



## COLOR SENSOR PLATFORM (CuSP) REFERENCE DOCUMENT

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# 1 Introduction

The CuSP platform is a small, wireless, low powered sensor that measures incident illuminance along with static and dynamic motion angle parameters. The following are the core design requirements:-

1. RGBY sensing at 0-50Hz.
2. Sensor orientation sensing.
3. Able to communicate to a hub in room. (Data rate: 30-100Hz)
4. Low powered. Must run for longer than 24hrs on coin cell battery.

The following are the 'nice-to-have's for the second version

1. On board pluggable camera module.
2. Controlable field of view by using optics.
3. Integrated VLC transceiver.

The following document gives a basic overview of the CuSP platform.

## 2 Components

The current version of the platform has the following components on board:-

1. MSP430F2619: Microcontroller
2. TCS3414: Taos Color Sensor
3. TCS3471: Taos Color Sensor
4. ADJD-S311-CR999: Avago Color Sensor
5. ADXL345: 3-Axial Digital Accelerometer
6. ITG-3200: 3-Axial Digital Gyroscope
7. ANT11TS33M4IB: ANT AT3 RF Transceiver Drop-in Module

The Microcontroller is responsible for scheduling and execution of tasks like data acquisition from the sensors, data processing and set up transmission over RF to a receiver. The color sensors on board measure light intensities over 4 channels - Red, Green, Blue and Clear. After evaluating performance, one will be selected for the next revision while the other two will be discarded. Data from the 3-axis accelerometer is used to compute the static orientation of the platform. Data from 3-axis gyroscope is used to compute the orientation of the platform when under motion. the ANT RF module is used to transmit data and receive commands from a service running on an ANT enabled computer. The following subsections highlight relevant information about the components. In-depth details can be found in their respective datasheets.

### 2.1 Microcontroller

- 16-bit ultra low powered
- Operates on a 3V coin cell battery
- 2X 16-bit timer modules
- 2X I2C modules
- 4X SPI modules

### 2.2 TAOS 3414

- RGBClr color sensor
- 16-bit digital output
- I2C module

- Programmable gain and integration time
- Programmable filter
- Programmable interrupts
- External timing through SYNC

### **2.3 TAOS 3471**

- RGBClr color sensor
- 16-bit digital output
- I2C module
- Programmable gain and integration time
- Dedicated interrupts
- Very low powered

### **2.4 Avago ADJD-S311**

- RGBClr color sensor
- 10-bit digital output
- I2C module
- Programmable gain and integration control
- Programmable interrupts
- Low powered

### **2.5 Accelerometer**

- Tri-Axial
- Programmable range
- I2C module
- Configurable interrupts
- Low powered

