Agilent AECS-1010-AA02
Color Sensing Application Kit—Reflective
Data Sheet

Description
Agilent's color sensing application kit is a light-to-voltage converting device. The kit combines a white LED light source, a color sensor and post-sensor amplifying circuitry. Featuring a filter coated photodiode, the colour sensor converts the primary components of light, namely, Red (R), Green (G) and Blue (B), into photocurrent. The amplifier amplifies and converts photocurrent into analog voltages for each of the R, G, B component, denoted by V_{ROUT}, V_{GOUT} and V_{BOUT}, respectively. The kit incorporates optical lens to focus reflected light to the sensor as well as a gap alignment tool for ease of usage.

Theory of Operation
The application kit is used in reflective arrangement where the LED light source and color sensor are placed close to the surface/object of interest. Light emitted by the LED is reflected off the surface/object and measured by the sensor. For a given LED color, the color of light reflected depends on surface/object color. Given that any color is made up of unique R, G, B ratio, the sensor provides a definite manner of measuring reflected light color, and hence, the surface/object color. The kit also differentiates reflectivity of surfaces/objects where more light bounces off highly reflective surface and results in increased sensor output voltage.

Applications
Being able to accurately and consistently 'name' a color, the color sensor opens up opportunities to manipulate and control color. It is ideal for color detection, color measurement and color control in both open and closed loop systems. Potential areas of application are office automation, quality control and color coding in such industries as food, textile, paint, assembly and packaging, environmental lighting, consumer good, pharmaceutical, medical and research and automotive.

Note: The application kit is only meant for engineering evaluation purposes and not for reliability testing.

Features
- **Convert color point of reflective light to analog voltage**
- **Integrated photodiode and transimpedance amplifier**
- **Integral R, G, B color filters**
- **High intensity white LED illuminant**
- **Operating temperature 0° to +50°C**
- **Optical lens and gap alignment tool for light focusing**

ESD WARNING:
Normal precautions should be taken to avoid static discharge.

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AECS-1010 Absolute Maximum Ratings

Subjecting the device beyond maximum ratings may cause permanent damage to the device; these are stress rating beyond which proper operation of device is not guaranteed. Prolonged exposure to these extreme conditions may also affect reliability of the device.

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	T_S	0	50	°C
Operating Temperature	T_A	0	50	°C
Supply Voltage	V_{DD}	5	6	V

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Operating Temperature	T_A	0	25	50	°C	
Supply Voltage	V_{DD}	5	5.5	6	V	
Sensor Gap	G		10		mm	Sensor-gap guide is set to 10 mm height

Application Kit Electrical Characteristics

Electrical Characteristics at V_{DD} = 5.5V, T_A = 25°C, R_L = 10 kΩ

Parameter	Symbol	Min.	Typ.	Max	Unit	Remark
Dark Voltage	V_D		30	100	mV	
Output Voltage	V_O		2		V	Sensing 'white' of Macbeth chart.
Supply Current	I_{DD}		40		mA	

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Pin Configuration

Pin	Description
1	V_{DD}
2	Ground
3	Analog output for Red
4	Analog ouput for Green
5	Analog ouput for Blue

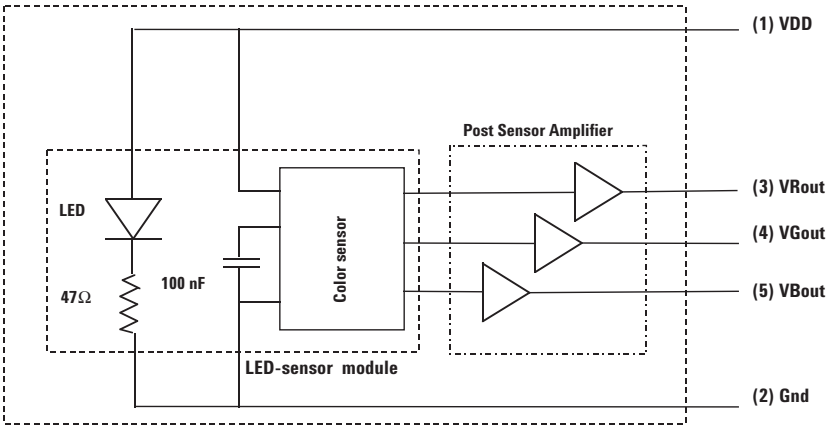

Figure 1. Schematic of Reflective Sensing Application Kit.

LED Electrical and Optical Characteristics

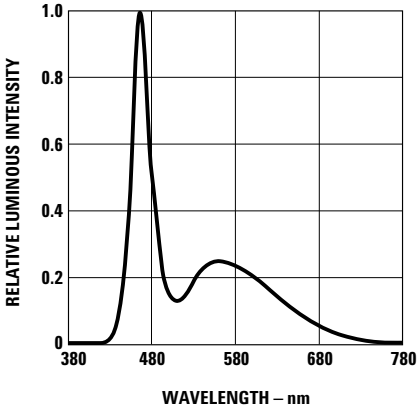

Figure 2. Light Source Relative Intensity vs. Wavelength.

Parameter	Sym.	Min.	Typ.	Max.	Unit	Remark
Forward voltage	V_F		3.8	4.0	V	I_F = 20 mA
Reverse voltage	V_R	5.0			V	I_R = 10 µA
Intensity	I_V	4200		12000	mcd	I_F = 20 mA
Wavelength		Refer to LED spectrum graph.				

ESD WARNING:
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Data subject to change.

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