



XPS-D

Universal High-Performance Motion Controller/Driver



User Interface Manual

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Original instructions.

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Table of Contents

1.0	Introduction	1
1.1	Scope of the Manual	1
1.2	Prerequisite	1
1.3	Special case of HXP-ELEC-D controller.....	1
1.4	System Environment.....	1
2.0	User Interface description	2
2.1	Interface Overview.....	2
2.2	Restart and Reboot.....	3
2.3	Controller – Users Management	3
2.4	Controller – IP Management.....	4
2.5	Controller – General Information.....	5
2.6	Controller – Terminal Configurator	5
2.7	Controller – TCL to API Builder	6
2.8	Controller – Firmware Update	8
2.9	System – Error file Display.....	10
2.10	System – Previous Error File Display	10
2.11	System – Default Configuration.....	11
2.12	System – Quick Configuration.....	11
2.13	System – Manual Configuration	12
2.14	Stage – Add, Remove or Edit Stages	12
2.15	Stages – Create Custom Stages.....	13
2.16	Stages – Tuning.....	14
2.16.1	Tuning – Auto-Scaling.....	14
2.16.2	Tuning – Auto-Tuning	15
2.17	Stages – Lissajous	18
2.18	Front panel – Move.....	19
2.19	Front panel – Cycle.....	20
2.20	Front panel – Jog.....	20
2.21	Front panel – Spindle.....	21
2.22	Front panel – I/O Control.....	22
2.23	Front panel – Device Status	22
2.23.1	Device Status – Positioner Errors.....	22
2.23.2	Device Status – Hardware Status	23
2.23.3	Device Status – Driver Status.....	23
2.24	Terminal.....	24
2.25	Data Acquisition – Easy Gathering.....	26
2.26	Data Acquisition – Easy External Gathering	32

2.27	Data Acquisition – Functional Tests	36
2.28	Files – Gathering Files	37
2.29	Files – Trajectory Files	38
2.30	Files – TCL Scripts	39
2.31	Files – Configuration Files.....	40
2.32	Files – Log Files.....	42
2.33	Documentation.....	43
<hr/>		
3.0	HXP-ELEC-D specific menus	44
3.1	System menu.....	44
3.2	Stages menu	44
3.3	Controller menu	44
3.3.1	Controller – Firmware Update	44
3.4	Front panel menu	46
3.4.1	Front panel – HXP Tool.....	46
3.4.2	Front panel – HXP Work	47
3.5	Files menu.....	48
3.5.1	Files – Configuration files.....	48
<hr/>		
	Service Form	51



Universal High-Performance Motion Controller/Driver XPS-D Controller

1.0 Introduction

1.1 Scope of the Manual

The XPS is an extremely high-performance, easy to use, integrated motion controller/driver offering high-speed communication through 10/100/1000 Base-T Ethernet, outstanding trajectory accuracy and powerful programming functionality. It combines user-friendly web interfaces with advanced trajectory and synchronization features to precisely control from the most basic to the most complex motion sequences. Multiple digital and analog I/O's, triggers and supplemental encoder inputs provide users with additional data acquisition, synchronization and control features that can improve the most demanding motion applications.

To maximize the value of the XPS Controller/Driver system, it is important that users become thoroughly familiar with available documentation.

The present **XPS-D User Interface Manual** describes the Graphical User Interface (also called web interface) of the controller. It applies to several controller versions of the XPS-D family. Therefore, some details of the screenshots presented in this manual may slightly differ from reality (background picture or footer product name for instance).

1.2 Prerequisite

It is mandatory that the applicable **Start-Up Manual** (dedicated to your controller version) be thoroughly read and understood before going through the User Interface.

Particularly, Ethernet connection must be established between the computer and the controller, either directly or through a network.

1.3 Special case of HXP-ELEC-D controller

In case of XPS-D controller preconfigured to drive a Newport Hexapod (then referenced HXPxxx-ELEC-D), some menus may not be accessible, especially those dedicated to system/stage configuration (to prevent modifying the factory settings) On the other hand, several additional pages or features specific to hexpod group become available: see section 3.0.

1.4 System Environment

XPS-D web interface is compatible with Windows 7 and above.

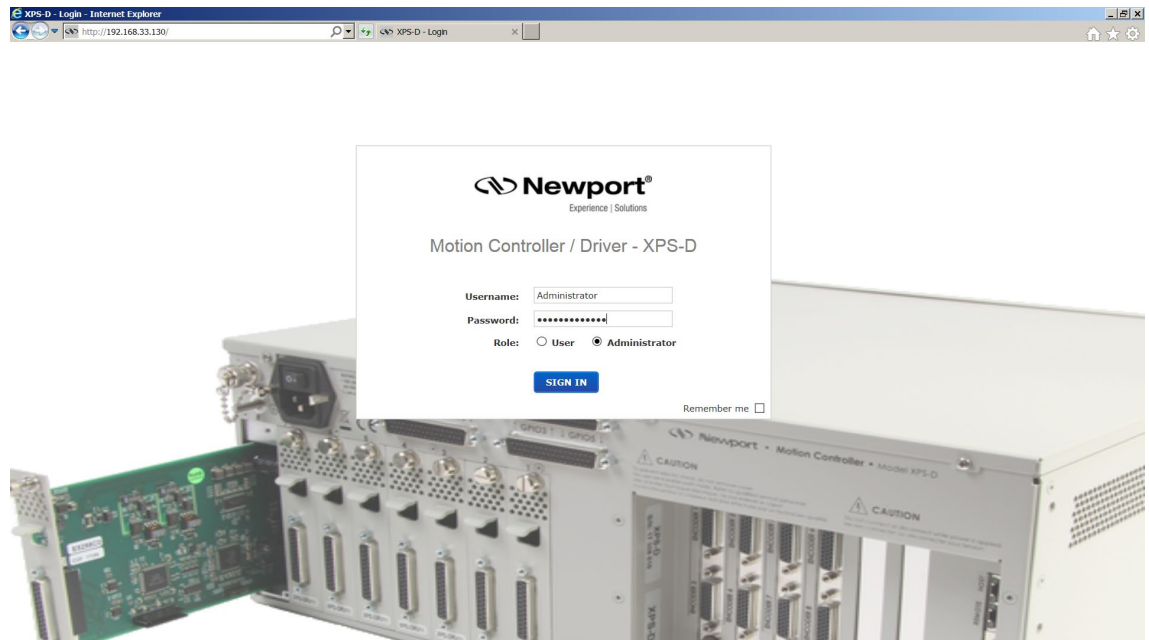
2.0 User Interface description

2.1 Interface Overview

The XPS software tools provide users a convenient access to the most common features and functions of the XPS controller. All software tools are implemented as a web interface. The advantage of a web interface is that it is independent from the user's operating system and doesn't require any specific software on the host PC.

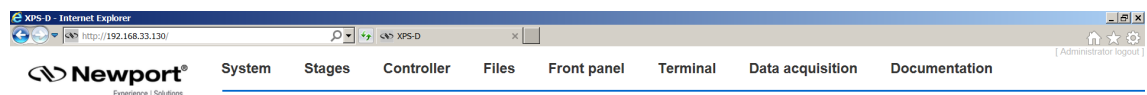
When connected to the controller, a log-in menu pops up. There are two options to log-in to the XPS controller: as "User" or as "Administrator". Users can log-in only with User rights. Administrators can log-in with User or with Administrator rights by selecting the respective Role in the login page. When logged-in with Administrator rights, you have an extended set of tools available.

The predefined user has the log-in name **Anonymous**, Password **Anonymous**. The predefined Administrator has the log-in name **Administrator**, Password **Administrator**. Both the log-in name and the password are case sensitive. Select "Remember me" to save the login credentials.

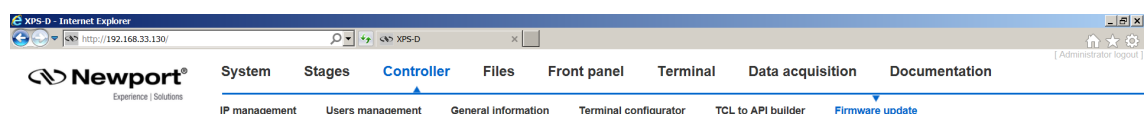


Once logged, the main tab is displayed across the top of the XPS Motion Controller/Driver main program window, and lists each primary interface option. Each interface option has its own pull-down menu that allows the user to select various options by clicking the mouse's left button.

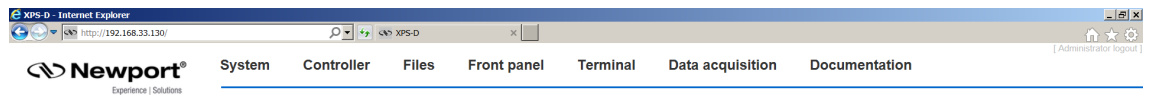
Administrator Menus (with Administrator Rights)



Sub-Menu for CONTROLLER (with Administrator Rights)



Restricted set of User Menus



On the following pages, a brief description of each available tool is provided.

2.2 Restart and Reboot

After making changes to the hardware or software parameters a Restart or a Reboot of the controller will be a necessary to apply the changes. Restart is a quicker process than a Reboot.

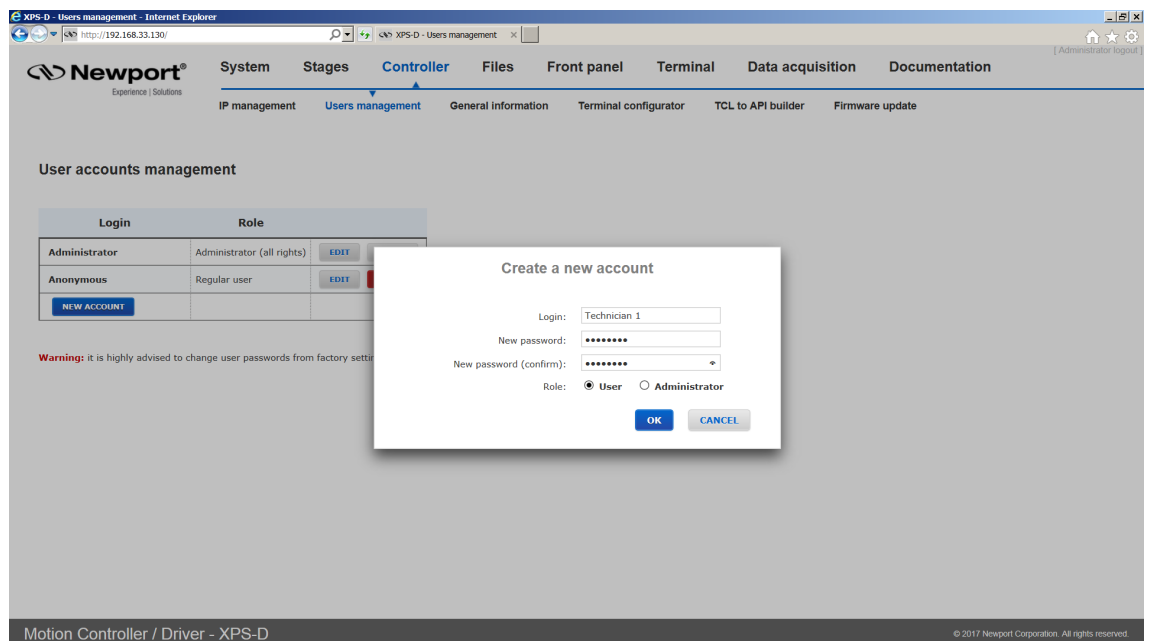
- Restart = reload all configuration files.
- Reboot = reload files + re-initialize hardware.

2.3 Controller – Users Management

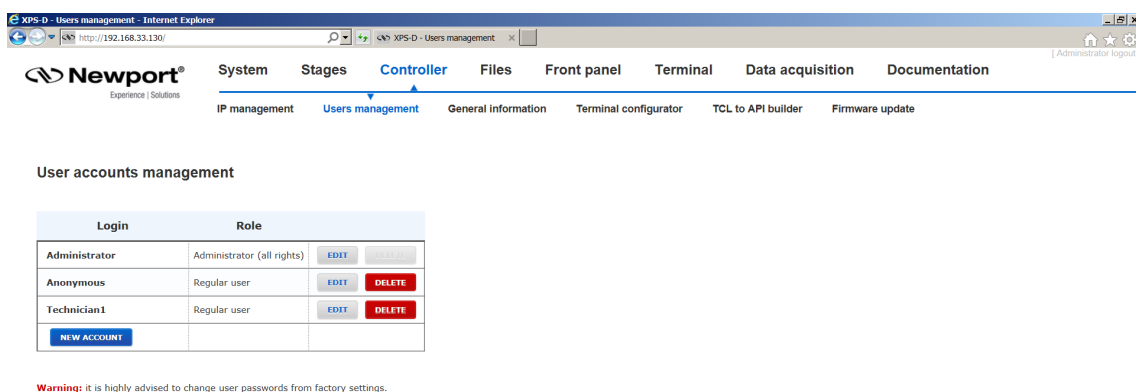
This tool allows managing User accounts. There are two types of users: Administrators and Users. Administrators have configurations rights. Users have restricted rights to use the system.

The following steps are needed to create a new user:

1. Click on "New Account" and the following window appears:



2. Type in a Login name, password, and role (User or Administrator).
3. Click "OK" to add the new access account.



Login	Role		
Administrator	Administrator (all rights)	EDIT	DELETE
Anonymous	Regular user	EDIT	DELETE
Technician1	Regular user	EDIT	DELETE

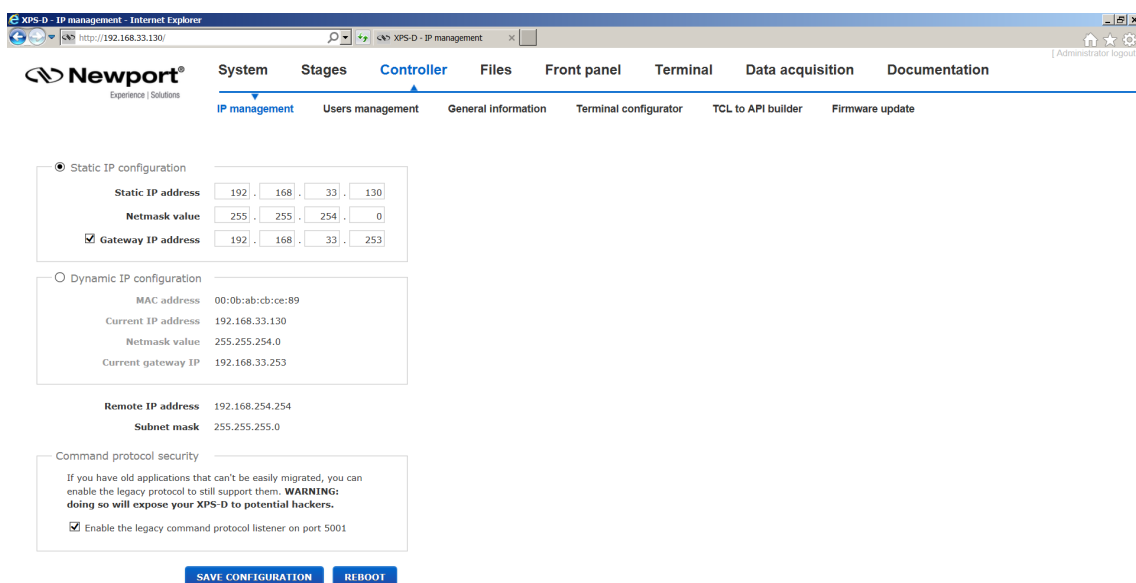
Warning: it is highly advised to change user passwords from factory settings.

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2.4 Controller – IP Management

To access this Web Tool, users must be logged in with Administrator rights. This screen allows HOST Ethernet plug IP address management and setting (see **Start-Up Manual** for further details).



☒ Static IP configuration

Static IP address: 192 . 168 . 33 . 130

Netmask value: 255 . 255 . 254 . 0

☒ Gateway IP address: 192 . 168 . 33 . 253

☐ Dynamic IP configuration

MAC address: 00:0b:ab:cb:ce:89

Current IP address: 192.168.33.130

Netmask value: 255.255.254.0

Current gateway IP: 192.168.33.253

Remote IP address: 192.168.254.254

Subnet mask: 255.255.255.0

Command protocol security

If you have old applications that can't be easily migrated, you can enable the legacy protocol to still support them. **WARNING: doing so will expose your XPS-D to potential hackers.**

☒ Enable the legacy command protocol listener on port 5001

SAVE CONFIGURATION **REBOOT**

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2.5 Controller – General Information

This screen provides valuable information about the firmware and the hardware of the controller. It is an important screen for troubleshooting the controller. This screen also displays information about the IP configuration as well as TCL scripts which are currently running.

