PRIOR Scientific

WHERE VISION MEETS PRECISION

ProScan™ III

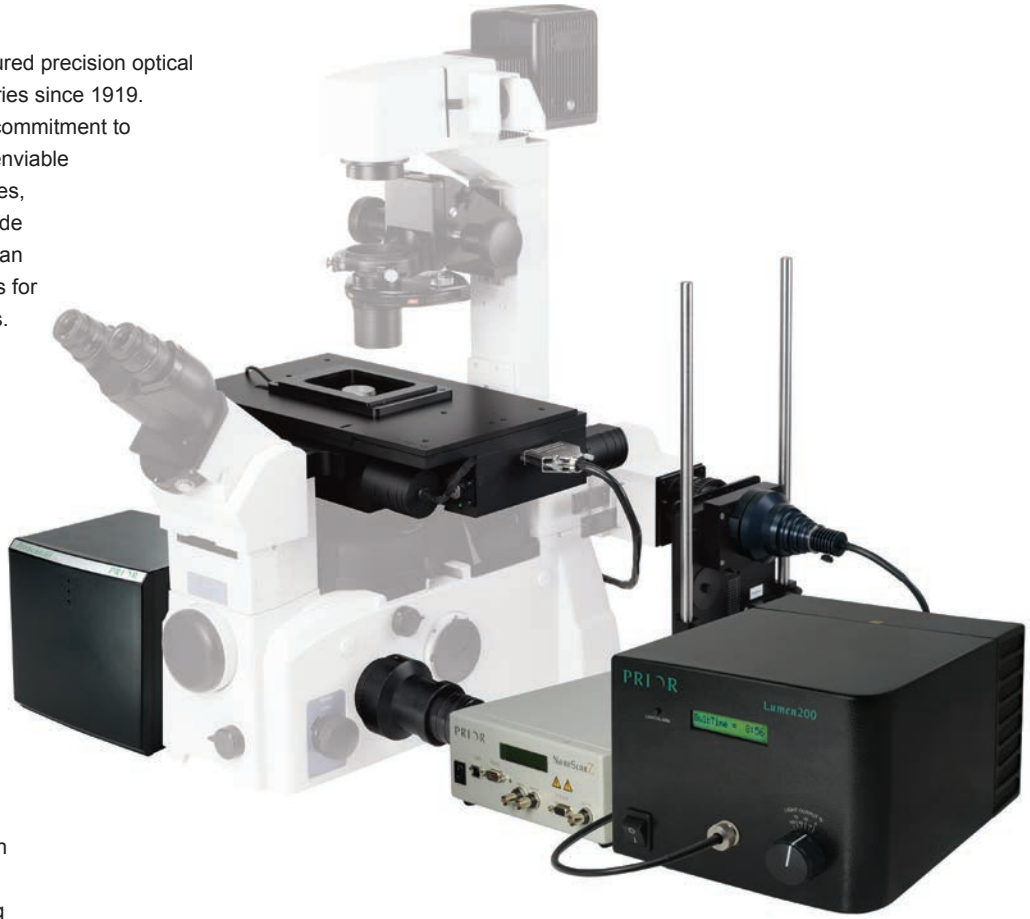
High Performance Flexible Microscope Automation Systems

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 are 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, filter wheels and 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 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 TLL can control the movements of a stage, focus motor, filter wheels and shutters for fast analogue interfacing and camera control.

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. (More than one ancillary box may be added.)

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.

Spread Out

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

Interactive Control Center

The Interactive Control Center or (ICC) is capable of so much more than traditional microscope joysticks providing centralized 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.

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 Motorized Stages

Precision Stepper Motors

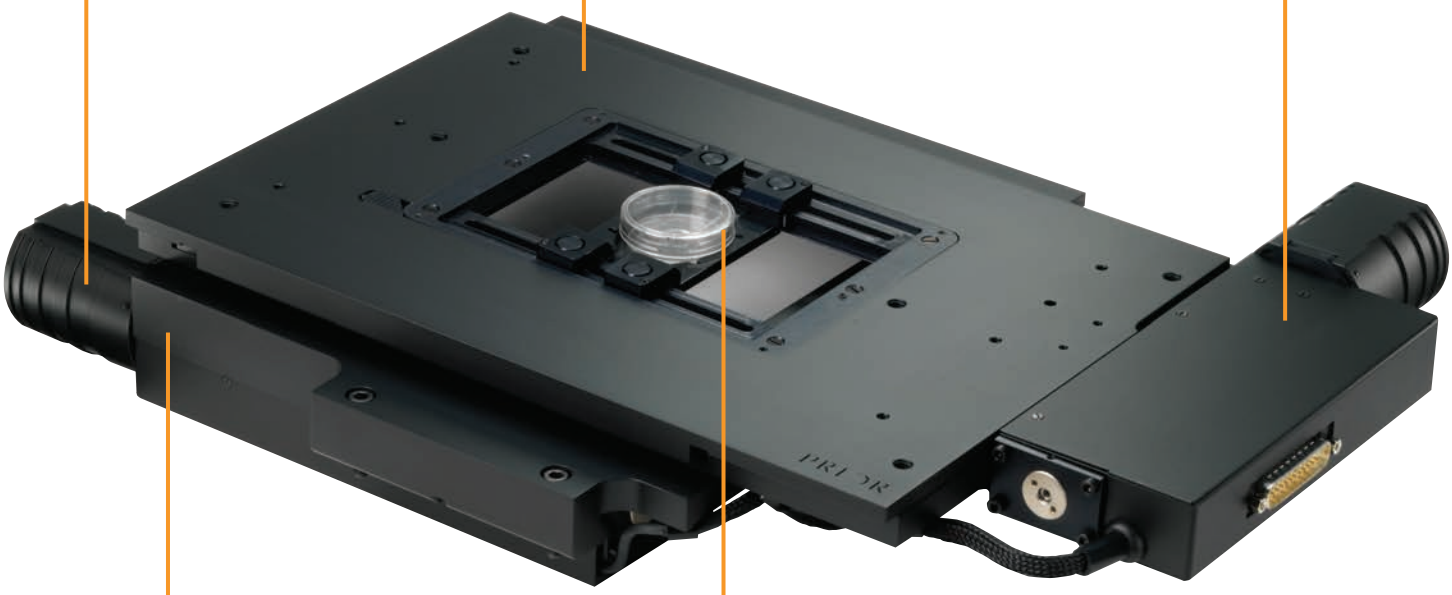
Quiet and precise stepper motors ensure exact positioning of the stage while the use of micro-stepping provides very smooth motion even at low speeds. A range of motors are available to allow both high accuracy and smooth motion at low speed plus high acceleration and speeds of up to 300mm/s.

