

SteppingStage™ Installation Manual

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Conwy Valley Systems Ltd.

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Introduction

Background

PETROG and PetrogLite are software applications for controlling the SteppingStage™, developed by Conwy Valley Systems Limited. See www.petrog.com for more details.

The SteppingStage™ is a replacement for the Prior electro-mechanical stage, brought up-to-date and with significantly improved accuracy. It is fully automated, moving a slide in both X- and Y-axis directions under software control.

These installation instructions are provided for the sole use of the licensee of PETROG or PetrogLite and must not be passed on to non-licensees, in any form, whether electronic, paper, fiche or otherwise, without express written permission from Conwy Valley Systems Ltd.

These installation instructions have been prepared by Conwy Valley Systems limited with due care and with cognizance of the importance of the task to which they relate. Nevertheless, Conwy Valley Systems Ltd., its employees and agents, cannot be held responsible for actions undertaken as a result of reading this manual, whether based on any errors or omissions or otherwise.

Please notify any errors or omissions to support@SteppingStage.com so that Conwy Valley Systems Ltd. may expedite any corrections necessary.

Conwy Valley Systems Ltd. recognises the trademarks and registered trademarks of all products and manufacturers referenced herein.

Installation Summary

SteppingStage's with serial numbers less than 300 (Mk. 1 units) connect via a serial cable. These should plug in to a serial port and be recognised straight away. If there is no serial port, a third-party serial-USB converter may be purchased from any good computer store. These should come with their own drivers.

SteppingStage's with serial numbers 301 onwards (Mk 1.5 units) communicate directly via a USB cable, although internally the control box still treats it as RS232, so drivers must be installed on the computer to convert between USB and serial. Full instructions are in this manual and the troubleshooting section contains instructions on what to do if anything does not operate as expected.

Physical attachment to the microscope is via screws and dowels. There is a choice of holes in the baseplate which should allow attachment to the major manufacturers' pol microscopes. There are SteppingStage's currently working satisfactorily on (in alphabetical order) Leica, Leitz, Meiji, Motic, Nikon, Olympus, Prior, Vickers and Zeiss microscopes.

Setting up the SteppingStage™

The SteppingStage is designed to fit onto a specific microscope stage. The locating pins and securing screw are designed for a hole pattern which is unique to a stage. For copyright reasons we cannot publish diagrams but, if you have problems with the fixings, please contact us by e-mail at support@SteppingStage.com.

A SteppingStage consists of the following 5 main components (each is described in greater detail below):

- a power lead and transformer for connection to mains power and converting this to 12V DC;
- the SteppingStage assembly, which fits onto the stage of the microscope, is located with two pins and retained with one screw, and includes two permanently attached trailing leads;
- a control box, with sockets at one end for the lead from the SteppingStage assembly and at the other for connection to mains power and connection to the computer;
- EITHER: a null-modem cable to connect the control box to the computer's comms (RS232 communications) port;
- OR: a USB cable to connect the control box to the computer's USB port;
- software, which may be PETROG, PetrogLite or custom software developed for a specific purpose.

Connection to Mains Power

The control box is designed to accept 12V DC power and therefore requires an adapter for AC mains supply. The SteppingStage is supplied with a suitable adapter, but the plug will depend on the locale and is therefore not always supplied. The adapter has been chosen for compatibility with gaming consoles and other consumer devices so that you should be able to purchase a plug and lead, or just a plug adapter, at a local electrical retailer or computer dealer.

The SteppingStage Assembly

The SteppingStage assembly fits onto the stage of the microscope where it is located with two pins and retained with one screw. The unit should function quite well without being screwed down; it should not need to be retained tightly. Do not over tighten the screw.

There are two leads trailing from the unit, one from each of the X- and Y- sliders. Position these carefully so that they cannot tangle or snag and hence restrict the movement of either slider.

WARNING: The motors in the sliders are very powerful and, if the leads snag, it is possible for the motors to pull the sliders from their mountings. In such an event the unit must be returned to the manufacturer for maintenance.

The Control Box

At one end the control box has an on/off switch, a socket designed to accept 12V DC (centre positive, +) power and

EITHER a 9-pin RS232 socket



Figure 1 Mk. 1 Control box (back)

OR a USB 'B' socket,



Figure 2 Mk. 1.5 Control box (back)

in both cases marked **PC**.

At the other end there is a socket (3 rows of 5 pins per row) for the cable from the SteppingStage unit (marked **STEPPING STAGE**) and an indicator light, marked **PWR ON**, to show that the box is connected to mains power and is switched on.



Figure 3 Mk. 1 / 1.5 Control box (front)

Cable Null Modem or USB 'B'

The control box is connected to the computer using:

EITHER a standard RS232 null-modem cable (specification: wires 2 and 3 crossed, 5 connected);

OR a USB 'B' cable.

If either cable is lost it can be replaced at most computer dealers. In the former case, if there is no serial port on the PC, then use the USB-to-serial converter supplied. This will require installation of additional device drivers. See Installing a Serial Port SteppingStage (no PC serial port) .

Software

The latest version of PETROG or PetrogLite may be downloaded from the website www.petrog.com, provided you have the relevant login details. If you have lost your username and/or password please email support@SteppingStage.com.

