

# KLEIN K10-A COLORIMETER/ FLICKER METER

Tristimulus Colorimeter with Long-Range Measurement Capabilities



The Klein K10-A has long been regarded as the industry standard in display calibration. Its enhanced optics give it a 3X advantage in sensitivity over the original K-10 SF. The K10-A can measure from any distance, making it perfect for calibration of any display type, even projectors. The unparalleled speed and iconic design of this colorimeter have made it the most widely known Klein product.

## Data Captured in Milliseconds

Ultra fast measurements make this colorimeter the perfect choice for quality control and production line purposes. The K10-A can stream Intensity data in 3.2 milliseconds, and can provide color data in 125 milliseconds. The Klein K10-A is also extremely sensitive and color accurate. Large photodiodes give the probe superior performance even in extremely low light (down to 0.00006 cd/m<sup>2</sup>). Klein diodes are very large; 5mm x 5mm each, and are thermally stable and linear to report the highest degree of accuracy.

## Winning Design

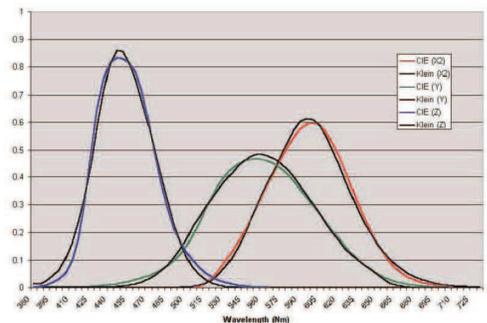
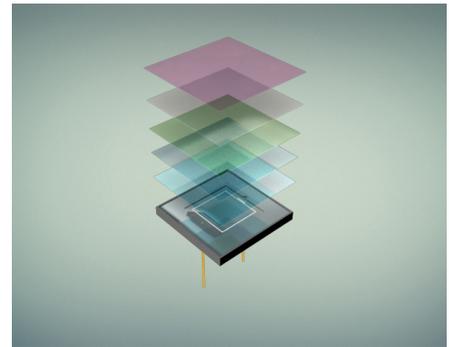
Like all Klein colorimeters, the K10-A is ruggedly constructed with machined aluminum and high impact plastic. It is equipped with LED aiming lights can be easily turned on and off by rotating the aluminum knob. The K10-A's auto ranging is solid state, and the housing is impact resistant to hold up to the 24 hours a day, 7 days a week usage that the display manufacturers require. The K10-A's compact size and light weight make transportation convenient. It is also fitted with a universal tripod mount for easy positioning and integration into workflows.

## Exceptionally Accurate Filters

For maximum accuracy, not only is the f1' of Y critical, but the accuracy of X and Z as well. To the left is the actual graph of the Klein filters vs. the CIE graph. Each diode has a specially layered filter pack designed for maximum color accuracy. Klein colorimeters are also rigorously tested to ensure that each device is thermally stable with an operating temperature range of 15-35 C.

## Versatility

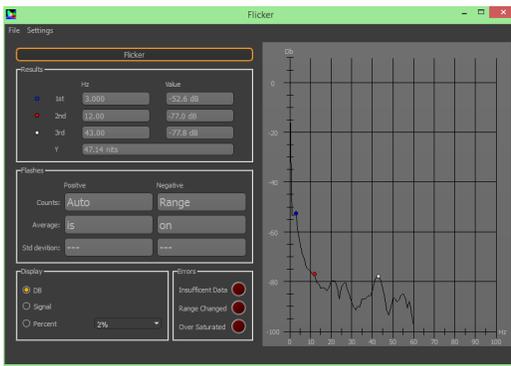
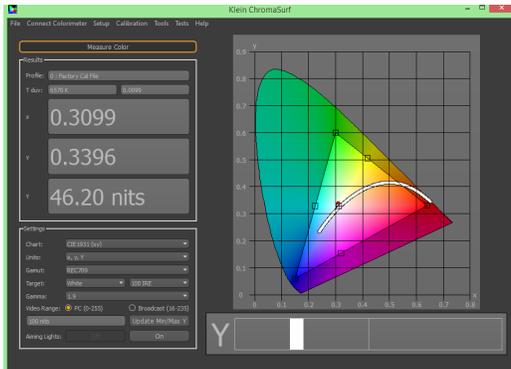
The Klein K10-A provides industry standard colorimetry analysis, as well as the capability to measure flicker. The probe can measure color and flicker on OLEDs, LED backlit displays, CRTs, plasmas, projectors, and more. The Klein K10-A can also measure and log flashes from various direct light sources. The K10-A also features aiming lights to outline the measurement area of the probe. This reduces the time it takes to set up your colorimeter in the field.



