MODEL 7121/7122

Key Features:

■ Non-contact luminance and chromaticity measurement for color displays
■ Wide luminance range:
   0.1 to 9999 cd/m^2 (7121)
   0.1 to 6000 cd/m^2 (7122)
■ High accuracy measurement:
   ±2% ±1digit for luminance(Y),
   ±0.002 for Chromaticity coordinates (xy)
■ Selectable display modes:
   xyY, T∆uvY, u' v' Y, RGB, XYZ
   FMA(7122), FLVL(7122)
■ Support Flicker Contrast & JEITA measurements (7122)
■ Memory for storing 100 channels of standard color data and calibration data
■ Built-in flat display calibration data (LCD-D65, LCD-9300) to be applied for chromaticity measurement instantly
■ Equipped with high contrast VFD display to increase the recognizability of data display
■ Convenient user interface that switches the luminance unit by a single button
■ The measurement position can be easily confirmed by positioned projecting light
■ Standard USB & RS-232 data communication interface design to connect with PC

DISPLAY COLOR ANALYZER
MODEL 7121/7122

Chroma 7121/7122 Display Color Analyzer adopts the design of non-contact type measurement to measure the luminance and chromaticity of display panels. Developed with the most advanced digital signal processor and the technology of optoelectronic transfer as well as precision optical parts and circuit design, the 7121/7122 is capable of performing high speed, accurate and stable tests.

The configuration of 7121/7122 complies with the color matching function sensor of CIE 1931 and CIE1976 UCS that can measure the luminance and chromaticity of display panel accurately. Users can switch to various types of chromaticity coordinates including xyY, T∆uvY, u' v' Y, RGB, XYZ, FMA and FLVL modes freely. The luminance measurement range of 7121 is up to 0.1 to 9999 cd/m² (0.029 to 2918 fL) that can cover the luminance and chromaticity measures for all displays.

The optical measurement software incorporated by 7121/7122 is able to do chromaticity, luminance, Flicker(7122) and Gamma measurements on PC, and then show the measured data on CIE 1931 and CIE1976 UCS chromaticity coordinate directly. Besides the function of drawing Gamma curve, the measured data can also be stored on PC and exported to EXCEL® for process. The example programs enclosed in optical measurement software allow users to develop the test programs that suit their needs.

The 7121/7122 has 100 channels of built-in memory for storing the value of standard colors and calibrated data. In addition, the 7121/7122 also provides many friendly user interfaces for operation such as the way test data shows, the position set for push buttons, the positioning projector, USB and RS-232 interfaces for data transmission, etc. to satisfy the requirements for actual measures.
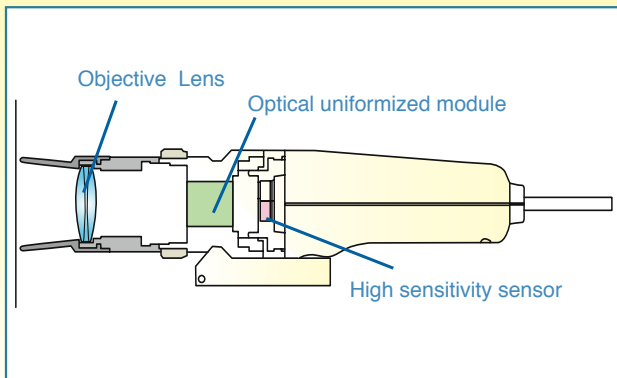
As the technology and products of flat displays have become the mainstream in the market today, every manufacturer is seeking for high value-added and low cost measurement solutions to raise its competitiveness; the 7121/7122 is the excellent tool to assist in achieving that purpose.

USB 2.0   RS-232C   CE   SGS   UKAS
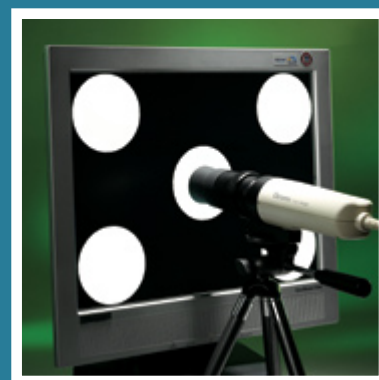
PROBE OPTICAL SYSTEM FEATURE

The Probe Optical System (patented) of Chroma 7121/7122 Display Color Analyzer is featured in 3 parts - 1. Objective lens, 2. Optical uniformized module, 3. High sensitivity sensor. It can measure various display devices such as LCD, CRT, PDP, FED, SED, OLED and other soft display devices precisely.

