

D9010UDAA

User-defined application software for Infiniium, InfiniiVision, and DCA oscilloscopes

Introduction

UDA is an easy-to-use tool that lets you generate custom GUIs for test automation applications with minimum programming. You can automate testing, generate reports, test consistently across your organization, and control switch matrices for multi-lane testing, all while adding analysis to your compliance or debug software.



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Product Overview

Automated testing continues to be an extremely important part of today’s engineering environment. Today’s oscilloscope vendors provide compliance applications such as USB 3.0, PCIe, MIPI, and DDR to provide specific automation for the technology that you need to ensure certification of your design.

However, these compliance applications were created specifically for the technology that you are designing. These applications cannot be modified, which means limited flexibility. Any custom automation has to be done on your own with more complicated programming environments.

Keysight oscilloscopes solve this problem with the User Defined Application (UDA). UDA is the only fully customizable automated environment made for your oscilloscope. It provides full automation, including the ability to control other Keysight instruments, external applications such as MATLAB, and your DUT software. UDA also provides the ability to add custom tests to your Infiniium compliance applications. In addition, UDA automates and customizes your multi-lane interface testing with a switch matrix. UDA switches the signal under test from a multi-lane interface automatically, so you do not have to be in front of the test setup to do this manually. It also supports the test plan feature, which iteratively runs through different permutations of your device setup and tracks the results. It makes testing of multi-lane signals more efficient and saves you time.

When working with InfiniVision oscilloscopes, the UDA application executes on a Windows PC and uses a network or USB connection to fully control and automate the test process. For DCA and Infiniium oscilloscopes, it is optional to run on a separate PC or directly on the oscilloscope, giving you the flexibility to optimize your test environment.

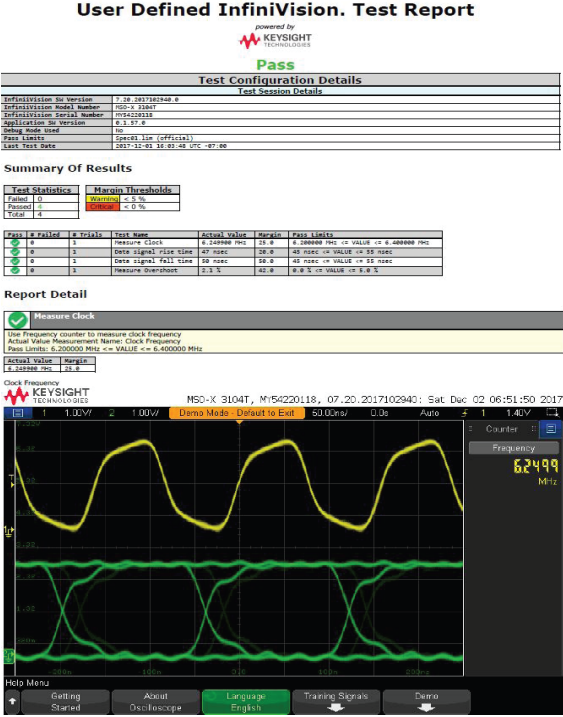


Figure 1. Easy documentation of all tests in HTML, PDF, or CSV formats

The Development Environment

Developed for oscilloscope test

There are two key differentiators for UDA from programs such as Keysight's VEE. The first is that UDA was designed specifically for Keysight oscilloscopes. The UDA development environment is easier to use than other test and measurement automation packages, which allows you to spend less time programming and more time testing your application. The second key differentiator is that the environment is built around the Infiniium proprietary compliance testing framework, which gives you features developed for Infiniium's compliance testing and the customization you want. Other oscilloscope vendors may have compliance applications or leverage development environments such as VEE; however, only Keysight oscilloscopes have the added advantage of the flexibility and ease of use of UDA.

The development environment

Like other programming applications, UDA has its own development environment. The environment can be downloaded for free at www.keysight.com/find/uda.

The UDA environment includes all the tabs that you would see in a typical compliance application, however, you control the tests and automation that you need.

To make developing simple and easy, the development environment has two modes (Basic and Advanced). Basic mode allows you to quickly build an application. Tests written for basic mode will load a single setup file and execute a single script or command. You get a variable setup and can load your own company logo.

