Prior Scientific Help Guides and Installation Instructions

UPDATED 18 February 2016

Installing and Using Prior Software

Installing the software

Prior Scientific has developed its own software allowing the control of Prior products via USB or RS232 commands. Although many users will wish to incorporate our equipment into their own programs, using Prior software means that our products will perform at their peak, and that diagnosing the causes of problems may be easier. Our software, collectively called 'Demo Software', is freely available online. Commands for each product that can be entered into the computer are found in that product's manual. Set up instructions will differ slightly between different versions of Windows. Please do not hesitate to contact Prior Scientific at uksales@prior.com for further advice and support.

Ensure that you read the manual of the product(s) in use in addition to this guide to ensure that the product is used effectively and safely.

The 'Control Demo' software is a GUI based program allowing control of the ProScan and OptiScan series of controllers. Prior Terminal is a command link based program in which commands are directly entered – these commands can be found in the relevant product manual. This demo software also includes other pieces of software – for example, controlling the Well Plate and Slide Loaders. These programs are not covered in this manual and are covered in the respective product manuals.

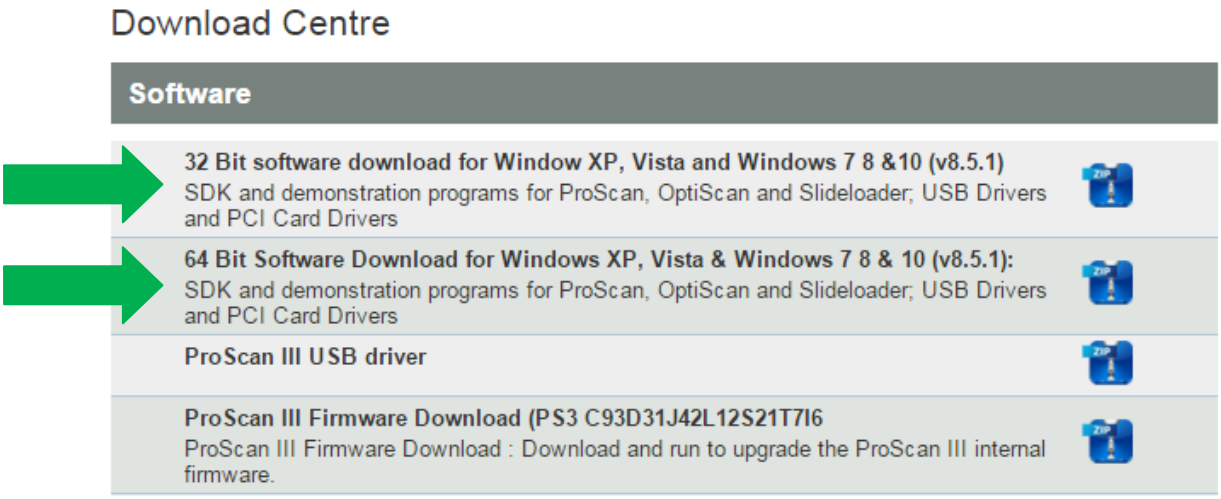
Installing the software is simple.

Go to www.prior.com and click on the image directly above 'Prior Scientific Ltd'. This takes you straight to the UK site.

Go to 'Download Centre'.

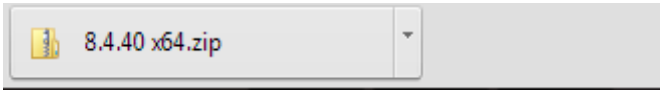
Go to 'Software'.

Depending on your system, select either "32 Bit Software Download ..." or "64 Bit Software Download"

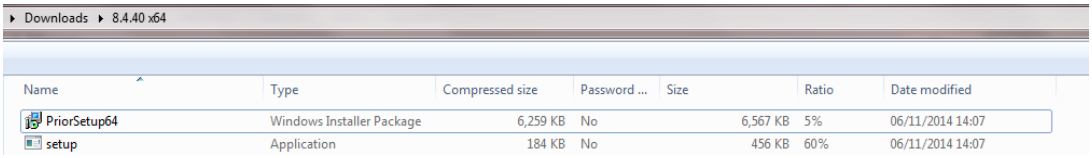


Click the Zip icon next to the software you wish to download.

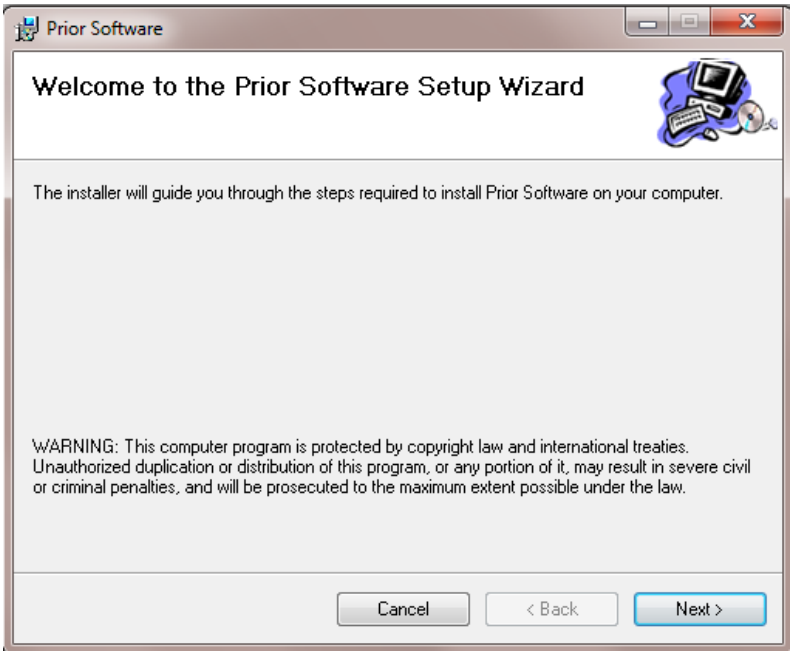
It should automatically download.



Click on it and open.



Double click on 'setup' and ignore any warning messages.



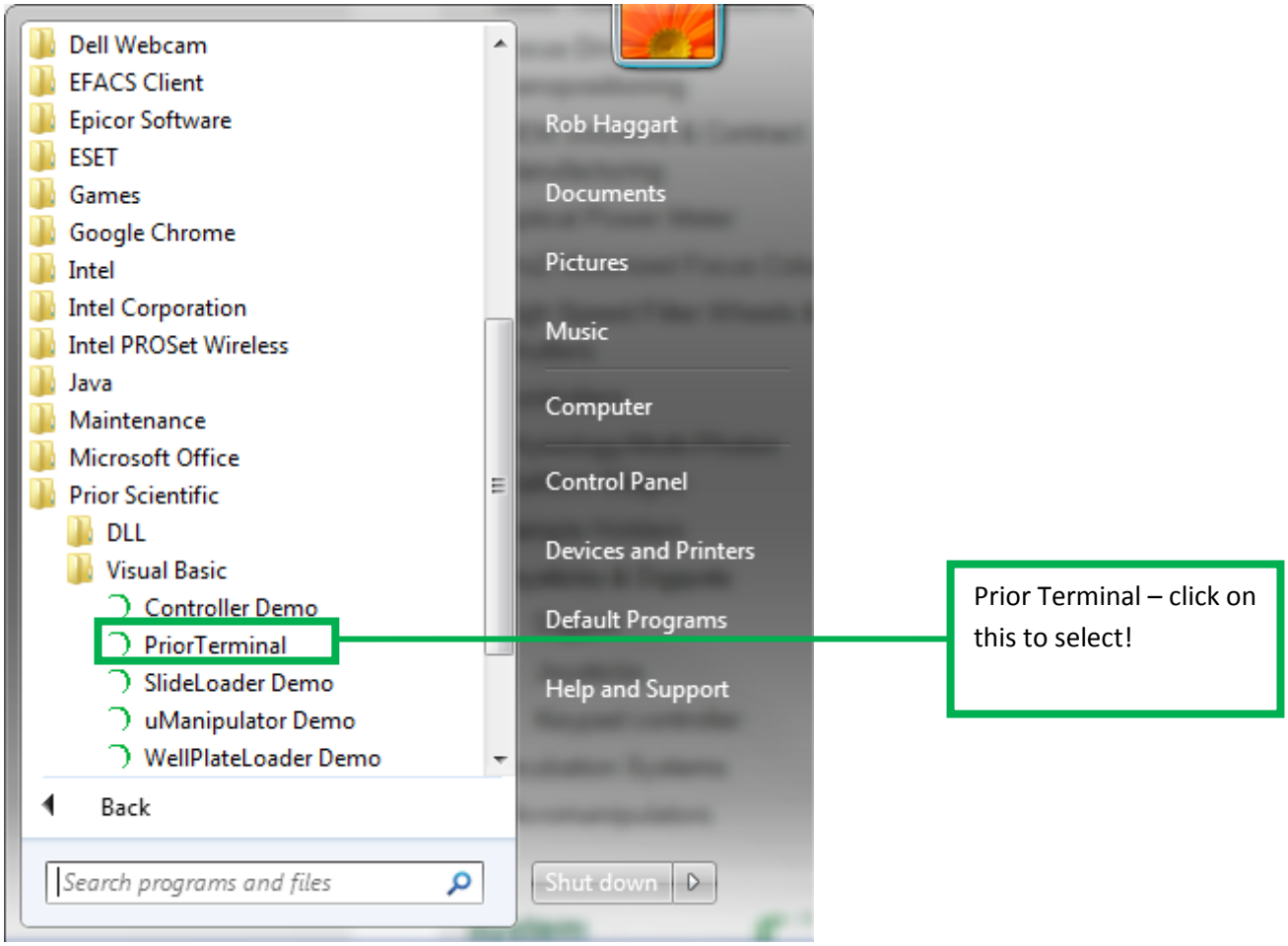
Continue through the installation following the onscreen instructions. The software should install within five minutes. You will get a message informing you that the software has successfully been installed.

