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DATA SHEET

33503B BenchLink Waveform Builder Pro Software

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

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 33503B BenchLink Waveform Builder Pro is a 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 7-day trial version and create custom waveforms faster

To order your copy or download a free 7-day trial version and start gaining insights into your measurements today, visit www.keysight.com/find/33503

If you choose to continue to utilize the software after the trial period, you may purchase a license and retain the full functionality and benefits.

Key applications

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

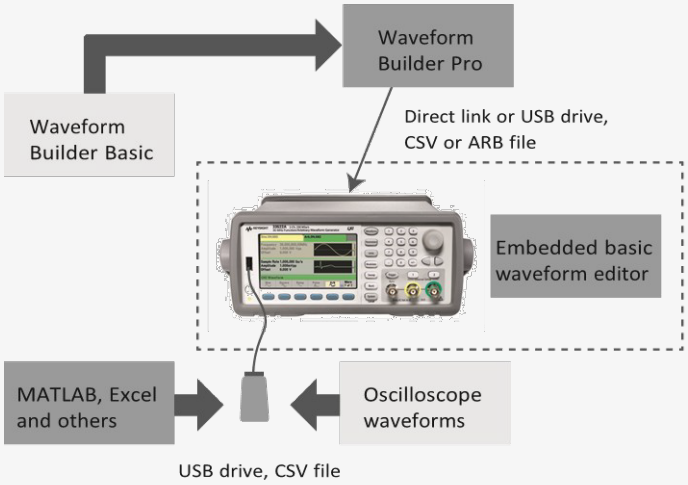

Figure 1. Multiple methods to create and import waveforms into the new 33500B and 33600A Series Trueform waveform generators.

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. 33503B BenchLink Waveform Builder Pro functionality.

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

Category	Description
	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
	Edit/add/remove waveform points via table
Math	Addition
	Subtraction
	Multiplication
	Math operation with waveform library
	Math operation with constants
	Math operation with clipboard
	Division by constant
Dual-channel waveforms	
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

Category	Description
	Edit/add/remove waveform points via table
	Synchronize and un-synchronize editing of dual-channel waveform
Math	Addition
	Subtraction
	Multiplication
	Math operation with waveform library
	Math operation with constants
	Math operation with clipboard
Sequencing	
	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)

Category	Description
Filters	Low pass (F)
	High pass (F)
	Band pass (F,F)
	Low pass (second order) (F)
	Raised cosine
	Root-raised cosine
	Butterworth
	Chebyshev
	Bessel
	Elliptical
	User FIR (16 coefficients)
Windowing	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

Category	Description
	Flexibility in editing the application display properties
	View FFT of waveform
	View constellation (X vs. Y) of waveform
Edit	Set total samples/total time duration/sampling rate
	Freehand draw
	Line draw
	Point draw (with interpolation as linear, smooth, staircase)
Zooming	Horizontal zoom
	Vertical zoom
	Area zoom
	Zoom out
	Zoom with mouse wheel

