

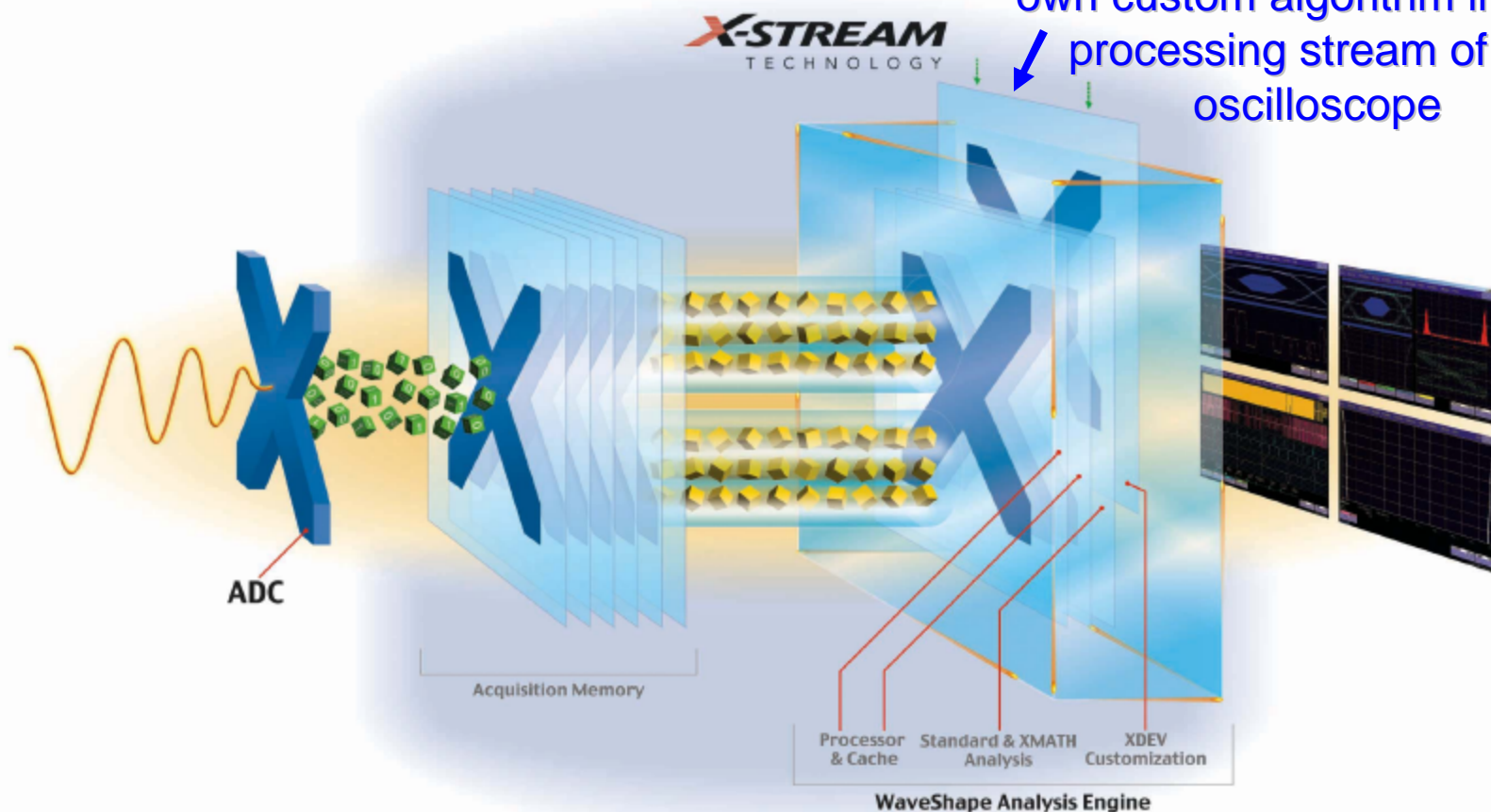


WaveMaster™ DSO Customization

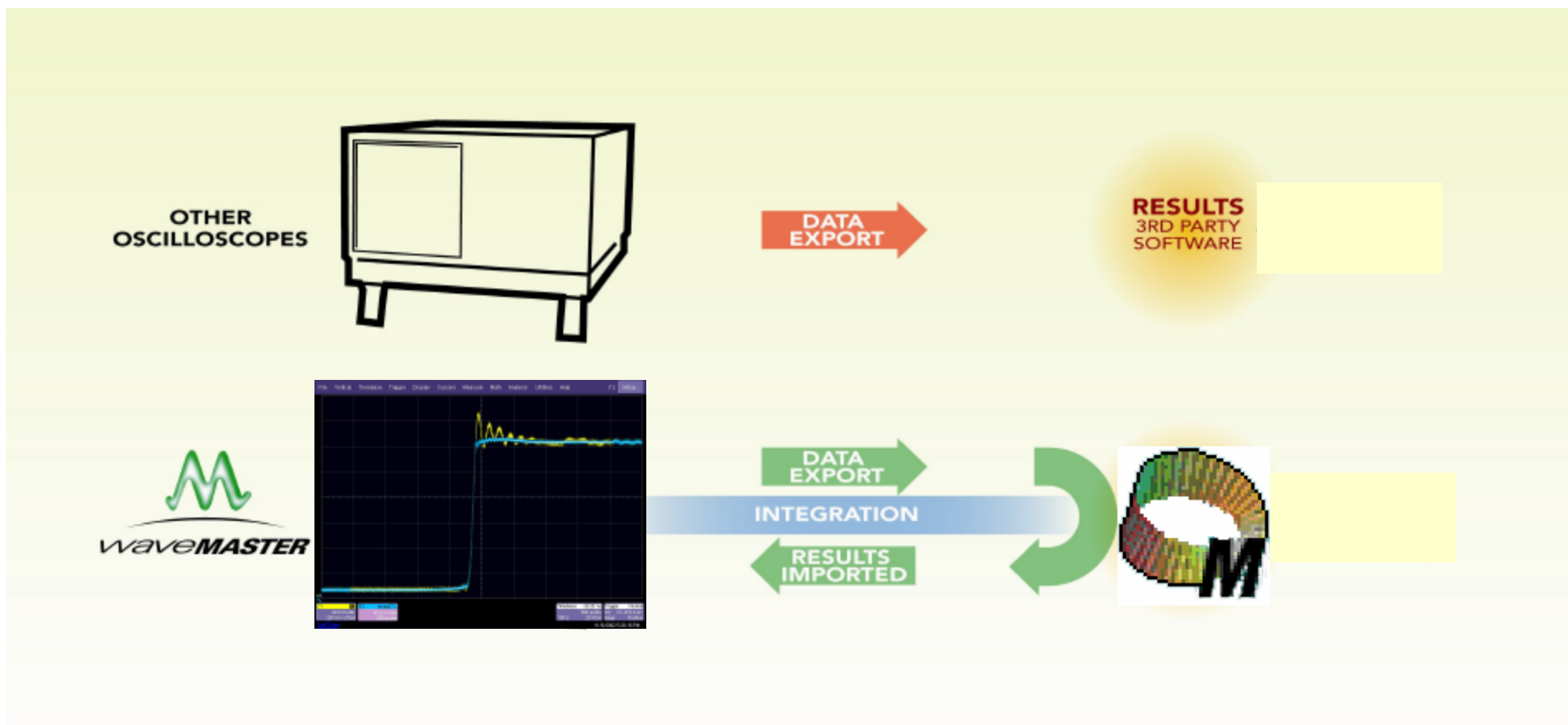
Using XDEV Advanced
Customization (available from LeCroy) and
Mathcad (available from Mathsoft Engineering
and Education, Inc.)

X-STREAM Technology Makes XDEV Customization Possible

X-Stream's WaveShape Analysis Engine allows you to insert your own custom algorithm into the processing stream of the oscilloscope



WaveMaster with LeCroy's XDEV Completely Integrates Mathcad



Step 1 – Select a Math Trace

File Vertical Timebase Trigger Display Cursors Measure Math Analysis Utilities Help

C1
40.0 mV/div
-287 mV offset

Timebase -39.20 ns
500 ps/div
100 S 20 GS/s

Trigger Normal
DC C3 474.0 mV
Edge Positive

Math F1 F2 F3 F4 F5 F6 F7 F8

Trace On
single dual
f(x) f(g(x))
graph web e...

