

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Keysight / Agilent 54810-66525* at our website: ***Click HERE***

Infiniium 54800 Series Oscilloscopes

Product Overview

- **500 MHz, 1 GHz, 1.5 GHz and 2.25 GHz bandwidth models**
- **Up to 8 GSa/s sample rates**
- **Superior probing solutions with bandwidths up to 4 GHz**
- **Instantly familiar, analog-like front panel with Windows Windows®-based GUI**
- **10/100Base-T LAN printer and file sharing**
- **Web-enabled, control and view from any web-browser**
- **E-mail on trigger**
- **Supports cordless trackball, mouse, keyboard or other PC pointing device**
- **Eye diagram measurements and optional communications mask testing**
- **VoiceControl option for hands free operation**
- **Integrate scope waveforms and markers onto the 16700 logic analyzer with the correlation fixture option**
- **USB test option with embedded MatLab**



Figure 1. The Agilent Infiniium 54846A Oscilloscope

Agilent Technologies' Infiniium 54800 Series oscilloscopes are designed to help you get your measurement job done faster. A simple, analog-like front panel, the graphical user interface of a PC, and powerful connectivity capabilities make high-performance features accessible and uncomplicated.

Simple Analog-Like Front Panel

Infiniium oscilloscopes give you the simple, uncluttered front panel of an analog scope for accessing basic functions. Dedicated scale and position knobs for each channel provide intuitive operation. Trigger LEDs show you trigger status at a glance. To speed up measurements, the QuickMeas+ key gives you instant access to any four measurements or and four preselected functions.

Familiar Graphical User Interface

Infiniium scopes employ a graphical user interface based on Microsoft® Windows®. The familiar Windows interface minimizes time spent learning and relearning the scope. Pull-down menus give you easy access to advanced features. Dialog boxes display all the choices you need to make for measurement setups. In addition, waveforms, markers, and measurements can be easily positioned on the display by using your mouse to drag and drop.

Easy Remote Access

Access your Infiniium scope remotely over the web or LAN. You can remotely display and control your Infiniium from any Java™ -enabled web browser, or set up your Infiniium to send an e-mail with a bit map of the display screen when the scope triggers on an intermittent event. You can even control your scope with GPIB commands over LAN.

Convenient Data Sharing

Infiniium scopes offer the tools you need to document and share your results. It takes just a few mouse clicks to save waveforms and screen bit maps to the 5 GByte hard drive, the 120 MByte SuperDisk floppy disk drive, or a drive on your network. LAN connectivity also lets you print your results to networked printers.

The Performance You Need

Infiniium scopes aren't just easier to use. These scopes provide the high-performance specifications and features you need for today's demanding jobs. With bandwidths up to 2.25 GHz, sample rates up to 8 GSa/s, and probes with up to 4 GHz bandwidths, Infiniium can view your fastest signals. Powerful triggering and analysis make it easy to capture and analyze your waveforms. Display and math features, such as color-grade persistence and histograms, let you easily view and isolate signal problems.

Try Infiniium Yourself

If you plan to purchase a new scope in the near future, we can arrange for you to try Infiniium in your lab. Call 1-800-452-4844 or view the web site at http://www.agilent.com/find/infiniium for more information.

Agilent Technologies

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Performance to Get the Job Done

Agilent Infiniium scopes combine ease-of-use, the right specifications, and a broad feature set to help you get your job done faster. Use the information here to find the scope that meets your signal measurement needs; and review the features on the following pages to see how Infiniium makes its advanced power so usable.

General-Purpose Versatility

The 500 MHz versions of Infiniium provide exceptional performance and capability for general-purpose lab measurements. Select a sample rate of 1 or 2 GSa/s, based on your requirements for single-shot measurement accuracy, and let your application needs and budget determine your choice of a two- or four-channel model. Whichever Infiniium you select, you can be sure of getting a powerful scope.

High Performance

For applications requiring more than 500 MHz bandwidth, the 54835A offers four channels at 1 GHz, with sample rates up to 4 GSa/s.