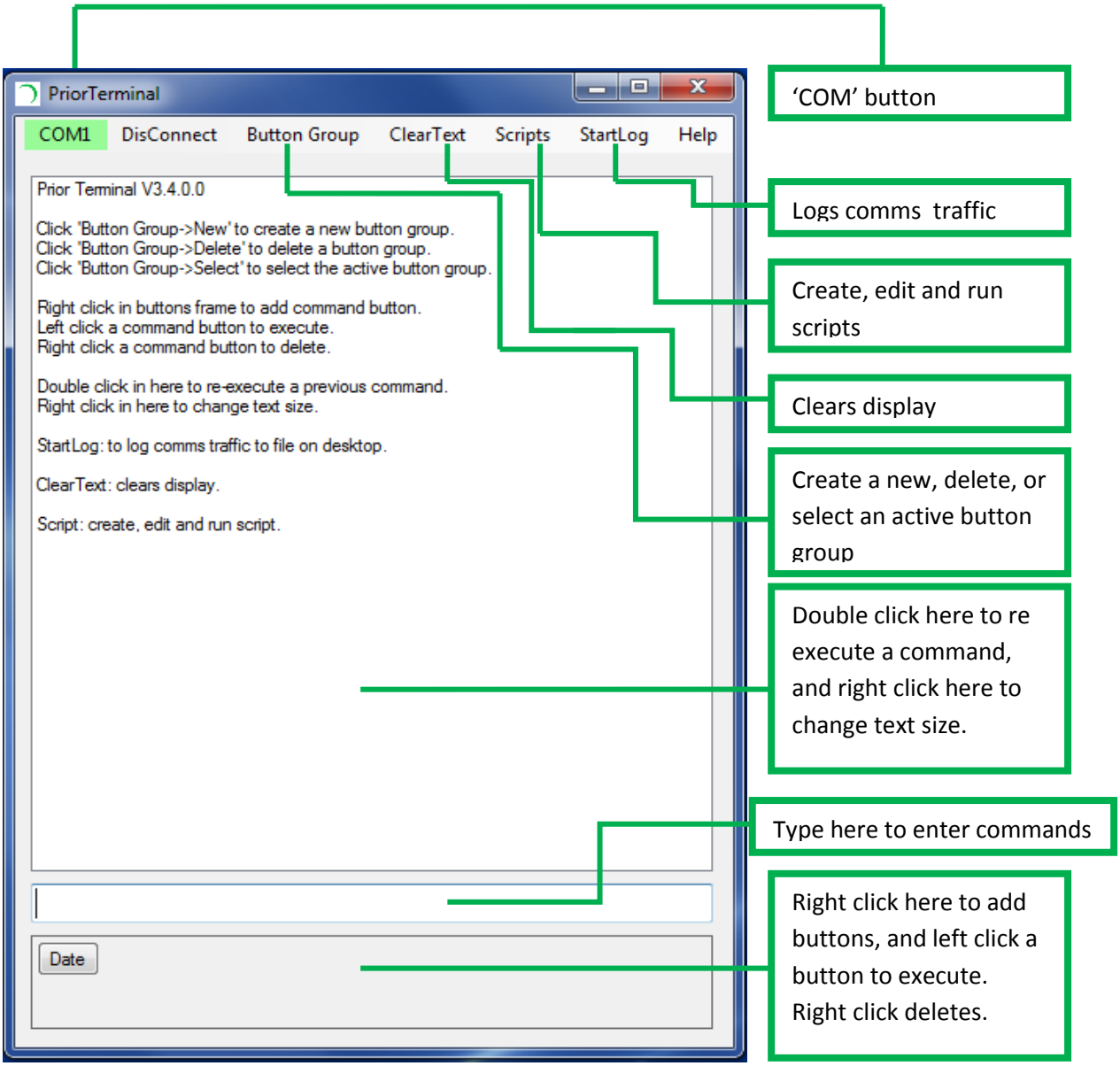
By installing the 'Demo Software', it should now be possible to simply connect your computer and the product in question.

Ensure that the device is connected via USB. Note that, in some rare cases, it may be necessary to use the RS232 output on the device and then utilise a RS232/USB convertor.

Prior Terminal

Click on the Windows Start menu and go to ‘All Programs’. Go to ‘Prior Scientific’ and select ‘Visual Basic’. From this, go to ‘Prior Terminal’ and open that program. Other programs are also available. The ‘Controller Demo’ will be covered later in this guide. Since the other programs are specific to a particular product, instructions for these are covered in the respective manuals.





It is important to select the correct COM Port to allow the system to function. This is done by clicking 'Com', which also allows the baud rate to be changed. The default setting of the controllers is 9600; however some software can change this. Once Prior Terminal is open, to list what hardware is connected type '?'. From the product manual you should see the correct response this should generate. For example, from the ProScan III one might get the response:

PROSCAN INFORMATION
DSP_1 IS 3-AXIS STEPPER VERSION 0.0
DSP_2 IS 3-AXIS STEPPER VERSION 0.0
DRIVE CHIPS 111111
JOYSTICK NOT FITTED
STAGE = H101AENC
FOCUS = FB20X
FOURTH = NONE
FILTER_1 = NONE
FILTER_2 = NONE
SHUTTERS = 001
LED = 0000
TRIGGER = NONE

INTERPOLATOR = NONE
AUTOFOCUS = NONE
VIDEO = NONE
HARDWARE REV F
END

All commands must be terminated with a carriage return e.g the ENTER key .

If this generates the correct response everything is connected properly. If not, try the following.

Ensure that the product is on, and that the connections between the computer and product are secure.

Try changing the baud rate.

You might be able to swiftly resolve the problem by clicking 'Com' and altering the port. If there are a large number of ports, go to Start Menu > Control Panel > System. Open Windows Device Manager to identify the correct port.

For older ProScan devices, the correct port should be labelled 'Prior Communications Port'. For more recent PS3 or ES11 devices equipped with FTDI, or connections via a RS232 to USB convertor, the port will be labelled as 'USB Serial Port'. Ensure that this is the port selected.

For older ProScan devices, a cause of a failure to connect could be the drivers not being installed. When first connecting, Windows Device Manager may prompt for the driver. Go to Control Panel > Systems > > Device Manager. Scan for hardware changes, select 'Prior Virtual COM port'. Right click 'Update driver' and select the correct driver. The driver will be located in the 'Prior Scientific' program files as it is automatically included in the Prior Terminal download (C:\Program Files\Prior Scientific\Prior Software (assuming the program is in the C Drive)). Generally, the driver to be selected is the driver for that product, e.g. a ProScan III driver.

(Note that newer versions of the ProScan III should not have this problem as the drivers are bundled with Windows. In the unlikely event that the drivers do not install automatically go to http://www.ftdichip.com/Drivers/VCP.htm to download.)

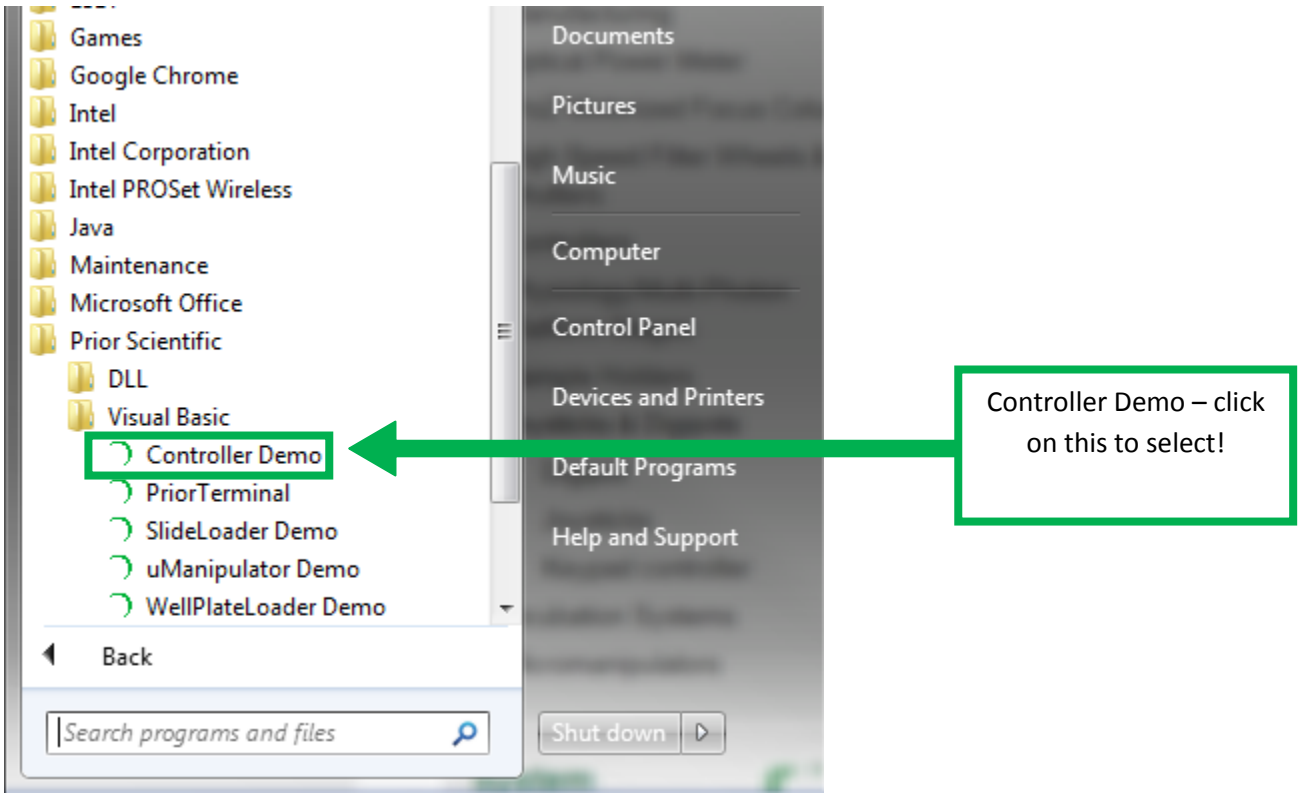
Ensure that this is the port selected by Prior Terminal by clicking the 'Com' button. If this fails to resolve the problem then it is probably the case that the driver is not installed properly. Repeat the above process. If this fails, then please contact Prior Scientific.

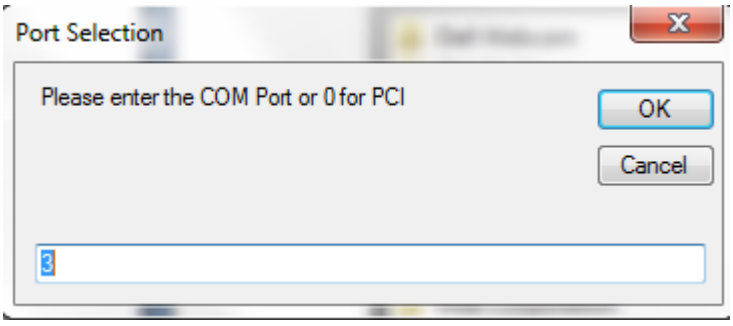
Note that Legacy ES9/ES10/PS2 controllers use a Cypress USB chip set that is no longer supported by Windows. It is recommended in this case to use an off the shelf USB-to-RS232 adapter cable.

Controller Demo

The ProScan III can also be controlled using the 'Controller Demo' software, allowing a user to use a GUI to finely control the ProScan III and its associated peripherals. The OptiScan III can also be controlled by this system.

Select the controller demo using the Windows Start Menu. Go to 'All Programs'. Go to 'Prior Scientific' and select 'Visual Basic'. From this, go to 'Controller Demo' and open that program.

