XPS-Q8

Universal High-Performance Motion Controller/Driver

Newport

Experience | Solutions

Release Note

V1.3.x

For Motion, Think Newport™

Preface

Confidentiality & Proprietary Rights

Reservation of Title

The Newport Programs and all materials furnished or produced in connection with them ("Related Materials") contain trade secrets of Newport and are for use only in the manner expressly permitted. Newport claims and reserves all rights and benefits afforded under law in the Programs provided by Newport Corporation.

Newport shall retain full ownership of Intellectual Property Rights in and to all development, process, align or assembly technologies developed and other derivative work that may be developed by Newport. Customer shall not challenge, or cause any third party to challenge, the rights of Newport.

Preservation of Secrecy and Confidentiality and Restrictions to Access

Customer shall protect the Newport Programs and Related Materials as trade secrets of Newport, and shall devote its best efforts to ensure that all its personnel protect the Newport Programs as trade secrets of Newport Corporation. Customer shall not at any time disclose Newport's trade secrets to any other person, firm, organization, or employee that does not need (consistent with Customer's right of use hereunder) to obtain access to the Newport Programs and Related Materials. These restrictions shall not apply to information (1) generally known to the public or obtainable from public sources; (2) readily apparent from the keyboard operations, visual display, or output reports of the Programs; (3) previously in the possession of Customer or subsequently developed or acquired without reliance on the Newport Programs; or (4) approved by Newport for release without restriction.

©**2013** Newport Corporation
1791 Deere Ave.
Irvine, CA 92606, USA
(949) 863-3144

Newport.
Experience | Solutions

Table of Contents

XPS
Universal High-Performance
Motion Controller/Driver

1.0   Introduction

There are some changes with the new XPS-Q8 Firmware relative to the XPS-C8 Firmware. This document summarizes those changes. For detailed information on those changes refer to the controller manuals.

NOTE

The XPS-Q8 pack is fully case sensitive. The folder and file names have to be case sensitive to be recognized by the controller. For example system.ini and System.ini will be interpreted by the controller as two different files.

NOTE

The XPS-Q8 firmware installer has two additional features. The first is the ability to enter a new IP address after the upgrade of a controller; the second is the ability to open a text file that contains a number of IP addresses (one per line) and to update all controllers that are listed.

NOTE

The XPS-Q8 Firmware uses a Symetrical Multi-Processes (SMP) Operating System which allows the use of a dual core processor. In one processor the Newport Motion Kernel is executed while the second one handles all the other tasks. This brings more stability and resources for applications.

NOTE

The XPS-Q8 controller introduces the capability to control stages that utilize an external drive, such as XPS-EDBL, via a passthrough XPS-DRV00P. This feature requires a change to the controller boot up sequence. The smart stage is not tested during boot up but is tested during the execution of the GroupInitialize( ) function.

2.0   Firmware Version Name

The version name of the new firmware is:

- **Firmware Standard V1.x.x** for Standard controller.
- **XPS-Q8 Firmware Precision Platform V1.x.x** for Precision Platform controller.

3.0   Users files Acces on XPS Controller

3.1   Administrator

With the previous generation   XPS-C8 Controller, the Administrator can access the folders as shown in figture 1.a, using FTP protocol. The Administrator's home directory contains *CONFIG Firmware Public* and *WebFiles* folders:
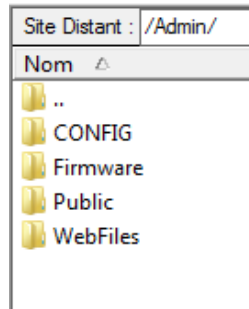
<table>
<tr>
<td>

Site Distant : /Admin/

Nom △
..
CONFIG
Firmware
Public
WebFiles

</td>
<td>

Site Distant : /Admin/

Nom △
..
bin
Config
Firmware
Public
UserOptionalModules
usr
WebFiles

</td>
</tr>
</table>

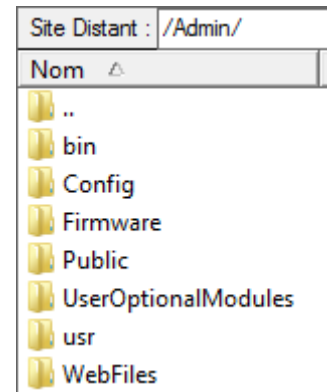*Figure 1.a: Home directory of Administrator user on XPS-C8 controller.*

Figure 1.b: Home directory of Administrator user on XPS-Q8 controller.

