AAC Technologies

Laser Ablation Master Toolpath Generator

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Master Toolpath Generator

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Introduction

Master Toolpath Generator is short script that will compose a master toolpath for whole convex preform laser ablation having different types of cavities (main lenses, reference lenses, overflow lenses).

It needs an input in a form of individual cavity toolpath, i.e. **.bia* file generated by standard means.

The input syntax is defined by type of lenses, e.g. “type-a”, “type-l” etc. The Master Toolpath Generator then look for removal (“remov” syntax for cavity preform ablation) and cleaning (“clean” syntax for cavity cleaning).

The main orientation of the mold inside laser ablation machine is mold arrow pointing towards right hand side (positive X direction of laser ablation machine coordinates).

It corrects the layout position based on CMM symmetry measurement.

The generated master toolpath have sorted cavities for their laser ablation in an order that starts to ablate cavities with lowest Y coordinate, removal and cleaning (if specified) at each cavity position. Once lowest Y coordinate cavities are finished, the second lowest Y coordinate cavities are being processed etc.

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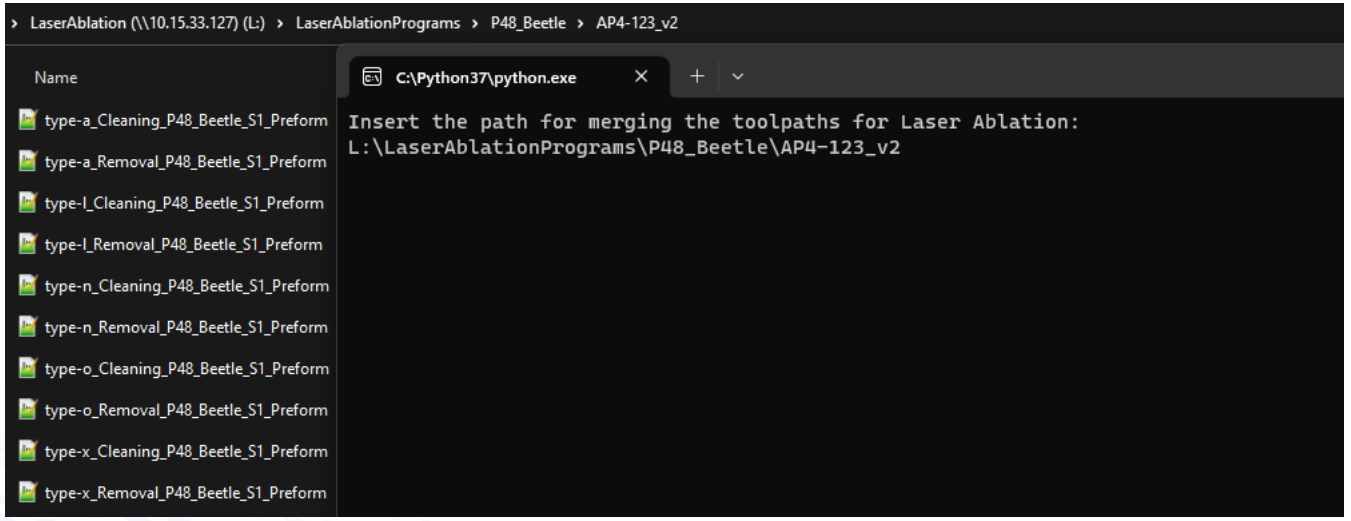
Open “Master Toolpath Generator_v1.0.2.py” in Python

Once you open the Master Toolpath Generator in Python, you will be requested to enter the full path of the prepared **.bia* files for individual types of lenses and removal/cleaning parameters.

Insert the full path (including drive letter) where *.bia files for the mold are present.



