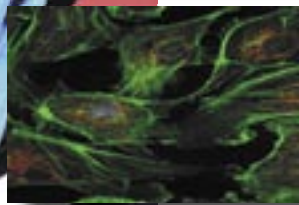
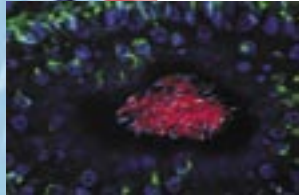


# BioPrecision2

High Performance Motorized Stages for Microscopy

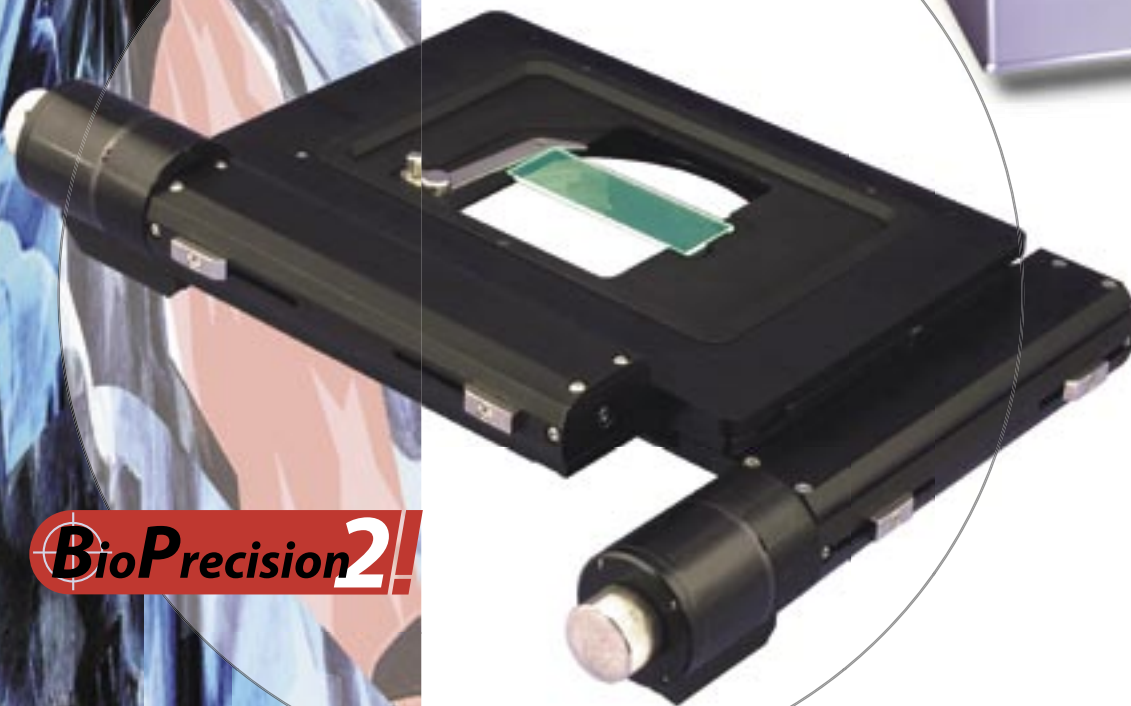


Highest Performing Microscope Stage

Universal Microscope Mount

Linear Encoder Options

MAC 5000 Modular control system



**BioPrecision2**



Ludl Electronic Products Ltd.

## The BioPrecision2 Difference

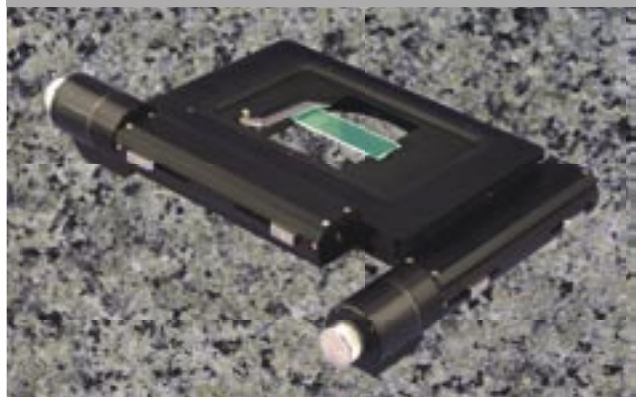
BioPrecision2 stages represent the state of the art for microscope positioning. The design is the product of more than 20 years experience with precision positioning for microscopy. Many new features make the stage lighter and more precise with emphasis on ergonomics and microscope compatibility.

The BioPrecision2 positioning mechanism features a stepper motor driven precision recirculating ball leadscrew providing a minimum step resolution of 25nm. Speed performance is not compromised with high resolution; the maximum speed is 30mm/sec. (1.2MHz step rate).