When connecting to an XPS-Q8 controller with the new generation firmware, the home directory for the Administrator (figure 1.b) includes new folders *bin* and *usr* which contain system files; *Config* is equivalent to the previous *CONFIG* folder. The Administrator can access and modify three folders: Config, Public and UserOptionalModules.

UserOptionalModules is a new folder wherein the Administrator can save newly created optional modules, see Fig 2. This folder contains a shared library for the Focus application. The Administrator needs to modify this library only when the Focus interface is used..

Site Distant : /Admin/UserOptionalModules/

Nom △	Taille
..	
libFocusInterface.so	19400
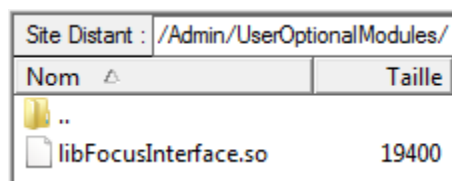
Figure 2: UserOptionalModules directory.

The *Public* directory contains the folders listed below:

Site Distant : /Admin/Public/

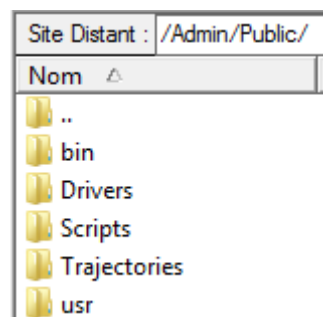| Nom △ |
|---|
| .. |
| bin |
| Drivers |
| Scripts |
| Trajectories |
| usr |

Figure 3: Public *directory content of the XPS-Q8 controller*

bin and *usr* are new folders added to the *Public* directory which contains system files; these directories are not to be accessed by the Administrator..

3.2   User

Public is the home directory for a User with no Administrative rights when connecting to the XPS-Q8 controller. Two new folders *bin* and *usr* were added to the *Public* directory for the XPS-Q8 controller; see figures 3.a and 3.b below:
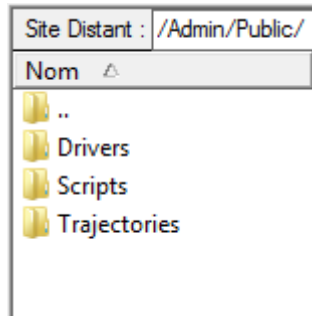
Site Distant : /Admin/Public/	Site Distant : /Admin/Public/
Nom △	Nom △
..	..
Drivers	bin
Scripts	Drivers
Trajectories	Scripts
	Trajectories
	usr

Figure 3.a: Home directory of a User on XPS-C8 controller.
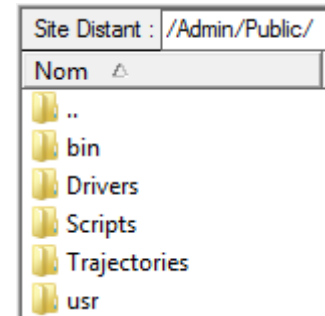
Figure 3.b: Home directory of User on XPS-Q8 controller.

bin and *usr* directories must not be accessed by a user.