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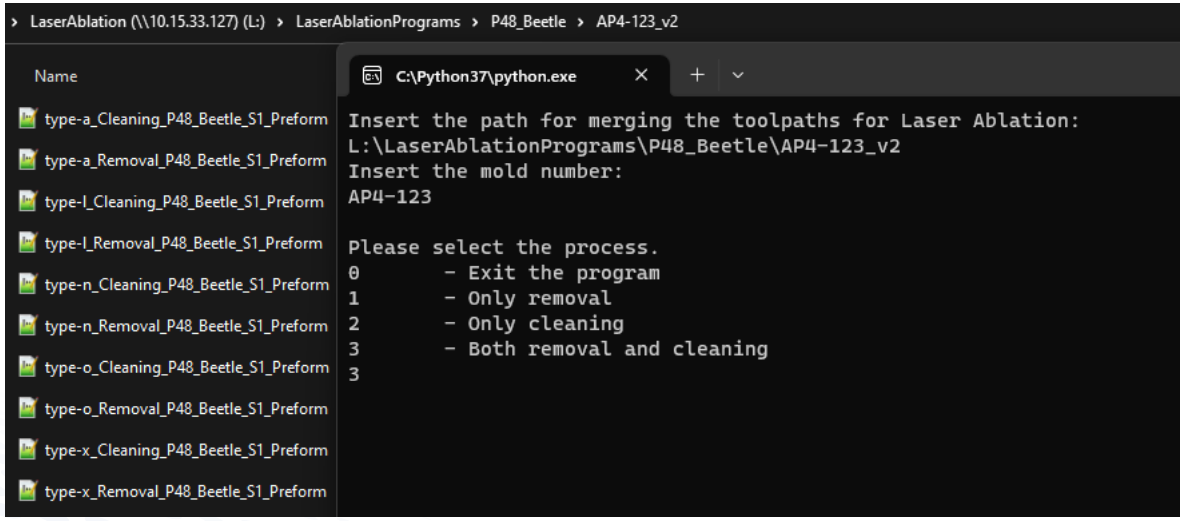
Mold number and process

Insert correct mold number and press “Enter”.

New line with process selection appears, you can choose whether only removal, only cleaning or both. Write a number corresponding to your choice and press “Enter”.



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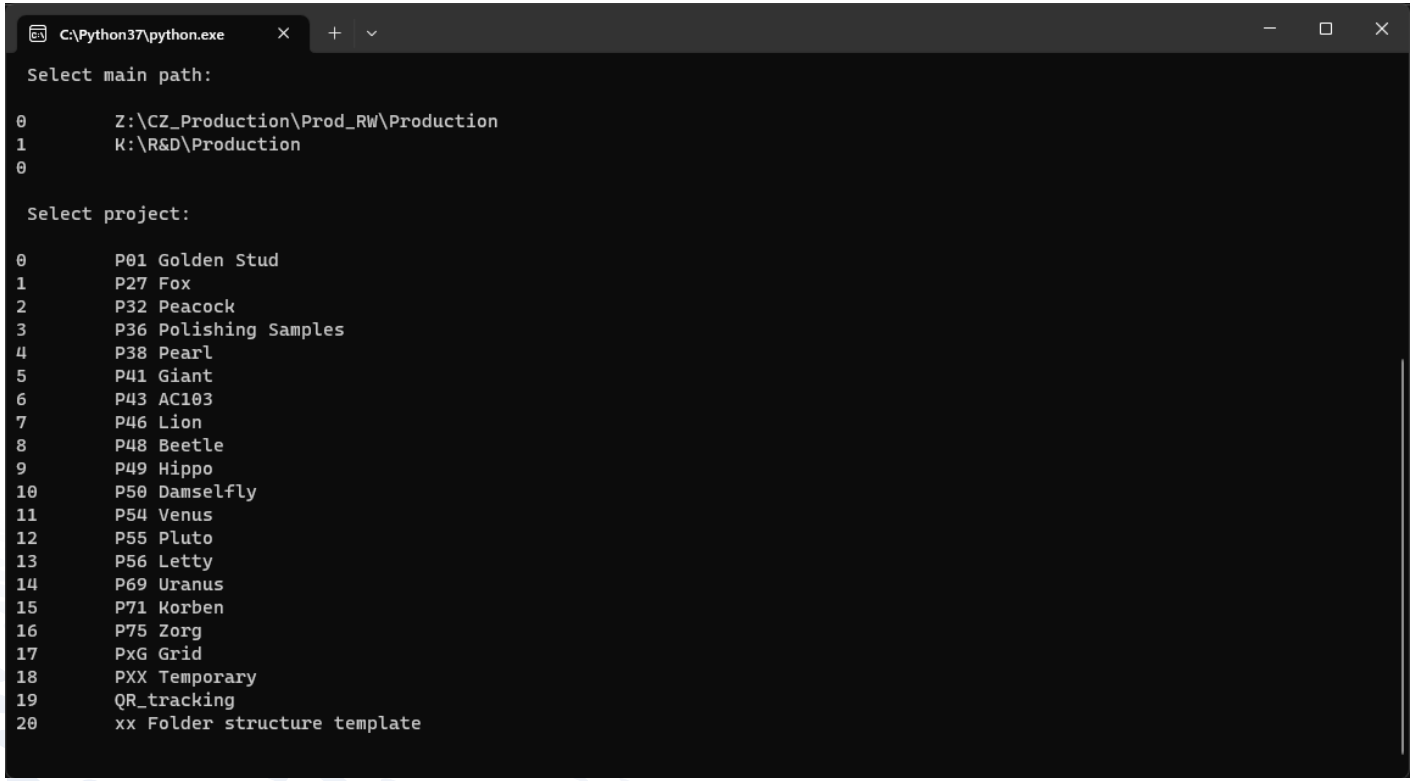
Select the main path of your production folder

To distinguish from new R&D projects run at Kaleido and standard/mass production run in Czech please select the path. This selection will redirect you to the choice of project in the selected path.



