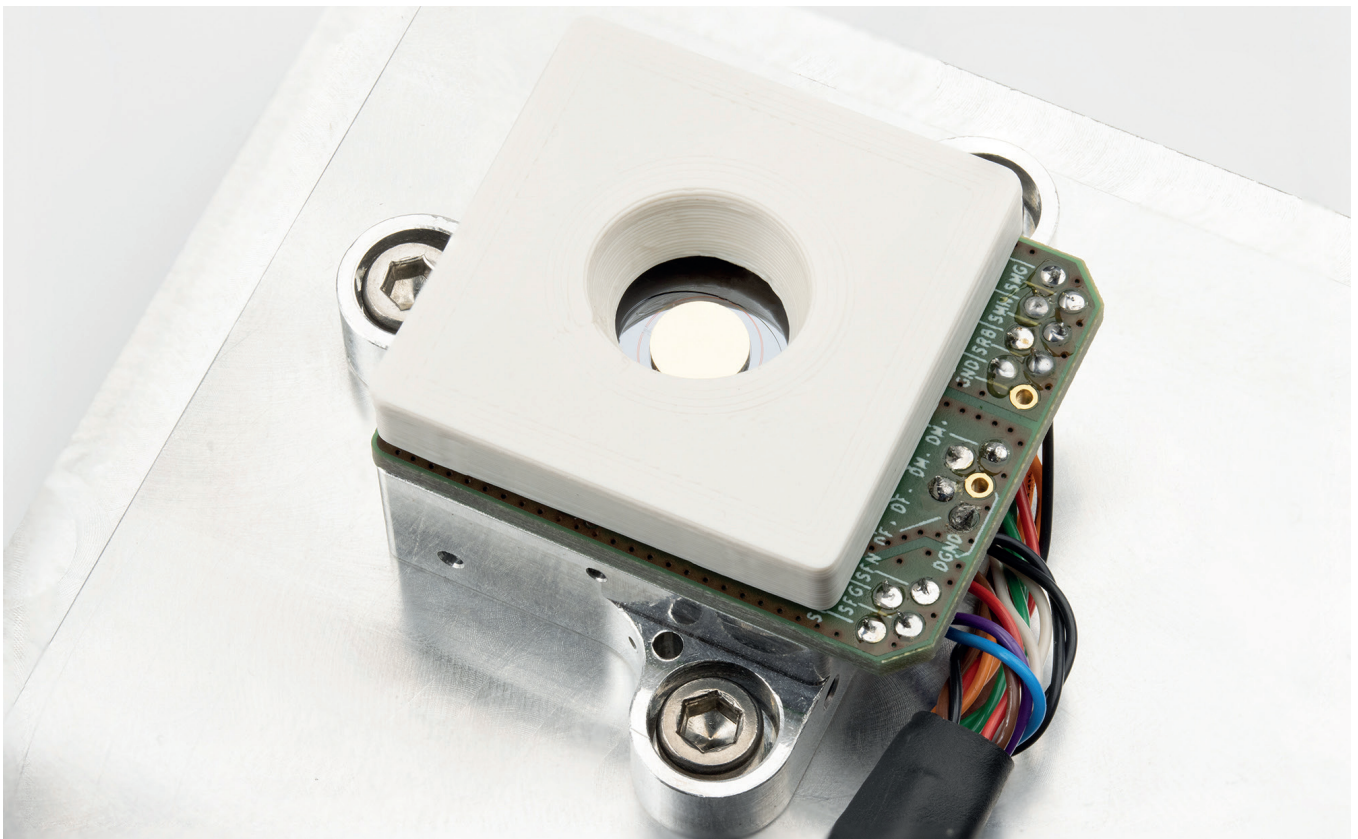


2D vector scanning module I2DQSEM01 with electromagnetic drive



The 2D vector scanner module I2DQSEM01 is the first representative of the new MEMS microscanners with electromagnetic drive in the Fraunhofer IPMS portfolio. Here, Fraunhofer IPMS builds on many years of experience in the fabrication of gimbaled, monolithic 2D MEMS scanner mirrors and combines this with existing know-how in MEMS micro-assembly technologies. These new hybrid devices consist of a mirror fabricated in bulk micromechanics technology in the clean room of Fraunhofer IPMS, a MEMS mirror, a magnet and a magnetic drive unit.