4.0   Configuration Files

4.1   system.ref file

With the previous generation XPS-C8 controller, external modules (N1231.out, Focus.out, TCL_API_drivers.out, WatchDog_PEAK715.out, RCModule.out, ..) were defined in the *system.ref* configuration file and were includeed in the *ExternalModuleNames* line as shown in figure 4.a:.

```
[GENERAL]
HardwareType = XPS                          ; XPS or SPS
FirmwareName = MainController
ExternalModuleNames = N1231B.out, Focus.out, TCL_API_drivers.out,
ISRBaseFrequency = 12e6                     ; Hertz
CorrectorISRPeriod = 100e-6                 ; seconds
IRQDelay = 6e-6                             ; seconds
DACUpdateDelay = 90e-6                      ; seconds
```

Figure 4a: Declaration of external modules in the system.ref configuration file for the XPS-C8 controller.

External modules declaration is changed for XPS-Q8 controller; N1231.out, Focus.out, TCL_API_drivers.out, WatchDog_PEAK715.out, RCModule.out and etc are no longer declared in the system.ref configuration file. For the XPS-Q8 version, only the XPSRemoteControl (RCModule.out) external module is declared in this *system.ref* file.

```
[GENERAL]
HardwareType = XPS                                      ; XPS or SPS
FirmwareName = MainController
ExternalModuleNames = XPSRemoteControl
OptionalModuleNames =
ISRBaseFrequency = 12e6                                 ; Hertz
CorrectorISRPeriod = 100e-6                             ; seconds
IRQDelay = 6e-6                                         ; seconds
DACUpdateDelay = 90e-6                                  ; seconds
ProfileGeneratorISRRatio = 4
ServitudesISRRatio = 10
GatheringBufferSize = 1000000
DelayBeforeStartup = 0                                  ; seconds
HomingSensorOffset = 0.02                               ; units => stages.ini, Homing section
ProfilerPriorityOverrunPatch = Disabled                ; Disabled or Enabled
GantrySecondaryMotorEnableDelay = 1.0                   ; seconds=> system.ini, Positioner section

[AUTOTUNING]
VelocityAutoTuningParameters = 20, 10, 15, 0.5, 0.5
VoltageAutoTuningParameters = 15, 10, 15, 0.5, 0.5
AccelerationAutoTuningParameters = 10, 10, 15, 0.5, 0.5, 50, 1000, 750
AccelerationAutoScalingParameters = 10, 15, 5, 5

[FEATURES]
CompensationSystemPreFeedForwardMode = Disabled        ; Disabled or Enabled
CompensationSystemPostFeedForwardMode = Disabled       ; Disabled or Enabled
```

Figure 4b: System.ref changes for the new XPS-Q8 controller.

Red text in figure 4b indicates the deleted parameters.

The **HomingSensorOffset** parameter is moved to the *Homing* section of the *stage.ini* configuration file and the **GantrySecondaryMotorEnableDelay** parameter is moved to the *Positioner* section of the *system.ini* configuration file.

These changes are valid for both Standard and Precision Platform versions of the XPS-Q8 Controller. See the Programmer's Manual for more details.

4.2   System.ini File for the Standard Version of the XPS-Q8 Controller

The *System.ini* configuration file is modified in the new standard version of the XPS-Q8 controller. The **EncoderIndexOffset** and **EncoderHardInterpolatorErrorCheck** parameters are moved to the Encoder section of the *stages.ini* configuration file.

The **SecondaryPositionerGantry**, **SecondaryPositionerGantryMotorEnableDelay** and **XMotorForceBalance** are newly added parameters to the *system.ini* configuration file. See the Programmer's Manual for more details.