Configuring the SteppingStage

PETROG Main Window or PetrogLite Main Window

On start-up the SteppingStage will be sent to its 'Home' position. To allow you time to ensure there is no clash with microscope objectives, PETROG and PetrogLite display the message below before sending the SteppingStage to its 'Home' position:

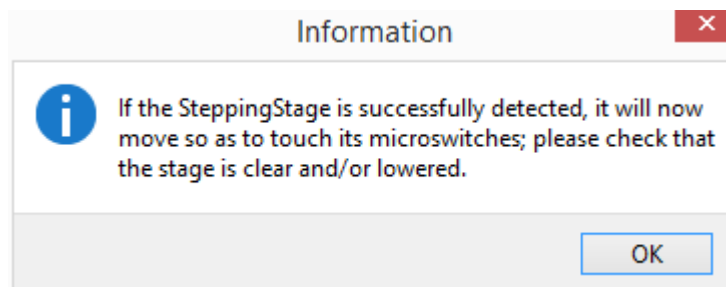


Figure 4 Start-up information message

The home position touches the red micro-switches and initialises the positioning. All subsequent movements will be made relative to this home position. If the SteppingStage is already at its home position you may still hear it briefly touch the micro-switches.

If the SteppingStage is not detected a warning window will be displayed:

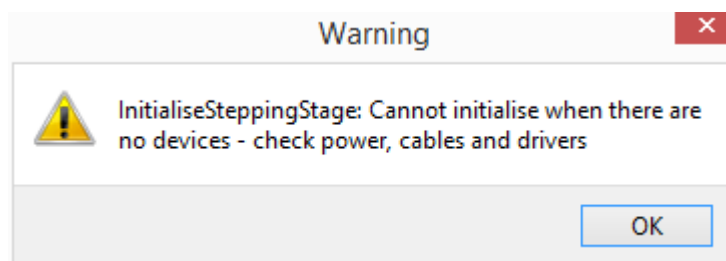


Figure 5 SteppingStage not found warning message

In this event, please ensure that the control box has power and that all cables are connected. If using a RS232 connection and wish to change from COMMS PORT 1 (default), another port can be chosen using the registry editor; see Port Configuration.

The main window then displays the current state of the program:

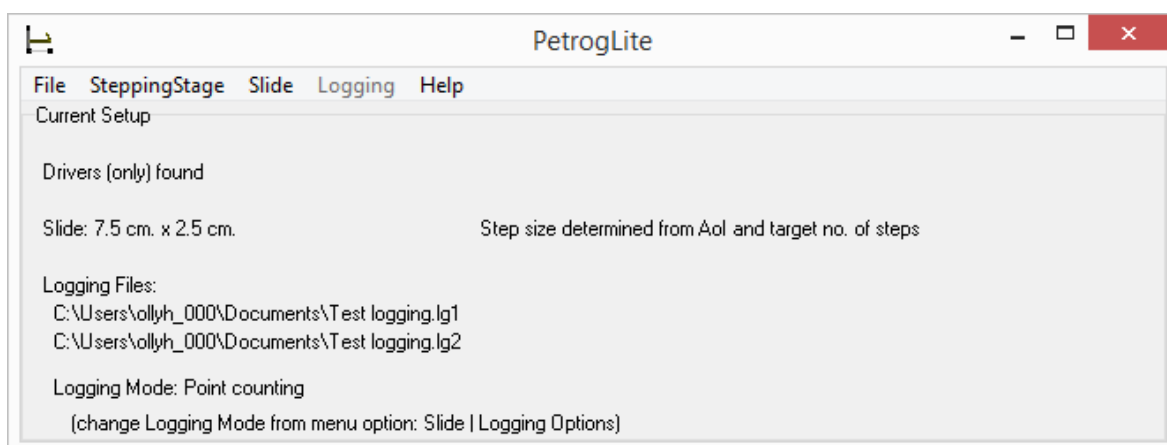


Figure 6 PetrogLite Main Menu (drivers only)

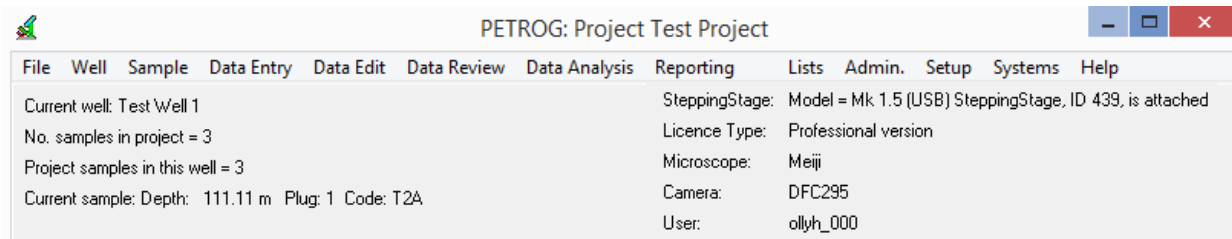


Figure 7 PETROG Main Menu (Mk1.5 SteppingStage attached)

Information displayed includes whether a SteppingStage is attached and its serial number.

Installing a Serial Port SteppingStage (no PC serial port)

If there is no serial port on the PC, and you have a Control Box with a 9-pin RS232 socket, then you must use a Serial-to-USB converter to connect the SteppingStage to a USB port on the PC.

This will require installation of additional device drivers. Plugging the SteppingStage into a USB port via a USB-to-serial converter will prompt you to install the drivers. If this converter was provided with your SteppingStage, then the drivers can be found on the installation CD under (if D:\ is your CD disk drive):

D:\USB_to_Serial\

From this location you should run the setup.exe that is appropriate for your operating system.

