

## CI503 Color Analyzer

### I Product Overview

CI503 is a portable luminance colorimeter. The instrument uses XYZ filter+CMOS detector to collect the three stimulus values XYZ of the light source, and then calculates the luminance and chromaticity coordinates of the light source. The instrument has a measuring angle of  $1^\circ$ , a minimum measuring area of  $\Phi 6\text{mm}$  and a maximum measuring range of  $200,000 \text{ cd/m}^2$ .

The instrument is equipped with a 2.8-inch TFT capacitive touch screen, 3000 mAh lithium-ion battery, Bluetooth WIFI multifunctional chip, and large capacity memory.

The instrument can measure the luminance(Lv), color temperature, chromaticity coordinates, main wavelength, display gamut, panel uniformity, and other parameters.

The instrument is equipped with single measurement, average measurement, continuous measurement, flash measurement, and other measurement modes, easy to operate, accurate and stable measurement.



Figure 1

### II Product Characteristics

1. The instrument uses XYZ filter+CMOS detector to collect the three stimulus values XYZ of the illumination light source or display in the range of 400-700nm, and then calculates the luminance(Lv), chromaticity coordinates, and color temperature of the sample to be tested, which is cost-effective.

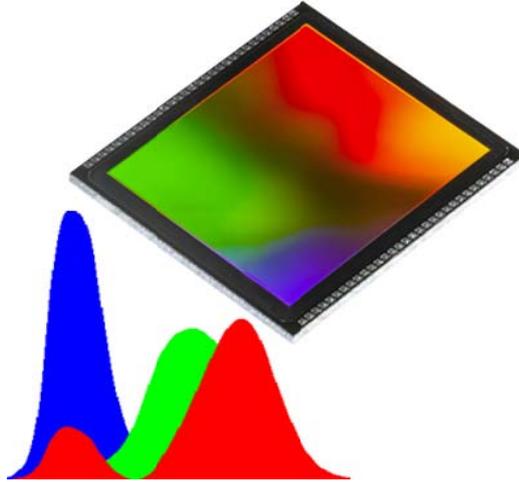


Figure 2

2. The instrument utilizes an industrial-grade MCU processor, equipped with a 2.8-inch TFT capacitive touch screen and up to 2,000 storage spaces. It features simple operation and stable performance.

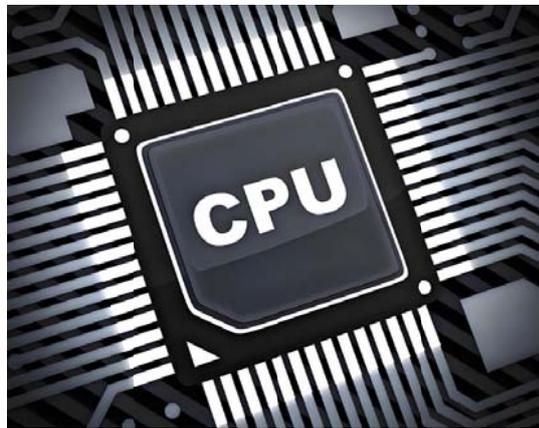


Figure 3

3. The instrument is equipped with a 3000 mAh lithium-ion battery, offering a long standby time. It is also equipped with Type-C and Bluetooth 5.0 interfaces, with a reserved WIFI interface. These rich expansion interfaces are highly suitable for secondary development and have a wide range of application scenarios.

