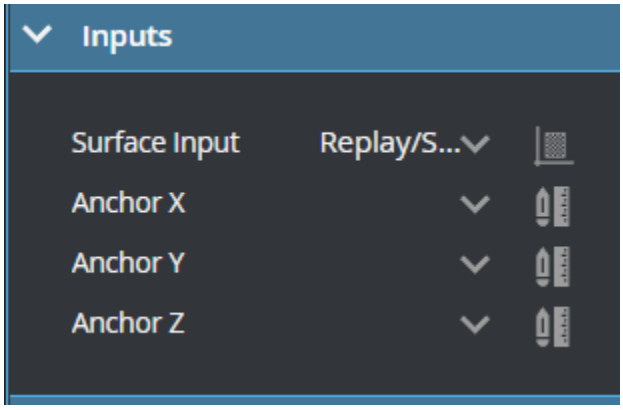
Surface Barcode

Purpose

The Barcode tool lets you decode data encoded in 1D (linear) and 2D barcodes from surface data (intensity data or heightmap data) without the need for 2D vision cameras or barcode readers. The tool also supports dot-peened types (Datamatrix and QR code). For a complete list of the types the tool supports, see "Type" in Parameters.

The tool returns whether it has found the barcode and whether it is valid, as well as the X, Y, and Z position of the barcode's lower left corner.

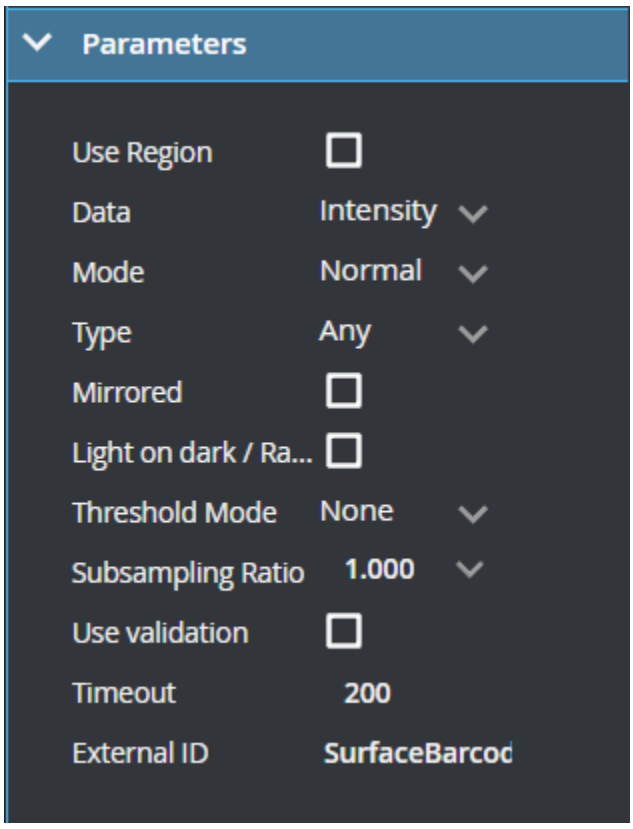
Inputs



Name	Description
Surface Input	The main surface data (uniform) that the tool will use.
Anchor X, Y, Z	Lets you choose the X, Y, Z measurement of another tool to use as a positional anchor for this tool.

