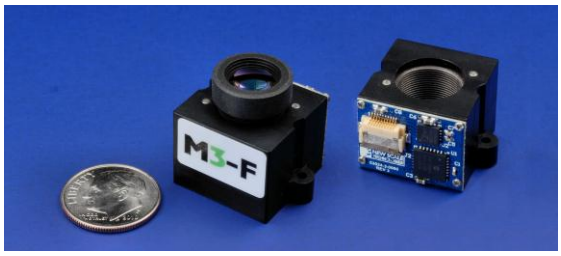
M3-F

Micro-Mechatronic Focus Modules



FEATURES

- **Small:** complete, compact system with NO external control board
- **Superior image quality:** no liquid medium, NONE of the attendant issues with transmission, clarity and temperature sensitivity
- **Low Voltage, low power use:** runs on 3.3 V input, holds focus with power off
- **Simple system integration:** accepts high-level commands over standard serial interface (I2C or SPI)
- **Flexible, production-ready system:** compatible with M8 to M12 lenses and standard imager formats (e.g. 1/2" and 1/1.8")
- **Cost-effective system solution:** single-lens system with embedded closed-loop drive circuit for high repeatability with low external processing requirements

APPLICATIONS

Miniature, high-resolution cameras

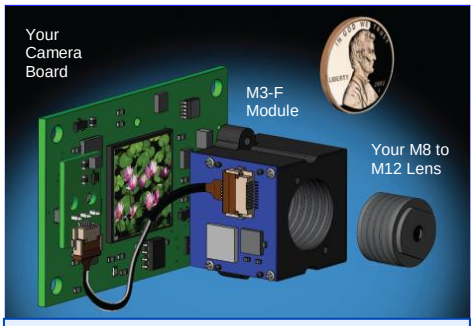
- Biometric systems
- Infrared cameras
- Medical diagnostic and inspection systems
- Machine vision and industrial inspection systems
- Conferencing systems
- Miniature surveillance cameras, video cameras, computer cameras
- Projectors
- Targeting systems

Precision lens control; superior image quality

M3-F focus modules add high-resolution lens motion to the smallest OEM cameras. A complete closed-loop motion solution, the **M3-F** module is no larger than a fixed lens holder and has low power requirements for use in battery-powered devices.

The **M3-F** module is a single-lens focus solution with minimal external processing requirements, making it simple and cost-effective to integrate focus into your camera system. Precise lens position control (0.5 micron resolution), best-in-class bi-directional repeatability and no hysteresis enable you to capture the sharpest images from your board-mounted camera system.

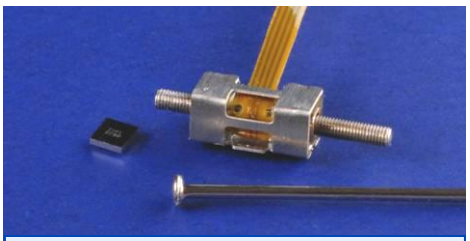
M3-F modules are designed for long life, with high performance that is not susceptible to temperature or power variations.



Flexibility and Precision: M3-F modules are easily integrated with your camera board and lens. The **M3-F** is a complete, drop-in focus solution that requires no more space than a fixed lens holder.

The M3 platform

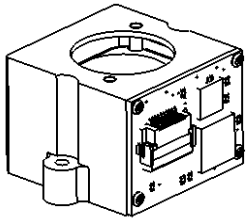
The **M3-F** module is built on New Scale's **M3** **M**icro-**M**echatronic **M**odule technology platform. The platform provides the smallest, highest resolution and most repeatable closed-loop micro-mechatronic system available – all in an easily integrated, customizable package. The platform includes a patented **SQUIGGLE®** **RV** piezo micro motor, an NSD-2101 drive ASIC, an NSE-5310 high-resolution magnetic position sensor, and a microprocessor with on-board closed loop control. These combine to create the world's smallest closed-loop linear motion system, with performance comparable to much larger systems.