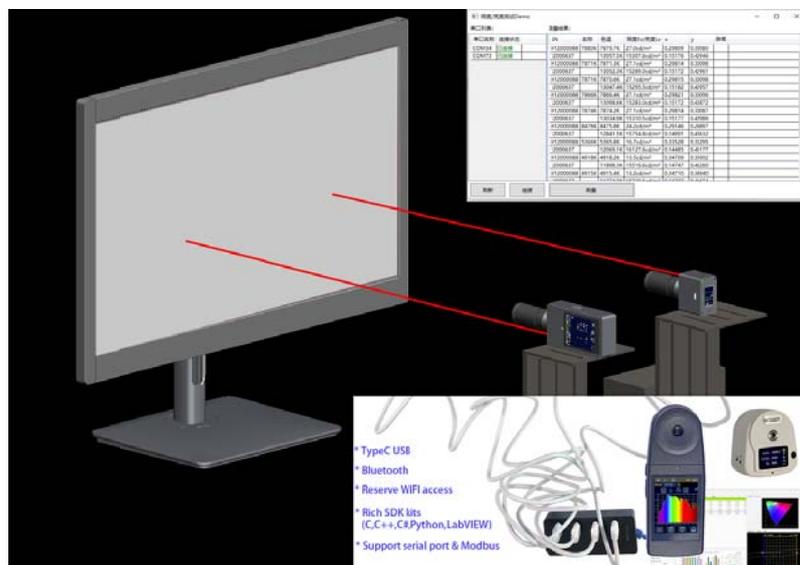


Figure 4

4. A novel and fashionable appearance design based on ergonomics.



Figure 5

5. The measurement interface of the instrument can be locked to avoid misoperation.

6. The instrument is widely applied in LED lighting industry, engineering lighting, display screens, TV multimedia, and so on.

7. A computer can connect multiple instrument simultaneously via USB or Bluetooth for synchronous measurement and control.

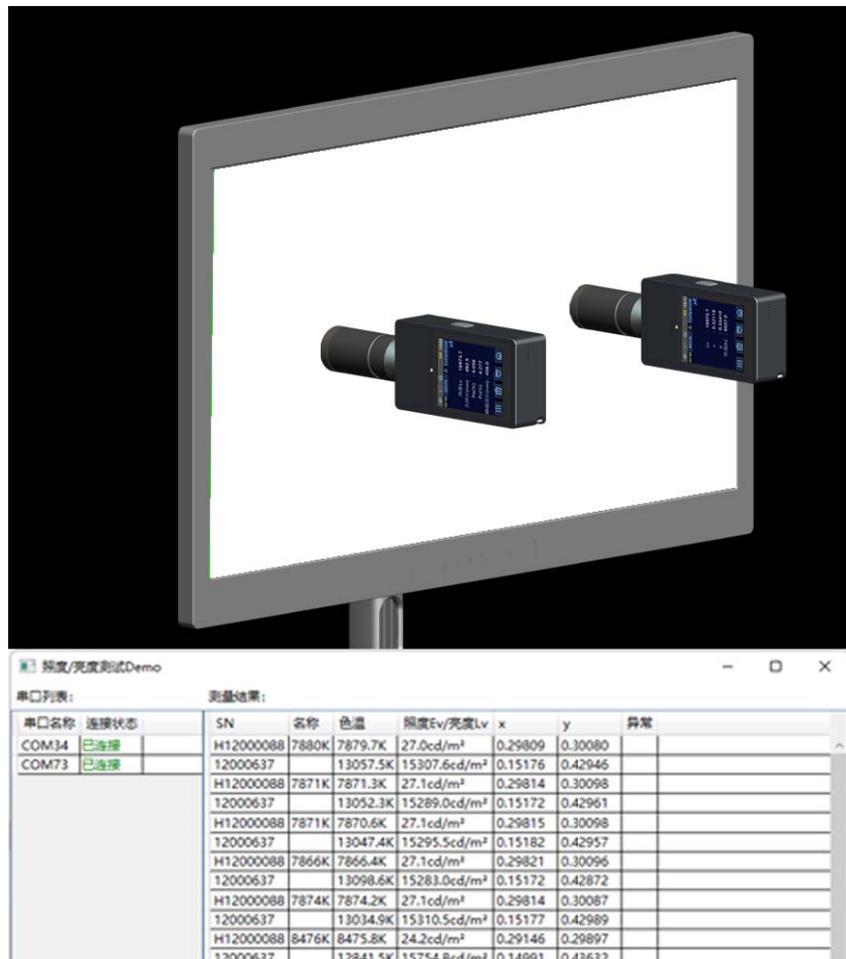


Figure 6

8. The instrument has professional PC software, Rich SDK (support C # , C + + , Python, LabView and other platforms) .



Figure 7

### III Applications

#### 3.1 Lv and chromaticity coordinates measurement of Display panel/LCD

In a darkroom environment, the display/LCD panel is powered on and warmed up for half an hour. The CI503 is fixed on a mounting fixture, ensuring its optical axis is perpendicular to the display surface, with the probe positioned approximately 30mm from the display surface (or the measurement port is pressed tightly against the screen). The display panel is controlled to show different colors, and the CI503 captures the Lv, chromaticity coordinates, and spectral radiance of the screen at a 1° measurement angle. Based on this data, the display's color gamut and uniformity can be calculated, and functions such as GAMMA/DICOM/color calibration can be performed.