The light projected by the light source to be measured is gathered into the optical uniformized module through the objective lens. After uniformizing the light of each dot on the area to be tested in the module, it projects equally to a probe device with X, Y and Z filter compensation.
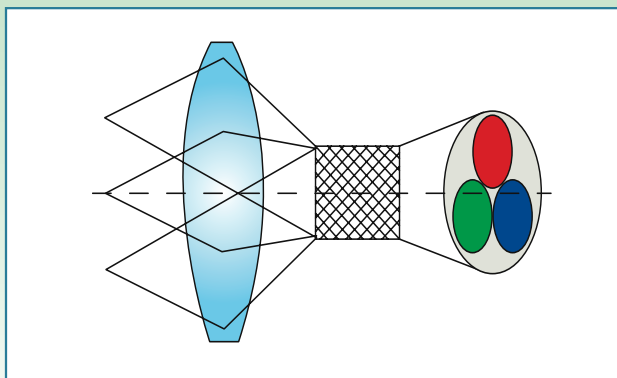
LOW-LUMINANCE MEASUREMENT

Diagram of Optical Uniformized Module

Reducing the light loss during transmission in the system hence increasing the use rate of input light quantity is the main factor that the system can accomplish rapid and accurate measures under low luminance measurement mode.

The optical uniformized module implemented in 7121/7122 not only uniformizes the input light quantity but also reduces its loss significantly due to transmission, moreover raises the use rate. The high sensitive detection device of 7121/7122 formed by high transmission Y filter and high light sensitivity detector further increases the use rate of input light quantity for outputting accurate low-luminance test results.
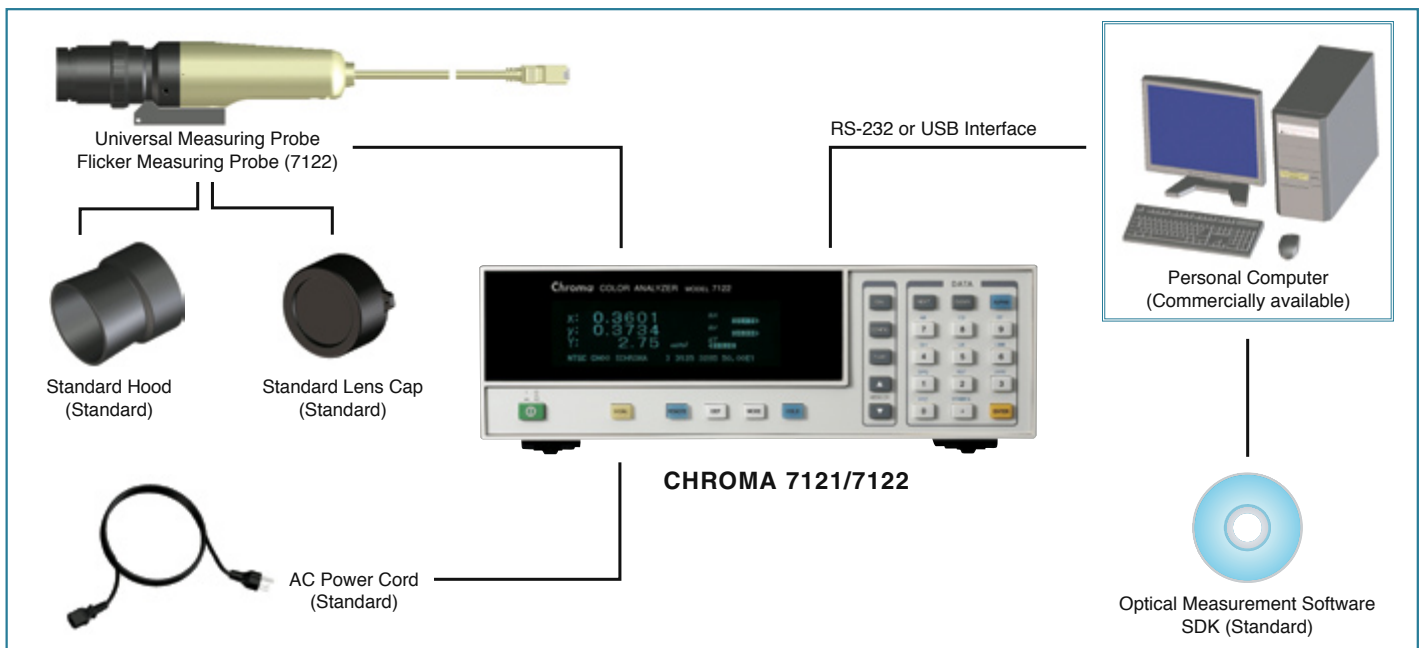
OBJECT-SIDE TELECENTRIC OPTICAL SYSTEM
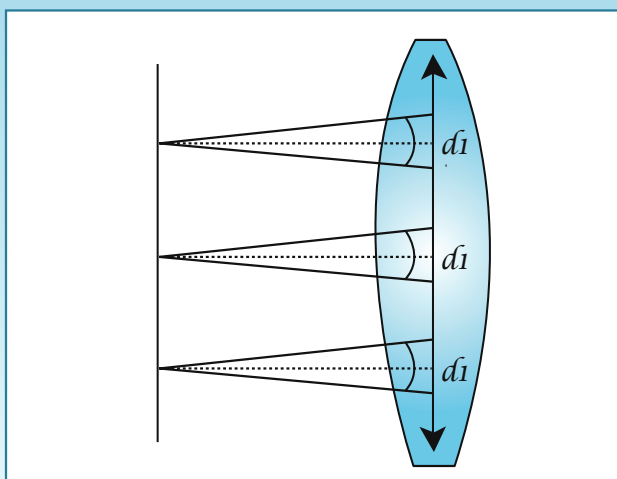
Measurement Angle of 7121/7122

