



meadowlark optics

# LIQUID CRYSTAL DEVICES




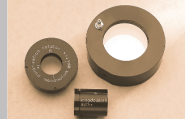
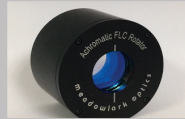





— SELECTION GUIDE —








POLARIZERS • SPATIAL LIGHT MODULATORS • WAVEPLATES • LIQUID CRYSTAL DEVICES • OTHER CAPABILITIES



Over 45 Years of Photonics Innovation

	LIQUID CRYSTAL COMPONENT	FEATURES	WAVELENGTH	TWD P-V	*SWITCHING SPEED (typical)	CONTRAST RATIO	BEAM DEVIATION
Variable Retarders		<ul style="list-style-type: none"> <li>• Custom retardances</li> <li>• Temperature control options</li> <li>• Available compensated</li> <li>• Precision non-mechanical retardation control</li> </ul>	450 – 1800 nm	$\leq \lambda/4$	10 – 30 ms	N/A	$\leq 2$ arc min
		<ul style="list-style-type: none"> <li>• Precision control at lower cost</li> <li>• Scalable quantities (Quantities of 20 – 100s)</li> <li>• Thin housing</li> <li>• Large clear aperture</li> </ul>	450 – 1800 nm	$\leq \lambda/2$	10 – 30 ms	N/A	$\leq 3$ arc min
		<ul style="list-style-type: none"> <li>• Phase or amplitude modulation of UV spectrum</li> <li>• Analog modulation</li> <li>• Non-mechanical polarization control</li> </ul>	350 – 450 nm	$\leq \lambda/4$	~ 4 ms	N/A	$\leq 2$ arc min
Rotators		<ul style="list-style-type: none"> <li>• High polarization purity</li> <li>• 180-degree polarization rotation</li> <li>• Continuous rotation of linearly polarized light</li> </ul>	450 – 1800 nm	$\leq \lambda/4$	10 – 30 ms	150:1 average	$\leq 2$ arc min
		<ul style="list-style-type: none"> <li>• Sub-millisecond switching speeds</li> <li>• Broadband performance</li> <li>• Silent, vibration-free</li> <li>• Binary switching</li> </ul>	405 – 850 nm	$\leq \lambda/2$	< 100 $\mu$ s	N/A	$\leq 5$ arc min
		<ul style="list-style-type: none"> <li>• High polarization purity</li> <li>• Silent, vibration-free, low voltage operation</li> <li>• Broad thermal range</li> <li>• Faster switching speeds than LCVRs</li> </ul>	400 – 1800 nm	$\leq \lambda/4$	5 – 15 ms	500:1	$\leq 2$ arc min
Shutters / Variable Attenuators		<ul style="list-style-type: none"> <li>• Sub-millisecond switching speeds</li> <li>• Stand alone controller available</li> <li>• Silent, vibration-free</li> <li>• OEM sizes and shapes</li> </ul>	400 – 750 nm	$\leq \lambda/2$	< 100 $\mu$ s	N/A	$\leq 5$ arc min
		<ul style="list-style-type: none"> <li>• Sub-millisecond switching</li> <li>• Does not require 50/50 duty cycle drive scheme</li> <li>• Ships complete with controller &amp; software</li> <li>• No mechanical motion</li> </ul>	450 – 700 nm	$\leq \lambda/4$	~1 ms	N/A	$\leq 2$ arc min
		<ul style="list-style-type: none"> <li>• High contrast</li> <li>• No mechanical motion</li> <li>• No vibration</li> </ul>	450 – 1800 nm	$\leq \lambda/2$	5 – 15 ms	1,000:1	$\leq 5$ arc min
		<ul style="list-style-type: none"> <li>• High contrast</li> <li>• Computer control capabilities</li> <li>• Continuous control of light intensity</li> </ul>	450 – 1800 nm	$\leq \lambda/4$	5 – 15 ms	500:1	$\leq 2$ arc min

\*Switching speeds vary by wavelength and temperature. Speeds shown are approximate.

CONTROLLER	FEATURES	# LC CHANNELS	USB
 <b>Temperature Controller</b>	<ul style="list-style-type: none"> <li>• Stand alone*</li> <li>• LED display</li> <li>• 1 channel temperature control</li> </ul> <p>*Temperature control option on liquid crystal device required.</p>	0	No
 <b>Analog LC Controller</b>	<ul style="list-style-type: none"> <li>• Stand alone</li> <li>• Low Cost</li> <li>• Battery backup</li> <li>• 20V max output</li> <li>• Banana jacks for easy voltage monitoring</li> <li>• SMA to BNC adapter included</li> </ul>	1	No
 <b>Liquid Crystal Digital Interface</b>	<ul style="list-style-type: none"> <li>• Waveforms generated within controller itself</li> <li>• Autonomous mode</li> <li>• 10V max output (20V option available)</li> <li>• External modulation / trigger I/O</li> <li>• 2 channel voltage and temperature control</li> </ul>	2	Yes
 <b>High Speed LCVR Digital Interface</b>	<ul style="list-style-type: none"> <li>• Waveforms generated within controller itself</li> <li>• I/O connectors for external synchronization</li> <li>• 20V max output</li> <li>• Designed to be paired with HS LCVR</li> <li>• 2 channel voltage and temperature control</li> </ul>	2	Yes
 <b>Ferroelectric LC Controller</b>	<ul style="list-style-type: none"> <li>• Automatically DC balances</li> <li>• External modulation</li> <li>• 10V output</li> <li>• Gate input</li> <li>• Drive I/O</li> <li>• Frequency range 1 Hz – 10 kHz</li> </ul>	2	No
<p>Two and three year extended warranty options available.  Please contact your Meadowlark Optics Solutions Engineer – sales@meadowlark.com or +1.303.433.8333</p>			

## Why Choose Meadowlark Liquid Crystal Devices?

**Industry-Leading Metrology** – Meadowlark is the most experienced manufacturer of precision liquid crystal devices. Our proprietary measurement techniques provide you with extremely accurate calibration for every liquid crystal device we ship.

**High Quality and Precision** – When selecting a liquid crystal device, key performance features must be considered. These include wavelength dependence, temperature sensitivity, laser damage threshold, response time and aperture size. Our liquid crystal selection chart provides an at-a-glance review of our standard LC devices; as always, Meadowlark Solutions Engineers are happy to assist you in the process of selecting an LC component or controller that works for your application.

**Custom Solutions** – While we are delighted to provide you with one of our standard components or systems, we are also happy to customize a solution for you. Switching speeds, retardance values, wavelength ranges, coatings, sizes and shapes can all be modified to your specifications.

## About Meadowlark Optics

Innovating since 1979 – Meadowlark Optics has provided world-class polarization optics and liquid crystal solutions for a variety of applications for over 45 years. To ensure precision and top quality, our 20,000 SF headquarters and manufacturing facility boasts the latest in clean rooms, optical fabrication, and metrology equipment. Need help selecting the right product for your application? Contact one of our Solutions Engineers to discuss your requirements.

**meadowlark optics**

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