



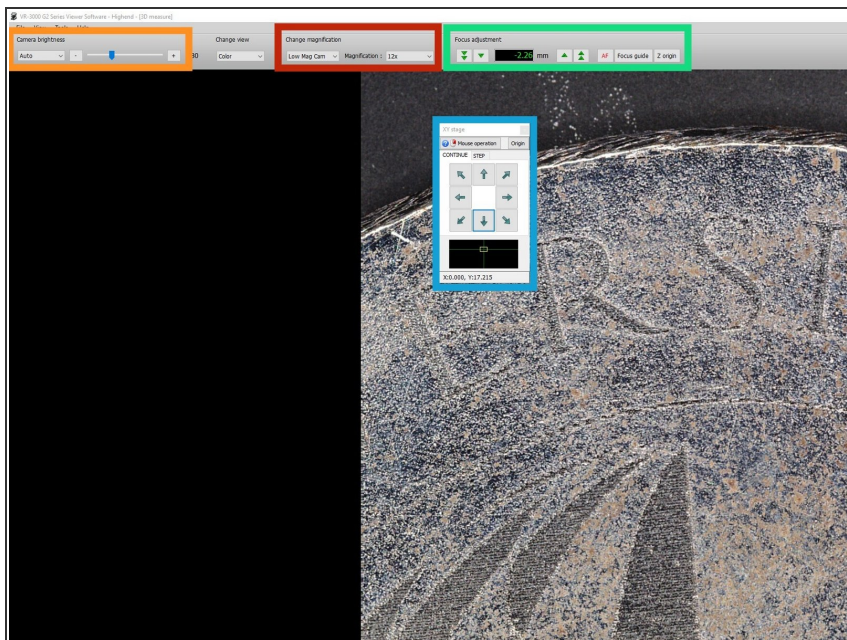
Keyence VR-3200 Executing a Basic 3D Scan

