

ProScan™ III

PRIOR
Scientific

High Performance Flexible
Microscope Automation Systems



ProScan™ III Universal Microscope Automation Controller

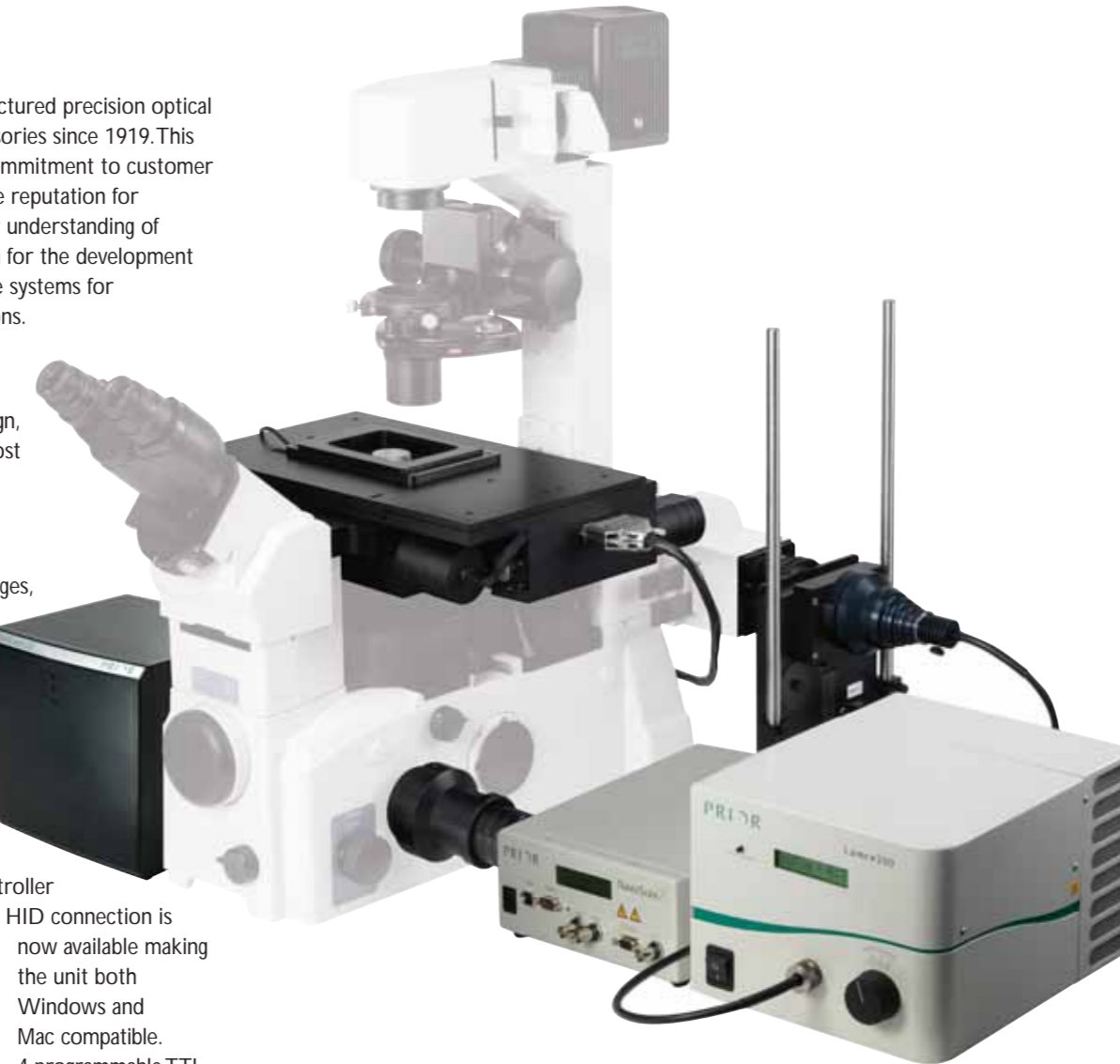
System Control

Prior Scientific has designed and manufactured precision optical systems, microscopes and related accessories since 1919. This wealth of experience is matched by a commitment to customer service that has earned Prior an enviable reputation for excellent support. These values, plus our understanding of microscopy, provide a unique foundation for the development of an advanced range of motorised stage systems for microscopy and image analysis applications.

Prior proudly introduces the ProScan III system which sets new standards in automated microscopy. Modular by design, a wide range of stages is available for most upright and inverted microscopes.