Certain types of displays (ex. LCD) have stronger directive that can adhere to human eyes when watching a display device. For the feature of receiving smaller emission angle, the light acceptance angle should be within 5° according to the recommendation of IEC 61747-6 and EIAJ ED-2522 standards.

Chroma 7121/7122 Display Color Analyzer designs the light acceptance angle to 5° in comply with the IEC standards. With the object-side telecentric optical system design the light acceptance angle in the measurement range will show symmetry along the flat surface of display in vertical direction. Therefore, the light acceptance angle of 7121/7122 for normal direction of display flat surface is ±2.5° only (as the figure shows.) Moreover, the telecentricity of 7121/7122 that is the middle line of light acceptance angle and the normal included angle of device flat surface has the error less than 0.25°.

Universal Measuring Probe
Flicker Measuring Probe (7122)

RS-232 or USB Interface

Personal Computer
(Commercially available)

Standard Hood
(Standard)

Standard Lens Cap
(Standard)

CHROMA 7121/7122

AC Power Cord
(Standard)

Optical Measurement Software
SDK (Standard)

OPTICAL MEASUREMENT SOFTWARE / SDK (STANDARD)

Chroma 7121/7122 Display Color Analyzer working with the optical measurement software is able to grab the measured data to PC and store it or export it to EXCEL® for process. The example programs of optical measurement software are also enclosed for users to develop the application that suits their need.

Color Measurement

It shows both digital and analog at the same time and there are xyY, T△uvY, u' v' Y, RGB, XYZ, FMA and FLVL seven display modes available for setting one time or continuous measurement.
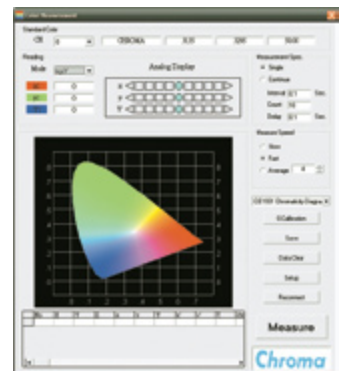
Color Measurement
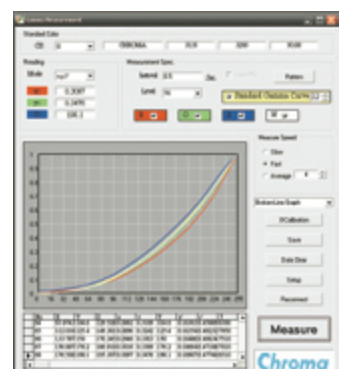
Flicker Measurement

The 7122 supports FMA and FLVL two modes. FMA Flicker measurement mode can see the comparison (AC/DC) between luminance change (AC) and basic amount (DC); while the FLVL (JEITA/VESA) Flicker measurement mode can separate the AC amount for different frequencies. The Flicker value of each frequency shows on the chart allows users to identify the location of Flicker frequency dot easily.

Flicker Measurement

Gamma Measurement

Gamma measurement for red, green, blue and white four colors can be done when it is connected to the VPG of Chroma. It can set up to 4096 (12 bit) levels for measurement as need and display the standard Gamma curve at the same time.

Software Development Kit (SDK)

■ Example Program:
- Color Measurement
- Gamma Measurement
- Color Calibration
- Multiple Analyzers Control
■ API Development Library

System Requirements

Operating System: Windows® 2000/XP

Windows® & EXCEL® are the trademarks of Microsoft in United States and other countries.

