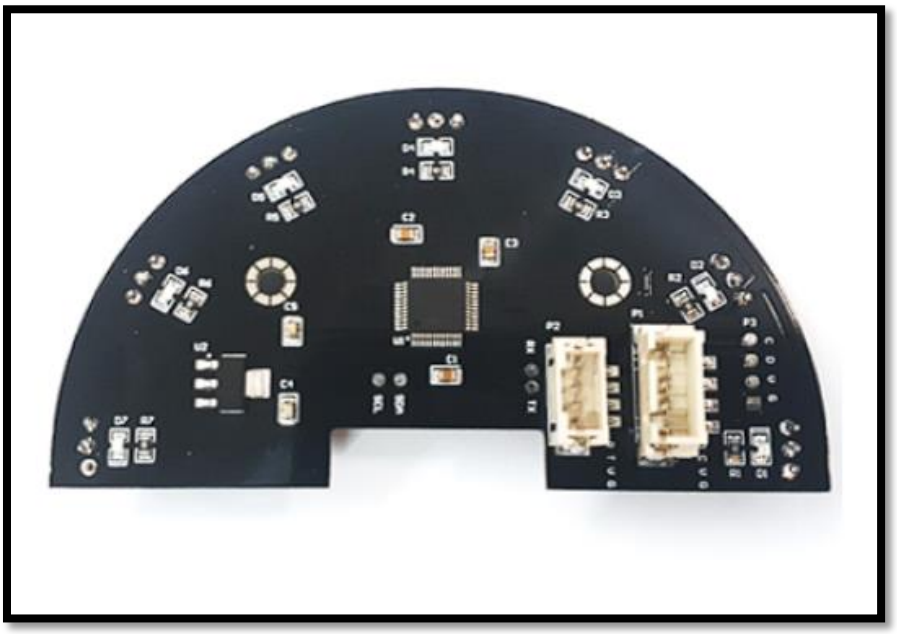
Compound Eye Module



Introduction

The TSSP58038 Compound Eye Module is a specialized 38 kHz infrared (IR) detection array designed specifically for tracking IR-emitting targets such as the RCJ-05r IR ball. Equipped with seven onboard Vishay TSSP58038 IR sensors arranged in a compound configuration, a single module provides a wide 180° field of view divided into seven discrete directional sectors. By mounting two modules back-to-back, the system achieves complete 360° omnidirectional coverage for full-range target localization.

Features

7-Channel IR Detection Array: Equipped with 7 Vishay TSSP58038 infrared sensors per module for a 180° directional detection field.

Dual-Module 360° Operation: Connect two modules in Double Mode to achieve complete 360° omnidirectional target tracking.

Onboard Power Management: Powered by 5V DC with an onboard 1117 low-dropout (LDO) voltage regulator delivering stable power to the embedded MCU and sensor array.

Embedded Processing: Integrated STM32L051 microcontroller handles real-time IR signal processing, angle calculation, and protocol management.