In addition, advanced mode adds connection diagrams, external instrument control, external application value source (file-based), test grouping, sequential test steps, and independent scripts running during testing.

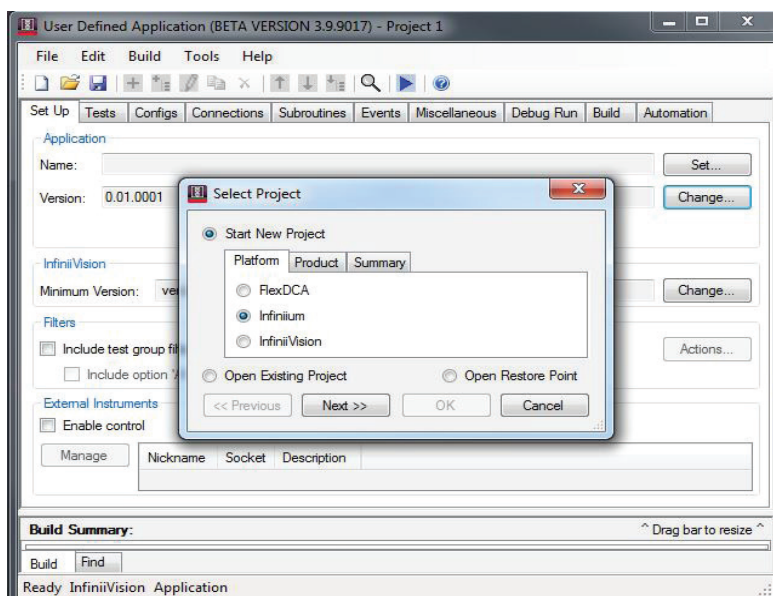


Figure 2. Keysight's UDA supports multiple oscilloscope types

Integration into the oscilloscope user interface

Once you have developed your UDA and installed it on your oscilloscope, the application is fully integrated into the FlexDCA or Infiniium GUI. You run your UDA like any of Infiniium's best-in-class compliance applications. The application can be found in the Analyze menu under the automated test apps.

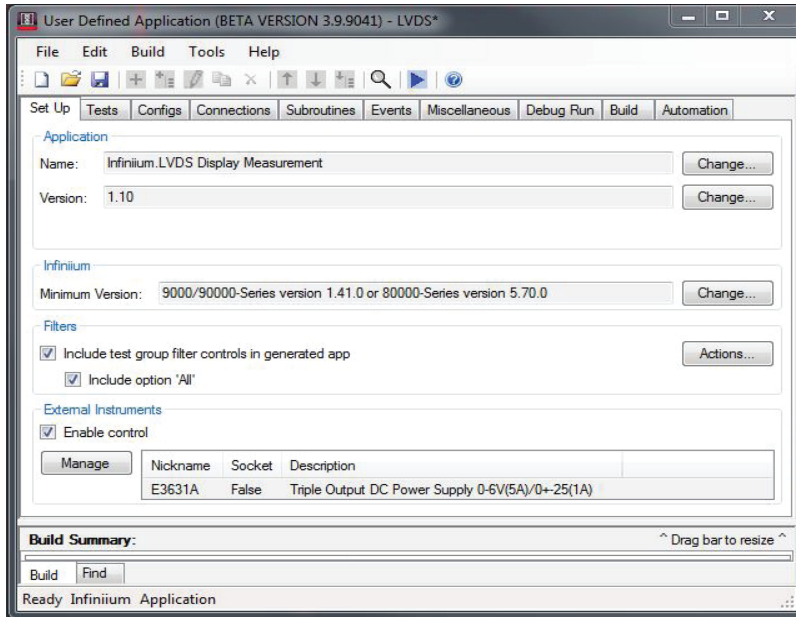


Figure 3. Basic UDA development environment

Complete variable control

UDA also allows you to set up and use variables. This simplifies your programs. For instance, if you are using CHAN as the variable for my oscilloscopes' four channels, you can set channel 1 as the default. Create variables that are input by the user at run-time on the scope.

