A GUI based tool to simplify & automate test program development on the NI STS Platform
About Soliton

Test & Measurement Automation Experts

NI Alliance Member
- Since 1998
- 170+ Employees

Services
- Software Consulting
- R&D

Associated Service Offerings
- Embedded Systems Design
- Web Services
- Data Analytics
- Machine Vision & Computer Vision

Industries
- Semiconductor
- Industrial & Medical
- Automotive

Presence
- US
- India
- Philippines
About Soliton

Platform Expertise
- Soliton has over 140 LabVIEW trained engineers on staff
- Largest semiconductor focused LabVIEW team among NI Partners
- Experienced team with 12 LabVIEW Architects

Awards
- Soliton has won 24 awards from National Instruments so far
- Record 3-time Overall Winner of the NIWeek Best Application Contest
- Outstanding Technical Resources Award (Alliance) – 2014, 2015, 2016 & 2017

Semiconductor Customers
- Texas Instruments
- Analog Devices
- NXP
- Cirrus Logic
- Cypress
- ON Semiconductor
### What is S5?
- GUI based tool to simplify STS-based Software development
- Helps approach STS based test program development from a device testing standpoint rather than a software development standpoint

### When is it helpful?
- Project Startup – Generate Shell code for new project
- Project Development & Debug
- Project Deployment

### Is it an alternative to NI’s TSM or other S/W products?
- NO
S5 - Primary Objectives

- Simplify User’s STS SW Development Experience
- Develop Highly Optimized STS Test Programs despite minimal experience with LabVIEW & TestStand
- Create Project Specific Debug Capabilities
- Enable Test Program Standardization
- Insert Recommendations & Software Best Practices from NI / Central Teams
- Align with NI Software roadmap for STS
S5 Flow

Begin Project with
- Device Datasheet
- DUT Test Plan
- Schematics
- Pin Map

Instantiate STS Project

~ 15 Minutes

User Code Development / Configuration

Validate Code & Measurements

Test Addition

~ 2 min

Publish Tests (to STDF)

~ 10 min

Handle
- Test Configurations
- Binning

Project Instantiation

Development

Deployment

Release to Production

~ 15 Minutes
S5 Features

**Project Instantiation**
- Relinked Project Folder
- TestStand Sequence
- Project Specific Debug Tools
- LabVIEW Code Modules
  - Templates
  - Completed Code Modules
  - Project Specific APIs

**Development & Debug**
- Test Limits Editor
- Parameter Iteration Tool
- Parameter Configuration
- New Test Addition

**Deployment**
- Test Configuration Handling
Simplified Project Instantiation

- Ensures LabVIEW, TestStand, TSM version compliance
- Validates Driver availability & versions
- Validate Pin Map against STS Configurations
Automated TestStand Sequence & LabVIEW Code Module Generation

Based on User configuration
GUI based Test Addition

- Choose from
  - Templates
    - Custom User Created
    - S5 provided
  - Ready to run code for common tests
    - Continuity
    - Leakage
    - Digital Pattern Test
- Simple GUI for addition of new tests in the sequence.
- Simple assignment of Pins, Test Limits and Software Bins for each step
- Add/edit steps after creation

April 2016
Template Code Modules

- **S5 Template Code Modules (TCM)**
  - Pins to Sessions
  - Result Publishing
  - State-Machine Structure
  - User addable custom templates

- **Completed Code Modules (CCM)**
  - Test Methodology Implemented
  - Only User Configuration is required for the step to execute
  - Custom CCMs can be created by the user
Simple UI Configuration – Zero Coding for Completed Code Modules

Example: Continuity Test Configuration Screen
- Ready to run code module (zero coding required)
Project Specific API Creation

- Avoid repetitive user code development
- Refer by User defined functional state configuration
- Define in a single screen – use across multiple code modules
- Multisite enabled
- APIs created for
  - Power Pins
  - Relay Pins

- Ability to change the state values during TestStand execution for better debug
- Ability to add/delete/edit existing states during code development/debug.
- Available as Project Specific LabVIEW Palette APIs

Replaced with LabVIEW Palette APIs
S5 SPACS Screen

- Test Input Parameter Configuration & Status Utility
- Executes in parallel to TestStand Sequence Execution
- Allows saving / loading test input parameters to / from Configuration Files
- Allows user to publish & display intermediate step results
- Designed no / insignificant overhead to test execution time

- Right Click Plug-In to add any constant / control into Config Screen
- Easy access to user defined relay & power states & S5 Global Parameters
- Individual screen for each user added step in the test program

- Test Variables accessible from standalone utility
- Value change without having to stop TestStand
- Save multiple configurations

- Intermediate Step Results Display
  - Per Site data
S5 Test Limits Editor

- Custom Utility
- Maintains linkage to Steps in TestStand Sequence
- Maintains linkage to Configurations in Test Program

Tests Data

Same Column Headers as TestStand -> Tests Tab

Configuration Selection

Add / Delete / Reorder Tests

Sort / Filter / Search across tests

Easy Access to Pin Map Editor
Reload file changes outside of S5
S5 Test Configuration Assignment

- User test configuration added as a Separate ‘Sub’ Sequence in the Main Sequence of Test Program
  - Automated Scripting of new ‘Sub’ Sequences
- Separate Test Limits File for each configuration
  - Automatically created & assigned by S5
- Automatic selection of Sub-sequence based on ‘TSM Lot Settings’
- Assign a Step to a configuration simply by enabling/disabling in S5 Utility
S5 Test Configuration Assignment

User
S5
Steps

TSM Test Configurations

Steps Assigned to Selected Configuration

‘Sub’ Sequence addition in Main Sequence

Test Limits files created and assigned by S5 for Test Configuration
S5 Right Click Features for Productivity Enhancement

Make Selected Code Multi-Site Capable

Access / Sequence Power & Relay States

Access Publish Data Ids
Accessing S5 during Test Program Development

**TestStand**
- TestStand Menu
  - Source Control
  - Semiconductor Module
  - Tools
  - Measurement and Automation Explorer...
  - Deploy TestStand System...
- Insertion Palette
  - Select State to Set
  - Start of Batch
  - End of Batch
- Project Specific Custom Step UIs

**LabVIEW**
- Project Specific LabVIEW Palette APIs
- Analyzer Rules to avoid cross-linking
- Set Up Utility to set Active Test Program
S5 2017 Feature Roadmap

**Simplified DUT Communication using NI PXI 6570**
- Protocol Agnostic
- Configuration & Zero Coding for each flavor
- Register Peek & Poke Screen in SPACS utility

**Test Input Parameter Sweeping Tool**
- Sweep across a series of input parameter values with zero coding
### S5 Distribution

- S5 Distributed as a Soliton-licensed TestStand Plugin
- S5 to be included in the STS tester customer software stack
- 2 types of Licenses
  - Test Program Development License
  - Test program Deployment License

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Contact

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