Flexible Communication Architectue: Single mode and dual mode

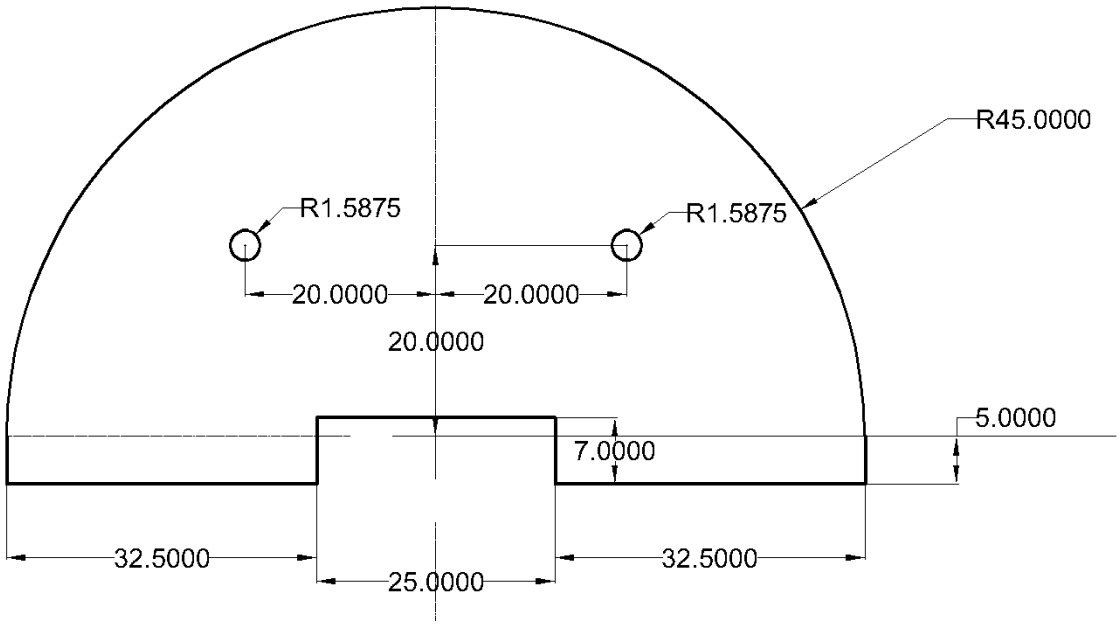
Specfications

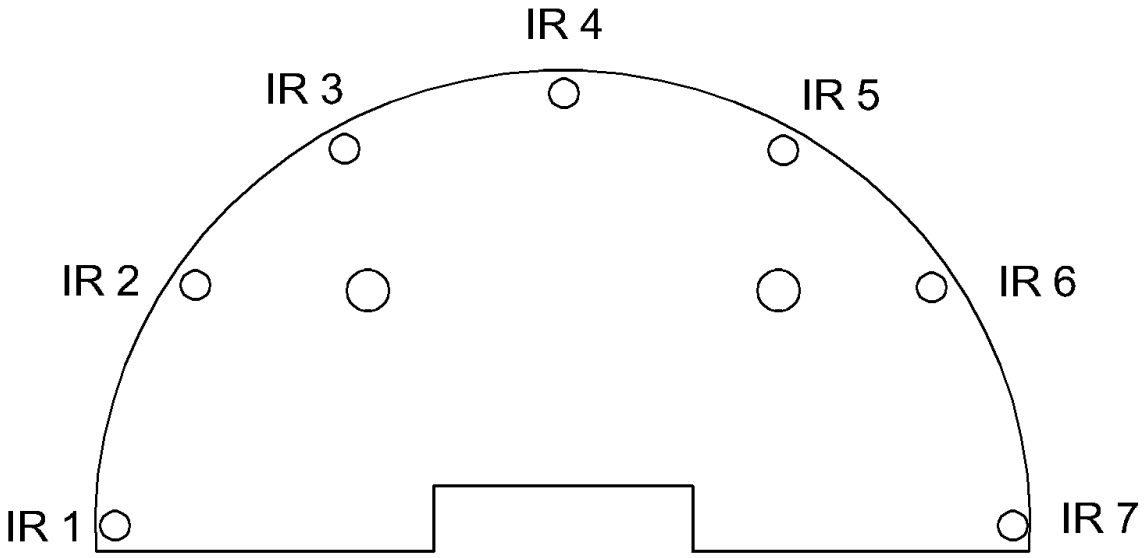
Power supply voltage	: 4.5 ~ 5.5V DC
Operating current	: ~ 0.2mA
Operating temperature	: -25 ~ 85°C
Operating Humidity	: <90%
Weight	: 16.4g
Interface	: I²C Standard-mode 7-bits address 0x13
Size	: 90x25 mm
Detect distance	: 0 ~ 80 cm (recommend usage range)
Maximum distance	: ~ 2m

Communication Bus Interface I²C and Its Address

The module operates as an I²C Target(Slave) device, esponding to commands transmitted by the host Controller (Master) over a 2-wire serial bus interface. The interface is fully compliant with the standard NXP I²C-Bus Specification (Document No. 9398 393 40011).