How to execute a basic scan using the Keyence

Written By: Amera Grace Gianotti

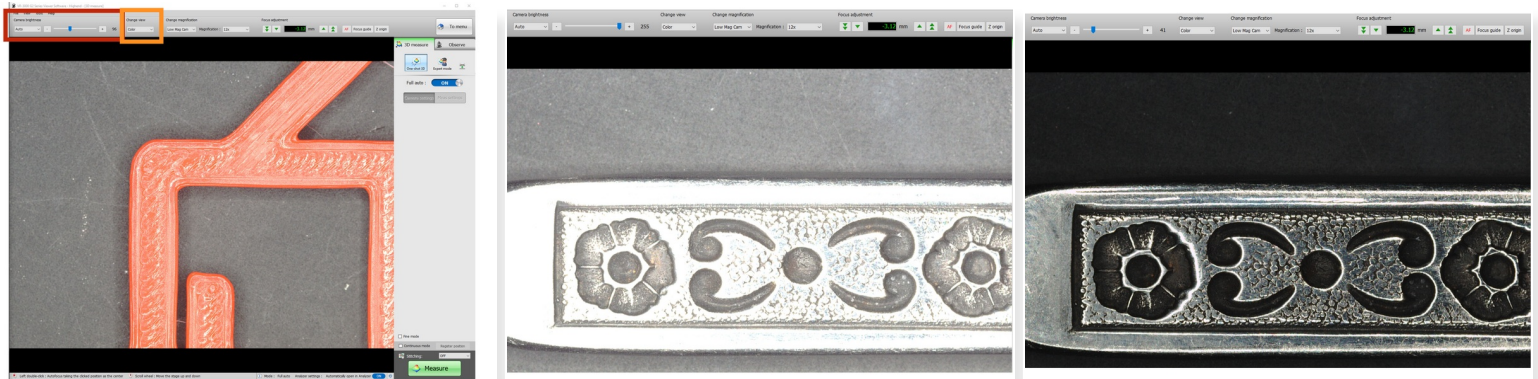


Step 1 — Basic Camera Controls



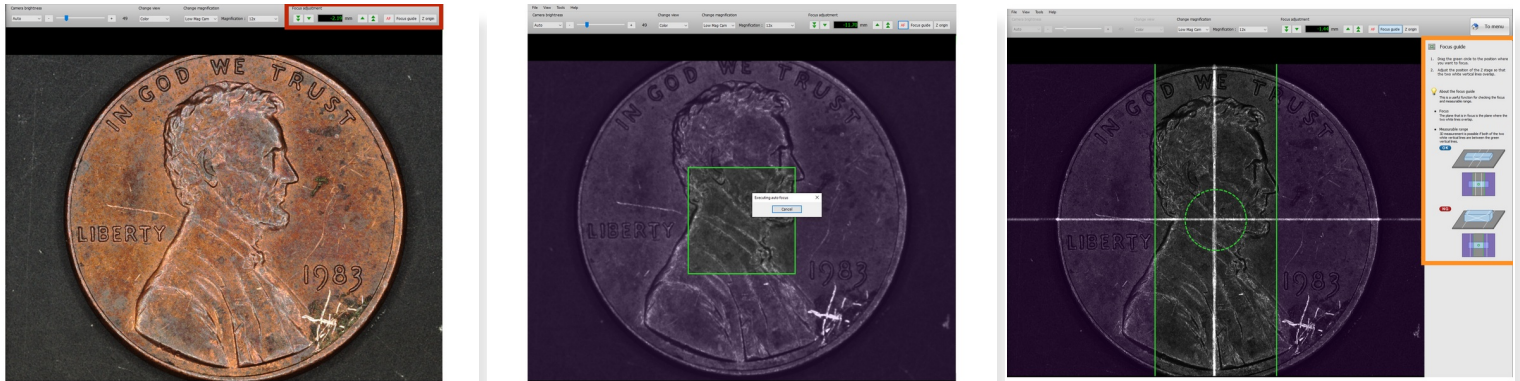
- The magnification can be adjusted by selecting between low mag and high mag (detailed in step 4)
- Low mag is capable of scanning up to 1 cm depth, allowing for 12x, 25x, 38x, and 50x magnification
- High mag is capable of scanning up to 1 mm depth, allowing for 40x, 80x, 120x, and 160x magnification
- The camera brightness can be adjusted depending on the color and luster of the sample (see step 2)
- The focus can be adjusted manually or automatically, and should be done before any scans (see step 3)
- To move the view around, either use the movement window or right click and drag on the viewing window
- The movement window has arrows that can be clicked and held, a "step" tab that allow specific transverse movements, or a small sub-window that can be clicked on to move the stage.

Step 2 — Brightness and Exposure



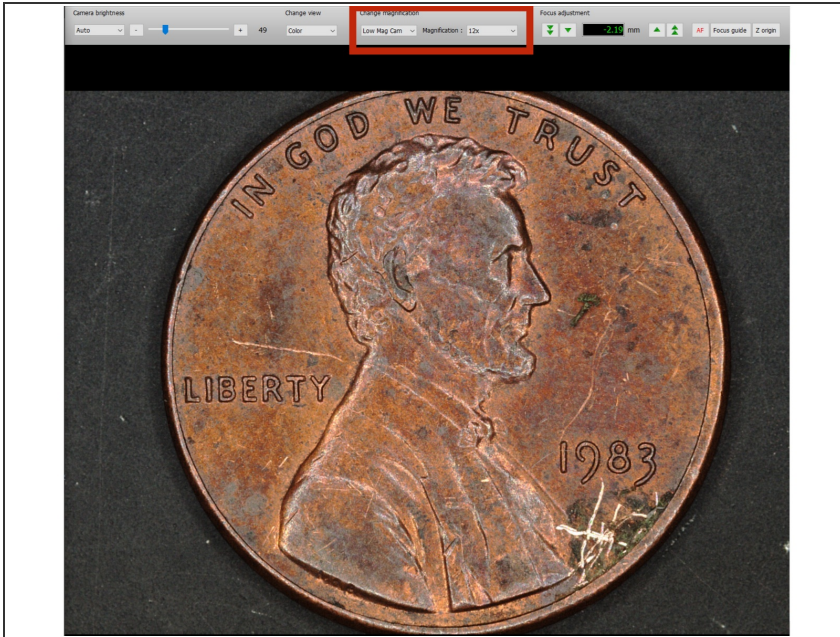
- Color settings can also be modified
- Brightness can be edited with the leftmost settings under "Camera brightness"
 - The dropdown has "manual" and "automatic" options, which allow brightness adjustment via exposure time and average pixel brightness.
 - "manual" ranges from 0.1ms to 20ms, and "automatic" ranges from 0 to 255.
- Image 2 shows an example of over-exposure, and image 3 shows an example of the correct exposure level.
- Correctly choosing an exposure level can affect the accuracy of the following scans and images.

