USER MANUAL

EN colour sensor TCS3200 module

WPSE325

whadda.com

Introduction

To all residents of the European Union
Important environmental information about this product
This symbol on the device or the package indicates that disposal of the device after its lifecycle could harm the environment. Do not dispose of the unit (or batteries) as unsorted municipal waste; it should be taken to a specialized company for recycling. This device should be returned to your distributor or to a local recycling service. Respect the local environmental rules.
If in doubt, contact your local waste disposal authorities.

Thank you for choosing Whadda! Please read the manual thoroughly before bringing this device into service. If the device was damaged in transit, do not install or use it and contact your dealer.

Safety Instructions

Read and understand this manual and all safety signs before using this appliance.

For indoor use only.

- This device can be used by children aged from 8 years and above, and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning the use of the device in a safe way and understand the hazards involved. Children shall not play with the device. Cleaning and user maintenance shall not be made by children without supervision.

General Guidelines

- Refer to the Velleman® Service and Quality Warranty on the last pages of this manual.
- All modifications of the device are forbidden for safety reasons. Damage caused by user modifications to the device is not covered by the warranty.
- Only use the device for its intended purpose. Using the device in an unauthorized way will void the warranty.
- Damage caused by disregard of certain guidelines in this manual is not covered by the warranty and the dealer will not accept responsibility for any ensuing defects or problems.
- Nor Velleman Group nv nor its dealers can be held responsible for any damage (extraordinary, incidental or indirect) – of any nature (financial, physical…) arising from the possession, use or failure of this product.
- Keep this manual for future reference.

What is Arduino®

Arduino® is an open-source prototyping platform based on easy-to-use hardware and software. Arduino® boards are able to read inputs – light-on sensor, a finger on a button or a Twitter message – and turn it into an output – activating of a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so, you use the Arduino programming language (based on Wiring) and the Arduino® software IDE (based on Processing). Additional shields/modules/components are required for reading a twitter message or publishing online. Surf to www.arduino.cc for more information.

Product Overview

The TCS3200 senses colour light with the help of an 8 x 8 array of photodiodes. Then using a Current-to-Frequency Converter the readings from the photodiodes are converted into a square wave with a frequency directly proportional to the light intensity. Finally, using the Arduino® Board we can read the square wave output and get the results for the colour.

Specifications

- supply voltage: 2.7-5.5 VDC
- dimensions: 28.4 x 28.4 mm

Features

- high-resolution conversion of light intensity to frequency
- programmable colour and full-scale output frequency
- communicates directly with a microcontroller
- single-supply operation (2.7 V to 5.5 V)
- power-down feature
- non-linearity error typically 0.2 % at 50 kHz
- stable 200 ppm/°C temperature coefficient

Pin Layout

GND	ground
OUT	output frequency
S0	output frequency scaling selection input
S1	output frequency scaling selection input
S2	photodiode type selection input
S3	photodiode type selection input
V	5 VDC power supply
G	ground
OE	output enable, must be connected to G (ground)
LED	LED enable input, low=ON

Example

Connection

Arduino®		**WPSE325**
5 V	►	V
GND	►	GND
D3	►	S0
D4	►	S1
D5	►	S2
D6	►	S3
D2	►	OUT
D7	►	LED
GND	►	OE

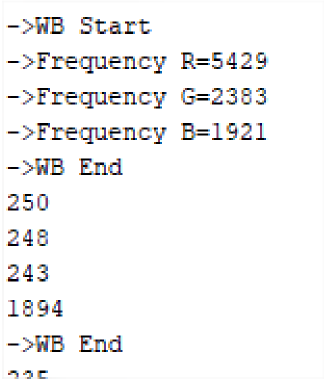
Connect your WPSE325 to your microcontroller (WPB100) as above.

Download the library and data sheet from our website.

Open the Arduino® IDE and import the three libraries. LiquidCrystal_I2C.h is only needed if you are also connecting an I^{2}C LCD to your controller.

Load the VMA325_code sketch into the IDE, compile and upload.

