2.0   System Overview

2.1   Specifications

Number of Axes	• 1 to 8 axes of stepper, DC brush, DC brushless motors or piezo-electric stacks using internal drives • Other motion devices using external third-party drives
Communication Interfaces	• Internet protocol TCP/IP • One Ethernet 10/100 Base-T (RJ45 connector) with fixed IP address for local communication • One Ethernet 10/100 Base-T (RJ45 connector) for networking, dynamic addressing with DHCP and DNS • Typically 0.3 ms from sending a tell position command to receiving the answer • Optional XPS-RC remote control
Firmware Features	• Powerful and intuitive, object oriented command language • Native user defined units (no need to program in encoder counts) • Real time execution of custom tasks using TCL scripts • Multi-user capability • Concept of sockets for parallel processes • Distance spaced trigger output pulses, max. 2.5 MHz rate, programmable filter • Time spaced trigger output pulses, 0.02 Hz to 2.5 MHz rate, 50 ns accuracy • Trigger output on trajectories with 100 µs resolution • Data gathering at up to 8 kHz rate, up to 1,000,000 data entries • User-defined "actions at events" monitored by the controller autonomously at a rate of 8 kHz • User-definable system referencing with hardware position latch of reference signal transition and "set current position to value" capability • Axis position or speed controlled by analog input • Axis position, speed or acceleration copied to analog output • Trajectory precheck function replying with travel requirement and max. possible speed • Auto-tuning and auto-scaling
Motion	• Jogging mode including on-the fly changes of speed and acceleration • Synchronized point-to-point • Spindle motion (continuous motion with periodic position reset) • Gantry mode including XY gantries with variable load ratio • Line-arc mode (linear and circular interpolation incl. continuous path contouring) • Splines (Catmull-Rom type) • PVT (complex trajectory based on position, velocity and time coordinates) • Analog tracking (using analog input as position or velocity command) • Master-slave including single master-multiple slaves and custom gear ratio
Compensation	• Linear error, Backlash, positioner error mapping • XY and XYZ error mapping • All corrections are taken into account on the servo loop
Servo Rate	• 8 kHz
Control Loop	• Open loop, PI position, PIDFF velocity, PIDFF acceleration, PIDDualFF voltage • Variable PID's (PID values depending on distance to target position) • Deadband threshold; Integration limit and integration time • Derivative cut-off filter; 2 user-defined notch filters

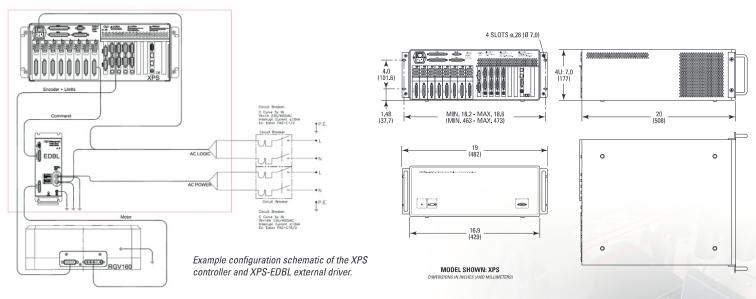| I/O	• 30 TTL inputs and 30 TTL outputs (open-collector) • 4 synch. analog inputs ±10 V, 14 Bit • 4 synch. uncommitted analog outputs, 16 Bit • Watchdog timer and remote interlock
Trigger In	• Hardware latch of all positions and all analog I/O's; 8 kHz max. frequency • <50 ns latency on positions • <100 μs time jitter on analog I/O's
Trigger Out	• One high-speed position compare output per axes that can be either configured for position synchronized pulses or for time synchronized pulses : <50 ns accuracy/latency, 2.5 MHz max. rate
Dedicated Inputs Per Axis	• RS-422 differential inputs for A, B and I, Max. 25 MHz, over-velocity and quadrature error detection • 1 Vpp analog encoder input up to x32768 interpolation used for servo; amplitude, phase and offset correction; additional 2nd hardware interpolator used for synchronization; up to x200 interpolation • Forward and reverse limit, home, error input
Dedicated Outputs Per Axis (when using external drives)	2 channel 16-bit, ±10 V D/A Drive enable, error output
Drive Capability	• Analog voltage, analog velocity, and analog acceleration (used with XPS-DRV01 and XPS-DRV03 for DC brush motor control). • Analog position (used with XPS-DRV01 for stepper motor control or with the XPS-DRVP1 for piezo control) • Analog position (used with external drives for example 3rd party motors) • Analog acceleration, sine acceleration and dual sine acceleration (used with XPS-DRV02 for brushless motors control) • Step and direction and +/- pulse mode for stepper motors (requires XPS-DRV00P and external stepper motor driver) • 500 W @ 230 VAC and 425 W @ 115 VAC total available power
AC Power Requirements	• 100–240 VAC 60/50 Hz 10 A–5.5 A The controller should be connected to a power installation that incorporates appropriate protection devices. Refer to the installation requirements of your facility and local applicable Standards concerning the use of RCDs (residual current device).
Dimensions (W x D x H)	• 19" – 4U, L: 508 mm
Weight	• 15 kg max

