Using MATLAB® with LeCroy Oscilloscopes

Engineers and scientists turn to LeCroy oscilloscopes when they need to create customized measurement and math algorithms. MATLAB extends the functionality of LeCroy oscilloscopes by providing engineers and scientists the ability to fully integrate into the LeCroy oscilloscope processing architecture and display a pre-defined or custom-generated MATLAB algorithm. The power, wide availability, and installed user-base of MATLAB combines with unique LeCroy oscilloscope capability to allow greatly expanded customization capability not possible with another oscilloscope or MATLAB alone.

What is MATLAB?

MATLAB is a software environment used by over 1,000,000 users world-wide in various industries and at more than 3,500 colleges and universities. Its high-level language and interactive environment enable you to perform computationally intensive tasks faster than with traditional programming languages such as C, C++, and Fortran.

How do I use MATLAB with LeCroy oscilloscopes?

1. *Live Data Streaming* – Use MATLAB directly on most Windows-based LeCroy oscilloscopes to stream acquired oscilloscope data into MATLAB for processing after every trigger event, and then stream MATLAB processed data back into the LeCroy oscilloscope for display or further processing. A wide variety of customized algorithms may be defined, including math functions and measurements. Requires LeCroy's XDEV option.
2. *Instrument Control and Configuration* – Use MathWorks Instrument Control Toolbox on the LeCroy oscilloscope or on a remote computer to configure and control LeCroy oscilloscopes or other instruments. Acquire data from the oscilloscope into the MATLAB environment for building analysis routines. Provides a common user-control for multiple oscilloscopes and instruments when off-line control and processing is desired. May be easily combined with the Live Data Streaming functionality for more power and flexibility.

Value of MATLAB to LeCroy oscilloscope users

1. Create customized math or measurement algorithms (such as a non-standard rise-time measurement or signal filtering) with MATLAB and show the results directly in the LeCroy user environment or in MATLAB.
2. Quickly use pre-defined MATLAB algorithms or algorithms created by third parties in the standard LeCroy oscilloscope processing and display environment.
3. Internal oscilloscope "closed-loop" processing of MATLAB algorithms provides quicker access to your data — improves productivity and allows you to gain faster and deeper insight into your results.
4. Conventional use of MATLAB with the MathWork's Instrument Control Toolbox is supported for those users who prefer to work completely in the MATLAB environment with the oscilloscope as a data acquisition device only.

On-line Resources

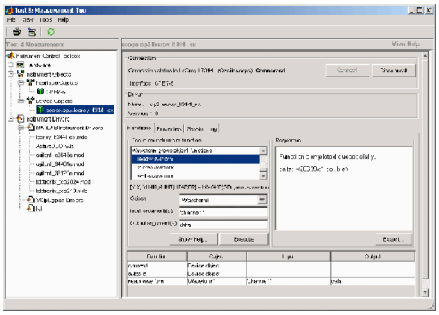
- MathWorks MATLAB overview: www.mathworks.com/products/matlab
- MathWorks Instrument Control Toolbox: www.mathworks.com/products/instrument
- LeCroy XDEV software option: www.lecroy.com/tm/Options/Software/XDEV
- LeCroy Application Brief – Filter Signals using MATLAB: www.lecroy.com/tm/library/LABs/PDF/LAB_WM760.pdf
- LeCroy Application Brief – Decoding NRZ Data using MATLAB: www.lecroy.com/tm/Library/LABs/PDF/LAB766.pdf

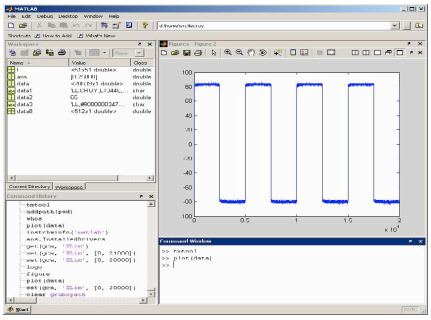
- MathWorks On-Demand webinar – *Acquiring Live Data into MATLAB for Analysis:* www.mathworks.com/wbnr11882

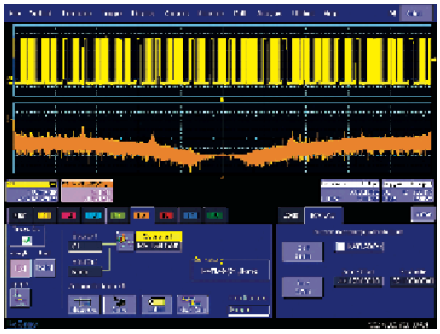
For More Information

To discuss how you can use MATLAB with LeCroy oscilloscopes or to arrange a product demo, contact:

- LeCroy: (800) 553-2769 or your local LeCroy representative
- The MathWorks: David Malenchini, (508) 647-7212, david.malenchini@mathworks.com







Left: Configure and control oscilloscopes or other instruments using MATLAB and the Test & Measurement Tool provided with MathWork's Instrument Control Toolbox.

Center: Acquire measurements from instruments directly into the MATLAB environment to develop analysis routines.

Right: Execute MATLAB analysis routines on the live data and show the results directly in the LeCroy oscilloscope environment, where they are available for display and additional processing.