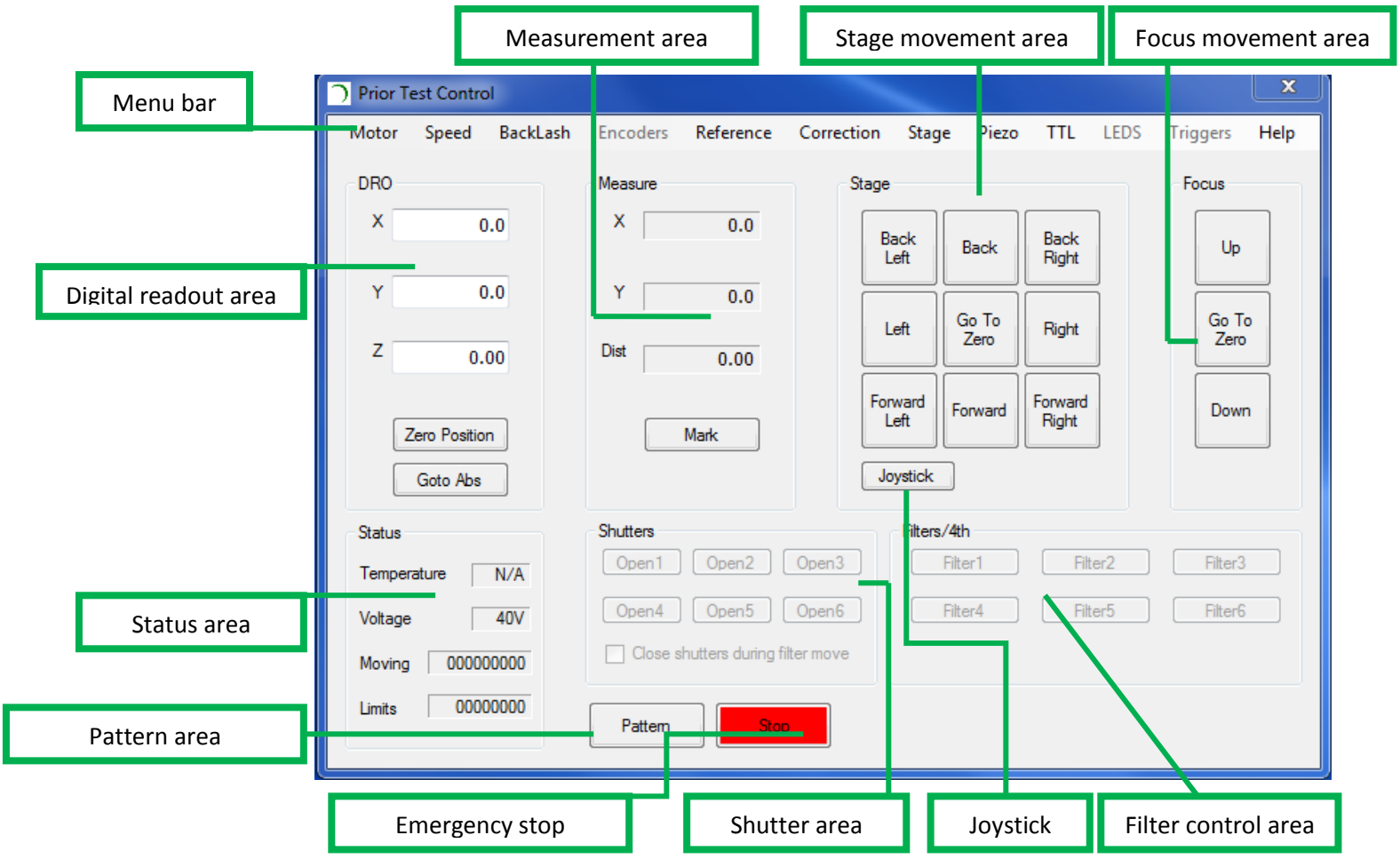




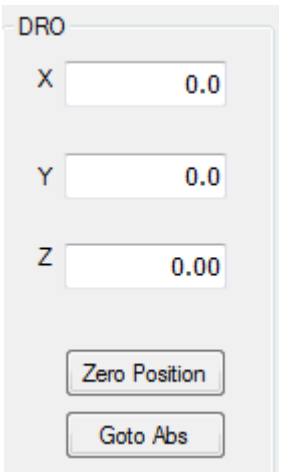
See above for advice on selecting the correct port, installing drivers, etc.

The following screen will be displayed once the correct Port is entered.

Only attached accessory sections will be active, e.g., if there are no shutters all of the Shutter buttons in the Shutter area will be light grey and inactive.



See below for information on how to use the different menus in this software.



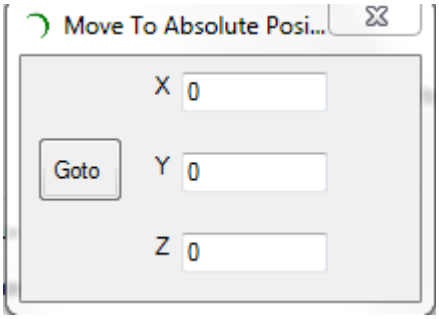
X is the X position (in microns)

Y is the Y position (in microns)

Z is the Z position (in microns, if the UPR is set correctly for the microscope)

Zero Position Button: Zero's all three positions, all previous positional information is lost.

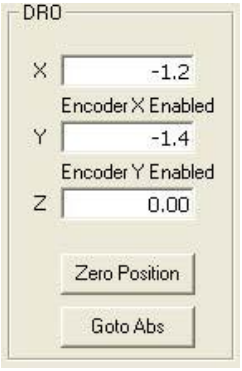
Go to Abs Button:



Type the X Y and Z position you require and Press 'Goto'.

Moves the X Y and Z to the absolute X Y and Z position.

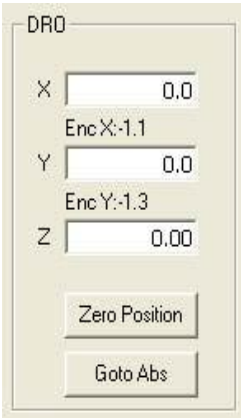
Digital Readout with Encoders:



X value using encoder (Based on the encoder settings)

Y value using encoder (Based on the encoder settings)

No z-encoder fitted, Z position. (in microns, if the UPR is set correctly for the microcope).



Digital Readout with encoder fitted but disabled:

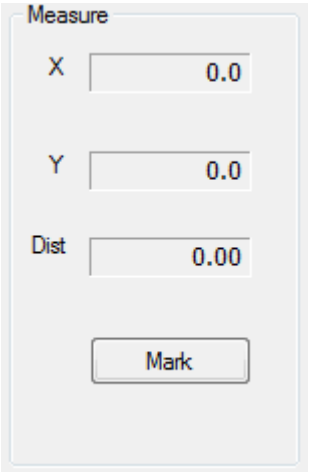
X is the X position (in microns)

EncX: X encoder position

Y is the Y position (in microns)

Enc Y: Y encoder position

Z is the Z position (in microns, if the UPR is set correctly for the microscope)



Measurement Area:

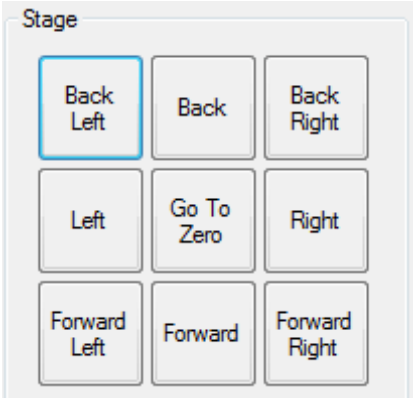
X distance from marked position to current position.

Y distance from marked position to current position.

Diagonal distance from marked position to current position.

Click 'Mark' to make current position marked position.

Stage move area:



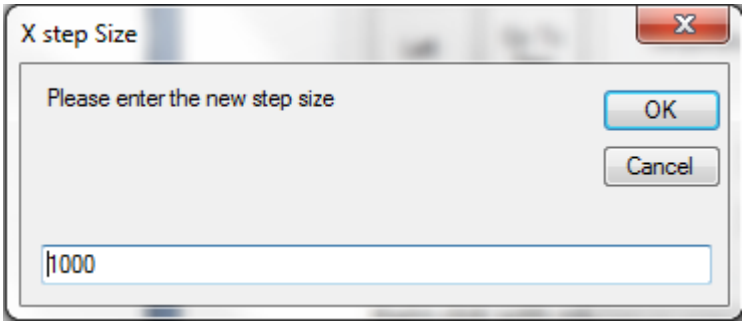
Click buttons to move stage set distances (default 1000um).

Back, Forward (Y)

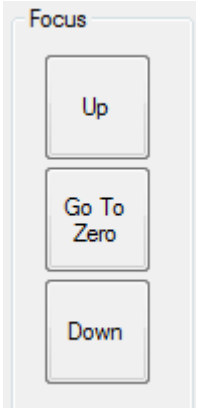
Left, right (X)

Right click with mouse on one of the buttons to set the distance travelled.

Type in the step size (distance travelled) in microns and click ok.

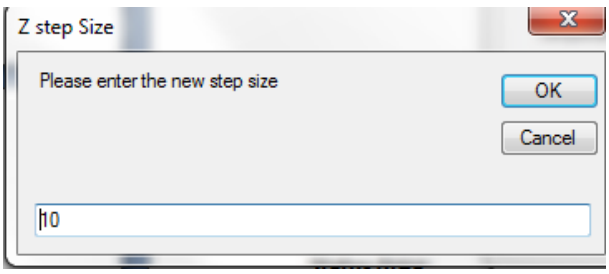


Focus Move Area:



Click buttons to move focus set distances (default 10µm).

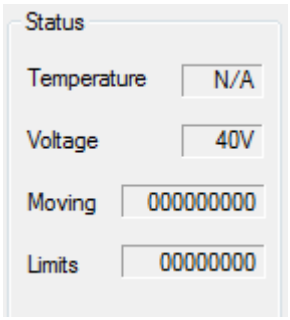
Go To Zero: move the focus to absolute zero.



Right click with mouse on either ‘up’ or ‘down’ to set the distance the focus will travel.

Type in the step size (distance travelled) in microns and click ok.

Status Area:



Temperature: Chip temperature is displayed if available.

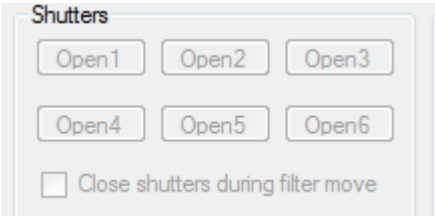
Voltage: Drive voltage is displayed.

Moving: Displays nine digits, one for each axis, 0 if the axis is stationary and 1 if it is moving.

All digits are always displayed in the following order: F6,F5,F4,F2,F1,F3/A,Z,Y,X. 0010011 indicates the Filter 1, X and Y are moving, for example.

Limits: Displays eight digits, one for each end of each axis, 0 is not active 1 is limit active. All digits are always displayed in the following order: A-, A+, Z-,Z+,Y-,Y+, X-,X+.