The Infiniium 54845A and 54846A provide the performance you need for your most demanding applications. The 54845A offers 1.5 GHz bandwidth, while the new 54846A offers 2.25 GHz bandwidth. Both provide sample rates up to 8 GSa/s to ensure fast, accurate capture of your signals. In addition, both the 54845A and 54846A offer a standard cycle-to-cycle jitter measurement so that you can characterize your system jitter.

General-Purpose Infiniium Oscilloscopes

Agilent Model	Channels	Bandwidth	Sample Rate	Memory Depth
54810A	2	500 MHz	1 GSa/s	32K
54815A	4	500 MHz	1 GSa/s	32K
54820A	2	500 MHz	2 GSa/s	32K
54825A	4	500 MHz	2 GSa/s	32K

High-Performance Infiniium Oscilloscopes

Agilent Model	Channels	Bandwidth	Sample Rate	Memory Depth
54835A	4	1 GHz	4 GSa/s (2 channel mode)	64K (2 channel mode)
			2 GSa/s (4 channel mode)	32K (4 channel mode)
54845A	4	1.5 GHz	8 GSa/s (2 channel mode)	64K (2 channel mode)
			4 GSa/s (4 channel mode)	32K (4 channel mode)
54846A	4	2.25 GHz	8 GSa/s (2 channel mode)	64K (2 channel mode)
			4 GSa/s (4 channel mode)	32K (4 channel mode

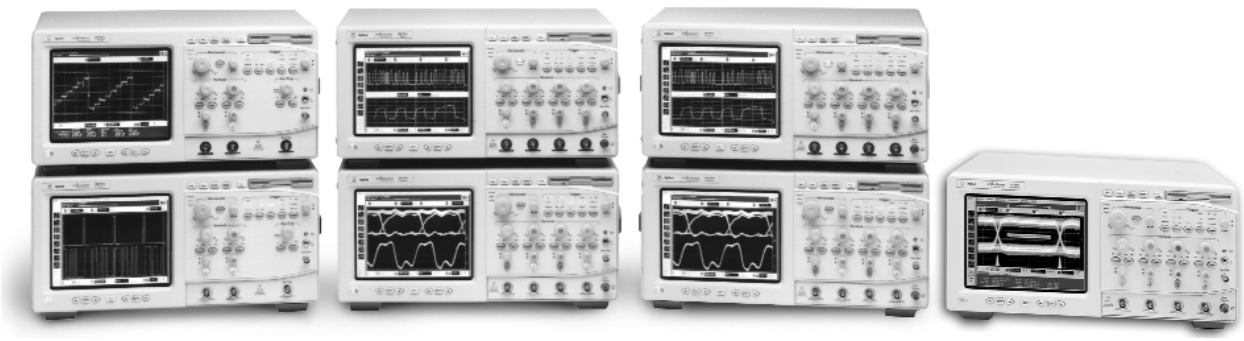


Figure 2. The Agilent Infiniium 54800 Series Oscilloscopes.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Features to Get the Job Done Faster