Advanced and Powerful Control

Like the ProScan range of motorised stages, this advanced controller has been designed and manufactured by Prior Scientific. The compact and modular design is capable of controlling, a motorised stage, a focus motor, 3 filter wheels and 3 shutters with the speed, accuracy and precision required by today's highly automated and demanding applications. Communication to the controller has been improved, as a USB with direct HID connection is now available making the unit both Windows and Mac compatible.



4 programmable TTL inputs and outputs allow the unit peripherals or external cameras to be controlled via TTL. The advanced internal software allows for simple control of all accessories via RS232 or USB, and a SDK is supplied for easy integration into third party software.

Access to acceleration, speed and even drive current is also made available for more advanced users to allow total customisation of the unit.

Intelligent Control

Accessories utilise the plug and play features of the ProScan system. These have been improved in ProScan III so that each stage's individual settings are stored on the stage, which complements the patented IST technology and enhances the performance of the ProScan range of stages. ProScan III defies obsolescence by utilising a user friendly, web downloadable, firmware upgrade.

For the most demanding imaging applications which require high accuracy, speed and repeatability, ProScan III uniquely provides the option to encode all motor axes.

Advanced Communications

The system includes fast RS232 (115200 baud) and true USB with HID capability communications, and the programmable TTL can control the movements of a stage, focus motor, filter wheels and shutters for fast analogue interfacing and camera control.



Interactive Control Centre

The Interactive Control Centre or (ICC) is capable of so much more than traditional microscope joysticks providing centralised manual control of all equipment. The screen provides positional feedback while the joystick, buttons and digipots control accessories such as: a stage, focus, filter wheels and shutters.

New features in the ICC allow the user to measure distances, label filter wheel positions with dye names (e.g., DAPI, FITC, etc.) and take fine control of the stage for intricate movements. This gives the user instant feedback as to what fluorophor the system is setup for and where the areas of interest are located on the stage. It also allows basic diagnostics of encoders, TTL and internal ProScan III settings, such as axis movement speed.

Modular System

ProScan III provides a modular approach to minimise the footprint of the controller. The cubic design provides stylish looks with a footprint of only 177x177mm. The base unit is designed to accommodate a 3 axis system, e.g., a stage and focus. Additional functionality can be added to the unit via modular sections which allow easy expansion. The ancillary box accommodates any extra functionality required, e.g., 3 filter wheels and 3 shutters.

Configured for your Needs

Any of the accessories can be controlled in either the main cube or the ancillary boxes, providing a system which is totally configurable. ProScan III can be expanded horizontally or vertically to accommodate increased functionality, easing the pressure on the limited space in modern labs.

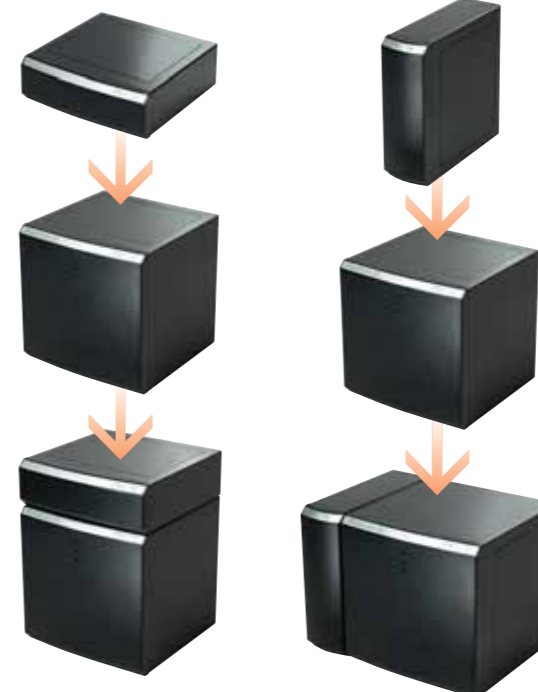


Build Up

Expand vertically to reduce the footprint on the precious desk space available.

Spread Out

Expand horizontally to fit under or on shelves or in rack mounted systems, the controller has a height of only 4U.



IST and Stage Specifications Explained

GB Patent No. 2411249 : US Patent No. 7330307

To enable IST, Prior measure the accuracy of every stage made, then by storing this data on the stage ProScan III can adapt the requested movements to enhance the performance of the stage.

For Full Mapping, implemented for larger stages, the frequency of measurements across the stage is increased to significantly improve the metric accuracy of these stages. This is ideal for tiling and image stitching applications.

Nomenclature

It is easy to be confused by figures, but here at Prior we pride ourselves on providing information on the true performance of our stages. This is a quick guide to the terminology used when describing accuracy and repeatability. When comparing figures you should compare like with like.