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Parameters



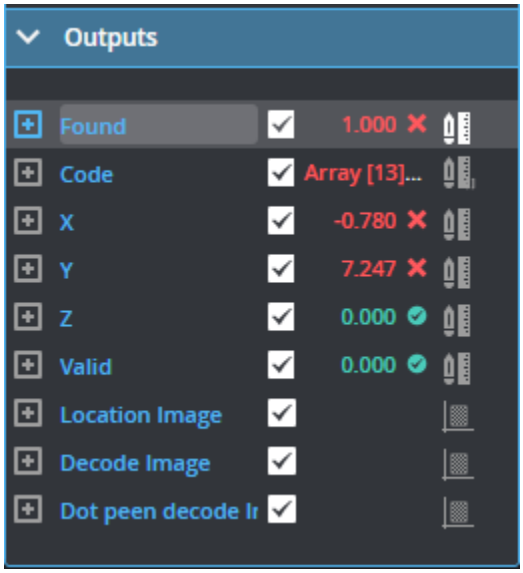
Flexible Region Group parameters

Name	Description
Use Region	Indicates whether the tool uses a user-defined region. If this option is not checked, the tool uses data from the entire active area.
Region	The region to which the tool's measurements will apply.
Data	The data the tool uses to detect a bar code. One of the following: ● Intensity ● Heightmap
Type	The type of barcode the tool expects. One of the following: ● Any: Detects any type of barcode.

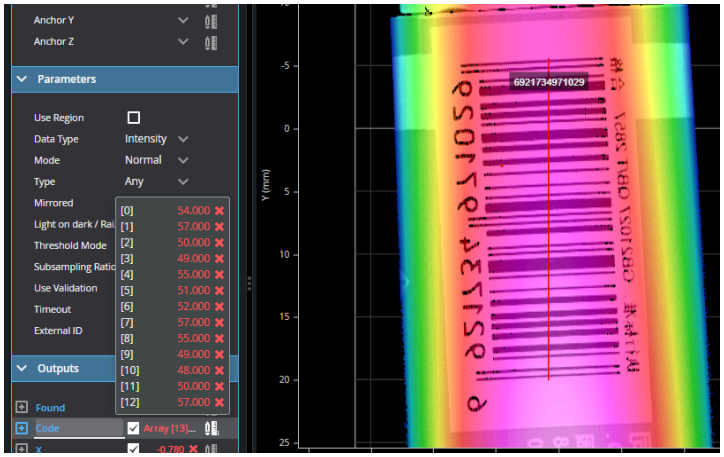
	• 1D Barcode (All): Detects any type of 1D (linear) barcode. • EAN-8 • EAN-13 • ISBN-10 • ISBN-13 • UPC-A • UPC-E • Code-39 • Code-128 • Interleave 2 of 5 • PDF417 • Data Matrix • Data Matrix dot peened • QR Code • QR Code dot peened
Mirrored	Reverses the scan. Use this if the scan is mirrored. Only useful with 2D barcodes.
Light on dark / Raised	If you are scanning light-on-dark barcodes or raised barcodes, enable this option.
Use Threshold	Enables the Threshold setting (see below).
Threshold Mode	Sets the threshold mode the tool uses. Any data points below the threshold are ignored and considered part of the "background"; data points not excluded are considered part of the barcode. Useful for cases where the surrounding surface is similar to the intensity or height of the barcode itself. One of the following: • None: No thresholding is performed. • Fixed: A global thresholding method. Set Threshold to a value between 0 and 255. When Data is set to Intensity, the value in Threshold is simply the intensity cut-off. When Data is set to Heightmap, the value is a percentile of the height values, converted to the 0-255 range. • Otsu: A global thresholding method. Illumination of the target should be relatively uniform and tilt should be removed (for example, using the Surface Transform tool; see Transform). • Adaptive: A local thresholding method that can help deal with local variation (intensity or height) in the target.

Threshold	The threshold of intensity or height values the tool uses to distinguish between the code and the surrounding surface. The parameter accepts a value between 0 and 255, whether Data is set to Heightmap or Intensity. This setting is only displayed when Threshold Mode is set to Fixed.
Subsampling ratio	Downsamples the image. Can make the tool run faster. (A value of at least 2 is usually necessary.)
Use validation	Enables validation of the decoded string, using the string in Validation for the comparison.
Validation	The case-sensitive string the tool compares to the decoded string. The parameter does not support wild cards or truncated values. If the comparison is valid, the Valid measurement returns 1.000.
Timeout	The maximum time the tool is allowed to take.

