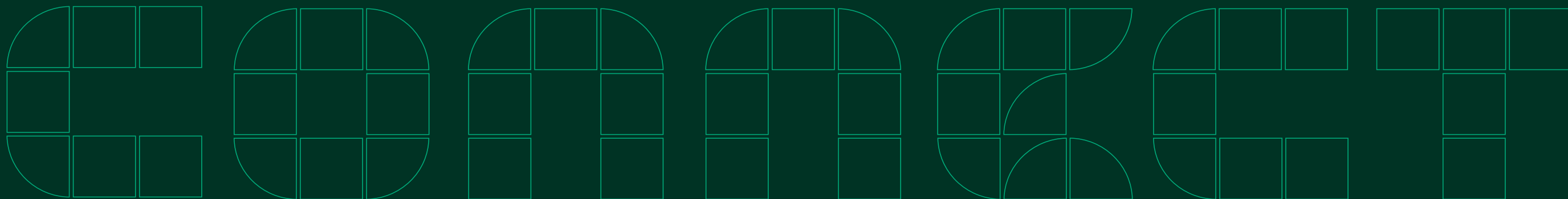




connect

2024 AUSTIN





InstrumentStudio Professional

A Low-code Environment for Manual and
Automated Measurement

Agenda

Overview

Introduction to the electronics workflows

Introducing InstrumentStudio Pro

One environment for instrument configuration, custom measurements, and automation

Demo

Steps from instrument set up to automation

What's Next?

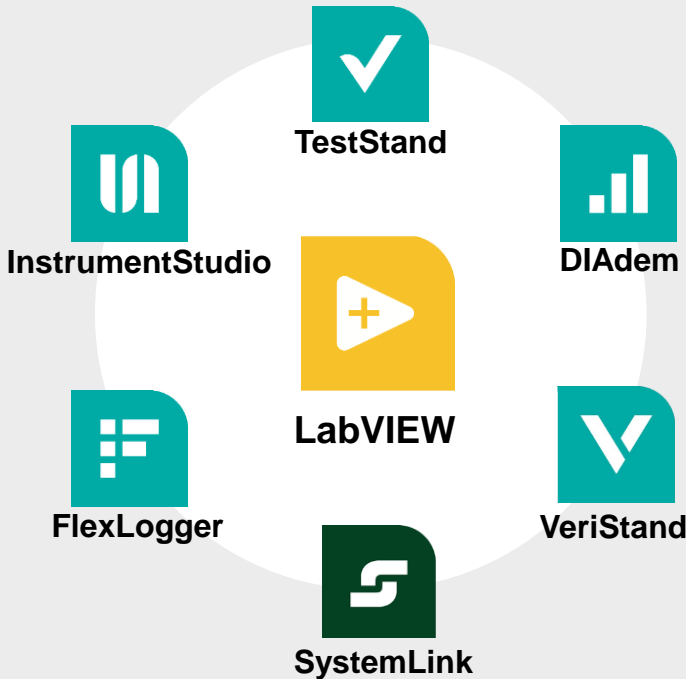
Sneak peak into the roadmap and coming features for InstrumentStudio Pro

Q&A

Time for questions and answers

Evolving NI Test Software

Enable Automated Test & Measurement Professionals



1

Strengthen LabVIEW

Deliver new capabilities in **LabVIEW & NI Software** to meet the evolving requirements of applications and users

2

Connect LabVIEW+

Bridge seamlessly between tools, tasks and teams to accelerate the productivity of test professionals

3

Build Community

Engage and collaborate with the community to empower their continued success

Software for Professional Test Workflows

Electronics Validation Test

Characterizing electronic prototypes to ensure quality and performance

Set-up & Configure

Measure & Automate

Analyze & Share



Electronics Production Test

Functional test ensuring manufactured products meet specifications

Set-up & Configure

Measure & Automate

Deploy & Maintain



Electromechanical Validation Test

Characterizing physical prototypes to ensure quality and performance

Build & Customize

Configure

Analyze & Share



Embedded Software Test

Testing deployed software for defects across wide parameter variations

Configure & Map

Test & Bring Up

Automate & Execute



Electronics Test | Areas of Investment

Modernize UI Building

Update UI controls to provide engaging experience for custom interfaces

Example features

- Multilanguage character support
- Web controls

Open Architectures

Compatibility with 3rd party hardware and software tools

Example features

- Step Types for 3rd party instruments
- Ease use of .NET, Python, MATLAB, C#

Measurement Transition

Software tool interoperability to quickly share specifications, measurements, data and results

Example features

- Use measurements from a library
- Integration with SystemLink

Modern Dev Practices

Improve collaborative tools in LabVIEW+ to ease large, complex application development

Example features

- git integration for LabVIEW and TestStand
- Improve diff and merge of LabVIEW code to support CI/CD

System Security

Meet regulatory requirements for security, especially when maintaining long term system deployments