Source1 Operator1
C1 MathcadMath

Source2
None

Summary
mcd(C1, None)

Actions for trace F3
Measure Store Label Next Grid Help Markers Simple

Zoom Mathcad Vars Scale Close

Horizontal Center
39.205 ns
Scale / div
500 ps
x 1.00 Var.

Vertical Center
287.6 mV
Scale / div
40.0 mV
x 1.13 Var.

in out in out Reset Zoom

LeCroy 11/6/2002 5:29:41 PM

Step 2 – Select the Mathcad custom function

The screenshot displays the LeCroy oscilloscope interface with the 'Select Math Operator' dialog box open. The dialog box has a 'Category' list on the left and a 'Choices' table on the right. The 'Custom' category is selected, and the 'MathcadMath' option is highlighted. The background shows an oscilloscope trace with a yellow waveform and various control panels.

Category	Choices										
All Functions											
Basic Math											
Custom	<table border="1"><thead><tr><th>Name</th><th>Description</th></tr></thead><tbody><tr><td>ExcelMath</td><td>Perform Math in Excel. Transfers 1 or 2 waveforms into Excel and reads the resulting waveform.</td></tr><tr><td>MathcadMath</td><td>Produces a waveform using a user specified Mathcad function</td></tr><tr><td>MATLAB math</td><td>Produces a waveform using a user specified MATLAB function</td></tr><tr><td>Math script</td><td>Visual Basic script which produces a waveform from one or two input waveforms</td></tr></tbody></table>	Name	Description	ExcelMath	Perform Math in Excel. Transfers 1 or 2 waveforms into Excel and reads the resulting waveform.	MathcadMath	Produces a waveform using a user specified Mathcad function	MATLAB math	Produces a waveform using a user specified MATLAB function	Math script	Visual Basic script which produces a waveform from one or two input waveforms
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Math script	Visual Basic script which produces a waveform from one or two input waveforms										
Filter											
Frequency Analysis											
Functions											
Graphing											
Jitter Functions											

Background interface elements include a menu bar (File, Vertical, Timebase, Trigger, Display, Cursors, Measure, Math, Analysis, Utilities, Help), a waveform trace, and various control panels such as 'Math' (F1), 'Trace On', 'single', 'dual', 'graph', 'web e...', 'Measure', 'Store', 'Label', 'Next Grid', 'Help Markers', 'Simple', 'in', 'out', 'Reset Zoom', and 'Close'.

Step 3 – Load the Mathcad File in WaveMaster

File Vertical Timebase Trigger Display Cursors Measure Math Analysis Utilities Help

Worksheet Filename

Name	Size	Type
Mathcad FFT	2 KB	Mathcad D...
Mathcad Invert	3 KB	Mathcad D...
Mathcad Stdev Parame...	3 KB	Mathcad D...
Mathcfft (absolute)	5 KB	Mathcad D...
MathcfftOct14	5 KB	Mathcad D...
MathKSmoothOct14	5 KB	Mathcad D...
MathSinFitOct15	5 KB	Mathcad D...
MathSupSmoothOct14	5 KB	Mathcad D...
MaxParameter	5 KB	Mathcad D...
MedSmoothOct14	3 KB	Mathcad D...
ParamStDevOct14	3 KB	Mathcad D...