Components version display

Snapshot version	20170824								
Firmware version	XPS-D Firmware Standard Installer								
Firmware build version	XPS Unified V1.0.12								
QNX kernel version	QNX kernel configuration V3.0.1 (20170706, SYSTEM, bios-newport mode)								
Web server version	XPS-D 2.0.0-beta5 (20170824)								
Snapshot details	Refer to XPSFirmwareHistory.pdf								
Stage database revision	StageDataBase V4.0.0 - Beta 3								
Control boards	<table border="1"> <tr><th>PCI1</th><th>PCI2</th><th>PCI3</th><th>PCI4</th></tr> <tr><td>E536200_6483203</td><td>E536200</td><td>x</td><td>x</td></tr> </table>	PCI1	PCI2	PCI3	PCI4	E536200_6483203	E536200	x	x
PCI1	PCI2	PCI3	PCI4						
E536200_6483203	E536200	x	x						
Available driver slots	8								

IP configuration

Host IP address	192.168.33.130 (static)
Host netmask	255.255.254.0
Gateway IP address	192.168.33.253

Running TCL scripts

No running process at the moment

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2.6 Controller – Terminal Configurator

Under **Controller** → **Terminal configurator**, an Administrator user can specify which API functions will be displayed to all users in the **Terminal** webpage. Not all API functions may be useful to a given application especially after the application has been developed. For this purpose simplifying the Terminal display may be helpful.

1. Click a line to select/deselect the API function.
2. Once all desired API functions are selected, click RESTART CONTROLLER.

In the following example a total of 7 API functions were selected.

Terminal functions allowed to users

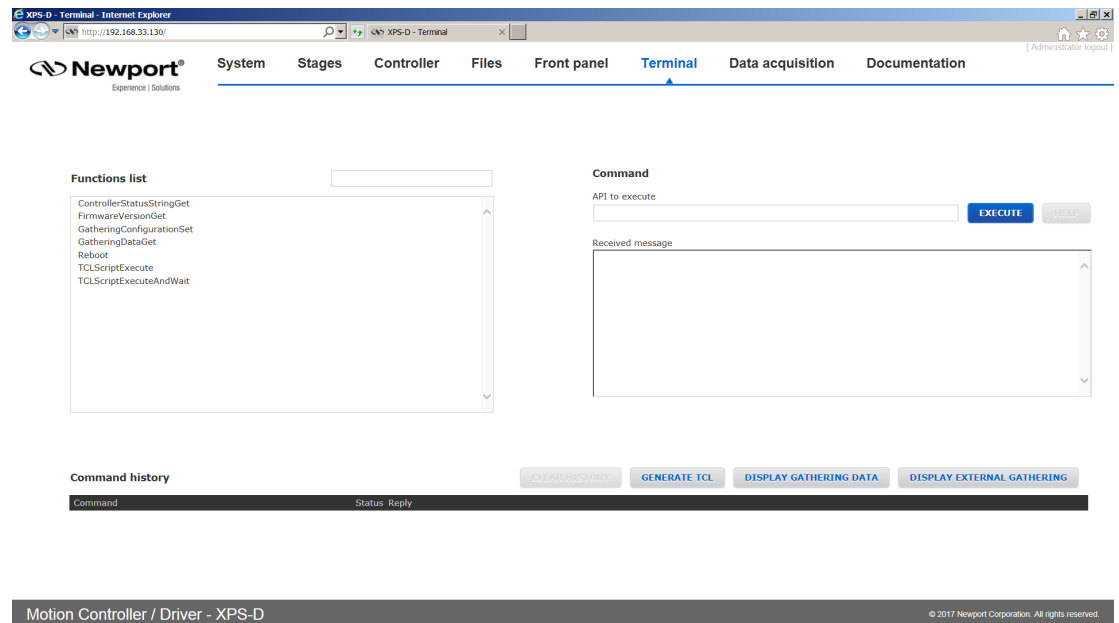
In this page, the administrators can specify which API functions will be displayed to all users.

Click a line to select/deselect the API. Changes require a controller restart to apply. Only the selected APIs will be visible in **Terminal** (currently: 3 selected)

RESTORE DEFAULTS - SELECT ALL UNSELECT ALL RESTART CONTROLLER

API name	Description
<input checked="" type="checkbox"/> FirmwareVersionGet	Return firmware version from firmware.ref
<input type="checkbox"/> FirmwareBuildVersionNumberGet	Return firmware build version number
<input type="checkbox"/> InstallerVersionGet	Return installer pack version
<input checked="" type="checkbox"/> Reboot	Reboot the controller
<input type="checkbox"/> RestartApplication	Restart the Controller
<input type="checkbox"/> ControllerMotionKernelTimeLoadGet	Get controller motion kernel time load
<input type="checkbox"/> ControllerRTTimeGet	Get controller corrector period and calculation time
<input type="checkbox"/> ControllerStatusGet	Get controller current status and reset the status
<input type="checkbox"/> ControllerStatusRead	Read controller current status
<input checked="" type="checkbox"/> ControllerStatusStringGet	Return the controller status string
<input type="checkbox"/> ElapsedTimeGet	Return elapsed time from controller power on
<input type="checkbox"/> ErrorStringGet	Return the error string corresponding to the error code

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2.7 Controller – TCL to API Builder

Under **Controller** → **TCL to API builder**, users can write custom API functions from a TCL script then add the custom API to the terminal and launch the custom API.

Example

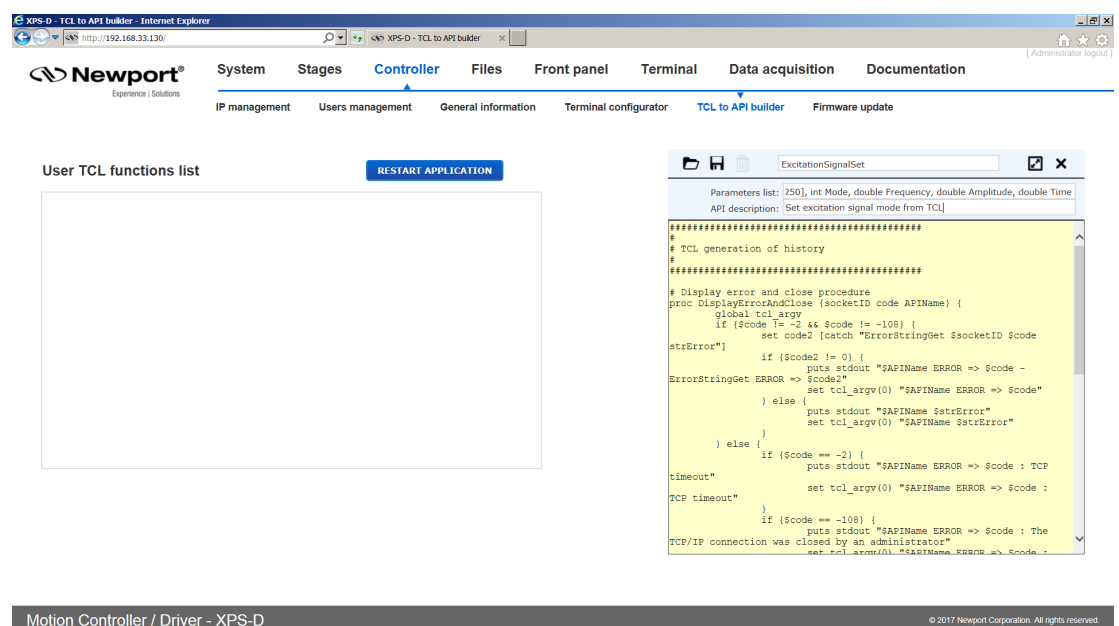
For this example, there must be a TCL file “ExcitationSignalSet.tcl” uploaded to the XPS controller.

Go to the XPS **Controller** → **TCL To API builder** webpage:

1. Load the existing TCL script named ExcitationSignalSet.tcl by clicking on the folder icon in the text editor.



2. In the Parameters list enter the arguments “char PositionerName[250], int Mode, double Frequency, double Amplitude, double Time”.
3. Enter a description in the API description: “Set excitation signal mode from TCL”.



- Save the custom API by clicking in the floppy disk icon in the text editor.



- In the TCL function list, “int ExcitationSignalSet(char PositionerName[250], int Mode, double Frequency, double Amplitude, double Time) // Set excitation signal mode from TCL” is added.
- Click “RESTART APPLICATION” to take in account the changes.
- Connect to the website, go to the “Terminal” page and search for the new API, “ExcitationSignalSet,” in the **Function list**.

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- Select new API and enter the parameters as usual.

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2.8 Controller – Firmware Update

NOTE

It is recommended to make a backup of the configuration using SAVE CONFIG utility before installing a new firmware version (refer to section 2.31 Files – Configuration Files).

Users can regularly update the controller with new firmware releases.

Before updating the firmware, we recommend to note the current firmware version (refer to section “2.5 Controller – General Information”), to be able to identify the changes made and listed in the InstallerHistory document.

Firmware updates may include the addition of new parameters to the configuration files (stages.ini, system.ini or system.ref files) which are required to ensure error-free controller restart. To maintain the initial configuration, it is necessary to check the presence of these parameters in the current configuration files and, if necessary, add them manually using the text editor (refer to section 2.31 Files – Configuration Files), and following the instructions given in the InstallerHistory document from the current version of firmware to the new one.

Refer to the InstallerHistory document, delivered with the new firmware pack, which explains changes to the configuration files, if any.

By selecting the “Reset the controller’s system/stages configuration to factory defaults” option in the installation confirmation window the firmware update will erase the current configuration files and replace them by compatible default configuration files, which requires to redo the configuration.

Refer to the XPS webpage at www.newport.com for more information including the InstallerHistory document, the StageDataBase.txt file and the new firmware installer pack.

Updating the XPS Firmware

1. Download the firmware installer pack from the XPS webpage at www.newport.com.
2. Connect to the XPS controller. For more information see Start-Up Manual.
3. Login on to the XPS with Administrator rights.
4. Go to Controller → Firmware update.

Firmware install log

update.log file contents

```
[2017-08-24 21:34:13] Filesystem update starting
[2017-08-24 21:34:13] Located snapshot: snapshot-20170824.tbz
[2017-08-24 21:35:57] Snapshot is authentic and looks consistent
[2017-08-24 21:36:15] WARNING: this controller's firmware.ref doesn't specify an installer type
[2017-08-24 21:36:34] Snapshot can be extracted without error
[2017-08-24 21:36:34] Selected files successfully backed up
[2017-08-24 21:36:34] System partition successfully formatted as a G2X4 filesystem
[2017-08-24 21:36:34] System partition successfully checked against bad blocks
[2017-08-24 21:36:34] Second-stage bootloader successfully installed
[2017-08-24 21:36:34] System partition successfully mounted
[2017-08-24 21:38:03] Snapshot successfully extracted
[2017-08-24 21:38:03] Operating system kernel successfully installed
[2017-08-24 21:38:03] Backed up files successfully restored
```

Available firmwares

175.6 Mb free / 383.4 Mb total

Firmware name	Size	Uploaded	Action
snapshot-20170725.tbz	77.2 Mb	2017-07-27 17:03:50	DOWNLOAD INSTALL DELETE
rescue-20170720.tbz	34.0 Mb	2017-07-27 17:49:14	DOWNLOAD INSTALL DELETE
snapshot-20170824.tbz	95.3 Mb	2017-08-24 23:31:46	DOWNLOAD INSTALL DELETE

[UPLOAD FIRMWARE](#)

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5. Click on UPLOAD FIRMWARE and select the installer pack file saved on the PC.
6. Click INSTALL and the following Confirmation window appears:

Confirmation

Please confirm you want to **install** the following firmware snapshot:

snapshot-XPS-D-USB_N13105-MREF.tbz

This operation will take a few minutes, during which the system will be reformatted.
It will not destroy the users' files, which are on a separate partition.

☐ Reset the controller's IP address to factory defaults
☐ Reset the controller's system/stages configuration to factory defaults
☐ Reset all user accounts to factory defaults
☐ Factory reset (WARNING: all user files will be destroyed!)

☒ YES, I confirm that I want to install this upgrade

INSTALL NOW CANCEL

7. Select “Yes, I confirm that I want to install this upgrade.” to confirm installation.
Resetting the controller's IP address, configuration files or user accounts is optional.
Factory reset option performs all options and restore factory settings.

NOTE

Controller configuration files including stages.ini and system.ini files can be downloaded under Files→ Configuration files prior to updating the controller firmware. See chapter 2.31: “Files – Configuration Files” for more information.

8. Click INSTALL NOW.

NOTE

This will reboot the controller and reset the controller configuration if requested before.

A firmware update occurred

It appears that there are new entries in the firmware install logs.

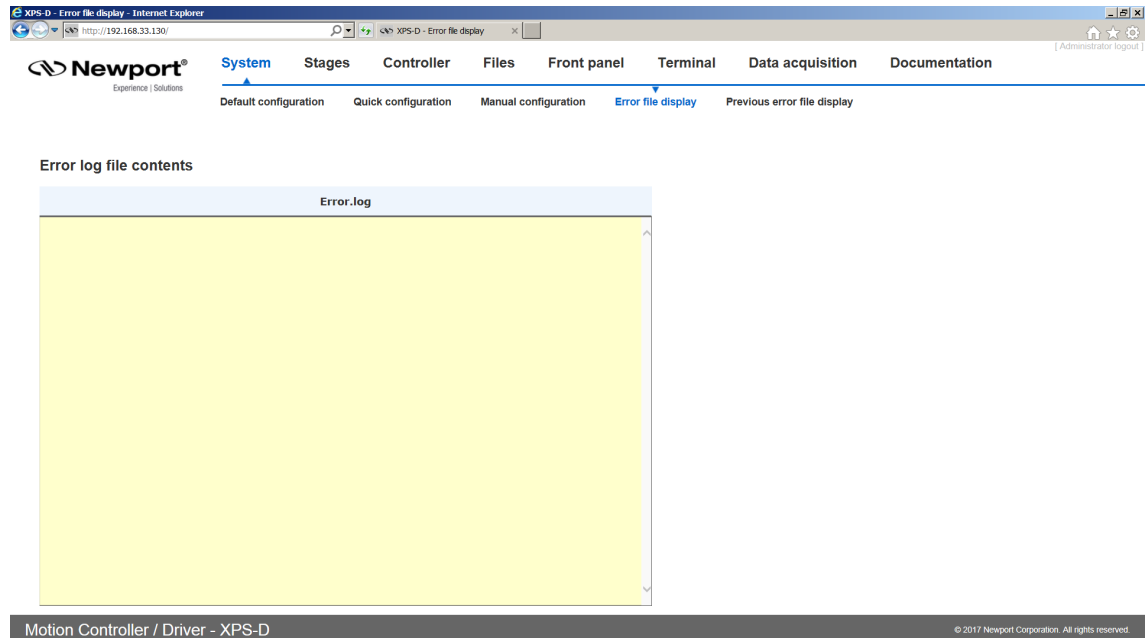
You will be taken to the firmware update page in order to review the update logs and ensure that everything went fine.

OK

2.9 System – Error file Display

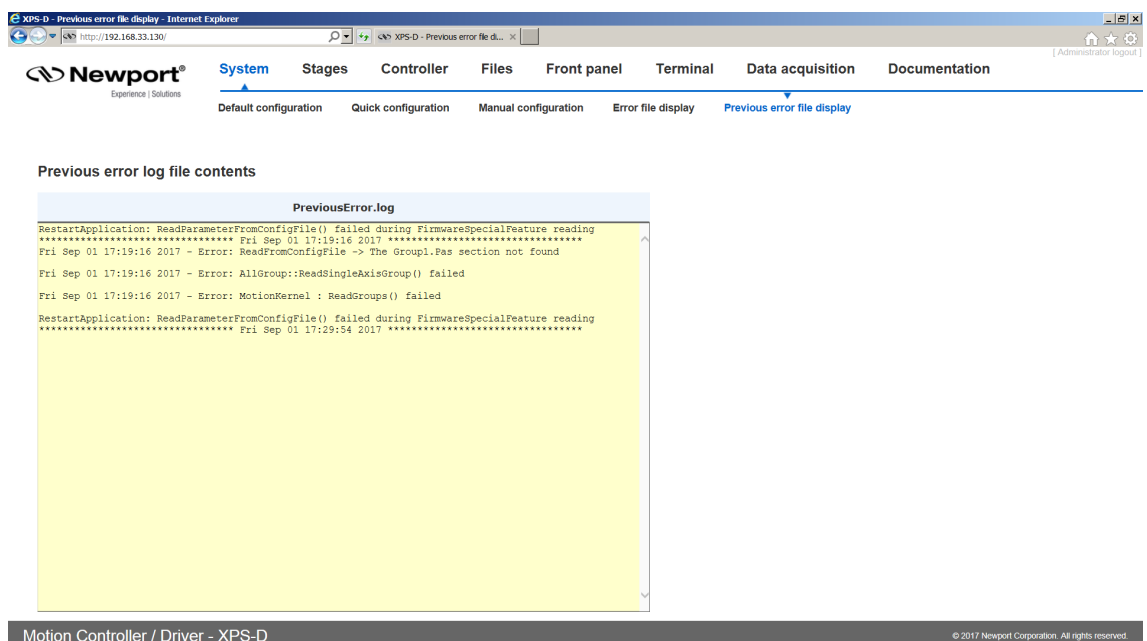
The Error File Display is another important screen for troubleshooting the XPS controller. When the XPS encounters any error during booting, for instance due to an error in the configuration files or because the configuration is not compatible with the connected hardware, there are entries in the error log file that guides you to correct the error. If several consecutive boot sequences contain errors, they are all reported.