Installing a USB SteppingStage

NOTE: A 'USB SteppingStage' refers to a SteppingStage which has a USB 'B' socket at the **Power** switch end (serial numbers 301 onwards).

The drivers for the SteppingStage are installed as part of the installation procedure for both PETROG and PetrogLite. In the event that the driver installation during this installation procedure was unsuccessful, then it will be necessary to reinstall the drivers, which are located on the installation CD as:

CDM20824_Setup.exe

Double-click this executable file and the appropriate drivers will be installed.

If this is missing or the CD has been lost, the driver software can be downloaded from www.ftdichip.com/Drivers/D2XX.htm

If there is a newer version of the drivers at this location, it should be safe to install the latest version instead. If we know of any compatibility issues, they will be posted on the forum. Go to

www.petrog.com/petrog-forum

after which you can log in to see the Support forum, where postings will be made about known driver issues. If you identify any incompatibility issues, or you suspect that the drivers you are using are not correct, please post to the Support forum or e-mail us directly.

When you switch on the SteppingStage after installing, you should see a message pop-up "Your new hardware is installed and ready to use". Then go to Device Manager and check that a USB Serial Port device is listed. This will only be listed if both the control box is switched on and the drivers have been installed. In case of any doubt, please contact support@petrog.com.

Port Configuration

Once the drivers have been installed, PETROG or PetrogLite has to be configured to the correct port. Configuring for one automatically takes care of the other. The same dialogue is used in either case, but accessed differently from the main menu.

In the PetrogLite main window, select:

SteppingStage | Configure and answer Yes to the question.

In the PETROG main window, select:

Systems | System Diagnostics | SteppingStage Test

If the message says there is no SteppingStage attached, dismiss this window and then answer **Yes** to the next question.

Once the dialogue has opened, it will be showing the SteppingStage model which the software is currently expecting to detect. If this is not the correct SteppingStage model, then the window will be displaying the message “No SteppingStage detected”, as below:

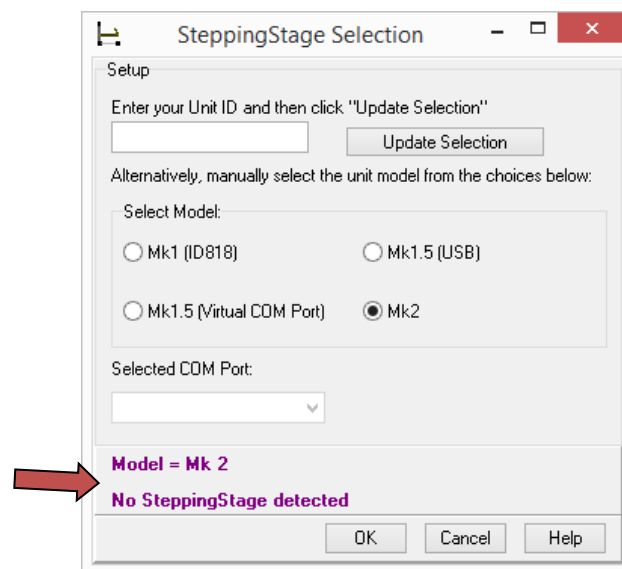


Figure 8 PetrogLite – SteppingStage not yet detected

You need to select the correct SteppingStage model from the radio buttons provided. If you wish to select a different COM Port for an RS232 model, this must be selected from the dropdown list provided. If the drivers have just been installed, then the port they allocated will almost always be the last one in the list (the highest numbered port). If this selection does not result in the message changing, to indicate that the SteppingStage has been found, and if the SteppingStage is switched on and connected correctly, then choose the other available ports in turn until the SteppingStage is found.

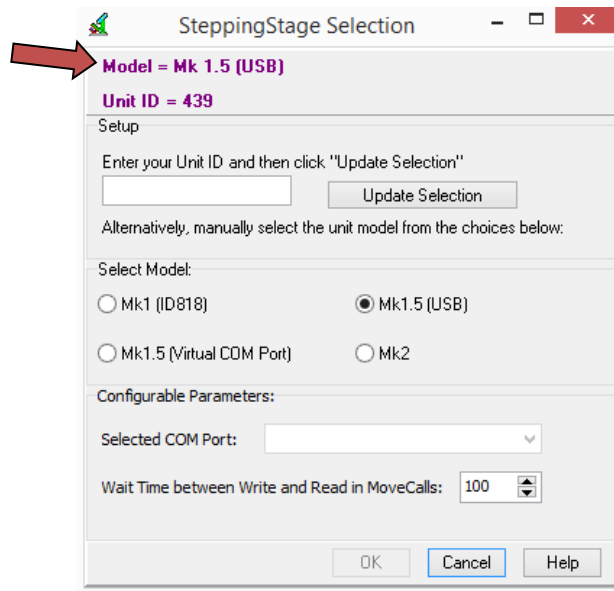


Figure 9 PETROG - SteppingStage detected

If it is not found for any model or on any port, look at the Troubleshooting section of this document for further suggestions.

Attachment to a Microscope

When you receive your SteppingStage, it should be configured for the microscope make and model specified in the order. To initially attach it to a microscope, lower the microscope stage as far as it will go, locate the appropriate set of holes, line up the dowels and insert them into the holes, and then use the screw to hold it in place. Units with serial numbers less than 380 will need to be connected to the software and initially moved away from the 'home' position in order to uncover the screw hole. This may be done with the unit on or off the microscope stage. Units with serial numbers 381 onwards have the central hole initially visible (i.e. accessible in the 'home' position).