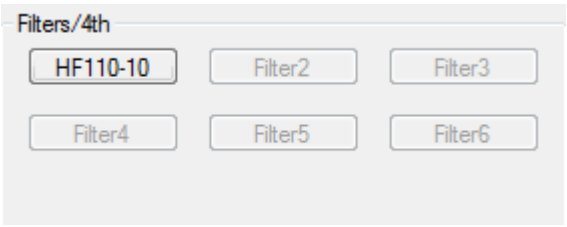
Shutters Area:



Click the appropriate button to Open or Close an attached shutter. If the button is greyed out the shutter is not detected.

Check the Close shutter during filter move to close all shutter when any attached filter wheel is moved.

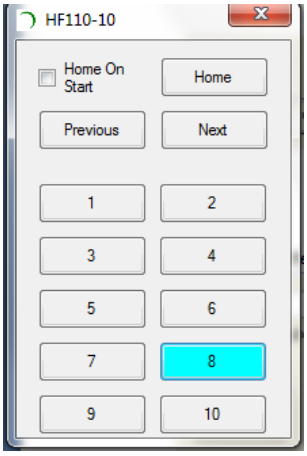
Filters/4th Area:



Click the appropriate button to open another window to access the Filter Wheel, Lumen Attenuator ('LLG Shutter'), or 4th Axis Accessory ('Theta').

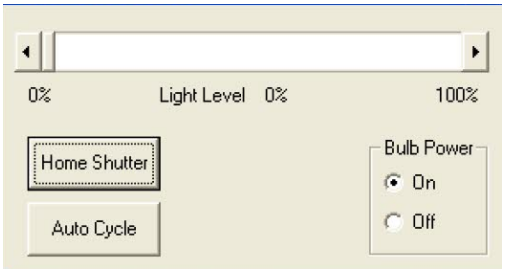
Greyed out buttons show that no accessory is detected.

Filter Wheels:



Click 'Next' to move the next filter wheel position. Click 'Previous' to move the previous filter wheel position. Click 'Home' to home the Filter wheel. Check the 'Home on start', to activate the home on startup feature which will automatically home the filter wheel when the ProScan unit is powered on.

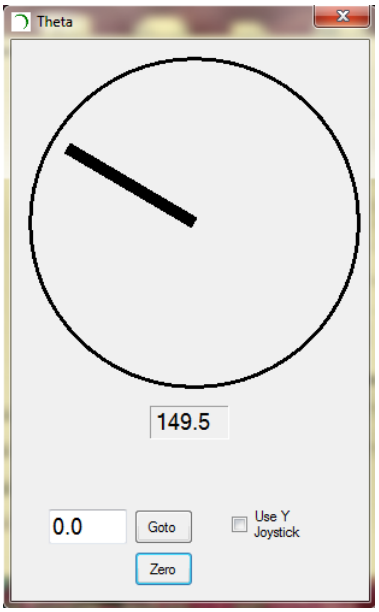
Lumen Attenuator:



Use the scroll bar to set the light output level from 0 to 100%.

Click the 'Home Shutter' to home the shutter; this should be done on start-up.

'Auto Cycle', click to automatically cycle the unit through 0-100% light output, Click cancel to stop.
Bulb Power: Switches entire Lumen On/Off



4th Axis – Theta:
Displays the position of the theta insert or stage axis.

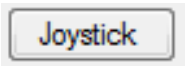
Type a angle position 0-360 degrees into the Goto box and click Goto to move the axis to that angle.

*
Check the 'Use Y Joystick box' to enable the Y axis of the Joystick to be used as the Theta controller.

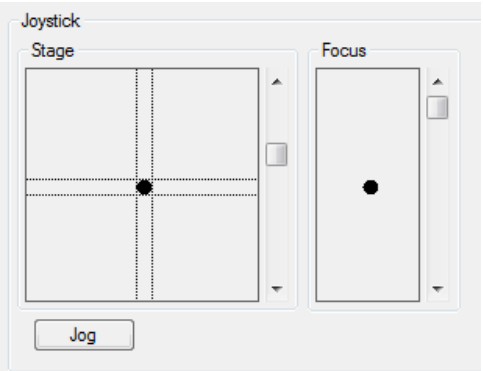
Buttons:

Stop: Press this button to stop all axis immediately.

Pattern: Click the 'Pattern' button the launch Pattern Manager.

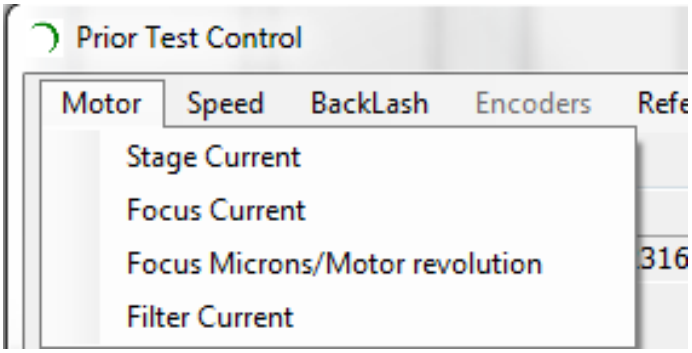


Joystick: Click Joystick to launch the Joystick windows.

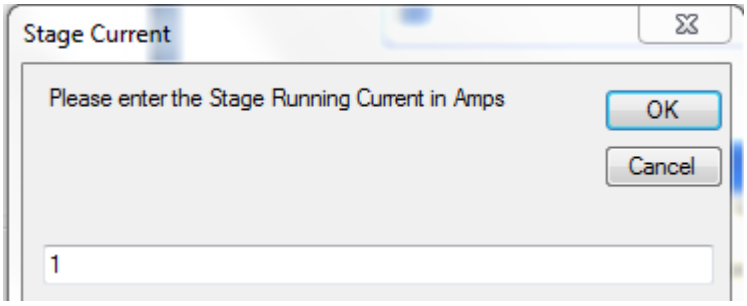


Drag the black ball to make the axis move.

Menu Functions:



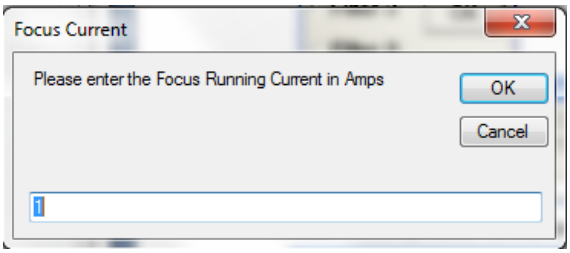
Stage Current:



Sets the running current for the motors on the stage between 0 and 1.5Amps.

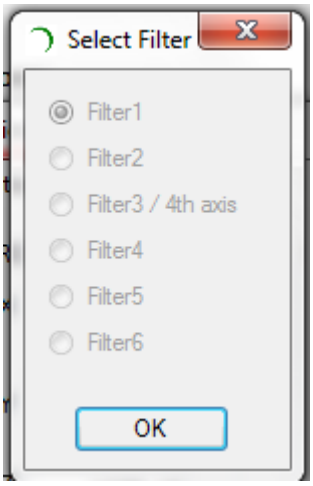
WARNING: Changing this value may damage your motors.

Focus Current:



Sets the running current for the motors on the focus between 0 and 1.5Amps. **WARNING**: Changing this value may damage your motors.

Filter Current:

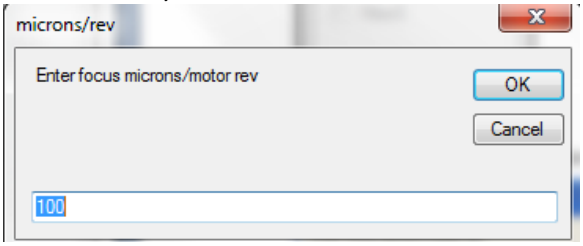


Select the filter wheel axis you would like to change the drive current for and click OK.

Sets the running current for the motors on the filter wheel axis between 0 and 1.5Amps

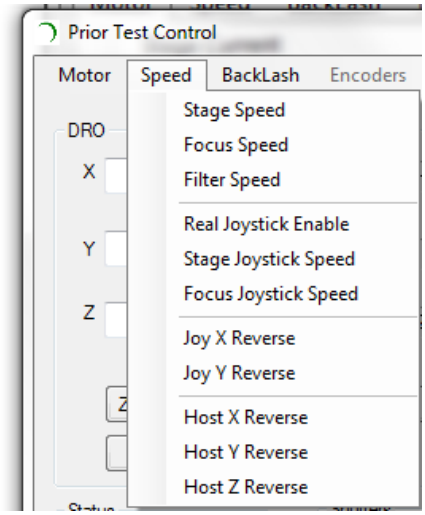
WARNING: Changing this value may damage your motors.

Focus microns/motor revolution:

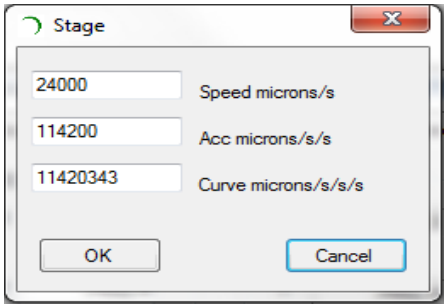


Enter here the number of microns the microscope focus moves when the fine focus knob is rotated 1 revolution.
This enables the micron value in the display to be related correctly to the attached microscope.

Speed Menu:



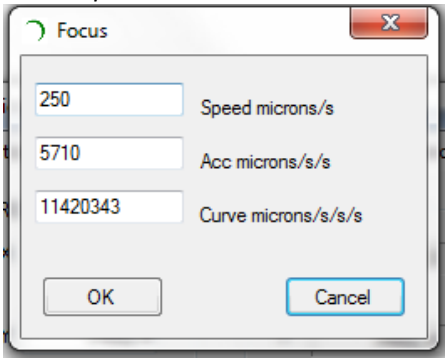
Stage Speed:



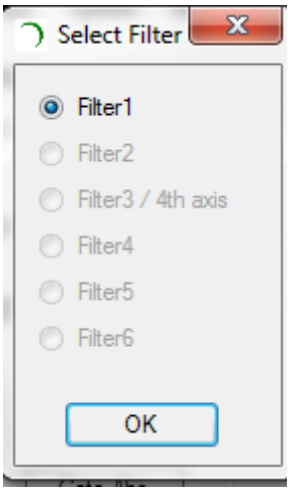
Changes the intrinsic characteristics of the stage. Speed is in micro steps per second. Acceleration in micro steps per second per second

WARNING: Stage may stall under certain settings.