Outputs



Type	Name	Description

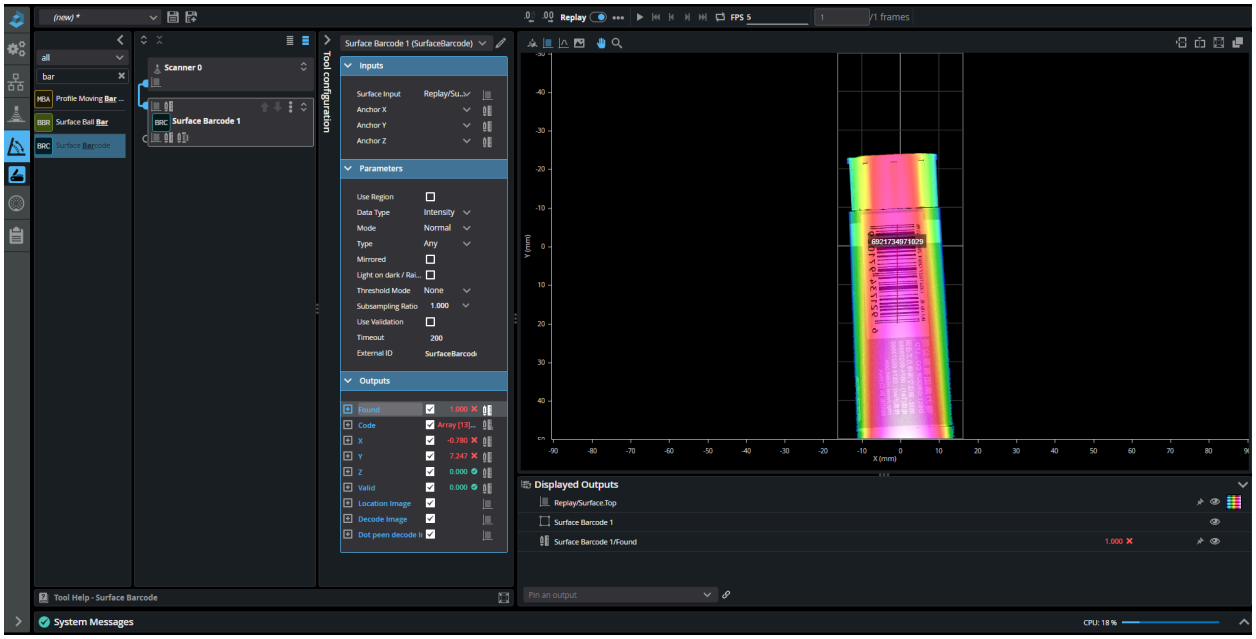
Measurement	Found	Returns 1.000 if the tool detects the configured barcode; otherwise, Invalid. Places a red rectangle around detected QR codes and Datamatrix codes.
Arrayed Measurement	Code	The recognized string in the format of an array of ASCII values. 
Measurement	X / Y / Z	These measurements return the X, Y, and Z position of the code, respectively.
Measurement	Valid	Determines whether the barcode is valid by comparing the string in the Validation parameter with the decoded string.
Surface	Location Image	The image the tool uses to find the a dot-peen barcode. (When Type is set to a printed barcode, that is, a type other than a dot-peen code, this image is the same as the decode image.)
Surface	Decode Image	The image the tool uses as part of the dot peen decode algorithm. Use this to adjust the image (for example, using one of the filter tools) and to diagnose issues.
Surface	Dot peen decode Image	A binarized image the tool runs the dot peen decode algorithm on. The points of the code should appear clearly in the image to ensure proper decoding. Use this to adjust the image (for example, using one of the filter tools) and to diagnose issues.

LMI TECHNOLOGIES

Major Revisions

- Output all “Invalid” for no found case in GoPxL, while output 0 / 0 / 0 for X / Y / Z and 2 other “Invalid” in Classic.
- Recognized codes are sent through an array of values (the arrayed measurement “Code”) in GoPxL, while Classic sends it through generic output (the data output “Output String”).

Application Examples



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