

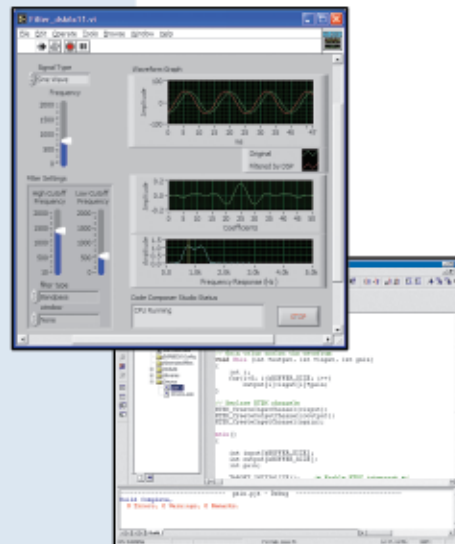
LabVIEW DSP Tools for Texas Instruments DSP

LabVIEW DSP Test Integration Toolkit

- Interface with TI Code Composer Studio from LabVIEW
- Automate basic DSP development routines and tasks
- Communicate directly with DSP through direct memory or through Real-Time Data Exchange (RTDX)
- Interactive executable included to communicate directly to RTDX channels with no programming

System Requirements

- LabVIEW 7.0 or later
- Code Composer Studio 2.2 or later
- DSP Development Device



Overview

With the LabVIEW DSP Test Integration Toolkit, design engineers now have a high-level tool for easily building test systems and utilities for their DSP system. By more easily integrating testing, engineers can iteratively verify their design throughout the design cycle, identifying flaws early in the process, reducing overall development time. In addition, the iterative testing process delivers a more robust product for the end customer. These tools help you more easily integrate testing into your system by:

- Automating the standard Code Composer Studio routines such as building, downloading and running DSP code.
- Communicating directly with your DSP through RTDX.

Developing a DSP Test System

With the LabVIEW DSP Test Integration Toolkit, you can rapidly develop DSP test systems by automating the routine functions from Code Composer Studio. With a simple set of LabVIEW VIs, you can automate opening, compiling, downloading and running your DSP code.

After you have written your code in Code Composer Studio, you can also use these VIs to automate file management, making it easier to develop a utility to handle multiple files without having to return to the Code Composer Studio IDE. Once the code is running, you can use other Memory VIs or RTDX VIs to send and receive data directly to and from your DSP system.

Debug and Verification of DSP Code

To debug and verify proper behavior of your code, you can iteratively start and stop the code execution while reading and writing directly to memory locations that correspond to particular variables on your

DSP. Although this process is one way to verify proper code execution, it does not provide a true picture of performance because you have to continuously start and stop your code.

With RTDX, you incorporate “channels” inside your code that you can then communicate to without ever stopping the execution of your code. Because your code execution is never impacted, you get a much better understanding of how your code will respond when deployed.

CCS Automation VIs	CCS Communication VIs
CCS Open Project.vi	CCS RTDX Read.vi*
CCS Build.vi	CCS RTDX Write.vi*
CCS Download Code.vi	CCS RTDX Enable.vi
CCS Run.vi	CCS RTDX Enable Channel.vi
CCS Halt.vi	CCS RTDX Disable.vi
CCS Close Project.vi	CCS RTDX Disable Channel.vi
CCS Window Visibility.vi	CCS Memory Read.vi+
CCS Reset	CCS Memory Write.vi+
	CCS Symbol to Memory Address.vi

*RTDX VIs can use scalars and arrays for double and single precision floating-point numbers and 32, 16, and 8 bit integers.
+Memory VIs can use 32, 16, and 8 bit integers

Table 1. List of VIs in the NI LabVIEW DSP Test Integration Toolkit

Communicating Directly to the DSP

Through RTDX VIs and Memory VIs, you can easily communicate with your DSP code. You can send either scalar values (such as a gain factor) or arrays (such as a waveform or filter coefficients) by wiring the data directly to the RTDX or Memory Write VIs. Furthermore, you can use the LabVIEW Analysis VIs to generate any waveforms or filter coefficients and wire this data directly to RTDX or Memory Write VIs. Within the same VI you can use RTDX or Memory Read VIs to read any data from the DSP RTDX channels or memory locations internal to the DSP. Using RTDX or direct memory to send waveforms and using Analysis VIs from

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LabVIEW make it easy to understand how your DSP responds under different circumstances.