Example features

- SBOMs and CVEs
- Linux deployments

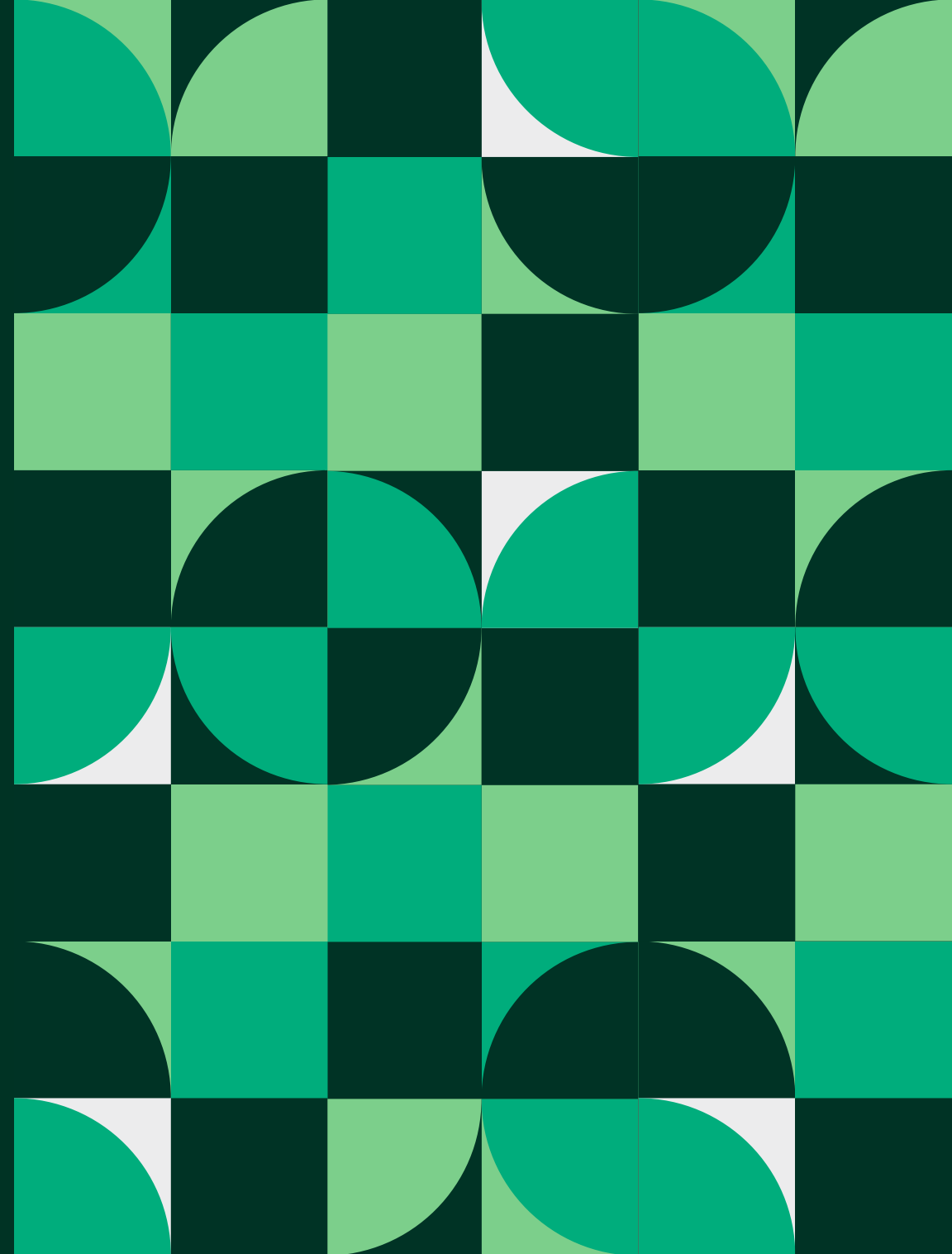
Electronics Test | Validation Workflow



Challenges

- DUT bring-up and interactive measurement workflows can be disconnected from test automation and debugging
- Mixing and matching hardware from different vendors is complex
- Variety of different programming languages and open-source technologies
- Difficult to reuse IP across teams or projects

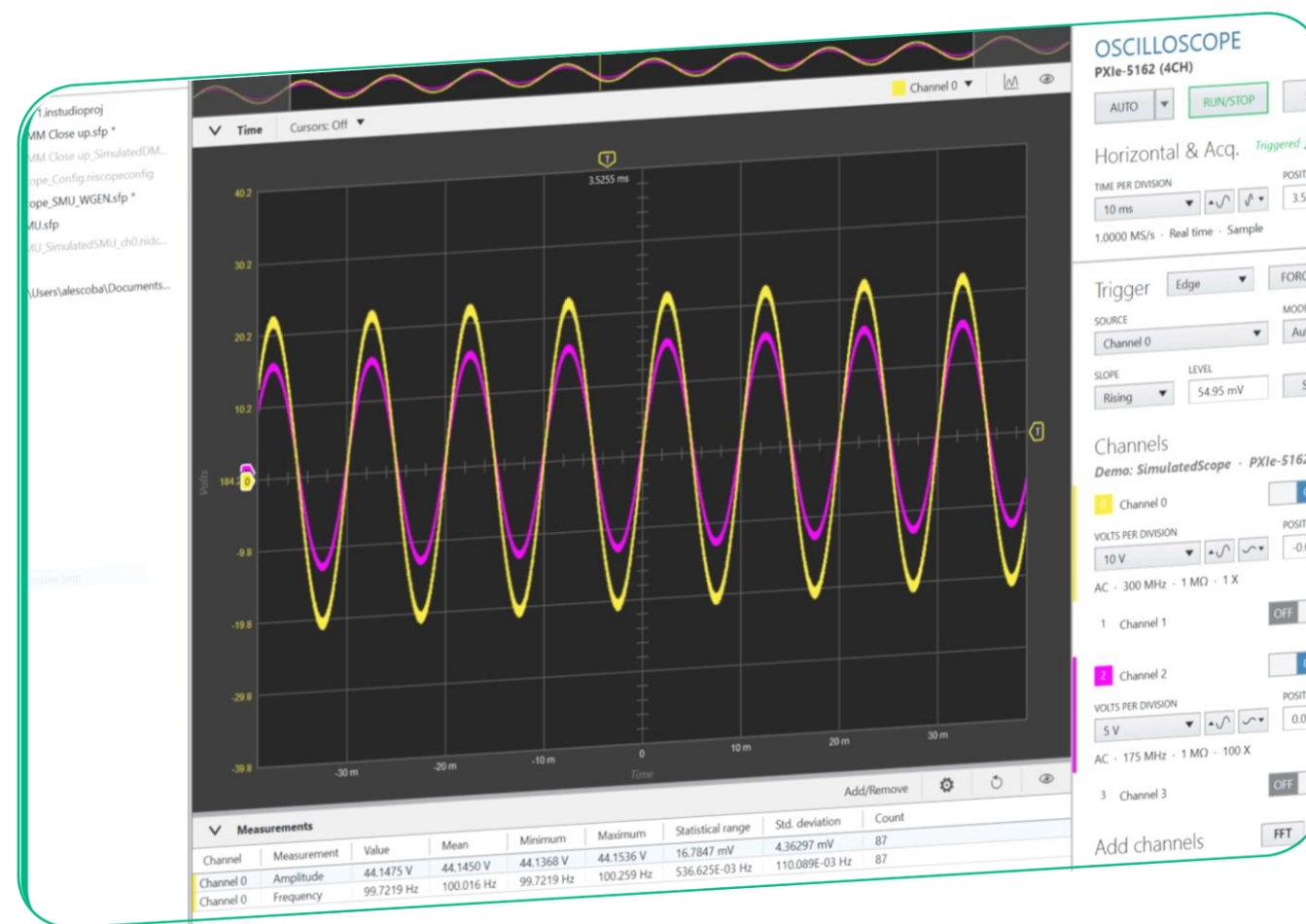
Introducing InstrumentStudio Professional