Below is an example of a *system.ini* file; Red text indicates deleted parameters and blue text   indicates new parameters.

```
[GENERAL]
BootScriptFileName =
BootScriptArguments =

[GROUPS]
SingleAxisInUse = ;Single
SpindleInUse =
XYInUse = XY
XYZInUse =
MultipleAxesInUse =

[Single]
PositionerInUse = Pos

[Single.Pos]
PlugNumber = 4
StageName = LTA
;--- Time flasher
TimeFlasherBaseFrequency = 40e6    ; Hz

;--- Encoder
EncoderIndexOffset =    => stages.ini, Encoder section
EncoderHardInterpolatorErrorCheck = => stages.ini
; Secondary positioner (gantry)
SecondaryPositionerGantry = ; Enabled or Disabled
SecondaryPlugNumber =
SecondaryStageName =
SecondaryPositionerGantryEndReferencingPosition =
SecondaryPositionerGantryEndReferencingTolerance =
SecondaryPositionerGantryEndOffsetAfterInitialization =
SecondaryPostionerGantryMotorEnableDelay = ; seconds

[XY]
PositionerInUse = Pos
InitializationAndHomeSearchSequence =
; XY gantry motor force
XMotorForceBalance = ; Enabled or Disabled
YOffsetForForceRatio =
PrimaryYForceRatio =
SecondaryYForceRatio =
```

4.3   System.ini File for the Precision Platform Version of the XPS-Q8 Controller

The **EncoderIndexOffset** and **EncoderHardInterpolatorErrorCheck** parameters are moved from the *system.ini* configuration file to Encoder section of *stages.ini* file

The **PIDBaseFilter**; **SecondaryPositionerGantry**; **SecondaryPostionerGantryMotorEnableDelay** and **XMotorForceBalance** are newly added parameters to the *system.ini* configuration file. See the Programmer's Manual for more details.

Below is an example of a *system.ini* file; Red text indicates deleted parameters and blue text indicates new parameters.

```
[GENERAL]
BootScriptFileName =
BootScriptArguments =

[GROUPS]
SingleAxisInUse = ;Single
SingleAxisWithClampingInUse =
SingleAxisThetaInUse =
SpindleInUse =
XYInUse = XY
XYZInUse =
TZInUse =
InterlockedGroups =
MultipleAxesInUse =

[Single]
PositionerInUse = Pos

[Single.Pos]
PlugNumber = 4
StageName = LTA
;--- Time flasher
TimeFlasherBaseFrequency = 40e6   ; Hz
;--- PID Base filter
PIDBaseFilter = ; Enabled or Disabled
StaticMass = 0
Viscosity = 0
Stiffness = 0
;--- Encoder
EncoderIndexOffset =    => stages.ini, Encoder section
EncoderHardInterpolatorErrorCheck = => stages.ini
SecondaryPositionerGantry = ; Enabled or Disabled
SecondaryPlugNumber =
SecondaryStageName =
SecondaryPositionerGantryEndReferencingPosition =
SecondaryPositionerGantryEndReferencingTolerance =
SecondaryPositionerGantryEndOffsetAfterInitialization =
SecondaryPostionerGantryMotorEnableDelay = ; seconds

[XY]
PositionerInUse = Pos
InitializationAndHomeSearchSequence =
; XY gantry motor force
```

Newport.
Experience | Solutions

XMotorForceBalance = *; Enabled or Disabled*
YOffsetForForceRatio =
PrimaryYForceRatio =
SecondaryYForceRatio =

4.4   Stages.ini File

Some new parameters are added to the stages.ini configuration file:

- **EncoderIndexOffset:** This parameter is added to the *Position encoder interface parameters* section and used for *Interpolated* and *AquadB* Encoders.

- **EncoderHardInterpolatorErrorCheck:** This parameter is added to the *Position encoder interface parameters* section and used for *Interpolated* Encoders.

- **HomingSensorOffset:** This parameter is added to the *Home search process parameters* section and used for every type of home search process, except the *CurrentPositionAsHome.*

These parameters are valid for both the Standard and Precision Platform versions of the XPS-Q8 controller. See Programmer's Manual for more details.

5.0   Optional Module Management

The optional module programming within the XPS-Q8 controller allows managing (execute and stop execution) the program blocks (optional modules) written by the user inside the XPS controller, but with the following conditions:

- Every optional module must be written in C language (GNU with QNX Momentics IDE).

- The optional module file must be placed in the "/Admin/ UserOptionalModules /" in the XPS controller.