Focus Speed:



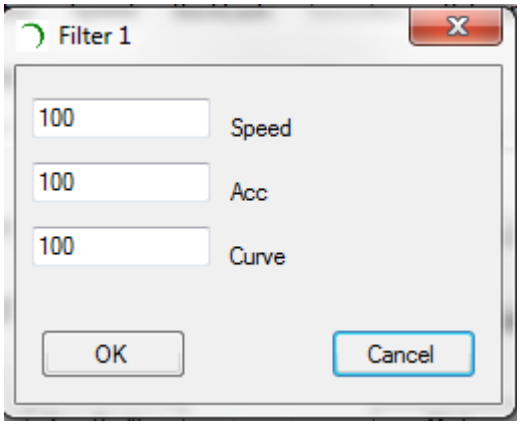
Changes the intrinsic characteristics of the focus. Speed in micro steps per second. Acceleration in micro steps per second per second
WARNING: Focus may stall under certain settings.



Filter Speed:
Select the filter axis you wish to change.

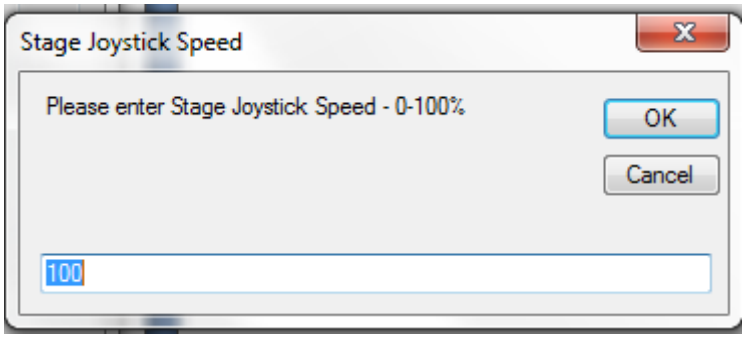
Changes the characteristics of the selected filter axis. Speed, 1-100%.

Acceleration 4-100%
Curve (See S-Curve in Appendix D) 1-100% WARNING: Filter axis may stall under certain settings.



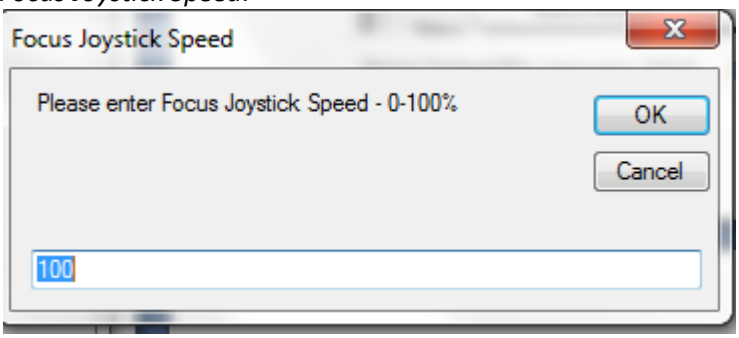
Joystick Enable: Enables or Disables Joystick, check to enable.

Stage Joystick Speed:



Enter the % speed from 0-100% for the joystick to move the stage.

Focus Joystick Speed:



Enter the % speed from 0-100% for the joystick to move the focus.

Joy X reverse: Check to reverse the direction of the X axis under joystick control.

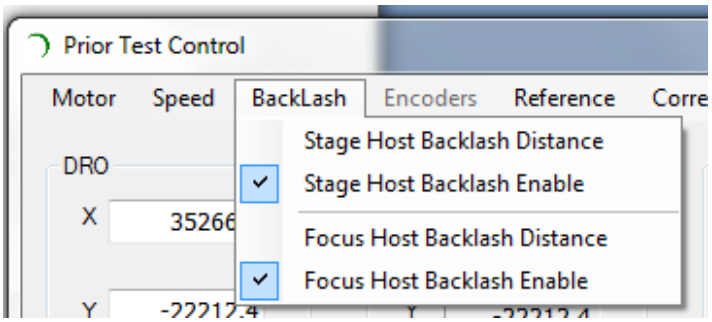
Joy Y reverse: Check to reverse the direction of the Y axis under joystick control.

Host X reverse: Check to reverse the direction of the X axis under computer control.

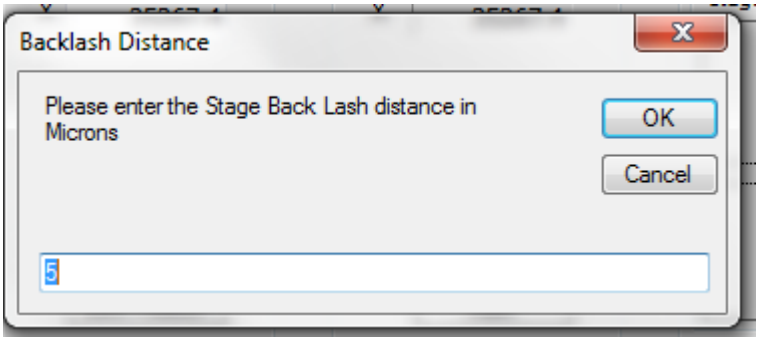
Host Y reverse: Check to reverse the direction of the Y axis under computer control.

Host Z reverse (Focus): Check to reverse the direction of the Z (Focus) axis under computer control.

Backlash Menu:



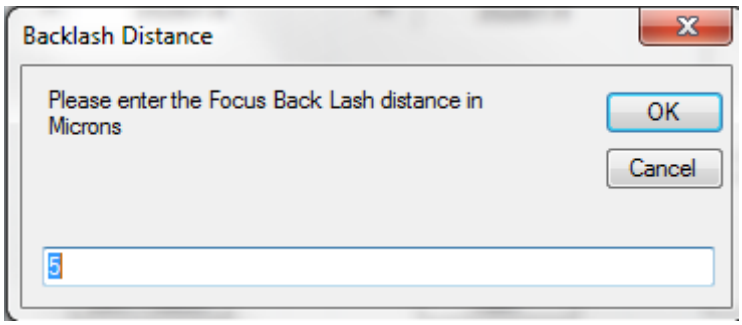
Stage Host Backlash Distance:



Sets the distance the stage will move when under computer control and performing the backlash correction. Input the number of microns required.

Stage Host Backlash Enable: Check this to enable the backlash feature for computer control on the stage.

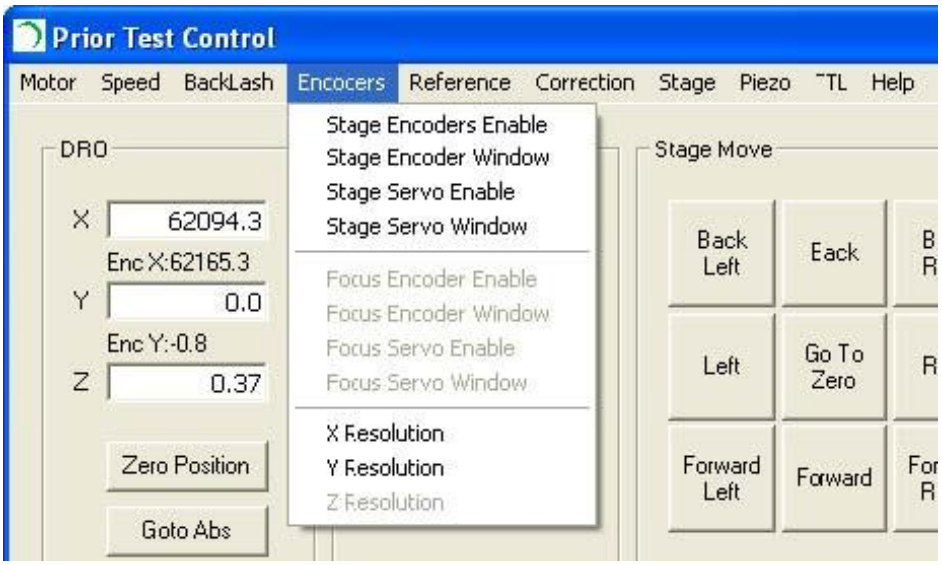
Focus Host Backlash Distance:



Sets the distance the focus will move when under computer control and performing the backlash correction. Input the number of microns required.

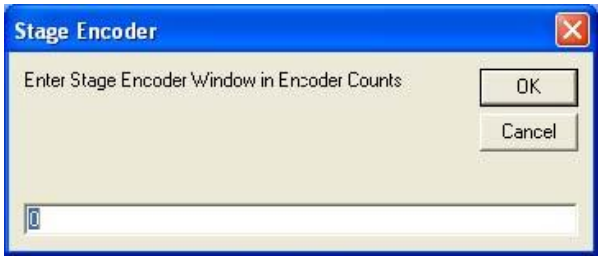
Focus Host Backlash Enable: Check this to enable the backlash feature for computer control on the focus axis.

Encoder Menu:



Stage Encoders Enable: Check this to enable the encoders to function with the stage.

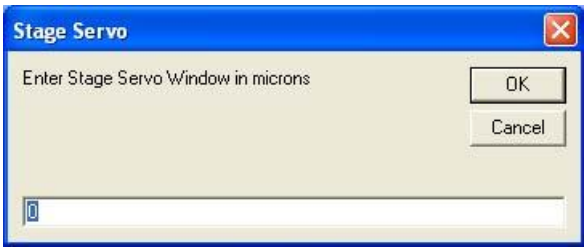
Stage Encoder Window:
If encoders are enabled the controller will move the stage to an encoder position. The encoder window is the number of encoder counts away from this position the system can be. If the encoder window is set too small the system may move continually while searching the exact position requested.



Stage Servo Enable:

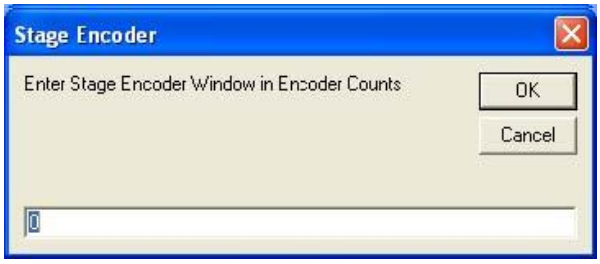
Check this to enable stage servo. This makes the stage attempt to stay at the programmed position. Use this function to overcome drift in time-lapse experiments.

Stage Servo Window:



When in servo mode the controller will attempt to keep the stage at a particular position. The servo window is the number of encoder counts the stage can move before the controller will respond and correct the position.

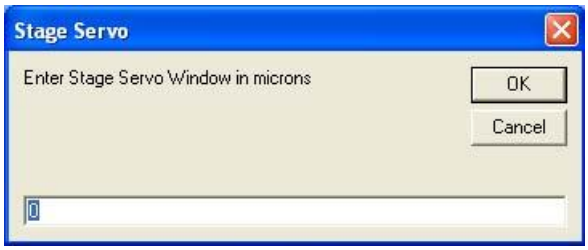
Focus Encoders Enable: Check this to enable the encoders to function with the focus.



Encoder window: If encoders are enabled the controller will move the focus to an encoder position. The encoder window is the number of encoder counts away from this position the system can be. If the encoder window is set too small the focus may move continually while searching the exact position requested.

Focus Servo Enable: Check this to enable focus servo. This is make the focus attempt to stay at the programmed position. Use this function to overcome drift in time-lapse experiments.

