Chapter
1

Getting Started

ABOUT LABVIEW

LabVIEW is a graphical programming language used by millions of engineers and scientists to develop sophisticated measurement, test, and control programs. LabVIEW offers integration with thousands of hardware devices and provides hundreds of built-in libraries for advanced analysis and data visualization. The LabVIEW platform is scalable across multiple targets and operating systems, and since its introduction in 1986, has become an industry leader.

Educators use LabVIEW for teaching engineering, student design projects, and research projects. LabVIEW allows hands-on investigation of engineering concepts by acquiring a signal, performing analysis, and visualizing the data.

LabVIEW is a graphical programming language that uses icons instead of lines of text to create programs. In contrast to text-based programming languages, where instructions determine program execution, LabVIEW uses dataflow programming, where the flow of data determines execution order.

LabVIEW programs/subroutines are called virtual instruments (VIs). A LabVIEW VI represents a fundamental shift from traditional hardware-centered instrumentation systems to software-centered systems that exploit the computing power, productivity, display, and connectivity capabilities of popular desktop computers and workstations. With LabVIEW VIs, engineers and scientists build measurement and automation programs that suit their needs exactly (user-defined) instead of being limited by traditional fixed-function instruments (vendor-defined).

The LabVIEW Education Edition software helps teachers bring Science, Technology, Engineering, and Math (STEM) to life through hands-on learning. With LabVIEW, you can quickly build a program to log data, power a robot, or analyze information. The new LabVIEW Education Edition was designed in conjunction with Tufts Center for Engineering Education and Outreach to meet the needs of engineering educators, and works seamlessly with products such as Vernier SensorDAQ, Vernier LabQuest interfaces, Vernier Go! sensors, and the LEGO NXT Intelligent Brick.

ABOUT VERNIER SENSORS AND INTERFACES

Vernier Software & Technology produces a wide variety of sensors for science and engineering education. These sensors work with several different “lab interfaces,” which are electronic devices that connect to the USB port of a computer. The interface performs the analog to digital conversion and timing for data collection. It may also control analog or digital output lines. This book supports Vernier SensorDAQ and all Vernier LabQuest interfaces. Each of these interfaces has three or four connectors for analog sensors. Examples of analog sensors available from Vernier include Voltage, Microphone, Temperature, pH, Force, and Heart Rate Sensors. LabQuest interfaces also have two connectors for digital sensors. SensorDAQ has one connector for digital sensors. Examples of digital sensors include Motion Detectors, Photogates, Rotary Motion Sensors, and Radiation Monitors. Vernier Digital Control Unit (DCU) can also be connected and used to provide sufficient current for controlling external electrical devices.

In addition to the analog and digital sensor connectors, SensorDAQ includes a screw terminal connector. The screw terminal channels include digital input/output, analog output, counter/timer, +5 volt line, and two analog input channels. These connectors can be used to build circuits, create custom sensors, control RC servo motors, turn on electronic devices, and more.