

LabSmith SVM340

Synchronized Video Microscope

- ▶ High-sensitivity video output
- ▶ Synchronous pulsed fluorescence illuminator
- ▶ Motorized x-y traverse and focus
- ▶ Adaptable, customizable and easy to interface
- ▶ Innovative software tailored for microfluidics



The SVM340 is a research-grade, inverted fluorescence video microscope for imaging microfluidics and microbiology experiments. With a synchronously pulsed illuminator, sensitive camera, and powerful video analysis software, the SVM340 is a workhorse for microsystem research that's affordable enough to be dedicated to a single user or experiment—even in a crowded lab.

Applications

- ▶ μ TAS research and prototyping
- ▶ Gene and protein chip reading
- ▶ General miniature lab automation
- ▶ Closed-loop microsystem control
- ▶ Automated methods development
- ▶ Array assays
- ▶ Forensics
- ▶ Blood analysis
- ▶ Particle Image Velocimetry (PIV)

Publication-Ready Images

The compact SVM340 microscope excels at producing high quality images, video and data. Sensitive video cameras and a synchronous pulsed illuminator support low-light imaging and fight blur and photo-bleaching.

Easy Microsystem Monitoring

Combining bottom-up viewing and illumination with a motionless sample stage, the SVM340 lets you view microsystems without perturbing the fluid flow. Access for external connections is simple and unhindered.

Never Miss an Image

Lossless data recording, comprehensive triggers, post-save and instant replay make sure you capture any key event, no matter how rare or brief.

Real-Time PIV

Perform real-time Micro Particle Image Velocimetry (μ PIV) with easy-to-use probes with variable region size, shape and more (Figure 1).

Flexibility - Designed for Research

The SVM's interchangeable optics modules and objectives let you configure for one or more fluorophores, with up to five channels of illumination. The EPI epifluorescence option improves signal-to-noise ratio and provides tighter wavelength selectivity.

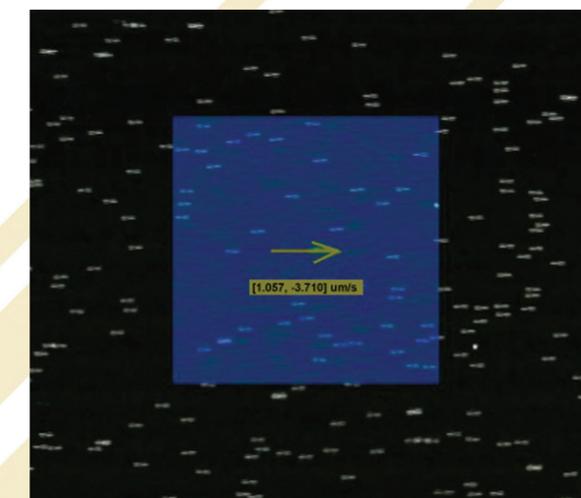


Figure 1. Image of a μ PIV velocity probe of polystyrene beads in a microfluidic chip, moving under an applied electric field. Imaged using the SVM340 and LabSmith uScope™ software. Courtesy of Professor Blanca H. Lapizco-Encinas et al, Tecnológico de Monterrey (Monterrey, Mexico).

