Think of Your Eyes!

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Over the years, backlit screens have become an increasingly important part of our lives. With millions of people now staying at home to help prevent the spread of COVID-19, this trend has accelerated sharply.

Although performing work or attending classes online is much safer than doing so in person during these times, it has its own set of health risks. One of these is the impact on the human eye of staring at screens all day, and for many people, even long into the night.

We present a system which is designed to help alleviate these issues, and, in particular, assist during the nighttime hours.

BlueBlock is the Answer

The BlueBlock device lies between the user's computer and monitor, modifying the color of the screen according to the time of day, ambient light, or user preferences. It can be configured using a Web interface or an Android app (coming soon). All monitors and computers that support the VGA standard are compatible with BlueBlock, regardless of operating system or hardware. And, best of all, it uses *zero* system resources - you can forget the slowness of software solutions.

Setup is simple. After just connecting the computer to the device and the device to the monitor, the user can adjust the monitor's color at any time using the knobs on the device. Once the device is given the user's WiFi information, it will connect to the network, giving access to more advanced configuration options through the Web interface.

Major Features

No other night-mode or screen-tinting solution can match the extensive features of BlueBlock.

- Can tint to any color.
- Low latency due to innovative analog attenuation system.
- Preserves image quality.
- Can automatically change the color depending on the time of day...
- Or, depending on light level in the room.
- Compatible with all VGA output devices and monitors, regardless of operating system.
- Can be configured from any device on the network that has a web browser.

How it Works

Unlike other systems that try to use the computer's CPU to process every pixel on the screen - 124 million of them a second[1] - our system uses simple electrical engineering principles to change the color using inexpensive hardware.

In a VGA cable, there is one wire for red, one for green, and one for blue. The analog voltage level on each wire changes as the signal scans across the screen. BlueBlock uses digitally-controlled potentiometers to attenuate the individual color lines, thus achieving a color change without significant latency. The other signal lines are unchanged.

The whole BlueBlock device is run by an Espressif Systems ESP8266EX micro-controller. This WiFi-enabled chip works in tandem with an Atmel ATmega328P micro-controller to read user input, keep track of the time, sense the ambient light level, save the user's settings, and control the color of the display.

[1] 1920x1080 at 60 FPS = 124,416,000 pixels/sec