Software Options *for*
XY Phase and Amplitude Series
512 x 512 and 256 x 256 Spatial Light Modulators

Description

Boulder Nonlinear Systems (BNS) offers several software options, enabling the user to select a program that will best suit their needs. These versions of software have different levels of functionality:

- *Blink Compact*
- *Blink Plus*
- *Blink Full*
- *Visual C++ Software Developer Kit (SDK)*
- *LabView Software Developer Kit (SDK)*

Blink Compact

Blink Compact is the basic software included with each purchase of a XY Phase or Amplitude SLM system. Each CD contains custom configuration files designed to provide improved performance on startup.

The single CD includes the executable program, run-time libraries, device drivers, and a custom phase linearization Look-Up-Table (LUT) file for our XY Phase Series SLMs. The CD includes an install program for loading the software onto the user's computer. Blink Compact is supported on Windows® 2000 and Windows XP Professional.

Features:
1. Loads a BMP pattern file into the SLM.
2. Allows for either a custom, or a generic LUT that can be used to linearize the SLM output versus pixel value.
3. Allows the user to change from one pattern to another under manual control.
4. Preloads the SLM Driver Board's memory with a group of predefined pattern files.
5. Allows for sequencing through a list of "pre-loaded" patterns (eg. Movie).
6. Allows the user to change the sequencing speed.
7. The user is allowed control of the percentage of time that the laser sync signal is on, and the amplitude of that signal for direct control of some laser systems.

Blink Plus

Blink Plus includes all of the features of Blink Compact, plus an added feature to remove the static phase patterns when working with the XY Phase Series SLMs. (Not compatible with XY Amplitude Series SLMs.) Blink Plus is included with the purchase of a XY PhaseFlat Series SLM system. Each CD contains custom configuration files designed to provide improved performance on startup.

The single CD includes the executable program, a custom SLM phase optimization file, a custom phase linearization LUT file, run-time libraries, and device drivers required for proper operation. The CD includes an install program for loading the software onto the user's computer. Blink Plus is supported on Windows 2000 and Windows XP Professional.

Features:
1. All of the features of Blink Compact.
2. Optimizes for phase errors inherent in the SLM using custom factory configuration data.
3. Provides ability to optimize for additional system phase errors through the use of a customer supplied phase conjugate pattern or zernike polynomials.
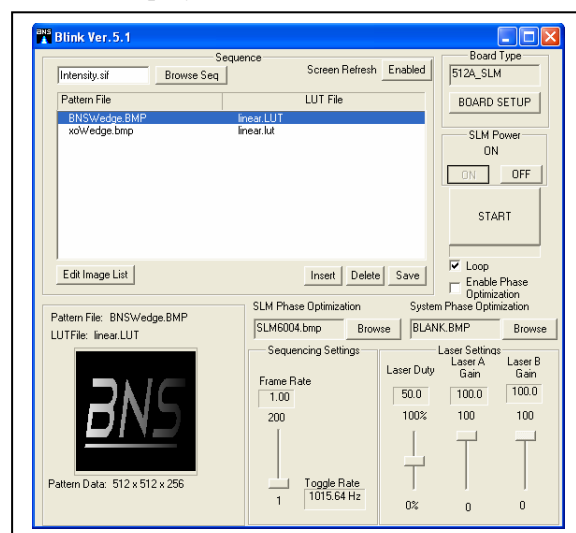

Figure 1 ~ Blink Plus Screen Capture with Optimization Applied

Blink Full

Intended for programmer's familiar with Microsoft Visual C++ and device driver design, Blink Full is useful for those who wish to write their own software interface, and wish to modify the device driver. This software package includes the source code used to generate the Blink program. Source code is included for the upper level graphical user interface, as well as for the run-time libraries and device drivers. Operating Systems supported: Windows 2000 and Windows XP Professional.

Software Tools Required: Microsoft Visual C++ Version 6.0, Jungo "WinDriver Windows" Version 6.02 or greater

Provides all features of Blink Plus in addition to examples for the experienced GUI programmer to:
1. Read and Load a BMP pattern file into the SLM, with the option for phase users to load an additional SLM phase compensation pattern, and a system phase compensation pattern or Zernike Polynomials.
2. Apply LUT correction to a pattern.
3. Browse for or save files.
4. Read from and write to the registry.
5. Disable controls.
6. Use sliders, listboxes, checkboxes, and buttons.
7. Create a dialog box.
8. Manage a pointer list of structures to keep track of pattern files, LUT's, and active sequence records within the sequence list.
9. Use timers for periodic screen updates.
10. Display images on the screen.
11. Dump debug data while running from the debugger (as opposed to manually stepping through the program).
12. Pattern file management.

At a Device Driver level:
1. What registers exist in the hardware
2. How to read/write from/to those registers
3. How to use and handle interrupts
4. The function call order in which the registers need to be written to and read from to put a pattern on the SLM.

Visual C++ Software Developer Kit

Intended for programmers familiar with Microsoft Visual C++ who intend to write their own software interface, but have little desire to understand or to modify the device driver. This simplified software package has a minimal user interface. It is meant to demonstrate how to call the run time library functions available to the user, and the order that those functions should be called in. An included example shows the user how to perform basic functions. Source code is included for the upper level graphical user interface, but is not included for the device driver. The following Operating Systems are supported: Windows 2000 and Windows XP Professional.