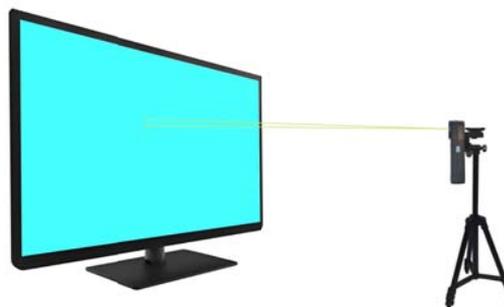


Figure 8

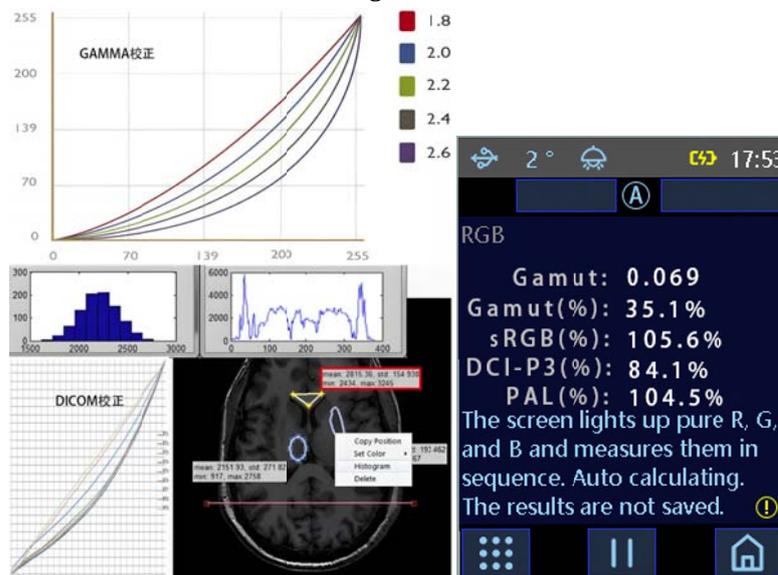


Figure 9

### 3.2 LED and solid-state lighting source spectrum, Lv, color temperature, uniformity, dominant wavelength, and other parameters test

CI503 luminance colorimeter stand-alone instrument can easily realize Lv, color temperature, dominant wavelength, and other parameters measurement.

The luminous flux can be measured by integrating sphere. With the help of professional HIQC software, the chromaticity coordinate measurement and classification of LED solid-state light source can be easily realized.