To move the stepping stage from one microscope to another, it is probably necessary to change the dowels. The correct dowels can be located from the table below and, if not contained in the original shipment, requested from Conwy Valley Systems Limited (support@petrog.com)

The baseplate of a unit with serial number less than 380 looks like this:

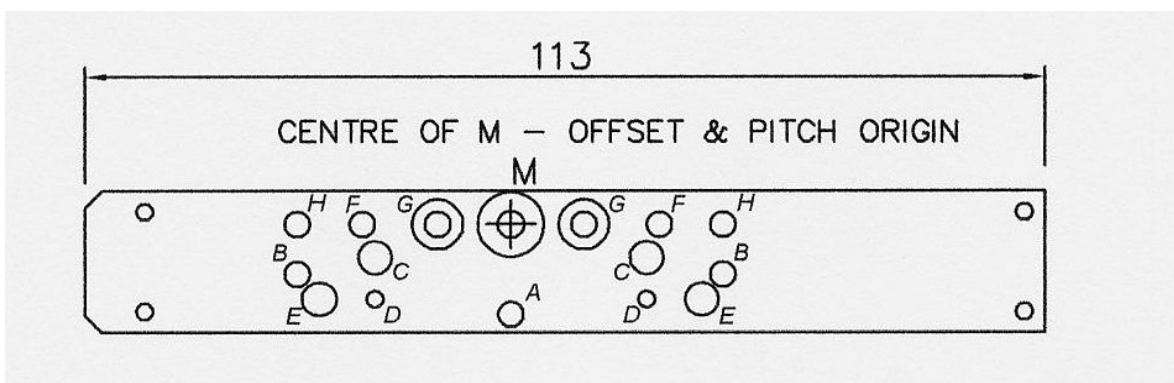


Figure 10 Diagram to illustrate the baseplate of each SteppingStage

The letters do not appear on the baseplate, they are on the diagram solely to aid identification of the correct set of holes for each microscope make and model. See below for detailed explanation. In each case (except pattern G), attachment is via two dowels and one screw. The holes M and G should be threaded, none of the others are threaded.

Pattern G (two screws) is provided because the baseplate was not large enough to accommodate the offset (orthogonal distance from the line joining the two unthreaded, dowel holes and the central threaded, screw hole).

SteppingStages with serial numbers 381 onwards have a baseplate with the same pattern of holes as above, but with the entire pattern repeated alongside. This allows more choice for attaching the stepping stage nearer to the centre of the stage or further from the centre, to help optimise the coverage of slides.

The hole patterns correspond to major microscope manufacturers' models as follows (*errors and omissions excepted; this list is provided for illustrative purposes only and does not purport to be definitive and does not reflect the opinion of the microscope manufacturers nor to reproduce their specifications*):

A	Prior (early models)	Zero pitch, 10.8mm offset, M4, 3mm dowels
B	Leica	50mm pitch, 6mm offset, M4, 3mm dowels
C1	Olympus (except BH), Leitz, Nikon Labophot	32mm pitch, 4mm offset, M4, 4mm dowels
C2	Olympus BH, Nikon Optiphot	32mm pitch, 4mm offset, M3.5, 2mm dowels
C3	re-drilled Optiphot	32mm pitch, 4mm offset, M4, 3mm dowels
D	Zeiss Axioskop, Axiolab, sometimes Axioplan2	32mm pitch, 4mm Offset, 2mm Dowels, M4 mounting screw
E	Early Nikon "E" series and Optiphot 2	45mm pitch, 9mm offset, M3, 4mm dowels
F	Prior (later models)	35mm pitch, zero offset, M4, 3mm dowels
G	Late Nikon "E" series, Nikon LV50, 50i, LV100	2 M3 screws (17.25mm pitch, zero offset, M3, no dowels)
H	Zeiss AxioImager, sometimes Axioplan2	50mm pitch, zero offset, 2.8mm Dowels, M4 mounting Screw

N.B.

1. All dowels are attached to the baseplate via 2mm threaded screws.
2. C1, C2, C3 are the same holes, with different diameter dowels and/or different sized screws.
3. On the Nikon models matching the G specification above, the depth of the screw holes changed around 2011, but there is no record of this in the Nikon specifications so please contact us (support@petrog.com) if you have difficulty with attaching to any of these models.

Troubleshooting

Step1: Power

If the SteppingStage does not respond, or if the main window displays the message:

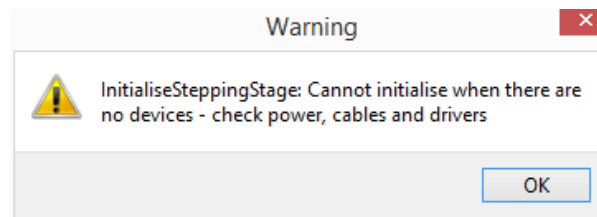


Figure 11 SteppingStage not found warning message

first check that there is power to the SteppingStage. If there is power to the SteppingStage Control Box, then the **PWR ON** light should be illuminated. If it is not, check the power supply to the control box. Start by checking and replacing each component of the power supply in turn.

When the power is turned on, the SteppingStage should touch its microswitches, to initialise its coordinates. If the motors are positioned a long way from the microswitches, then you should see each motor in turn, x motor first, travel back to its home position. Even if they are currently at home, they will each briefly touch the microswitch and rebound a small distance, to home. This rebound should be both audible and visible. The x motor should move first, then the y motor. If you do not notice this movement, try cycling the power again (turn off then turn on), being careful to listen. If the motors are not responding, then either the power is not reaching the motors or the motors are broken. In either case, we do not recommend on-site maintenance, so please contact support@petrog.com. This check can be undertaken without the SteppingStage being connected to the computer and with no software installed or running.