6.0   New Features

The XPS-Q8 controller has a new feature, RestartApplication( ) function, that allows restarting the controllers' application without a hardware reboot.

For more details, see the Programmers Manual.

7.0   Not Supported Features

Focus process module and Agilent Interferometer features are not supported in the XPS-Q8 controller.

8.0   Web Site

8.1   Connection to Website

Care is to be taken with the XPS-Q8 controller when you login to its website as an Administator and you copy/paste the "Administrator" text from the login page as shown in figure below. At the end of the selected text sometimes there is a space that must be deleted after copy/pasting the selected text in Name and Password entries.

Figure 5: Web site login page of
XPS-Q8 controller

8.2   Web Pages Modifications

8.2.1   "Add Custom stage" web page

The web page "*Add custom stage*" exists only in the Standard XPS-Q8 Controller.

Figure 6: "Add custom stage" web page of the
Standard XPS-Q8 Controller.

8.2.2   "IP Management" web page

There are some changes to the format of the "IP Management" web page of the new XPS-Q8 controller website, but the functionality of the web page remains unchanged. The different formats are illustrated below in Figures 7a and 7b.
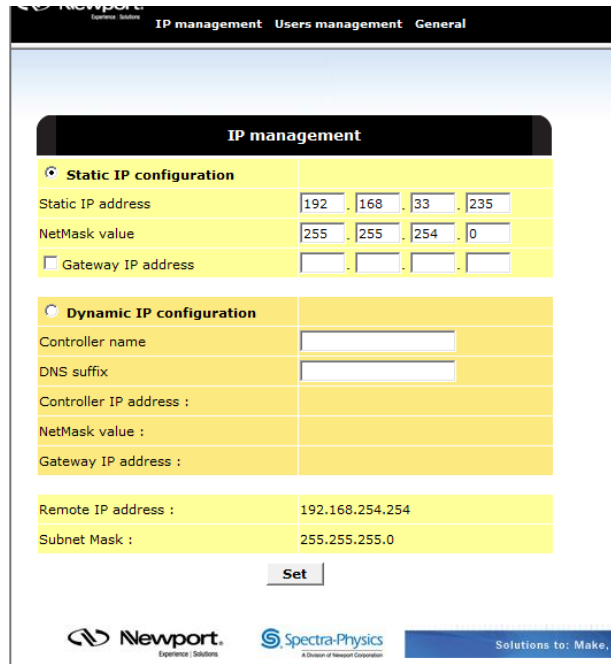

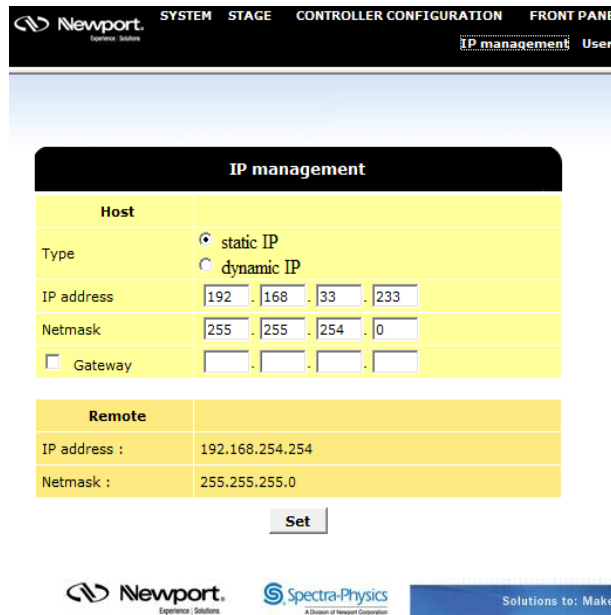*Figure 7a: "IP Management" web page of the XPS-C8 controller.*

Figure 7b: "IP Management" page of XPS-Q8 controller.

8.2.3   "General" web page

A new line "Installer version" is added in the XPS-Q8 controller website, illustrated below in Figures 7c.

