Advanced Technology and Manufacturing Institute

Zygo ZeScope

Created by Andrew Miller

ATAMI Oregon State University

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<tr>
<th>Revision</th>
<th>Date</th>
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<td>0</td>
<td>8/31/2018</td>
<td>New Document</td>
<td>Andrew Miller</td>
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Introduction

The purpose of this document is to provide guidance on the operation of the Zygo ZeScope at the Advanced Technology and Manufacturing Institute. This manual is meant to be used in conjunction with the ATAMI Client Training and Tool Use Guidance.

Description

The Zygo ZeScope is an optical profiler and is used to precisely measure the height differences on a surface. Optical profiling splits a beam of light which then is reflected off of a reference surface and the test surface. When the two beams are reflected back, constructive and destructive interference occurs. The interference creates light and dark bands or interference fringes. Using the interference fringes and the wavelength of the light, a three-dimensional map of the test surface is created.

Precautions

- LOWERING THE ZESCOPE: When lowering the Zygo ZeScope take care to avoid ramming the ZeScope into your part. This can damage the ZeScope.
- MOVING PARTS: Avoid impeding the movement of the ZeScope tray and this may damage the machine.
- ANTI-VIBRATION TABLE: Do not lean on the ZeScope table as this will cause the table to rock and will reduce the quality of the data collected.
Operation

Start Up

Turn on the ZeScope by double clicking the ZeScope icon.

Initially a large page will pop up across the entire screen. Close this page.
The ZeScope will check all the devices to make sure they are working properly. If all the devices “Pass”, the start up will continue. If all the devices to not “Pass” try turning off the ZeScope and the Joystick and trying again.

After all the devices have been checked, another pop-up will appear. Click “Yes”. This process may take a minute.
Next a pop-up will prompt you to pick a recipe to use. Select “Open Default Recipe”.

Now you will see this screen pop up and you will be ready to look at your part.
Data Acquisition

Move the ZeScope to the loading position by selecting “Move To” → “Load Position”

Place your part onto the ZeScope.

Move the ZeScope to the measuring position by selecting “Move To” → “Measure Position”

Select the desired magnification.
Select the desired speed for the joystick.

Use the XY-joystick to focus the ZeScope over your part. It will be easiest to start with high speed and switch to low speed once your part is close to the desired position.
Next use the Z-joystick to lower the ZeScope. Stop lowering the ZeScope once your part comes into focus. The part is in focus when waves appear on the screen.

For reference, here are the values where the ZeScope focuses on the surface of the tray:

<table>
<thead>
<tr>
<th>Magnification Lens</th>
<th>Focus Height (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5X</td>
<td>177.570</td>
</tr>
<tr>
<td>10X</td>
<td>177.642</td>
</tr>
<tr>
<td>20X</td>
<td>177.105</td>
</tr>
</tbody>
</table>

An easy way to make use of this table is to measure the thickness of your part, then subtract that thickness from the focus height of the desired magnification lens.
To acquire data for your part select “Acquire Tools” → “Acquire Options”

Change the Surface to “Rough Scan”. Change the Scan Position to “Top”. Change the Scan Length to twice the depth of your features. Select “Start Acquire”.

If the scan does not produce adequate results, select “Thresh” and adjust the threshold. Additionally, increasing the number of “Data Averages” will improve the scan quality. However, this will also significantly increase the time to complete a scan.
Data Improvement

Now that you have acquired the scan, there are a few ways to improve it.

First to make the scan 3 dimensional select the triangle-square-circle icon.

Next select the “Process Map” icon.

Select “Fill Void Pixels”
Select “Fill all pixels within a boundary”, then select “Apply”.

To use the level tool select “Levels”→“Level Tool”

Drag the white rectangle over an area that is level. Right click and select “Remove Tilt”
Sequencing

To create a sequence, select “Sequence” → “Stage Options”.

Next select “Stitch”.
Now adjust the number of rows and columns in your sequence. Then select “Ok”.

Now, once you have selected “Acquire Tools” → “Acquire Options”, select “Start Sequence”.