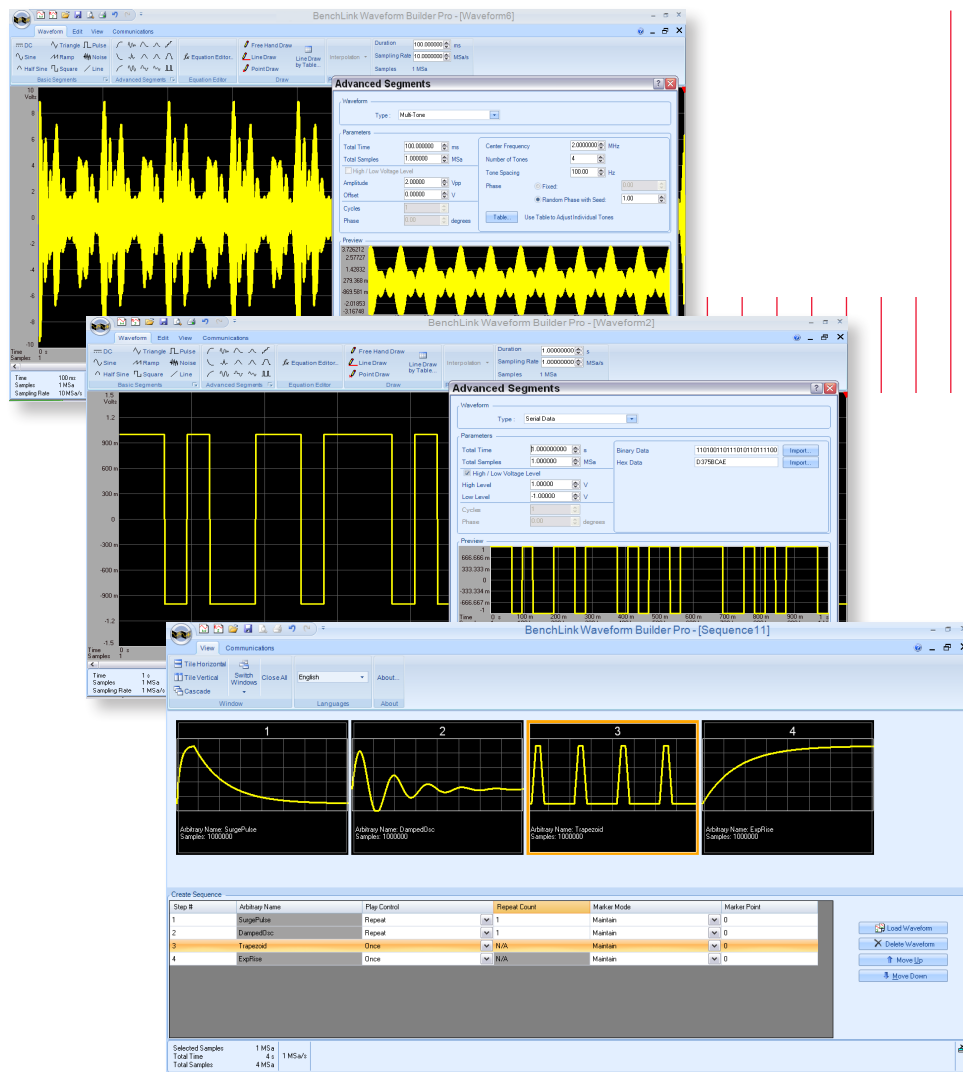


# Keysight 33503A

## BenchLink Waveform Builder Pro and Basic Software

For Keysight Function/Arbitrary/Pulse Waveform Generators  
and InfiniiVision Oscilloscopes

Data Sheet



## Create Custom Waveforms Faster

### Fast and easy analysis tools for more insight

- Standard waveform library provides quick access to common signals (DC, half-sine, noise, sine, square, triangle, ramp, pulse, exponential)
- Comprehensive library of built-in signals provides fast, easy access to complex signals
- Free-hand, point and line-draw modes to create custom shapes
- Equation editor enables creation of waveforms with exact polynomials
- Advanced math functions provide additional flexibility for more complex signals
- Sequencing editor to build and arrange composite waveforms for design optimization
- Filtering and windowing functions allow smooth transitions between waveforms
- Fast Fourier Transform (FFT) capability enables viewing of signal frequency characteristics
- Complimentary Cumulative Distribution Function (CCDF) curves enables viewing of signal power characteristics

## Fast, Efficient Custom Waveform Creation

The Keysight 33503A BenchLink Waveform Builder Pro is the first full-featured waveform creation software for waveform generators. The software enables engineers to take full advantage of Keysight signal generation capabilities and makes custom waveform creation fast and simple. It is ideal for R&D engineers characterizing new designs and test system engineers validating production units.