Step2: Drivers

If the SteppingStage is receiving power, but the application (PETROG or PetrogLite) does not recognise its presence, check that the drivers have been installed correctly. For installing drivers, see above, either section Installing a Serial Port SteppingStage or section Installing a USB SteppingStage. The following refers to the USB variant; for serial port SteppingStages, this will vary depending on which third party USB-Serial converter is being used.

When you switch on the SteppingStage after installing, you should see a message pop-up "Your new hardware is installed and ready to use". You can then go to Device Manager and check that a USB Serial Port device is listed (see below). To check that the drivers are installed, you can go to (XP):

Control Panel | Add or Remove Software

and look for Windows Driver Package - FTDI CDM Driver Package:

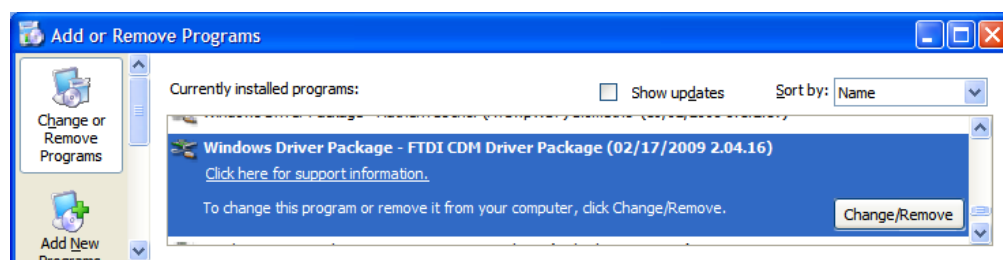


Figure 12 Check driver installation status (Windows XP)

or (Windows 7/8):

Control Panel | Programs and Features

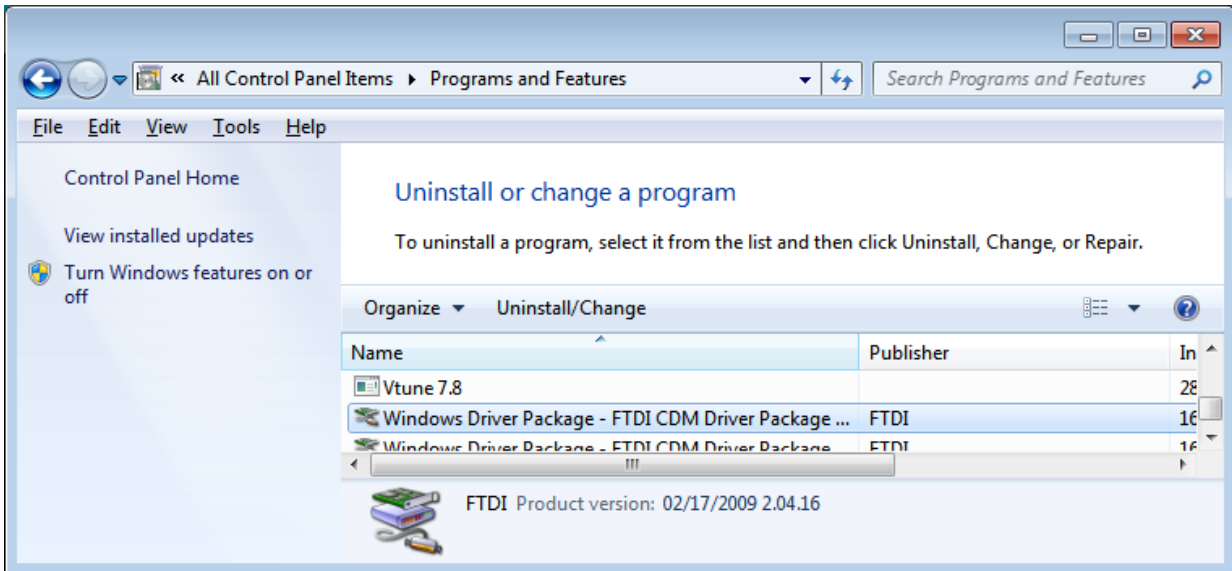


Figure 13 Check driver installation status (Windows 7/8)

If you cannot locate **Windows Driver Package - FTDI CDM Driver Package** in the list of installed software, please install (or re-install) the drivers as described above.

If you cannot locate the CD, the software for installing the drivers can be downloaded from www.ftdichip.com/Drivers/D2XX.htm

Step3: Application Software, Port and Registry

If the SteppingStage is receiving power and the drivers are correctly installed, but the application (PETROG or PetrogLite) still doesn't recognise its presence, use the PetrogLite menu option:

SteppingStage | Configure

or the PETROG menu option:

Systems | System Diagnostics | SteppingStage Test

to check that it is under software control. Check that the model/ COM port is correctly identified, as described above under Port Configuration. If the device has just been added to the computer then the port allocated to it should be the largest number in the drop-down list of available ports.

If setting the model/port and re-initialising does not correct the problem, check that the SteppingStage is correctly connected to the computer. The connection into the control unit is labelled **PC**; at the computer, the cable should be connected into a serial (COM) port (preferably the first available) or USB port, as appropriate. If the cable needs to be replaced, a standard null-modem or USB 'B' cable may be used as appropriate.