This approach significantly expands the parameter space of the previous monolithic scanners. At the same time, the established

advantages of the Fraunhofer IPMS scanner mirror technology, namely its high optical planarity and decoupling of the scan axes by means of gimbal suspension as well as the fatigue-proof nature of the suspension elements.

The new devices allow 2-dimensional quasi-static deflection at larger mirror apertures as well as high vectorial positioning speed. The module also provides the mirror position in the form of analog signals in order to be able to realize a controlled system. In addition, we will be happy to provide additional features such as customer-specific, highly reflective dielectric mirror coating or the manufacturing of the mirror plate as a diffraction grating.

I2DQSEM01 – Technical parameters

Mirror

Diameter 5 mm

X mirror axis

Natural frequency 142 Hz

Positioning speed 100 %/s ... 400 %/s

Drive current (static) 23 mA / °

Q factor 250

Mechanical scan range +/- 13°

Y mirror axis

Natural frequency 124 Hz

Positioning speed 100 %/s ... 400 %/s

Drive current (static) 23 mA / °

Q factor 100

Mechanical scan range +/- 13°

Module dimensions (without mounting)

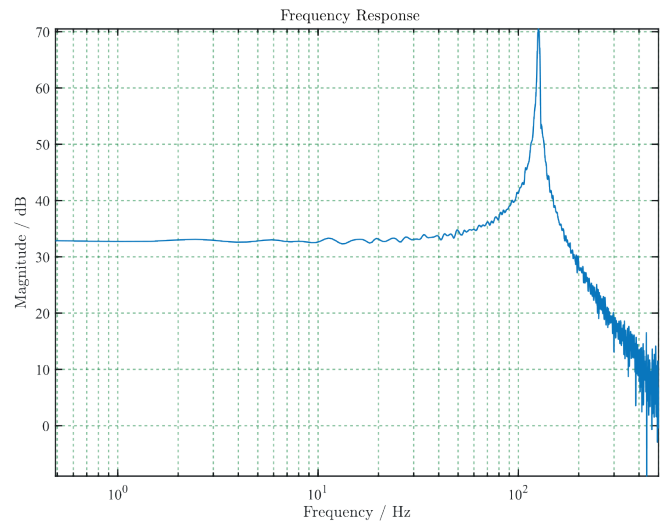
Length 30 mm

Width 25 mm

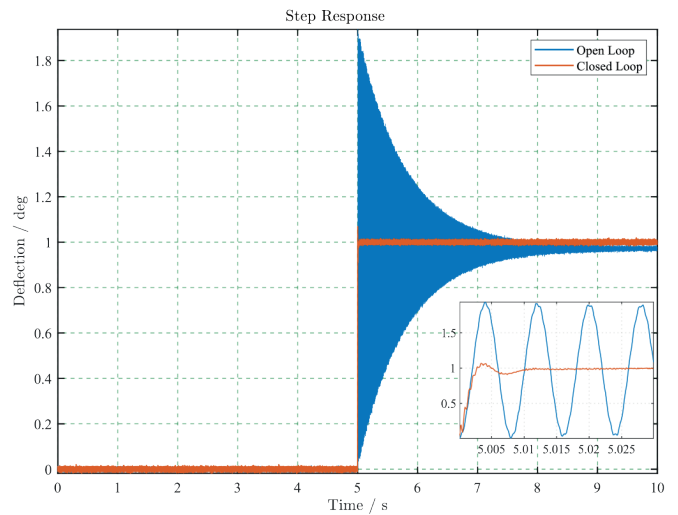
Height 11 mm

Operation

In order to exploit the performance of the scan module, we recommend operating the device in closed-loop control mode. The required control algorithms, which are adapted specifically to the mechanical properties of the module, were developed at Fraunhofer IPMS and can be applied to the digital control of the customer's system electronics (FPGA or microcontroller). In addition, compact control electronics, also developed at Fraunhofer IPMS, with a precise analog driver stage and input stages is also available. It can be accessed via both an analogue and a digital interface.



Relative amplitude frequency response of a drive axis



Step response (deflection to 1°) in open and in closed loop control mode

Contact

Dr. Christine Ruffert
Active Micromechanical
Systems
Business Development
+49 351 69 4763
christine.ruffert@
ipms.fraunhofer.de

Dr. Thilo Sandner
Active Micromechanical
Systems
+49 351 8823-152
thilo.sandner@ipms.
fraunhofer.de

Fraunhofer Institute for Photonic Microsystems IPMS
Maria-Reiche-Str. 2, 01109 Dresden, Germany
www.ipms.fraunhofer.de