When no error is detected during the last system boot, this file becomes blank.



2.10 System – Previous Error File Display

The Previous error file display shows all errors encountered during the previous series of consecutive faulty XPS boots once the last is OK. After the following boot (OK or not), this file becomes blank.



2.11 System – Default Configuration

With the help of this screen, a fast, basic configuration of the XPS controller can be done. For further information, refer to Configuration Manual.

Slot	Stage model	Driver model	Configuration in StageDataBase	Name
1	TRB25CC	XPS-DRV11	TRB@TRB25CC@XPS-DRV11	Group1.Pos
2	VP-25XA	XPS-DRV11	VP@VP-25XA@XPS-DRV11	Group2.Pos
3	UTS50CC	XPS-DRV11	UTS@UTS50CC@XPS-DRV11	Group3.Pos
4	BGS50CC	XPS-DRV11	BGS@BGS50CC@XPS-DRV11	Group4.Pos
5	Unknown	none	Unknown configuration	Not used
6	Unknown	none	Unknown configuration	Not used
7	Unknown	none	Unknown configuration	Not used
8	Unknown	none	Unknown configuration	Not used

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2.12 System – Quick Configuration

The Quick configuration is very similar to the Default configuration as it also lists all detected hardware including Newport ESP compatible stages and motor drivers under the respectively columns Stage Model and Driver model. The Quick configuration differs in the source for stage configuration.

As a result, this screen also provides valuable information for diagnosing or troubleshooting the system.

For further information, refer to Configuration Manual.

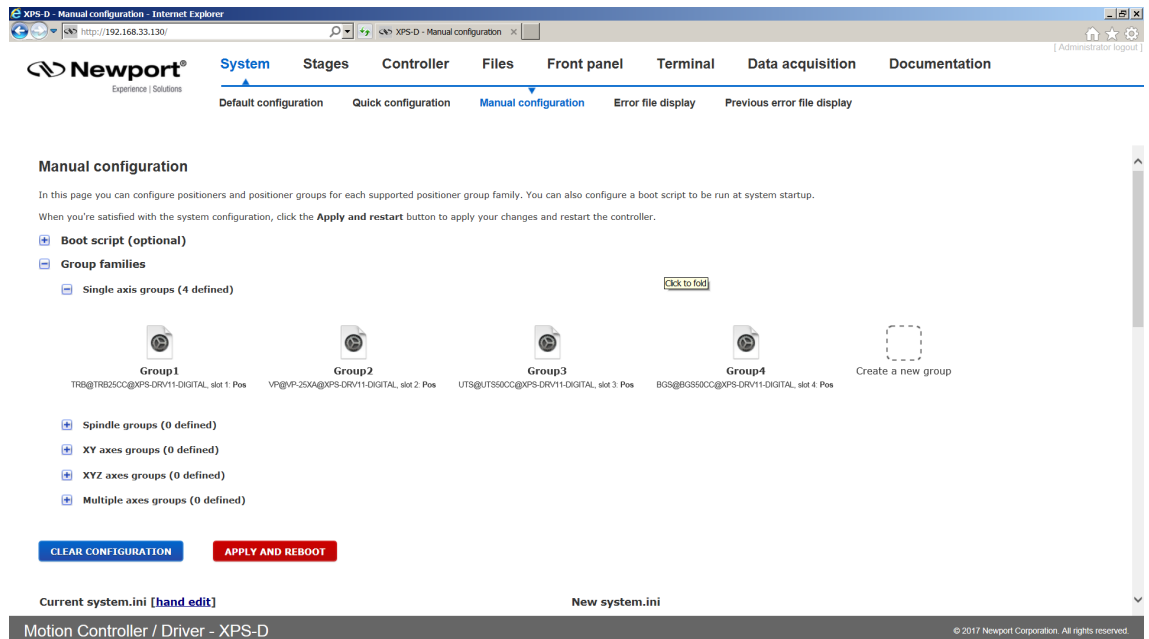
Slot	Stage model	Driver model	Configuration in stages.ini	Name
1	TRB25CC	XPS-DRV11	<input type="checkbox"/>	Not used
2	VP-25XA	XPS-DRV11	<input type="checkbox"/>	Not used
3	UTS50CC	XPS-DRV11	<input type="checkbox"/>	Not used
4	BGS50CC	XPS-DRV11	<input type="checkbox"/>	Not used
5	Unknown	none	<input type="checkbox"/>	Not used
6	Unknown	none	<input type="checkbox"/>	Not used
7	Unknown	none	<input type="checkbox"/>	Not used
8	Unknown	none	<input type="checkbox"/>	Not used

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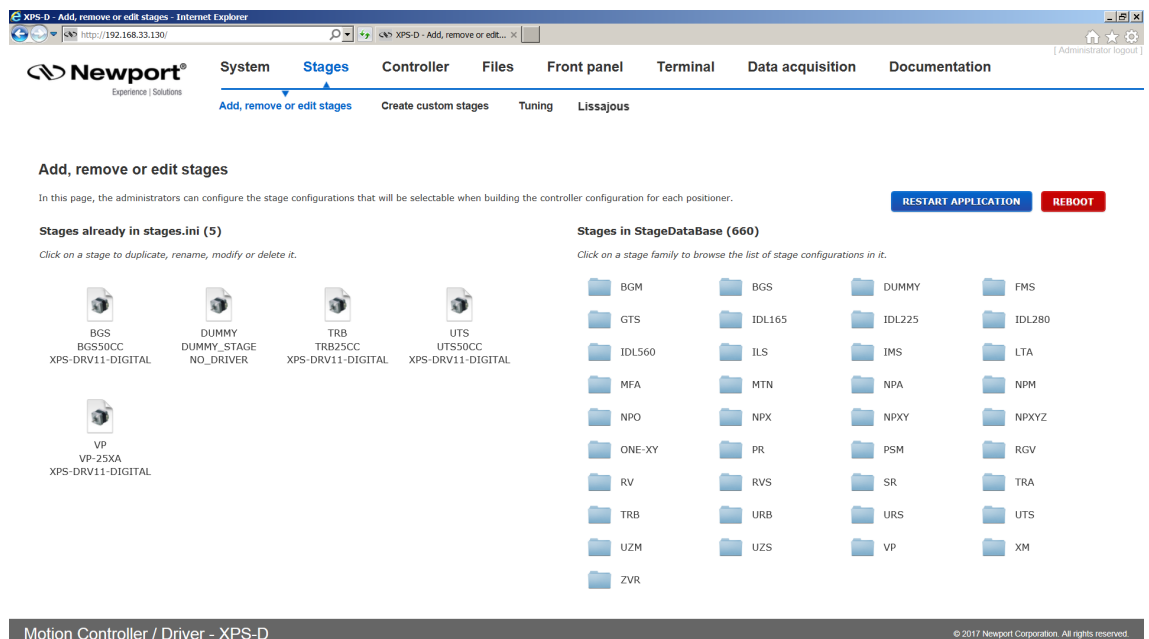
2.13 System – Manual Configuration

Manual Configuration allows you to review the current system configuration or to define a new one. See Configuration Manual for further information.



2.14 Stage – Add, Remove or Edit Stages

With the help of this screen, a stage from the Newport stage data base can be added to or removed from the personal stage data base, called stages.ini, as well as modified. On the left side of the screen, you can review the name of the stages that are already in stages.ini file. See Configuration Manual for details.



2.15 Stages – Create Custom Stages

This web page is used to build stage configuration files for stages not found in the controller's StageDataBase.txt such as non-Newport stages.

The integrated web tool, **Stages → Create custom stages**, is accessible when logged in as administrator. This web tool is designed to help users configure the XPS controller for motors and stages that are not included in the XPS general stage data base such as stages not manufactured by Newport. The tool generates a new entry in the customer's stage database, *stages.ini*, which is stored on the controller and is accessible through the webpage **Files → Configuration files**.

Refer to Configuration Manual for more information.

Newport
Experience | Solutions

System **Stages** Controller Files Front panel Terminal Data acquisition Documentation

Add, remove or edit stages **Create custom stages** Tuning Lissajous

Add custom stage

Single click to configure an item, double-click to change its type. The stage is ready to be saved when all the boxes are green.

```

graph LR
    Backlash[Backlash  
Please set]
    Profiler[Profiler  
Please set]
    Corrector[Corrector  
Please set]
    MotorDriver[Motor driver interface  
Please set]
    Driver[Driver  
Please set]
    Stage[Stage  
Please set]
    Encoder[Encoder  
Please set]
    MotionDone[Motion done  
Please set]
    HomeSearch[Home search  
Please set]
    Servitudes[Servitudes  
Please set]

    Profiler --> Corrector
    Corrector --> MotorDriver
    MotorDriver --> Driver
    Driver --> Stage
    Stage --> Encoder
    Encoder --> MotionDone
    Encoder --> HomeSearch
    HomeSearch --> Servitudes
  
```

Work in progress

ABORT SAVE CLEAR

ADD TO STAGE DATA

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2.16 Stages – Tuning

2.16.1 Tuning – Auto-Scaling

Auto-scaling is only available with positioners that feature a direct drive motor such as the XM, ILS-LM, IMS-LM or RGV100BL. To guarantee consistent performance of these stages, it is strongly recommended to perform Auto-scaling once the load is attached to the stage. During auto-scaling, the XPS controller measures the mass (inertia for rotation stages) on the positioner and returns recommended values for the Scaling Acceleration parameter.

Repeat Auto-scaling with any major change of the payload on the positioner. With no major change of the payload, there is no need to redo Auto-scaling.

To perform Auto-scaling, do the following:

1. Select the main tab TUNING. Then select a positioner name. The following screen appears:

Positioner tuning

Group1.Pos Refresh delay (ms): 200

Current position: -4.91336 Absolute move:

State: Not initialized state due to a GroupKill or KillAll command

Corrector parameters

Type: Positioner corrector PIDFF acceleration

Closed loop status: 1 (closed)

KP: 219000

KI: 15600000

KD: 875

KS: 0.8

Integration time (s): 1e+99

Derivative filter cut off frequency (Hz): 4000

GKP: 0

GKI: 0

GKD: 0

K form: 0

K feed forward acceleration (units/s/s): 1

K feed forward jerk: 0

Mode: Short setting

Filters parameters

Type: Positioner corrector notch filters

Notch frequency 1 (Hz): 0

Notch bandwidth 1: 0

Notch gain 1: 0

Notch frequency 2 (Hz): 0

Notch bandwidth 2: 0

Notch gain 2: 0

Backlash filter parameters

Current velocity cut-off frequency: 50

Current acceleration cut-off frequency: 50

Acquisition parameters

Gathering 1: ☒

Gathering 2: ☒

Gathering 3: ☒

Gathering 4: ☒

Gathering 5: ☒

Number of points: 1000

Frequency divider: 10

Velocity: 720

Acceleration: 1000

Minimum jerk time: 0.005

Maximum jerk time: 0.05

Distance to move (relative): 0

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2. Click “Kill” if not in “Not initialized state”, then click “Auto-scaling”. The stage vibrates and an auto-scaling progress bar appears.

Positioner tuning

Group1.Pos Refresh delay (ms): 200

Current position: 0.32459 Absolute move:

State: Scaling calibration state

Corrector parameters

Type: Positioner corrector PIDFF acceleration

Closed loop status: 1 (closed)

KP: 219000

KI: 15600000

KD: 875

KS: 0.8

Integration time (s): 1e+99

Derivative filter cut off frequency (Hz): 4000

GKP: 0

GKI: 0

GKD: 0

K form: 0

K feed forward acceleration (units/s/s): 1

K feed forward jerk: 0

Mode: Short setting

Filters parameters

Type: Positioner corrector notch filters

Notch frequency 1 (Hz): 0

Notch bandwidth 1: 0

Notch gain 1: 0

Notch frequency 2 (Hz): 0

Notch bandwidth 2: 0

Notch gain 2: 0

Backlash filter parameters

Current velocity cut-off frequency: 50

Current acceleration cut-off frequency: 50

Acquisition parameters

Gathering 1: ☒

Gathering 2: ☒

Gathering 3: ☒

Gathering 4: ☒

Gathering 5: ☒

Number of points: 1000

Frequency divider: 10

Velocity: 720

Acceleration: 1000

Minimum jerk time: 0.005

Maximum jerk time: 0.05

Distance to move (relative): 0

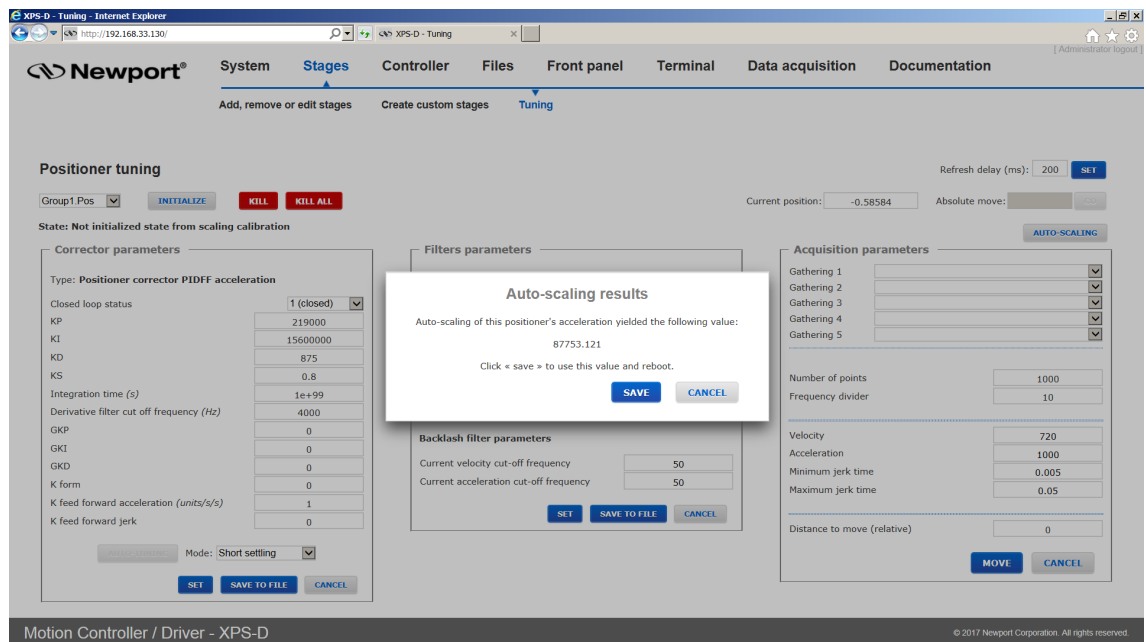
Auto-scaling in progress

Please wait while the controller attempts to auto-scale this positioner's acceleration.

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- When the auto-scaling routine is complete, the results are displayed. To save the recommended values and reboot the controller, click “Save”. The positioner should now work properly.



NOTE

All other functions of the tuning page should be used only by experienced users.

2.16.2 Tuning – Auto-Tuning

NOTE

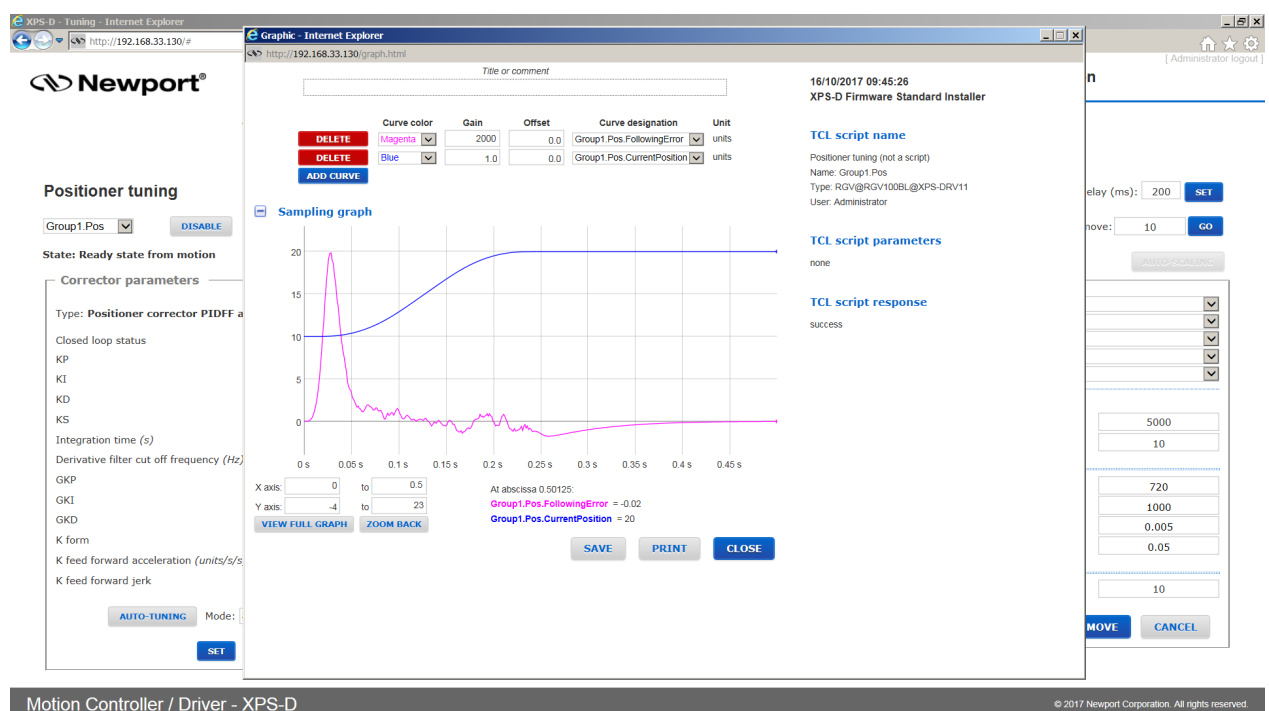
Apart from the Auto-scaling feature, which is described in the previous chapter, only experienced motion control users should use the TUNING tool of the XPS controller.