Waveform Creation Examples

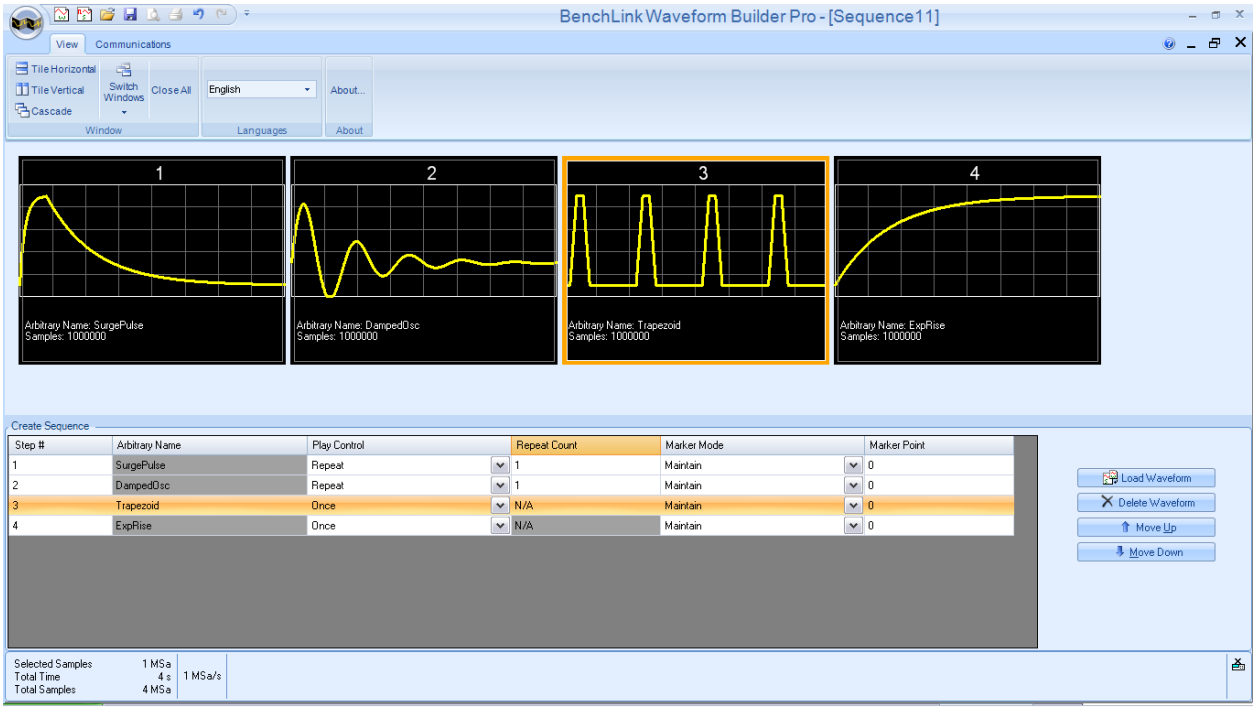

Figure 2. Arbitrary Waveform Sequences: Use the Waveform Sequence Tool to create longer custom waveforms by linking multiple waveforms together.