Cast Aluminium Plate

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

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.



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.

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.

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.

H101F Flat Range

Ultra flat stage for upright microscopes, providing the same high specification as the established H101A series of stages. The H101F situates the sample at the highest point of the stage surface giving the maximum objective clearance possible.

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 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.

H105A Range

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

H112 Range

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

HT Range

Solid frame stage for reflected light applications such as hardness testing providing a range of travel ranges, 50x50mm, 100x100mm and 150x150mm suitable for a wide range of applications. Includes IST for improved metric accuracy.

H116 Range

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

Accessories

High Speed Shutters

Filter Wheels

Focus Drives

NanoScanZ

LF210

Accessories Controlled by ProScan™ III

Filter Wheels

The high speed filter wheel system delivers smooth operation and changes filter positions in as little as 55ms. 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 400µm travel Z range. 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.

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.

ProScan™ III System Partners

Lumen 200 Fluorescence Illumination System

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 200 Fluorescence Illumination System 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.

Lumen 200S Fluorescence Illumination System

All the benefits of the standard Lumen 200 but with the addition of an integrated high speed shutter. It can be controlled directly from the PC via USB, RS232 or TTLs, or via a ProScan or OptiScan controller with an active shutter port.

Lumen 200Pro Fluorescence Illumination System

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 motorized 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 minimized vibration and thermal drift which equates to faster imaging.

LED Illumination

Lumen LED

Prior Offers a choice of up to 10 LED modules which can be configured with a 2 or 4 LED combiner. Direct coupling to the microscope ensures maximum intensity with a 10,000+ hour lifetime each LED has a dedicated TTL for ultra fast switching. Compatible with the ProScan III control system

Lumen LED

Brightfield LED

Brightfield LED

The Brightfield LED illuminator provides all the advantages of LED illumination in a flexible package that can be fitted to most modern upright and inverted microscope systems. Instant on/off and simple intensity control make the Brightfield LED an ideal replacement for traditional halogen and mechanical shutter applications.

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.

Automated Well Plate Loading and Scanning

Prior's PLW20 Well Plate Loading System is compatible with the ProScan III system and with most major inverted microscopes. The PLW20 features a 20 well plate capacity in stainless steel racks for easy cleaning. Compatible with covered and uncovered well plates, the system fits all standard microtitre plates up to 19mm thick.

Motorized Z-Deck

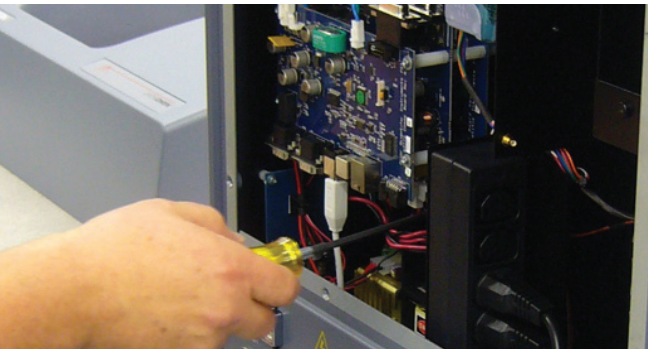
Compatible with the Proscan III system the Z-Deck quick adjust enables users to increase their productivity by allowing them to image multiple areas of interest with speed and precision. Compatible with most microscopes. Supported using the ProScan operating system and has a travel range of 65mm x 65mm and the ability to add micromanipulators at each side.

Pro Z Motorized Focus Columns

Pro Z Motorized Focus Column

Prior Scientific modular ProZ components offer a wide range of configurations to meet your Z focus and XY microscopy needs. Compatible with Prior ProScan and Optiscan control systems and Lumen and Lumen LED illumination systems. Three different stage mount options are available. A standard BX dovetail is available for basic reflected light applications. For transmitted light applications the ProZ Motorized Focus Column has options for both a brightfield/ oblique transillumination module that uses a tiltable sliding mirror or a full Koehler illumination module.

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.

ProScan™ III Specifications

Power	Universal Mains Input 110/240 VAC 50-60Hz
Computer Interface	USB (HID or Virtual COM) RS232C
COM Port Communications Protocol	8 bit word, 1 stop bit, no parity, no handshake, baud rate options of, 9600, 19200, 38400 and 115400.
Controller Dimensions	Cube: Width, Height and Depth 177mm (ancillary box add 59mm)
Controller Weight	3kg (1kg for ancillary box)
Stage Speed	Up to 300mm/s
Step Size	From 0.01um for XY, 0.002um for Z
Repeatability (Focus/Stages)	Typically <1um
Linear Scales	0.1um or 0.05um options available
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

Certificate No: FM 61600
Standard: BS EN ISO 9001:2000

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