All Newport positioners are supplied with default tuning parameters that provide consistently high performance for the vast majority of applications. Use the Tuning tool with Newport positioners only when not fully satisfied with the dynamic behavior of the positioners. Auto-Tuning works best with direct drive stages. Friction drive or ballscrew drive systems may not result in optimum tuning using this feature.

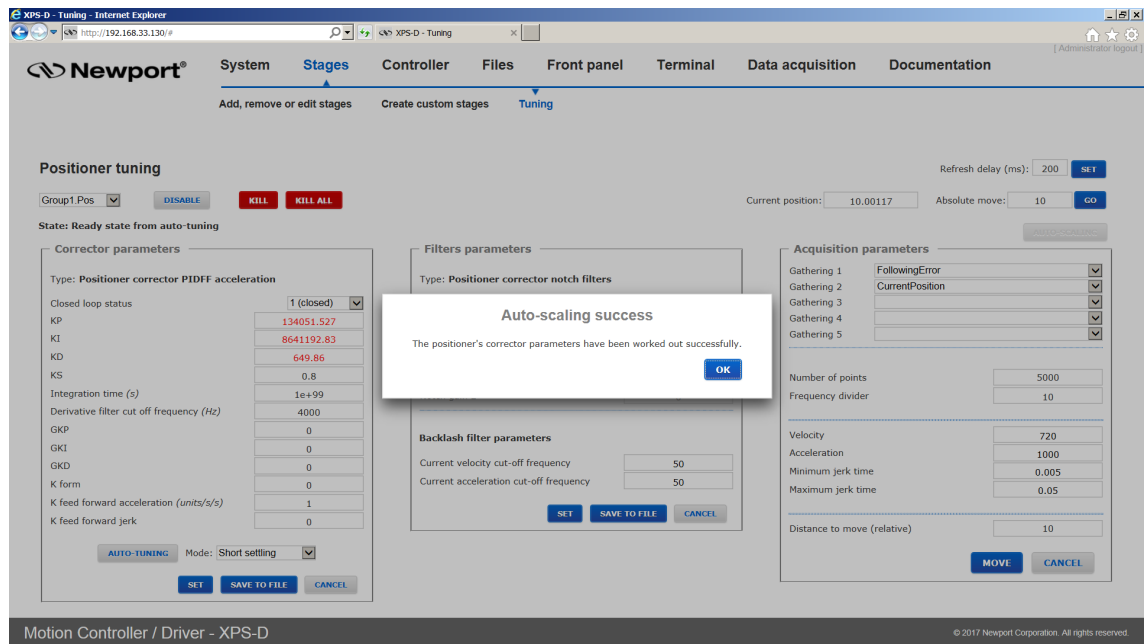
The following is a brief description of the TUNING tool:

- Select a positioner name. The following screen appears:

- Using this screen, perform a data gathering with your current parameter settings:
 - Initialize and home the positioner, then move to the desired start position (set the position in the “Absolute move” field on top right and then click “Go”).
 - Under “Acquisition parameters”, define the gathering data: For the stage tuning, it is recommended to gather only the following error and the current position.
 - Define the frequency divisor. The frequency divisor defines the sampling rate of the gathering. A frequency divisor equal to one means one data point is gathered every servo cycle. With most positioners, it is sufficient to set a value of 10.
 - Define the number of points in relation to the distance, the frequency divisor, the velocity and the acceleration.
 - Define the velocity, acceleration and jerk time.
 - Define a typical motion distance.
 - When done, click “MOVE”. The following page appears:



3. If satisfied with the results, there is no need to tune the stage. If not satisfied, return to the tuning page by clicking “Close” and move back to the start position.
4. Next to the Auto-tuning button, there is a Mode field for Auto-tuning. Select “Short settling” or “High robustness”. Choose “Short settling” to improve the settling time after a motion or to reduce the following error during the motion. Short settling will define “high” PID vales for your stage, but there is a risk of oscillation. Choose “High robustness” to improve the robustness of the motion system and to avoid oscillations during or after a motion. “High robustness”, for instance, can avoid oscillations for a rotation stage with high payload inertia. When done with the selection, click Auto-tuning.
5. The stage vibrates for a couple of seconds. When done the following screen appears:



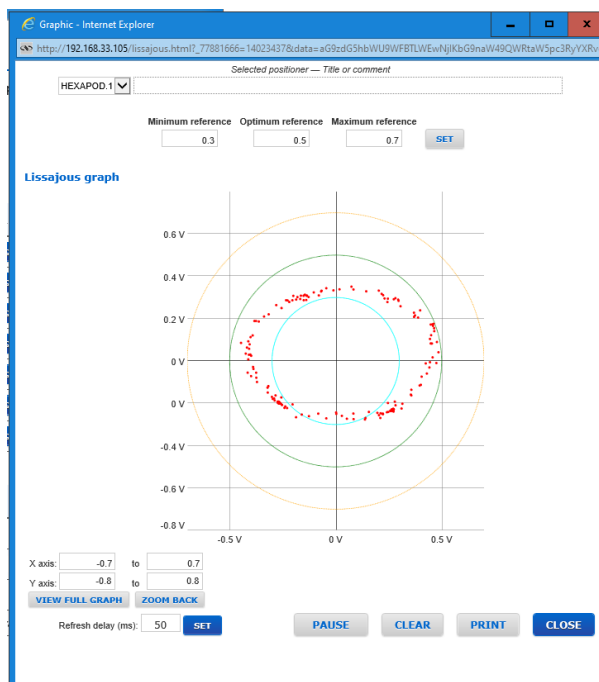
6. Press “OK” in the pop-up window, the proposed modifications are colored in red. You must click “Set” to apply the new parameters. “Set” only changes the working parameters without saving them. Recover the previous parameters by rebooting the system.
7. To test the behavior of the motion system with the new parameters, repeat the same data gathering and compare the results. Make manual changes to the settings if necessary and verify the behavior.
8. To permanently save the settings to the stages.ini, press “SAVE TO FILE”. “SAVE TO FILE” overwrites the current settings in your stages.ini. Press “SAVE TO FILE” only when fully satisfied with the results. For recovery, Newport recommends making a copy of the stages.ini with the old settings.

NOTE

For further information about the meaning of the different tuning parameters, see Features Manual.

2.17 Stages – Lissajous

This page shows the current analog encoder signals. Refer to Features Manual for more details.



2.18 Front panel – Move

The Move page provides access to basic group functions like initialize, home, or motor disable, and executes relative and absolute moves where speed, acceleration and jerk time can be modified during motion (but not during the acceleration period).

The Move page also provides a convenient review of all important group information like group names, group states and positions. All motion groups are listed in the Move page.

- Click “Initialize”. The State number changes from 0 to 42 and the Action button changes from “Initialize” to “Home”.
- Click “Home”. The stage starts moving to find its reference position. When done, the state number is 11 and the action button changes to disable.
- Enter an allowed absolute position value in the “Abs move 1” or “Abs move 2”, or a relative move value in the “Relative move” field and click “Go”. The stage moves to the new position.
- You can click on “Disable” to disable a stage. The Action button changes to “Enable”.
- Click on “Enable” to enable the stage again without losing encoder position.

Move to position

Position	State	Action	Positioner	Parameters	Absolute move 1	Absolute move 2	Relative move
-0.36361663	7	INITIALIZE	Group1.Pos				
-2.9726	1	INITIALIZE	Group2.Pos				
6.227	1	INITIALIZE	Group3.Pos				
-6.258268	1	INITIALIZE	Group4.Pos				
		KILL ALL					

Refresh delay (in milliseconds):

NOTE

A spindle group can do relative moves and absolute moves. So, it can be used in the Move page. See Features Manual for more information about Spindle moves.

NOTE

In case of XPS-D controller driving a hexapod, even though this Move page can be used to move each actuator independently, it is much easier to use HXP Tool or HXP Work page, through which all actuators will be simultaneously controlled to obtain the desired carriage motion.

2.19 Front panel – Cycle

The cycle page allows cycling of a stage. A cycle motion moves back and forth between two defined positions where speed, acceleration and jerk time can be modified during motion (but not during the acceleration period).

Cycle between two positions

Position	State	Action	Positioner	Parameters	Position 1	Position 2	Dwell time	Cycle
-0.36361663	7	INITIALIZE	Group1.Pos				ms	
-2.9726	1	INITIALIZE	Group2.Pos				ms	
6.227	1	INITIALIZE	Group3.Pos				ms	
-6.258268	1	INITIALIZE	Group4.Pos				ms	
KILL ALL								

Refresh delay (in milliseconds): 200 SET

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2.20 Front panel – Jog

The Jog page allows executing a jog motion. A jog motion is a continuous motion, where only the speed and acceleration are defined, but no target position. Speed and acceleration can be changed during the motion (but not during the acceleration period).

For a Jog motion, the jog mode must be enabled: click on the “Action” button to Initialize, Home and then Enable Jog.

Jog to velocity

Position	State	Action	Positioner	Parameters	Jog
-0.36361663	7	INITIALIZE	Group1.Pos		
-2.9726	1	INITIALIZE	Group2.Pos		
6.227	1	INITIALIZE	Group3.Pos		
-6.258268	1	INITIALIZE	Group4.Pos		
KILL ALL					

Refresh delay (in milliseconds): 200 SET

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2.21 Front panel – Spindle

The Spindle page provides similar functions to the Jog page. However, specific jog actions are replaced by spindle actions that only work for Spindle groups.

NOTE

Spindle configuration does not allow indexing of the rotary stage. For a rotary stage to have indexing and move more than 360 degrees, the user must configure the stage as a group type other than spindle and change the software travel limits, MinimumTargetPosition and MaximumTargetPosition, in the stages.ini file. Refer to section 2.14: “Stage – Add, Remove or Edit Stages” for more details. Additionally, the rotary may need to have optical travel limits disabled. Refer to the rotary stage User's Manual.

Spindle

Position	State	Action	Positioner	Parameters	Spindle
-0.36361663	7	[Buttons]	Group1.Pos	[Buttons]	[Buttons]
-2.9726	1	[Buttons]	Group2.Pos	[Buttons]	[Buttons]
6.227	1	[Buttons]	Group3.Pos	[Buttons]	[Buttons]
-6.258268	1	[Buttons]	Group4.Pos	[Buttons]	[Buttons]
[KILL ALL]					

Refresh delay (in milliseconds): [SET]

2.22 Front panel – I/O Control

The I/O Control page shows the current states or values of all analog and all digital I/O's of the controller and allows the user to set all the analog and digital outputs of the controller.

Digital I/O

Connector	I/O	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
GPIO3.DI	IN	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GPIO3.DO	OUT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GPIO5.DI	IN	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GPIO5.DO	OUT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GPIO6.DI	IN	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GPIO6.DO	OUT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Analog I/O

Connector	I/O	Value
GPIO4.ADC1	IN	-0.00152
GPIO4.ADC2	IN	-0.00122
GPIO4.ADC3	IN	-0.00152
GPIO4.ADC4	IN	-0.00182
GPIO4.ADC5	IN	-0.00091

Connector	I/O	Value
GPIO4.DAC1	OUT	0.00000 <input type="button" value="SET"/>
GPIO4.DAC2	OUT	0.00000 <input type="button" value="SET"/>
GPIO4.DAC3	OUT	0.00000 <input type="button" value="SET"/>
GPIO4.DAC4	OUT	0.00000 <input type="button" value="SET"/>
GPIO4.DAC5	OUT	0.00000 <input type="button" value="SET"/>

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2.23 Front panel – Device Status

The Device Status page contains several sections.

2.23.1 Device Status – Positioner Errors

The Positioner Errors section is an important page for trouble-shooting. When encountering any problems during the use of the system, information about the errors related to the positioners are found in this page.

Positioner errors

	Group 1 Pos	Group 2 Pos	Group 3 Pos	Group 4 Pos
Positioner error state	OK	OK	OK	OK
I2C transfert error				
GPIO transfert error				
Fatal internal error				
Interferometer glitch error on axis or reference or Zygo P2 fatal error				
Interferometer no signal error on axis or reference				
Home search mechanical zero inconsistency				
AqB and Sine/Cosine out of phase				
Second driver in fault				
First driver in fault				
X or Y correction is out of encoder correction limits				
Sine and Cosine radius error				
Encoder frequency or coherence error				
Encoder quadrature error				
Plus end of run glitch				
Minus end of run glitch				

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2.23.2 Device Status – Hardware Status

The Hardware Status section is another important page for trouble-shooting, but not all information is related to an error.

The screenshot shows the 'Hardware status' section of the XPS-D interface. It contains a table with the following data:

	Group1 Pos	Group2 Pos	Group3 Pos	Group4 Pos
External gathering error				
I2C transfer error				
GPIO External gathering error				
PCO pulses ended				
PCO error (underrun)				
Interferometer glitch error on axis or reference				
Interferometer no signal error on axis or reference				
Second driver powered on				
First driver powered on	x	x	x	x
Second driver in fault				
First driver in fault				
X or Y correction is out of encoder correction limits				
Sine and Cosine radius error				
AqB overspeed				
Encoder quadrature error				

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2.23.3 Device Status – Driver Status

The Driver Status section is another important page for trouble-shooting, but not all information is related to an error.

The type of status information that you can get depends on the drivers used.

The screenshot shows the 'Driver status' section of the XPS-D interface. It contains a table with the following data:

	Group1 Pos	Group2 Pos	Group3 Pos	Group4 Pos
Driver in fault				
Inhibition input				
TG is opened or no stage connected				
Current or power limit				
I2T or dynamic error				
Initialization or Invalid parameters or Digital stepper overrun error				
Thermistor fault or over temperature				
Safe Stop or Internal fuse broken or voltage out of range, contact Newport				
Short-circuit or current following error				

Refresh delay (in milliseconds): 200 SET

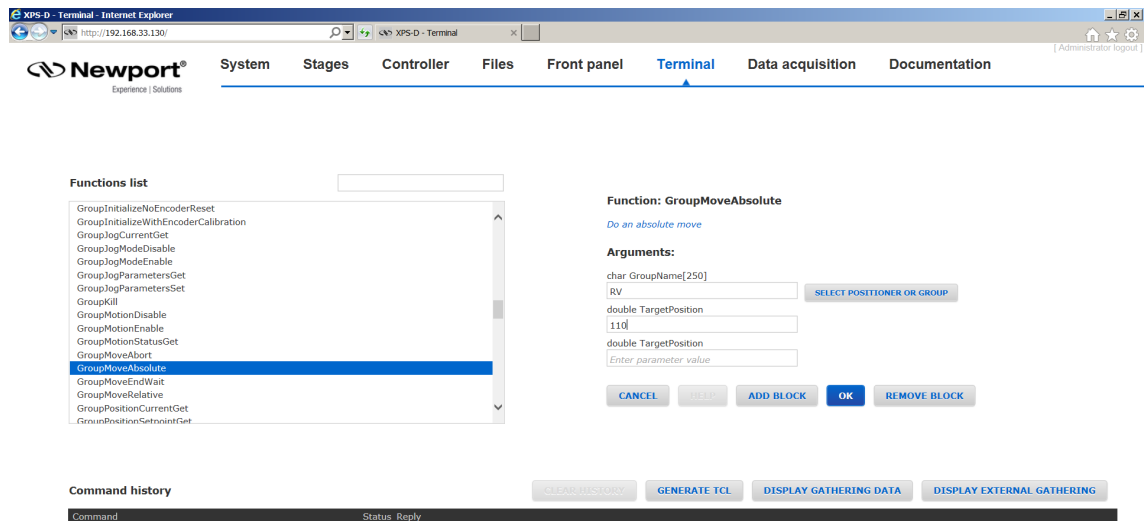
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2.24 Terminal

The Terminal screen allows the execution of all XPS controller functions. It also provides a convenient method for generating executable TCL scripts. For more details about TCL scripts, see **Features Manual**.

