QNET MECHATRONIC SYSTEMS BOARD FOR NI ELVIS

The most comprehensive solution for teaching mechatronics, using NI ELVIS platform and LabVIEW™ software.

EXPOSE STUDENTS TO A COMPLEX MECHATRONIC SYSTEM

The QNET Mechatronic Systems board is a versatile system that combines various topics covered in typical mechatronics courses and programs, and applies them to a complex mechatronic system. The board is designed exclusively for NI ELVIS platform, taking the full advantage of accurate timing and control of FPGA-based, reconfigurable I/O, brought by the new ELVIS RIO Control Module.

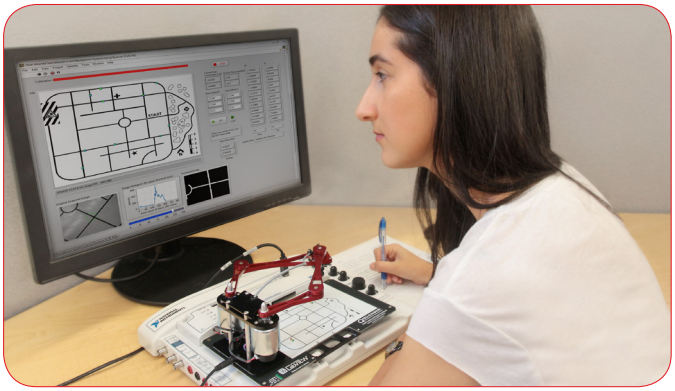
The QNET Mechatronic Systems board is the only solution that takes students from component-level knowledge of sensors, actuators, and interfacing fundamentals to a system-level understanding of mechatronics design. Students investigate and implement various sub-components of a mechatronic system from manipulator control, to image processing, line-following, pattern recognition, PWM generation, encoder decoding, LabVIEW FPGA coding, and more. This exemplifies challenges they will encounter in a typical industry-level applications.

HOW IT WORKS

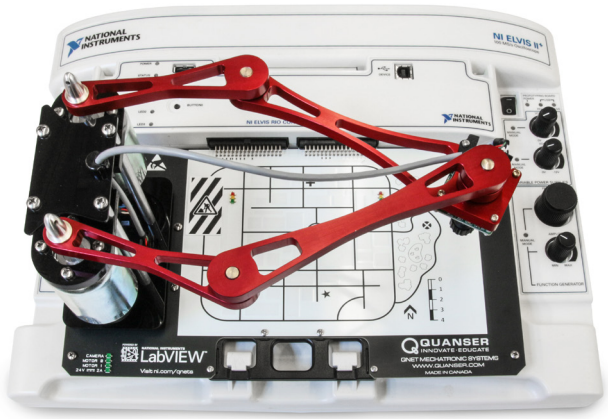
The QNET Mechatronic Systems board consists of two brushed DC motors direct-driving a five-link parallel manipulator with a serial camera at the end-effector. The angular position of the motors is measured by optical encoders.

The camera is suspended above a default map representing a city, with LEDs mimicking traffic lights, and other elements (city park, construction zone, round-abouts), that allow students to design and test a sophisticated path planning algorithm.

The default map can be replaced by other images based on a provided template, so that you can create other challenges for the system, applicable to your curriculum goals, such as finding minimum and maximum height on a topological map.



The QNET Mechatronic Systems board presents students with a complete mechatronic system, challenging them to explore, develop and integrate the component subsystems.



System specifications on reverse page.

QNET MECHATRONIC SYSTEMS WORKSTATION COMPONENTS:

- QNET Mechatronic Systems board[1]
- NI ELVIS II or ELVIS II+[1]
- NI ELVIS RIO Control Module[1]
- 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. NI ELVIS integrates 12 most commonly used instruments, including an oscilloscope, digital multimeter, function generator, dynamic signal analyzer in one device. The new NI ELVIS RIO Control Module brings the industrial standard NI Reconfigurable I/O (NI RIO) and FPGA architecture to the NI ELVIS, allowing students to quickly simulate, test, and design, using the same tools adopted by research and industry.

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 Actuators

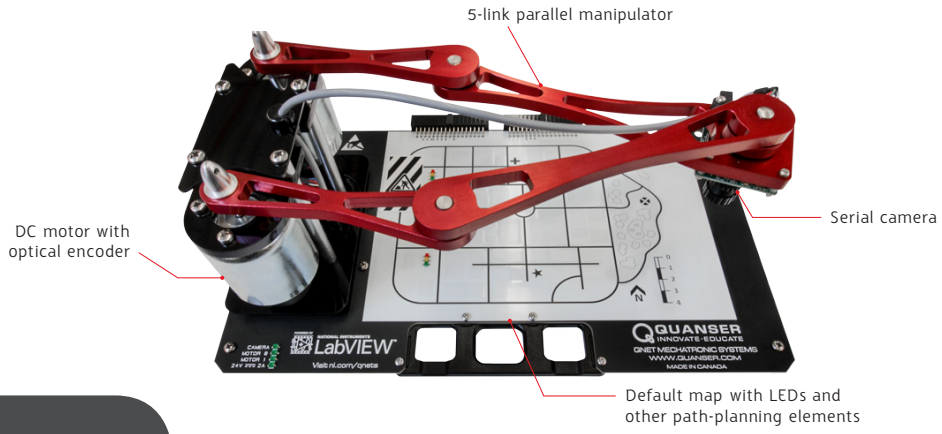
QNET Mechatronic Interfacing

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 SYSTEMS BOARD



FEATURES

- 5 bar parallel SCARA robot
- Direct-drive brushed DC motors
- Built-in PWM amplifier for each motor
- Optical encoders
- Serial camera for embedded imaging applications
- Default map with dynamic LEDs and other elements for path planning tasks
- Template for map or other custom applications
- Built-in MXP connectors for NI ELVIS RIO Control Module for quick and easy lab setup
- Fully compatible with LabVIEW™
- Fully documented system models and parameters provided for LabVIEW™
- Comprehensive ABET-aligned course resources
- Additional community-created resources available on www.QuanserShare.com

COURSEWARE TOPICS COVERED

- Goal-directed line following
- Image processing
  - Image tresholding
  - Blob detection
  - Pattern matching
- State machines
- Manipulator control
  - PWM generation
  - Encoder decoding
  - Inverse kinematics
  - Forward kinematics
  - PID position control

DEVICE SPECIFICATION

DC motor nominal input voltage	18 V
DC motor nominal speed	3050 RPM
DC motor nominal current	0.54 A
Encoder line count	512 lines/rev
Encoder resolution (in quadrature)	0.176 deg/count
Amplifier type	PWM
Amplifier continuous current	2.5 A
Amplifier nominal frequency	20 kHz
Camera type	CMOS VGA serial camera
Image formats	JPEG and RAW
Image resolutions	160 x 128 / 320 x 240 / 640 x 480 (in JPEG mode) 80 x 60 / 160 x 120 / 128 x 128 / 128 x 96 (in RAW mode)

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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