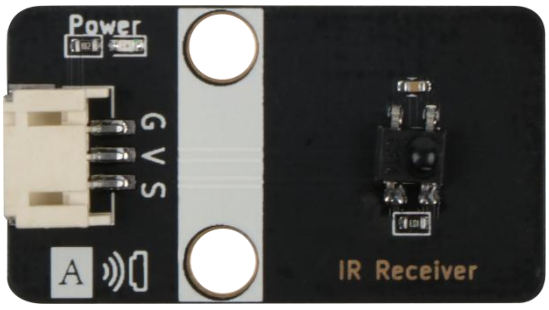
Infrared Receiving Experiment

Module Introduction

Infrared receiving tube is a kind of device which can convert electric energy into near-infrared light directly. Its structure and principle are similar to general light-emitting diodes, but the semiconductor materials are different. The infrared receiver is a kind of receiving, amplifying and demodulating device. The internal integrated circuit has completed the demodulation, and the output is digital signal. The infrared receiver is composed of IC and PD. IC is the processing element of receiving head, which is mainly composed of silicon crystal and circuit. It is a highly integrated device. PD is a kind of photodiode whose main function is to receive optical signals. The infrared receiver needs to be demodulated first, and the demodulation process is received by the infrared receiving tube. The basic working process is: when the infrared receiving module receives the modulated signal, it outputs high level, otherwise the output is low level, which is the inverse process of modulation. The original data signal output by the infrared receiver head just reverses with the transmitter. In other words, the original signal at the transmitter is high level, and the output of receiver head is low level, otherwise.

The signal from the infrared remote control is a series of binary pulse codes. In order to avoid the interference of other infrared signals in the wireless transmission process, it is usually first modulated on a specific carrier frequency - 38kHz, and then sent out by the infrared emitting diode. The integrated receiving and modulating infrared of infrared sensor is realized. The infrared receiving device needs to filter out other clutter, and receive the signal of the specific frequency and restore it to binary pulse code, namely, demodulation.



Purpose of the Experiment

Get the value of EM remote control.

Device List

- BLE-UNO Main Board: 1
- Expansion Board: 1
- USB Data Wire: 1
- Infrared Receiving Module: 1
- EM Infrared Remote Control: 1
- 3PIN Wire Jumper: 1

Key Value Corresponding Table of EM Infrared Remote Control

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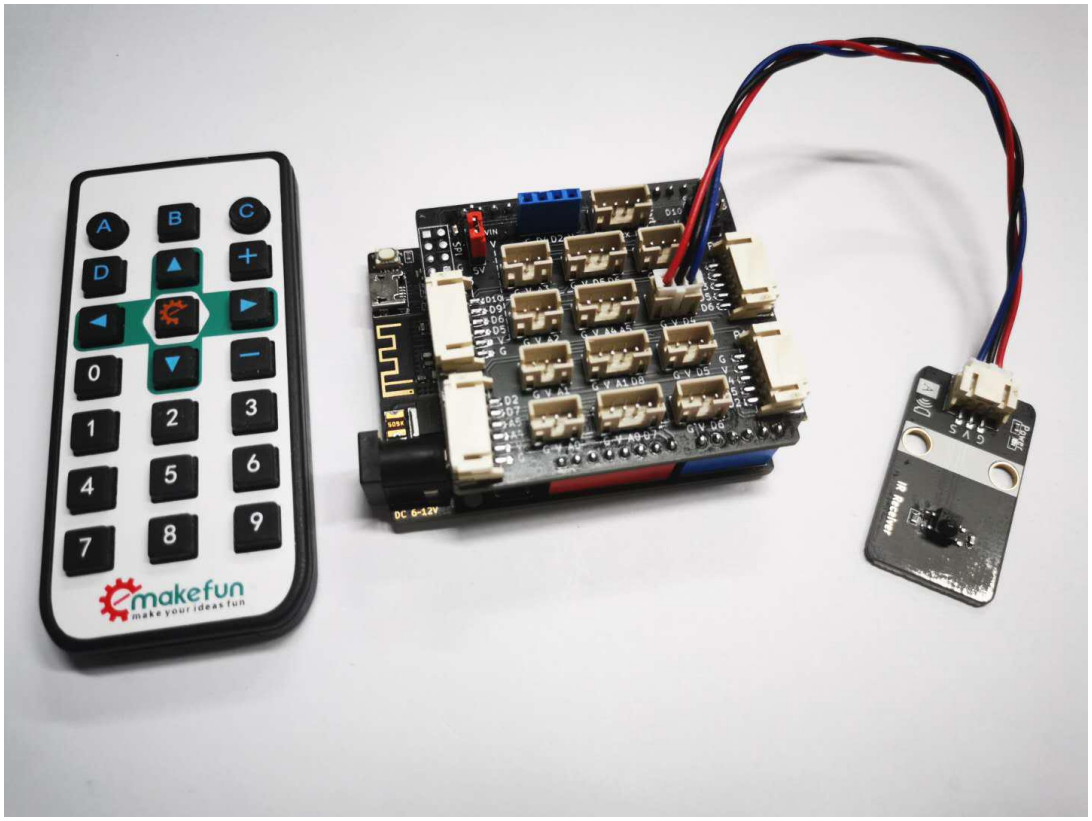
Keys	**Decimal Value**	**Hexadecimal Value**	**Keys**	**Decimal Value**	**Hexadecimal Value**	**Keys**	**Decimal Value**	**Hexadecimal Value**
1	12	0x0C	8	82	0x52	A	69	0x45
2	24	0x18	9	74	0x4A	B	70	0x46
3	94	0x5E	0	22	0x16	C	71	0x47
4	8	0x08	UP	64	0x40	D	68	0x44
5	28	0x1C	DOWN	25	0x19	OK	21	0x15
6	90	0x5A	LEFT	7	0x07	+	67	0x43
7	66	0x42	RIGHT	9	0x09	-	13	0x0D

Physical Wiring Diagram



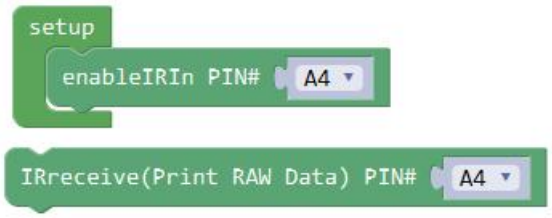
Program Code

```
#include "IRremote.h"
#include "Keymap.h"

IRremote ir(3);

unsigned char keycode;
char str[128];
void setup()
{
    Serial.begin(9600); //set bpm
    ir.begin();
}

void loop()
{
    if (keycode = ir.getCode())
    { //Determine whether the button is pressed, and assign the button value to keycode
```

```
            String key_name = ir.getKeyMap(keycode, IR_TYPE_EM);
            sprintf(str, "Get ir code: 0x%x key name: %s \n", keycode,
                        (char *)key_name.c_str());
            Serial.println(str);    //print value
        }
        delay(110);
}
```

MagicBlock Program

Mixly Program



Experimental Conclusion

After the device is wired, burn the above program to the Arduino uno board, turn on the serial port monitor, and set the baud rate to 9600. Press the key of the infrared remote control, and the serial port monitor will print the corresponding key number.