Versions display	
Installer version :	Refer to XPSFirmwareHistory.pdf
Stage database revision :	StageDataBase V2.7.4
Controller version :	XPS-Q8 Firmware Precision Platform V1.1.1 Beta Test 9
QNX Kernel version :	QNX kernel configuration V2.1.0
Web server version :	XPS-Q8 Webserver Precision Platform V1.0.2 Beta 6
Remote control version :	XPS-RC-V0.0.0, XPSRemoteControl-V1.0.1
Internal hardware :	E3442A6;;;;E4323C0;E4323C0;E4323C0;E4323C0;;;;

Figure 7c: "General" page of XPS-Q8 controller.

9.0   Communication with Tcl Script from a telnet Session

The XPS-C8 firmware, which is based on the VxWorks operating system, redirected the console displays to a unique Telnet session. This is a limitation when running Tcl scripts as all messages were randomly displayed.

Now with the new XPS-Q8 firmware, Tcl execution errors and messages sent from the XPS are by default directed to the stdout device. It is possible to specify a different output device for each script to view the messages sent from Tcl scripts. An output device can be a Telnet session. Refer to Chapter 4 of the Tcl Manual, ***Principle of a Tcl script redirection to a telnet session*** for more details.

10.0   Modification of XPS-Q8 Documentation File Names from N30006 Installer Pack

The XPS-Q8 firmware documentation file names, that are in the XPS-Q8 controller (*/Admin/WebFiles/doc/* folder), are modified in the N30006 Installer Pack. The new file names are :

- XPS-Q8_XPSDocumentation.pdf
- XPS-Q8_ProgrammerManual.pdf
- XPS-Q8_ReleaseNote.pdf
- XPS-Q8_TCLManual.pdf
- XPS-Q8_LabVIEWManual.pdf
- XPS-Q8_ConfigurationWizardDocumentation.pdf
- XPS-Q8_SoftwareDriversManual.pdf

So to avoid the redundant documentation files when installing the N30006 installer pack on a previously installed XPS-Q8 controller, pay attention to remove every files in the */Admin/WebFiles/doc* folder before installation.

Newport
Experience | Solutions

Service Form

Your Local Representative

Tel.: _____

Fax:_____

Name: _____

Company:_____

Address: _____

Country: _____

P.O. Number: _____

Item(s) Being Returned:_____

Model#: _____

Return authorization #: _____

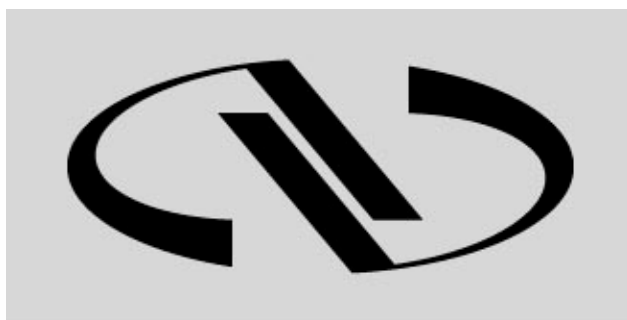*(Please obtain prior to return of item)*

Date: _____

Phone Number: _____

Fax Number: _____

Serial #: _____

Description: _____

Reasons of return of goods (please list any specific problems): _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

North America & Asia
Newport Corporation
1791 Deere Ave.
Irvine, CA 92606, USA

Sales
Tel.: (800) 222-6440
e-mail: sales@newport.com

Technical Support
Tel.: (800) 222-6440
e-mail: tech@newport.com

Service, RMAs & Returns
Tel.: (800) 222-6440
e-mail: rma.service@newport.com

Europe
MICRO-CONTROLE Spectra-Physics S.A.S
9, rue du Bois Sauvage
91055 Évry CEDEX
France

Sales
Tel.: +33 (0)1.60.91.68.68
e-mail: france@newport-fr.com

Technical Support
e-mail: tech_europe@newport.com

Service & Returns
Tel.: +33 (0)2.38.40.51.55