Start the serial monitor. You should see a result like this:



```
->WB Start
->Frequency R=5429
->Frequency G=2383
->Frequency B=1921
->WB End
250
248
243
1894
->WB End
```

Please also read the data sheet of the TCS2300, which is included in the VMA325.zip available from our website.

```
// CODE BEGIN
#include <TimerOne.h>
#include <Wire.h>
#include <LiquidCrystal_I2C.h> //This is only needed if You connect a I2C LCD to Your
microcontroller
LiquidCrystal_I2C lcd(0x27,20,4);

#define S0     6
#define S1     5
#define S2     4
#define S3     3
#define OUT    2
#define LED    7

int   g_count = 0;    // count the frequency
int   g_array[3];     // store the RGB value
int   g_flag = 0;     // filter of RGB queue
float g_SF[3];        // save the RGB Scale factor
// Init TSC230 and setting Frequency.

void TSC_Init()
{
 pinMode(S0, OUTPUT);
 pinMode(S1, OUTPUT);
 pinMode(S2, OUTPUT);
 pinMode(S3, OUTPUT);
 pinMode(OUT, INPUT);
 pinMode(LED, OUTPUT);
 digitalWrite(S0, LOW);// OUTPUT FREQUENCY SCALING 2%
 digitalWrite(S1, HIGH);
 digitalWrite(LED,HIGH) ; // LOW = Switch ON the 4 LED's , HIGH = switch off the 4 LED's
}

// Select the filter color//
void TSC_FilterColor(int Level01, int Level02)
```

```
{
 if(Level01 != 0)
  Level01 = HIGH;

 if(Level02 != 0)
  Level02 = HIGH;

 digitalWrite(S2, Level01);
 digitalWrite(S3, Level02);
}

void TSC_Count()
{
 g_count ++ ;
}

void TSC_Callback()
{
 switch(g_flag)
 {
  case 0:
   Serial.println("->WB Start");
   TSC_WB(LOW, LOW);
   break;
  case 1:
   Serial.print("->Frequency R=");
   //lcd.setCursor(0,0);
   //lcd.print("Start");
   Serial.println(g_count);
   g_array[0] = g_count;
   TSC_WB(HIGH, HIGH);
   break;
  case 2:
   Serial.print("->Frequency G=");
   Serial.println(g_count);
   g_array[1] = g_count;
   TSC_WB(LOW, HIGH);
   break;
  case 3:
   Serial.print("->Frequency B=");
   Serial.println(g_count);
   Serial.println("->WB End");
   g_array[2] = g_count;
   TSC_WB(HIGH, LOW);
   break;
  default:
   g_count = 0;
   break;
 }
}

 void TSC_WB(int Level0, int Level1) //White Balance
```

```
{
  g_count = 0;
  g_flag ++;
  TSC_FilterColor(Level0, Level1);
  Timer1.setPeriod(1000000);
}

void setup()
{
  TSC_Init();
  lcd.init();
  delay(100);
  lcd.backlight();
  Wire.begin();
  delay(100);
  lcd.setCursor(14,0);
  lcd.print("Color");
  lcd.setCursor(0,3);
  lcd.print("S0:2 S1:3 S2:4 S3:5 OUT:6 LED:-");
  Serial.begin(9600);
  Timer1.initialize();             // defaulte is 1s
  Timer1.attachInterrupt(TSC_Callback);
  attachInterrupt(0, TSC_Count, RISING);
  delay(4000);
  for(int i=0; i<3; i++)
  Serial.println(g_array[i]);
  g_SF[0] = 255.0/ g_array[0];     //R Scale factor
  g_SF[1] = 255.0/ g_array[1] ;    //G Scale factor
  g_SF[2] = 255.0/ g_array[2] ;    //B Scale factor

  Serial.println(g_SF[0]);
  Serial.println(g_SF[1]);
  Serial.println(g_SF[2]);

 //for(int i=0; i<3; i++)
  // Serial.println(int(g_array[i] * g_SF[i]));
}
void loop()
{
  g_flag = 0;
  for(int i=0; i<3; i++)

  {
    Serial.println(int(g_array[i] * g_SF[i]));
    //lcd.setCursor(0,1);
    //lcd.print(int(g_array[i] * g_SF[i]));
  }
  lcd.setCursor(0,1);
  lcd.print(int(g_array[0] * g_SF[0]));
  lcd.setCursor(6,1);
  lcd.print(int(g_array[1] * g_SF[1]));
  lcd.setCursor(12,1);
```

```
   lcd.print(int(g_array[2] * g_SF[2]));
   delay(4000);
   Clean2004();
 }

 void Clean2004()
{
  lcd.setCursor(0,1);
  lcd.print("                    ");
  lcd.setCursor(0,2);
  lcd.print("                    ");
}
// CODE END
```

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