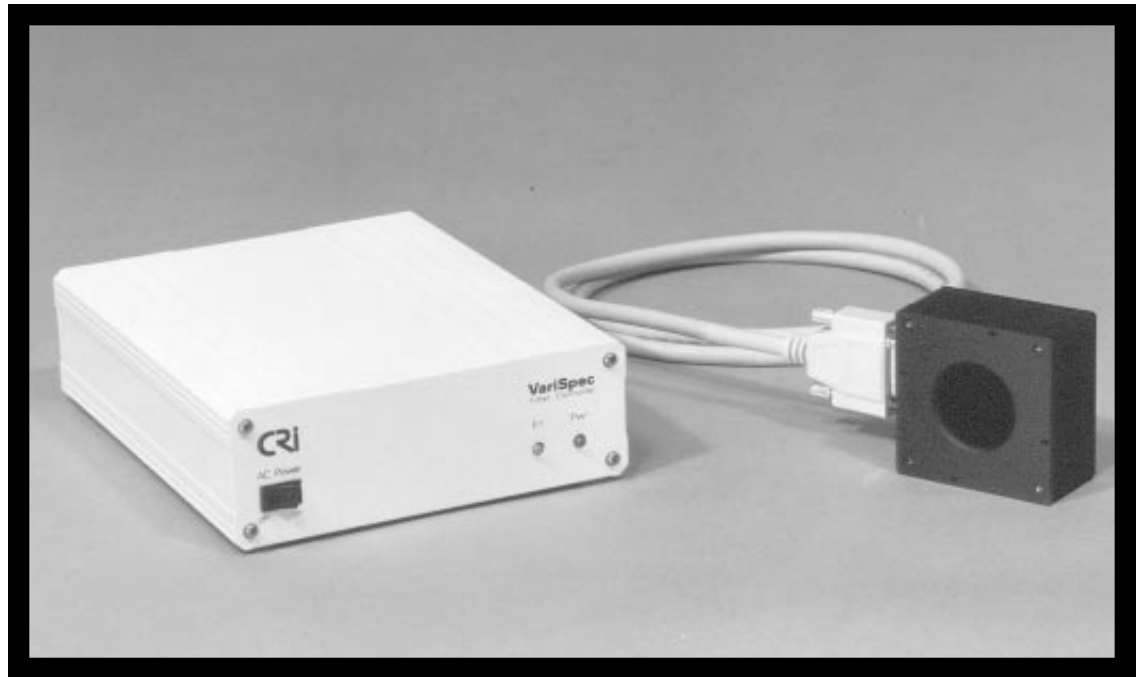




## VARISPEC

## TUNABLE IMAGING FILTER

*Image at any wave-  
length you choose  
with CRI's patented  
liquid crystal  
tunable filters.*



The VariSpec liquid crystal tunable filter (LCTF) is like a high quality interference filter, but the color of light it transmits is electronically-controllable, providing rapid, vibrationless selection of any wavelength in the visible and near-IR ranges. It enables you to obtain multi-spectral, ultra-high resolution images using a monochrome CCD camera. The VariSpec's unlimited wavelength selection and excellent image quality are valuable in an increasing number of applications.

### Features

- Tunes in wavelength continuously over hundreds of nanometers
- Excellent imaging quality
- No moving parts and no image shift
- Fast, random-access wavelength selection
- Compact, low-power design

### Applications

- Multi-probe fluorescence studies
- Bright-field microscopy
- Tissue spectroscopy
- Astronomy
- Airborne hyper-spectral imaging
- CCD/Display characterizations

