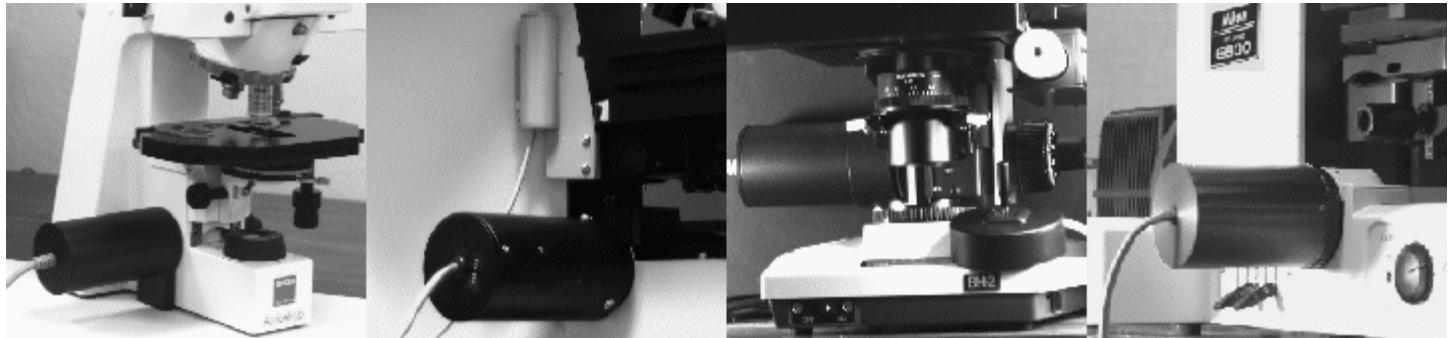


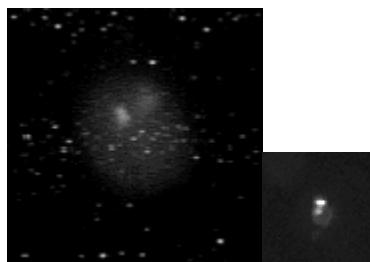
# **TOFRA, Inc. (Tools for Research Automation)**

microscope automation ♦ filter wheels ♦ focus drives and limits ♦ scanning stages ♦ RGB LED light sources

## **Focus Drives**



Focus Drive is a microscope attachment that provides high resolution movement of fine focus by driving it with a step motor and at the same time retains manual movement of the coarse focus. The Focus Drive can be used as a part of an automated microscope system with a variety of commercial step motor controllers, including [TOFRA Motor Controller Units](#).



These Z-stacks of DNA probe images were acquired using a TOFRA Focus Drive and a TOFRA Motor Controller Unit.

The Focus Drive consists of a step motor, connected directly to the fine focus shaft of the microscope via a flexible coupling, and of an adapter that fits over the coarse focus knob of the microscope. The use of a high torsion stiffness flexible coupling ensures virtually no backlash in the drive and at the same time does not require very accurate attachment of the adapter. This results in low cost and easy installation.

### **Focus Drive Specifications**

Range of travel	Entire vertical range of the microscope
Step size	1 um with full step controller, down to 0.01 um with microstep controller (depends on controller)
Backlash in the drive	0.125 um. (Not to confuse with backlash in the microscope focus system)
Motor	2 phase, 1.8 degrees per step, 1A/phase
Mounting	No modification of the microscope is required

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## **Ordering information for focus drives**