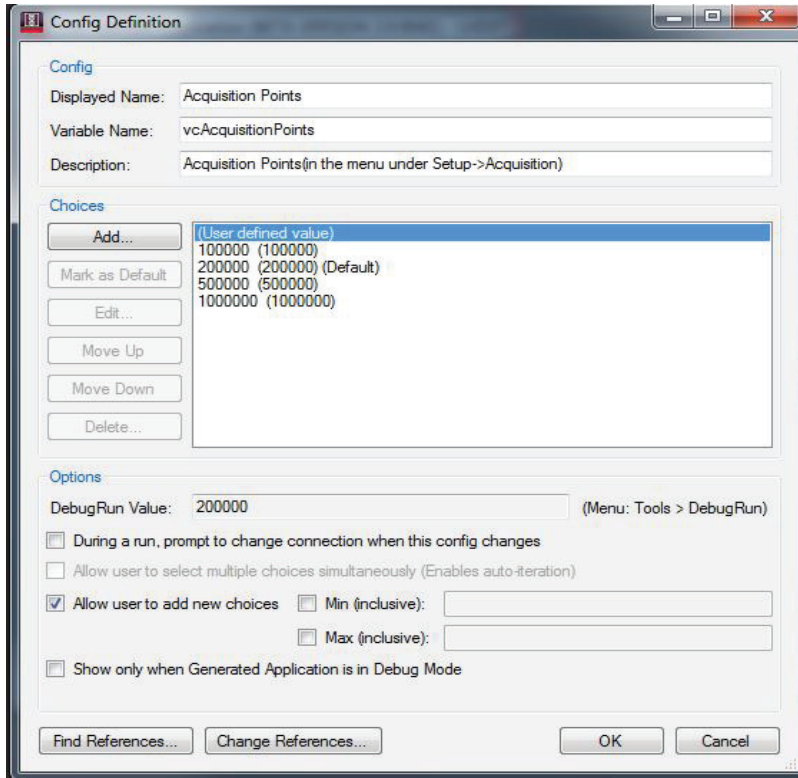


Figure 4. Setting up variables

Building your program

Once you have completed your UDA you can “generate” the application that you have developed. There are four different options for building your applications that include the following:

- Build application
- Launch application (Works when you are developing the UDA on your oscilloscope. This will launch the application on the oscilloscope).
- Generate installer (Generates the application and generates a zip file to be downloaded and installed on your oscilloscope desktop).
- Install application (Works when you are developing the UDA on your oscilloscope. This will install everything you need to run the UDA. When you use this option, the application is permanently installed on your oscilloscope).

At any time during the development of your application, you can do a “debug” run, which allows you to check for any errors, such as a file not existing or a path being incorrect. Debug runs also can check to see if any external instruments you are controlling can be found.