BenchLink Waveform Builder Pro is a Microsoft Windows-based program that provides easy-to-use creation tools, such as an equation editor, waveform math and drawing tools, which can be used to create custom signals. It features a standard function library, waveform sequencer; as well as filters and windowing functions that allow you to easily modify and further refine your waveform. A library of built-in signals supports fast creation of more complex waveforms such as multi-tone, serial data, trapezoid and Gaussian.

With BenchLink Waveform Builder Pro, you gain access to advanced signal creation and editing capabilities, without requiring hours of programming. The result is quicker, easier creation of custom waveforms, coupled with deeper analysis insight into your signals.

## Download Keysight's free 30-day trial version and create custom waveforms faster

The free 30-day demo version of the BenchLink Waveform Builder Pro Software is the fully functional Pro version. After the 30-day trial period the full version of the software will revert to the basic free version. If you choose to continue to utilize the full Pro version, you may purchase a license to retain the Pro version's full functionality and benefits.

For more information and to download your free copy today visit:  
[www.keysight.com/find/33503](http://www.keysight.com/find/33503)

## Key applications

- Electronic controls, baseband wire less communications
- Linear amplifiers, DC brushless motors, switching power supplies
- Medical devices, digital audio
- Clock signals, modulation source

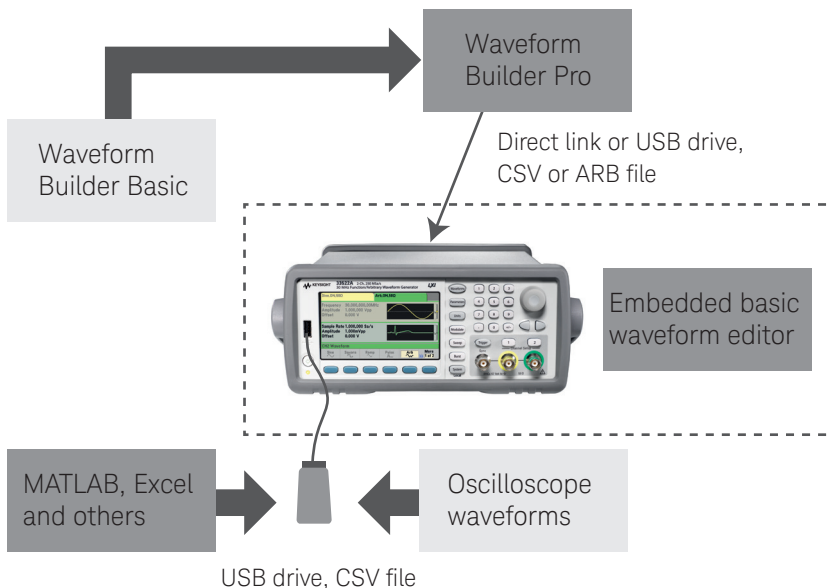


Figure 1. Multiple methods to create and import waveforms into the new 33500B and 33600A Series Trueform waveform generators.

## Exceptional Functionality

The BenchLink Waveform Builder Pro software features a range of functionality designed to make common and custom waveform creation a fast and simple process. This functionality is summarized in Table 1.

Table 1. 33503A BenchLink Waveform Builder Pro and Basic version functionality.