Configuration Selection Guide

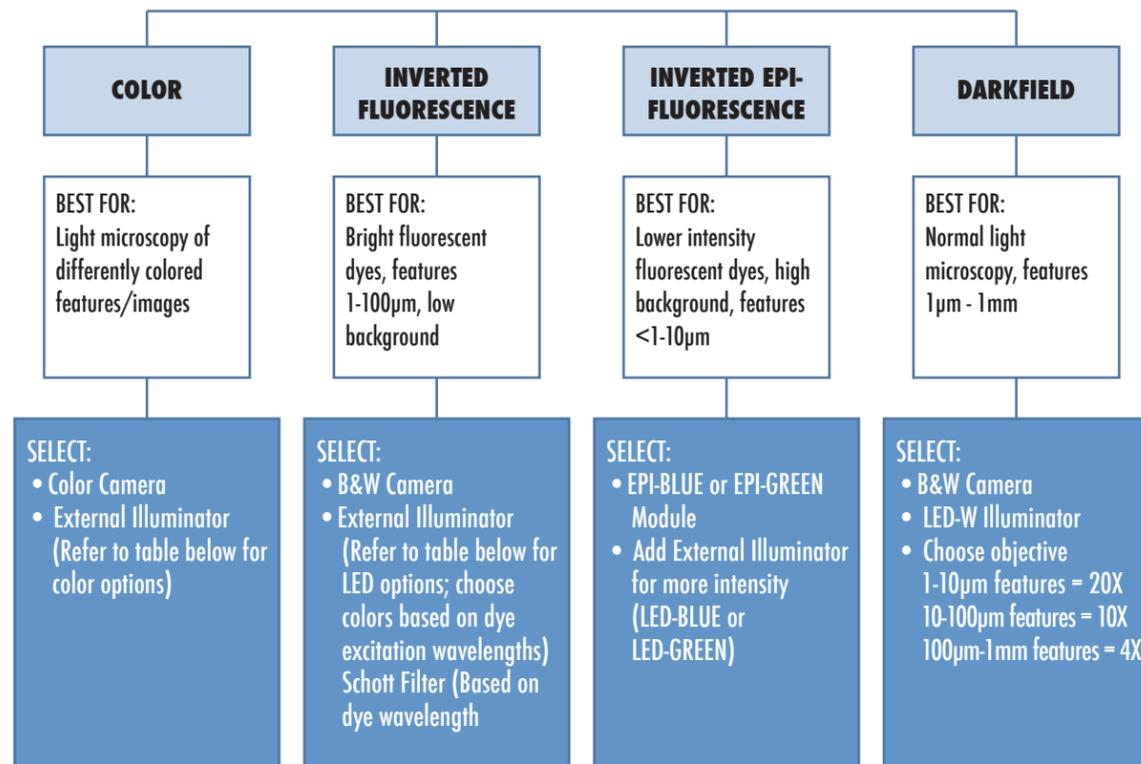


Figure 7. Configuration selection guide for various microscopy modes. Custom versions also available.

EXTERNAL ILLUMINATOR MODULES	
Four-channel array of 24 high brightness LEDs. Specify one or more:	
LED-B	3 blue channels (464 – 476 nm), one white channel
LED-G	3 green channels (520 – 535 nm), one white channel
LED-Y	3 yellow channels (590 nm), one white channel
LED-R	3 red channels (625 nm), one white channel
LED-W	4 white channels
LED-X	One channel each of blue, green, red and white
Custom modules also available.	
Trigger output available for driving external LED or laser illuminator.	

SCHOTT FILTERS FOR CAMERA MODULES				
495, 515, 530, 550, 570, 590, 610, 630, 645, 665 nm wavelengths.*				
ELECTRONIC INTERFACE BOARD (REQUIRED)				
Power	Numerical Aperture	Working Distance	Focal Length	Field of View
4X	0.10	15.97 mm	31.0 mm	1.5 x 1.5 mm
10X	0.25	6.3 mm	16.76 mm	0.6 x 0.6 mm
20X	0.40	3.3 mm	8.55 mm	0.3 x 0.3 mm

* Contact LabSmith for availability of External Illuminator LEDs and Schott filters with wavelengths not listed here.

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The easily configurable SVM340 modules let you tailor the optics and illumination to your particular application (Figure 2). Choose from black, white, color, or epifluorescence camera modules. Select the illumination wavelengths for the 4-channel illuminator, the magnification objectives, and even customized stage plates.

These specifications and options are given in the tables herein. Consult the Configuration Guide (Figure 7) for the recommended options for different types of microscopy possible with the SVM340.

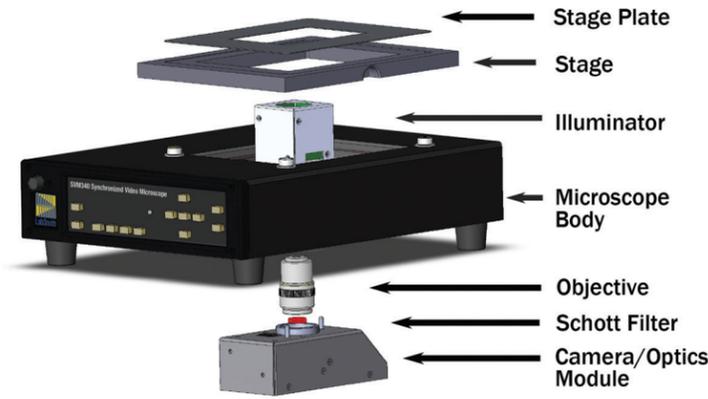


Figure 2. SVM340 components. Note that in the epifluorescence configuration an EPI module replaces the illuminator, camera and filter.