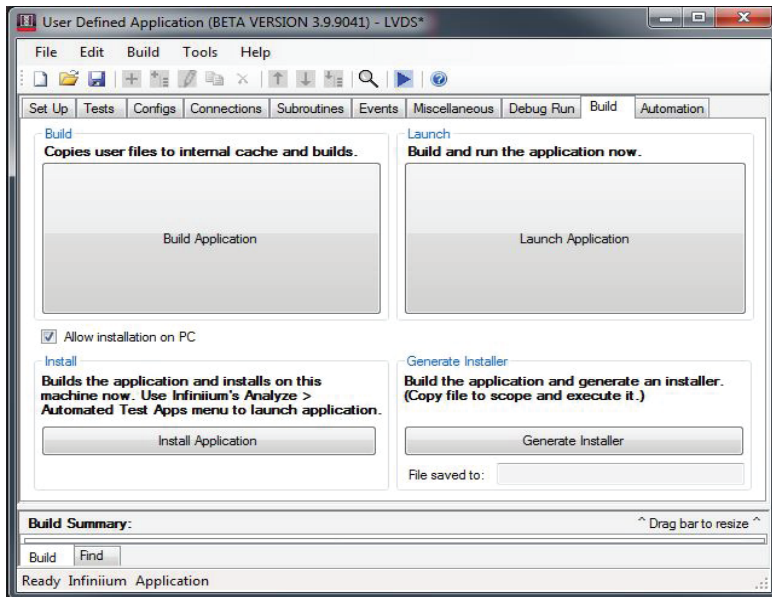


Figure 5. Four different options to build your program

Application Integration

Infiniium analysis software

UDA is fully compatible with all the DCA, Infiniium, and InfiniiVision oscilloscope applications via SCPI commands. This compatibility includes Infiniium applications such as Serial Data Equalization, Serial Data Analysis, EZJIT Plus, InfiniiSim, and InfiniiScan. By combining UDA with these Infiniium applications, you can get exactly the automated analysis that you need. For example, you can create a UDA to find which equalization algorithm will best open your eye. Simply combine UDA with the Serial Data Equalization and the eye height measurement, and you can quickly find the filter you need for the optimal filter design. Not only will you know which tap values to use, but you will also have your customized HTML report to show it.

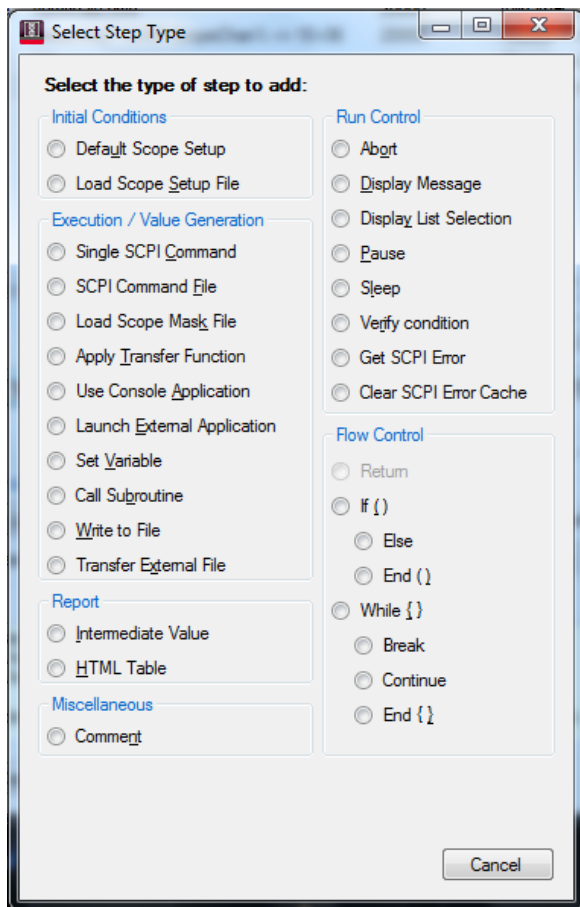


Figure 6. Options of what can be added to a UDA test routine

In addition to working with all other Infiniium software, UDA is fully compatible with MATLAB and Infiniium's User-Defined Function, which allows you unprecedented flexibility in your measurement capability and in your automation software. UDA even allows you to import MATLAB graphics into your user-defined application report. Use your add-in capability to create tests that unlock the power of de-embedding and your application. Compliance applications may allow you to de-embed a fixture, but UDA allows you to show the improvement in your design by removing the cable and the fixture.

Compliance test add-ins

In UDA version 2.50 and later, you can create test add-ins. A test add-in can be added to your DCA, Infiniium, or InfiniVision compliance application, such as USB Signal Quality Testing or PCIe Gen3. This capability now allows you to test to the exact compliance specification and then create additional customized automation tests through UDA and test them all in the same report. This now gives you the unmatched combination of the ease of use of compliance applications and the flexibility of customized technologies. There is no other tool in the oscilloscope industry that allows this combination.

External applications

One of the most advanced features of UDA is the ability to run any external application on your UDA. You can create a script from VBA or C# and then execute it into the UDA application. This allows you to add customizable consoles.

Figure 7 shows a UDA that was created for setting up testing of SDI (serial data interface). The VBA example occurs at run time and allows the user to test to the exact conditions the user wishes for testing.