Instrument Studio™

Free Companion Software for PXI Instruments



Visualize and Control PXI Instruments

Interact with Multiple Instruments

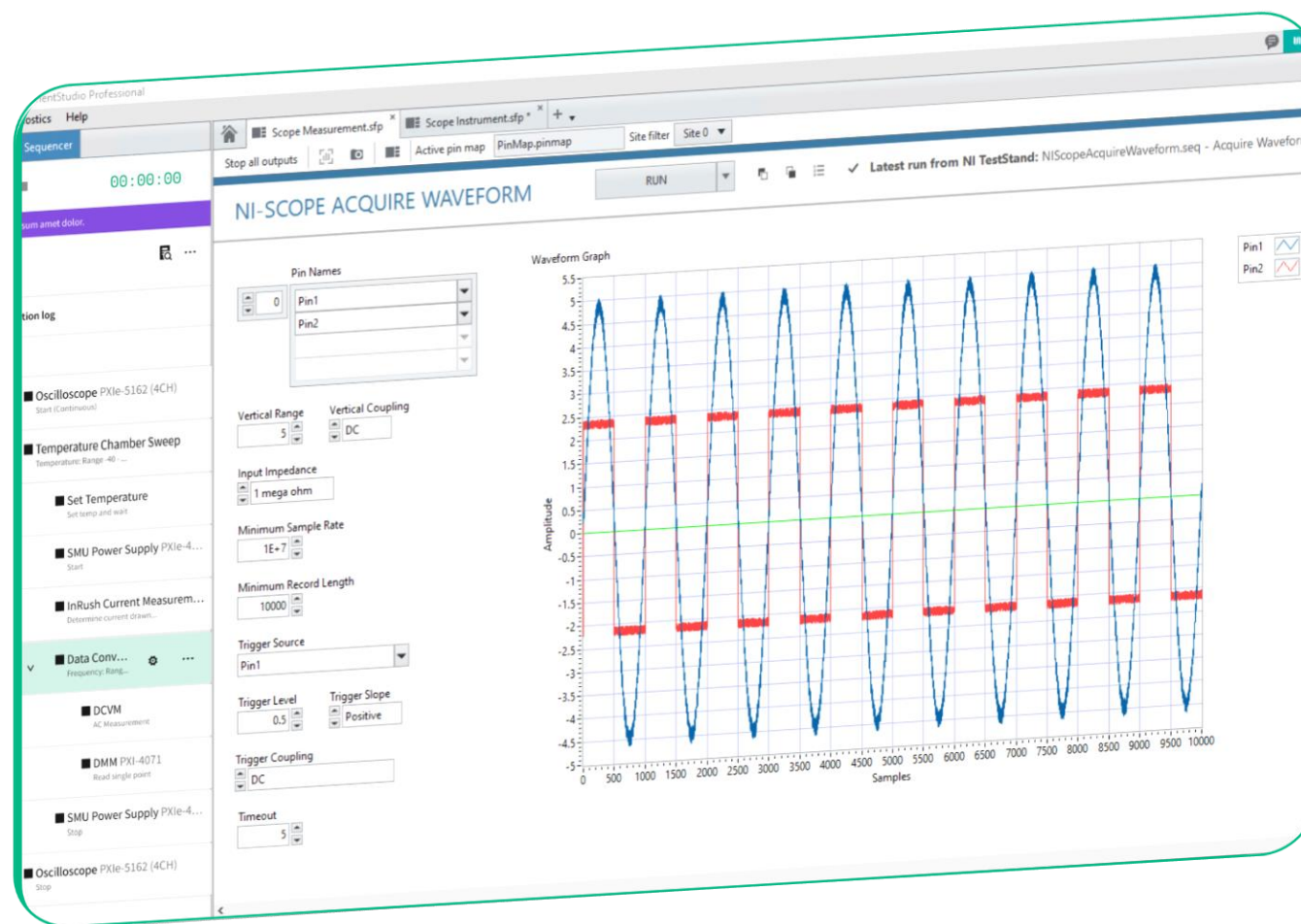
Monitor and Debug Applications



Instrument Studio™ Professional

Coming
in July!

Extensible Automated Validation



Run Custom Measurements

Automate Measurements

Control Any Instrument

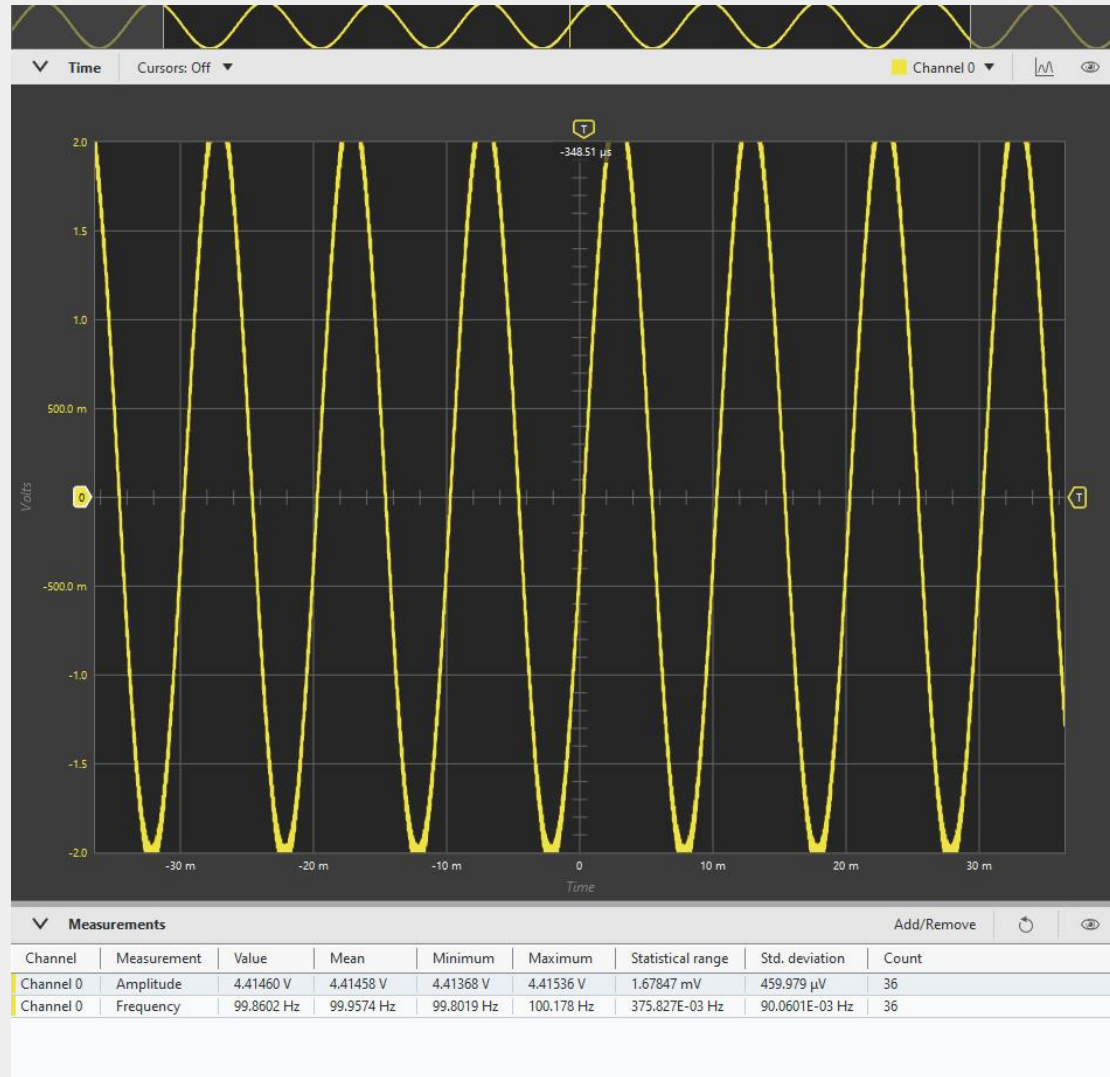
Electronics Test | Validation Workflow



Benefits of Standardized Workflow

- Reduce Time to First Measurements
- Reduce Time Spent Developing Duplicate Measurement IP
- Reuse Code Across Projects, Teams, and Sites

Set Up



OSCILLOSCOPE PXIe-5162 (4CH)

AUTO RUN/STOP SINGLE

Horizontal & Acq. Triggered J'L

TIME PER DIVISION 10 ms POSITION -348.51 μs

1.0000 MS/s · Real time · Sample

Trigger Edge FORCE

SOURCE Channel 0 MODE Auto

SLOPE Rising LEVEL 0.000 V SET 50%

Channels Demo: SimulatedScope · PXIe-5162 (4CH)