PHYSICAL		
Dimensions	21 x 27 x 8.5 cm (8.3 x 10.5 x 3.3") W x L x H	
Enclosure	Black enamel-coated, anti-RFI steel enclosure	
Weight	2.8 kg (6.2 lbs)	
Power	Voltage	90-264 VAC, 47-63 Hz
	Current	0.5 A
Mounting	Four 8-32 threaded holes on 17.8 x 22.9 cm (7.0 x 9.0") rectangle	
TRAVERSE-FOCUS		
Motorized traverse and focus controlled through software and front panel.		
	Range	Resolution
X-Y traverse	5 cm x 7.5 cm	10 μm
Z-traverse (Focus)	3 mm	1 μm
SAMPLE STAGE		
Fixed, black Delrin® sample stage attached to top of enclosure. Interchangeable stainless steel stage plates. Light shielding cover.		
Dimensions	14 cm x 17.5 cm x 1.2 cm (5.5 x 7.0 x 0.5") W x L x H	
Stage Plates	Standard plate has 55 x 80 mm opening; A-SVM-Stage plate has Two rectangular openings: 20 x 32 mm and 22 x 66 mm.	
Light Shield	A-SHIELD sits on top of SVM to block ambient light.	

CAMERA MODULES	
Snap-in modules with CCD camera, optional fluorescence filter and threading for standard DIN microscope objective.	
RS-170-BW, EPI Modules	High sensitivity analog black & white camera with 640 x 480 pixels, 600 lines of resolution, 30 frames per second
RS-170-C	490 lines of resolution, 30 fps, S Video output
CONTROL & ACQUISITION SOFTWARE	
uScope™ software included: <ul style="list-style-type: none"> - Automated controls for illuminator, x-y traverse and focus - Save and process videos and images - Particle Image Velocimetry 	
LabVIEW™ drivers available	
Software Developers' Kit (C, C++) included	
Requires PC-compatible computer with USB 2.0 port or PCI slot; Windows® 2000, XP or 7	
INPUTS & OUTPUTS	
Analog (camera dependent): <ul style="list-style-type: none"> - Composite video (NTSC) - S Video 	
Digital (for synchronization and coordination): <ul style="list-style-type: none"> - 4 programmable inputs - 3 programmable outputs - External LED/Laser illuminator trigger/driver - RS232; optional USB adaptor sold separately 	