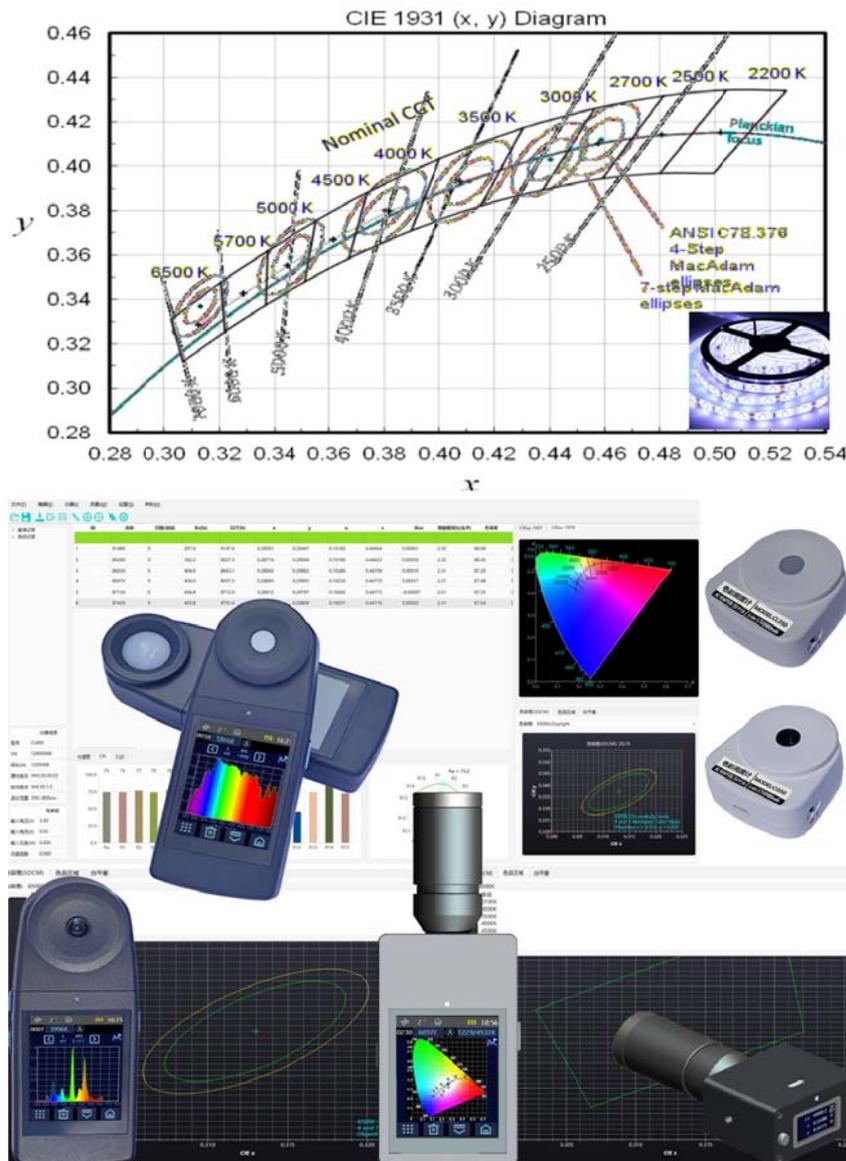


Figure 10

### 3.3 Color temperature(CCT), Uniformity measurement of Light box or Display panel

The main technical indexes of the light box include the following: the standardization of the spectral distribution of the light source, the display uniformity of the illumination of the light source, the stability of the light source, the color temperature and color rendering index of the light source, and the life of the light source. The CI503 can easily measure the stability, uniformity and spectral matching of the light box.



Figure 11

### 3.4 Transmittance Test

Transmittance is the ratio of the luminous flux (radiant flux) of light passing through the measured object to the incident luminous flux (radiant flux). The transmittance of visible light is usually the ratio of the luminous flux of visible light at wavelengths of 380-780 nm, UVA transmissivity is usually the ratio of UVA to UVA radiation flux, and IR transmissivity is the ratio of IR radiation flux at wavelengths over 780 nm.

LED light source or halogen tungsten lamp is usually used as the lighting source in the transmissometer. From the test results, different lighting sources have a certain influence on the transmittance test results, usually affecting about 5%.

Many standards and documents clearly state that the D65 standard illuminator is the most ideal illuminator for transmissometers. The D65 standard lighting source is the Earth's average northern hemisphere solar spectrum, so the transmittance tested under this light source condition is very representative and easily accepted by the public. For example, outdoor glass, UV sunscreen glasses and other related standards clearly state that the D65 light source should be used for transmittance testing. However, the light source used by the common transmittance meter is far from the D65 standard lighting source, so the test results are not very good.

CI503 can use outdoor sunlight (as close as possible to the D65 standard lighting source) as the lighting source, after two tests, very convenient test glasses, architectural glass in D65 standard lighting source under the condition of transmittance.

### 3.4 A cost-effective testing solution for luminance and color coordinates of displays

The LCD panel/OLED panel/miniLED panel industry requires high testing accuracy for luminance, and color coordinates, and must be consistent with data from specific brand instruments (standard machines). The testing principle of irradiance/ luminance colorimeter using coated filter plates+CMOS/PD silicon photovoltaic cell detectors usually has CIEXYZ adaptation errors, which can result in slightly lower testing accuracy and data consistency for this type of irradiance/ luminance colorimeter.

In this case, HCAL software can be used to calibrate this type of irradiance/ luminance colorimeter. If the calibration is reasonable and compared with standard machine test data, the calibrated irradiance/ luminance colorimeter usually has a luminance accuracy of 3% and an average chromaticity coordinate xy error of 0.003.