Software Tools Required: Microsoft Visual C++ Version 6.0

This source code and related documentation explains the following:
1. The minimum steps necessary to display a pattern on the SLM.
2. For Phase users: how to superimpose a SLM and/or system compensation pattern onto a desired pattern.
3. What the BNS functions are and how to call those functions, what the parameters are, and what those parameters are responsible for.
4. Polling the hardware while sequencing.
5. Controlling the laser and sequencing rate.
6. Using a listbox.
7. A description of the software architecture of the software.
8. Conserving hardware memory when the same pattern is found in the sequence multiple times.
9. Handling memory allocation and de-allocation.

LabVIEW Software Developers Kit

Intended for programmer's familiar with Microsoft Visual C++ and LabVIEW who intend to write his or her own LabVIEW VI to drive the SLM, but have little desire to understand or to modify the device driver. This simplified software package has a minimal user interface. It is meant to demonstrate how to call C++ functions through a DLL from LabVIEW, and the order that those functions should be called in.

This example shows the user how to perform most basic functions. Source code is included for the VI, but is not included for the device driver. The following Operating Systems are supported: Windows 2000 and Windows XP Professional.

Software Tools Required: LabVIEW 6.1 Professional Development System

This source code and related documentation explains the following:

1. The minimum steps necessary to display a pattern on the SLM.
2. For Phase users: how to superimpose a SLM and/or system compensation pattern onto a desired pattern.
3. What the BNS functions are and how to call those functions, what the parameters are, and what those parameters are responsible for.
4. Polling the hardware while sequencing.
5. Controlling the laser and sequencing rate.
6. Using a listbox.
7. A description of the architecture of the software.
8. Conserving hardware memory when the same pattern is found in the sequence multiple times.
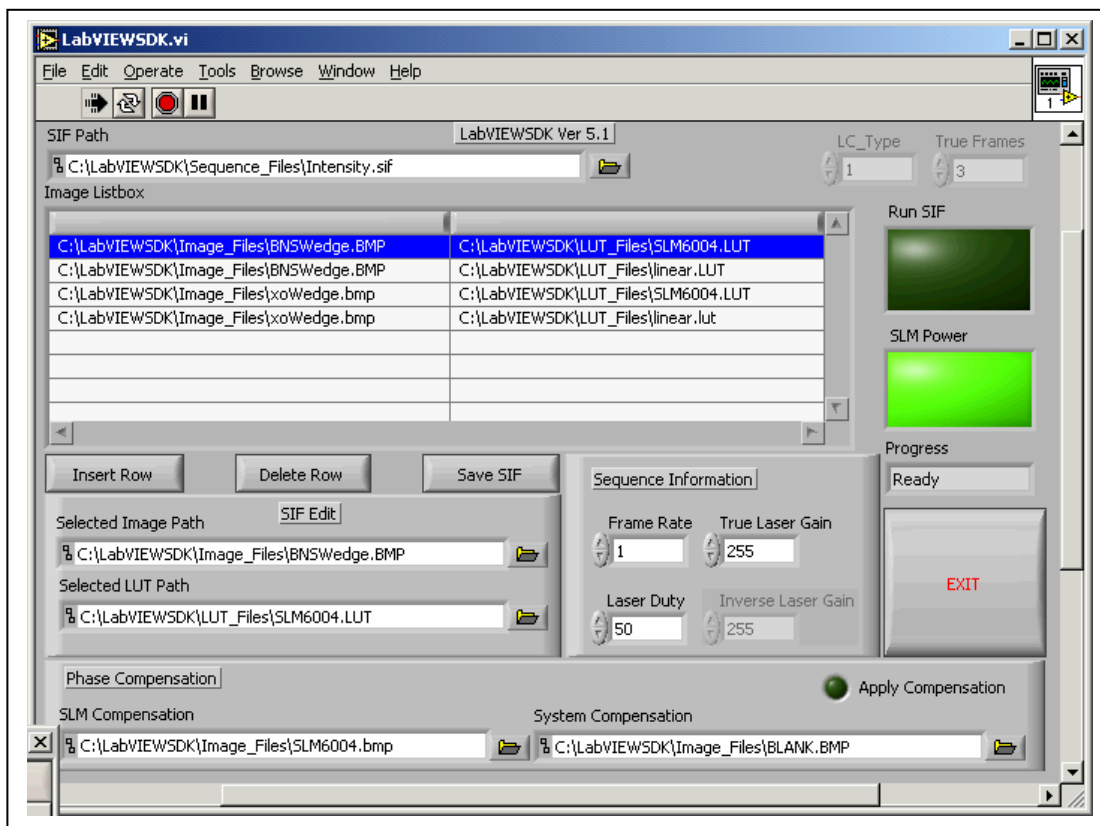

Figure 2 ~ LabView Interface Screen Capture

Software Selection Guide

	Driver Source Code	Example Source Code	Optimization	Graphical User Interface (GUI)
Blink Compact				✔
Blink Full	✔	✔	✔	✔
Blink Plus			✔	✔
Visual C++ SDK		✔	✔	✔
LabView SDK		✔	✔	✔

Company Profile

Boulder Nonlinear Systems, Inc. (BNS) is an innovative technology company specializing in dynamic liquid crystal polarization control solutions for both laser-based and imaging systems. Company strengths in scientific research and development are leveraged into OEM and standard product offerings targeted for astronomy, biomedical, defense, microscopy, optical computing, optical storage, and telecommunications applications.

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