Channel 0 ON

VOLTS PER DIVISION 500 mV POSITION 0.000 div

DC · 300 MHz · 1 MΩ · 1 X

1 Channel 1 OFF

2 Channel 2 OFF

3 Channel 3 OFF

Add channels FFT a+b

SMU/POWER SUPPLY PXIe-4141

PAUSE

Channels Demo: SimulatedSMU · PXIe-4141

Channel 0 Voltage

DIGITAL MULTIMETER
PXIe-4081

STOP

Channels Demo: SimulatedDMM · PXIe-4081

Channel 0 DC voltage

RF SIGNAL GENERATOR
Demo: SimulatedRFSG · PXIe-5841

PRESET CW ARB STOP

RF OFF

FREQUENCY 1.000000000 GHz LEVEL -174.00 dBm

WAVEFORM GENERATOR PXIe-5423 (2CH)

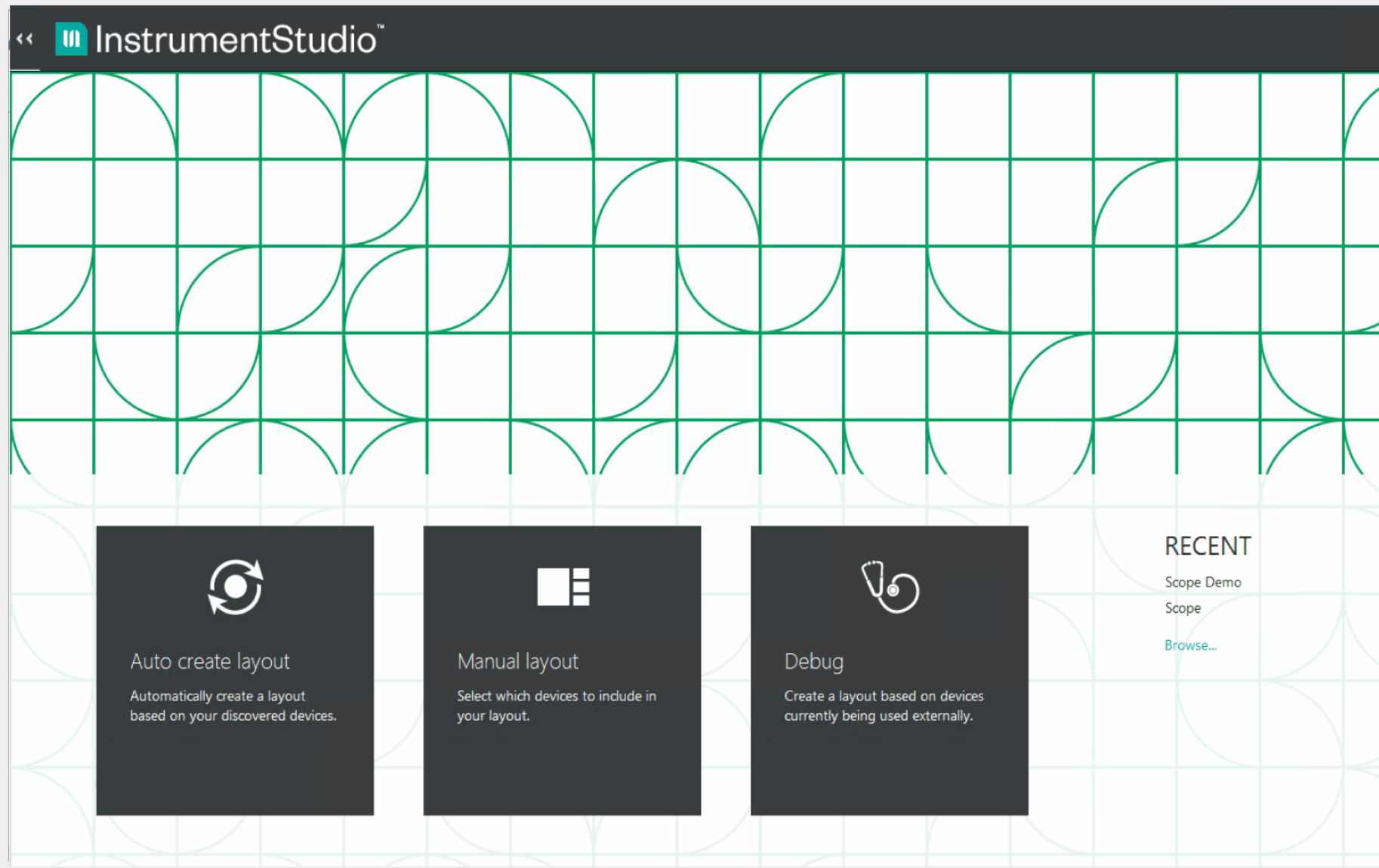
STANDARD WAVEFORM STOP

Channels Demo: SimulatedFGEN · PXIe-5423 (2CH)

Configuration Environment for PXI Instruments

- Connect a wide range of DC, analog, digital, RF, and NI instruments
- Customize panels for multiple instruments
- Create pin maps for DUT centric set up
- Save layouts and configuration as a projects for instant repeatability
- Capture data to share with colleagues