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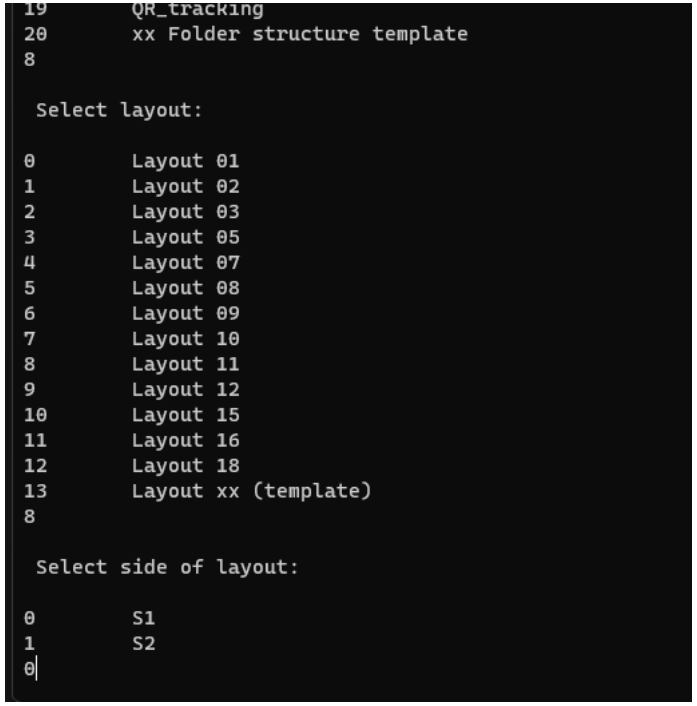
Project, layout and mold side selection

Write a number specifying your desired project to be laser ablated, e.g. for “P48 Beetle” write corresponding number “8” from previous slide.

Then write a number corresponding to the layout you want to laser ablate, e.g. write number “8” for “Layout 11”.

Then select which side of the mold you want to laser ablate, e.g. write “0” for “S1”.



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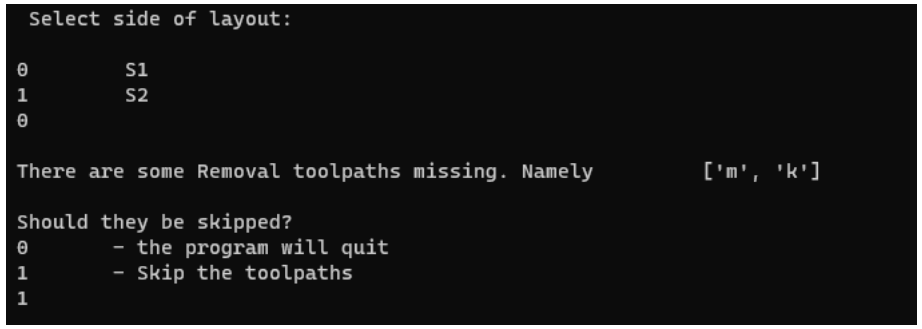
Skip missing toolpaths

Based on the layout you will be prompted to skip missing toolpaths.

Typically “m” and “k” types which do not have preform and are grinded at grid grinding process.

This serves as a check that you have all toolpaths in place to start the laser ablation process.



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Define layout center position and mold orientation MK3

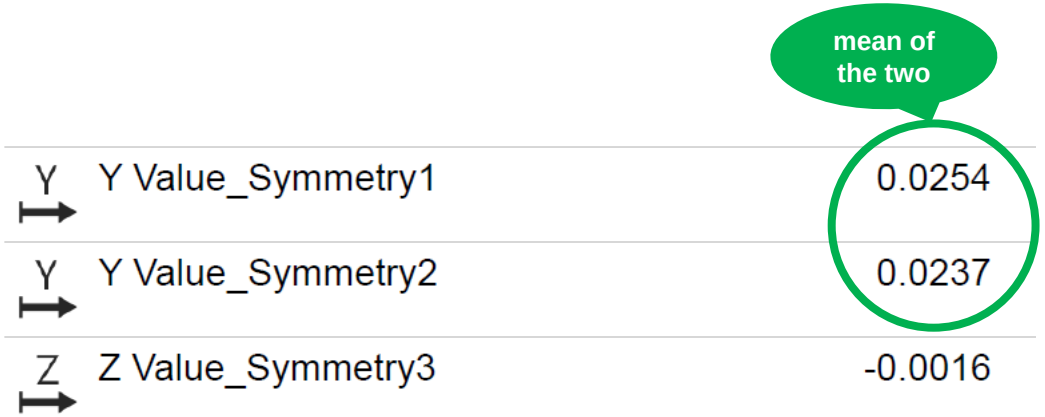
Enter the half size of the mold (or mold center from the top mirror surface). Typically it is **„-37.452“** mm for MK4 mold.

