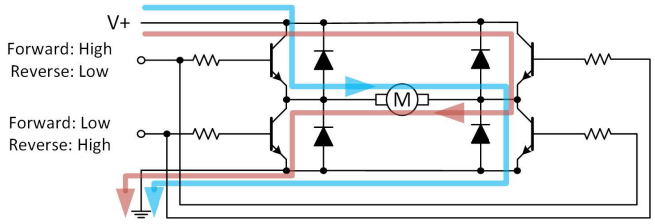
QNET MECHATRONIC ACTUATORS BOARD FOR NI ELVIS

Demonstrate the fundamentals of the actuators applied most commonly in mechatronic systems, using NI ELVIS platform and LabVIEW™ software.

TEACH BASIC CONCEPTS OF ACTUATION

One of the topics covered in a typical introductory mechatronics course is understanding and application of actuators commonly used in modern mechatronic systems. The QNET Mechatronic Actuators board is an ideal tool to introduce hands-on a variety of actuators, and demonstrate their advantages, interfacing and operation, as well as design considerations and limitations. Designed exclusively for NI ELVIS platform and LabVIEW™ software, students learn principles of electromagnetic actuation, linear and PWM actuators, brushed and brushless DC motors, stepper motors and servos.



A typical full H-bridge configuration for bi-directional DC motor control as most commonly configured using transistors.

HOW IT WORKS

The QNET Mechatronic Actuators board consists of a solenoid, two brushed DC motors, a brushless DC motor, an unipolar stepper motor, and a servo motor. One of the brushed DC motors is commanded through a linear power amplifier, the other is commanded by a PWM amplifier. The solenoid can be used to couple the two brushed DC motors. The brushless DC motor, stepper motor and servo motor are driven by a PWM amplifier. Current sense is used to read the current supplied to each of the motors, the angular position of the motors is measured by photomicrosensors.

Using the QNET Mechatronic Actuators board, students learn about a variety of actuators used in modern mechatronic systems.

NI Part No. 784100-01

System specifications on reverse page.

QNET MECHATRONIC ACTUATORS WORKSTATION COMPONENTS:

- QNET Mechatronic Actuators board
- NI ELVIS II or ELVIS II+[1]
- 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.

BUILD A COMPLETE MECHATRONICS LAB

Four Quanser add-on boards for NI ELVIS cover arguably the most important technical hardware-focused skills in mechatronics: sensing, actuation, inter-device communication and integration of these concepts in an actual mechatronic system. With the QNET Mechatronics board family, you can give students a great lab experience and prepare them to take on high fidelity mechatronic application and design challenges.

QNET Mechatronic Sensors

QNET Mechatronic Interfacing

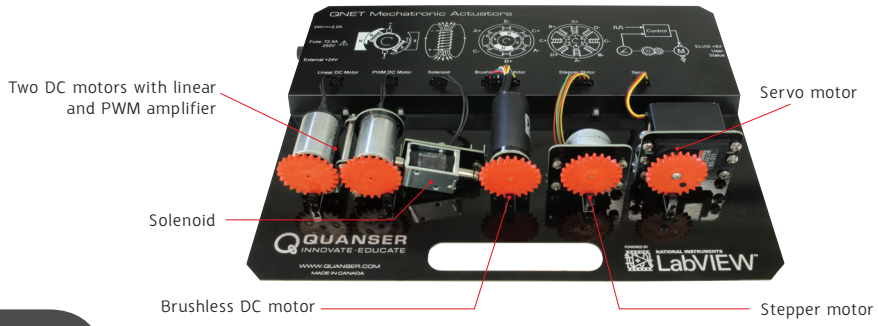
QNET Mechatronic Systems

For the full range of Quanser QNET boards, visit www.quanser.com

[1] Can be purchased directly from Quanser in selected regions. For details contact sales@quanser.com

SYSTEM SPECIFICATIONS

QNET MECHATRONIC ACTUATORS BOARD



FEATURES

- Two brushed DC motors with gears to compare linear versus PWM amplifier technology
- Brushless DC motor
- Stepper motor
- Hobby servo motor
- Solenoid for coupling two brushed DC motors
- Separate photomicrosensors for each motor
- Built-in PWM and linear amplifiers
- Visualization of internal actuator mechanisms animated by hardware motion
- Built-in PCI connector for NI ELVIS II /ELVIS II+ for quick and easy lab setup
- Fully compatible with LabVIEW™
- Fully documented system models and parameters provided for LabVIEW™
- Comprehensive digital course resources
- Additional community-created resources available on www.QuanserShare.com

COURSEWARE TOPICS COVERED

- Principles of electromagnetic actuation:
  - Magnetic fields of coiled conductors
  - Implementation of electromagnetic field theory in solenoids
- Principles of linear and pulse width modulation (PWM) amplifiers
  - Actuator dead-band measurement and compensation
  - Linearity of an amplifier
- Principles of brushed and brushless DC motors
- Principles of stepper motors, their control and excitation modes
- Introduction to servo motor position control

DEVICE SPECIFICATION

Brushed DC motor nominal input voltage	24 V
Brushed DC motor nominal speed	8700 rpm
Brushless DC motor nominal input voltage	24 V
Brushless DC motor nominal speed	4600 rpm
Stepper motor nominal input voltage	5 V
Stepper motor step angle	15°
Servo motor nominal operating voltage	4.8 V - 6 V
Servo motor nominal speed (no load)	0.19 s/60° (4.8 V) - 0.15 s/60° (6 V)
Solenoid nominal operating voltage	6 V
Photomicrosensor typical rising and falling time	4 µs
Photomicrosensor resolution	15° / count

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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