TI DSP	Automation VIs	RTDX VIs
C2000	✓	✓
C5000	✓	✓
C6000	✓	✓

Table 1. Applicable TI DSP Devices

LabVIEW Debugging Workbench for RTDX Communication

The LabVIEW Debugging Workbench for RTDX Communication is an easy-to-use executable to visualize and control data through RTDX without any programming. Simply drag and drop controls and indicators into the workbench front panel and configure the objects with a few mouse clicks. The workbench includes objects such as a waveform generator, filter coefficients, charts, graphs, buttons, knobs and more for you to communicate to your DSP code quickly and easily.

Integrating Real-World Signals to Your DSP Test System

After you have your test system configured for RTDX or direct memory interaction, you can easily integrate real-world signals with

the LabVIEW programming environment. Simply replace RTDX or memory VIs with VIs for data acquisition or instrumentation such as waveform generators, scopes, or switches, and you have a system that sends signals directly to your DSP device I/O ports with little modification to the overall program.

By building a DSP test system with LabVIEW and the DSP Test Integration Toolkit, you can rapidly validate your DSP code using both simulated signals generated in LabVIEW and real-world signals generated by the hardware of your choice tightly integrated with LabVIEW. By using both real-world signals and simulated data through RTDX or direct memory, you can build your DSP system I/O points incrementally, migrating your RTDX channels into real I/O ports.

System Requirements

The LabVIEW DSP Test Toolkit requires the following:

- LabVIEW 7.0 Express or later
- TI Code Composer Studio 2.2 or later
- TI DSP Development Device

Ordering Information

LabVIEW DSP Test Integration Toolkit778648-03

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Visit ni.com/info and enter *lvdspti*.

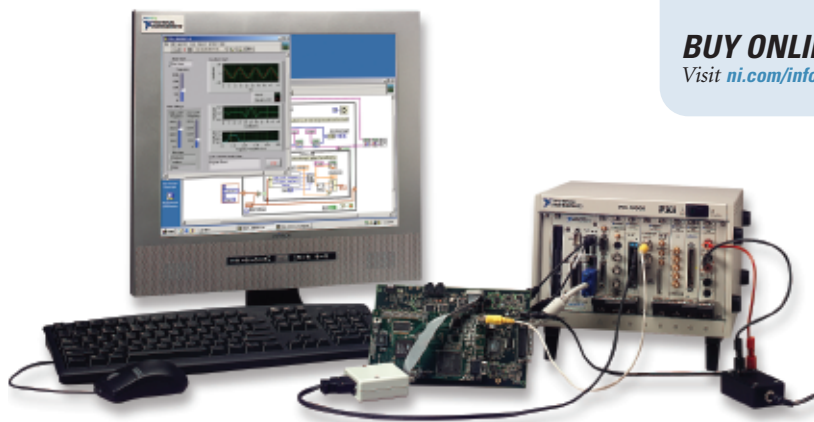


Figure 1. DSP Test System Connected to NI PXI-5431 video signal generator and NI PXI-4070 DMM.

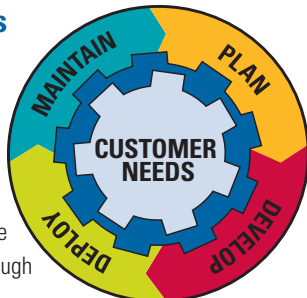
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