Integrated Suite of 12 Instruments for Hands-On, Multidiscipline Education

NI ELVIS II/II+ **NEW!**

- Design and prototyping platform for measurement and instrumentation, circuits, controls, telecommunications, and embedded/MCU experiments
- Complete integration with Multisim for circuits and electronics
- Completely open and customizable in LabVIEW
- Express VIs for point-and-click configuration in LabVIEW and LabVIEW SignalExpress

Platform Features

- Open architecture for third-party plug-in boards
- Hi-Speed USB plug-and-play connectivity
- 1.25 MS/s oscilloscope with 100 MS/s option on NI ELVIS II+
- 5½-digit isolated digital multimeter
- ±15 and +5 V power supply
- Manual control – function generator and variable power supply
- Circuit protection with resettable fuse

Integrated Suite of 12 Virtual Instruments

- Oscilloscope
- Function generator (manual control)
- Digital multimeter (DMM)
- Arbitrary waveform generator
- Bode analyzer
- 2-wire current voltage analyzer
- 3-wire current voltage analyzer
- Dynamic signal analyzer (DSA)
- Impedance analyzer
- Digital reader
- Digital writer
- Variable power supply (manual control)

Recommended Software

- LabVIEW
- NI Circuit Design Suite

Driver Software (included)

- NI-ELVISmx
- LabVIEW SignalExpress

Overview

The NI Educational Laboratory Virtual Instrumentation Suite (NI ELVIS) is a hands-on design and prototyping platform that integrates 12 of the most commonly used instruments – including the oscilloscope, DMM, function generator, and Bode analyzer – into a compact form factor ideal for the hardware lab or classroom. A 100 MS/s oscilloscope option is available on the NI ELVIS II+.

Based on NI LabVIEW graphical system design software, NI ELVIS, with USB plug-and-play capabilities, offers the flexibility of virtual instrumentation and allows for quick and easy measurement acquisition and display.

This hardware platform, used from first-year classes to advanced senior classes, helps educators teach a variety of concepts, including measurement and instrumentation, analog and digital circuits, controls and mechatronics, telecommunications, and embedded theory.

<table>
<thead>
<tr>
<th>Features</th>
<th>NI ELVIS I</th>
<th>NI ELVIS II</th>
<th>NI ELVIS II+</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 integrated instruments</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>PC/PCI/PCMCIA</td>
<td>✓</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Integrated USB</td>
<td>–</td>
<td>–</td>
<td>✓</td>
</tr>
<tr>
<td>Isolated digital multimeter</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>NI-DAQmx software</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>True Multisim integration</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>100 MS/s oscilloscope</td>
<td>–</td>
<td>–</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 1. NI ELVIS Platform Comparison

Figure 1. The NI ELVIS Education Platform
NI Electronics Education Platform

NI ELVIS, an integral part of the NI electronics education platform, combines simulation and measurements from NI ELVIS inside the NI Multisim capture and SPICE simulation environment. Students transfer concepts taught in a textbook to Multisim, where they can learn through modeling circuit behavior and interactive circuits. They can compare simulation and real measurements with a single mouse click using NI ELVIS instruments inside the Multisim environment and achieve more complex analysis using LabVIEW or LabVIEW SignalExpress.

For more information on the NI electronics education platform, visit ni.com/academic/eep.

NI-ELVISmx Driver and LabVIEW Accessibility

With the NI-ELVISmx driver, students can access their suite of 12 instruments through the NI-ELVISmx instrument launcher. These virtual instruments with their soft front panels provide an interactive interface to configure instruments.

NI ELVIS virtual instruments are open-sourced and customizable in LabVIEW. With the installation of the driver, students can use LabVIEW Express VIs and LabVIEW SignalExpress steps to program their devices. This provides point-and-click configuration capabilities for the individual instruments, so they can achieve customized and more complex analysis of acquired data in LabVIEW.

Those who are familiar with the DAQmx API can program general analog input, analog output, and timing functionality on NI ELVIS using NI-DAQmx.

Teach a Variety of Disciplines with Plug-In Boards

Educators can extend their labs beyond instrumentation and circuits with NI ELVIS plug-in boards and courseware from third-party collaborators such as Emona, Freescale Semiconductor, and Quanser to teach telecommunications, microcontroller, and control concepts. National Instruments also now provides introduces a digital electronics and field-programmable gate array (FPGA) plug-in board for the platform.

NI ELVIS is an open architecture, which helps leading teaching solution providers take advantage of the platform. The following plug-in boards are available from the following companies.