Dimensions





Product Parameters

Mechanical and Technical Specifications:

Parameter	Specification	Unit/ Condition
Dimensions	90 x 50 x 18.8	mm
Weight	16.4	g
Communication Interface	I²C Standard-Mode(100kHz) I²C Fast-Mode (400kHz)	7-bit Slave Address

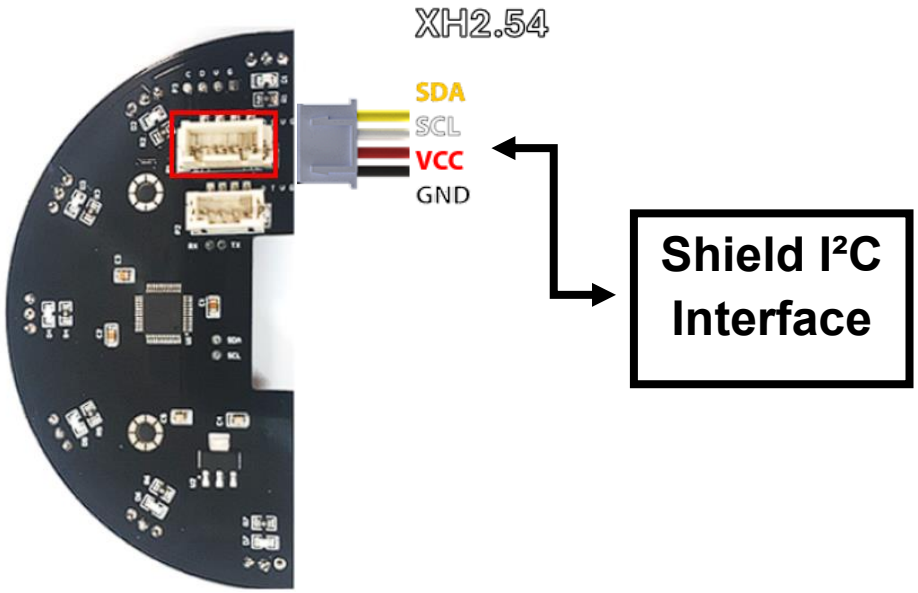
I²C Register/ Command Map

Register	Command Name	Description	Output Data Range
0x00	IR1_Reading	Intensity reading of IR Sensor 1	0-255
0x01	IR2_Reading	Intensity reading of IR Sensor 2	0-255
0x02	IR3_Reading	Intensity reading of IR Sensor 3	0-255
0x03	IR4_Reading	Intensity reading of IR Sensor 4	0-255
0x04	IR5_Reading	Intensity reading of IR Sensor 5	0-255
0x05	IR6_Reading	Intensity reading of IR Sensor 6	0-255
0x06	IR7_Reading	Intensity reading of IR Sensor 7	0-255
0x07	IR8_Reading	Intensity reading of IR Sensor 8	0-255
0x08	IR9_Reading	Intensity reading of IR Sensor 9	0-255
0x09	IR10_Reading	Intensity reading of IR Sensor 10	0-255
0x0A	IR11_Reading	Intensity reading of IR Sensor 11	0-255
0x0B	IR12_Reading	Intensity reading of IR Sensor 12	0-255
0x0C	MAX_IR_Reading	Highest signal intensity across all active IR sensors	0-255
0x0D	MAX_IR_NUM	ID number of the IR sensor detecting maximum signal strength	1-12
0x0E	Angle	Estimated angular direction of detected IR signal	$0^\circ - 360^\circ$
0x0F	Mode	Operating mode status	0: Single 1: Dual