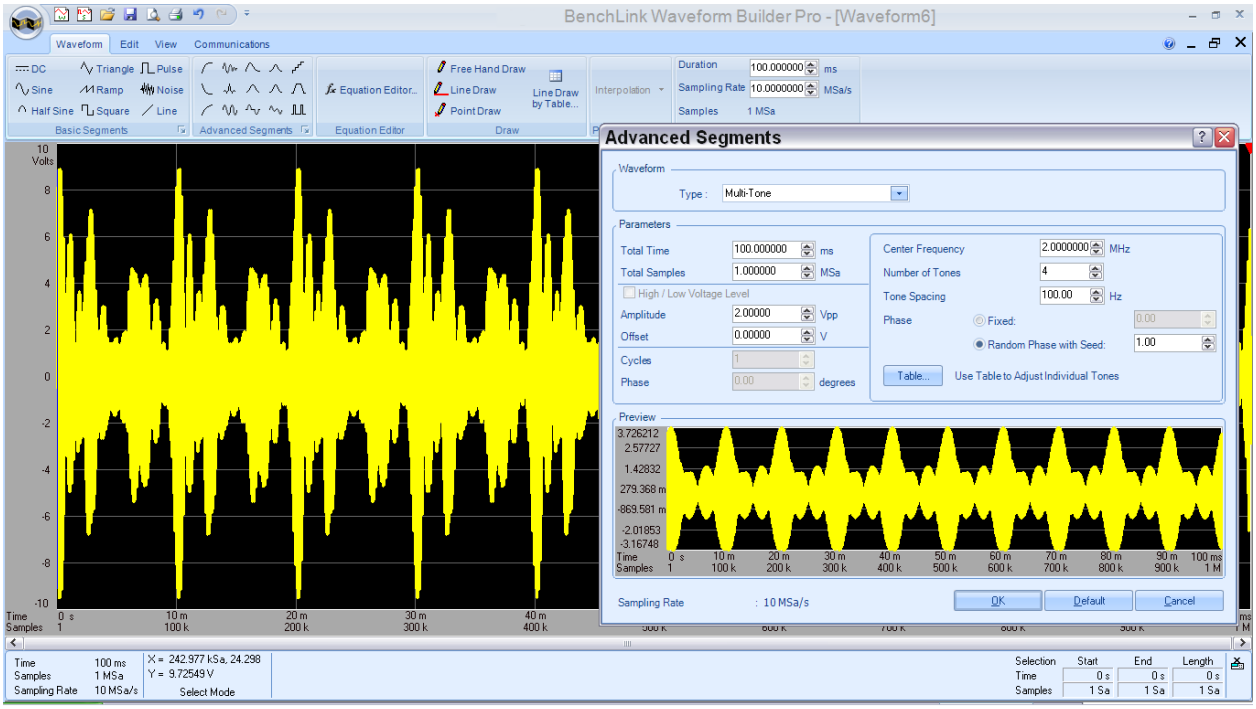

Figure 3. Multi-tone Signals: Use the Multi-tone Segment Tool to create a multi-tone signal, up to 64 tones, to analyze a communications device.

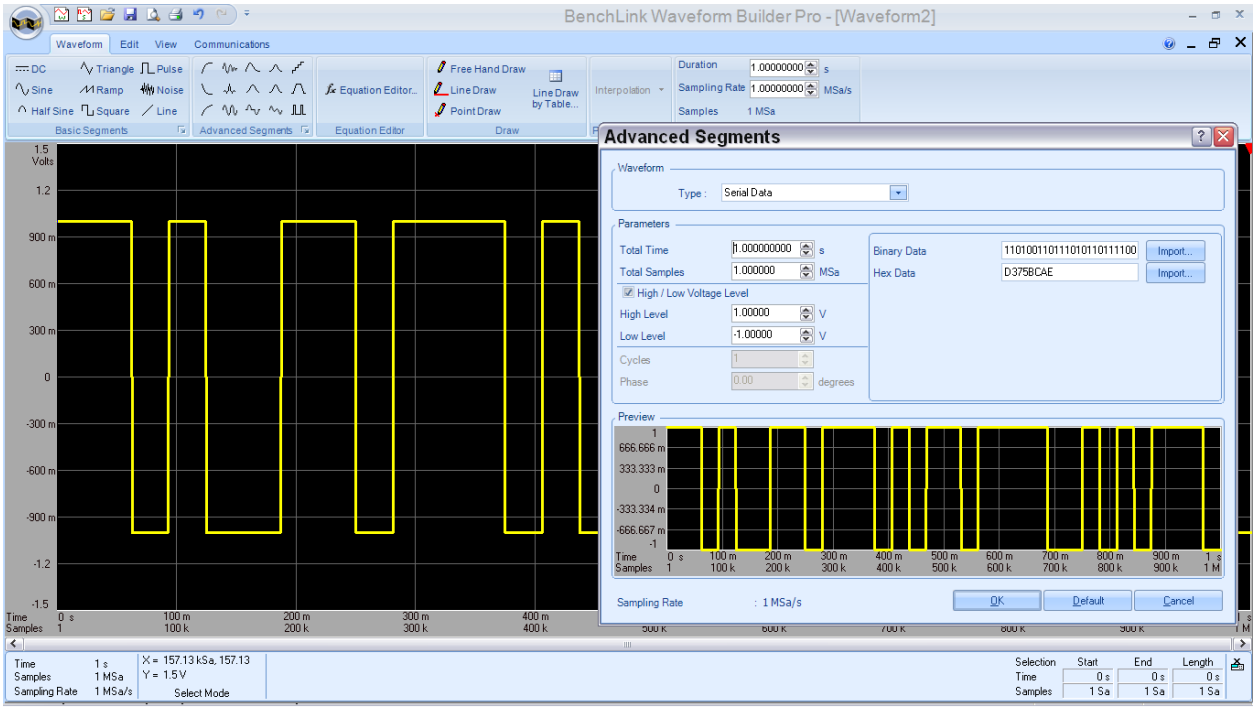

Figure 4. Serial Data Stream: Use the Serial Data Segment Tool to create a digital bit stream to simulate the data flow of a serial link in your device.

