

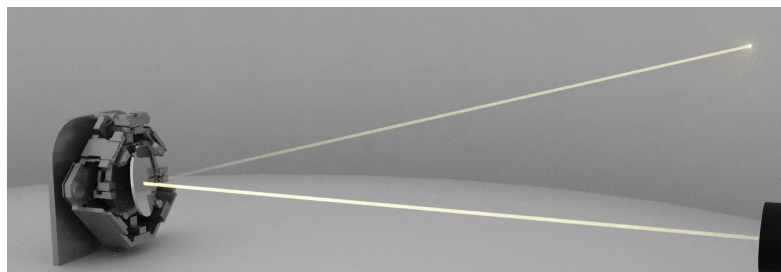
## M3-TMM-U2-4.5-6 Two-Axis Tilting Mirror Module

- **Small:** 14mm x 14mm x 7mm total system size
- **Precise:** 0.02 deg repeatability
- **Smart:** Embedded controller, I2C or SPI communication, or USB adapter to PC/Pathway
- **High speed:** 720 deg/sec
- **Low Power:** 3.3 V DC

### Simplicity and performance for miniaturized beam steering applications

The M3-TMM-U2-4.5-6, Two-Axis Tilting Mirror Module is an all-in-one solution for controlling laser beams in multiple axes. All necessary position sensors, communication, and motor drivers are built in.

Rotations are produced by friction with stable zero-power hold and high first resonant frequency, providing greater stability and durability under external shock loads.

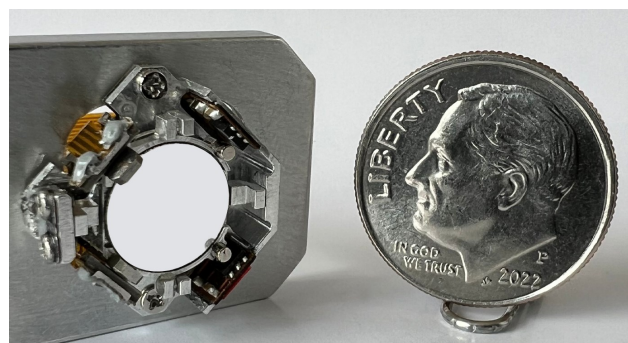


### Power and Digital Control

Only 3.3 V DC nominal power and digital commands via SPI or I2C are required.

### Preliminary Specifications

Parameter	Value
Mirror Size	6 mm diameter
Width	14 mm
Length	14 mm
Thickness	7 mm
Center of Rotation	Center of Mirror Surface
ThetaX and ThetaY	
Range	+/- 8 deg, both X & Y axis
Resolution	0.01 deg
Repeatability	0.02 deg
Speed	720 deg/sec
Step and Settle	15 msec (0.5 deg step) 50 msec (5 deg step)
Off-Power Hold	Yes
Maximum Input Voltage	3.3 VDC +/-10%
Lifetime	50 cycles/day, 4 years

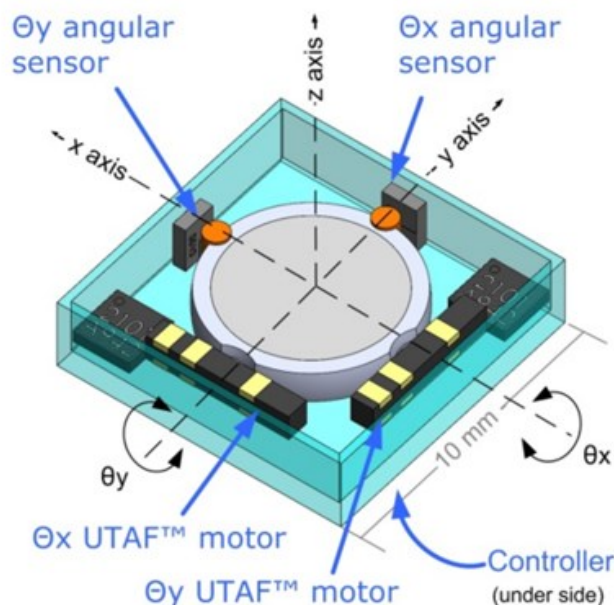


This **Two-Axis Tilting Mirror Module** is an ultra-compact beam steering system intended for use in miniature beam steering applications. Its small size and high precision make it ideal for extreme miniaturization of large and complex photonics instruments and benchtop systems.

### Internal Construction

This product uses New Scale's patented UTAF piezoelectric ultrasonic motors in a planar configuration that moves a single mirror in two independent orthogonal axes using nested gimbals. The UTAF motors fit in the plane of the mirror and generate movement around the X and Y axes.

Mirror substrate and coating can be selected by the customer.



### Applications

- Quantum computing
- DNA sequencing
- Optogenetics
- Point-to-point beam steering