If the device is still not recognised by the software, check your computer system set-up by running the Device Manager for

USB:

Microsoft Windows XP/7/8 Control Panel:

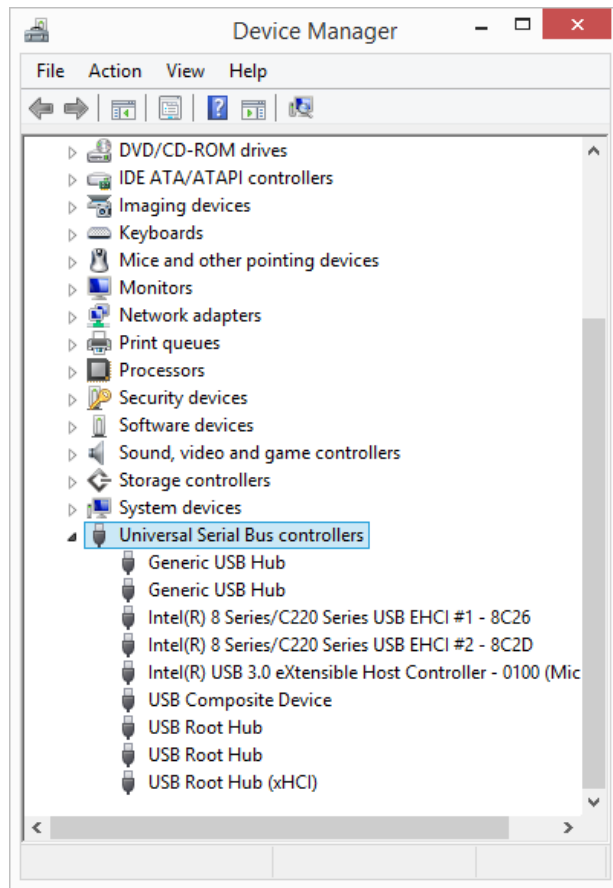


Figure 14 Check Device Manager for USB (Windows XP/7/8)

COM Port:

Microsoft Windows XP Control Panel:

Control Panel | System | Hardware | Device Manager | Ports (COM & LPT)

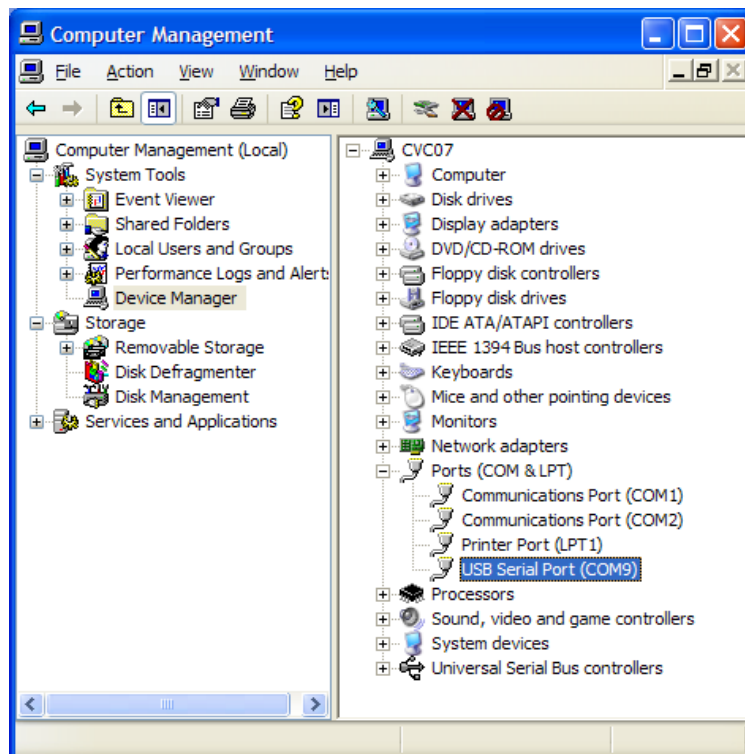


Figure 15 Check Device Manager for COM Port (Windows XP)

Or, in Microsoft Windows 7/8:

Control Panel | Device Manager | Ports (COM & LPT)

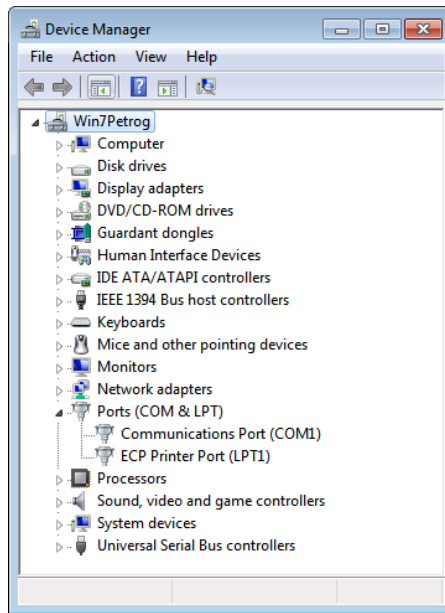


Figure 16 Check Device Manager for COM Port (Windows 7/8)

Make a note of which COM ports are available, and then set each in turn manually, using the registry. Running RegEdit from the Microsoft Windows XP Start menu or in Microsoft Windows 7 Run... (which has to be activated by accessing Customisation in the Taskbar and Start Menu Properties | Customise Start Menu options) will allow you to type this number into the registry. To do this, look in the registry under:

RootKey HKEY_CURRENT_USER\Software\PetrogShared\Port_Number

i.e.