Category	Description
Waveform types	
Basic waveforms	DC
	Sine
	Triangle
	Square (with transition)
	Pulse (with transition)
	Ramp
	Noise
	Half-sine
	Line
Advance waveforms (Pro version only)	Exponential rise
	Exponential fall
	Noise
	Sinc
	Sweep
	Multi-tone
	Lorentz
	Stair step
	Haversine
	Gaussian
	Logarithmic
	Trapezoid
	Serial data
	Damped oscillation
	Distorted sine
	Surge pulse

**Single-channel waveform**

View	Segment markers
	X and Y cursors
	Pin cursors
Edit	Multi-level undo/redo for all basic waveform editing operations
	Paste options such as at beginning, end, cursor, or replacement selection
	Copy/paste options with excel sheet
	Copy/paste options with text file
	Insert options such as at beginning, end, cursor, or replacement selection
Math	Edit/add/remove waveform points via table
	Addition
	Subtraction
	Multiplication
	Math operation with waveform library
	Math operation with constants
	Math operation with clipboard
	Division by constant

**Dual-channel waveforms (Pro version only)**

View	Segment markers
	X and Y cursors
	Pin cursors
	Blinking cursor
Edit	Multi-level undo/redo for all basic waveform editing operations
	Paste options such as at beginning, end, cursor, or replacement selection
	Copy/paste options with Excel sheet
	Copy/paste options with text file
	Insert options such as at beginning, end, cursor, or replacement selection
	Edit/add/remove waveform points via table
Math	Synchronize and un-synchronize editing of dual-channel waveform
	Addition
	Subtraction
	Multiplication
	Math operation with waveform library
	Math operation with constants
	Math operation with clipboard

**Sequencing (Pro version only)**

	Drag/drop sequence thumbnails
	Sequence editing via grid
	Simple undo/redo support
	Samples information
	Time duration
	Scrolling
	Repeat
Waveform generators that support sequencing	Create and save sequence
	Send and play sequence

**Common math operations (Single and dual-channel)**

Math	Clip
	Absolute
	Invert
	Mirror
	Resize
	Shift/rotate -> horizontal
	Normalize waveform
	Trim
	Scale
	Re-sampling of waveform (sinc, linear, add points with zero amplitude)
Filters (Pro version only)	Low pass (F)
	High pass (F)
	Band pass (F,F)
	Low pass (second order) (F)
	Raised cosine
	Root-raised cosine
	Butterworth
	Chebyshev
	Bessel
	Elliptical
Windowing (Pro version only)	User FIR (16 coefficients)
	Hann
	Hamming
	Rectangular (uniform)
	Triangular
	Smooth (circular)
	Gaussian
	Blackman
	Flat top

**Equation editor**

	Build equations to create more advanced waveforms
Arithmetic operators	+, -, *, /, x^y, (, )
Function library	ABS, ARCTAN, COS, EXP, FACT, LN, NOISE (uniform), NOISE (normal), POINT, SIN, SQRT, STEP, TAN

**View operations**

View	View individual data points/connect dots
	Panoramic view
	Time scale
	Scrolling
	Flexibility in editing the application display properties
	View FFT of waveform
	View CCDF of waveform
	View constellation (X vs. Y) of waveform
Edit	Set total samples/total time duration/sampling rate
	Freehand draw
	Line draw
Zooming	Point draw (with interpolation as linear, smooth, staircase)
	Horizontal zoom
	Vertical zoom
	Area zoom
	Zoom out
	Zoom with mouse wheel

Waveform Creation Examples

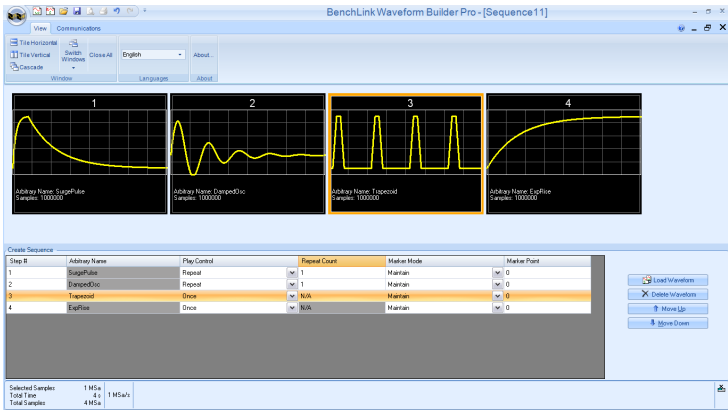


Figure 2.  
**Arbitrary Waveform Sequences:** Use the Waveform Sequence Tool to create longer custom waveforms by linking multiple waveforms together.