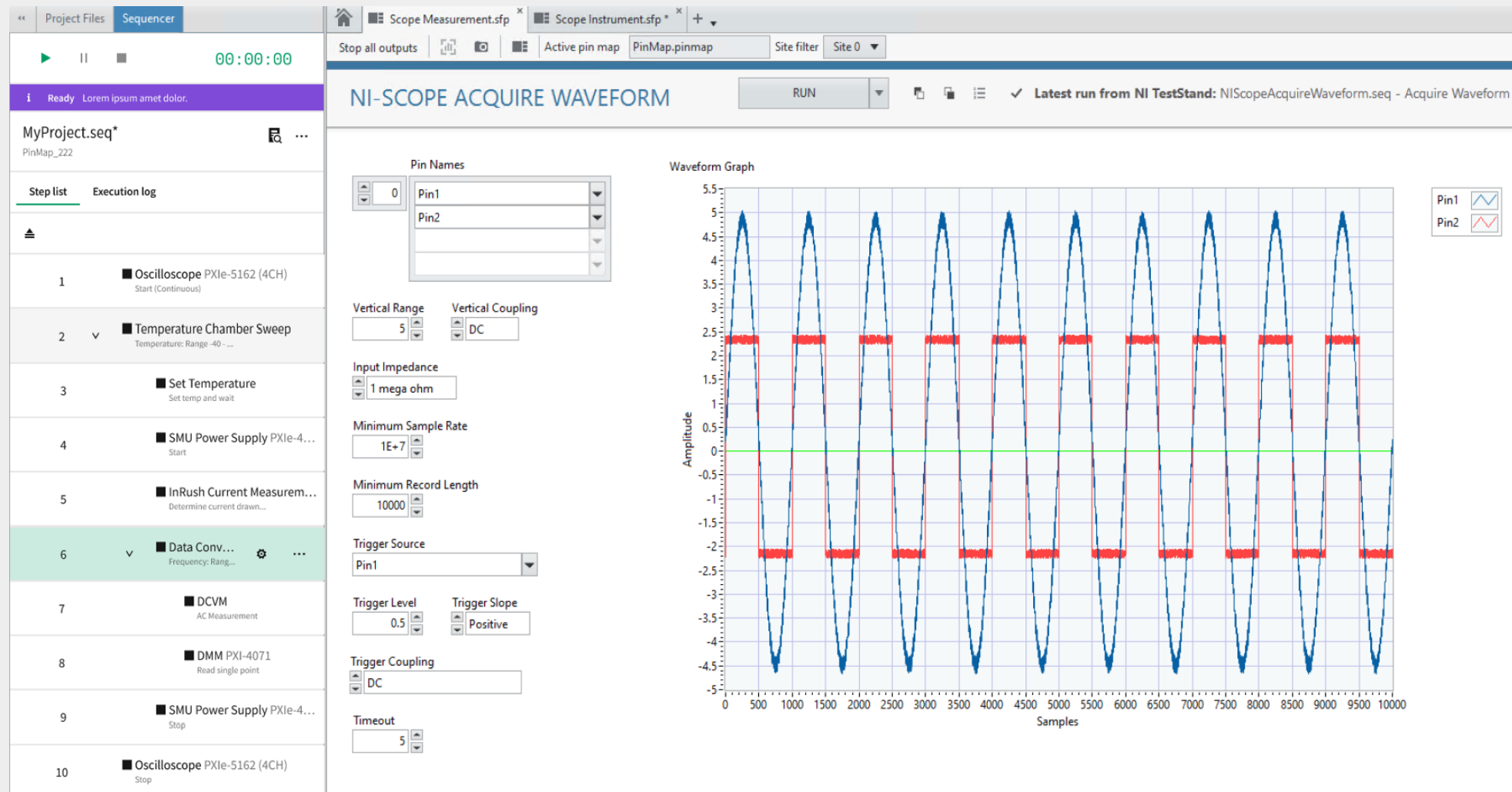
Measure



Measurement Plug-Ins

- One environment for measurements and instruments
- Integrate measurement plug-ins with LabVIEW or Python
- Capture multi-instrument measurements
- Use measurements plug-ins from NI libraries and build your own
- Extend for non-NI instruments

Automate



In-App Sequencing

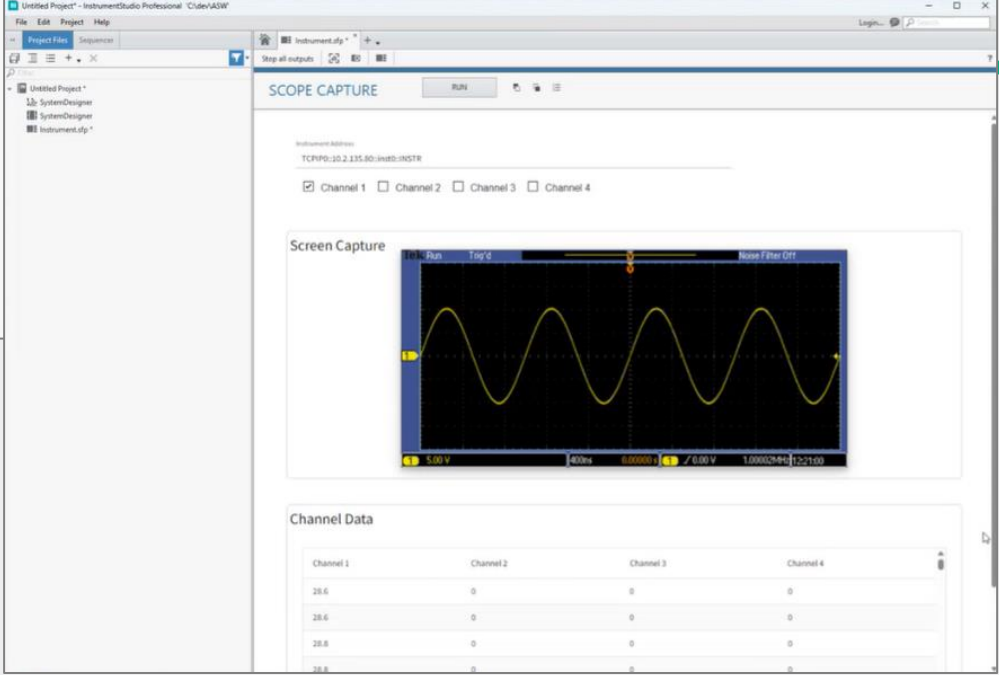
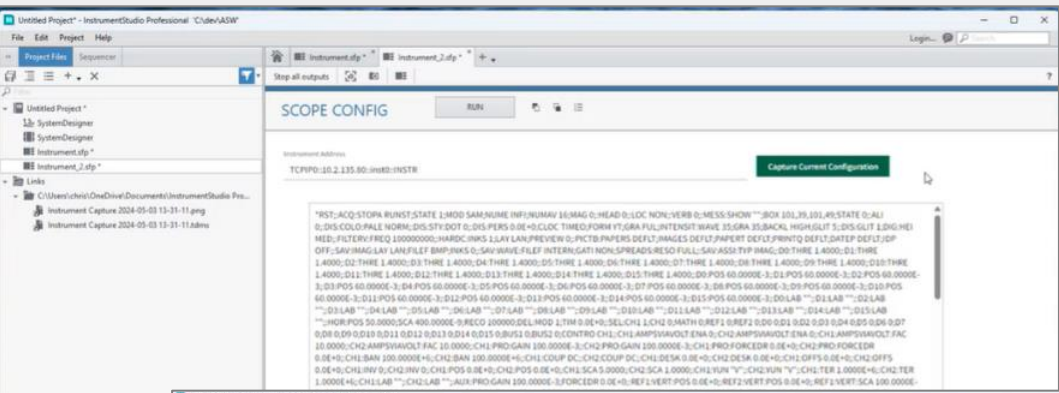
- Sequence over interactive steps
- Automate parametric sweeps
- Interactively debug automation
- Generate reports
- Copy-paste measurements to TestStand for advanced automation

Demo

2024

Set Up: Non-NI Hardware





SCPI

non-NI Instrument

Any Instrument Companion

- Connect to non-NI hardware
- Allow instrument state save and restore
- Allow data capture