Digital Electronics with National Instruments

- NI Digital Electronics FPGA Board based on Xilinx Spartan-3E FPGA

Control and Simulation with Quanser

- QNET-010 DC motor control
- QNET-011 rotary inverted pendulum
- QNET-012 HVAC system
- QNET-013 Vertical Take-Off and Landing (VTOL) actuator
- QNET-014 mechatronics sensor 1
Embedded/MCU Design with Freescale
• Embedded/MCU design with Freescale Microcontroller Student Learning Kit (SLK)

Telecommunications and Fiber Optics with Emona
• Telecommunications with Emona DATEx
• Fiber optics with Emona FOTEx

Other Companion Products
• Circuits – NI electronics education platform with Multisim
• Embedded/DSP – Analog Devices ADSP-BF537 Blackfin Processor
• Sensors – Vernier sensor adapters for NI ELVIS

Ordering Information

Bundles
NI ELVIS II+ Circuit Design Bundle ........................................ 780379-02
NI ELVIS II Circuit Design Bundle ........................................ 780379-01
Includes NI ELVIS workstation, Multisim, LabVIEW, LabVIEW SignalExpress, and user manual.
NI ELVIS II+ Basic Bundle .................................................. 780378-02
NI ELVIS II Basic Bundle ...................................................... 780378-01
Includes NI ELVIS workstation, LabVIEW, LabVIEW SignalExpress, and user manual.
NI ELVIS II+ instrumentation design
and training platform .......................................................... 780380-02
NI ELVIS II instrumentation design
and training platform .......................................................... 780380-01
Includes NI ELVIS workstation only and user manual for industry and vocational training.
NI ELVIS II prototyping board .............................................. 188432-01
Used with NI ELVIS II and NI ELVIS II+

BUY NOW!
For complete product specifications, pricing, and accessory information, call 800 813 3693 (U.S.) or go to ni.com/nielvis.
Specifications

**Analog Input**
- Channels: 8 differential or 16 single-ended
- ADC resolution: 16 bits
- Absolute accuracy: Refer to NI ELVIS II
- Maximum sampling rate: 1.25 MS/s single channel, 1.00 MS/s multichannel (aggregate)
- Input range: ±10, ±5, ±2, ±1, ±0.5, ±0.2, and ±0.1 V
- Maximum working voltage for analog inputs (signal + common mode): ±11 V of AIGND
- Input impedance:
  - Device on – AI+ or AI- to AIGND: >10 GΩ
  - Device off – AI+ or AI- to AIGND: 820 Ω
- Small signal bandwidth (-3 dB): 1.2 MHz

**Analog Triggers**
- Number of triggers: 1
- Source: AI<0..15>, and available on NI ELVIS II only, ScopeCH0, ScopeCH1
- Functions: Start trigger, reference trigger, pause trigger, sample clock, convert clock, sample clock timebase
- Source level: ±Full scale
- Resolution: 10 bits
- Modes: Analog edge triggering, analog edge triggering with hysteresis, and analog window triggering

**Arbitrary Waveform Generator/Analog Output**
- Channels: 2
- DAC resolution: 16 bits
- Maximum update rate:
  - 1 channel: 2.8 MS/s
  - 2 channels: 2.0 MS/s
- Timing resolution: 50 ns
- Output range: ±10 V, ±5 V
- Slew rate: 20 V/μs

**Digital I/O and PFI**
- Channels: 24 DI0,15 PFI
- Direction control: Each line individually programmable as input or output
- Pull-down resistor: 50 kΩ typ, 20 kΩ min

**General-Purpose Counter/Timers**
- Counter/timers: 2
- Resolution: 32 bits

**Counter Measurements**
- Edge counting, pulse, semiperiod, period, two-edge separation
- X1, X2, X4 quadrature encoding with Channel Z reloading; two-pulse encoding

**Position Measurements**
- Pulse, pulse train with dynamic updates, frequency division, equivalent time sampling

**Output Applications**
- External base clock frequency: 0 to 20 MHz
- Base clock accuracy: 50 ppm
- Maximum frequency: 1 MHz
- Inputs: Gate, source, HW_Arm, Aux, A, B, Z, Up_Down

**Frequency Generator**
- Channels: 1
- Base clocks: 10 MHz, 100 kHz
- Divisors: 1 to 16
- Maximum frequency: 1 MHz
- Base clock accuracy: 50 ppm

**External Digital Triggers**
- Source: TRIG BNC or any PFI
- Polarity: Software-selectable for most signals
- Analog input function: Start trigger, reference trigger, pause trigger, sample clock, convert clock, sample clock timebase
- Analog output function: Start trigger, pause trigger, sample clock, sample clock timebase
- Counter/timer function: Gate, source, HW_Arm, Aux, A, B, Z, Up_Down

**Digital Multimeter (DMM)**
- Isolated functions: DC voltage, AC voltage, DC current, AC current, resistance, diode
- Isolation level: 60 VDC/20 Vrms
- Resolution: 5 Ω digits
- Input impedance: 11 MΩ
- Nonisolated functions: Capacitance, inductance

**Voltage Measurement**
- DC ranges: 100 mV, 1 V, 10 V, 60 V
- AC ranges: 200 mVrms, 2 Vrms, 20 Vrms
- Accuracy: Refer to NI ELVIS II

**Current Measurement**
- DC range: 2 A
- AC ranges: 500 mA rms, 2 Arms
- Shunt resistor: 0.1 Ω
- Burden voltage: <0.6 V
- Accuracy: Refer to NI ELVIS II
- Input protection: F 3.15 A 250 V, fast-acting user-replaceable fuse

