LabWindows™/CVI™ – Using the Latest ANSI C Tools for High-Performance Automated Test
Agenda

- Introduction to LabWindows/CVI and modular instruments
- Developing modular instrument applications
- Hybrid systems
- Automated test
LabWindows/CVI

Complete ANSI C integrated development environment (IDE) for test, measurement, and automation applications

IDE
• Editor
• Debugger
• Compiler
• Linker
• Workspace
• Function panels

Engineering Specific Functionality
• Scientific user interface controls
• Analysis libraries
• Data acquisition libraries and wizards
• Instrument control libraries, wizards, and drivers
LabWindows/CVI Function Panels

- Interactive code execution
- Hardware operation testing
- Easy function experimentation
- Automatic code generation
- Automatic variable declaration
- Detailed function help
- Reduced C source syntax errors
- No compiling required
- Automatic linking to libraries
- Interactive search function panels
LabWindows/CVI Data Analysis

Signal Processing
- Filters
- Windows
- Signal generation
- Frequency domain
- Time domain

Mathematics
- 1D and 2D array operations
- Complex arithmetic
- Statistics
- Vector and matrix algebra

Advanced
- Curve fitting
- Interpolation
- Probability
- Decomposition/complex operations
User Interface Editor

- Drag-and-drop editor
- Instrumentation controls
- Custom menus
- Easy to build – simple to change
NI Modular Instruments

*Instruments for any measurement*

**Signal Generators**
- 200 MS/s sampling rate

**High-Speed Digitizers**
- Up to 24 bit, up to 200 MS/s

**High Speed Digital IO**
- 400 Mb/s data rate

**DMM**
- 7½ digits of resolution

**RF Measurements/Generation**
- Up to 2.7 GHz

**Switches**
- 26 GHz bandwidth, 300 V, 196 channels per slot

**Dynamic Signal Acquisition**
- Resolutions up to 24 bits and sample rates up to 204.8 kS/s
NI Modular Instruments Benefits

• High performance
  ✓ Up to 26 bits of resolution
  ✓ Up to 2.7 GHz bandwidth
• Deep on-board memory
  ✓ Up to 512MB memory
• Tight synchronization
  ✓ 10 pSec channel alignment
• Multiple platforms
  ✓ PXI, PCI, PCMCIA, USB
• Compact form factor
  ✓ 3U
• High-channel count
  ✓ 5,000+ synchronized channels
Modular Instrument APIs for LabWindows/CVI

- **NI Digitizers**
  - Function panels for NI-SCOPE and IviScope class driver
  - 28 LabWindows/CVI shipping examples

- **NI Function and Waveform Generators**
  - Function panels for NI-FGEN and the IviFgen class driver
  - 20 LabWindows/CVI shipping examples

- **NI Digital Multimeters**
  - Function panels for NI-DMM and IviDmm class driver
  - 29 LabWindows/CVI shipping examples

- **NI High Speed Digital Devices**
  - Function panels for NI-HSDIO
  - 46 LabWindows/CVI shipping examples

- **NI Switches**
  - Function panels for NI-SWITCH and IviSwtch
  - 7 LabWindows/CVI shipping examples

- **NI RF Measurement Devices**
  - Function panels for NI-RFSG and NI-TUNER
  - 18 LabWindows/CVI shipping examples

- **NI Sound and Vibration Measurement Devices**
  - Function panels for NI-DAQmx
  - 25 LabWindows/CVI shipping examples
NI-SCOPE

- NI-SCOPE and IviScope class driver
- Measurements built into driver
- Multirecord acquisitions supported
- Trigger and clock synchronization
- Instrument driver for calibration
- Example program library
- NI-TClk synchronization
Additional Software Support

- Digital and Analog Waveform Editors
- Soft Front Panels
- Test Panels
Build a Simple Example

1. Create new waveform
2. Create new project
3. Design user interface
4. Automatically generate source code
5. Load NI-FGEN instrument driver
6. Output waveform
7. Load NI-SCOPE instrument driver
8. Read data
9. Plot data
Hybrid Systems

- **Platform independence**
  - Software independent from hardware
  - Industry standard interfaces

- **Longevity**
  - Reuse/replace interfaces
  - Adaptable components

- **Growth**
  - Multiple entry points
  - Layers promote innovation and competition

- **Price/Performance**
  - Leverage PC and COTS

NI Technical Symposium for MEASUREMENT and AUTOMATION
Stand-Alone Instrument Control in LabWindows/CVI

- **NI-VISA**
  - Ethernet, PXI, VXI, serial, parallel, GPIB, USB, 1394
- **NI-488.2**
  - GPIB
- **IVI**
  - Instrument model and vendor interchangeability
- **Instrument I/O Assistant**
  - Interactively configure and communicate with your instruments
Building an Automated Test System

Operator Interface

Test Management

Switch Management

Test Module

Test Module

Hardware Drivers

NI Technical Symposium for Measurement and Automation
Test Executive Software – NI TestStand

• Graphical sequence editor environment
• Automate tests written in any language: LabWindows/CVI, LabVIEW, C/C++, VB, C#.NET, HTBasic, ATLAS, Python, VEE
• Multithreaded sequence execution
• XML, ATML, ASCII, HTML/Web, report generation
• Access, Oracle, SQL Server, MySQL, Sybase database connectivity
• Integrated LabWindows/CVI module adapter
Certification

• Certification for scientists, engineers, designers, and systems integrators
• Recognition of expertise with NI products and technologies
• Use of Certified Developer logo for business and resume
• Differentiation recognized by industry, employers, and peers
Resources

• ni.com/cvi
• ni.com/teststand
  – Full-functional evaluation software
  – White papers
  – Example code
• ni.com/modularinstruments
  – Tutorials
  – Data sheets
Visit the Consultation Zone

• Discuss products and configure your application
• Get estimated costs or a quote to take with you
• Request a FREE consultation – an NI engineer visits your office to:
  – Discuss your application and specialized topics
  – Demonstrate customized applications, examples, and products
• Schedule an on-site seminar at your location