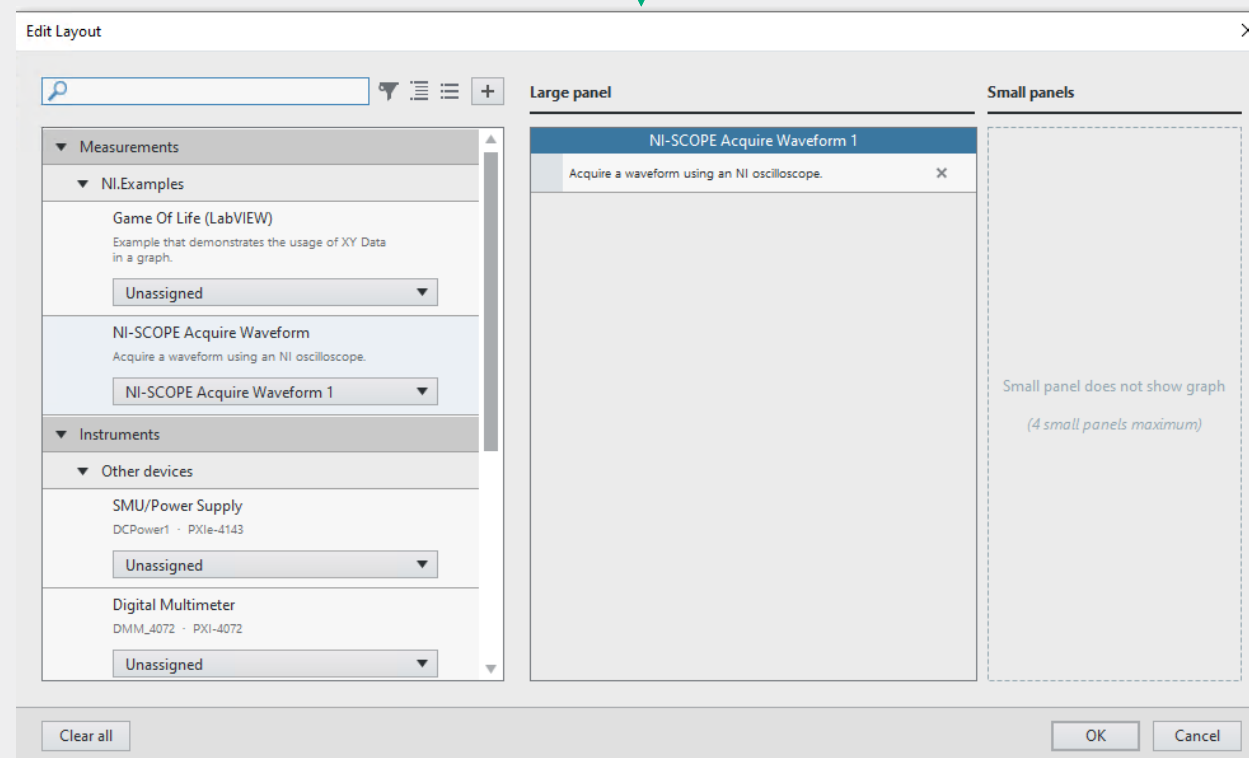
Example of non-NI instrument connected to InstrumentStudio over SCPI

Measure: Plug-In Library



Customer Plug-in
Library

NI Plug-in
Library



Accessing Plug-In library from within InstrumentStudio

Description

- Discover and use plug-ins and collections of plug-ins shared locally on a customer's network or externally by partners and NI
- Plug-ins available in the library may also include source code to improve code debug workflows

2025+

Instrument Studio[™] Roadmap

Short-term product focus

- Cover broad range of electronics test validation and production debug operations
- Allow basic automation of interactive operations
- Allow the creation and sharing of custom panels
- Deliver more out-of-the-box panel functionality

Long-term product focus

- Support more advanced testing topologies
- Increase data connectivity
- Improve path to fully optimized production test
- Streamline and improve customization capabilities

	Capability	Shipped	2024	2025+
	Panels			
	RFmx S-Parameter measurement workflows	2023 Q4		
	Support for electronic loads	2023 Q4		
Pro	Measurement-centric panels		✓	
Pro	Support for non-NI hardware		✓	
	Support for additional NI hardware			✓
	Workflow			
	Measurement organization and search	2023 Q4		
	Improved channel alias and pin map options		✓	✓
	Improved system configuration			✓
	Additional data logging options			✓
Pro	Additional remote-control support			✓
Pro	Additional parallelism support			✓
	Automation			
Pro	In-app sequencing and sweeping		✓	
Pro	Streamlined sequence creation			✓
	TestStand Semiconductor Module support			✓
	Extensibility			
	LabVIEW VISA gRPC driver APIs	2024 Q1		
	Simplified session management	2024 Q1		
Pro	Publish and share custom measurements		✓	
Pro	Additional datatypes and controls			✓
	Full C# support for custom measurements			✓

Roadmap Date:
2024 Q2

Next Release: 2024 Q3

Release Cadence:
Quarterly

Roadmap is a snapshot and can change based on a variety of factors, including development execution and customer input.

Support for additional NI hardware

Stop all outputs

Statistics

Channel	Measurement	Electronic range	Value	Mean	Minimum	Maximum	Statistical range	Std. deviation	Count
Input 0	Current	0.040160642570281124 A	---	---	---	---	---	---	0
Input 1	RTD	Auto	---	---	---	---	---	---	0
Input 2	Voltage	10 V	---	---	---	---	---	---	0
Input 3	Voltage	10 V	---	---	---	---	---	---	0
Input 4	Voltage	10 V	---	---	---	---	---	---	0
Input 5	Voltage	10 V	---	---	---	---	---	---	0
Input 6	Voltage	10 V	---	---	---	---	---	---	0
Input 7	Voltage	10 V	---	---	---	---	---	---	0
Input 8	Voltage	10 V	---	---	---	---	---	---	0
Input 9	Voltage	10 V	---	---	---	---	---	---	0
Input 10	Voltage	10 V	---	---	---	---	---	---	0
Input 11	Voltage	10 V	---	---	---	---	---	---	0
Input 12	Voltage	10 V	---	---	---	---	---	---	0
Input 13	Voltage	10 V	---	---	---	---	---	---	0
Input 14	Voltage	10 V	---	---	---	---	---	---	0
Input 15	Voltage	10 V	---	---	---	---	---	---	0
Input 16	Voltage	10 V	---	---	---	---	---	---	0
Input 17	Voltage	10 V	---	---	---	---	---	---	0
Input 18	Voltage	10 V	---	---	---	---	---	---	0
Input 19	Voltage	10 V	---	---	---	---	---	---	0
Input 20	Voltage	10 V	---	---	---	---	---	---	0
Input 21	Voltage	10 V	---	---	---	---	---	---	0
Input 22	Voltage	10 V	---	---	---	---	---	---	0
Input 23	Voltage	10 V	---	---	---	---	---	---	0
Input 24	Voltage	10 V	---	---	---	---	---	---	0
Input 25	Voltage	10 V	---	---	---	---	---	---	0
Input 26	Voltage	10 V	---	---	---	---	---	---	0
Input 27	Voltage	10 V	---	---	---	---	---	---	0
Input 28	Voltage	10 V	---	---	---	---	---	---	0
Input 29	Voltage	10 V	---	---	---	---	---	---	0
Input 30	Voltage	10 V	---	---	---	---	---	---	0
Input 31	Voltage	10 V	---	---	---	---	---	---	0

ANALOG INPUT
NIPCIe-6363 · PCIe-6363

RUN

Timing

SAMPLE RATE
31.250 kHz

SAMPLES TO READ
100000

Trigger

None

Channels

Input 0 A Current

Input 1 RTD

Channel Settings

Input 0

Input 1

Input 2

Input 3

Input 4

Input 5

Input 6

Input 7

Input 8

Input 9

Input 10

Input 11

Input 12

Input 13

Input 14

Input 15

Input 16

Input 17

NIPCIe-6363/ai1

Name

Input 1

Signal type

RTD

Units

Degree Celsius (°C)

RTD Input

Minimum

-245.00 °C

Maximum

-180.00 °C

RTD Type

Pt3750

R₀

100.00 Ω

Configuration

Two Wire

Excitation Source

External

Excitation Value

2.5000 mA

Analog Input Panel targeting NI-DAQ instrument

Description

- Expand out-of-the-box support to more NI instrumentation such as
 - DAQ
 - CompactDAQ
 - Compact RIO
 - Switch
 - Sync

Improved system configuration

Project Files

all_sites.digisysview

site0.digisysview

site1.digisysview

site2.digisysview

site3.digisysview

SystemView.digisysview *

Digital

Capture Waveforms

Compiled Patterns

Levels

Shmoo

Source Waveforms

Timing

Pin Maps

Specifications

SystemView.digisysview

Filter

Aa |ab| ?