High grade components and superior construction combine ensuring stage stability, accuracy and reliability. All BioPrecision2 stages utilize corrosion resistant stainless steel hardware, precision ground crossed roller bearings and low detent stepper motors with CNC machined aircraft grade aluminum parts anodized to strict military specifications. “When you’re working with nanometers, every detail is important!”

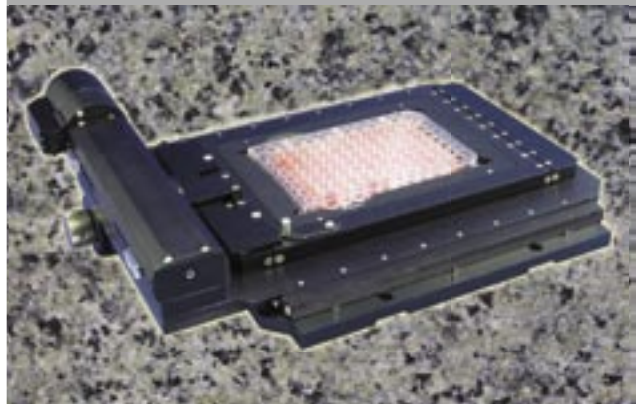
### Upright Stage

For upright microscope applications the BioPrecision2 stages feature lightweight, efficient design without sacrificing precision and performance. The wide specimen insert platform allows for free use of high magnification objective lenses without risk of interference. Embedded high resolution linear encoders are available to provide the highest precision without compromising microscope compatibility or ergonomics. For easy mounting a unique adapter ring ensures that the stage mounts to each microscope at the correct height and with proper clearance.



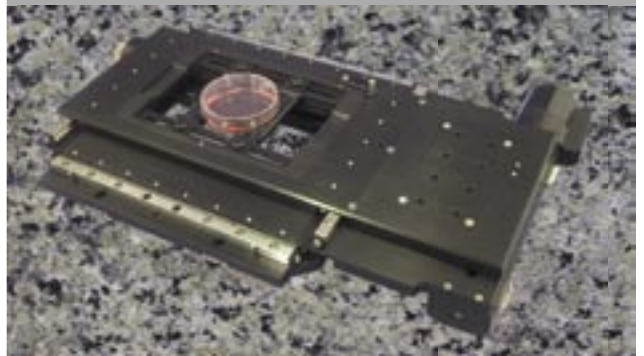
### Standard Inverted Stage

The inverted BioPrecision2 stage is designed to accommodate the unique requirements of the inverted research microscope where applications require both precision and utility. Performance is assured with the efficient BioPrecision2 positioning mechanism, oversize linear guide bearings and patented anti-migration device. A large assortment of specimen holders are available to accommodate glass slides, multi-well plates, Petri dishes, and various flasks extending the utility of the BioPrecision2 inverted stage and the microscope itself.



### Flat-top Inverted Stage

Live-cell microscopy often requires the use of environmental chambers, probes, manipulators and large specimens. The BioPrecision2 flat-top stage addresses these requirements with a completely flat, open top surface. The stage is fully compatible with all of the standard LEP inverted stage inserts and accessories. In addition, a unique removable “mini breadboard” area is available on both the left and right sides of the stage to provide a convenient point for attachment of manipulators and probes.



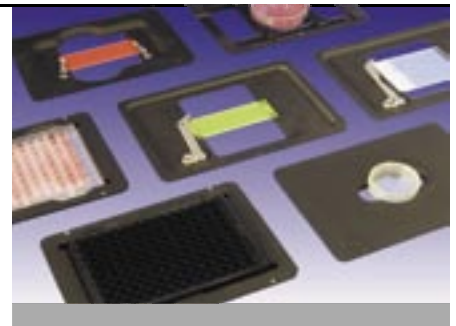
## Modular Control System

BioPrecision2 stages achieve full performance when used with the modular MAC 5000 controller system. The precision tuned linear microstepper drive electronics provide uniform current stabilized motor stepping at all speeds and duty cycles without the adverse effects of excessive motor heating and radiated electrical noise. The standard joystick provides very responsive manual control. The modular construction of the MAC 5000 system facilitates system expansion and simplifies troubleshooting.



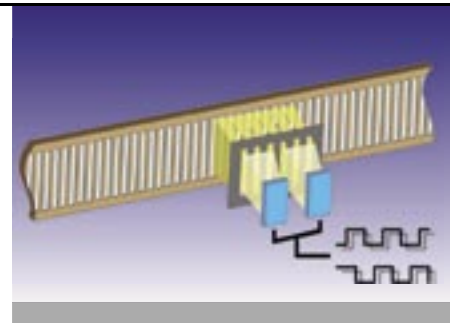
## Specimen Holders

BioPrecision2 stages can accommodate almost any specimen with the large selection of standard, unique and custom specimen holders. Slide and multi-well plate holders are designed to work with the BioPrecision2 stage ensuring perfect microscope focus as well as allowing proper Köhler illumination according to the microscope manufacturers' design. For high speed automated image processing applications a piezo driven focus insert is available for inverted stages.