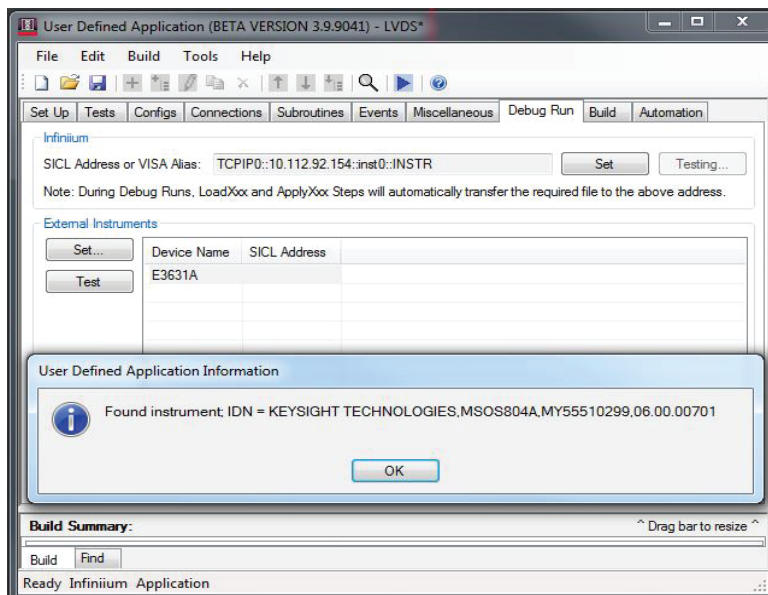


Figure 7. Easily debug as you create customer applications.

Switch matrix

The custom switch matrix software option for UDA used together with switch matrix hardware provides automated and customizable testing for multi-lane digital bus interfaces. The benefits of the automated switching solution include:

- **Eliminate reconnections** — which saves time and reduces errors through automating tests for each lane of a multi-lane bus.
- **Maintain accuracy** — with the use of unique PrecisionProbe or InfiniiSim to compensate switch path losses and skew.
- **Customize testing** — with the use of a remote programming interface and UDA for device control, instrument control, and test customization.

Check [Using Microwave Switches When Testing High-Speed Digital Interfaces application note](#) for more details. More on the solution and configuration can be found at <http://www.keysight.com/find/switching>.

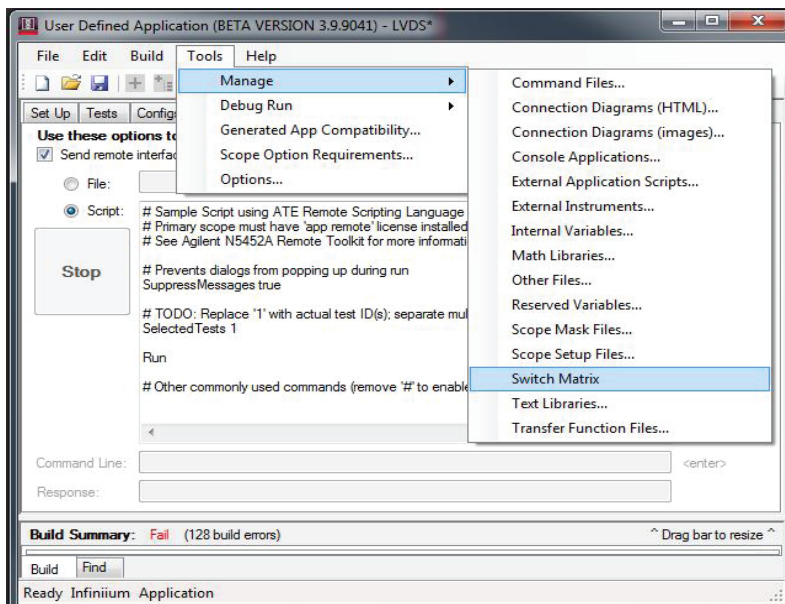


Figure 8. Switch matrix software enabled within UDA



Figure 9. Automated testing for multi-lane digital bus interface using our switching solution

Share, modify, and transfer user-defined applications and add-ins

UDA development environment is free to download at www.keysight.com/find/uda. You can create your UDA and share your application both on-site or trans-regionally. You can run as many UDAs on your oscilloscope as you would like with one license.

You can find examples of UDA at: www.keysight.com/find/share_uda.