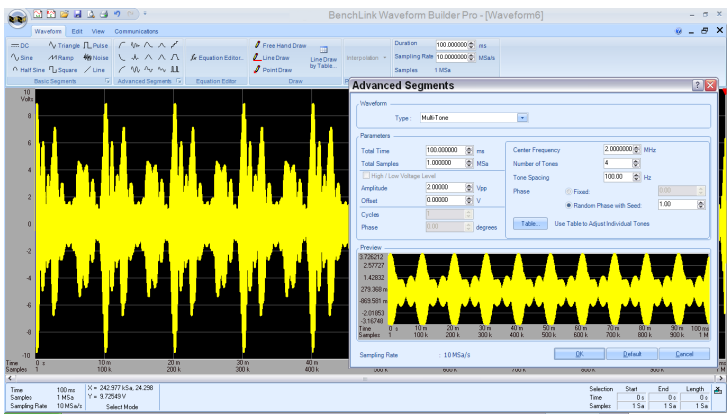


Figure 3.  
**Multi-tone Signals:** Use the Multi-tone Segment Tool to create a multi-tone signal, up to 64 tones, to analyze a communications device.

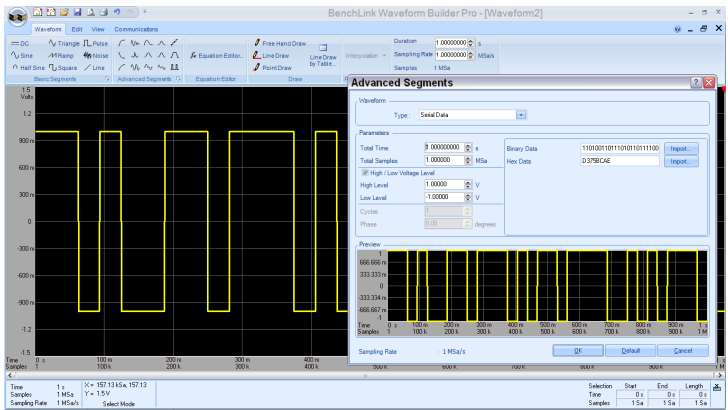


Figure 4.  
**Serial Data Stream:** Use the Serial Data Segment Tool to create a digital bit stream to simulate the data flow of a serial link in your device.

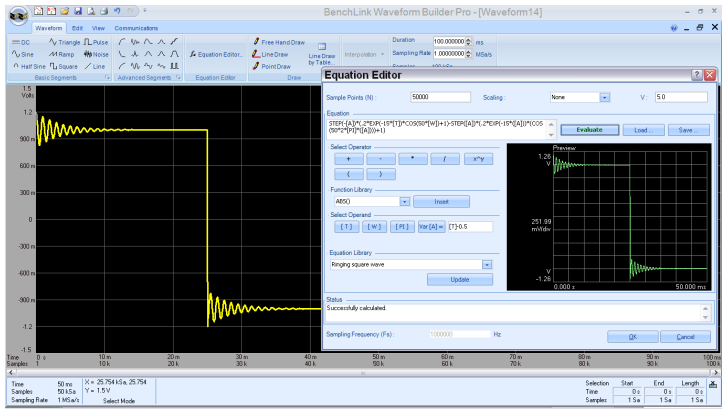


Figure 5.  
**Equation Editor:** Use the Equation Editor Tool to create more advanced waveforms by writing equations that simulate your specific applications.