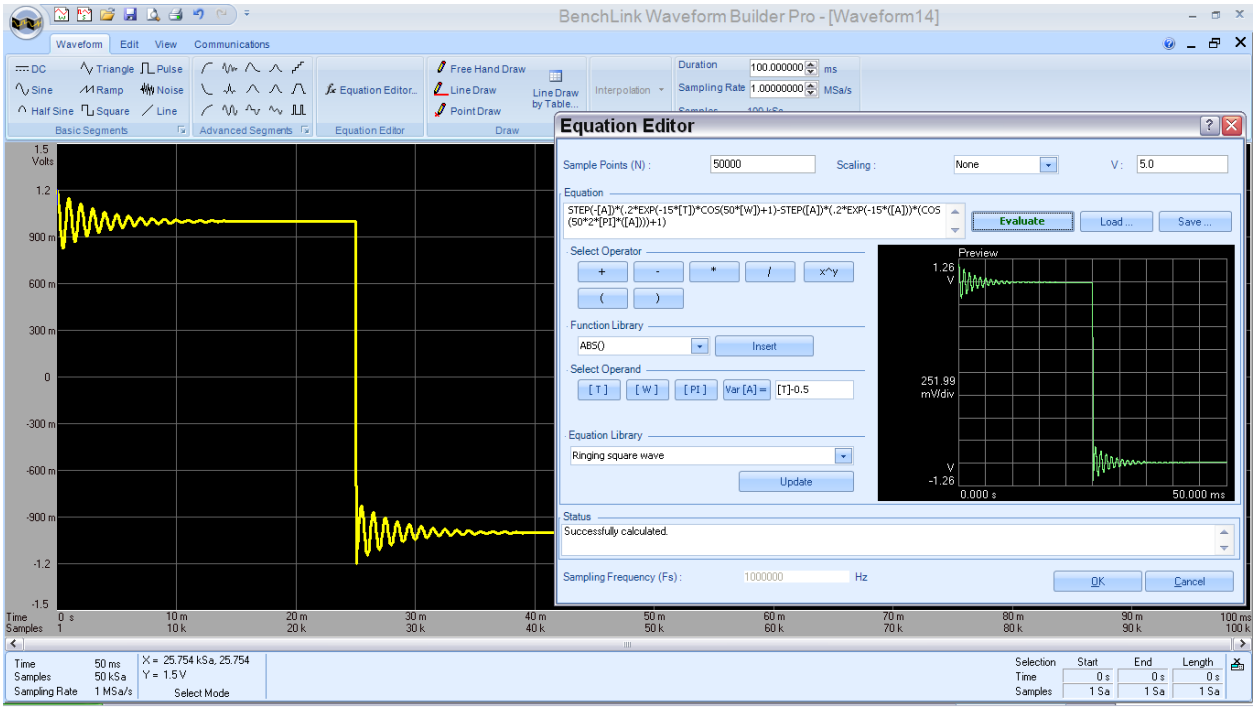

Figure 5. Equation Editor: Use the Equation Editor Tool to create more advanced waveforms by writing equations that simulate your specific applications.

Summary of BenchLink Waveform Builder Pro Functionality

Features	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[1].

