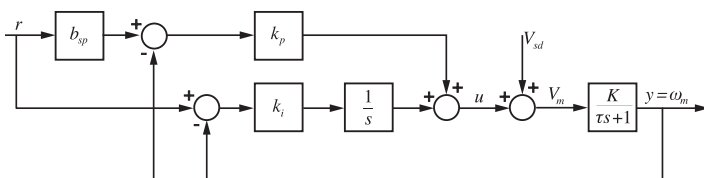


## QNET 2.0 DC MOTOR BOARD FOR NI ELVIS

Illustrate the fundamentals of motor control through system modeling, position and speed control, using NI ELVIS platform and LabVIEW™ software.

### TEACH FUNDAMENTALS OF DC MOTOR CONTROL

The Quanser QNET 2.0 DC Motor board is a versatile servo system designed to teach and demonstrate the fundamentals of DC motor control in a variety of ways. Designed exclusively for NI ELVIS platform and LabVIEW™ software, the system can be easily configured to control motor position and speed, as well as for modeling experiments.



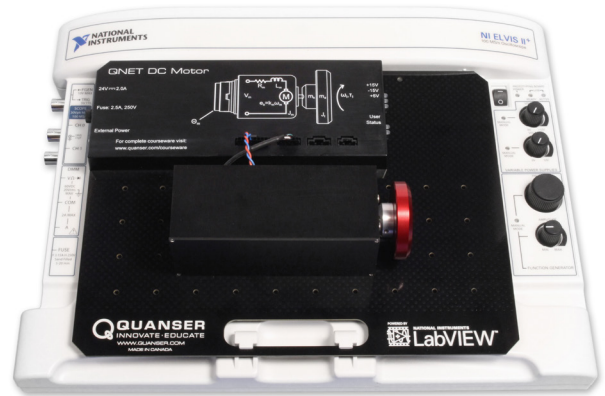
QNET DC Motor PI closed-loop block diagram

### HOW IT WORKS

The QNET 2.0 DC Motor board consists of a direct-drive motor with a single-ended rotary encoder measuring the angular position of the motor, and an inertia disk on the motor shaft. The inertia disk can be easily attached using a magnetic connector. The motor is driven using a pulse-width modulated (PWM) power amplifier. Signals to and from the system are available on a header and on standard connectors for control via a data acquisition card. The control variable is the voltage to the drive amplifier of the system and the output is either the inertia disk speed or the angle of the inertia disk. Disturbances can be introduced manually by manipulating the wheel or digitally through LabVIEW™ software.



Students learn how to model a DC motor experimentally, design and implement controllers to control the speed and position of a motor, and to track error and disturbance rejection.



NI Part No. 783649-01

[System specifications on reverse page.](#)

### QNET 2.0 DC MOTOR WORKSTATION COMPONENTS

- QNET 2.0 DC Motor board
- NI ELVIS II or ELVIS II\*<sup>1</sup>
- ABET-aligned course resources with comprehensive lab exercises, fully documented system models, and pre-designed VIs

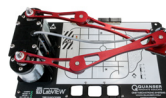
### ACCELERATE DISCOVERY WITH NI ELVIS PLATFORM

The NI Educational Laboratory Virtual Instrumentation Suite (NI ELVIS) presents a modular teaching platform suitable for any engineering lab. Integrating 12 most commonly used instruments, including an oscilloscope, digital multimeter, function generator, dynamic signal analyzer in one device allows for quick and easy measurement, design and prototyping in an educational laboratory setting.

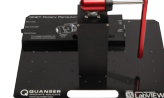
With a wide range of Quanser plug-and-play add-on boards for NI ELVIS, you can give students a great lab experience, and increases the value of your investment in NI ELVIS and LabVIEW software. Plus the comprehensive courseware reduces your lab planning time and allows you to focus on higher-value tasks.

For the full range of Quanser QNET boards, visit [www.quanser.com](http://www.quanser.com)

Teach  
Mechanics



Teach  
Controls

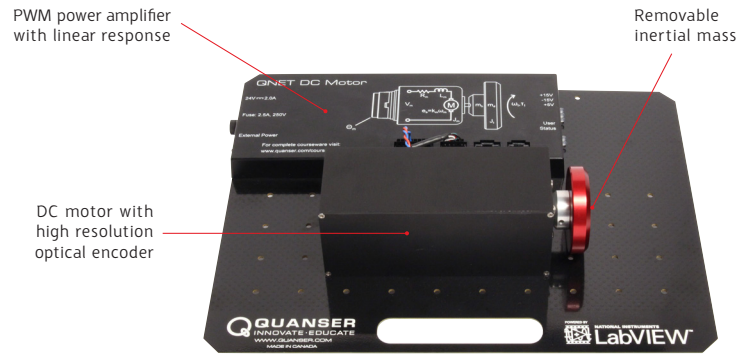


Teach  
Power Electronics



# SYSTEM SPECIFICATIONS

## QNET 2.0 DC MOTOR BOARD



### FEATURES

- Durable DC servo motor with no cogging
- Removable inertia disk
- Built-in PWM amplifier with linear response
- High resolution optical encoder to sense position
- Built-in PCI connector for NI ELVIS II /ELVIS II+ for quick and easy lab setup
- Hardware velocity measurement
- Fully compatible with LabVIEW™
- Fully documented system models and parameters provided for LabVIEW™
- Comprehensive digital course resources aligned with ABET requirements
- Additional community-created resources available on [www.QuanserShare.com](http://www.QuanserShare.com)

### COURSEWARE TOPICS COVERED

- System modeling and model validation
- Speed and position control
- System simulation
- PID control
- Error tracking
- Disturbance rejection

### DEVICE SPECIFICATION

DC motor nominal input voltage	18 V
DC motor nominal speed	3050 rpm
DC motor nominal current	0.54 A
DC motor terminal resistance	8.4 $\Omega$
DC motor rotor inertia	4.0 x 10 <sup>-6</sup> kg.m <sup>2</sup>
Encoder line count	512 lines/rev
Encoder line count (in quadrature)	2048 lines/rev
Encoder resolution (in quadrature)	0.176 deg/count
Amplifier type	PWM
Amplifier peak current	2.5 A
Amplifier continuous current	0.5 A
Amplifier output voltage	± 24 V with 42% duty cycle limit (± 10 V)

#### 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 succeed 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.