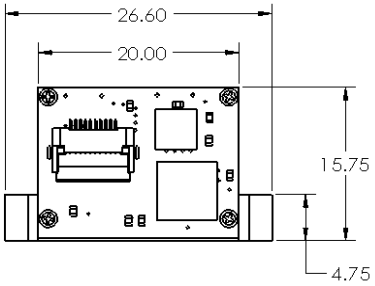


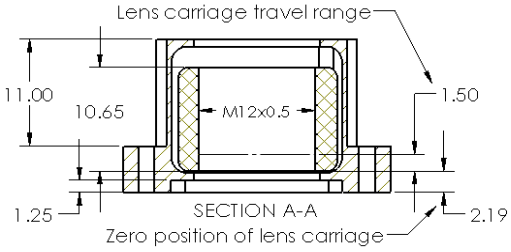
SQUIGGLE RV motor and driver inside every **M3-F** module is the world's smallest linear motor system.

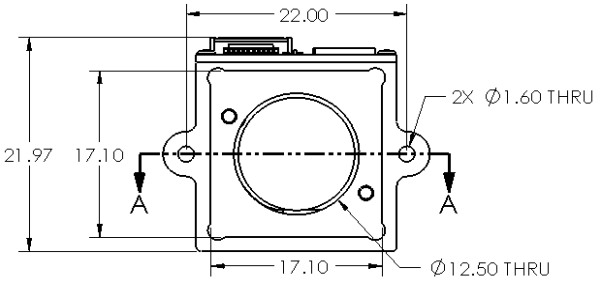
M3-F Developer's Kits

M3-F Developer's Kits provide convenient engineering evaluation and demonstration of focus in your camera in just a few minutes. New Scale Pathway™ software allows you to perform manual focus operations immediately from your PC.









All dimensions in mm
For additional integration information, please refer to SQL-RV-1.8 motor manual

Reference Information

See www.newscaletech.com/application_notes.html

- *Checking Optical and Imager Geometry in DK-M3-F* (design note). Lens recommendations, guidelines for image sensor and lens compatibility with the M3-F Developer's Kit module.
- *M3-F focus module in camera system design* (application note). Includes module details as well as repeatability and other performance considerations.

Order a Developer's Kit

Order online at http://shop.newscaletech.com.

Model Number	Description
DK-M3F-1.8-TRK-1.5-C	M3-F Developer's Kit Configured for I^2C (Inter-Integrated Circuit Bus)
DK-M3F-1.8-TRK-1.5-S	M3-F Developer's Kit Configured for SPI (Serial Peripheral Interface Bus)

Application-Specific Solutions

In addition to the mass-production M3 platform, New Scale can quickly create a customized focus module to meet your more demanding OEM specifications. Our sales and engineering team will rapidly respond to your request for longer travel, custom lens interface, mounting requirements and unique environmental considerations.

M3-F Developer's Kit Specifications	
Lens Type (Lens not included)	Accepts M12x0.5mm smaller lenses to M8x0.35 with adapter from your lens supplier
Lens Weight *	< 5 grams
Travel Range	Up to 1.5 mm
Housing Dimension	20 x 22 x 16 mm
Max Image Sensor Area (image sensor not included)	17 x 17 x 1.25 mm (including 1/2" and 1/1.8" formats)
Speed	> 5 mm/s
Resolution	0.5 µm
Hysteresis	None
Repeatability	Uni-directional: +/- 5 µm Bi-directional: +/- 20 µm
Linear Accuracy	± 30 µm
Angular alignment (Static tip/tilt)	<± 1 degree
Angular movement (Dynamic tip/tilt)	<± 0.15 degrees
Static Concentricity	<± 0.25 mm
Dynamic Concentricity	<± 0.02 mm
Input Voltage	3.1 to 3.6 Volts
Input Power **	< 0.5 Watts (5mm/s with 5g mass) < 0.13 Watts quiescent
Temperature /RH ***	5° to 70°C (lower possible) <70% RH non-condensing
Mean Time Before Failure	>2M Cycles (fixed orientation) 500K Cycles (random orientation)
Weight of module (without lens)	5.8 grams
Compliance	CE / RoHS

* Fixed orientation will allow for heavier lens operation
** Power depends on input voltage, speed & load.
*** Consult the factory for lower temperature requirements.

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Ingeniously Small Motion Systems