Relays

Relay	Site	Closed	Open Label	Closed Label	Relay Groups	Relay Driver Module	Control Line
RL_K0_VDDISO	0	<input type="checkbox"/>	OFF	ON	Continuity_Relays, PwrDown_All_Relays	RELAY_2567_C1_S08	K32
RL_K0_VDDISO	1	<input type="checkbox"/>	OFF	ON	Continuity_Relays, PwrDown_All_Relays	RELAY_2567_C1_S08	K8
RL_K0_VDDISO	2	<input type="checkbox"/>	OFF	ON	Continuity_Relays, PwrDown_All_Relays	RELAY_2567_C1_S08	K40
RL_K0_VDDISO	3	<input type="checkbox"/>	OFF	ON	Continuity_Relays, PwrDown_All_Relays	RELAY_2567_C1_S08	K8
RL_K1_ALDOOUT	0	<input type="checkbox"/>	OFF	ON	Continuity_Relays, PwrDown_All_Relays	RELAY_2567_C1_S08	K33
RL_K1_ALDOOUT	1	<input type="checkbox"/>	OFF	ON	Continuity_Relays, PwrDown_All_Relays	RELAY_2567_C1_S08	K1
RL_K1_ALDOOUT	2	<input type="checkbox"/>	OFF	ON	Continuity_Relays, PwrDown_All_Relays	RELAY_2567_C1_S08	K41
RL_K1_ALDOOUT	3	<input type="checkbox"/>	OFF	ON	Continuity_Relays, PwrDown_All_Relays	RELAY_2567_C1_S08	K9
RL_K2_AVDD	0	<input type="checkbox"/>	OFF	ON	PwrDown_All_Relays	RELAY_2567_C1_S08	K34
RL_K2_AVDD	1	<input type="checkbox"/>	OFF	ON	PwrDown_All_Relays	RELAY_2567_C1_S08	K2
RL_K2_AVDD	2	<input type="checkbox"/>	OFF	ON	PwrDown_All_Relays	RELAY_2567_C1_S08	K42
RL_K2_AVDD	3	<input type="checkbox"/>	OFF	ON	PwrDown_All_Relays	RELAY_2567_C1_S08	K10

DCPower Pins

Pin	Site	Function	Output	Connected	Current	Voltage	I Range	V Range	V _f	I _c	I _f	V _c	Sense	Pin Groups
ALDOOUT_SHU	0	Voltage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	149.400 mA	0.0000 V	150 mA	24 V	0 V	150 mA	150 mA	24 V	Local	All_SHU_Instruments, Power_Pins, Continuity_LDO_Pins, PwrDownAnaIn_SHU_Pins, PwrDown_Measure_SHU_Pins, ALDO_VLDO_REF_OUT_SHU
ALDOOUT_SHU	1	Voltage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	149.400 mA	0.0000 V	150 mA	24 V	0 V	150 mA	150 mA	24 V	Local	All_SHU_Instruments, Power_Pins, Continuity_LDO_Pins, PwrDownAnaIn_SHU_Pins, PwrDown_Measure_SHU_Pins, ALDO_VLDO_REF_OUT_SHU
ALDOOUT_SHU	2	Voltage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	149.400 mA	0.0000 V	150 mA	24 V	0 V	150 mA	150 mA	24 V	Local	All_SHU_Instruments, Power_Pins, Continuity_LDO_Pins, PwrDownAnaIn_SHU_Pins, PwrDown_Measure_SHU_Pins, ALDO_VLDO_REF_OUT_SHU
ALDOOUT_SHU	3	Voltage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	149.400 mA	0.0000 V	150 mA	24 V	0 V	150 mA	150 mA	24 V	Local	All_SHU_Instruments, Power_Pins, Continuity_LDO_Pins, PwrDownAnaIn_SHU_Pins, PwrDown_Measure_SHU_Pins, ALDO_VLDO_REF_OUT_SHU
ALDOOUT_SHU_PLUS	0	Voltage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	149.400 mA	0.0000 V	150 mA	24 V	0 V	150 mA	150 mA	24 V	Local	All_SHU_Instruments
ALDOOUT_SHU_PLUS	1	Voltage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	149.400 mA	0.0000 V	150 mA	24 V	0 V	150 mA	150 mA	24 V	Local	All_SHU_Instruments
ALDOOUT_SHU_PLUS	2	Voltage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	149.400 mA	0.0000 V	150 mA	24 V	0 V	150 mA	150 mA	24 V	Local	All_SHU_Instruments
ALDOOUT_SHU_PLUS	3	Voltage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	149.400 mA	0.0000 V	150 mA	24 V	0 V	150 mA	150 mA	24 V	Local	All_SHU_Instruments
AVDD_SHU	0	Voltage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	149.400 mA	0.0000 V	150 mA	24 V	0 V	150 mA	150 mA	24 V	Local	All_SHU_Instruments, Continuity_Odd_SHU_Pins, VDDISO_AVDD, VDD_AVDD, CONT_ODD_SHU_SPPLY
AVDD_SHU	1	Voltage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	149.400 mA	0.0000 V	150 mA	24 V	0 V	150 mA	150 mA	24 V	Local	All_SHU_Instruments, Continuity_Odd_SHU_Pins, VDDISO_AVDD, VDD_AVDD, CONT_ODD_SHU_SPPLY
AVDD_SHU	2	Voltage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	149.400 mA	0.0000 V	150 mA	24 V	0 V	150 mA	150 mA	24 V	Local	All_SHU_Instruments, Continuity_Odd_SHU_Pins, VDDISO_AVDD, VDD_AVDD, CONT_ODD_SHU_SPPLY
AVDD_SHU	3	Voltage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	149.400 mA	0.0000 V	150 mA	24 V	0 V	150 mA	150 mA	24 V	Local	All_SHU_Instruments, Continuity_Odd_SHU_Pins, VDDISO_AVDD, VDD_AVDD, CONT_ODD_SHU_SPPLY