# Klein Chromasurf



Klein Chromasurf is the free companion software for the K10-A. Its streamlined, user-friendly interface is perfect for color calibration and flicker analysis. Also available is the Klein SDK, which allows users to develop customized solutions for measuring with a Klein colorimeter.



- **Cross platform:** Chromasurf is compatible with Windows, Mac, and Linux operating systems, giving you flexibility in your working environment
- **Streamlined and Intuitive:** Chromasurf features a simple, straightforward interface, with easy access to all the powerful features needed in calibration.
- **Data Display:** Chromasurf gives the user control over how data is visualized. The graph or chart can be changed to a number of different configurations. Displayed units can also be manipulated for added versatility.
- **Real-time Flicker Analysis:** The software's flicker panel gives immediate access to information as it's gathered. Flicker can be displayed in multiple formats to suit multiple applications.
- **Visual calibration:** Chromasurf provides real-time visual information regarding, whitepoint, RGB primaries, gammut, and more.

## Flicker

The Klein K10-A also functions as an FFT (Fast Fourier Transform) flicker meter. The probe measures and integrates Y data in the head, streams in real time to the PC, and then the FFT is performed. The Klein K10-A can measure regular flicker between 1-150Hz. Multiple methods for displaying flicker data including JJEITA, VESA, Percent Flicker, and Contrast methods are selectable in the software. The Klein K10-A can be used to analyze any luminance source, including the common refresh-rate flicker in monitors, and random flashes caused by the transmission of current variations through solid state devices (LEDs). All flicker information can be logged and reported with Klein Chromasurf.

## Accessories

- Metal Klein Carrying case
- Tripod
- Rubber Lens Hood
- Cosine Diffuser
- Extension Tube
- Install Disc with Klein Chromasurf, Legacy Software, and Drivers
- Certificate of Calibration

Model		K10-A
Receptors	Silicon Photocells	
Measurement area	43 mm at contact 60 mm at 10 cm distance 75 cm at 4 m distance	
Acceptance angle	±5°	
Measurement distance	Any distance	
Display range	Luminance	0.0001 to 10,000 cd/m <sup>2</sup>
	Chromaticity	Displayed as 3 or 4 digit value (selectable)*
Luminance	Meas. range	0.00006 to 10,000 cd/m <sup>2</sup>
	Accuracy†	±2% (3.00 to 10,000 cd/m <sup>2</sup> )
	Repeatability†	±0.1% (3.00 to 10,000 cd/m <sup>2</sup> )
Chromaticity	Meas. range	0.020 to 10,000 cd/m <sup>2</sup>
	Accuracy†	±0.002†, ±0.004††
	Repeatability†	±0.003 (0.05 to 0.1 cd/m <sup>2</sup> ) ±0.0003 (2 to 10 cd/m <sup>2</sup> )
Flicker (VESA)	Meas. range	1 to 150Hz*
	Display range	0.0 to 999.9%
	Accuracy	±1% (flicker frequency: 30 Hz 75% duty cycle square wave) ±1% (flicker frequency: 60 Hz 75% duty cycle square wave)
	Repeatability	1% (flicker frequency: 30 Hz 75% duty cycle sine wave)
Flicker (Contrast Method)	Meas. range	1 to 150Hz*
	Display range	0.0 to 999%
	Accuracy	±.4% (flicker frequency: 30Hz AC/DC 10% sine wave)
Measurement speed	xyY	8 measurements per second, averaging below 2.7 nits
	Flicker	384 measurements per second*
SYNC mode	Universal	
Memory channels	90 stored in colorimeter	
RGB Analyzer function	Standard	
Interface	USB or RS-232c (38,400 bps maximum)	
Multi-point measurement axis	1,4,5, or 9 probes using Klein K-colorimeter software‡	
Software Solutions	Chromasurf (available on website) SDK software (supplied as standard accessory)‡	
Operating temperature/humidity range	Temperature: 15 to 35°C; Relative Humidity 70% or less with no condensation. Luminance change: ±2% ±1 digit of reading for white; Chromaticity change: ±0.002 for white, ±0.006 for monochrome from reading of Klein's standard LCD, 120 cd/m <sup>2</sup> at 23°C 40%RH	
Storage temperature/humidity range	0 to 28°C: Relative Humidity 70% or less with no condensation; 28 to 40°C: Relative humidity 40% or less with no condensation	
Input voltage range/ power	5V (USB power), ≤150mA	
Dimensions	60mm diameter, 265mm length	
Weight	570g	

\*with firmware version P2v01.01ab and higher

†measured at 23°C on Klein Factory display on white field

‡additional software provided by various vendors

††measured at 23°C on Klein Factory display on RGB fields