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 sequece (.seq)
- 81100 Series sequence (.dseq)
- Dual-channel operation

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

System and Ordering Information

System and installation requirements

System	Installation requirements
Operating System	Windows 10, Windows 8 (32-bit and 64-bit)
Processor	Recommended Intel Core i5 (or equivalent)
RAM	Recommended 3GB or higher
Disk Space	Recommended 300 MB, min 200 MB
Display	1024 x 768 resolution
Keysight IO Libraries version 17.2 or later installed on your machine	The IO libraries can be downloaded from the ADN web site: www.keysight.com/find/adn
33521A, 33522A models	Firmware revision 1.12 or greater

Ordering options and licensing information

Model number	Product name
33503B	BenchLink Waveform Builder Pro Software License

Order the software and download directly from the Keysight web site for immediate use.
www.keysight.com/find/33503

You can now choose your license type (node-locked (fixed), transportable, floating (single site, single region, worldwide), or USB portable), license term (perpetual or subscription), and then choose the KeysightCare Software Support subscription period that best meets your needs. See more details below.

Step 1. Choose your software product.

Step 2. Choose your license: perpetual or subscription.

Step 3. Choose your license type: node-locked, transportable, USB portable, or floating.

Step 4. Depending on the license term, choose your subscription or support duration.

1 Product	3 License type	2 License term			
		Perpetual			Subscription
		License		Support	License & support
S1234567A	Node-locked (fixed)	R-x5y-001-A	+	R-x6y-001-z	R-x4y-001-z
	Transportable	R-x5y-004-D	+	R-x6y-004-z	R-x4y-004-z
	USB Portable[1]	R-x5y-005-E	+	R-x6y-005-z	R-x4y-005-z
	Floating (single site)	R-x5y-002-B	+	R-x6y-002-z	R-x4y-002-z
	Floating (single region)	R-x5y-006-F	+	R-x6y-006-z	R-x4y-006-z
	Floating (worldwide)	R-x5y-010-J	+	R-x6y-010-z	R-x4y-010-z

4

z =	Duration	z =	Duration
L	12 months (default)	F	6 months
X	24 months	L	12 months
Y	36 months	X	24 months
Z	60 months	Y	36 months

[1] USB portable license requires a certified USB dongle (available for additional purchase, Keysight part number E8900-D10)

License terms

License term	Description
Perpetual	Licenses can be used indefinitely.
Subscription	Licenses can be used through the term of the subscription (6, 12, 24 or 36 months).

License types

License type	Description
Node-locked	License can be used on one specified instrument/computer.
Transportable	License can be used on one instrument/computer at a time but may be transferred to another using Keysight Software Manager (internet connection required).
USB Portable	License can be used on one instrument/computer at a time but can be transferred to another using a certified USB dongle (available for additional purchase, Keysight part number E8900-D10).
Floating	Networked instruments/computers can access a license from a server one at a time. Multiple licenses may be purchased for concurrent usage. Three types of floating license are available: Single Site: 1-mile radius from the server; Single Region[1]: Americas; Europe; Asia; Worldwide (export restriction identified in End User License Agreement (EULA))

1. Americas (North, Central, and South America, Canada); Europe (European Continent, Middle Eastern Europe, Africa, India); Asia (North and South Asia Pacific Countries, China, Taiwan, Japan)

KeysightCare software support subscriptions

Subscription	Description
KeysightCare Software Support	Perpetual licenses are sold with a 12 (default), 24, 36, or 60-month software support subscription. Support subscriptions may be renewed for a fee after that.
	Software subscription licenses include software support through the term of the license.

