

IR-2000 Camera for Electrophysiology

A primary market for the IR-2000 camera is electrophysiology. The IR-2000 provides an excellent, cost-effective solution to the problems encountered in visualizing electrode/pipet placement in tissues and cells. Significant growth in this research market is projected due to continued emphasis on aging and continued study of the brain.

Electrophysiology in neuroscience allows for examination and patch clamp experiments on nerve cells and brain slices, through the use of cell cultures, living tissue sections, organs or entire animals. Patch clamping of cells is a technique requiring live imaging and sensitivity across the visible and near IR wavelengths.

IMAGING CHALLENGES

Imaging challenges include:

1. Low contrast due to light scatter within tissue
2. Little to no visible light in deeper imaging environments (e.g. Brain slice studies) - so enhanced sensitivity in the near IR is essential to visualizing structure and/or cell membranes for electrode placement.
3. Real-time camera frame rates (30fps minimum) to provide movement and position feedback so precise positioning can be achieved.
4. Resolution to visualize the smallest details

INCREASED SENSITIVITY

The IR-2000 real-time camera offers enhanced sensitivity across the entire visible and near IR spectrum, with a >5X increase in sensitivity at 900nm. Its sensitivity is ideal for visible, IR-DIC and bright fluorescence models of operation. The wavelength used by the operator determines tissue observation.

Visible Light DIC/Dodt gradient contrast imaging - Allows operator high resolution observation of the tissue surface.

775nm IR-DIC/Dodt gradient contrast imaging - Allows observation within the tissue slice.

900nm Nomarski DIC/Dodt gradient contrast imaging - Allows observation deeper into the tissue.

IMPORTANT CAMERA FEATURES

In addition, the IR-2000 series cameras offer important features and flexibility:

- Automatic Contrast - When a scene changes, the electronics automatically and instantaneously readjust to achieve optimum contrast. Manual settings for gain and black level are provided to achieve specific gray-scale contrast.
- Digital Zoom - Enables user to instantly zoom on selected area of the image with the scroll of a mouse wheel, providing a significant increase in magnification with no pixelization. This is especially effective while viewing images in ultra HD resolution as small details can be visualized with greater clarity.
- Digital Noise Reduction - Performs image averaging and offers a crisp, clean image with no background noise; even under lower light level operating conditions.
- Real-Time Edge Enhancement - Sharpens edges of soft IR images, resulting in a clearer image.
- Adjustable Resolution & Frame Rates - Resolution and frame rates can be adjusted, depending upon specific viewing requirements. Examples of selectable resolutions up to 4K and high frame rates include:
 - 3072 x 2048 @ 40 fps
 - 1920 x 1080 @ 90 fps
 - 640 x 480 @ 248 fps
- Simple Image Capture - Images can be captured with the click of a button. Time-lapse settings for recording important experiments is also provided.
- IR-Capture Software - Also includes overlays, scale bar, annotations, measurements and drawing tools

The IR-2000 utilizes a 1/2" sensor and is C-mount adaptable. This camera is available in a stand-alone version or PC ready. The stand-alone version includes a digital controller with HDMI output for direct connection to an HD display for live viewing and image capture (no software download required). The PC-ready camera includes USB 3.0 output and IR-Capture software for interface to user's computer.

The IR-2000 cameras are compatible with standard HD displays. Use of a 4K UHD display provides maximum viewing performance.