RootKey HKEY_CURRENT_USER

key class Software

key sub-class PetrogShared

key Port_Number

and change it with Microsoft's RegEdit editor by using the **RMB** option Modify.

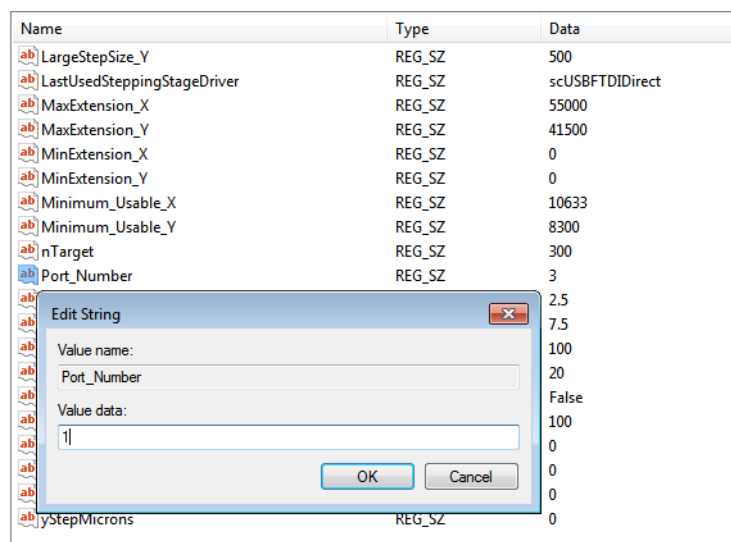


Figure 17 Edit Registry information to change COM port access for PETROG (Windows XP/7/8)

NOTE: You will have to start and close either PETROG or PetrogLite at least once, prior to running RegEdit, in order to create the registry entries.

Sometimes, computers are set up having more than one port with the same name. This causes problems for the operating system to identify the port. In that case, the SteppingStage will not work until one of the aforementioned ports is re-named.

If the SteppingStage behaves unexpectedly with:

Either, PETROG please see the manual for further information on its extensive debug capabilities.

Or, with PetrogLite software in logging mode, the SteppingStage writes its current position to the first of the two logging files (default extension lg1). This should provide an audit trail which can be compared with the key strokes used to reach that position. If the two do not match, please send the file and a list of the keystrokes to support@SteppingStage.com.

You might find that the COM port numbers are too high for PETROG or PetrogLite to recognise. For example, you might see the SteppingStage identified as COM port 41.

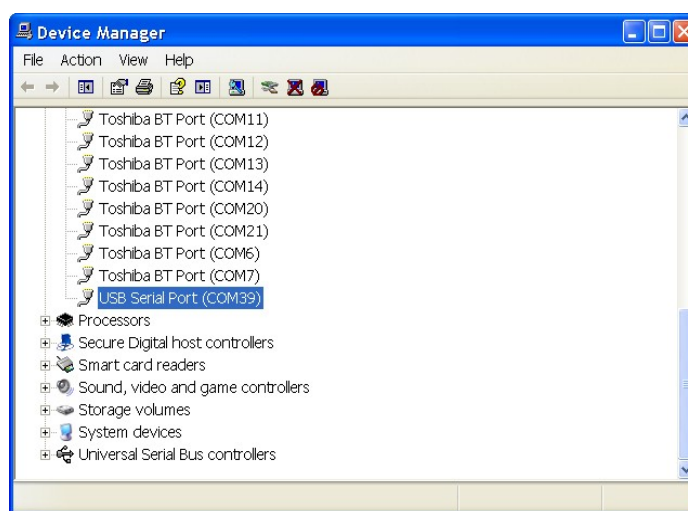


Figure 18 Check Device Manager for COM Port (Windows XP/7/8)

In this instance, right-click on the listed device with COM41, and select **Properties**. Then select the **Port Settings** tab.

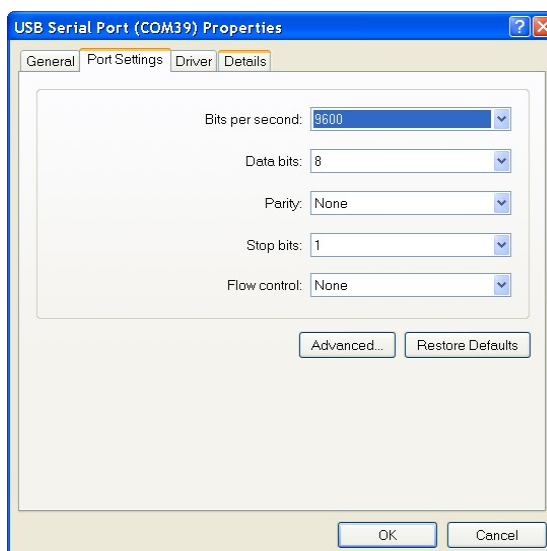


Figure 19 Device Properties for COM Port (Windows XP/7/8)

Then click the **Advanced...** button.