Index	Colors	STD-Y	STD-x	STD-y	TST-Y	TST-x	TST-y	TST-dY	TST-dx	TST-dy	CAL-Y
White		365.87	0.28772	0.30061	133.96	0.39094	0.38893	-231.91	0.10322	0.08832	
#ff969696		112.39	0.36018	0.36073	43.37	0.38669	0.38483	-69.02	0.02651	0.02410	
#ff202020		28.55	0.30768	0.31338	1.80	0.40205	0.39470	-26.75	0.09437	0.08132	
Red		90.55	0.57073	0.33170	49.70	0.61153	0.35941	-40.85	0.04080	0.02771	
Green		60.47	0.29002	0.48363	18.88	0.28071	0.59955	-41.59	-0.00931	0.11592	
Blue		26.09	0.18469	0.12137	4.80	0.17382	0.06719	-21.29	-0.01087	-0.05418	
Aqua		176.65	0.24544	0.39057	84.26	0.24612	0.41086	-92.39	0.00068	0.02029	
Fuchsia		106.28	0.40628	0.22792	54.74	0.45992	0.25912	-51.54	0.05364	0.03120	
Yellow		257.10	0.43817	0.47317	128.80	0.45133	0.47463	-128.30	0.01316	0.00146	

Figure 12

## IV Dimensions

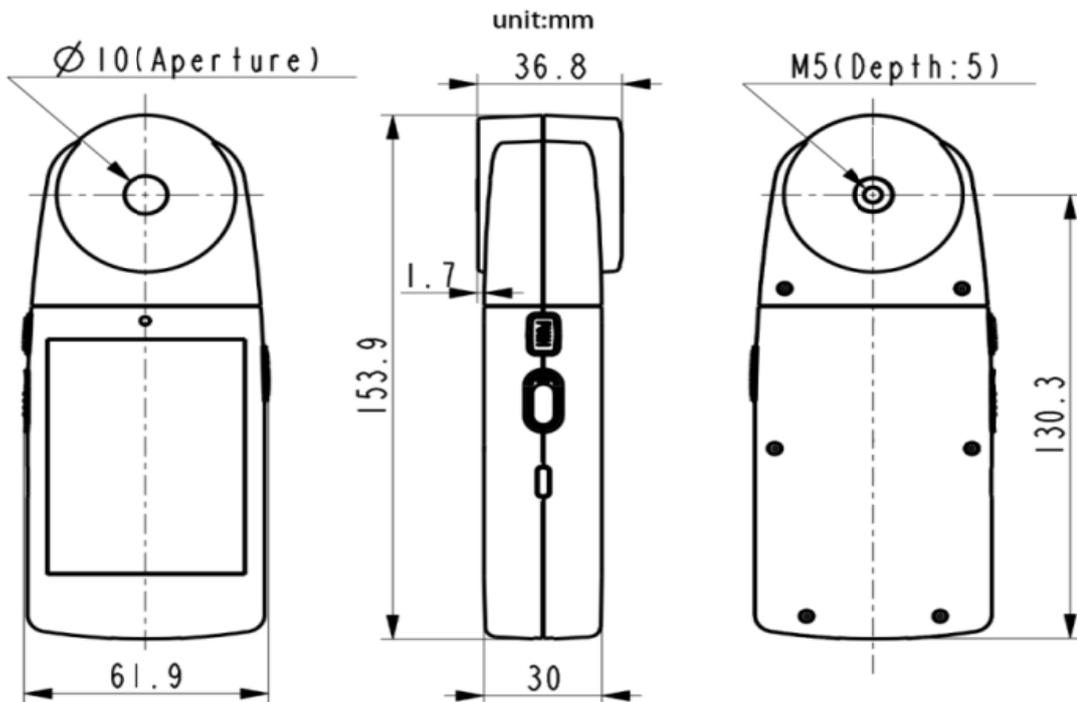


Figure 13

## V Technical Parameter

Product	LUMINANCE COLORIMETER		
Model	CI800	CI700	CI503
Wavelength Range	350~800nm	360~780nm	400~700nm
Wavelength Interval	1nm		/
Spectrophotometric Mode	Concave Grating		CIE XYZ Filter
Lv Range	0.1~200000cd/m <sup>2</sup>		
Accuracy (Light A)	Lv: ±4% ±1 display value xy: ±0.004 (>5cd/m <sup>2</sup> )		Lv: ±5% ±1 display value xy: ±0.006 (>5cd/m <sup>2</sup> )
Repeatability (Light A)	Lv: 0.2% ±1 display value xy: 0.001 (>10cd/m <sup>2</sup> ) xy: 0.002 (5~10cd/m <sup>2</sup> )		Lv: 0.2% ±1 display value xy: 0.001 (>10cd/m <sup>2</sup> ) xy: 0.002 (5~10cd/m <sup>2</sup> )
Measure Angle	1°		
Measurement Area	minimum Φ6mm; Distance=100mm, minimum area Φ6mm; Distance=200mm, minimum area Φ14mm; Distance=500mm, minimum area Φ30mm; Distance=1000mm, minimum area Φ55mm;		
Measurement Mode	Auto mode, Continuous mode, Average mode, Flash mode (except CI503)		
Measuring Time	Auto mode: 0.2~5 s		Auto mode: 0.003~5 s
Observer Angle	2° (CIE1931)		
Color Space	CIE XYZ, Lv xy, Lv u'v', Spectrum (except CI503)		
Colorimetric Index	1. Lv, CCT (K), CRI; CIE31x, y; CIE76u', v'; CIE31X, Y, Z; Duv, SDCM, S/P; Peak (nm), Center (nm); λ, PE, PC; Le, Lvis, Luv, Lb, Lg, Lr, Lrb, R(%), G(%), B(%); 2. Flicker (Hz), Modulation (%); (except CI700) 3. Display screen Gamut, Gamut Area (%), ΔCuv; 4. CQS CRI, Color Fidelity Qf, Gamut Index Qg and Qp; TM-30 Color Fidelity Rf and Gamut Index Rg; TLCI-2012 (except CI700); 5. Points/9 Points Uniformity; 6. Safety of lamps; 7. CIE31 xy diagram, CIE76 u'v' diagram, CRI/CQShistogram, CRI/CQS radar chart, MacAdam ellipse diagram, White Balance diagram		1. Lv, CCT (K); CIE31x, y; CIE76u', v'; CIE31X, Y, Z; Duv, SDCM; λd, PE, PC; 2. Display screen Gamut, Gamut Area (%); 3. Points/9 Points Uniformity; 4. CIE31 xy diagram, CIE76 u'v' diagram, MacAdam ellipse diagram
