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# THORLABS

## R1L1S4P - March 23, 2018

Item # R1L1S4P was discontinued on March 23, 2018. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

### CALIBRATION TARGETS

- ▶ Stage Micrometers and Concentric Squares for Calibrating Distances
- ▶ Allows for Precise Measurements of Enlarged Images



R1L1S4P  
Stage Micrometer



R1L3S1P  
Stage Micrometer



R3L3S3P  
Concentric Square Calibration Target

[Hide Overview](#)

#### OVERVIEW

##### Features

- Horizontal and Vertical Stage Micrometers with Divisions from 10  $\mu\text{m}$  to 100  $\mu\text{m}$
- Concentric Squares with Fourteen Positive Pattern Sizes from 0.1 mm to 50 mm

Thorlabs offers stage micrometers and concentric square patterns for calibrating distances in an imaging system. These targets feature soda lime glass substrates with vacuum-sputtered, low-reflectivity chrome. Each pattern is manufactured using photolithography, allowing for edge features to be resolved down to approximately 1  $\mu\text{m}$ .



Click to Enlarge  
An R1L3S1P Stage  
Micrometer Mounted in an  
XYFM1 Test Target  
Positioner

##### Mounting

These test targets can be mounted in one of four of our microscopy slide holders. Our MAX3SLH fixed slide holder provides two spring clips to mount the optic and can be mounted to any of our 3-axis flexure stages. The MAX3SLH is only compatible with test targets greater than or equal to 2" wide and provides a clear aperture of 1", which may cover the chrome pattern on some of the test targets. Thorlabs also offers our XYFM1(/M) test target positioning mount (see photo above) capable of translating a 1" (25.4 mm) to 3" (76.2 mm) wide rectangular target over a 50 mm (1.97") x 30 mm (1.18") area. An adapter on the back of the mount contains five 8-32 (M4) taps for various post-mountable orientations. The XYFM1 uses nylon-tipped setscrews to secure the optic. This will slightly cover the edges of the optic and can, in some instances, cover the chrome pattern on test targets. For users of the MLS203 microscopy stage, we offer the MLS203P2 slide holder for inverted microscopes, which can mount slides 25 mm to 26.5 mm wide and petri dishes 30 mm to 60 mm in diameter.

##### General Specifications

Chrome Thickness	0.120 $\mu\text{m}$
Chrome Optical Density	OD $\geq 3$ at 430 nm
Substrate Thickness	0.06" (1.5 mm)
Surface Flatness	<5 $\mu\text{m}$
Line Spacing Tolerance <sup>a</sup>	$\pm 1$ $\mu\text{m}$
Line Width Tolerance <sup>a</sup>	$\pm 0.5$ $\mu\text{m}$
Substrate	Soda Lime Glass

- This tolerance is valid for the mask used to create these targets and may differ minimally for the targets themselves.

Targets Selection Guide			
Resolution Test Targets	Distortion Test Targets	Slant Edge MTF Resolution Test Targets	Calibration Targets

[Hide Custom Targets](#)

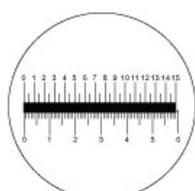
## CUSTOM TARGETS

### Custom Test Targets

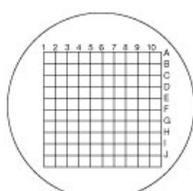
Thorlabs has extensive design and production capabilities for test targets and reticles. All of our test targets, stage micrometers, distortion grids, and reticles are manufactured in-house at our Thorlabs Quantum Electronics (TQE) division in Jessup, Maryland. In addition to the test targets that are offered from stock, we can provide custom patterns and sizes (circular, square, and rectangular), a sample of which are shown below. Please note that there is a significant tooling cost and lead time for custom test target patterns that makes the purchase of only a few pieces fairly costly.

We are also able to provide versions of our stock target patterns with an AR coating on the substrate or a higher or lower optical density. While most of our targets are sold from stock on soda lime glass, we are able to provide patterns on other substrates, such as opal.

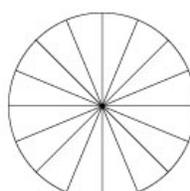
For more information about our photolithography production, please see our presentation on Thorlabs Semiconductor Manufacturing Capabilities. For a quote on custom test targets, please contact Tech Support.



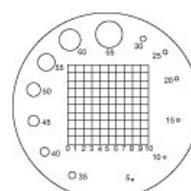
Micrometers



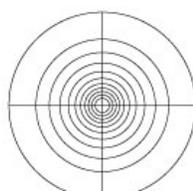
Grids



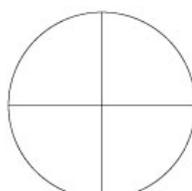
Protractors



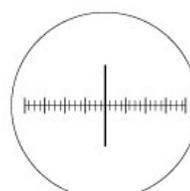
Pinholes



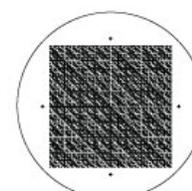
Concentric Circles



Crosshairs



Scales



Binary Tests

[Hide Mounting Options](#)

## MOUNTING OPTIONS

Mounting Options					
Mount Item #	MAX3SLH	XYFM1	MLS203P2	FFM1 with B3C	SFH2
Image (Click to Enlarge)					
Compatible Target Item #s	R1L3S1P, R1L3S2P	R1L1S4P, R1L1S5P <sup>a</sup> , R1L3S1P, R1L3S2P, R3L3S3P	R1L1S4P, R1L1S5P	R1L1S4P, R1L1S5P, R1L3S1P, R1L3S2P, R3L3S3P	R1L1S4P, R1L1S5P, R1L3S1P, R1L3S2P, R3L3S3P
Features/Mounting	Mounts to 3-Axis Stages or Any with 1/4"-20 Taps	XY Translation Ø1/2" Post Mountable	Mounts to Our MLS203-1 and MLS203-2 Fast XY Scanning Stages	Ø1/2" Post Mountable	Ø1/2" Post Mountable

- The pattern on this target will be partially obscured by this mount.