Microsoft Windows XP

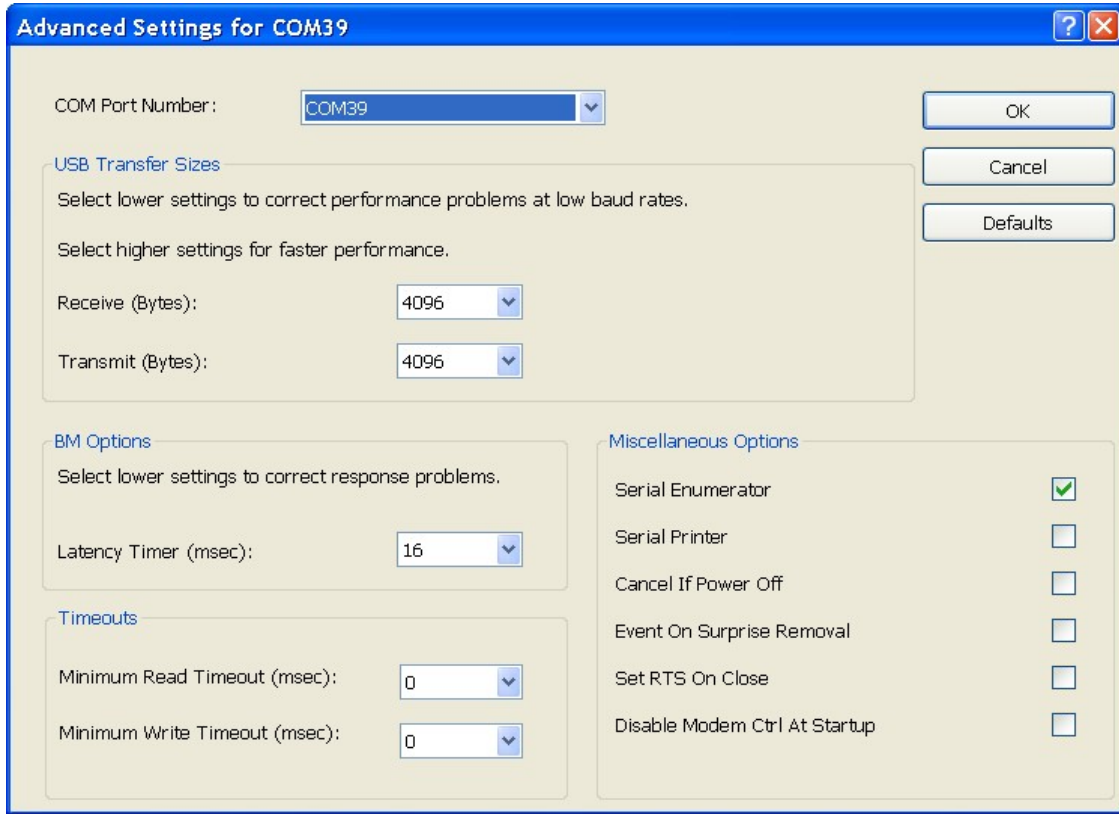


Figure 20 Advanced Settings for COM Port (Windows XP)

Windows 7/8

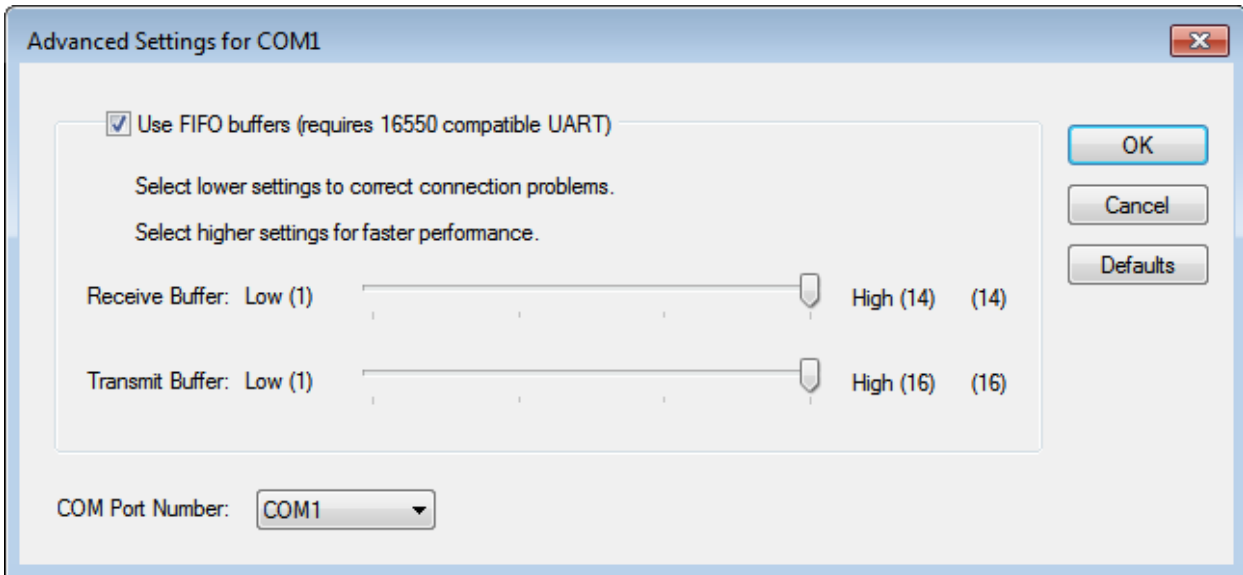


Figure 21 Advanced Settings for COM Port (Windows 7/8)

In both windows, select from the **COM Port Number** drop-down list a COM port with number between 2 and 40, which is not listed as “In Use”. Then click **OK**, and close the remaining Device Manager windows. If no such COM Port Number is available (i.e. all numbers between 2 and 40 are in use, then you need to pick one which will not adversely affect other devices that you have plugged in).

Once you have completed these steps, restart PETROG or PetrogLite and then follow the steps under Port Configuration, choosing the COM port number you selected in the previous step.