To execute a function from the Terminal, do the following:

1. Click to select a function, which then appears in the "API to execute" window.
2. Define the arguments for the function.
 - For functions with dynamic arguments "ADD BLOCK" and "REMOVE BLOCK" buttons are available. Alternatively, you can use a "," as a separator between different arguments.



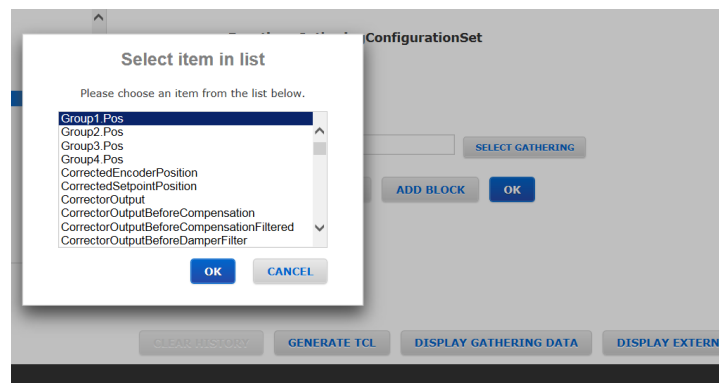
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- For some arguments like ExtendedEventName, ExtendedActionName or GatheringType, the argument name is not directly accessible. In these cases, define the first part of the argument name, then click in the field again and define the second part of the argument name. See the example below for defining the GatheringType with the function GatheringConfigurationSet():

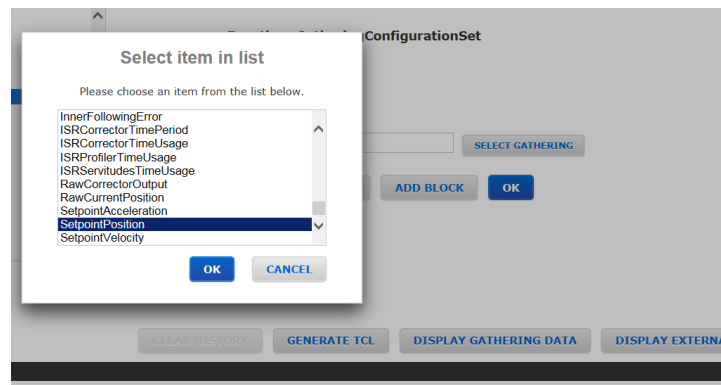
Step 1:

Click "SELECT EXTERNAL GATHERING" then select the positioner name and click "OK".



Step 2:

Click "SELECT EXTERNAL GATHERING" again then select the parameter name and click "OK".

**Step 3:**

To add another parameter, click **“ADD BLOCK”**.
Repeat Step 1 and Step 2.

Function: **GatheringConfigurationSet**

Configuration acquisition

Argument:

char Type[250]

Group1.Pos.SetpointPosition

SELECT GATHERING

CANCEL

HELP

ADD BLOCK

OK

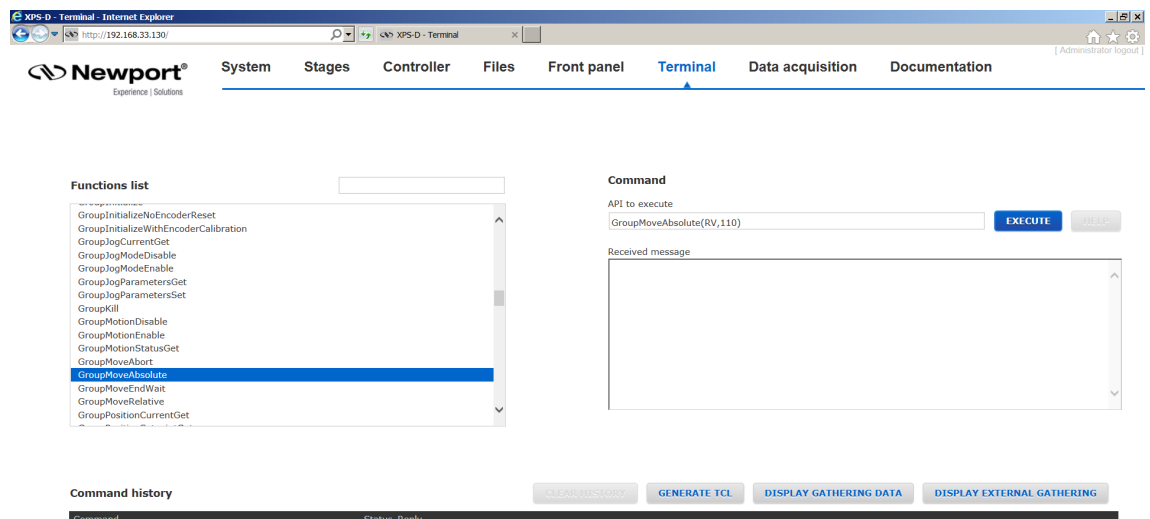
CLEAR HISTORY

GENERATE TCL

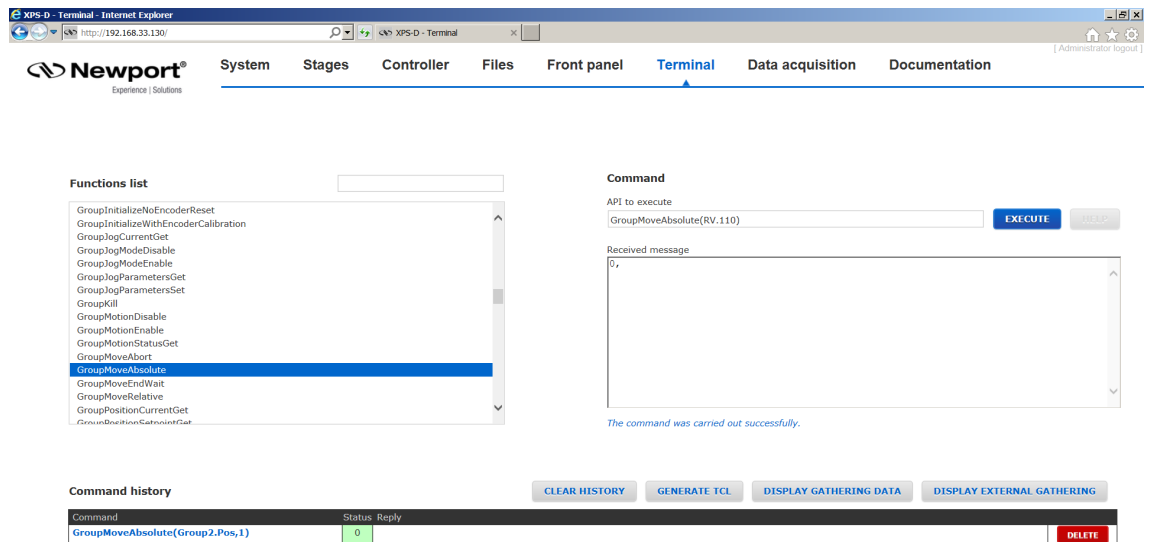
DISPLAY GATHERING DATA

DISPLAY EXTERNA

- When all arguments are defined, click **“OK”**. Now review the final syntax of the function and make final text changes, as needed. When done, click **“Execute”**.



- When the function is executed, the controller's response code will appear in the Received message window and a description will appear below the Received message window. If the command was carried out successfully, 0 is returned. In all other cases, there will be an error code. Use the function `ErrorStringGet()` to get the error code description.



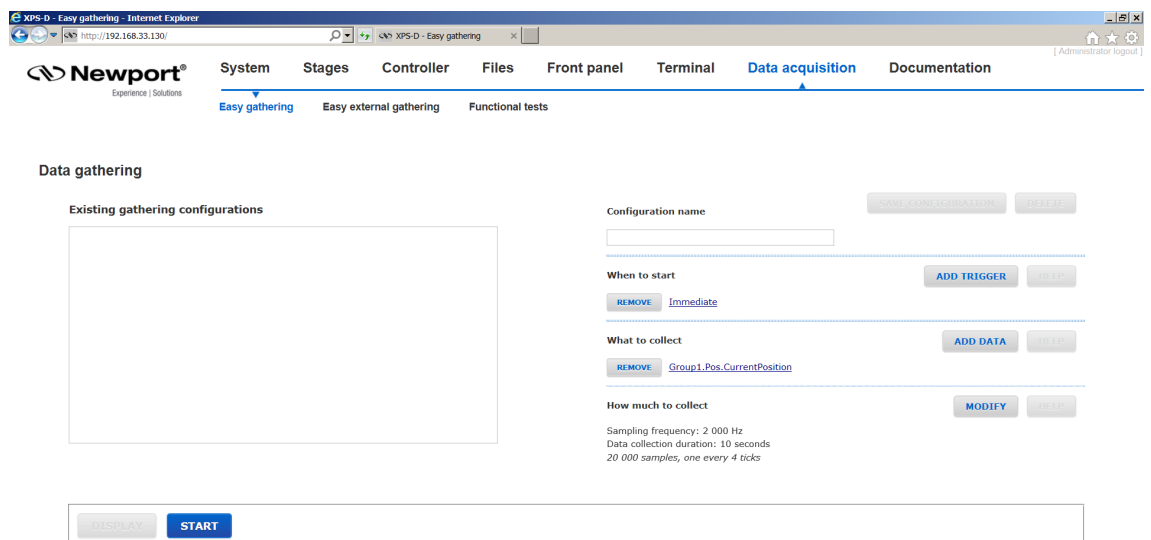
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The functions are listed in alphabetical order and can be searched for using the search bar at the top of the Function list. Functions listed are those available for display through the **Controller** → **Terminal configurator** or functions available for the current system configuration. For example, if the system consists only of SingleAxis groups, no group specific functions for Spindles, XY groups, XYZ groups or MultipleAxis groups will be listed.

2.25 Data Acquisition – Easy Gathering

Under **Data acquisition** → **Easy gathering**, users can define and save servo synchronous data gathering configurations for routine data acquisition operations including: time-based, event-based, or function based gathering. For more in-depth information regarding data gathering types, refer to **Features Manual**.



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The following procedure describes how to use the webpage to configure easy data gathering. In the initial factory configuration, an example trigger and data configuration is set (see example in the image below). It should be deleted before starting a new gathering.

Configuration name	SAVE CONFIGURATION	DELETE
<input type="text"/>		
<hr/>		
When to start	ADD TRIGGER	HELP
REMOVE Immediate		
<hr/>		
What to collect	ADD DATA	HELP
REMOVE Group1.Pos.CurrentPosition		
<hr/>		
How much to collect	MODIFY	HELP
Sampling frequency: 2 000 Hz Data collection duration: 10 seconds 20 000 samples, one every 4 ticks		

Step 1: Configuration name

1. Enter a name for the Gathering Configuration. *Example: Stage_Position.*

Configuration name	SAVE CONFIGURATION	DELETE
Stage_Position		
<hr/>		
When to start	ADD TRIGGER	HELP
Empty list. Please specify at least one trigger.		
<hr/>		
What to collect	ADD DATA	HELP
Empty list. Please select at least one type of data to collect.		
<hr/>		
How much to collect	MODIFY	HELP
Sampling frequency: 2 000 Hz Data collection duration: 10 seconds 20 000 samples, one every 4 ticks		

Step2: When to start

This step configures the data collection trigger and is based upon the API function `EventExtendedConfigurationTriggerSet([Actor].[Category].Event Name, Parameter1, Parameter2, Parameter3, Parameter4)`. For more information regarding this API, refer to **Features Manual**. If this section is not empty, delete example event trigger by clicking REMOVE.

1. Click on ADD TRIGGER and the following window appears.
2. From the list, highlight the group name, positioner name, TimerX or GPIO that triggers when to start collecting data and then click ADD. If the trigger selection is Immediately or Always, click OK and skip down to **Step 3: What to Collect.**

Example: *Group1.Pos*

Trigger selection

Please choose an item from the list below.

Group1

Group1.Pos

Group2

Group2.Pos

Group3

Group3.Pos

Group4

Group4.Pos

GPIO4.ADC1

GPIO4.ADC2

ADD

CLEAR

Event name:

Group1.Pos

Parameter 1:

Parameter 2:

Parameter 3:

Parameter 4:

OK

CANCEL

3.
- From the list, highlight the event that starts the data gathering and then click ADD. Depending on the event selection, Parameters 1 through Parameter 4 need to be filled in.

Example: *SGamma.ConstantVelocityState*

Trigger selection

Please choose an item from the list below.

SGamma.ConstantDecelerationEnd

SGamma.ConstantDecelerationStart

SGamma.ConstantDecelerationState

SGamma.ConstantVelocityEnd

SGamma.ConstantVelocityStart

SGamma.ConstantVelocityState

SGamma.MotionEnd

SGamma.MotionStart

SGamma.MotionState

Spin.ConstantAccelerationEnd

ADD

CLEAR

Event name:

Group1.Pos.SGamma.ConstantVelocityState

Parameter 1:

Parameter 2:

Parameter 3:

Parameter 4:

OK

CANCEL

4.
- Click OK when the trigger has been specified. Example: Gathering starts when the constant velocity state is reached for positioner Group1.Pos.

Configuration name

Stage_Position

SAVE CONFIGURATION

DELETE

When to start

REMOVE

Group1.Pos.SGamma.ConstantVelocityState

ADD TRIGGER

HELP

What to collect

ADD DATA

HELP

Empty list. Please select at least one type of data to collect.

How much to collect

MODIFY

HELP

Sampling frequency: 2 000 Hz

Data collection duration: 10 seconds

20 000 samples, one every 4 ticks

Step 3: What to collect

This step configures the data type to be collected and is based upon the API function `GatheringConfigurationSet([DataType])`. Refer to **Features Manual** for more information. If this section is not empty, delete example data collection type by clicking REMOVE.

1. Click on ADD DATA and the following window appears.
2. From the list, highlight the positioner name or GPIO from which data will be collected and then click ADD. Example: Group1.Pos

3. If a positioner name is selected, from the list, highlight the data type to be collected and then click ADD. Example: CurrentPosition

4. Click OK when the data type has been specified. Example: once the trigger event occurs, current position values will be collected for positioner Group1.Pos.

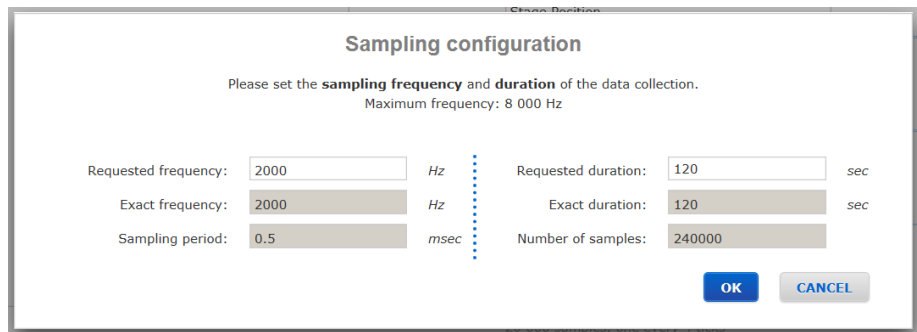
Configuration name	<input type="text" value="Stage_Position"/>	SAVE CONFIGURATION	DELETE
<hr/>			
When to start	REMOVE Group1.Pos.SGamma.ConstantVelocityState	ADD TRIGGER	HELP
<hr/>			
What to collect	REMOVE Group1.Pos.CurrentPosition	ADD DATA	HELP
<hr/>			
How much to collect	MODIFY HELP		
Sampling frequency: 2 000 Hz Data collection duration: 10 seconds 20 000 samples, one every 4 ticks			

5. Repeat Step 3 Add Data to add other data types to be collected under this specific Gathering Configuration.

Step 4: How much to collect

This step specifies the sampling frequency and sampling duration for the gathering configuration and is based upon the API function `EventExtendedConfigurationActionSet(GatheringRun, Nb of points, Divisor, 0, 0)`. Refer to **Features Manual** for more information.