Step 3 — Focusing



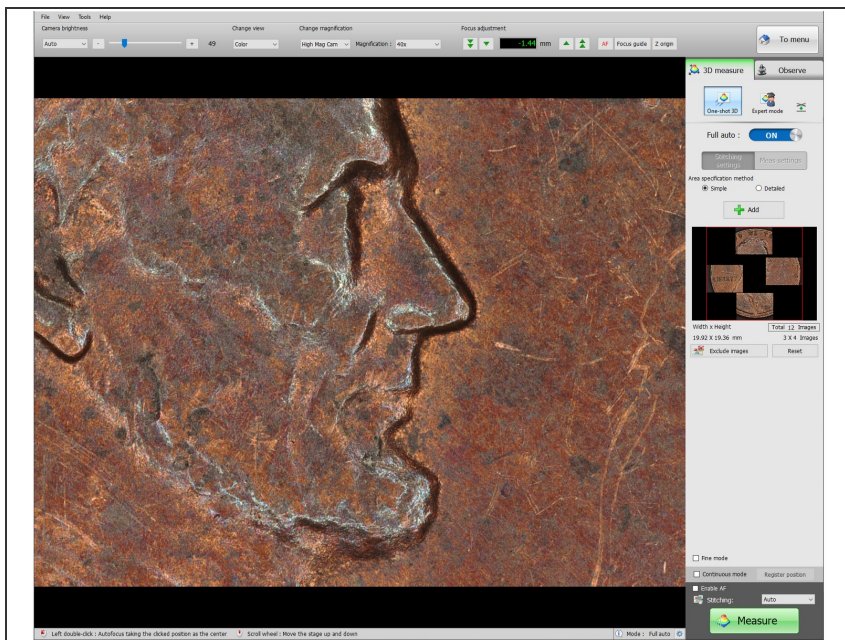
- When a new sample is placed on the stage, the focus needs to be adjusted
- "AF" stands for "Auto Focus", and when clicked will focus on the center of the screen
 - It can also be focused to a particular level by double clicking anywhere on the viewing image
- Manual Focusing takes a little bit more time, but can work better on materials that are very small, have a large height range, or are shiny/translucent.
 - The focus level can be controlled with the mouse scroll wheel or the dial on the side of the Keyence with "Up <--> Down" markings (scroll wheel is recommended)
- The instruction set on the right side does a good job of showing how to properly focus using the lights, but it boils down to changing the Z level until the lines meet in the middle.