Focus Servo Window:



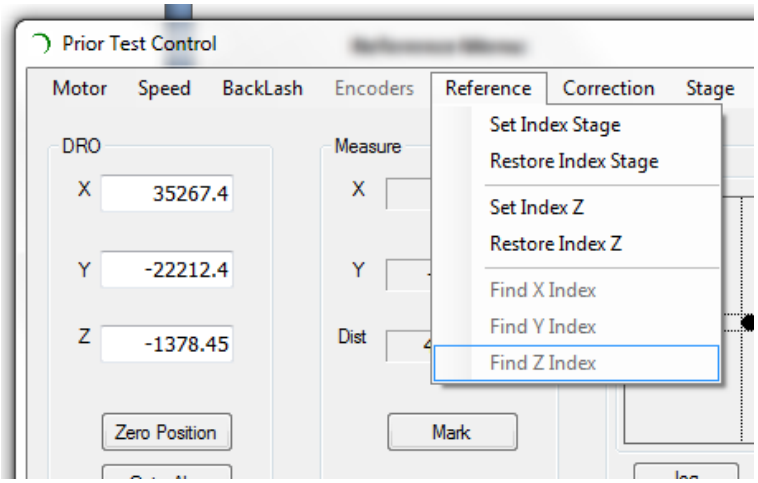
When in servo mode the controller will attempt to keep the focus at a particular position. The servo window is the number of encoder counts the focus can move before the controller will respond and correct the position.

X Resolution: Sets the encoder resolution for the X axis to determine the micron number displayed in the DRO. Use negative number to reverse the direction if the encoder is reversed.

Y Resolution: Sets the encoder resolution for the Y axis, this determines the micron number displayed in the DRO. Use negative number to reverse the direction if encoder reversed.

Z Resolution: Sets the encoder resolution for the Z axis, this determines the micron number displayed in the DRO. Use negative number to reverse the direction if encoder reversed.

Reference Menu:



Set Index of Stage: Unencoded: Moves stage to X+ and Y+ limits (Forward and right) and sets position as 0,0.

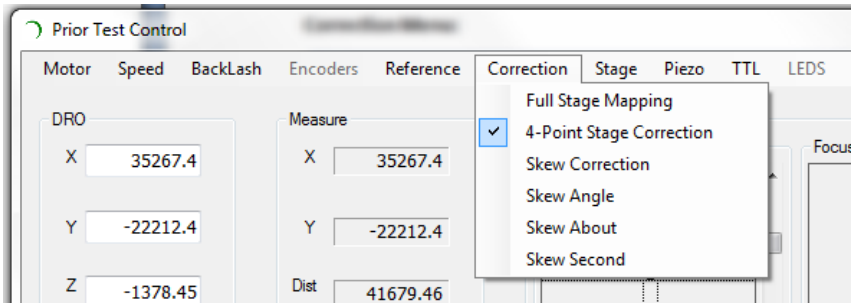
Encoded: Moves stage to X+ and Y+ limits, (Forward and right) and sets motor count to 0, then returns the stage to reference points on encoders and set position 0.

Restore Index of stage: Completes a Set Index of Stage move then returns the stage to the position it was originally at.

Set Index Z (Requires Z limits): Moves the focus to Z+ limit and sets motor count to 0.

Restore Index of Z: Completes a Set Index of Z then moves the focus to the position it was originally at.

Correction Menu:



Full Stage Mapping: Check to enable Full stage mapping. (Set Stage Index must be complete on startup and stage must be enabled with All point mapping).

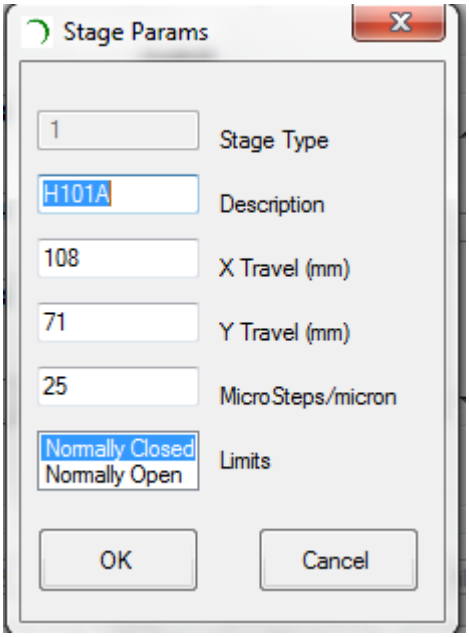
4-point Stage Correction: Check to enable IST stage correction.

Skew Correction: Enables Basic Skew correction using the parameters from Skew Angle, Skew About and Skew Second.

Skew Angle: Skew the stage by the angle inputted.

Skew About: Skews the stage between about this point with the above angle.

Stage menu:

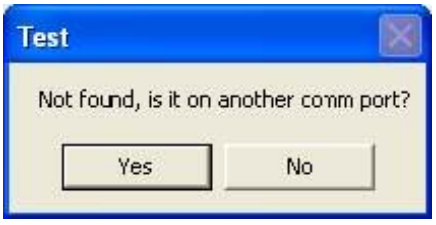


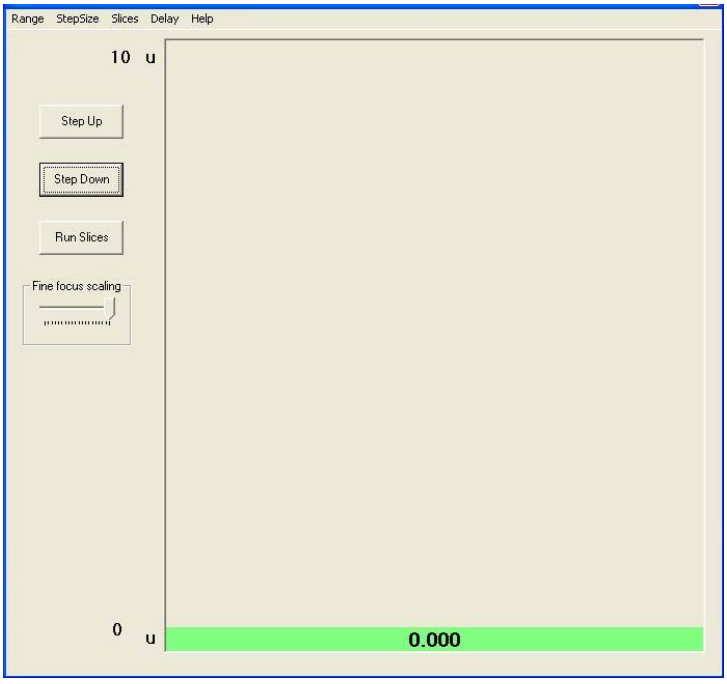
Displays information about the stage attached.

Piezo Menu:

This launches the piezo menu.

If the Piezo drive is daisy chained from the PS3 controller then it will be connected to immediately. If it is attatched to the computer via another COM port, click 'Yes'.





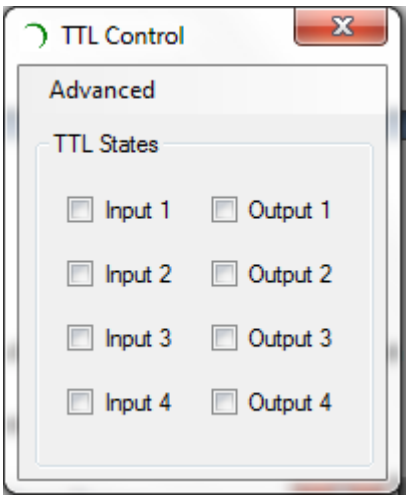
Range: Reports the Range of the Piezo.

Step Size: Sets the step size for the Step up and Step down buttons.

Slices: Set the number of slices for the run slices button.

Delays: Sets the delay between the slices for the run slices button.

Run Slices: Runs a program stepping though a number of equal slices between the position the stage is at to zero. Click into the area above the green banner and drag to mouse to make the piezo stage move. Use the Fine Focus scaling to increase and decrease movement speed.



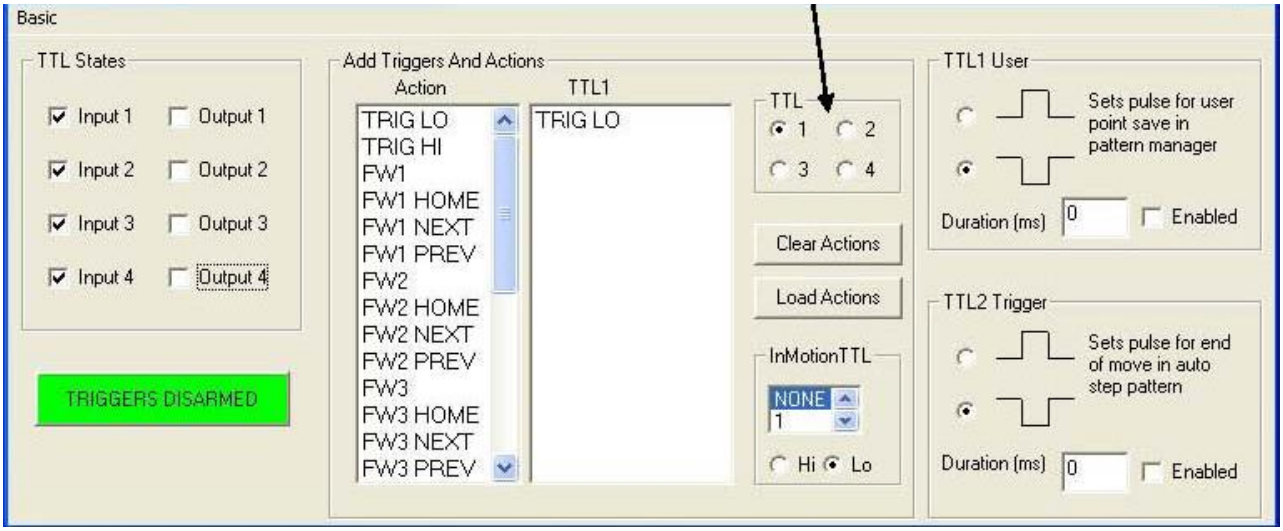
TTL Control Menu:

For basic TTL control and indication use the basic screen, check the boxes to output high signals and uncheck them to output low signals. The inputs will indicate if the signal is high (checked) or low (unchecked).

Advanced TTL control:

This allows the programming of the auto response TTL system. Use this to trigger events via TTL.

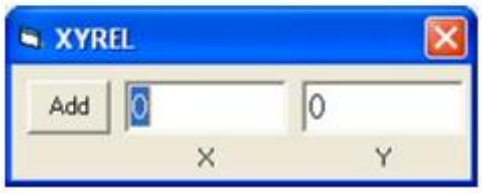
Supported Functions are:
Lumen Attenuator, move to % open.
Filter wheels: move to Next, Previous, Home and Move to position.
Shutter: Open and Close.
XYZ axis: Relative and Absolute Moves.
NanoScanZ (Piezo): Relative and Absolute Moves



Ensure triggers are disarmed. (Button should be green). Clear actions using Clear Actions button for each individual TTL channel. Select the TTL channel you would like to program (only program the TTL lines required). TTL can be used via the ProScan either via two modes – a 'High' TTL pulse or a 'Low' TTL pulse. . This allows more precise ordering of events than just associating a particular action with a TTL pulse. By default, TRIG LO (TTL Low) is displayed in the TTL window. If you want TTL High select TRIG HI.