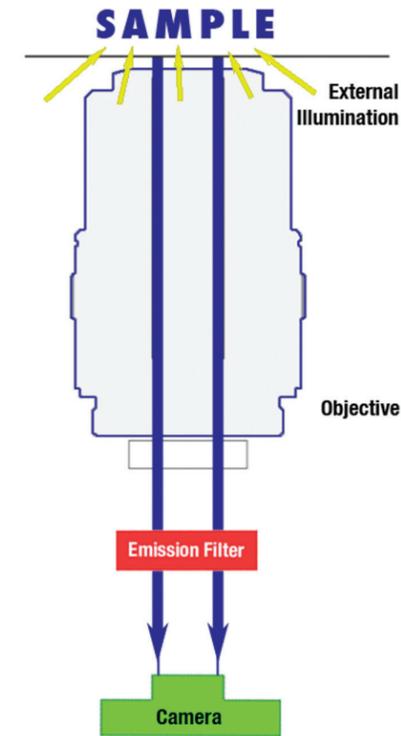


Figure 3. Inverted Fluorescence Microscope operation

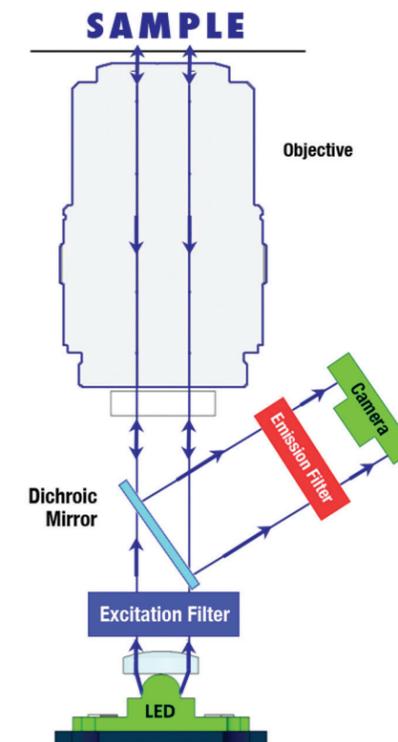


Figure 4. Inverted Epifluorescence Microscope operation

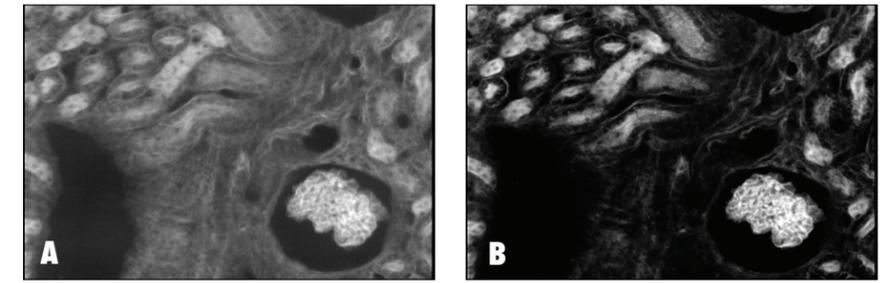


Figure 5. Mouse kidney slice labeled with AlexaFluor® 488, AlexaFluor® 568 Phalloidin, and DAPI. 10X DIN 0.25 objective. (a) Captured with the SVM340 and B&W module and (b) EPI-BLUE module. With the EPI-BLUE module only the AlexaFluor 488 labeled cell parts are visible, resulting in higher resolution with increased signal-to-noise.

When to Use Epifluorescence

Figures 3 and 4 show the configurations for an inverted fluorescence microscope and epi-fluorescence microscope, respectively. EPI modules are designed for applications that require greater wavelength discrimination and increased signal-to-noise (SNR), such as cell imaging and Micro Particle Image Velocimetry (μPIV). In Figure 5, the images of fluorescently labeled mouse kidney slices (Molecular Probes) illustrate the selectivity and increased SNR offered by the EPI module. Each sealed EPI module includes a high-sensitivity camera, excitation and emission filters, a dichroic mirror, LED illuminator and objective mount (Figure 4). EPI modules are compatible with new or existing SVM340 models and exchange in seconds for complete flexibility. Use an EPI module's integral illuminator on its own or with the SVM ring illuminator for increased intensity. Figure 6 shows the spectral specifications graphically for the EPI-BLUE and EPI-GREEN modules.

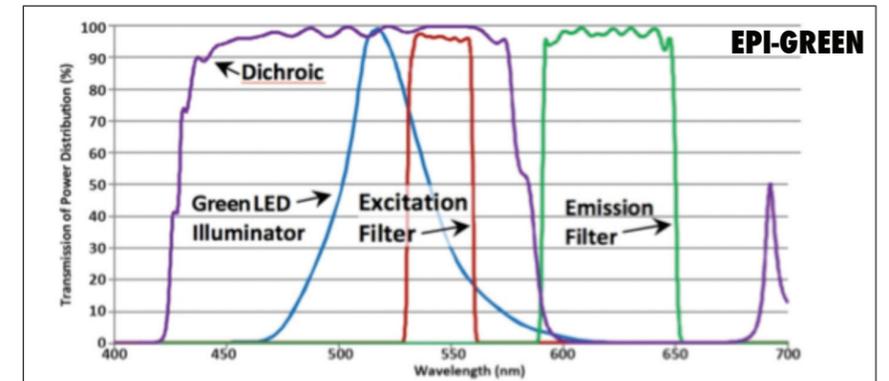
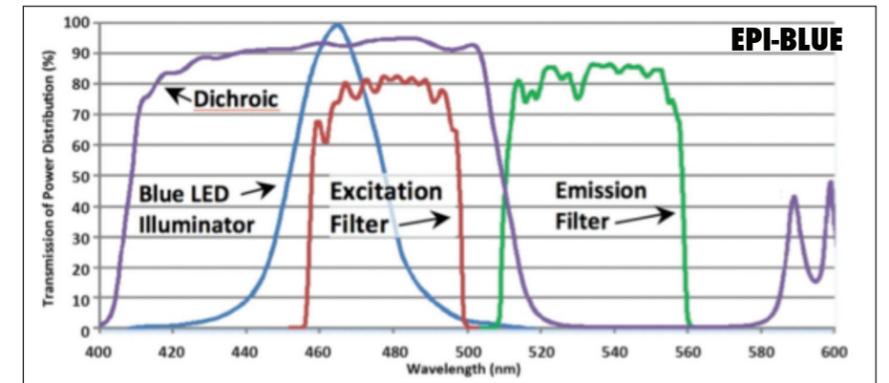


Figure 6. SVM340 EPI Spectral Specifications. Light transmitted vs. wavelength for light source and filters for EPI-BLUE and EPI-GREEN modules.