[Hide Stage Micrometers, 1" x 1"](#)

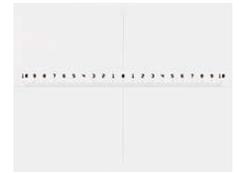
### Stage Micrometers, 1" x 1"

- ▶ 1" x 1" (25.4 mm x 25.4 mm) Stage Micrometers
- ▶ For Calibrating Eyepiece Reticles or Objective Magnification
- ▶ R1L1S4P: 10 mm Vertical Scale with 100  $\mu\text{m}$  Divisions
- ▶ R1L1S5P: 20 mm Horizontal Scale with 100  $\mu\text{m}$  Divisions and Crosshair

These targets each feature a stage micrometer pattern with 100  $\mu\text{m}$  divisions and numerical labeling every 1 mm. The R1L1S4P micrometer is oriented vertically and has a 10 mm long scale, while the R1L1S5P micrometer is oriented horizontally with a 20 mm long scale and a perpendicular crosshair. Both targets consist of a 1" x 1" soda lime substrate with low-reflectivity, vacuum-sputtered chrome. These positive targets are useful for the calibration of distances within imaging systems.



Click to Enlarge  
Close Up of the R1L1S4P  
Vertical Scale



Click to Enlarge  
Close Up of the R1L1S5P  
Horizontal Scale with Crosshair

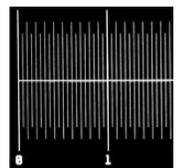
Part Number	Description	Price	Availability
R1L1S4P	10 mm Stage Micrometer with 100 $\mu\text{m}$ Divisions, 1" x 1", Soda Lime Glass	\$125.46	Lead Time
R1L1S5P	20 mm Stage Micrometer with 100 $\mu\text{m}$ Divisions, 1" x 1", Soda Lime Glass	\$125.46	Lead Time

[Hide Stage Micrometers, 3" x 1"](#)

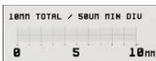
### Stage Micrometers, 3" x 1"

- ▶ For Calibrating Eyepiece Reticles or Objective Magnification
- ▶ R1L3S1P: 10 mm Scale with 50  $\mu\text{m}$  Divisions
- ▶ R1L3S2P: 1 mm Scale with 10  $\mu\text{m}$  Divisions
- ▶ Scales Centered on a 3" x 1" (76.2 mm x 25.4 mm) Microscope Slide

These targets each feature a horizontal stage micrometer pattern. The R1L3S1P micrometer has a 10 mm long scale with 50  $\mu\text{m}$  divisions and numerical labeling every millimeter, while the R1L3S2P has a 1 mm long scale with 10  $\mu\text{m}$  divisions and numerical labeling every 0.1 mm. Both targets consist of a 3" x 1" soda lime substrate with low-reflectivity, vacuum-sputtered chrome. These positive targets are useful for the calibration of distances within imaging systems.



Click to Enlarge  
Microscope Image of  
R1L3S1P Stage  
Micrometer



Click to Enlarge  
R1L3S1P Under  
Magnification



Click to Enlarge  
R1L3S2P Under  
Magnification

Part Number	Description	Price	Availability
R1L3S1P	10 mm Stage Micrometer with 50 $\mu\text{m}$ Divisions, 3" x 1", Soda Lime Glass	\$182.58	Lead Time
R1L3S2P	1 mm Stage Micrometer with 10 $\mu\text{m}$ Divisions, 3" x 1", Soda Lime Glass	\$162.18	Lead Time

[Hide Concentric Squares, 3" x 3"](#)

### Concentric Squares, 3" x 3"

- ▶ 3" x 3" (76.2 mm x 76.2 mm) Concentric Square Target
- ▶ Calibrate a Measurement for Imaging Software
- ▶ Low-Reflectivity, Vacuum-Sputtered Chrome

The R3L3S3P Concentric Square Target features fourteen concentric squares with lengths and widths ranging from 0.1 mm to 50 mm (see table below). Each square is labeled with its width on the target. This target is made from a soda lime glass substrate with low-reflectivity, vacuum-sputtered chrome. These positive targets are useful for the calibration of distances within imaging systems.



Click to Enlarge  
Close Up of the  
Squares Smaller than  
15 mm Wide on  
R3L3S3P Concentric  
Square Target



Click to Enlarge  
R3L3S3P Concentric  
Square Pattern

Widths of Positive Squares (mm)

- 0.1      • 0.5      • 2      • 4      • 10      • 20      • 40
- 0.25    • 1      • 3      • 5      • 15      • 30      • 50

Part Number	Description	Price	Availability
R3L3S3P	Positive Concentric Square Test Target, 3" x 3", Soda Lime Glass	\$364.14	3-5 Days