## **2.6 Gyroscope**

- Tri-Axial
- Programmable range
- I2C module
- Configurable interrupts

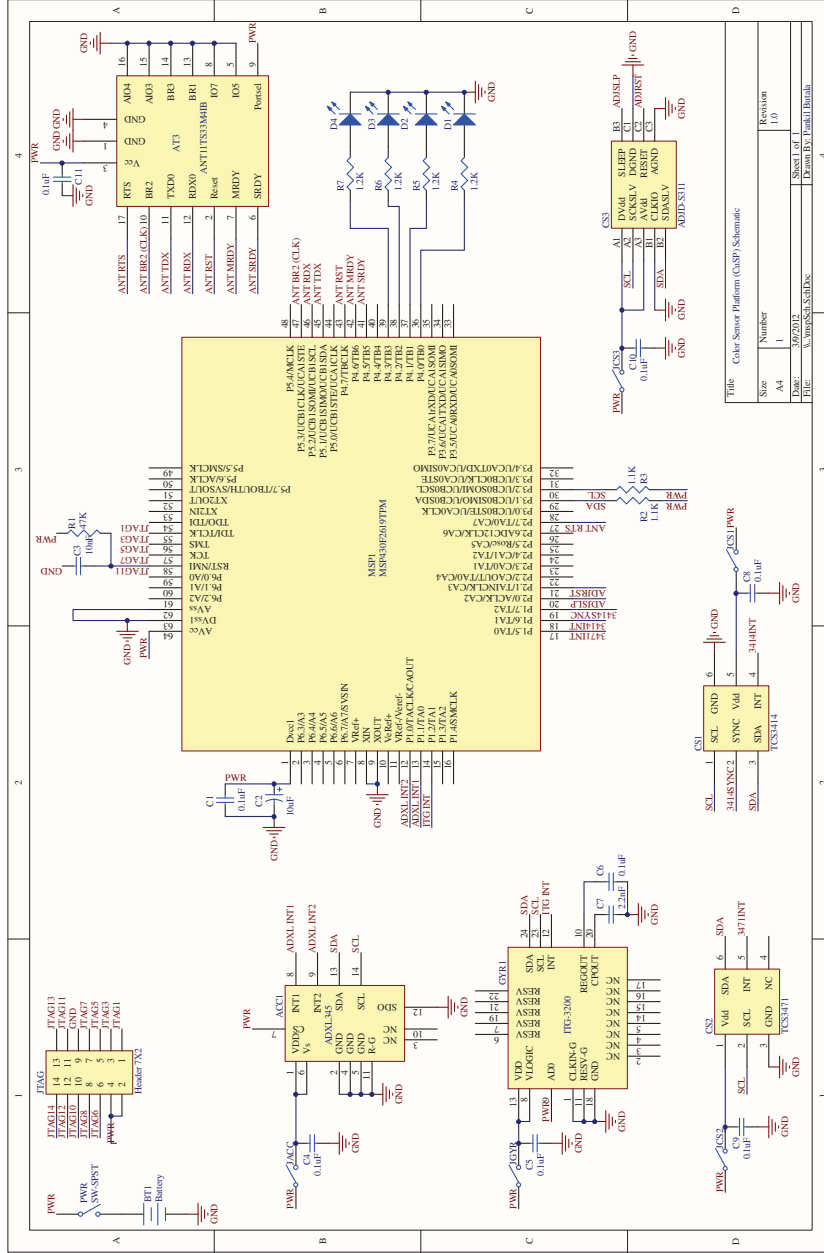
## **2.7 ANT AT3 Transceiver**

- Operates in 2.4GHz ISM band
- Simultaneous 8 channels
- 8 byte payload
- 0.5Hz - 180Hz data rate
- Coin cell operation
- Ultra low powered

### **3 Drawings**

The following section contains the schematic and layout drawings for CuSP.

### 3.1 Schematic



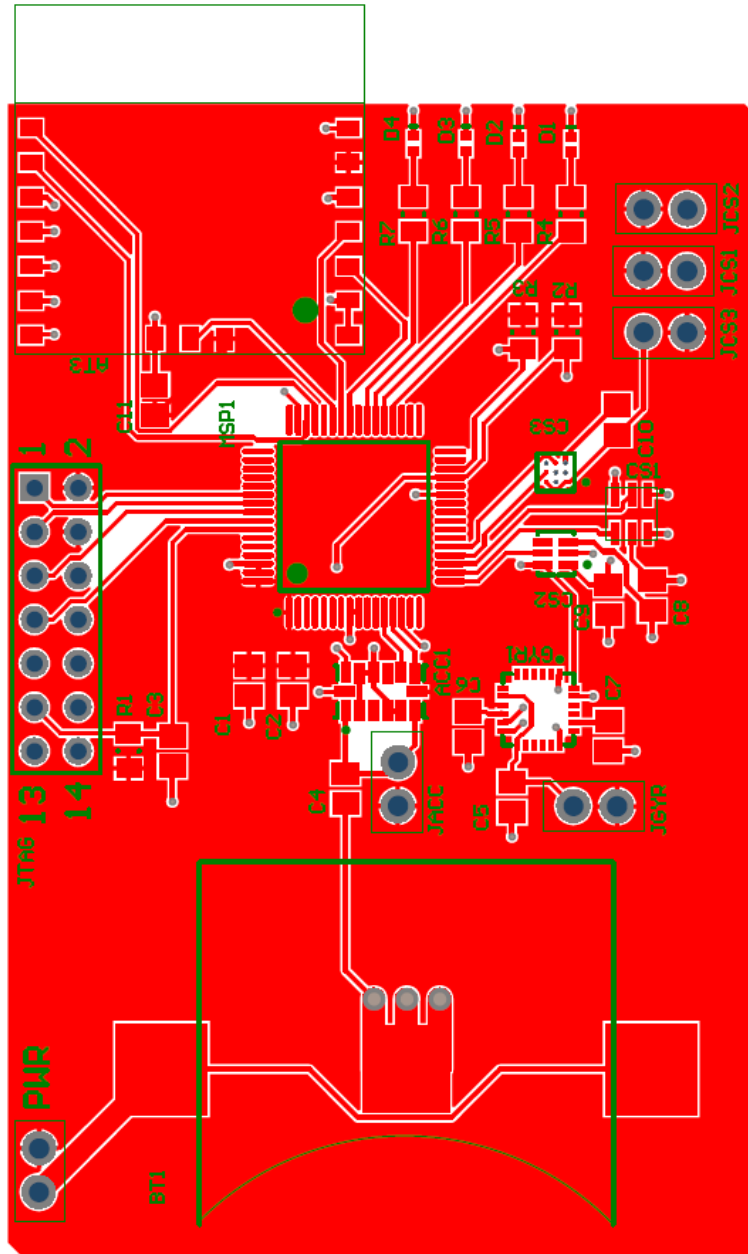
Title: Cable Sensor Platform (CASP) Schematic

Size	Number	Revision
A4	1	1.0

File: V:\Projects\CASP\...  
 Drawn By: Parthi Barah...



### 3.2 PCB: Top Layer



### 3.3 PCB: Bottom Layer