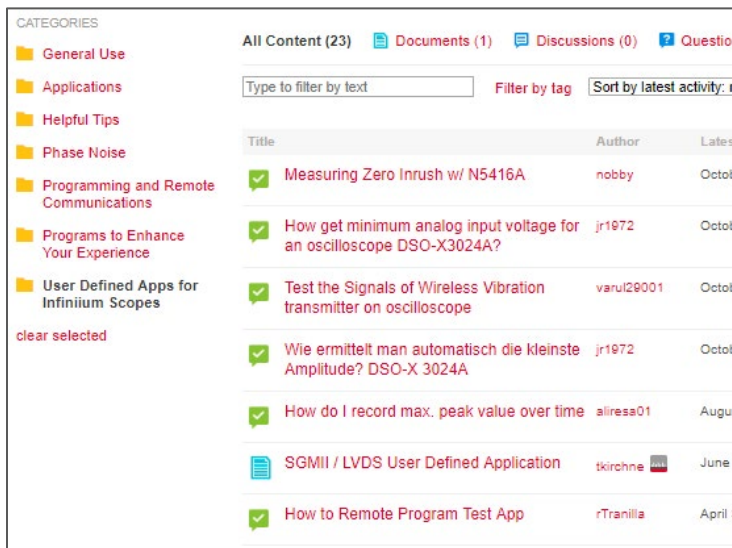


Figure 10. UDA applications being shared on our Keysight community forum

You can also share the UDAs that you have developed. You can download an example and then modify the application to be the exact application you need with one license.

Ordering Information

Recommended oscilloscopes

All listed firmware requirements are minimum, and any versions greater than listed can be used.

| InfiniiVision | | Infiniium | | DCA | |
|------------------|----------|------------|----------|---------|----------|
| Family | Firmware | Family | Firmware | Family | Firmware |
| 1000 X-Series | 1.10 | S-Series | 6.30 | FlexDCA | 6.0 |
| 1200 X-Series | 2.10 | V-Series | 6.30 | | |
| 2000 X-Series | 2.40 | Z-Series | 6.30 | | |
| 3000T/G X-Series | 7.10 | EXR-Series | 11.0 | | |
| 4000 X-Series | 7.10 | MXR-Series | 11.0 | | |
| 6000 X-Series | 7.10 | UXR-Series | 11.0 | | |

Flexible software licenses and KeysightCare Software Support Subscriptions

Keysight offers a variety of flexible licensing options to fit your needs and budget. Choose your license term and license type.

License terms

Perpetual – Perpetual licenses can be used indefinitely.

Subscription – Subscription licenses can be used through the term of the license only.

License types

Node-locked – License can be used on one specified instrument/computer.

Transportable – License can be used on one instrument/computer at a time but may be transferred to another using Keysight Software Manager (internet connection required).

USB Portable – License can be used on one instrument/computer at a time but may be transferred to another using a certified USB dongle (available for additional purchase with Keysight part number SW1000-D10).

Floating (single site) – Networked instruments/computers can access a license from a server one at a time. Multiple licenses can be purchased for concurrent usage.

KeysightCare Software Support Subscriptions

Perpetual licenses are sold with a 12 (default) and up to 60-month software support subscription with a user-selected start and end date. Support subscriptions can be renewed for a fee after that.

Subscription licenses include a software support subscription through the term of the license, from 3 to 36 months, with a user-selected start date.

Selecting your license

Step 1. Choose your software product (e.g. D9020ASIA)

Step 2. Choose your license term: perpetual or subscription.

Step 3. Choose your license type: node-locked, transportable, USB portable, or floating.

Step 4. Depending on the license term, choose your support subscription duration.

Example

| If you selected: | Your quote will look like this: | |
|--|---|--|
| D9020ASIA Node-locked | Part number D9020ASIA | Description Advanced Signal Integrity Software (EQ, InfiniiSimAdv, Crosstalk) Node-locked perpetual license |
| Perpetual license | SW1000-LIC-01 SW1000-SUP-01 | Node-locked KeysightCare software support subscription with user-selected start and end dates |
| D9020ASIA Transportable Subscription 6- month license | Part number D9020ASIA SW1000-SUB-01 | Description Advanced Signal Integrity Software (EQ, InfiniiSimAdv, Crosstalk) 6-months, transportable subscription license |

To configure your product and request a quote:

<http://www.keysight.com/find/software>

Contact your Keysight representative or authorized partner for more information or to place an order:

www.keysight.com/find/contactus

Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.



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