QUBE™-SERVO 2 FOR NI myRIO

Low cost, self-contained servomotor solution for undergraduate mechatronics and control labs.

QUANSER QUALITY AND PRECISION AT AN AFFORDABLE PRICE

The Quanser QUBE™-Servo 2 is a fully integrated controls lab designed for teaching students control concepts relevant to real world engineering.

With the QUBE-Servo 2, educators have a self contained, modular servomotor solution for undergraduate lab. Built with the same quality and precision that Quanser is renowned for, the QUBE-Servo 2 helps instructors build a state of the art controls lab that will engage students in any engineering discipline. The QUBE-Servo 2 comes with two quick connect modules - an inertia disk and pendulum, making it an ideal platform for teaching practical control concepts from introductory to advanced levels.

HOW IT WORKS

The QUBE-Servo 2 experiment consists of a DC motor with an optical encoder providing position and velocity feedback, a built-in amplifier with integrated current sensor, a data acquisition device and a MXP interface for connection to a NI myRIO.

The experiment includes two add-on modules - an inertia disk and a pendulum. With a quick-connect interface, you can easily attach the module, or remove it while the controller is running to observe the effect of different inertias on a controller response. Moreover, you can design and 3D print your own add-on modules to expand the scope of the experiment, or to create an engaging student project[1].

The QUBE-Servo 2 also has a user-controllable tri-color LED strip. It can be programmed to indicate state, power, or other control performance parameters of the experiment.

MODULAR, DIGITAL MEDIA COURSEWARE

The QUBE-Servo 2 solution comes with a mix-and-match, rich digital media courseware for easy adaptation of materials to specific course. A comprehensive mapping tool allows you to align courseware sections with specific chapters of the most popular control engineering textbooks, such as Control Systems Engineering by Norman S. Nise. The courseware is also aligned with the requirements of ABET[3] accreditation. All this allows professors to get their labs running faster, saving months of time typically required to develop lab materials and exercises.

See system specifications on reverse.

QUBE-SERVO 2 SOLUTION COMPONENTS

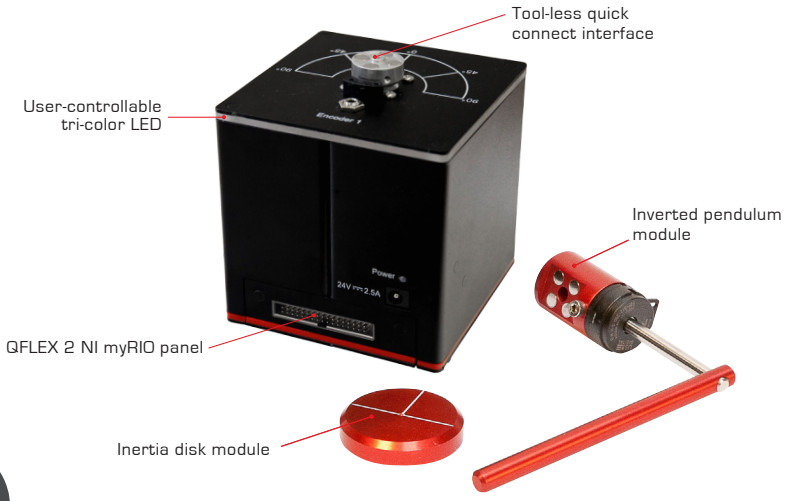
- QUBE-Servo 2 with NI myRIO panel
- Quanser control software QRCP for LabVIEW*
- Complete dynamic model and pre-build controllers
- ABET[2]-aligned, flexible digital media courseware

**LabVIEW licenses not included*

[1] The performance and safety of the experiment is guaranteed only with the original parts supplied by Quanser. Quanser does not carry any responsibility for damages caused when using any third-party add-on modules.
[2] ABET, Inc. is the recognized accreditor for college and university programs in applied science, computing, engineering, and technology.

SYSTEM SPECIFICATIONS

QUBE-Servo 2 for NI myRIO



FEATURES

- Compact and integrated rotary servo system
- Tool-less quick connect module interface
- Direct-drive brushed DC motor
- High resolution optical encoder
- Built-in voltage amplifier with integrated current and tachometer sensors
- User-controllable tri-color LED
- Easy-connect cables and connectors
- Open architecture design, allowing users to design their own controller
- Fully compatible with LabVIEW™
- Fully documented system models and parameters provided
- Additional community-created resources available on www.QuanserShare.com

COURSEWARE TOPICS COVERED

Inertia Disk Module:

- Hardware integration
- Step response modeling
- Noise measurement and filtering
- Electromechanical modeling
- Second-order systems
- PD control
- Stability analysis

Inverted Pendulum Module:

- Pendulum modeling
- Moment of inertia
- Balance control
- State-feedback LQR-based control
- State space modeling
- Swing-up control

COURSEWARE TEXTBOOK MAPPING

- Control Systems Engineering by Norman S. Nise
- Feedback Systems by K.J. Åström, R.M. Murray
- Mechatronics by W. Bolton
- Modern Control Systems by R.C. Dorf, R.H. Bishop
- Modern Control Engineering by K. Ogata
- Automatic Control Systems by F. Golnaraghi, B.C. Kuo
- Control Systems Engineering by I.J. Nagrath, M. Gopal
- Feedback Control of Dynamic Systems by G.F. Franklin, J.D. Powell, A. Emai-Naeini

DEVICE SPECIFICATION

Dimensions (W x H x D)	102 mm x 102 mm x 117 mm
Weight	1.2 kg
Pendulum length (pivot to tip)	9.5 cm
Servomotor encoder resolution	512 counts/revolution*
Inverted pendulum encoder resolution	512 counts/revolution*
DC motor nominal voltage	18 V
DC motor nominal current	0.54 A
DC motor nominal speed (no load)	4050 RPM

* Non-quadrature decoding

About Quanser:

Quanser is the world leader in education and research for real-time control design and implementation. We specialize in outfitting engineering control laboratories to help universities captivate the brightest minds, motivate them to success and produce graduates with industry-relevant skills. Universities worldwide implement Quanser's open architecture control solutions, industry-relevant curriculum and cutting-edge work stations to teach Introductory, Intermediate or Advanced controls to students in Electrical, Mechanical, Mechatronics, Robotics, Aerospace, Civil, and various other engineering disciplines.

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