# COLOR SKU:U009

Color Sensor

TCS3472
GROVE/I2C

Description

COLOR is color recognition unit integrated **TCS3472**. Like its namesake, **COLOR** is able to detect color value and return RGB data to the host.

Identify color principle: In the TCS3472, a 3*4 array of filtered photodiodes and a 16 bit analog-to-digital converters are embedded. Of the 12 photodiodes, 3 have red filters, 3 have green filters, 3 have blue filters and 3 have no filter(clear).

TCS3472

|		
V_{DD}	1	6 SDA
SCL	2	5 INT
GND	3	4 NC

Array
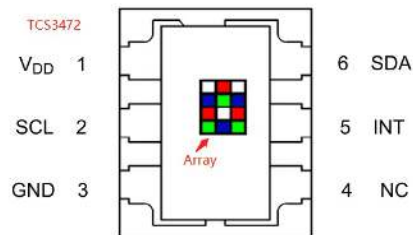
When detecting the color of an object, TCS3472 returns data from four channels: red(R), green(G), blue(B) and clear(C)(non-filtered). The response from the red, green and blue channels (RGB) can be used to determine a particular source's chromaticity coordinates (x, y).

RGB → CORRELATION MATRIX (3:3 TRANSFORM) → **XYZ** → 3:2 TRANSFORM → **xy**

Chromaticity Calculation Process Overview:

$X = (-0.14282)(R) + (1.54924)(G) + (-0.95641)(B)$
$Y = (-0.32466)(R) + (1.57837)(G) + (-0.73191)(B)$
$Z = (-0.68202)(R) + (0.77073)(G) + (0.56332)(B)$

$x = X/(X+Y+Z)$
$y = Y/(X+Y+Z)$

When we get coordinates (x, y), please reference the below figure so as to get the recommended color.

CIE 1931 Chromaticity Diagram

1931 2-degree Observer
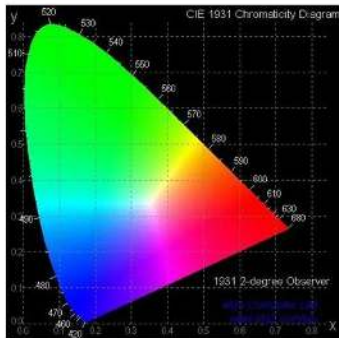
This Unit communicates with the M5Core via the GROVE A interface(I2C). Address is 0x29.

Product Features

Detection range: -40°C~85°C
GROVEinterface, support UIFlow and Arduino
Two Lego-compatible holes
Product Size: 32.2mm x 24.2mm x 8.2mm
Product weight: 3.9g

Include

1x COLORUnit
1x Grove Cable

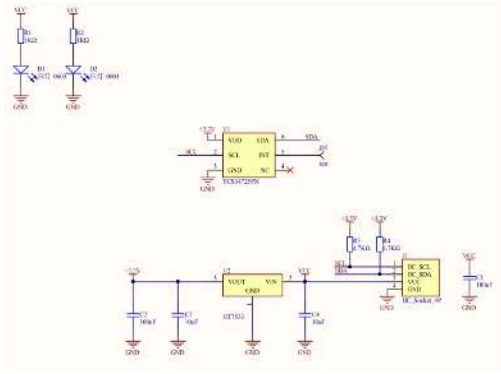## Applications

Product Color Verification
Color tracking robot

Related Link

Datasheet - TCS3472

EasyLoader

Schematic

PinMap

M5Core(GROVE A)	GPIO22	GPIO21	5V	GND
COLOR Unit	SCL	SDA	5V	GND

Example

1. Arduino IDE

The code below is incomplete. To get the complete code, please click here

After burnt this example, PC serial terminal will print original value RGBC(red, green, blue, clear).
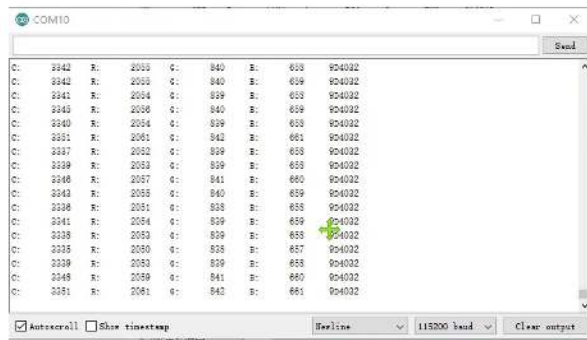
2. UIFlow

If you want the complete code, please click here