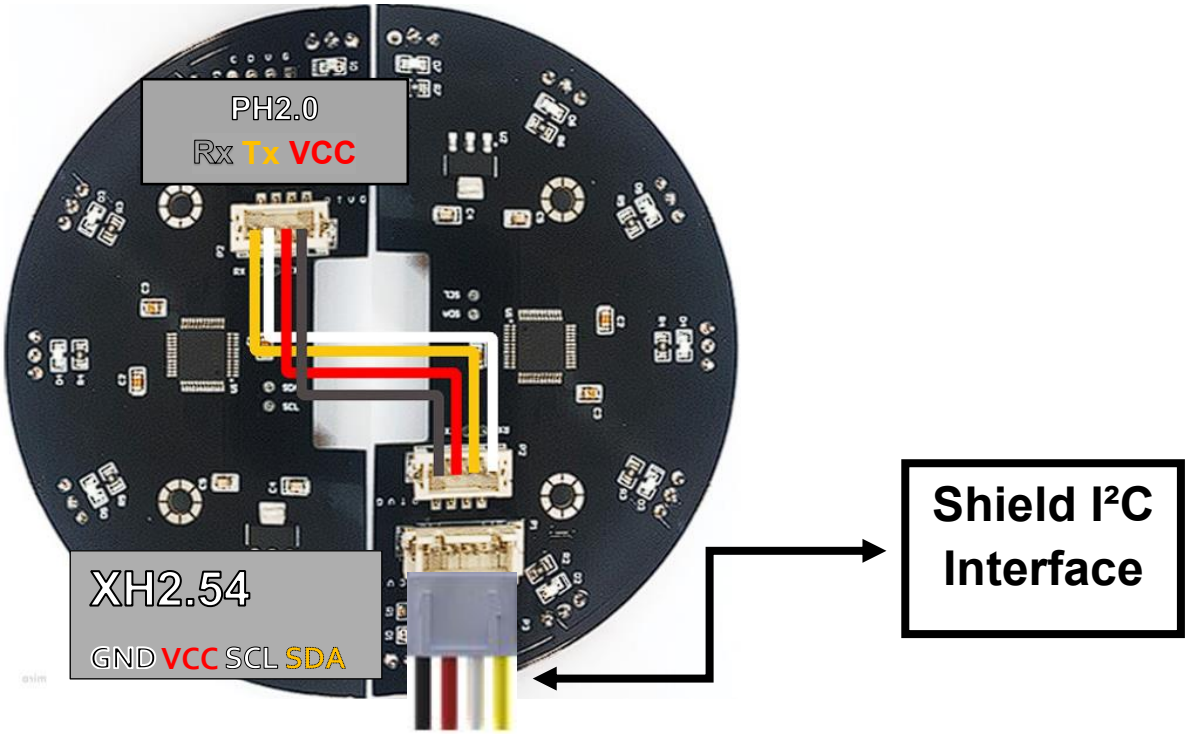
Application

Designed for seamless integration with Peanut King Solution Limited expansion shields, including the Peanut King Pila V4 Mega Shield and micro:bit Shield V2.1.

Single Mode:
Use a 4-pin XH2.54 cable to establish an I²C communication link between the module and the host expansion shield's onboard I²C header.



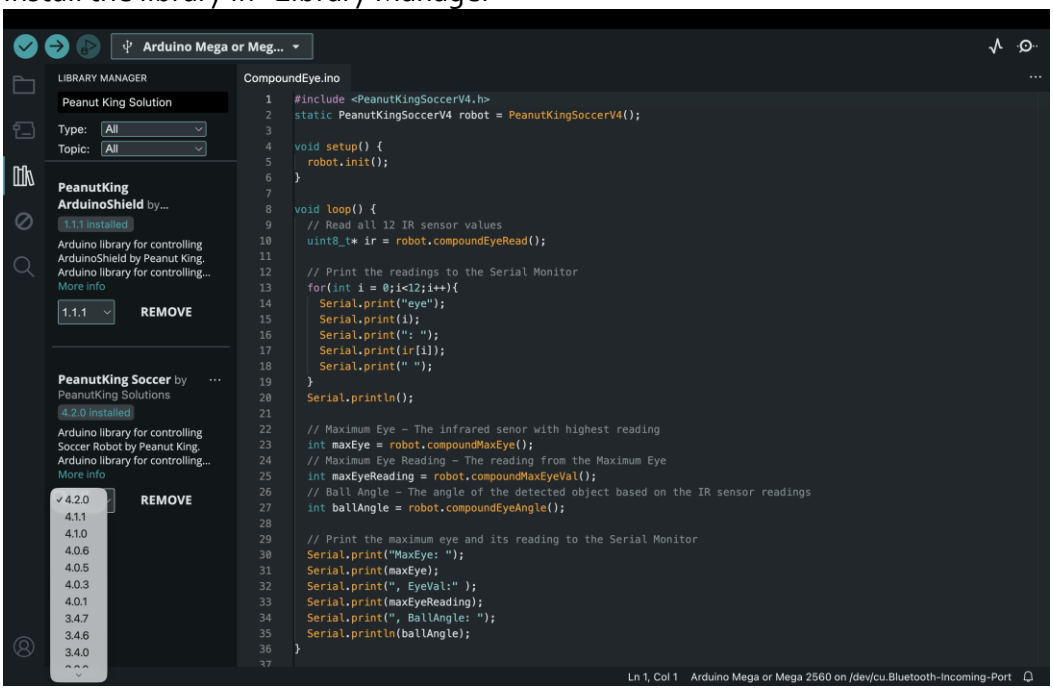
Dual Mode:
Connect the modules via 4-pin PH2.0 cable using standard TX-to-RX and RX-to-TX cross-over topology. Then connect one module directly to the expansion shield's I²C port to integrate the dual-module system into the host I²C bus.