2.2   Drive Options

The XPS controller is capable of driving up to 8 axes of most Newport positioners using driver cards that slide through the back of the chassis. These factory-tested drives are powered by an internal 500 W power supply, which is independent of the controller power supply. When used with Newport ESP stages, the configuration of the driver cards is easy using the auto-configuration utility software. Advanced users can also manually develop their own configuration files optimized for specific applications.

The XPS-DRV01 is a software configurable PWM amplifier that is compatible with most of Newport's and other companies' DC brush and stepper motor positioners.

The XPS-DRV01 motor driver supplies a maximum current of 3 Amps and 48 Volts. It has the capability to drive bipolar stepper motors in microstep mode (sine/cosine commutation) and DC brush motors in velocity mode, for motors with tachometer, or voltage mode, for motors without tachometer. Programmable gains and a programmable PWM switching frequency up to 300 kHz allow a very fine adjustment of the driver to the motor. For added safety, a programmable over-current protection setting is also available.

SPECIFICATIONS

	XPS-DRV00P	XPS-DRV01	XPS-DRV02	XPS-DRV02P	XPS-DRV02L	XPS-DRV03	XPS-DRVP1	XPS-EDBL
Number of Axis	1	1	1	1	1	1	1	1
Motor Type	Pass through card	DC Motor and Stepper Motor	Brushless Motor (3-phase)	Brushless Motor (3-phase)	Brushless Motor (3-phase)	DC Motor and DC Motor equipped with tachometer	Piezo-stack	Brushless Motor (3-phase)
Driver Differentiators	Interface to external drivers with ±10 V analog input commands, or pulse & direction capability	Standard	Standard	Higher resolution, Higher power	Higher resolution, Lower noise	Higher power, Voltage, Current or Velocity control	Standard	Higher resolution, Higher power
Drive Type	–	PWM	PWM	PWM	PWM	PWM	LINEAR	PWM
Current Range/Voltage	–	3 A/48 V	5 A/44 V	7 A/44 V	2 A/44 V	5 A/48 V	60 mA -10 V/+150 V	25 A/96 V
Max. Power	–	144 W	180 W	250 W	72 W	240 W	9 W	1200 W (with fans) 576 W (without fans)
Connector Interface	DB25	DB25	THERM/EOR: DB9 Motor: DB9	THERM/EOR: DB9 Motor: DB9	THERM/EOR: DB9 Motor: DB9	DB25	DB25	Motor: 9W4 EOR: DB9 XPS: DB25
Operating Environment	0–40 °C 20–85% humidity No corrosive gases							
Mounting	XPS	XPS	XPS	XPS	XPS	XPS	XPS	External
Weight	0.71 lb (0.32 kg)	1.19 lb (0.54 kg)	0.79 lb (0.36 kg)	0.58 lb (0.27 kg)	0.58 lb (0.27 kg)	0.71 lb (0.32 kg)	1.5 lb (0.68 kg)	14.8 lb (6.7 kg)
Dimensions	8.50" x 4.69" x 0.99" (216 x 119 x 25.2 mm)							7.75" x 10.3" x 12" (121 x 262 x 305 mm)
Standards	CE, RoHS							

Example configuration schematic of the XPS controller and XPS-EDBL external driver.

MODEL SHOWN: XPS
DIMENSIONS IN INCHES (AND MILLIMETERS)

4 SLOTS ø.28 (Ø 7.0)
4.0 (101.6)
1.48 (37,7)
MIN. 18.2 - MAX. 18.6 (MIN. 463 - MAX. 473)
4U: 7.0 (177)
20 (508)
19 (482)
16.9 (429)

ILX Lightwave — A Newport Company
New Focus — A Newport Company
OPHIR — A Newport Company
ORIEL INSTRUMENTS — A Newport Company
Richardson Gratings — A Newport Company
Spectra-Physics — A Newport Company
Spiricon — OPHIR Photonics A Newport Company