BUY ONLINE at ni.com or CALL 800 813 3693 (U.S.)
### Resistance Measurement

<table>
<thead>
<tr>
<th>Ranges</th>
<th>100 Ω, 1 kΩ, 10 kΩ, 100 kΩ, 1 MΩ, 100 MΩ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>Refer to NI ELVIS II</td>
</tr>
</tbody>
</table>

### Diode Measurement

<table>
<thead>
<tr>
<th>Range</th>
<th>10 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal test current</td>
<td>100 µA (10 V range)</td>
</tr>
</tbody>
</table>

### Capacitance Measurement

<table>
<thead>
<tr>
<th>Range</th>
<th>50 pF to 500 µF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>1%</td>
</tr>
</tbody>
</table>

### Inductance Measurement

<table>
<thead>
<tr>
<th>Range</th>
<th>100 µH to 100 mH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>1%</td>
</tr>
</tbody>
</table>

### Oscilloscope (NI ELVIS II)

<table>
<thead>
<tr>
<th>Channels</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input coupling</td>
<td>AC or DC</td>
</tr>
<tr>
<td>Input impedance</td>
<td>1 MΩ</td>
</tr>
<tr>
<td>Bandwidth (-3 dB)</td>
<td>1.7 MHz</td>
</tr>
<tr>
<td>AC coupling cutoff frequency (-3 dB)</td>
<td>10 MHz</td>
</tr>
<tr>
<td>Resolution</td>
<td>16 bits</td>
</tr>
<tr>
<td>Maximum sampling rate</td>
<td>1.25 MS/s (single channel) 500 kS/s (two channels)</td>
</tr>
<tr>
<td>DC accuracy</td>
<td>Refer to NI ELVIS II</td>
</tr>
</tbody>
</table>

### Oscilloscope (NI ELVIS II+)

<table>
<thead>
<tr>
<th>Channels</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input coupling</td>
<td>AC, DC, GND</td>
</tr>
<tr>
<td>Input impedance</td>
<td>1 MΩ</td>
</tr>
<tr>
<td>Bandwidth (-3 dB)</td>
<td>35 MHz (40 MV_{pp} range) 50 MHz (all other ranges)</td>
</tr>
<tr>
<td>Optional noise filter</td>
<td>20 MHz</td>
</tr>
<tr>
<td>AC coupling cutoff frequency (-3 dB)</td>
<td>12 Hz</td>
</tr>
</tbody>
</table>

### Bode Analyzer

- Frequency resolution: Software-controllable (200, 400, 800, 1600, 3200 lines)
- Accuracy: Refer to NI ELVIS II

### Dynamic Signal Analyzer

- Frequency resolution: Refer to NI ELVIS II or II+
- Accuracy: Refer to NI ELVIS II

### Two-Wire Current-Voltage Analyzer

- Current range: ±40 mA
- Voltage sweep range: ±10 V

### Three-Wire Current-Voltage Analyzer

- Supported devices: NPN and PNP transistors
- Minimum base current increment: 0.48 µA
- Maximum collector current: ±40 mA
- Maximum collector voltage: ±10 V

### Negative Variable Supply

- Output voltage: 0 to -12 V
- Voltage setpoint resolution: 10 bits
- Voltage accuracy (no load): 100 mV
- Maximum output current: 500 mA
- Short circuit protection: Self-resetting current limiter

### Positive Variable Supply

- Output voltage: 0 to +12 V
- Voltage setpoint resolution: 10 bits
- Voltage accuracy (no load): 100 mV
- Maximum output current: 500 mA
- Short circuit protection: Self-resetting current limiter

### Power Supplies

#### +15 V Supply

- Output voltage (no load): +15 V ±5%
- Maximum output current: 500 mA
- Short circuit protection: Resettable circuit breaker

#### -15 V Supply

- Output voltage (no load): -15 V ±5%
- Maximum output current: 500 mA
- Short circuit protection: Resettable circuit breaker

#### +5 V Supply

- Output voltage (no load): +5 V ±5%
- Maximum output current: 2 A
- Short circuit protection: Resettable circuit breaker

#### -5 V Supply

- Output voltage (no load): -5 V ±5%
- Maximum output current: 2 A
- Short circuit protection: Resettable circuit breaker
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Calibration
Recommended warm-up time .......... 15 minutes
Calibration interval ...................... 1 year

Communication
Bus interface .............. Hi-Speed USB

Physical
Dimensions ....................... 34.3 by 28.0 by 7.6 cm
(14.5 by 11 by 3 in.)
Weight (with prototyping board) ...... 1.9 kg (4.2 lb)

Environmental
Operating temperature ............... 10 to 35 °C
Storage temperature ................. 65 °C
Humidity ................................ 10 to 90% relative humidity, noncondensing
Maximum altitude .................... 2000 m
Pollution degree (indoor use only) .. 2
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Hardware Services

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Calibration Services

NI recognizes the need to maintain properly calibrated devices for high-accuracy measurements. We provide manual calibration procedures, services to recalibrate your products, and automated calibration software specifically designed for use by metrology laboratories. Visit ni.com/calibration.

Repair and Extended Warranty

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