Application

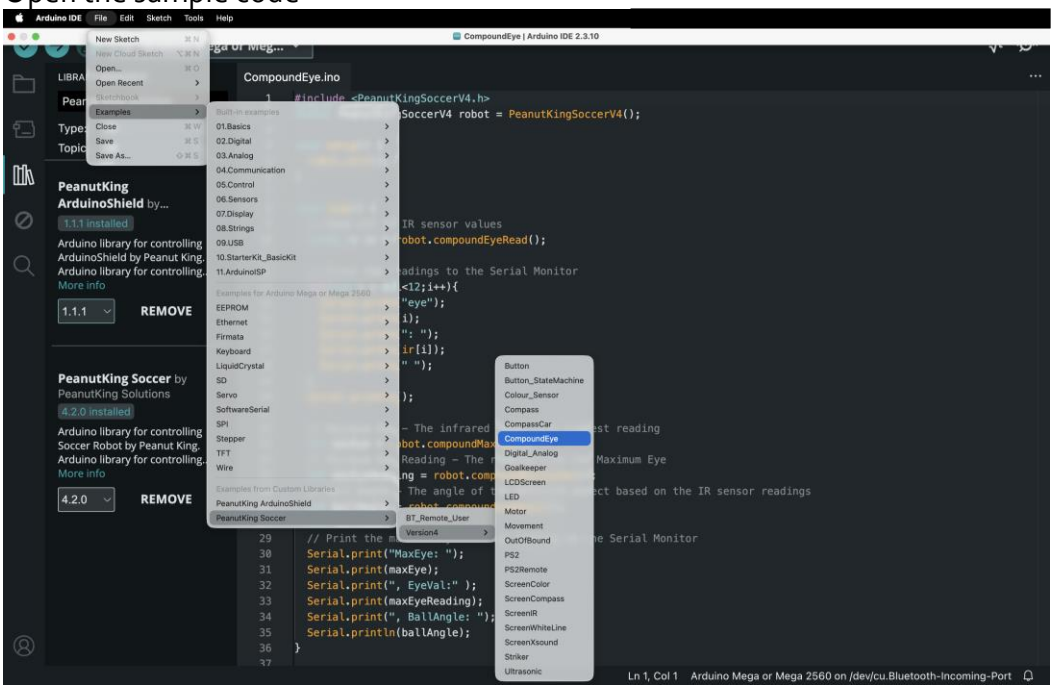
Peanut KING PILA V4.2 Shield:

Install the library in "Library Manager"



In File → Examples → PeanutKing Soccer → Version4→CompoundEye

Open the sample code



Application

```
#include <PeanutKingSoccerV4.h>
static PeanutKingSoccerV4 robot = PeanutKingSoccerV4();

void setup() {
 robot.init();
}

void loop() {
 // Read all 12 IR sensor values
 uint8_t* ir = robot.compoundEyeRead();

 // Print the readings to the Serial Monitor
 for(int i = 0;i<12;i++){
  Serial.print("eye");
  Serial.print(i);
  Serial.print(": ");
  Serial.print(ir[i]);
  Serial.print(" ");
 }
 Serial.println();

 // Maximum Eye - The infrared senor with highest reading
 int maxEye = robot.compoundMaxEye();
 // Maximum Eye Reading - The reading from the Maximum Eye
 int maxEyeReading = robot.compoundMaxEyeVal();
 // Ball Angle - The angle of the detected object based on the IR sensor readings
 int ballAngle = robot.compoundEyeAngle();

 // Print the maximum eye and its reading to the Serial Monitor
 Serial.print("MaxEye: ");
 Serial.print(maxEye);
 Serial.print(", EyeVal:" );
 Serial.print(maxEyeReading);
 Serial.print(", BallAngle: ");
 Serial.println(ballAngle);
}
```

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