Thorlabs Deformable Mirror DMP40 device adapter

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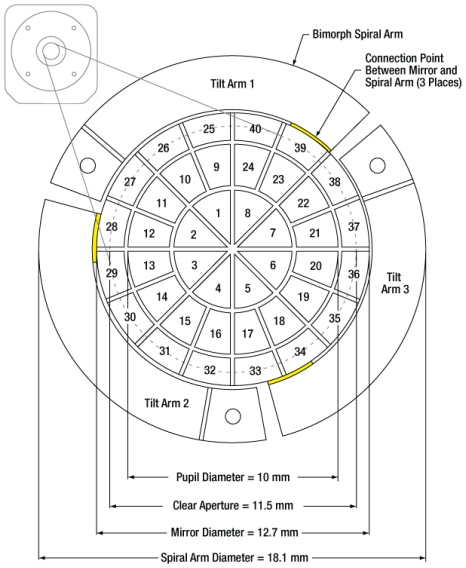
This is a brief user guide to set up a Thorlabs deformable (DMP40) device adapter in Micro-Manager. This adapter will allow you to control the deformable mirror via the “device property browser” found in the “tools” tab.

https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=5056



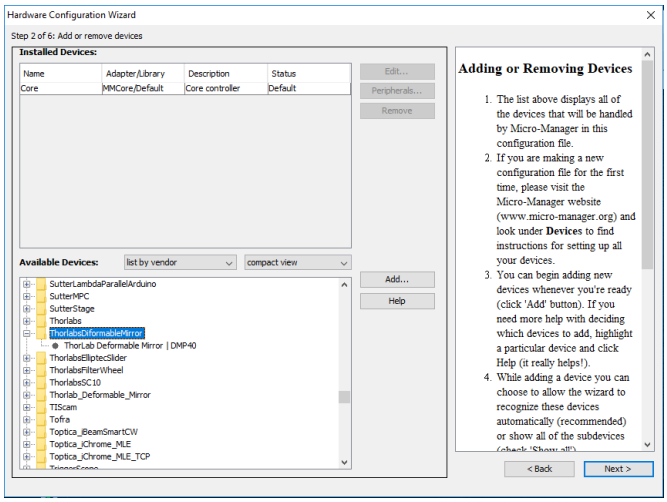
https://www.thorlabs.com/images/tabimages/DMP40-P01_Actuators_dwg_780.gif

Download and install Micro-Manager

1) Download Micro-Manager (https://micro-manager.org/wiki/Download%20Micro-Manager_Latest%20Release) and install it. We highly recommend downloading the nightly build version [Tested on both 1.4 and 2.0]. After installation, depending on the version of Micro-Manager, copy the “mmgr_dal_Thorlab_Deformable_Mirror.dll” file to the location of your Micro-Manager installation (e.g., C:\Program Files\Micro-Manager-1.4).

2) Check whether the dlls provided by Thorlabs (“TLDFM_64.dll” and “TLDFMX_64.dll”, found after installation in C:\Program Files\IVI Foundation\VISA\Win64\Bin) are present in the micromanager directory. If not, copy them.

3) Follow the instructions from “https://micro-manager.org/wiki/Micro-Manager_Configuration_Guide” to configure your deformable mirror in Micro-Manager. You can add your mirror under the ThorlabsDeformableMirror tab as shown below.



Usage

The deformable mirror has a number of property groups that can be changed as follows (see also figure below).

1. **Tip & Tilt** sets *Mirror-amplitude* and *Mirror-angle* controlling the three-arm segments of the mirror
2. **Apply Zernikes** for communication with the REALM plugin (https://github.com/MSiemons/REALM, As of February 2020, REALM requires Micro-Manager 1.4)
3. **Load wavefront correction** loads previously saved entries of property groups and PSF settings
4. **Temperature** shows the temperature of the mirror
5. **Relax the mirror** allows you to use relaxation feature, which removes mechanical tensions in the mirror. For more information please read the manual of the deformable mirror
6. **Reset segments** returns all 40 segments to 100 V
7. **Reset Zernikes** sets all Zernike coefficients to 0 and all 40 segments to 100 V
8. **Save current position** saves the voltages of all segments
9. **Mirror segments** sets the voltage of individual segments to value between 0 V to 200 V

10. **Zernike Coefficients** sets individual Zernike modes. Note that setting a Zernike mode will change all associated mirror segments.