Metric Accuracy: The accuracy of the movement compared to a standard. For example, if the stage is asked to move 1mm how close to 1mm will it move? (Important for virtual slide scanning and tiling images).

Uni-directional Repeatability: This measures the ability of the stage to return to the same point when approaching from the same direction each time. (Important for OEM customers and multi-positional time-lapse experiments).

Bi-directional Repeatability: This measures the ability of the stage to return to the same point when approaching from any direction. (Important for multi-positional time-lapse experiments).

Directions (When facing the microscope):

X is left to right. Y is front to back.

Precision Motorised Stages



H101A Range
Stage for upright microscopes, providing a travel range suitable for well plates at 114x76mm. Stages can be configured with 2mm ball screws and 200 step motors for high speed applications or 1mm and 400 step motors for high accuracy applications. Both options can be fitted with high precision encoders. Includes IST for improved metric accuracy.

H117 Range
Stage for Inverted microscopes, providing a travel range suitable for well plates at 114x76mm. Stages can be configured with 2mm ball screws and 200 step motors for high speed applications or 1mm and 400 step motors for high accuracy applications. Both options can be fitted with high precision encoders. Includes IST for improved metric accuracy.



H138A Range
Stage for upright microscopes, providing an extended x travel range suitable for eight slides at 240x76mm. Stages can be configured with 2mm ball screws and 200 step motors for high speed applications and can be fitted with high precision encoders. Includes IST for improved metric accuracy.

H105A Range
Stage for upright microscopes, providing a large travel range suitable for 6 inch wafers at 154x154mm. Stages can be configured with 2mm or 5mm ball screws for high accuracy and high speed applications. Both options can be fitted with high precision encoders. (Now includes full mapping.)



HT Range
Stage for upright hardness testing microscopes, providing a range of travel ranges, 50x50mm, 100x100mm and 150x150mm suitable for a wide range of applications. Includes IST for improved metric accuracy.



H112 Range
Stage for upright microscopes, providing a large travel range suitable for 12 inch wafers at 300x300mm. Stages can be configured with 2mm or 5mm ball screws for high accuracy and high speed applications. Both options can be fitted with high precision encoders. (Now includes full mapping.)



H116 Range
Stage for upright microscopes, providing a large travel range suitable for 8 inch wafers at 255x215mm. Stages can be configured with 2mm or 5mm ball screws for high accuracy and high speed applications. Both options can be fitted with high precision encoders. (Now includes full mapping.)



Precision Stepper Motors

Quiet and precise stepper motors ensure exact positioning of the stage while the use of micro-stepping provides very smooth motion even at low speeds. A range of motors are available to allow both high accuracy and smooth motion at low speed plus high acceleration and speeds of up to 300mm/s.

Cast Aluminium Plate

Prior stages are precision machined from specially cast aluminium plates which are lightweight and provide excellent dimensional stability.

Wide Range of Specimen Holders

ProScan stages are available for a wide range of applications involving specimens such as slides, micro titre plates, Petri dishes, metallurgical samples and semiconductor wafers. Specimen holders are anodised black to provide excellent wear resistance. Custom designs are always considered.



Adjustable Limit Switches

The flexibility to reduce the travel range of the stage to match your application will avoid damaging collisions with the microscope. The limits are internal to the stage to provide a tamper-proof solution and datum point automatically referenced by the ProScan firmware.

Precision Ball Screws

High accuracy ground ball screws provide smooth and maintenance free motion. The pre-loaded re-circulating ball screw nuts ensure zero backlash. The whole ball screw assembly is connected to the motor with an anti-backlash nut. Ball screws of various pitch are available for each stage to optimise the stage for speed and accuracy.



Accessories

Accessories Controlled by ProScan™ III

Filter Wheels

The high speed filter wheel system delivers smooth operation and changes filter positions in as little as 50ms. There are two wheel options available: an 8 position (32mm diameter filter) wheel and a 10 position (25mm diameter filter) wheel. The filter wheels can be installed on most microscopes in the excitation or emission channels.

High Speed Shutters

The filter wheels can be used stand alone or combined with a fast shutter (10ms) to provide total light control. Adaptors are available to connect to most microscopes on the excitation, emission or brightfield locations.

Focus Drives

A range of easy to fit motorised focus mechanisms for accurate control of microscope focusing. Encoded focus and optical limit switches are also supported by ProScan III. Step sizes as small as 2nm give precise and repeatable positioning for the Z-axis. For high speed focus moves for stereo microscopes the focus can be driven up to 60 rev/s.

