

White paper about working with motorized lenses from Opto Engineering

Runs perfectly

General / Motivation

Whereas many machine vision applications usually use constant distance (and constant lighting) and constant field of view, there are applications to use GigE Vision and USB3 Vision cameras also in applications requiring different magnifications or different foci and apertures.

Opto Engineering offers two series of motorized lenses for these application types.

- ENMT fixed focal length lenses with motorized focus and aperture control and
- MZMT series, 12x or 5X continuous macro zoom lenses with motorized control.

The advantage of this solution is that it requires only one programming interface from the host PC to the camera inclusive optics, saving the separate USB port to communicate with the controller otherwise.



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How to connect an Opto Engineering motorized lens to a camera?

It requires the RS232 port in the camera first. This is supported since firmware 2.24.975.0 for mvBlueCOUGAR-X (incl. POE) and -XD and mvBlueFOX3 camera families.

An Opto Engineering adapter-box MTCN001 is used to convert from RS232 to RS485. From there the signals go to the motion controller box.

MTDV3CH-00A1 is an open loop controller: motion modes are operated either manual or via PC/PLC and include relative/absolute position, move to a specific F-number, magnification or working distance.

Connect the adapter box with the help of cable KS-HR12S-HR12PP XX.X Nr.1520513 to the camera's Hirose port. Connect adapter box RS485 to motion controller port.

The following commands are supported by the mvIMPACT Acquire SDK interface:

```
mvStepperFirmwareVersion:
mvStepperAutoSave Position: [True, False]
mvStepperMotorSelector: [Zoom, Focus, Iris]
  mvStepperMoveToHome()
  mvStepperSteps: [min..max]
  mvStepperMoveSteps()
  mvStepperPosition: [min..max]
  mvStepperMoveToPosition()
  mvStepperStop()
  mvStepperCurrentPosition: [min..max]
  mvStepperStatus:
  mvStepperSpeed: [min..max]
  mvStepperAccerleration: [min..max]
mvStepperMoveToHomeAll()
mvStepperStopAll()
mvStepperPositionSetSelector: [0..<n>]
  mvStepperLoadPositionSet()
  mvStepperSavePositionSet()
```

Basic operation example via wxPropView

1. Switch "mv Serial Interface Mode" to OptoEngineeringStepper.
2. Use "mv Stepper Move ..." to move the selected motor to absolute positions.
3. Use "mv Stepper Position Set Selector" to load or store up to 100 predefined positions.

How to control lens via 3rd party libraries or APIs

The properties for mv RS232 Control are MATRIX VISION specific but appear in the camera's XML-file according to GigE Vision standards and SFNC (standard feature naming convention) thanks to the

standard. This makes it possible to use the features from third party applications or programs without problems, as shown with HALCON's image acquisition.

List of usable lenses

Compatible series are

- ENMT fixed focal length lenses with motorized focus and aperture control and
- MZMT series, 12x or 5X continuous macro zoom lenses with motorized control.

List of suitable cameras

All mvBlueFOX3 cameras and all mvBlueCOUGAR-X(D) cameras with sensor diagonals up to 2/3" (4/3" for the 5x macro)

Additional information

<http://www.opto-engineering.com/products/MZMT12X-continuous-macro-zoom-lenses-motorized-control>