1. Click on MODIFY to specify the frequency at which data is collected and the duration of the data sampling. The maximum sampling frequency is at the XPS servo rate. *Example: Data will be collected at 2 kHz frequency for a total of 2 minutes.*



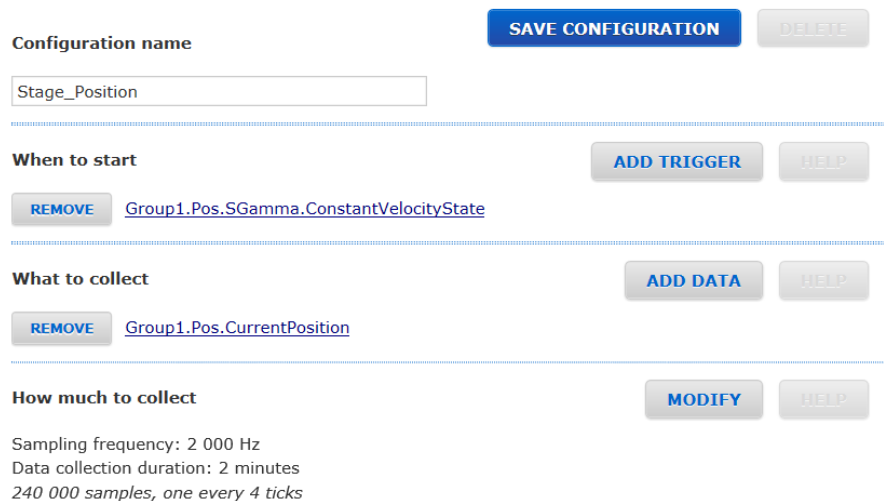
Sampling configuration

Please set the **sampling frequency** and **duration** of the data collection.
Maximum frequency: 8 000 Hz

Requested frequency:	<input type="text" value="2000"/>	Hz	Requested duration:	<input type="text" value="120"/>	sec
Exact frequency:	<input type="text" value="2000"/>	Hz	Exact duration:	<input type="text" value="120"/>	sec
Sampling period:	<input type="text" value="0.5"/>	msec	Number of samples:	<input type="text" value="240000"/>	

Step 5: Save Configuration

1. Click on SAVE CONFIGURATION to save the gathering configuration.
Example: Gathering starts when the constant velocity state is reached for positioner Group1.Pos. Once the trigger event occurs, current position values will be collected for positioner Group1.Pos. Data will be collected at 2 kHz frequency for a total of 2 minutes.



Configuration name

When to start

[Group1.Pos.SGamma.ConstantVelocityState](#)

What to collect

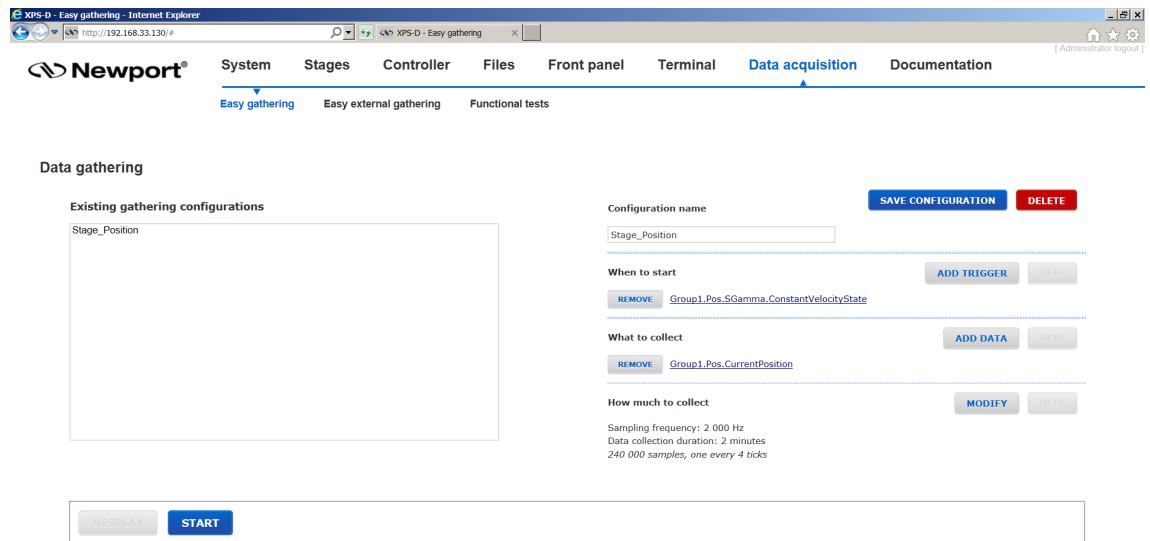
[Group1.Pos.CurrentPosition](#)

How much to collect

Sampling frequency: 2 000 Hz
Data collection duration: 2 minutes
240 000 samples, one every 4 ticks

Step 6: Start Gathering

1. To begin gathering data, click on START.



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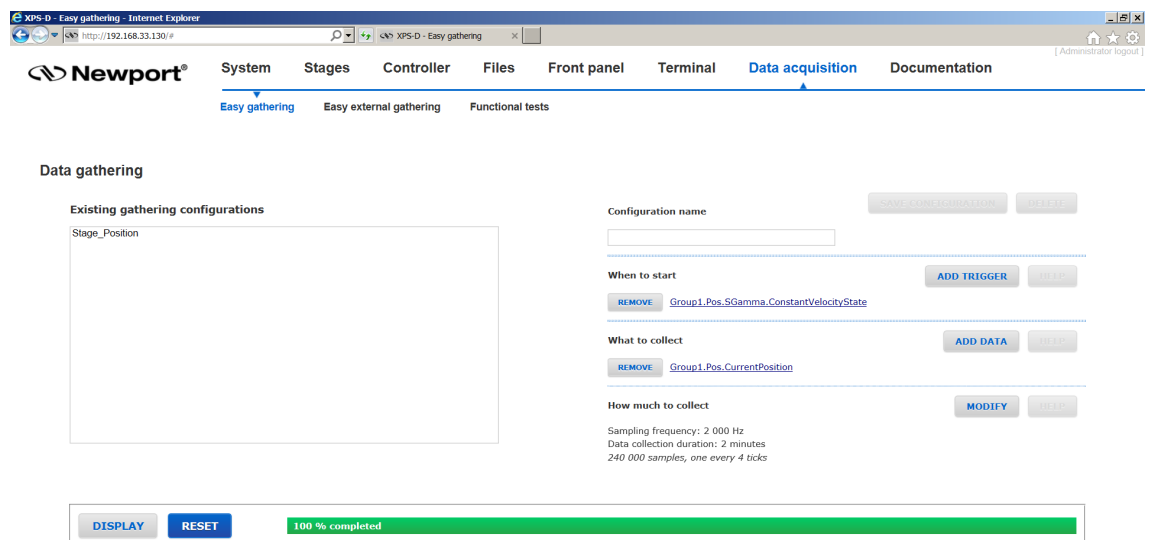
2. The controller then begins to monitor for the configured trigger.



3. Once the trigger event occurs, the data acquisition begins and a status bar appears.



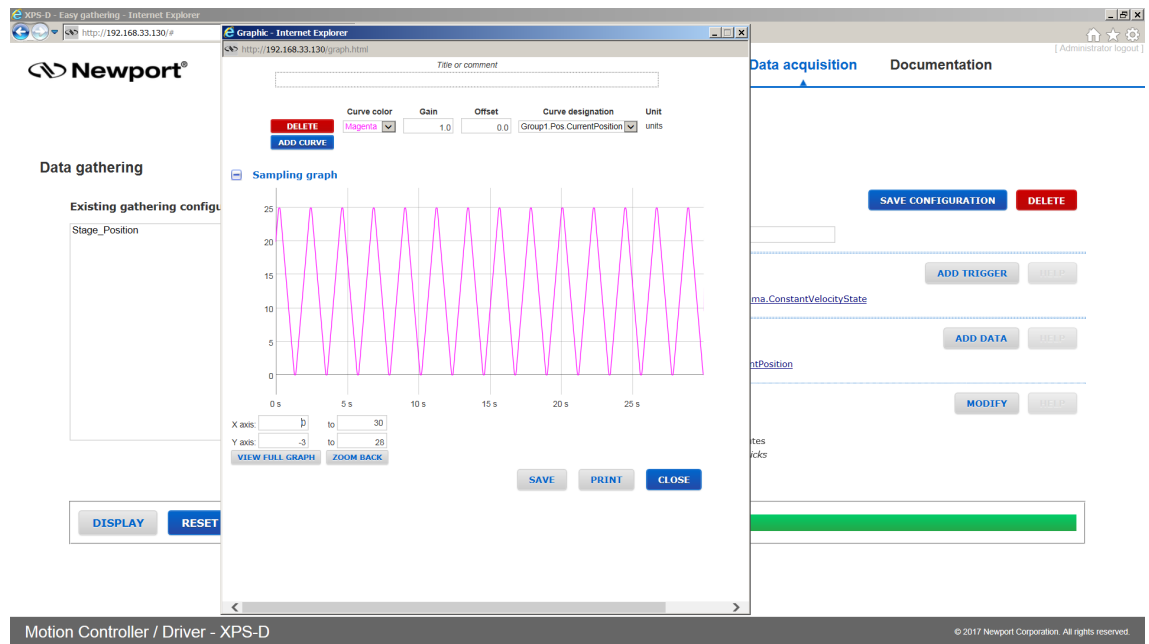
4. Once the data acquisition is complete, click on DISPLAY to view the data.



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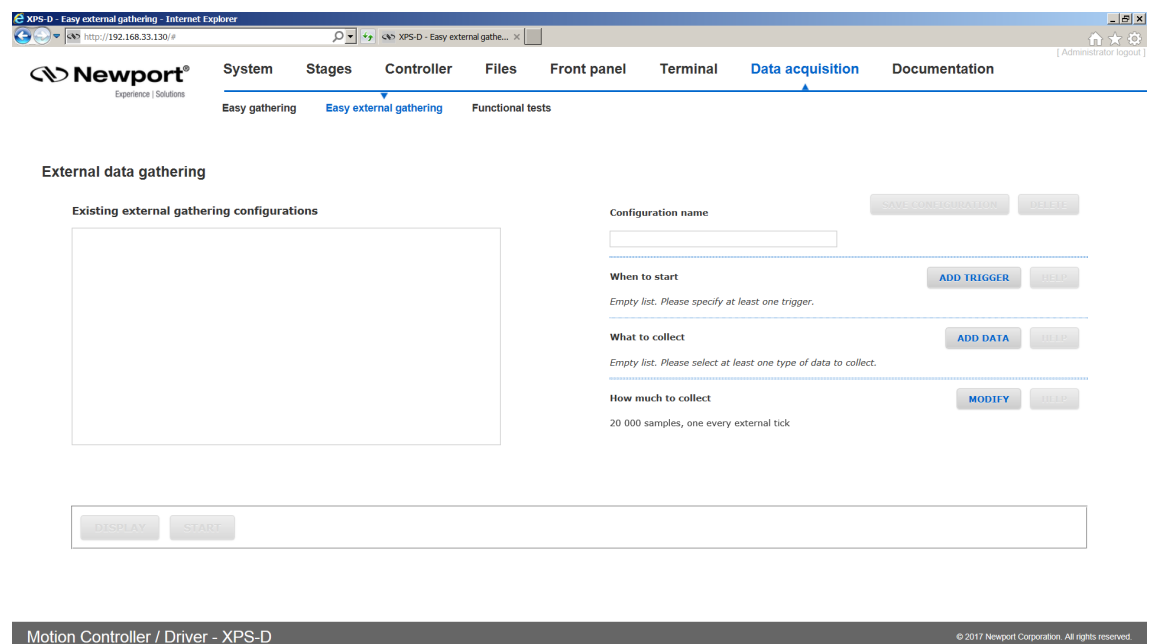
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5. The Data Graph is displayed. Colors, cales, gains and offsets can be changed. The graph can be saved or printed. Click "Close" to return to Easy Gathering screen.



2.26 Data Acquisition – Easy External Gathering

Under **Data acquisition** → **Easy external gathering**, users can define and save data gathering configurations for routine data acquisition operations triggered by an external device. For more in depth information regarding data gathering types, refer to **Features Manual**. In the initial factory configuration, an example trigger and data configuration is set. It should be deleted before starting a new gathering.



The following procedure describes how to use the webpage to configure easy external data gathering.

Step 1: Configuration name

1. Enter a name for the Gathering Configuration. *Example: Stage_Position.*

Configuration name

SAVE CONFIGURATION

DELETE

Stage_Position

When to start

ADD TRIGGER

HELP

Empty list. Please specify at least one trigger.

What to collect

ADD DATA

HELP

Empty list. Please select at least one type of data to collect.

How much to collect

MODIFY

HELP

240 000 samples, one every external tick

Step 2: When to start

This step configures the data collection trigger and is based upon the API function `EventExtendedConfigurationTriggerSet([Actor].[Category].Event Name, Parameter1, Parameter2, Parameter3, Parameter4)`. For more information regarding this API, refer to **Features Manual**. If this section is not empty, delete example event trigger by clicking REMOVE.

1. Click on ADD TRIGGER and the following window appears.
2. From the list, highlight Immediate or Always. Click ADD and then click OK.

Example: Immediate

Trigger selection

Please choose an item from the list below.

DIHighLow
DILowHigh
DIToggled
ExcitationSignalEnd
ExcitationSignalStart
Immediate
Jog.ConstantAccelerationEnd
Jog.ConstantAccelerationStart
Jog.ConstantAccelerationState
Jog.ConstantVelocityEnd

ADD
CLEAR

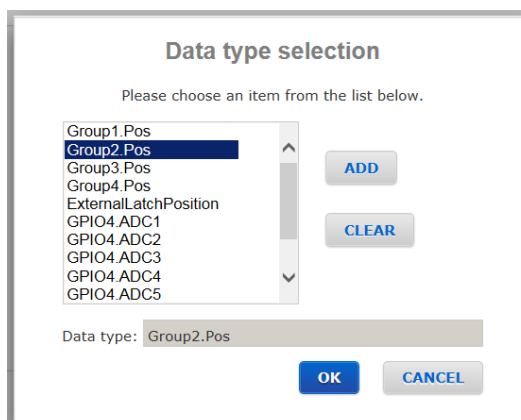
Event name: Immediate
Parameter 1:
Parameter 2:
Parameter 3:
Parameter 4:

OK
CANCEL

Step 3: What to collect

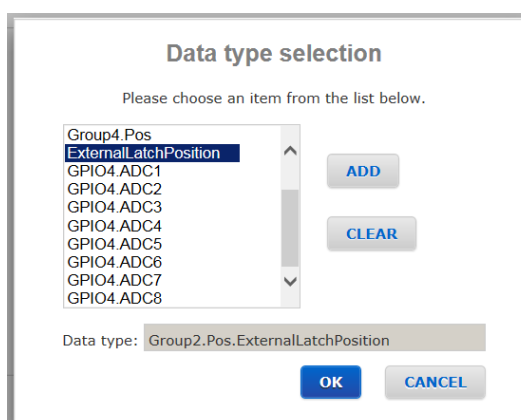
This step configures the data type to be collected and is based upon the API function `GatheringExternalConfigurationSet([DataType])`. Refer to **Features Manual**. If this section is not empty, delete example data collection type by clicking REMOVE.

1. Click on ADD DATA and the following window appears.
2. From the list, highlight the positioner name from which position data will be collected and then click ADD. *Example: Group2.Pos*



The dialog box is titled "Data type selection". It contains the instruction "Please choose an item from the list below." Below this is a list box with the following items: Group1.Pos, Group2.Pos (highlighted), Group3.Pos, Group4.Pos, ExternalLatchPosition, GPIO4.ADC1, GPIO4.ADC2, GPIO4.ADC3, GPIO4.ADC4, and GPIO4.ADC5. To the right of the list are "ADD" and "CLEAR" buttons. Below the list is a text field labeled "Data type:" containing "Group2.Pos". At the bottom are "OK" and "CANCEL" buttons.

3. From the list, highlight the data type ExternalLatchPosition, and then click ADD.
Example: ExternalLatchPosition



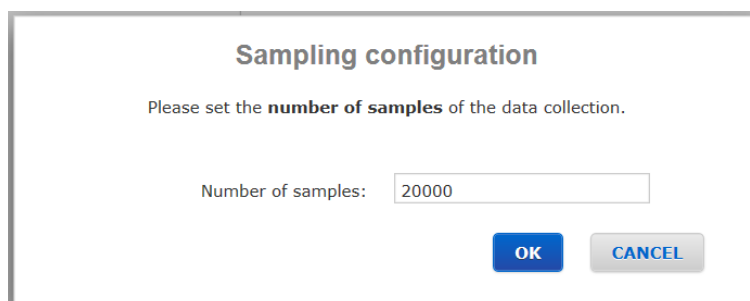
The dialog box is titled "Data type selection". It contains the instruction "Please choose an item from the list below." Below this is a list box with the following items: Group4.Pos, ExternalLatchPosition (highlighted), GPIO4.ADC1, GPIO4.ADC2, GPIO4.ADC3, GPIO4.ADC4, GPIO4.ADC5, GPIO4.ADC6, GPIO4.ADC7, and GPIO4.ADC8. To the right of the list are "ADD" and "CLEAR" buttons. Below the list is a text field labeled "Data type:" containing "Group2.Pos.ExternalLatchPosition". At the bottom are "OK" and "CANCEL" buttons.