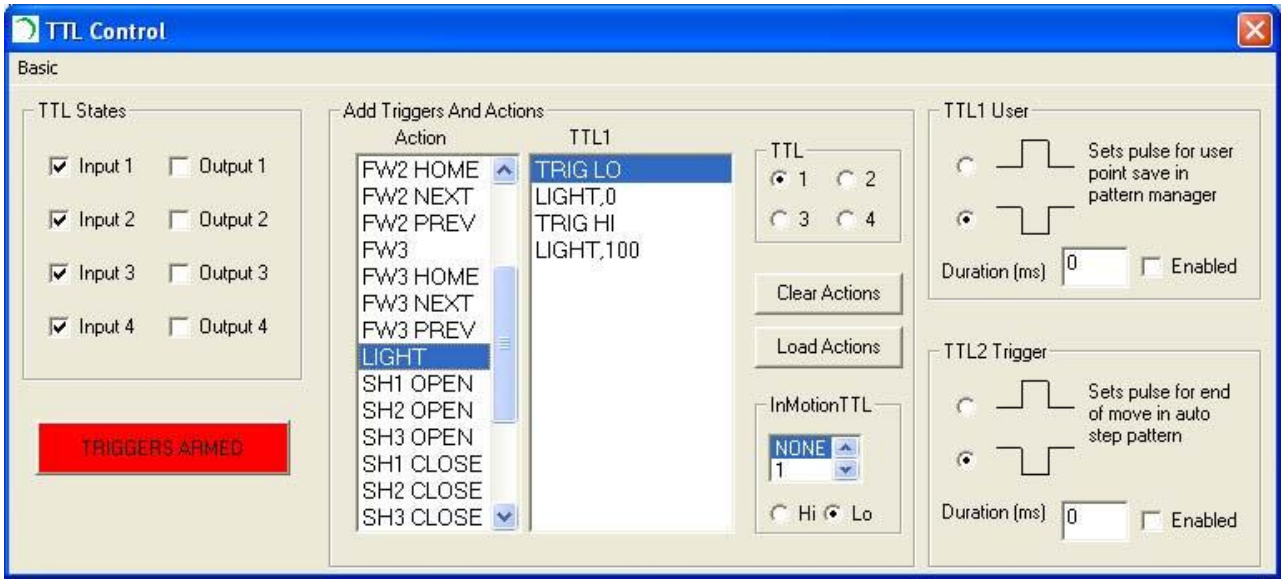
For some actions a window is opened, fill in the appropriate information to enable the assigned action.

e.g., Type in the % of light you would like the lumen attenuator to allow through.



e.g., Type in the relative move you would like the stage to make and then click add.

Click TRIG HI, if an action is to be assigned to TTL Hi. Select the action to be assigned to TTL Hi.



Click Load Actions to load the actions for that particular TTL to the ProScan Controller. Repeat the process for each of the TTL channels required.

The In motion TTL sets a TTL output (either high or low) when any axis is in motion.

Select the TTL and check Hi or Low as required and then click ‘Load Actions’.

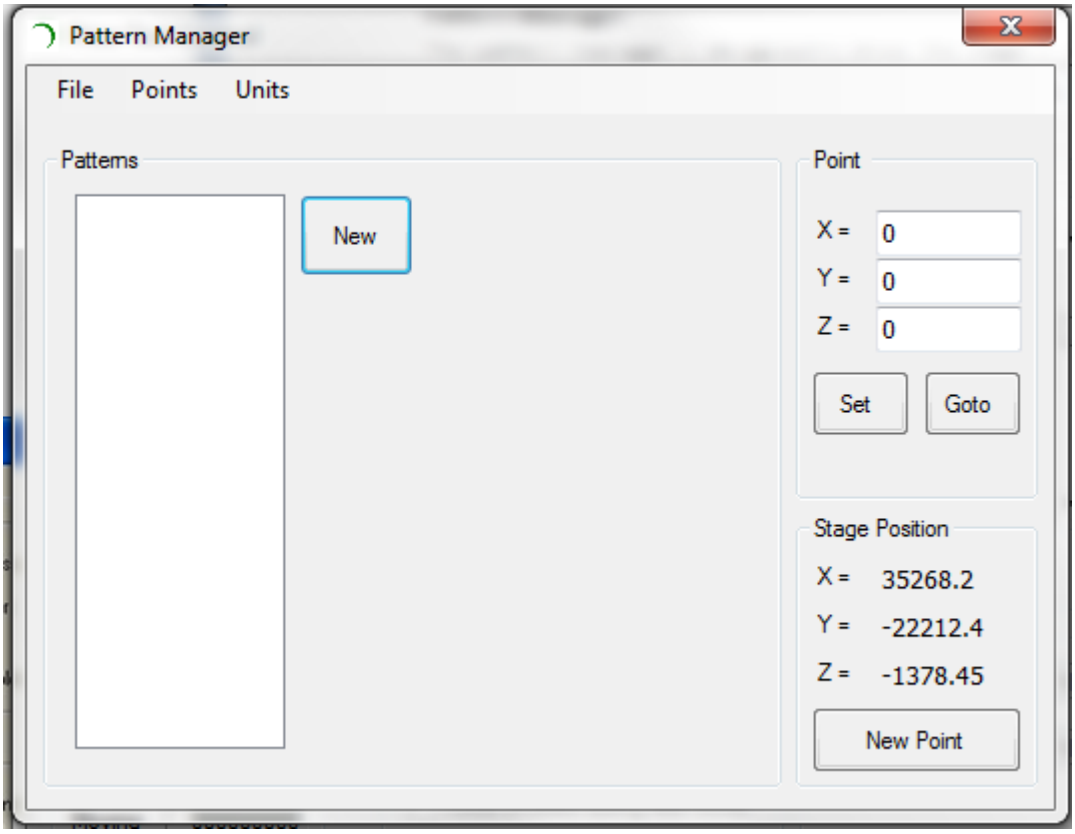
To arm the system and make it respond to TTL inputs and outputs click the ‘Triggers Disarmed’ button, this will change colour to red and display Triggers Armed as above.
Your system will now implement the TTL inputs as programmed.

TTL 1 User sets the length in ms and orientation, high-low-high or low-high-low of a TTL trigger pulse outputted via TTL 1, when a point is saved at the end of each move of a pattern (see ‘Patten

Manager'). Enable the feature by checking the Enable box.
TTL 2 Trigger sets the length in ms and orientation, high-low-high or low-high-low of a TTL trigger pulse outputted on TTL 2 at the end of each move of a pattern (see 'Pattern Manager'). Enable the feature by checking the Enable box.

Pattern Manager:
The pattern manager is designed to drive the stage in various patterns, with the TTL trigger functions enabled this can be used to automatically gather images for tilling or stitching.

Click the 'Pattern Button' on the main screen of the program.



You can open a previous saved pattern or save a pattern using the File menu.

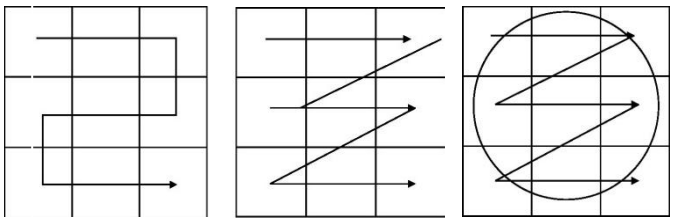
Click 'New' to create a new pattern. Select the type of Pattern Type in a name for the pattern, and select a type. The four choices determine how the stage moves through the pattern.

Left – Snake

Middle – Raster

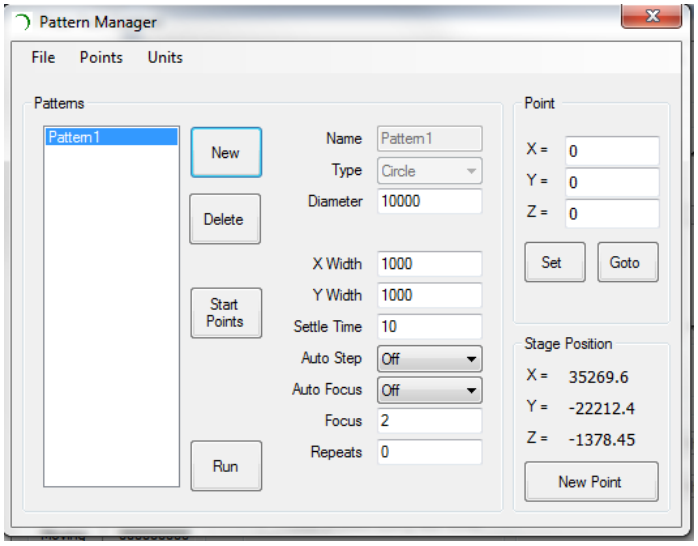
Right - Circle

(Not shown): User, where user pattern is defined as a number of user points which are followed in order.



Setup the characteristic of the pattern:

Circle:



Select the diameter of the circle, the X width, Y width and the (FOV) fields of view, in microns The settle time is the number of ms the stage will remain at each point.

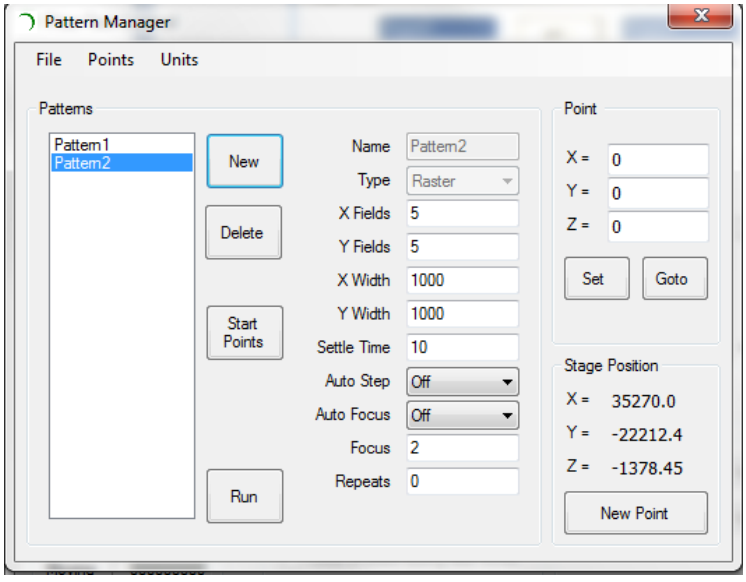
Autostep: will automatically move to the next point after the settle time is complete, select off to manually click though the points.