Floating license server requirements

Network Floating licenses require loading a vendor daemon on a license server. This server may be the same PC running the software or a separate server. Full installation instructions (5951-5739) and support are provided for compatible server operating systems:

Keysight license server software (lmgrd.exe and agileesofd.exe) is supported on: Microsoft Windows 7 Enterprise SP1(32-bit and 64-bit) Microsoft Windows 10 Creators Update (32-bit and 64-bit), 64-bit Red Hat Linux v7.0

Keysight License Manager 6 is supported on: 64-bit Microsoft Windows 7 Enterprise SP1, Microsoft Windows 10 Creators Update 64-bit

The license server software is supported on 32-bit and 64-bit Windows and 64-bit Linux systems, but the Keysight License Manager 6 utility is supported on 64-bit Windows systems only. To setup licensing on 32-bit Windows and on Linux systems, use the processes described in the Manual License Setup section of https://literature.cdn.keysight.com/litweb/pdf/5951-5739.pdf

Änderungen und Irrtümer vorbehalten. dataTec 13-12-2021 | © Keysight Technologies: 3121-1481.EN | December 6, 2021

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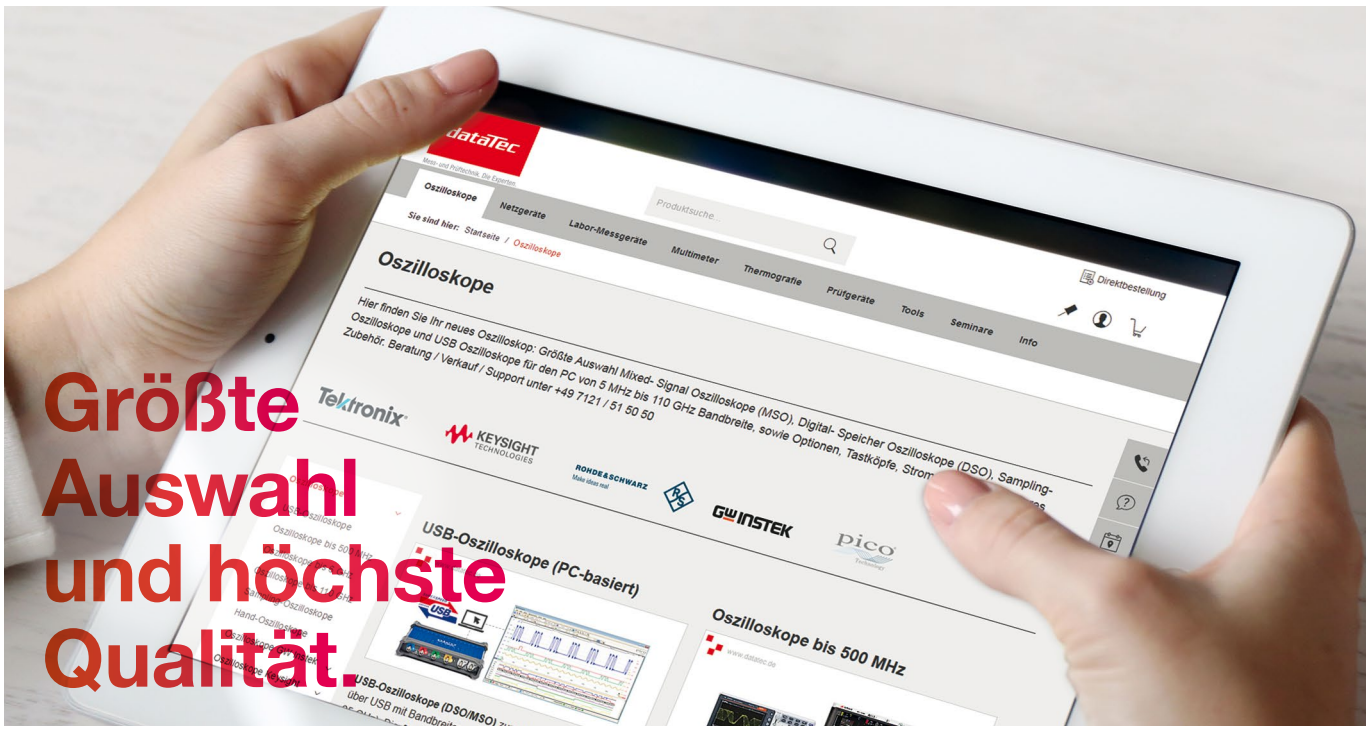

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