Data Storage	Sample 10000 Pcs	Sample 8000 Pcs	Sample 2000 Pcs
Dimension	L*W*H=154X62X37mm		
Weight	about 200g		
Battery	Li-ion battery, 3.7V, 4000mAh (8000 measurements within 24 hours)		
Display	2.8-inch TFT color LCD, Capacitive Touch Screen		
Data Port	Type C USB, Bluetooth 5.0 (Customizable WIFI)		
Language	English, Chinese		
Operating Environment	-10~40°C (0~85%RH/no condensing)		
Storage Environment	-20~50°C (0~85%RH/no condensing)		
Standard Accessory	Power adapter, USB cable, manual (Electronic Version), Protective Cover, PC Software (Download from office website), Wrist strap, Wiping Cloth		

Figure 14

## VI About Huicolor

**Shenzhen HUICOLOR Technology Co., Ltd.** was established in Nanshan District, Shenzhen, P.R.China. in 2015, it is a high-tech enterprise focusing on the research and development and manufacturing of precision optical detection instruments.

HUICOLOR Company adheres to the concept of "continuous innovation", aspires to build a well-known brand in the precision optical detection instrument industry, contributes to China's intelligent manufacturing. HUICOLOR Company has obtained multiple national technology patents, and hold the trademarks "HUICOLOR", simultaneously possessing multiple software copyrights.

HUICOLOR Company adheres to independent R&D, design, production and manufacturing. Since the establishment of the company, it has successfully launched multiple high-precision optical products with independent intellectual property rights, such as CI800 series spectral LUMINANCE COLORIMETER, CL500 series LUMINANCE COLORIMETER, CI800 series spectral Luminance Colorimeter, CL300 series spectrometer / UV energy meter and CI350 Display Calibration system, which are widely used in LED lighting, spectral analysis, liquid crystal display, intelligent agriculture, scientific research and other fields.

Shenzhen HUICOLOR Technology Co., Ltd. adheres to the concept of "continuous innovation", manufactures "excellent quality" precision optical equipment, provides professional technical services, and "creates value" for users to achieve a win-win situation.

## VII Contact Huicolor

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