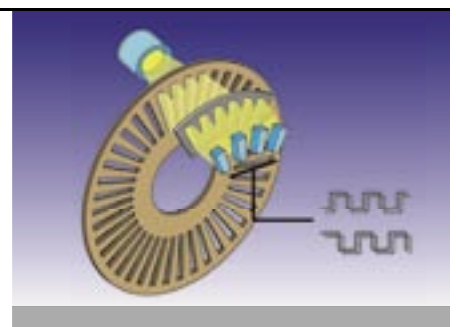
## Linear Encoder Option

Linear encoders provide the highest stability and accuracy for demanding applications. Applications such as extended time-lapse, image tiling and distance measurement yield the best results when linear encoders provide the position feedback. The BioPrecision2 linear encoder option is embedded into the stage rather than simply mounted as an afterthought. The benefit is a system that provides the highest precision performance without adversely affecting microscope compatibility while maintaining the BioPrecision2 ergonomic features.



## Rotary Encoder Option

Rotary encoders add increased reliability and positioning repeatability. The BioPrecision2 rotary encoder mounts directly to the leadscrew shaft effectively eliminating motor hysteresis and microstepping errors. While the overall stage accuracy is still very dependent upon the precision leadscrew, the rotary encoder improves sub-micron repeatability and accuracy. In addition, rotary encoders add robustness to the system by eliminating the chance of unexpected position loss or motor stalling.



## System Expansion

The fully expandable MAC 5000 supports programmable filter wheels, piezo and stepper motor focus controls, nosepiece and turret automation as well as general purpose and custom I/O. Simple in-field upgrades can be accomplished in minutes without problems of compatibility or time consuming 'return to factory' upgrades.



## Performance Specifications

|                      | Base Model Number | Travel Range | Speed    | Straightness Flatness | Weight** | Feedback Option    | Resolution | Repeatability | Accuracy |
|----------------------|-------------------|--------------|----------|-----------------------|----------|--------------------|------------|---------------|----------|
| Upright Microscopes  | 99S100            | 100x75mm     | 30mm/sec | 1µm/25mm              | 2.7kg    | Standard Open loop | 25nm       | 0.75µm        | 6µm      |
|                      |                   |              |          |                       |          | -RE Rotary Encoder | 100nm      | 0.60µm        | 6µm      |
|                      |                   |              |          |                       |          | -LE Linear Encoder | 100nm      | 0.25µm        | 2µm      |
|                      | 99S101            | 100x100mm    | 30mm/sec | 1µm/25mm              | 2.8kg    | Standard Open loop | 25nm       | 0.75µm        | 6µm      |
|                      |                   |              |          |                       |          | -RE Rotary Encoder | 100nm      | 0.60µm        | 6µm      |
|                      |                   |              |          |                       |          | -LE Linear Encoder | 100nm      | 0.25µm        | 2µm      |
| Inverted Microscopes | 99S108            | 100x120mm    | 60mm/sec | 1µm/25mm              | 3.7kg    | Standard Open loop | 50nm       | 0.75µm        | 6µm      |
|                      |                   |              |          |                       |          | -RE Rotary Encoder | 200nm      | 0.60µm        | 6µm      |
|                      |                   |              |          |                       |          | -LE Linear Encoder | 100nm      | 0.25µm        | 3µm      |
|                      | 99S106            | 100x120mm    | 60mm/sec | 1µm/25mm              | 4.3kg    | Standard Open loop | 50nm       | 0.75µm        | 6µm      |
|                      |                   |              |          |                       |          | -RE Rotary Encoder | 200nm      | 0.60µm        | 6µm      |
|                      |                   |              |          |                       |          | -LE Linear Encoder | 100nm      | 0.25µm        | 3µm      |

\* specifications when used with Ludl Electronic Products MAC 5000 automation controller

\*\* weight can vary with exact stage configuration

## System Configuration

A typical BioPrecision2 system includes a MAC 5000 controller, BioPrecision2 stage and specimen holder. Each stage includes an adapter ring that is determined at the time of order based on the specified microscope. The basic XY stage system can be expanded by adding MAC 5000 modules and automation accessories from our catalog. Contact your LEP dealer for a comprehensive list of components and stage accessories.

| Catalog Number | Description   |
|----------------|---|
| 99S100         | 4"x3" (100mmx75mm) travel stage with 1mm precision recirculating ball leadscrews, stepper motors and cables   |
| 995052         | MAC 5000 XY stage controller. Includes high accuracy microstepper motor drives for X and Y axes, RS-232/USB interface, XY digipot joystick, interface cables and documentation. |
| 99A153         | Single slide holder for 4"x3" and 4"x4" stage   |



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