File name: MedSmoothOct14.mcd
 File of type: *.mcd
 Current Path: D:\Scripts

OK Cancel

Measure Store Label Next Grid Help Markers Simple Reload

Worksheet Filename D:\Scripts\MedSmoothOct1 Browse

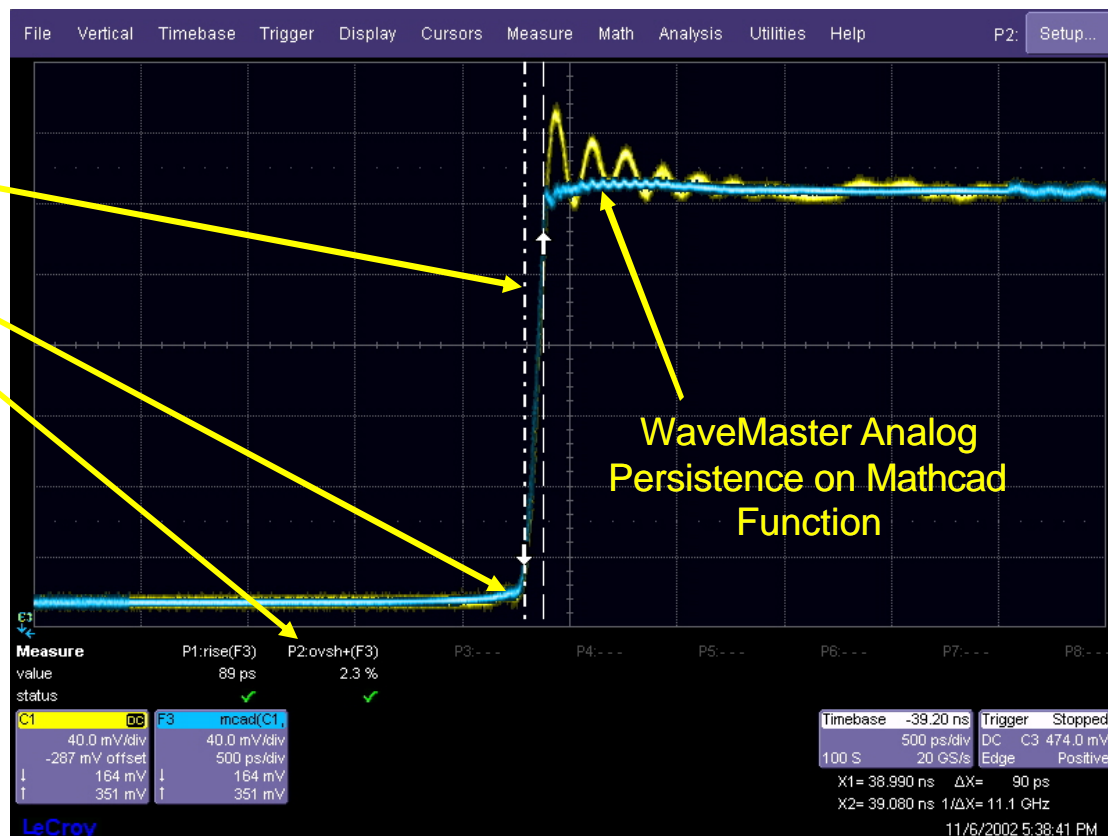
LeCroy 11/6/2002 5:33:55 PM

Step 4 – Turn on the F3 Trace, Result is Displayed in WaveMaster Program

The screenshot displays the LeCroy WaveMaster software interface. At the top, a menu bar includes File, Vertical, Timebase, Trigger, Display, Cursors, Measure, Math, Analysis, Utilities, Help, and F3: Setup... The main display area shows two waveforms: a yellow trace labeled 'C1' and a blue trace labeled 'F3'. Both traces show a step-like signal that transitions from a low level to a high level. Below the waveforms, a control panel for trace F3 is visible. It includes a 'Trace On' checkbox (checked), 'single' and 'dual' mode buttons, and 'graph' and 'web e...' options. The 'Source1' is set to 'C1' and 'Source2' is 'None'. The 'Math' function is set to 'MathcadMath'. A 'Summary' box shows 'mcad(C1, None)'. Other controls include 'Measure', 'Store', 'Label', 'Next Grid', and 'Help Markers' (set to 'Simple'). To the right, a 'Mathcad' configuration panel is open, showing 'Advanced' checked, 'Input 1 in s1', 'Output read from smooth...', 'Status OK', and a 'Worksheet Filename' of 'D:\Scripts\MedSmoothOct1'. The bottom left corner shows the LeCroy logo, and the bottom right corner shows the date and time: 11/6/2002 5:35:03 PM.

The *Ultimate* in Flexibility!

- Mathcad processed trace can be measured with WaveMaster
 - Cursors
 - Functions
 - Parameters
- Implement your solution *immediately!*
- Shorten product time to market
- Fast Setup – no difficult remote communication setup
- Real-time trace display and update



Try This Example on Your WaveMaster

■ You will need:

- A WaveMaster with the XDEV or XMAP software options
- A copy of Mathcad (Version 2001i or later) installed on your WaveMaster
- The *Mathcad_MedSmooth_Function.mcd* file (available on this web page)
- Additional demonstration files may also be downloaded and used (www.lecroy.com/mathcad)