Digital Pins

Pin	Site	Function	Voltage	Drive	V _H	V _L	Compare	V _{OH}	V _{OL}	Termination Mode	V _{TERM}	V _{COM}	I _{OL}	I _{OH}	PPMU Out	Current	I Range	V _f	I _f	V _c	V _L	Clock	Clock Frequency	Pin Groups
RL_DR_CS_N	0	Disconnect	----- V	X	3.3 V	0 V	-	1.7 V	1.6 V	High Z	2 V	2 V	1.5 mA	-1.5 mA	Voltage	----- A	128 µA	0 V	0 µA	6 V	-2 V	<input type="checkbox"/>	1 MHz	MAX4896_SPI
RL_DR_CS_N	1	Disconnect	----- V	X	3.3 V	0 V	-	1.7 V	1.6 V	High Z	2 V	2 V	1.5 mA	-1.5 mA	Voltage	----- A	128 µA	0 V	0 µA	6 V	-2 V	<input type="checkbox"/>	1 MHz	MAX4896_SPI
RL_DR_CS_N	2	Disconnect	----- V	X	3.3 V	0 V	-	1.7 V	1.6 V	High Z	2 V	2 V	1.5 mA	-1.5 mA	Voltage	----- A	128 µA	0 V	0 µA	6 V	-2 V	<input type="checkbox"/>	1 MHz	MAX4896_SPI
RL_DR_CS_N	3	Disconnect	----- V	X	3.3 V	0 V	-	1.7 V	1.6 V	High Z	2 V	2 V	1.5 mA	-1.5 mA	Voltage	----- A	128 µA	0 V	0 µA	6 V	-2 V	<input type="checkbox"/>	1 MHz	MAX4896_SPI
RL_DR_DIN	0	Disconnect	----- V	X	3.3 V	0 V	-	1.7 V	1.6 V	High Z	2 V	2 V	1.5 mA	-1.5 mA	Voltage	----- A	128 µA	0 V	0 µA	6 V	-2 V	<input type="checkbox"/>	1 MHz	MAX4896_SPI
RL_DR_DIN	1	Disconnect	----- V	X	3.3 V	0 V	-	1.7 V	1.6 V	High Z	2 V	2 V	1.5 mA	-1.5 mA	Voltage	----- A	128 µA	0 V	0 µA	6 V	-2 V	<input type="checkbox"/>	1 MHz	MAX4896_SPI
RL_DR_DIN	2	Disconnect	----- V	X	3.3 V	0 V	-	1.7 V	1.6 V	High Z	2 V	2 V	1.5 mA	-1.5 mA	Voltage	----- A	128 µA	0 V	0 µA	6 V	-2 V	<input type="checkbox"/>	1 MHz	MAX4896_SPI
RL_DR_DIN	3	Disconnect	----- V	X	3.3 V	0 V	-	1.7 V	1.6 V	High Z	2 V	2 V	1.5 mA	-1.5 mA	Voltage	----- A	128 µA	0 V	0 µA	6 V	-2 V	<input type="checkbox"/>	1 MHz	MAX4896_SPI
RL_DR_RESET_N	0	Disconnect	----- V	X	3.3 V	0 V	-	1.7 V	1.6 V	High Z	2 V	2 V	1.5 mA	-1.5 mA	Voltage	----- A	128 µA	0 V	0 µA	6 V	-2 V	<input type="checkbox"/>	1 MHz	MAX4896_RESET
RL_DR_RESET_N	1	Disconnect	----- V	X	3.3 V	0 V	-	1.7 V	1.6 V	High Z	2 V	2 V	1.5 mA	-1.5 mA	Voltage	----- A	128 µA	0 V	0 µA	6 V	-2 V	<input type="checkbox"/>	1 MHz	MAX4896_RESET
RL_DR_RESET_N	2	Disconnect	----- V	X	3.3 V	0 V	-	1.7 V	1.6 V	High Z	2 V	2 V	1.5 mA	-1.5 mA	Voltage	----- A	128 µA	0 V	0 µA	6 V	-2 V	<input type="checkbox"/>	1 MHz	MAX4896_RESET

Pattern Sequencer Flags

Instrument or Group	seqflag0	seqflag1	seqflag2	seqflag3
Digital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pattern Sequencer Registers

Instrument or Group	reg0	reg1	reg2	reg3	reg4	reg5	reg6	reg7	reg8	reg9	reg10	reg11	reg12	reg13	reg14	reg15
Digital	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

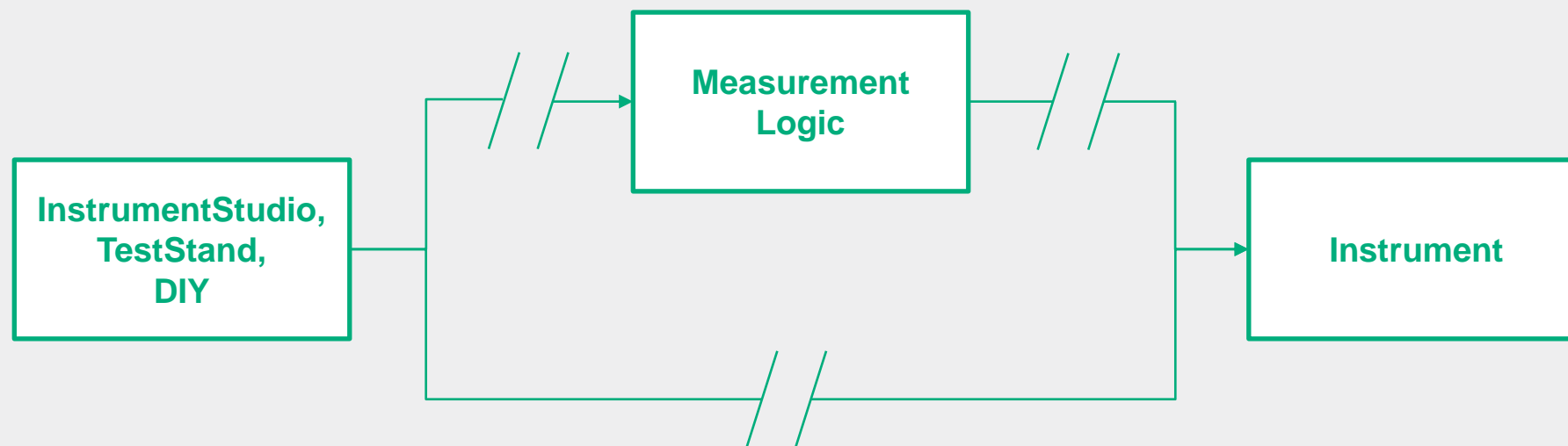
Loaded Patterns

No Patterns Loaded

Description

- Add more visibility and ability to configure the whole system from within InstrumentStudio

Additional remote control support



// Remote boundary

Description

- Easy and secure control of remote measurements and instruments from InstrumentStudio

Other Sessions and Demos



Session	Day	Time	Room
Software Hands-On: Workflows from Instrument Bring up to Test Automation	Wednesday, May, 22	1:30p - 3:45p	Ballroom E
Make Measurement Reuse Your New Superpower	Wednesday, May, 22	2:45p - 3:45p	19B
What's New in TestStand	Wednesday, May 22	1:30p – 2:20	19B

InstrumentStudio Pro Information

InstrumentStudio Pro Webinar

Register for the August 7, 2024 session



InstrumentStudio Pro Mailing List

Sign up to be notified when InstrumentStudio Pro releases and for opportunities to learn more

