

# ColorWizzard™ White Paper

## Introduction

ColorWizzard™ is a software product enabling end-users to characterize and calibrate their monitor. It turns every monitor (even basic, commodity priced, monitors) into desktop publishing ready, multimedia ready, viewing stations.

ColorWizzard provides consistent and accurate color on CRT (Cathode Ray Tube) monitors as well as on LCD (Liquid Crystal Display) flat panels. It is the only software solution to offer accurate LCD characterization and calibration using patented and patent pending technologies. LCDs have characteristics very different from CRTs and as most images and movies are engineered for CRTs, they often look bad on uncorrected LCDs.

ColorWizzard is a set-and-forget program that allows for precise control over displayed and printed colors and enhances image quality for home and business consumers. It is the only software color calibration system that replaces expensive hardware solutions.

ColorWizzard uses some clever image patterns to adjust the brightness, and the individual red, green, and blue TRC (transfer response curves). It also provides a unique patented light blue color swatch that is put on the surface of the display and used as a reference for optimal white point calculation. The final adjustments take into account not only the settings and properties of the monitor but also their perception as well as the ambient lighting conditions.

## Characterization

All monitors, even from the same manufacturer, display images differently due to monitor and video card specificities, factory and end user settings, room lighting and surround conditions.

Many people use their computers daily without ever spending the time to adjust the monitor for the best-possible picture and even less for accurate colors.

The color-temperature presets available on monitors offer only a crude adjustment, and most people do not fully understand how to properly adjust this control.

Starting with Windows 98®, all Microsoft® Operating Systems support ICM (Image Color Management) for matching color between input, display and output devices. Unfortunately crude assumptions about devices and generic ICC (International Color Consortium) profiles allow only for coarse adjustment.

Without monitor characterization, color matching in Microsoft Windows is inaccurate. ColorWizzard uses the foundation provided by ICM to create and provide accurate color profiles customized to a particular configuration and environment. Actually only ColorWizzard ensures a near perfect color rendering on CRT and LCD monitors. It characterizes a monitor through a simple sequence of screens, including patented ones, eventually creating a standard ICC profile. The profile fully determines how the system

displays color, taking into account many intrinsic and environmental variables. The profile is then used by the Microsoft Windows ICM engine and by ICC aware programs. No extra hardware is required. ColorWizzard allows characterizing white point through a patented visual method involving brightness and color comparison between a reference card and the monitor. For LCD, patented Auto Angle™ adjustment tool and patent pending TRC model provide very accurate characterization for flat panels.

### ***CRT parameters***

Black level, black point, gamma, white point, and EDID (Extended Display Identification Data) chromaticity coordinates. Final TRCs computed through Berns-Motta I/O model.

### ***LCD parameters***

Head to display relative position, highlight shoulder, curve points, white point, and EDID chromaticity coordinates. Final TRCs computed through a proprietary I/O model.

## **Calibration**

ColorWizzard allows calibrating monitors to various industry standards through a simple control panel. For example, ColorWizzard provides real sRGB (standard RGB) support for the Windows environment enabling the monitor to maintain consistent color across all sRGB compliant peripherals, such as printers, digital cameras and scanners and even the Internet. Other optimized standards, like business graphic, desktop publishing or computer-assisted-display are also available. By providing accurate profiles to the Windows ICM engine, ColorWizzard generates accurate screen preview which eliminates re-printing and re-working and then saves time, money and paper

In addition to CRT monitors, ColorWizzard patented Auto Angle™ adjustment tool and patent pending TRC model also provide very accurate calibration for LCD flat panels.

## **Characteristics**

- ColorWizzard supports Microsoft Windows® 98/Me/NT/2000/XP/2003.
- ColorWizzard supports multi-headed systems (including proprietary schemes).
- ColorWizzard supports all graphic adapter RAM DAC depths (latest video cards often use 10 and 12 bits DAC chips).
- ColorWizzard Control Panel can easily be integrated in other program through a standard and simple API.