Autofocus: the function is not available.

Focus Range: the function is not available.

Repeats: The number of times the pattern should be repeated.

Raster:



Select the number of X Fields and Y Fields. Select the X width Y width and the (FOV) fields of view, in microns.

The settle time is the number of ms the stage will remain at each point.

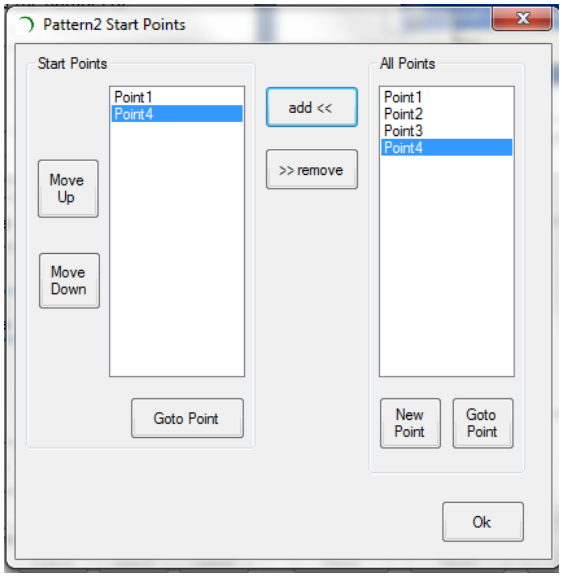
Autostep: will automatically move to the next point after the settle time is complete, select off to manually click though the points.

Autofocus: the function is not available. Focus Range: the function is not available.

Repeats: The number of times the pattern should be repeated.

Snake: The Snake has the same characteristic as the Raster above.

Adding start points to Snake Raster and Circle patterns:



Every time the pattern is run it will start at the start point, if no start point is set the pattern will run from the current position.

Move to the start point and click new point.

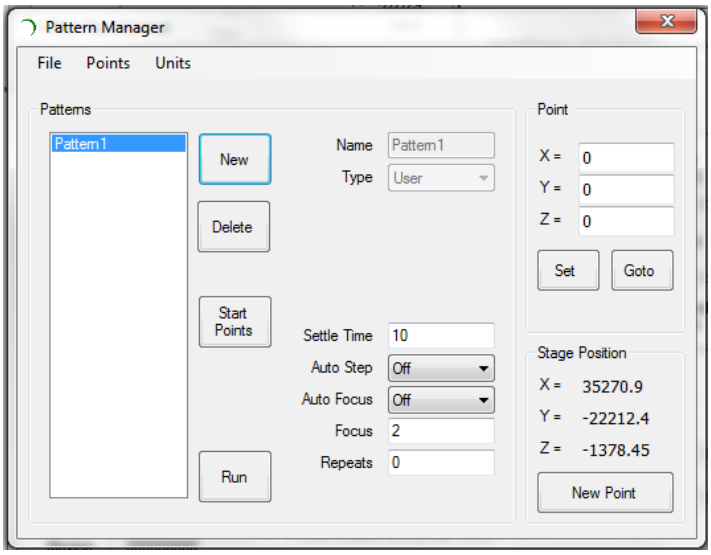
Name the point and click ok.

Click 'Start points'

Move the named point to Start points.

Click OK.

User:



The settle time is the number of ms the stage will remain at each point.

Autostep: will automatically move to the next point after the settle time is complete, select off to manually click though the points.

Autofocus: will automatically move to the next focus point after the settle time is complete.

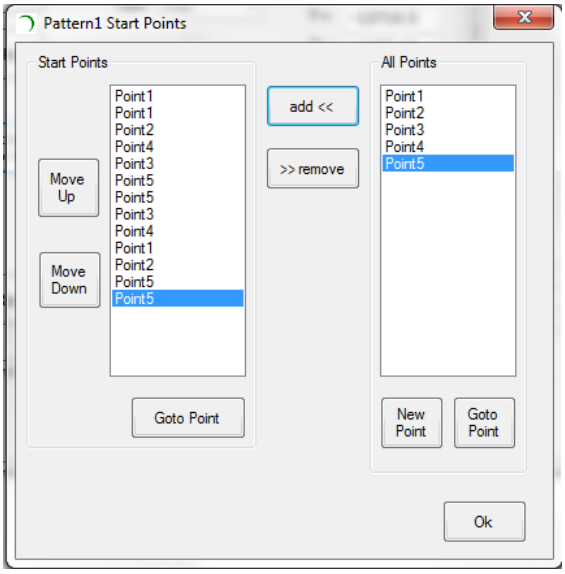
Repeats: The number of times the pattern should be repeated.

For the User pattern you must now add the points. Move to the location of a point you require for the user pattern and click New Point.

Give the point a name and click ok.

Repeat this for each user point.

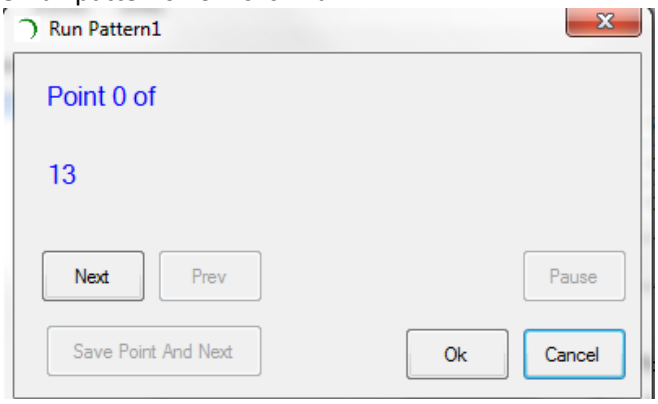
Click Start Points



Add the points and order them in the pattern required. You can add or remove points from the User pattern. Only point in the Start points will be used in the pattern.

Click OK once complete.

On all patterns now click Run.



If auto step off click ‘Next’ to move through the positions.
If autostep on click ‘Next’ to start pattern.
Click ‘Save Point’ and ‘Next’ to store the current point.

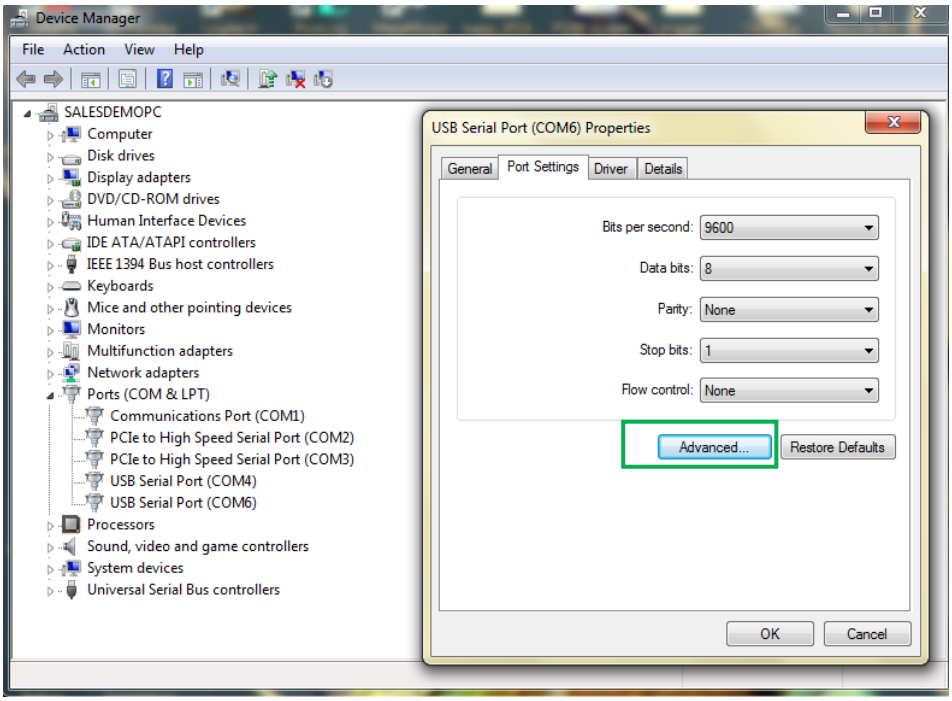
When exiting you will be prompted to save any unsaved patterns.

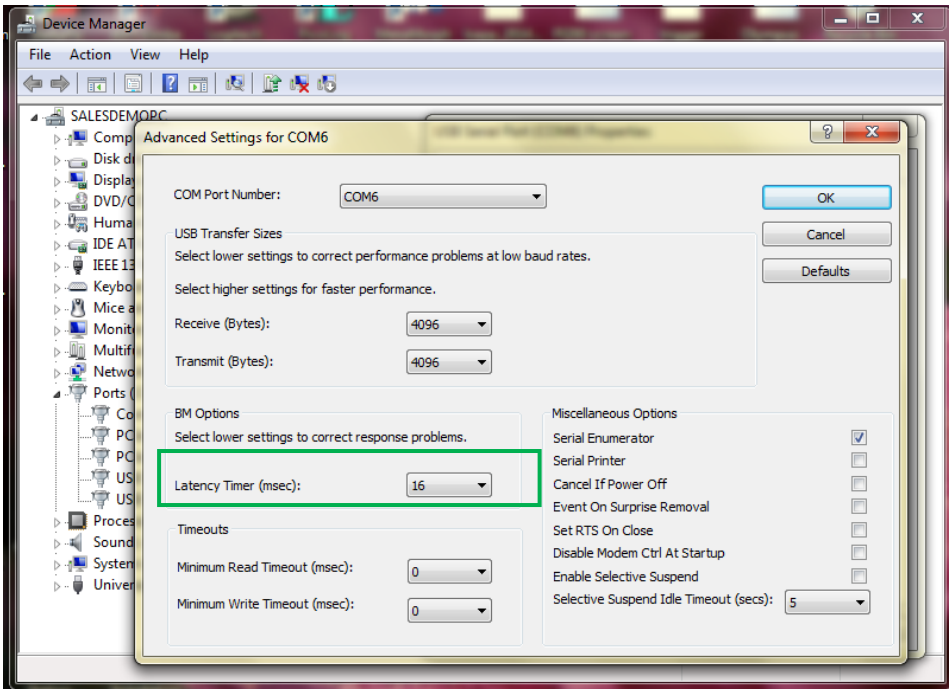
To enable the TTL pulse on pattern move or to have a TTL signal while the stage is moving, see the TTL section above.

Appendix A – FTDI Boards

More recent ProScan III controllers have FTDI boards inserted to increase their functionality and allow control via USB from Windows 8 and above operating systems. Some users have reported very minor differences in speed and response time when using these new controllers.

The response time can be altered in order to increase the speed of response. The default is 16 ms which may lead to slightly delayed responses. Right click on the appropriate port and select Port Settings > Advanced. Select a lower latency time (e.g. 2 ms) to reduce any delay observed.





If you require any help, please do not hesitate to contact your local Prior distributor.

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