Step 4 — Magnification Levels



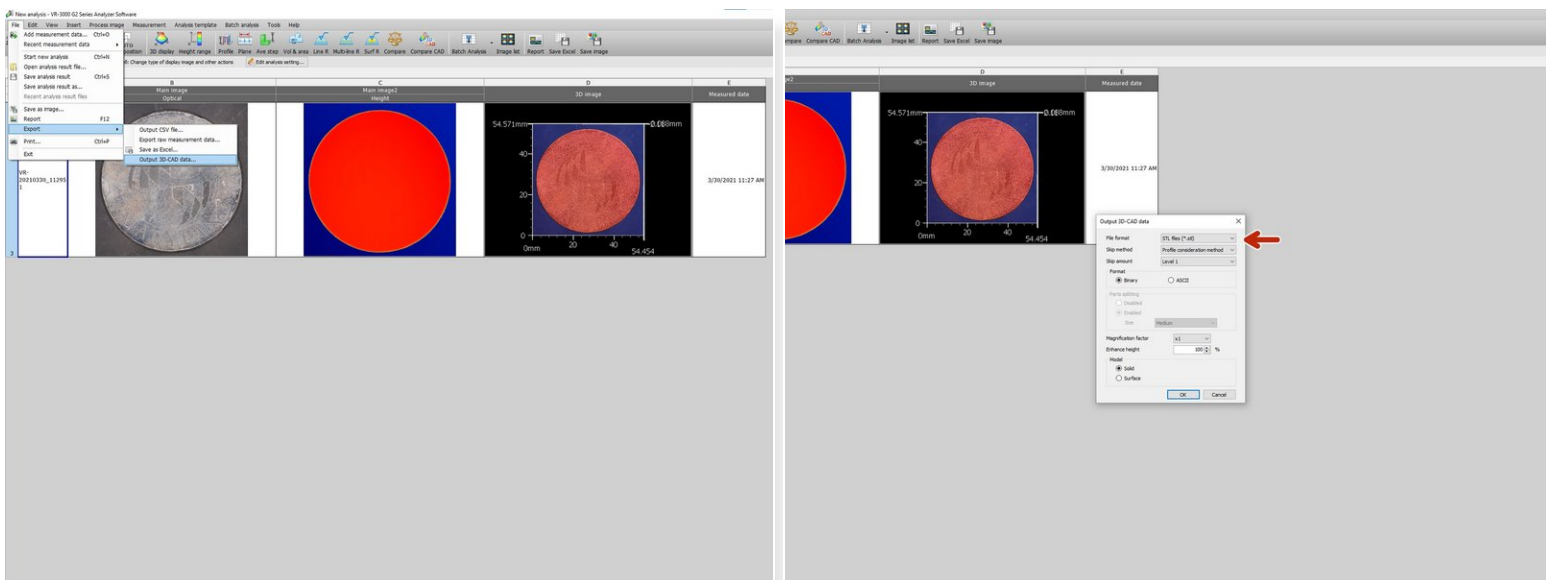
- Physical and Digital Zoom levels can be controlled under "change magnification"
- Physical zoom options are simple "low" and "high" magnification
 - Low magnification has 12x, 25x, 38x, and 50x magnification options
 - High magnification has 40x, 80x, 120x, and 160x magnification options
- Low and High magnification levels change the accuracy and potential height range of scans.
 - Low Mag: 10mm scan height, 1um repeatability, 5um accuracy
 - High Mag: 1mm scan height, 0.5um repeatability, 3um accuracy
- Focus must be adjusted when changing physical magnification levels

Step 5 — Stitching Multiple Scans



- ❗ In order to scan samples larger than the viewing field, stitching must be utilized
- There are multiple stitching configurations available, but this guide will cover "Auto" mode only, as it is far easier to use.
- The "Area specification method" section has "simple" and "detailed" options.
- "Simple" mode allows scanning of images
- Click **Measure** when done setting the boundaries so the software runs the scan
- The Viewer will automatically import the scan into the Analyzer software after the scan is complete

Step 6 — Exporting the Scan Result



- There are multiple ways to export the data of an individual scan (image 1)
- A ".zon" file can be saved with raw measurement data to be analyzed later.
- A ".csv" or ".xlsx" can export all images in the sheet as well as measurement data (not yet defined if the data is just imported). There are a few sub-options to change what data is captured in the output.
- Selecting "Output 3D CAD" data will allow exporting of ".stl", ".step", or ".asc" files. There are a few sub-options to customize the exact output.
- Individual images can be exported if just a pretty picture is desired as well.