4. Click OK when the data type has been specified.
5. Repeat **Step 3 Add Data** to add other data types to be collected under this specific Gathering Configuration.

Step 4: How much to collect

This step specifies the number of data points per set. This step is based upon the API function EventExtendedConfigurationActionSet(ExternalGatheringRun, Nb of points, 1, 0, 0). Refer to **Features Manual** for more information.

1. Click on MODIFY to specify the number of data points to be collected. Example: 20000 data samples will be collected for every external trigger.



The dialog box is titled "Sampling configuration". It contains the instruction "Please set the **number of samples** of the data collection." Below this is a text field labeled "Number of samples:" containing "20000". At the bottom are "OK" and "CANCEL" buttons.

Step 5: Save Configuration

1. Click on SAVE CONFIGURATION to save the gathering configuration.

Example:

Configuration name: Stage_Position

When to start: Immediate

What to collect: Group2.Pos.ExternalLatchPosition

How much to collect: 20 000 samples, one every external tick

Step 6: Start Gathering

1. To begin gathering data, click on START.

External data gathering

Existing external gathering configurations: Stage_Position

Configuration name: Stage_Position

When to start: Immediate

What to collect: Group2.Pos.ExternalLatchPosition

How much to collect: 20 000 samples, one every external tick

Buttons: DISPLAY, START

Motion Controller / Driver - XPS-D

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2. The controller then immediately begins to monitor for the configured external trigger.

Waiting for trigger...

Buttons: DISPLAY, ABORT

3. Once the trigger event occurs, the data acquisition begins and a status bar appears.

30 % completed

Buttons: DISPLAY, STOP

4. Once the data acquisition is complete, click on DISPLAY to view the data just like for Easy Gathering.

2.27 Data Acquisition – Functional Tests

The FUNCTIONAL TESTS page allows running TCL scripts saved in the “/Admin/Public/Scripts/ FunctionalTests” folder of the XPS controller. Supplied in the firmware, the Functional Tests scripts will then display the results of a gathering file.

Select the TCL Script name then press “Execute script” to run the script or “Kill script” to stop its execution.

Functional tests

TCL script selection	
TCL file name	GetVersion.tcl
Arguments string	Enter the TCL script's arguments

EXECUTE SCRIPT KILL SCRIPT

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2.28 Files – Gathering Files

In this webpage gathering files stored on the XPS controller can be downloaded, viewed, edited or deleted. To generate gathering files refer to **Features Manual**.

Download/Edit/View/Delete

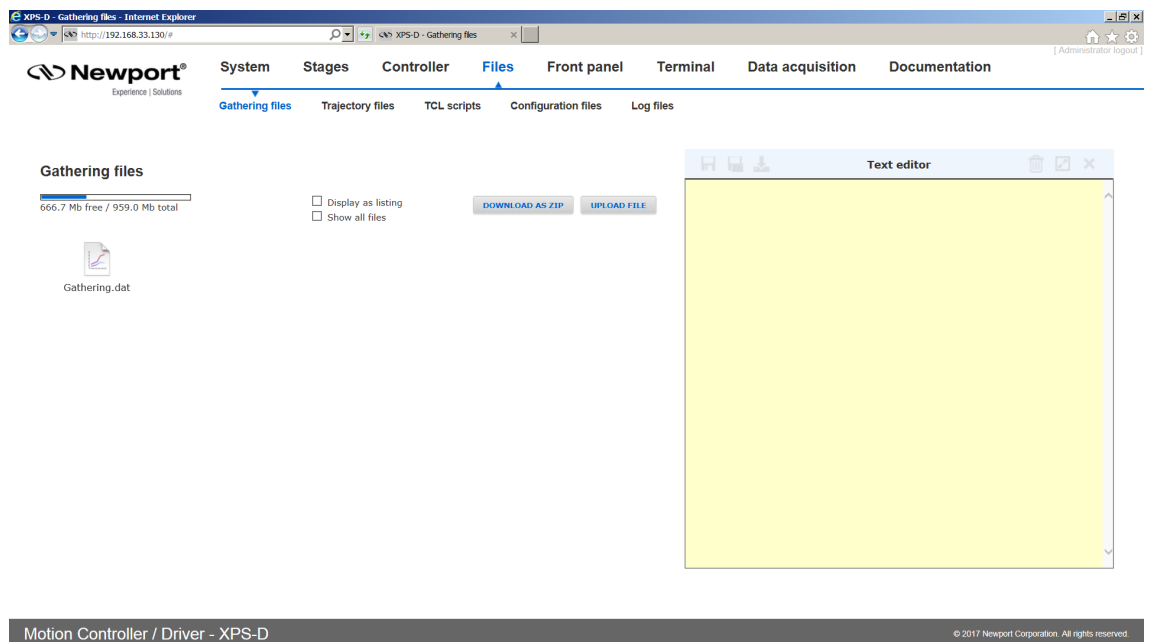
Click on the gathering file name to open the file in the text editor and a window will appear with a graphical representation of the data. In the text editor the user can view, edit, save, save as or delete the gathering file (in the controller) and download it to the user's PC.

UPLOAD FILE

Click UPLOAD FILE to upload a gathering file from the user's PC to the XPS controller.

DOWNLOAD AS ZIP

Click DOWNLOAD AS ZIP to download all gathering files to the user's PC.



NOTE

Ensure the web browser zoom is set at 100% to avoid image corruption when displaying a gathering file.

2.29 Files – Trajectory Files

In this webpage trajectory files stored on the XPS controller can be downloaded, uploaded, viewed, edited, created or deleted.

Download/Edit/View/Delete

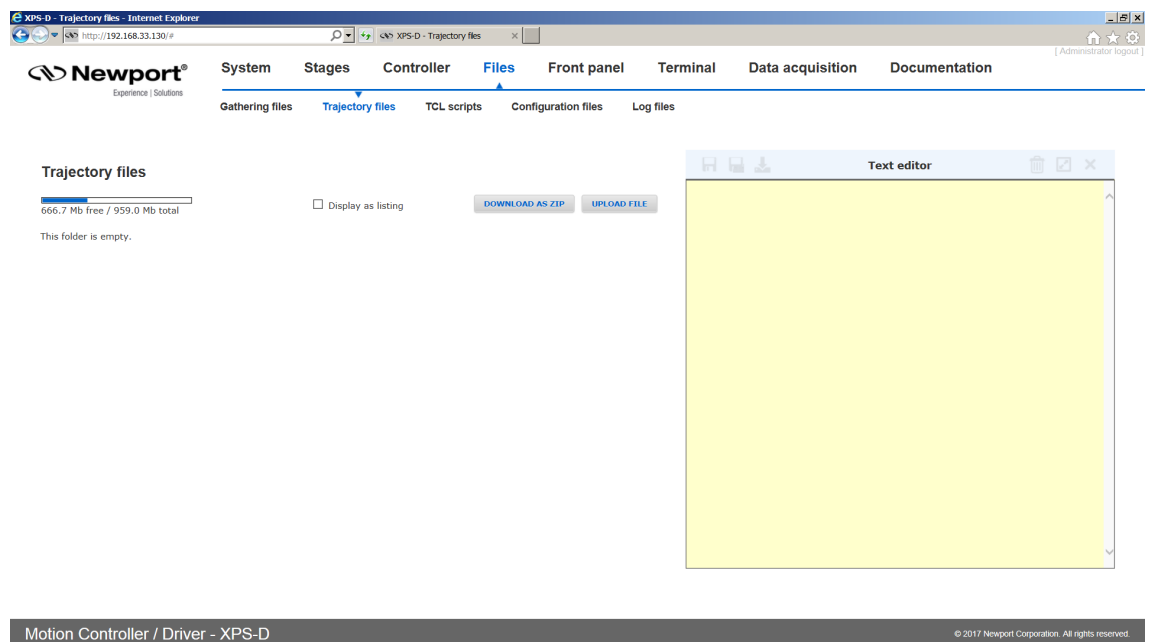
Click on the trajectory file name to open the file in the text editor. In the text editor the user can view, edit, save, save as or delete the trajectory file (in the controller) and download it to the user's PC.

UPLOAD FILE

Click UPLOAD FILE to upload a trajectory file from the user's PC to the XPS controller.

DOWNLOAD AS ZIP

Click DOWNLOAD AS ZIP to download all trajectory files to the user's PC.



2.30 Files – TCL Scripts

In this webpage TCL script files stored on the XPS controller can be downloaded, viewed, edited or deleted. TCL scripts could also be uploaded through this webpage.

Download/Edit/View/Delete

Click on the TCL script file name to open the file in the text editor. In the text editor the user can view, edit, save, save as or delete the TCL script (in the controller) and download it to the user's PC.

UPLOAD FILE

Click UPLOAD FILE to upload a TCL script file from the user's PC to the XPS controller.

DOWNLOAD AS ZIP

Click DOWNLOAD AS ZIP to download all TCL script files to the user's PC.

RUN SCRIPT

Click RUN SCRIPT to launch the selected script. Several scripts can be launched.

KILL SCRIPTS

Click KILL SCRIPTs to stop all scripts.

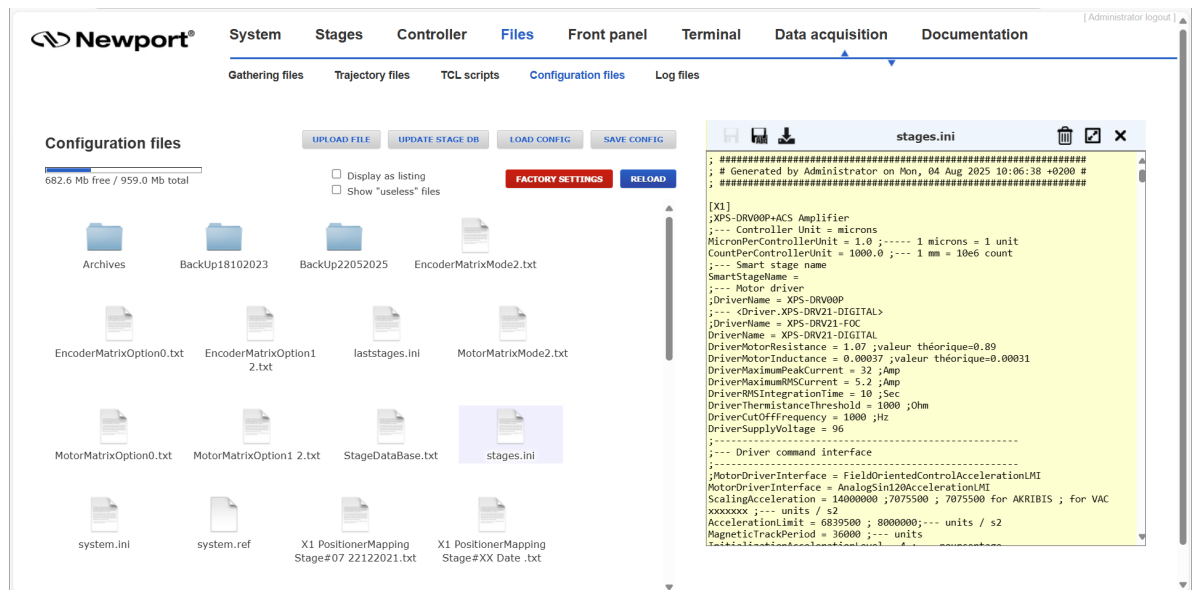
The screenshot displays the 'XPS-D - TCL scripts' web interface. The top navigation bar includes 'System', 'Stages', 'Controller', 'Files' (selected), 'Front panel', 'Terminal', 'Data acquisition', and 'Documentation'. Below this, a sub-navigation bar shows 'Gathering files', 'Trajectory files', 'TCL scripts' (selected), 'Configuration files', and 'Log files'. The main content area is titled 'TCL scripts' and shows a file manager interface with a storage indicator (666.7 Mb free / 959.0 Mb total) and a 'Display as listing' checkbox. A grid of script files is shown, including 'FunctionalTests', 'cycle1.tcl', 'cycle2.tcl', 'cycle3.tcl', 'cycle4.tcl', 'GetTCLLibraryVersion.tcl', 'GroupHomeSearch.tcl', 'GroupInitialize.tcl', 'GroupMoveAbsolute.tcl', 'GroupMoveRelative.tcl', 'NDRV11 testbench 170321.tcl', 'TestVersion.tcl', and 'XPS AST Cycle.tcl'. Action buttons 'RUN SCRIPT', 'KILL SCRIPTS', 'DOWNLOAD AS ZIP', and 'UPLOAD FILE' are present. A text editor window titled 'cycle1.tcl' is open, displaying the following script content:

```
#####
#
# TCL generation of history
#
#####

# Display error and close procedure
proc DisplayErrorAndClose {socketID code APIName} {
    global tcl_argv
    if {$code != -2 && $code != -108} {
        set code2 [catch "ErrorStringGet $socketID $code
strError"]
        if {$code2 != 0} {
            puts stdout "$APIName ERROR => $code -
ErrorStringGet ERROR => $code2"
            set tcl_argv(0) "$APIName ERROR => $code"
        } else {
            puts stdout "$APIName $strError"
            set tcl_argv(0) "$APIName $strError"
        }
    } else {
        if {$code == -2} {
            puts stdout "$APIName ERROR => $code : TCP
timeout"
            set tcl_argv(0) "$APIName ERROR => $code :
TCP timeout"
        }
        if {$code == -108} {
            puts stdout "$APIName ERROR => $code : The
```

2.31 Files – Configuration Files

In this webpage Configuration files stored on the XPS controller can be downloaded, uploaded, viewed, edited or deleted. Note: Users must be logged in with Administrator rights in order to access this webpage.



Download/Edit/View/Delete

Click on the configuration name to open the file in the text editor. In the text editor the user can view, edit, save, save as or delete the configuration file (in the controller) and download it to the user's PC.

UPLOAD FILE

Click UPLOAD FILE to upload a configuration file from the user's PC to the XPS controller. When uploading a file, take note of the file extension. The current file must be deleted or renamed before uploading new one.

LOAD CONFIG

Click LOAD CONFIG to upload all configuration files as a zip file from the user's PC to the controller.

SAVE CONFIG

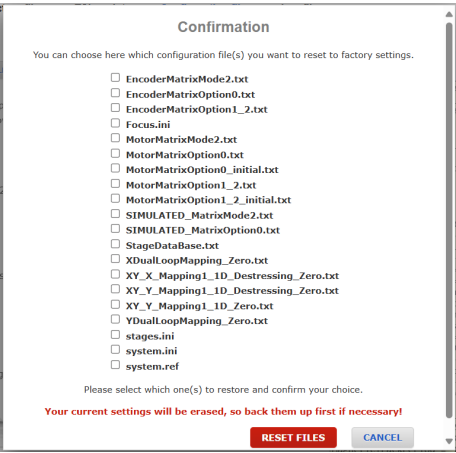
Click SAVE CONFIG to download all configuration files as a zip file from the controller to the user's PC.

UPDATE STAGE DB

Click UPDATE STAGE DB to upload a new StageDataBase.txt file from the user's PC to the controller.

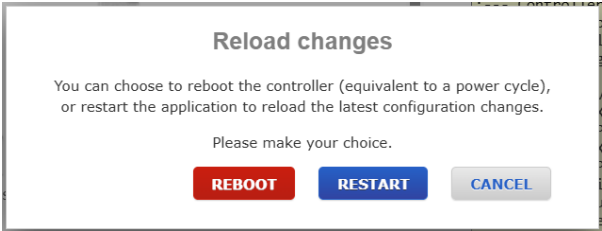
FACTORY SETTINGS

Click FACTORY SETTINGS and select in the pop-up window the original configuration files to restore as they were upon delivery.



RELOAD

Click RELOAD to reboot or restart controller to apply configuration changes.



2.32 Files – Log Files

In this webpage log files stored on the XPS controller can be downloaded, uploaded, viewed, edited or deleted. Note: Users must be logged in with Administrator rights in order to access this webpage.

Download/Edit/View/Delete

Click on the log file name to open the file in the text editor. In the text editor the user can view, edit, save, save as or delete the log file (in the controller) and download it to the user's PC.

UPLOAD FILE

Click **UPLOAD FILE** to upload a log file from the user's PC to the XPS controller. When uploading a file, take note of the file extension.

DOWNLOAD AS ZIP

Click **DOWNLOAD AS ZIP** to download all log files to the user's PC.

The screenshot displays the 'XPS-D - Log files' web interface in Internet Explorer. The interface includes a navigation bar with tabs: System, Stages, Controller, **Files**, Front panel, Terminal, Data acquisition, and Documentation. Under the 'Files' tab, there are sub-tabs: Gathering files, Trajectory files, TCL scripts, Configuration files, and **Log files**.