## Comparing BenchLink Waveform Builder Basic and Waveform Builder Pro

Table 2. Functionality comparison between BenchLink Waveform Builder Pro versus Basic

Features	Waveform Builder Basic	Waveform Builder Pro
Basic waveform library	√	√
Cut, copy, paste with Excel	√	√
Waveform math	√	√
Free hand	√	√
Line draw	√	√
Advanced waveform library		√
Equation editor		√
Point draw		√
FFT, CCDF, and constellation diagram		√
Filters		√
Windowing functions		√
Dual-channel operation		√

### Supported waveform generators and oscilloscopes

The BenchLink Waveform Builder Pro software supports the following Keysight waveform generators:

- 33210A, 33220A, 33250A function/arbitrary waveform generators
- 33500 Series, 33600 Series waveform generators
- 81150A, 81160A, 81180A pulse/function/arbitrary noise generators
- M8190A arbitrary waveform generator
- 2000 X-Series
- DSO/MSO-X InfiniiVision 3000, 4000 X-Series oscilloscopes
- 3000 T-Series
- U2761A USB modular function generator

### Compatible software

Keysight’s BenchVue software can be used with Waveform Builder Pro software. Create signals using Waveform Builder Pro, then use BenchVue to control the waveform generator signal outputs, modulation, and other parameters. These two software tools are built to work together for a more complete solution for controlling your waveform generator <sup>1</sup>.

1. BenchVue has different supported instrument models than Waveform Builder Pro. Please see [www.keysight.com/find/BenchVueInstruments](http://www.keysight.com/find/BenchVueInstruments) for the latest list of BenchVue supported instruments.



## Comparing BenchLink Waveform Builder Basic and Waveform Builder Pro (Continued)

### Instrument connectivity

- Keysight I/O support
- National instruments I/O support

### Supported interfaces

- USB
- LAN
- GPIB

### File operations for signal and dual channel waveforms (both open and save files)

File format:

- IntuiLink (.wvf)
- CSV (.csv)
- Binary
- Text (.txt)
- 33500 Series ASCII (.arb)
- 33500 Series binary (.barb)
- 33500 Series sequence (.seq)
- 33600 Series ASCII (.arb)
- 33600 Series binary (.barb)
- 33600 Series sequence (.seq)
- 81100 Series sequence (.dseq)
- Dual-channel operation

## System and Ordering Information

### System and installation requirements

System	Installation requirements
Operating system	Windows 7 Pro, Windows Vista (64- and 32-bit)
Processor	Recommend Intel CORE™, Minimum Pentium 5
RAM	Recommend 3 GB or greater
Disk space	Recommend 300 MB, min 200 MB
Display	1024 x 768 resolution, 256 colors
PC administrator access	Must login PC with a user password or have administrative access (soft-ware does not run in "guest mode")
Keysight IO Libraries version 17.2 or later installed on your machine	The IO libraries are included with instrument on CD or can be downloaded from the ADN web site: <a href="http://www.keysight.com/find/adn">www.keysight.com/find/adn</a>
33521A, 33522A models	Firmware revision 1.12 or greater

### Ordering options and licensing information

Model number	Product name
33503A	BenchLink Waveform Builder Pro software

1. Order the software and download directly from the Keysight web site for immediate use.
2. Order CD containing the software from the Keysight web site and it will be shipped to you.

To order your copy or download a free 30-day trial version and start gaining insights into your measurements today, visit [www.keysight.com/find/33503](http://www.keysight.com/find/33503).

The free 30-day demo version of the BenchLink Waveform Builder Pro Software is the fully functional Pro version. After the 30-day trial period the full version of the software will revert to the basic free version. If you choose to continue to utilize the full Pro version, you may purchase a license and retain the Pro version's full functionality and benefits.

## Download your next insight

Keysight software is downloadable expertise. From first simulation through first customer shipment, we deliver the tools your team needs to accelerate from data to information to actionable insight.



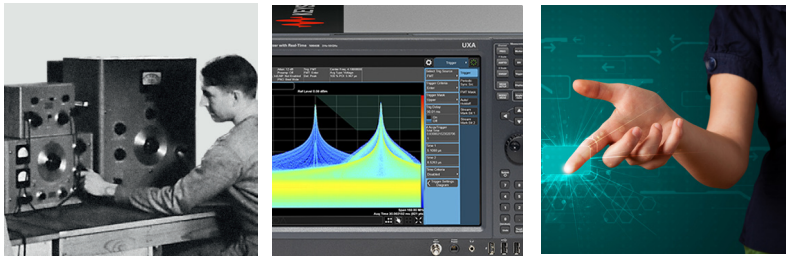
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