Gamma Measurement

Model		7121	7122
Main unit			
Measurement Area		ø27 mm	
Acceptance Angle		± 2.5˚	
Display Range	Luminance	0.01 to 9999 cd/m²	0.01 to 6000 cd/m²
	Chromaticity	Displayed in 4 or 3 digit value	
Measuring Range		0.10 to 9999 cd/m² (0.03 to 2918 fL)	0.10 to 6000 cd/m² (0.03 to 1751.4 fL)
Luminance Unit		cd/m² or fL, selectable via front panel key	
Display Mode	Digital	xyY; XYZ; TΔuvY ; u' v' Y; RGB	xyY; XYZ; T△uvY ; u' v' Y; RGB; FMA; FLVL
	Analog	Δx Δy ΔY; ΔR ΔG ΔB; ΔR G/R B/R; R/G ΔG B/G	△x △y △Y; △R △G △B; △R G/R B/R; R/G △G B/G;FMA
Luminance	Accuracy	±2% ±1digit (Calibrated by standard illuminant A under Chroma's testing condition)	
	Repeatability	0.10 to 0.99 cd/m² : 0.2% + 1digit (2σ) ; Above 1.00 cd/m² : 0.1% + 1 digit (2σ)	
Chromaticity	Accuracy	0.1 to 2.99 cd/m² : ± 0.008 (for standard illuminant A) 3.0 to 4.99 cd/m² : ± 0.005 (for standard illuminant A) 5.00 to 9.99 cd/m² : ± 0.003 (for standard illuminant A) 10.00 to 9999 cd/m² : ± 0.002 (for standard illuminant A)	0.1 to 2.99 cd/m² : ± 0.008 (for standard illuminant A) 3.0 to 4.99 cd/m² : ± 0.005 (for standard illuminant A) 5.00 to 9.99 cd/m² : ± 0.003 (for standard illuminant A) 10.00 to 6000 cd/m² : ± 0.002 (for standard illuminant A)
	Repeatability	0.10 to 0.19 cd/m² : 0.015 (2σ) 0.20 to 0.49 cd/m² : 0.008 (2σ) 0.50 to 1.99 cd/m² : 0.003 (2σ) 2.00 to 9999 cd/m²: 0.001 (2σ)	0.10 to 0.19 cd/m² : 0.015 (2σ) 0.20 to 0.49 cd/m² : 0.008 (2σ) 0.50 to 1.99 cd/m² : 0.003 (2σ) 2.00 to 6000 cd/m²: 0.001 (2σ)
Flicker Contrast method	Meas. Range	--	5 cd/m² or higher
	Display Range	--	0.0 to 100%
	Accuracy	--	±1% (Flicker frequency:30 Hz AC/DC 10 % sine wave) ±2% (Flicker frequency:60 Hz AC/DC 10 % sine wave)
	Repeatability	--	1% (2σ) (Flicker frequency:20 to 65 Hz AC/DC 10 % sine wave)
Flicker JEITA method	Meas. Range	--	5 cd/m² or higher
	Accuracy	--	±0.5dB (Flicker frequency:30 Hz AC/DC 10 % sine wave)
	Repeatability	--	0.3dB(2σ) (Flicker frequency:30 Hz AC/DC 10 % sine wave)
Measurement Speed		0.1 to 3.99 cd/m² : 5 times/second ; 4.00 cd/m² or above : 15 times/second	
Memory Channel		100 channels	
SYNC Mode		NTSC, PAL, EXT, UNIV, INT	
Object Under Measurement		10~100 Hz	10~135 Hz
Interface		USB(2.0), RS232C (Baud rate max. 115200)	
Input Voltage Range		AC 100~240V, 50/60 Hz, 50VA	
Temperature Range		Operation : 0˚C to 40˚C (32˚F to 104˚F) ; Storage : -20˚C to 55˚C (-4˚F to 131˚F)	
Humidity Range		Less than 85% relative humidity (at 35˚C/95˚F with no condensation)	
Dimensions (WxHxD)		320x115x240mm	
Weight		2.5 Kg	
Measuring Probe			
Number of measurement		One probe	
Dimensions		ø 46 x 235(D) mm	
Weight		500g	
Cord Length		2.5m	
Optical System		LED pointing function	
Other Functions		Calibration of user-selected color reference, storage of channel ID name, variable analog display range, measurement hold,remote control	
Certification		CE	

*Reference Standard : IEC 61747-6, EIAJ ED-2522, ASTM E455-03, VESA Standard
*All specifications are subject to change without notice.

ORDERING INFORMATION

7121 : Display Color Analyzer
A712100 : Probe with a 2.5-Meters Cable for Model 7121 Series
7122 : Display Color Analyzer
A712200 : Probe with a 2.5-Meters Cable for Model 7122 Series

Optional Accessory :
A712101 : Probe with a 5-Meters Cable for Model 7121
A712102 : Tripod (Including a level)