Then enter symmetry values from CMM measurement to shift the layout center accordingly.

Enter how you put the mold (orientation in laser ablation machine), mold top part is defined by an arrow.

- Arrow pointing in negative Y axis direction of machine coordinate system, i.e. select “No rotation”.
- Arrow pointing in positive X axis direction of machine coordinate system, i.e. select “90 deg CW rotation”.

```
What is the half size of the mold (distance from vision markers' mirror surface to the center of the mold) in [mm]?
78.5
What is the z-correction from CMM in [mm]?
-0.0016
What is the y-correction from CMM in [mm]?
0.02455
 Should the orientation be flipped?
0       - No rotation
1       - 90 deg CW rotation
1
```



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Define layout center position and mold orientation MK4 S1 concave

Enter the half size of the mold (or mold center from the top mirror surface). Typically it is **„-78.5“** mm for MK4 mold.

Then enter symmetry values from CMM measurement to shift the layout center accordingly.

- **For MK4 mold you have to also move typically 13 mm to the center of „ear“ when object reference on datums used (verify on drawing). Add „-13“ mm to „y-correction from CMM“.**

Enter how you put the mold (orientation in laser ablation machine), mold top part is defined by an arrow.

- Arrow pointing in negative Y axis direction of machine coordinate system, i.e. select “No rotation”.
- Arrow pointing in positive X axis direction of machine coordinate system, i.e. select “90 deg CW rotation”.

```
What is the half size of the mold (distance from vision markers' mirror surface to the center of the mold) in [mm]?
78.5
What is the z-correction from CMM in [mm]?
-0.0016
What is the y-correction from CMM in [mm]?
0.02455
 Should the orientation be flipped?
0       - No rotation
1       - 90 deg CW rotation
1
```

mean of the two

Y	Y Value_Symmetry1	0.0254
Y	Y Value_Symmetry2	0.0237
Z	Z Value_Symmetry3	-0.0016

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Define layout center position and mold orientation MK4 S2 concave

Enter the half size of the mold (or mold center from the top mirror surface). Typically it is **„-78.5“** mm for MK4 mold.

Then enter symmetry values from CMM measurement to shift the layout center accordingly.

- **For MK4 mold you have to also move typically 13 mm to the center of „ear“ when object reference on datums used (verify on drawing). Add „+13“ mm to „y-correction from CMM“.**

Enter how you put the mold (orientation in laser ablation machine), mold top part is defined by an arrow.

- Arrow pointing in negative Y axis direction of machine coordinate system, i.e. select “No rotation”.
- Arrow pointing in positive X axis direction of machine coordinate system, i.e. select “90 deg CW rotation”.

```
What is the half size of the mold (distance from vision markers' mirror surface to the center of the mold) in [mm]?
78.5
What is the z-correction from CMM in [mm]?
-0.0016
What is the y-correction from CMM in [mm]?
0.02455
 Should the orientation be flipped?
0       - No rotation
1       - 90 deg CW rotation
1
```

mean of the two

Y Value_Symmetry1	0.0254
Y Value_Symmetry2	0.0237
Z Value_Symmetry3	-0.0016

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Define layout center position and mold orientation MK5

Enter the half size of the mold (or mold center from the top mirror surface). Typically it is **„+68.5“** mm for MK5 mold.

Then enter symmetry values from CMM measurement to shift the layout center accordingly.

- **For MK5 mold you have to also move 74 mm when object reference on MK5 holder is used. Add „+74“ mm to „y-correction from CMM“.**

Enter how you put the mold (orientation in laser ablation machine), mold top part is defined by an arrow.

- Arrow pointing in negative Y axis direction of machine coordinate system, i.e. select “No rotation”.
- Arrow pointing in positive X axis direction of machine coordinate system, i.e. select “90 deg CW rotation”.

```
What is the half size of the mold (distance from vision markers' mirror surface to the center of the mold) in [mm]?
78.5
What is the z-correction from CMM in [mm]?
-0.0016
What is the y-correction from CMM in [mm]?
0.02455
 Should the orientation be flipped?
0       - No rotation
1       - 90 deg CW rotation
1
```

mean of the two

Y	Y Value_Symmetry1	0.0254
Y	Y Value_Symmetry2	0.0237
Z	Z Value_Symmetry3	-0.0016

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