The 'Log files' section shows a file list with a storage indicator (666.7 Mb free / 959.0 Mb total) and a 'Display as listing' checkbox. The file list includes:

- APIList.txt
- APIList Extended.txt
- APIList Extended AllConfig.txt
- Boot.log** (highlighted)
- Error.log
- Log.log
- PCI CIE Header.log
- PCI CIE1 Header.log
- PCI CIE2 Header.log
- PCI CIEBoard1 Axes.log
- PCI CIEBoard1 Header.log
- PCI CIEBoard2 Axes.log
- PCI CIEBoard2 Header.log
- PreviousError.log
- Zygo.log

Buttons for 'DOWNLOAD AS ZIP' and 'UPLOAD FILE' are visible. A preview window for 'Boot.log' is open on the right, showing the following content:

```

Boot Listing
XPS Unified V1.0.12
-----
DACUpdateDelay = 0.000008

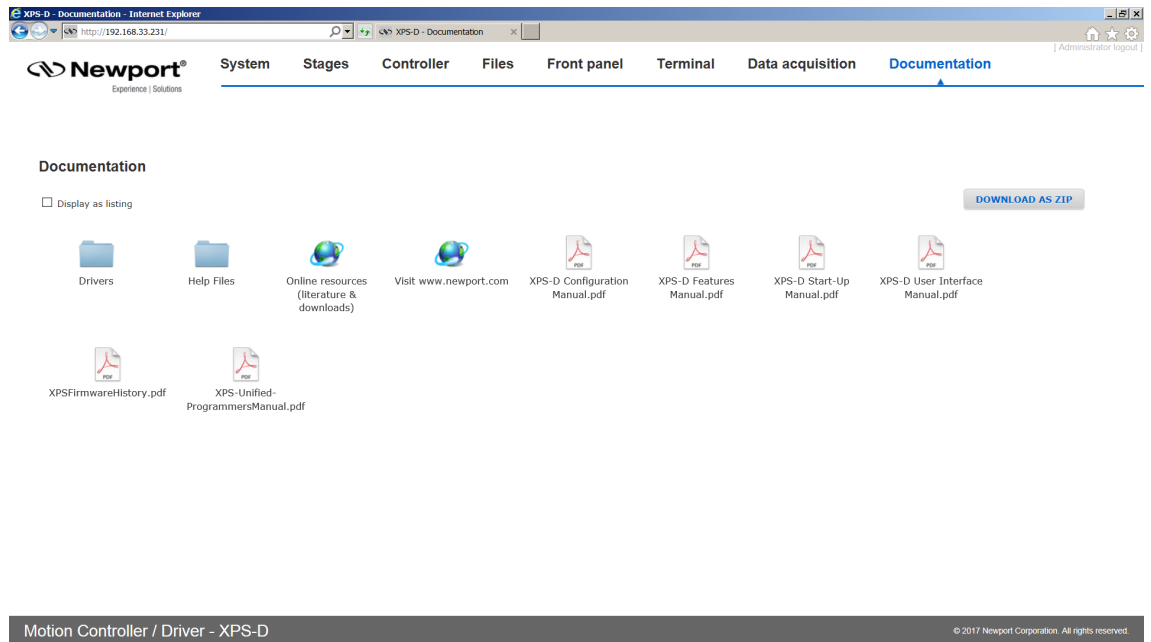
PCI_CIEBoard #1

  PCI_I2C OK
  PCI_CIEAxis #1 (EncoderPlug #1) from CIE Board #1 OK:
m_PCIAxisRegisterIndex = 128, m_PCIDriverRegisterIndex = 384,
PCIDriverRegisterValue = 0
  I2C Driver MUX values: (0) 8, (1) 4, (2) 2, (3) 1
  PCI_CIEAxis #2 (EncoderPlug #3) from CIE Board #1 OK:
m_PCIAxisRegisterIndex = 192, m_PCIDriverRegisterIndex = 400,
PCIDriverRegisterValue = 4
  I2C Driver MUX values: (0) 8, (1) 4, (2) 2, (3) 1
  PCI_CIEAxis #3 (EncoderPlug #2) from CIE Board #1 OK:
m_PCIAxisRegisterIndex = 256, m_PCIDriverRegisterIndex = 416,
PCIDriverRegisterValue = 2
  I2C Driver MUX values: (0) 8, (1) 4, (2) 2, (3) 1
  PCI_CIEAxis #4 (EncoderPlug #4) from CIE Board #1 OK:
m_PCIAxisRegisterIndex = 320, m_PCIDriverRegisterIndex = 432,
PCIDriverRegisterValue = 1
  I2C Driver MUX values: (0) 8, (1) 4, (2) 2, (3) 1
  PCI_PCOManager
  m_PCOManager
  m_PCOManager
  m_PCOManager
  PCI_PCOManager #1 OK
  PCI_PCOManager #2 OK
  PCI_PCOManager OK (ConstructionFlag = 0)
  PCI_CIEBoard #1 : Driver Plus MUX Config Register = 824181027
  
```

The footer of the interface reads: 'Motion Controller / Driver - XPS-D' and '© 2017 Newport Corporation. All rights reserved.'

2.33 Documentation

Under the webpage Documentation users can open and download XPS-D manuals, help files, drivers and example code.



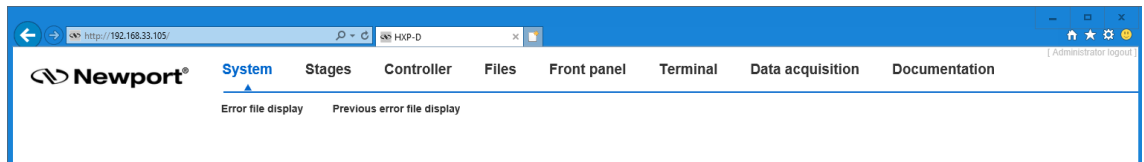
3.0 HXP-ELEC-D specific menus

When an XPS-D controller is preconfigured to drive a hexapod (referenced HXP-ELEC-D), some menus are different. They are described in this section.

3.1 System menu

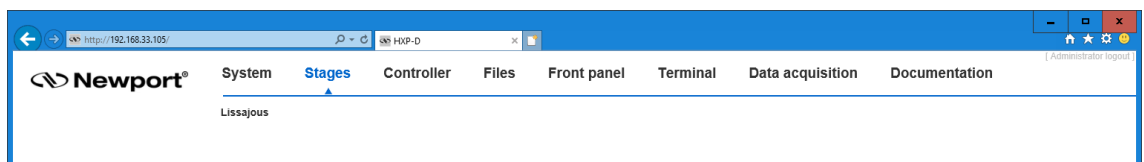
Since the configuration is built in factory, the configuration pages of the XPS-D standard "System" menu are no longer available.

This menu only includes "Error file display" and "Previous error file display" pages:



3.2 Stages menu

For the same reason, the "Stages" menu (Administrator only) is restricted to "Lissajous" page:



3.3 Controller menu

3.3.1 Controller – Firmware Update

NOTE

It is recommended to make a backup of the configuration before installing a new firmware version using SAVE CONFIG utility (refer to section 3.5.1 “Files – Configuration files”).

Users can regularly update the controller with new firmware releases.

Before updating the firmware, we recommend to note the current firmware version (refer to section “2.5 Controller – General Information”), to be able to identify the changes made and listed in the InstallerHistory document.

Firmware updates may include the addition of new parameters to the configuration files (stages.ini, system.ini or system.ref files) which are required to ensure error-free controller restart. To maintain the initial configuration, it is necessary to check the presence of these parameters in the current configuration files and, if necessary, add them manually using the text editor (refer to section 3.5.1 Files – Configuration files), and following the instructions given in the InstallerHistory document from the current version of firmware to the new one.

Refer to the InstallerHistory document, delivered with the new firmware pack, which explains changes to the configuration files, if any.

Refer to the HXP webpage at www.newport.com for more information including the InstallerHistory document, the StageDataBase.txt file and the new firmware installer pack.

Updating the HXP Firmware

1. Download the firmware installer pack from the HXP webpage at www.newport.com.
2. Connect to the HXP controller. For more information see Start-Up Manual.
3. Login on to the HXP with Administrator rights.
4. Go to Controller → Firmware update.

Firmware install log

update.log file contents

```
[2017-08-24 21:34:13] Filesystem update starting
[2017-08-24 21:34:13] Located snapshot: snapshot-20170824.tbz
[2017-08-24 21:35:57] Snapshot is authentic and looks consistent
[2017-08-24 21:36:15] WARNING: this controller's firmware.ref doesn't specify an installer type
[2017-08-24 21:36:34] Snapshot can be extracted without error
[2017-08-24 21:36:34] Selected files successfully backed up
[2017-08-24 21:36:34] System partition successfully formatted as a QNX4 filesystem
[2017-08-24 21:36:34] System partition successfully checked against bad blocks
[2017-08-24 21:36:34] Second-stage bootloader successfully installed
[2017-08-24 21:36:34] System partition successfully mounted
[2017-08-24 21:38:03] Snapshot successfully extracted
[2017-08-24 21:38:03] Operating system kernel successfully installed
[2017-08-24 21:38:03] Backed up files successfully restored
```

Available firmwares

175.6 Mb free / 383.4 Mb total

Firmware name	Size	Uploaded	Action
snapshot-20170725.tbz	77.2 Mb	2017-07-27 17:03:50	DOWNLOAD INSTALL DELETE
rescue-20170720.tbz	34.0 Mb	2017-07-27 17:49:14	DOWNLOAD INSTALL DELETE
snapshot-20170824.tbz	95.3 Mb	2017-08-24 23:31:46	DOWNLOAD INSTALL DELETE

[UPLOAD FIRMWARE](#)

5. Click on UPLOAD FIRMWARE and select the installer pack file saved on the PC.
6. Click INSTALL and the following Confirmation window appears:

Confirmation

Please confirm you want to **install** the following firmware snapshot:

snapshot-HXP-D-USB_N50106.tbz

This operation will take a few minutes, during which the system will be reformatted.
It will not destroy the users' files, which are on a separate partition.

☐ Reset the controller's IP address to factory defaults
☐ Reset all user accounts to factory defaults
☒ YES, I confirm that I want to install this upgrade

[INSTALL NOW](#)
[CANCEL](#)

7. Select “Yes, I confirm that I want to install this upgrade.” to confirm installation.
Resetting the controller's IP address or user accounts is optional.

NOTE

Controller configuration files including stages.ini and system.ini files can be downloaded under Files→ Configuration files prior to updating the controller firmware. See chapter 3.5.1: “Files – Configuration Files” for more information.

8. Click INSTALL NOW.

NOTE

This will reboot the controller.

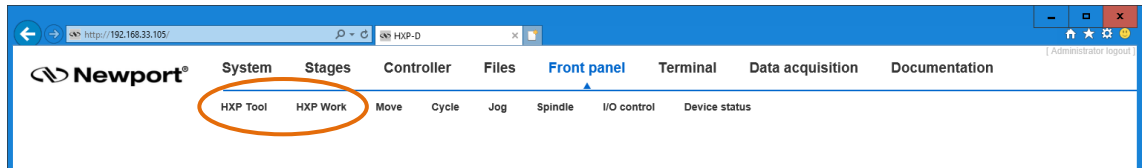
A firmware update occurred

It appears that there are new entries in the firmware install logs.
You will be taken to the firmware update page in order to review the update logs and ensure that everything went fine.

[OK](#)

3.4 Front panel menu

This main menu is emphasized with pages dedicated to hexapod which are described after:



3.4.1 Front panel – HXP Tool

The HXP Tool page provides access to incremental moves and RightPath Trajectory moves along and around the axes of the Tool coordinate system. See Features Manual for details. A couple of comments about this page:

Position refers to the position of the Tool coordinate system in the Work coordinate system.

State refers to the state of the Hexapod group.

Action gray field next to Group state is a dynamic action button. Its function changes according to the group state. It allows to Initialize, Home and Disable the hexapod.

KILL ALL stops all motion and sets the Hexapod to the “Not Initialized” state.

Coordinate lists the coordinate (X, Y, Z, U, V, or W).

Under **Incremental move**, it is possible to increment individual coordinates by entering a value in one of the six fields and pressing the “<” or “>” button next to the input window. It is also possible to increment all six coordinates at the same time (“<” and “>” button next to the “All together” mention).

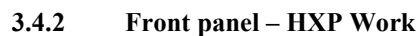
Increm. trajectory allows executing RightPath Trajectory motions. After choosing the type of trajectory (Line, Rotation or Arc), and entering the definition parameters, the motion is launched by pressing “GO” button.

Coordinate systems area displays and allows changing the different coordinate systems. These changes are not saved automatically in "system.ini" file.

Reset buttons reloads the genuine coordinate system (saved in system.ini).

Set permanent saves the coordinate system in system.ini file

Refresh delay (in milliseconds) sets screen update delay for position and group state.



More over, the “>>” buttons can be used to fill the “Absolute move” parameters with current position values, either individually or “All together”.



3.5 Files menu

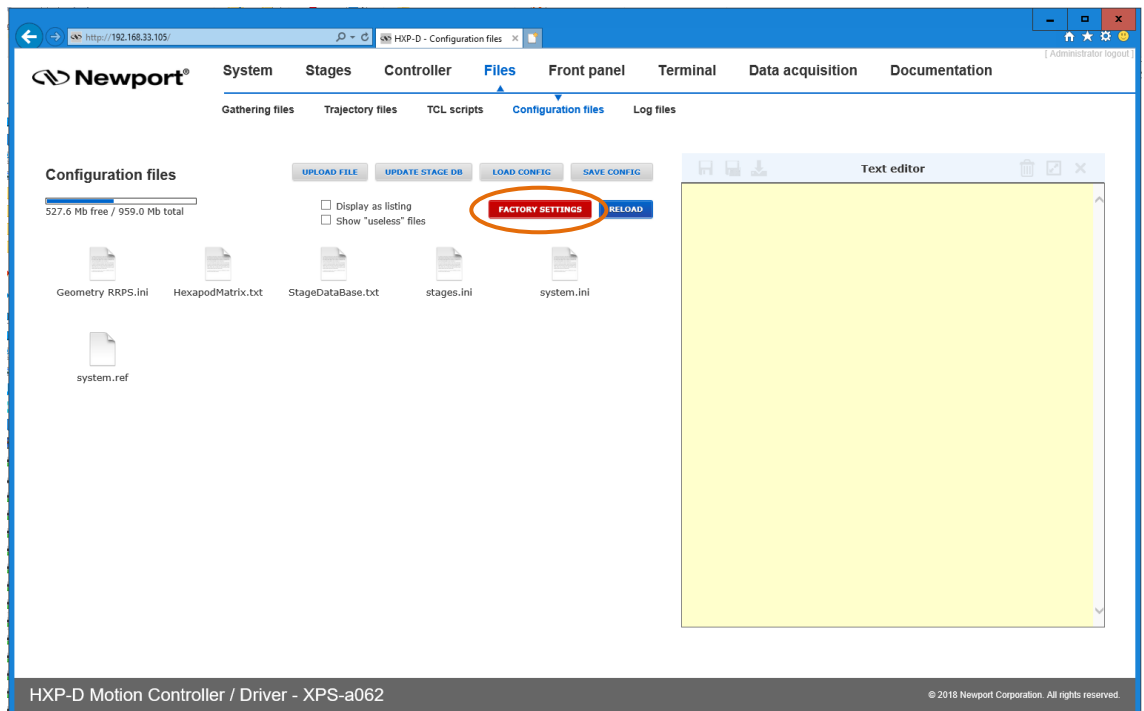
3.5.1 Files – Configuration files

This page remains available (for Administrator only) even though the configuration is built in factory. It may be used by experimented users or with the help of Newport support to make configuration changes directly in the configuration files.

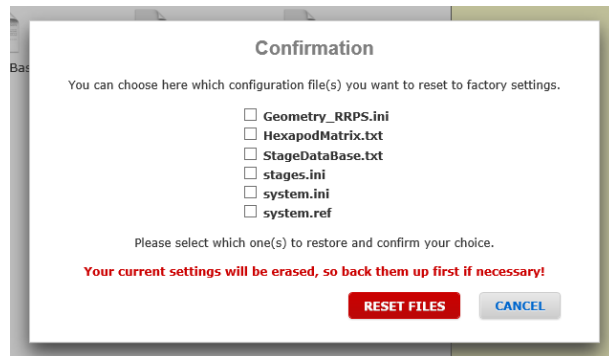
However, a "FACTORY SETTINGS" button is added to simply allow retrieving all the original configuration files. This affects the HEXAPOD group but also the additional single axes if any.

NOTE

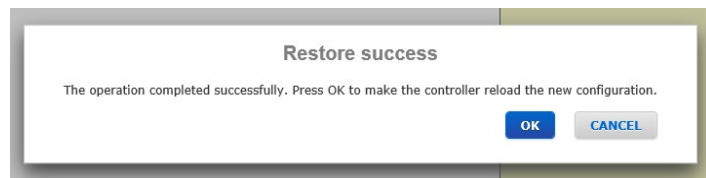
It is recommended to make a backup of the configuration before resetting configuration files using SAVE CONFIG utility.



After pressing this button, the following window appears. Tick the files you want to restore and click "RESET FILES".



A message pops up to inform restore success. Click OK to restart the controller and reload the new configuration.





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