TEACH FUNDAMENTALS OF EMBEDDED SYSTEMS
Typical introductory mechatronics courses cover topics such as microprocessor architecture, and inter-device communication. The QNET Mechatronic Interfacing board is an ideal tool to expose students to basic principles and applications of embedded systems. Designed exclusively for NI ELVIS platform and LabVIEW™ software, students learn how to control the microcontroller at the register level, and interact with sensors and other system components using industry communication standards.

HOW IT WORKS
The QNET Mechatronic Interfacing board consists of a dsPIC33e microcontroller, SPI and I²C devices, such as temperature, proximity and acceleration sensors, memory chips, keypad and touch screen interface devices, and external communication ports for UART and CAN. The internal registers of the PIC can be modified in real time to control the behaviour of the entire system without requiring re-flashing of firmware.

Using the QNET Mechatronic Interfacing board, students learn fundamentals of microcontrollers and interfacing to sensors and display peripherals.

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.

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 2.0 MECHATRONIC INTERFACING BOARD

FEATURES

• dsPIC33e microcontroller with ADC, SPI and I²C interfaces, UART and input capture
• Two position encoders
• Analog input signal generation via potentiometer
• Keypad and touch screen for user interface
• LCD screen and tri-colour LED for display
• Colour sensor, connected to LED via fiber-optic cable
• I²C accelerometer, gyroscope, thermometer, and IR range detector
• SPI RAM and Flash memory chips
• SD card slot with SPI interface
• Fiber-optic serial I/O connected to UART
• Two external CAN bus connectors with SPI CAN controller chips and built-in termination resistance
• 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

• Microcontroller I/O
• Hardware control registers
• Data storage in flash and RAM
• SPI and I²C communication
• CAN busses and inter-device communications
• User I/O, controls and displays
• Hardware integration

DEVICE SPECIFICATION

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPI RAM capacity</td>
<td>64 kB</td>
</tr>
<tr>
<td>Flash capacity</td>
<td>64 Mb [32 Mb reserved]</td>
</tr>
<tr>
<td>Encoder resolution</td>
<td>24 pulses/rev</td>
</tr>
<tr>
<td>Temperature sensor max. sensitivity</td>
<td>0.0625 °C</td>
</tr>
<tr>
<td>Accelerometer max. scale</td>
<td>± 8 g</td>
</tr>
<tr>
<td>Accelerometer granularity</td>
<td>12 bits</td>
</tr>
<tr>
<td>LCD colour depth</td>
<td>18 bits</td>
</tr>
<tr>
<td>Touch sensor granularity</td>
<td>16 bits</td>
</tr>
<tr>
<td>Gyroscope granularity</td>
<td>32 bits</td>
</tr>
<tr>
<td>CAN bus termination resistance</td>
<td>120 Ω</td>
</tr>
<tr>
<td>CAN transceiver voltage</td>
<td>5 V</td>
</tr>
<tr>
<td>Colour sensor max. output frequency</td>
<td>600 kHz</td>
</tr>
</tbody>
</table>

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.