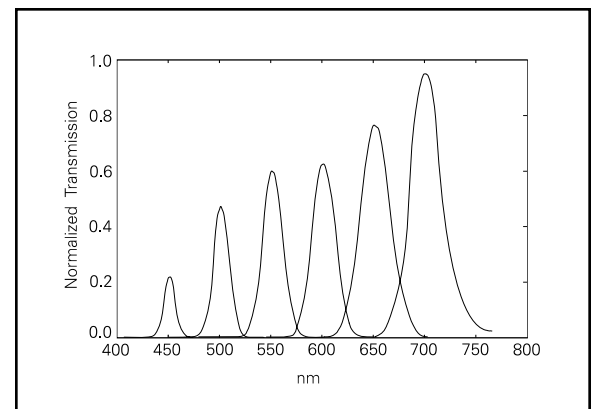


Figure 1. VariSpec VIS2-10 filter at several wavelength settings

The VariSpec uses electronically controlled liquid crystal elements to select a transmitted wavelength range, while blocking all others. The VariSpec offers excellent imaging quality, making it ideal for use with electronic cameras such as CCDs. It is also a compact, robust spectrometer with high throughput, well suited for many applications where imaging may not be required.

The VariSpec electronics provide an RS-232 interface, a digital control port, and a sync port, enabling the filter to respond to signals and synchronization pulses generated by cameras, computers, and other sources. Software drivers are available to use the VariSpec with Metamorph, Virtual Color and other commercial imaging packages.

**Specifications**

Clear aperture	20 or 35 mm
Bandwidth (FWHM)	5/7/10/15/20/30/40/50 nm (nominal)
Field-of-view	+/- 7 degrees from normal
Wavelength range	See ordering information
Wavelength accuracy	bandwidth/8
Response time (@25°C)	50 ms (random access)
Maximum optical input	500 mw/cm <sup>2</sup>
Computer interface	RS-232/TTL/sync
Operating temperature	20° - 45° C
Storage temperature	0° - 45° C

We are happy to discuss custom designs such as filters for Raman imaging.

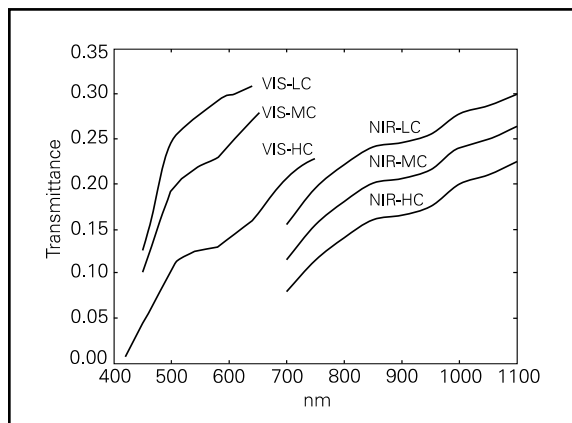


Figure 2. Transmittance for visible and NIR filters.

**General**

The VariSpec consists of an optics module and an electronics module, which are connected by a cable up to 2 meters in length.

The filter transmission is sensitive to polarization of the input beam, and is increased by a factor of two if the input beam is polarized along the axis of the input polarizer.

**Options and Accessories**

- RS-232 Hand-held controller
- Adapters for major microscopes and CCD cameras
- Variable attenuation capability
- Input polarization control

**Warranty**

One year full parts and labor warranty against defects in manufacture or materials.

**Ordering Information**

Part numbers are designated as follows:

Part #: VS - **www** - **bb** - **cc** - **aa** - **hh**

Example: VS - VIS1 - 30 - MC - 20 - SQ

**www** - wavelength range

- VIS1 450 - 650 nm
- VIS2 400 - 720 nm
- NIR1 700 - 1100 nm
- VIS3 425 - 750 nm
- NIR2 650 - 1050 nm

**bb** - nominal bandwidth in nm

- 05 □ 07 □ 10 □ 15 □ 20 □ 30 □ 40 □ 50

**cc** - contrast for out-of-band light

- LC <0.20% average out-of-band transmittance
- MC <0.05% average out-of-band transmittance
- HC <0.01% average out-of-band transmittance

**aa** - aperture in millimeters

- 20 □ 35

**hh** - housing style

- SQ



Cambridge Research & Instrumentation, Inc.  
 80 Ashford Street  
 Boston, MA 02134  
 TEL 617.787.5700 FAX 617.787.4488  
 e-mail sales@cri-inc.com