<b>Part number</b>	<b>Description</b>	<b>2008 Price (USD)</b>
001-01	Focus Drive for Olympus BH-2	750.
001-02	Focus Drive for Nikon Optiphot-1	750.
001-03	Focus Drive for Nikon Optiphot-2	750.
001-04	Focus Drive for <a href="#">Zeiss AxioSkop 1</a>	750.
001-05	Focus Drive for <a href="#">Olympus BX-60</a>	750.
001-06	Focus Drive for Leica DML	750.
001-07	Focus Drive for <a href="#">Nikon Eclipse-800</a>	750.
001-08	Focus Drive for Nikon Microphot SA	750.
001-09	Focus Drive for <a href="#">Nikon Eclipse-600</a>	750.
001-10	Focus Drive for <a href="#">Zeiss AxioPlan/Phot-2</a>	750.
001-11	Focus Drive for <a href="#">Olympus BX-40</a>	750.
001-12	Focus Drive for Zeiss AxioPlan/Phot-1	750.
001-13	Focus Drive for <a href="#">Zeiss AxioSkop 2</a>	750.
001-14	Focus Drive for <a href="#">Leica DMR</a>	750.
001-15	Focus Drive for <a href="#">Olympus BX 51</a>	750.
001-16	Focus Drive for <a href="#">Olympus AX-70</a>	750.
001-17	Focus Drive for <a href="#">Nikon TE300 and TE200</a>	750.
001-18	Focus Drive for <a href="#">Nikon TE2000</a>	750.
001-19	Focus Drive for <a href="#">Leitz Diaplan</a>	750.
001-20	Focus Drive for <a href="#">Nikon 80i</a>	750.
001-21	Focus Drive for <a href="#">Leica DM 4000/5000</a>	750.
001-22	Focus Drive for <a href="#">Nikon 50i</a>	750.
001-23	Focus Drive for <a href="#">Motic BA400/450 and AE30/31</a>	750.
001-24	Focus Drive for <a href="#">Zeiss Axiovert 135</a>	750.
001-25	Focus Drive for <a href="#">Zeiss Axiovert 200</a>	750.

## **Auxiliary devices: Switchstick and Focus Limits**

[Focus Switchstick](#) is an assembly of switches. A motor controller can interpret the switch combinations as direction and speed. This allows a very intuitive interface - coarse (fast speed) and fine (slow speed) focusing. Exact values of slow and fast speed may be changed by computer depending on magnification. Focus Switchstick allows to control focus with or without a computer.

[Focus limits](#) is a safety device, it is used to limit focus travel to the safe range. Focus limits is an assembly of two optical switches and a flag. Position of optical switches is adjustable and is set so that objective is prevented from crashing into the slide. Switch assembly is mounted on the microscope column and flag is mounted on the stage support block. Focus limits fulfill the safety function only when focus is driven by the motor. If the coarse focus knob is turned manually, focus limits will not block the travel.

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## **Focus Limits**

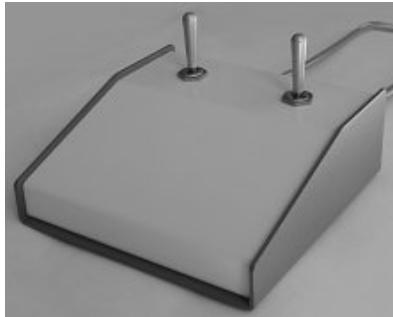


Focus limits is a safety device, it is used to limit focus travel to the safe range. Focus limits is an assembly of two optical switches and a flag. The flag has an adjustment screw, which is set so that objective is prevented from crashing into the slide. Switch assembly is mounted on the microscope column and flag is mounted on the stage support block. Focus limits fulfill the safety function only when focus is driven by the motor. If the coarse focus knob is turned manually, focus limits will not block the travel.

### **Ordering information for focus limits**

<b>Part number</b>	<b>Description</b>	<b>2008 Price (USD)</b>
005-05	Focus limits for most microscopes	250.

## **Switchsticks**



Stage and focus switchsticks are used to provide manual control of stage and focus direction and speed. The switchstick connectors plug directly into the [motor controller unit](#). The motor controllers interpret switch combinations as direction and speed. Exact values of slow and fast speed may be changed by computer depending on magnification. Stage and focus switchsticks allow to control stage and focus with or without a computer.

### **Ordering Information**

<b>Part number</b>	<b>Description</b>	<b>2008 Price (USD)</b>
003-05	Stage and focus switchstick with two speeds in each direction	450.

Specifications are subject to change without notice. Delivery 4-6 weeks ARO.