

# TOFRA, Inc. (Tools for Research Automation)

microscope automation ♦ filter changers ♦ focus drives ♦ scanning stages ♦ LED light sources

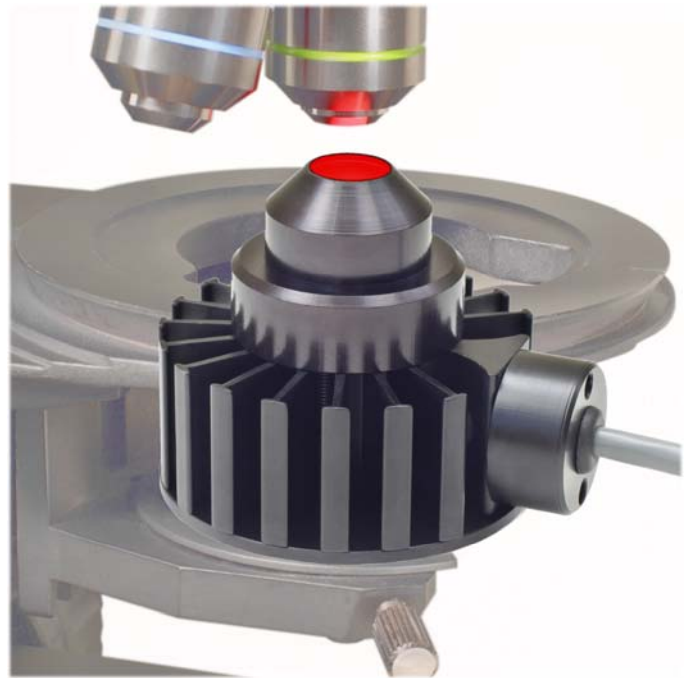
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## RGB LED Light Source for Microscopy

The RGB LED Light Source provides bright and uniform microscope illumination. Independent and accurate control of red, green and blue LEDs creates any desired color and intensity. Color images can be produced from monochrome cameras giving full non-interpolated color at every pixel. The light source head mounts instead of condenser on upright microscopes. The light source controller connects to the computer serial port, or to the USB port through USB-to-RS232 converter.

Wavelengths are 619 nm (red), 515 nm (green), 465 nm (blue). Switching time is less than 1 ms. At maximal light intensity required exposure time in each color for typical CCD cameras is between 0.5 and 5 ms. with a 10X objective. The standard head has illuminated area of 12.5 mm in diameter. For low-magnification objectives a special head with 25 mm in diameter can be provided. Software for interactive control and for automation from other applications is provided, as well as examples of direct control through serial port. The unit does not create any vibration or noise. It has low heat emission, low thermal drift, and low temperature gradient; it can be always on.

Each color is controlled with 10 bit accuracy providing any desired hue, saturation and intensity including white light for visual observation. Sequential acquisition of colors makes possible the adjustment of focus position for each color. Monochromatic illumination reduces the effect of chromatic aberrations present in microscope objectives. No extra components are introduced in the imaging path of the microscope, which ensures that there is no deterioration of image quality.



### Specifications

- Wavelengths: Red (619 nm), Green (515 nm), Blue (465 nm).
- Switching time: < 1 ms. (practically, speed is determined by the serial port and the software that controls it; for faster switching use digital control).
- Light intensity: At full intensity integration time for a typical CCD camera ~0.5-5 ms. in each color (with 10X objective).
- Illuminated area: 12.5mm or 25mm in diameter.
- Interface: Serial RS232 or USB with USB-to-serial converter (RS-232: needs 9 pin male connector in the computer; 9600 baud, 8 data bits, 1 stop bit, no parity); digital TTL-level available.
- Software: LEDTool/LEDToolV - ActiveX server for interactive control or for automation from other applications; direct control through serial port.
- Size: fits instead of substage condenser.

### Advantages

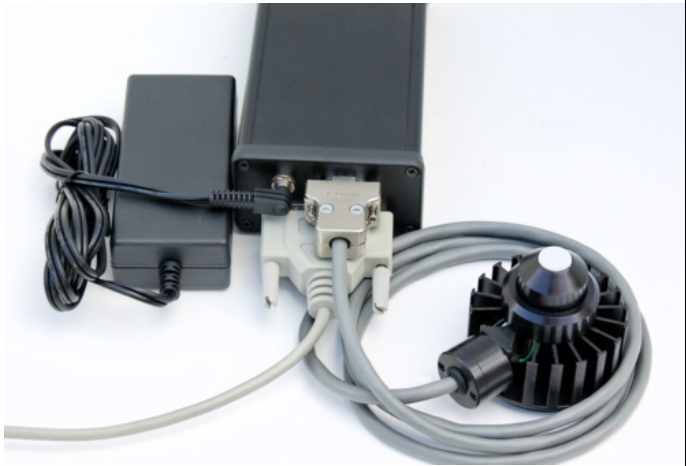

- Fast switching of colors under computer control (especially advantageous in scanning applications).
- Bright, uniform and diffuse illumination of large specimen area.
- Independent and accurate (10 bit) control of each color provides any desired color and intensity.
- Color images from monochrome digital camera with full non-interpolated color at every pixel maintain full resolution of the sensor.
- White light for visual observation.
- No vibration or noise.

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- Low heat emission, low thermal drift, low temperature gradient; can be always on.
- Sequential acquisition of colors makes possible the adjustment of focus position for each color.
- Improved image quality due to monochromatic illumination; this reduces the effect of chromatic aberrations present in microscope objectives.
- No extra components in the imaging path of the microscope ensure that there is no deterioration of image quality.
- Fits into condenser space of upright microscopes.
- Cost saving due to elimination of standard light source, condenser and filter changer.
- Long life, no moving or serviceable parts.

## Ordering

P/N	Description	Image	Price
010-00 (custom mount) 010-01 (Olympus BX) 010-02 (Nikon Eclipse) 010-03 (Zeiss Axio) 010-04 (Leica DM) other models to follow	<b>RGB LED Illuminator</b> Consists of illuminator head, control unit, power supply and serial cable. Control software - LEDTool.		\$1,300.
011-00-X (custom mount) 011-01-X (Olympus BX) 011-02-X (Nikon Eclipse) 011-03-X (Zeiss Axio) 011-04-X (Leica DM) other models to follow	<b>RGB LED Illuminator with Variable Intensity</b> Consists of illuminator head, control unit, power supply and serial or USB cable. Control software - LEDToolV. X in the part number: S - RS232, U - USB.	 (USB model shown).	\$1,500. RS232 or USB

To place an order, fax it to 1-650-494-7772. For more information send a message to [info@tofrainc.net](mailto:info@tofrainc.net)