NanoScanZ

Prior NanoScanZ provides ultra fast piezo Z movement with 100um, 200um, 250um and 500um travel Z ranges. The NanoScanZ provides the ability to take multiple images at high accuracy (approx 1nm) at high frame rates (10Hz), providing the highly accurate fast focus solutions needed for Z-stacking or slicing and image fusion applications. The stages are compatible with Prior automated scanning stages to provide seamless integration. For manual stages adaptors are available.

Interactive Control Centre

The new ProScan III interactive joystick provides local control of accessories, including a stage, focus, filter wheels, shutters and the LumenPro range. Read back the position of the stage, focus, filter wheels and shutter from the ICC's screen. ProScan III is backwards compatible with ProScan II manual accessories.

ProScan™ III System Partners

Lumen 200

This cost effective solution provides a powerful 200W collimated illumination beam which is adaptable to most microscopes. The specially designed bulb lasts a staggering 2000hrs before a simple procedure allows for the replacement of the bulb.

The DC bulb is specially cooled by the unit to provide a controlled environment producing a very stable output, not only over the average time of experiments but over the lifetime of the bulb. The unit can be positioned away from the microscope as the flexible liquid light guide connects the Lumen 200 to the microscope. This protects the microscope from any heat or vibration from the Lumen 200.

Five position manual attenuation is provided for control of the light output. The Lumen 200 can be combined with existing filter wheels and shutters to provide a complete automated fluorescence solution.

Lumen 200Pro

The Lumen 200Pro fully automated version of Prior's Lumen 200 fluorescence illumination system combines the intense fluorescence light source of the Lumen 200 with Prior's

high speed motorised six position filter wheel and light attenuator. In addition to being more cost effective than purchasing individual components the remote location of the Lumen 200Pro ensures minimised vibration and thermal drift which equates to faster imaging.

Lumen 200 Options

A range of heat filters are available for the Lumen 200 and Lumen 200Pro which protect the liquid light guide from damaging wavelengths emitted by the Lumen bulb. The standard unit has a filter designed to suit general microscopy needs. Two more options are available; the L210 extends the output wavelength into the red for CY5.5 and CY7 dyes and the L220 extends the output wavelength range to enhance Fura dye use in the UV and CY7 in the IR.

Automated Slide Loading and Scanning

Prior's PL-200 Slideloader is compatible with the ProScan III system and most major upright microscopes, providing the ability to reliably load up to 200 slides automatically onto the ProScan range of stages. The system has a multitude of sensors to ensure the slides progress is tracked throughout the handling process. This ensures precious slides are delivered safely to the stage, time after time. The PL-200 is supported in most major image software packages and is supplied with a free software integration kit for OEM customers.

Fast Laser Automatic Focus

Prior LF210 provides a laser based auto focus system which can be installed on most microscopes to provide real-time auto focus. The LF210 is ideally suited to automatic semiconductor wafer inspection applications.



Specifications

Power	Universal Mains Input 110/240 VAC 50-60Hz	Stage Speed	Up to 300mm/s
Computer Interface	USB (HID or Virtual COM) RS232C	Step Size	From 0.01um for XY, 0.002um for Z
COM Port Communications Protocol	8 bit word, 1 stop bit, no parity, no handshake, baudrate options of, 9600, 19200, 38400 and 115400.	Repeatability (Focus/Stages)	Typically <1um
Controller Dimensions	Cube:Width, Height and Depth 177mm (ancillary box add 59mm)	Linear Scales	0.1um or 0.05um options available
Controller Weight	3kg (1kg for ancillary box)	Ball Screws	Zero Backlash, ground recirculation ballscrews, 1mm, 2mm, 4mm or 5mm options available.
		Limit Switches	Adjustable in X and Y Optical and mechanical available in Z

Branded, Special and OEM Systems



Made to Measure from Prototype to Manufacture

At Prior Scientific we control the design and manufacturing process for all of our automated microscope products. This way, we can be sure of offering the most flexible service.

This approach along with our commitment to customer service means that Prior Scientific is uniquely placed to provide complete systems to match your exact specifications. From branded products to entirely unique solutions Prior has the tools to provide for your needs.

Our design engineering department employs the latest in computer

aided 3D modelling along with many years experience in the design and manufacture of scientific instruments. It is here that quality and reliability are designed into our products. Advanced CNC machines and computer aided manufacturing systems are used to produce high quality components. In assembly, experienced instrument makers build complete stage and controller assemblies with care and attention to detail.

It is this blend of skills, experience and flexibility that have established Prior as one of the world's leading manufacturers of automated microscopy products and OEM systems.



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