Remote Access	
IntuiLink	Easily transfer bitmap images and waveform data to your PC. Intuilink lets you focus more time on design issues rather than on programming. With the click of a button on Intuilink's toolbar, you can insert a snapshot of an Infiniium screen directly into your Microsoft Excel spreadsheets or Word documents, or save the image as a bitmap file. Once the data is in an Excel spreadsheet, you can leverage Excel's extensive analysis functions to create custom graphs and views. For more information, please reference the Intuilink datasheet (5980-3115) or visit the URL www.agilent.com/find/intuilink
Web-enabled connectivity	Use your favorite web browser to control and view the Infiniium from your computer. Recommended browsers include any Java script-enabled browser, Internet Explorer 5 or higher, or Netscape™ 4.7 or higher.
E-mail on trigger	The new e-mail on trigger feature allows you to receive an e-mail message from Infiniium when a trigger event occurs. The e-mail message will give you the time and date when the trigger occurred, the product and serial number of the Infiniium, and a bit map file of the oscilloscope screen.
GPIB over LAN	Send GPIB commands to and access data from any Infiniium over the LAN.
Usability	
VoiceControl option	The VoiceControl option allows you to speak natural English language commands through the supplied collar-mounted microphone, allowing hands-free operation of the front panel. VoiceControl is speaker- and gender-independent and does not require the scope to be "trained" to recognize a particular user.
Built-in information system	Infiniium's built-in information system puts measurement assistance at your fingertips in seven different languages English, French, German, Japanese, Korean, Chinese, and Simplified Chinese). Setup guides give you step-by-step instructions for 24 different measurements and procedures. In addition, you'll find a thorough index of help topics and context-sensitive help available from the dialog boxes.
Color-grade persistence	The color-grade persistence display mode provides a visual representation of waveform behavior over time, making it easy to locate and identify signal anomalies. And you don't lose debugging power -- all scope capabilities are available in this mode.
Display annotation	Add labels to the display to identify waveforms, annotate setups, or provide operator instructions. Infiniium's keyboard makes this an easy task.
Drag and drop measurements	Just drag and drop an icon from the measurement toolbar onto the portion of the waveform you want to measure and the measurement appears instantly on screen.
Easy zooming	Infiniium's graphical user interface gives you a new, easier way to zoom. Use the mouse to draw a box around the section of the waveform that you want to expand, then click inside the box to zoom in on the area of interest. You can also undo the zoom (up to 10 levels of undo available).
Advanced Measurements	
Advanced triggering	Infiniium scopes include powerful violation triggering technology, making it easier for you to capture and view your toughest signals. In addition to standard capabilities, such as edge, glitch, logic, state, and video trigger, violation triggering adds the ability to trigger on rise time, fall time, and setup and hold time. .
Communication mask test kit option	Easily test your product's conformance to ANSI T1.102, IEEE 802.3, and ITU-T G.703 standards with the new communication mask test kit option. This option simplifies the measurement task with a library of industry-standard waveform masks, push button alignment of the appropriate mask to your signal, and clear indications of failure points on the waveform. A set of "smart" termination adapters works with the probe interface to ensure error-free measurements.
USB Test Option	Make USB signal integrity pre-compliance testing as simple as capturing the signals with your oscilloscope. Embedded run-time MatLab works with USB scripts eliminating the need to transfer data to a PC for post-processing.
AutoMask and mask test capability	The standard AutoMask feature allows you to define a tolerance limit and automatically create a test envelope based on the waveform on screen. Mask testing then provides a pass/fail comparison of your incoming signal to the test envelope.
Waveform math with FFTs and histograms	Infiniium scopes provide a wide variety of math functions, including Fast Fourier Transforms (FFTs) and histograms. FFTs allow quick identification of frequency components within your signals, while histograms provide a quantifiable way to analyze signal variations over time. Both help you better understand noise, jitter, and other sources of problems within your design.
Eye diagram measurements	Eye diagram measurements simplify general testing of communications designs and systems.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Features to Get the Job Done Faster

Interfaces	
Standard interfaces	10/100 Mbps LAN, RS-232, and Centronics interfaces are standard features. Now Infiniium is fully GPIB programmable over LAN. LAN also allows you to transfer files or use network printers.
Internal hard and floppy disk drives	Saving your results is simple with Infiniium's data storage capabilities. You can use the internal 5 GByte hard drive or the 120 MByte LS-120 SuperDisk floppy drive to store waveform data, screen images, or scope setups. It's easy to share your information with others as well. Waveform data can be stored in ASCII or Microsoft Excel® formats, while images can be stored as BMP, PCX, TIF, GIF, EPS, or PS formats. These formats allow easy import into other programs for documentation or further analysis.
Printer support	Infiniium oscilloscopes offer full support of HP DeskJet and LaserJet printers.
Probes and Accessories	
Active probes up to 4 GHz	Use the 1156A, 1157A, 1158A active probes for the most non-intrusive, faithful reproduction of your signals. Agilent's breakthrough probing technology ensures minimal loading on your circuit and a flat response across the entire bandwidth of the probe.
High-bandwidth differential probes	Choose either the 1159A 1 GHz or 1154A 500 MHz differential probes to quickly and easily connect to your differential signals. These high-bandwidth probes are essential for viewing the high-speed, low-level differential signals prevalent in today's designs. Both probes have 1:1 gain and additional attenuators for larger signals. The 1154A also features 10X gain for mV measurements.
Simple surface-mount probing	The Agilent Wedge probe adapter provides accurate, mechanically non-invasive contact to 0.5 mm TQFP/PQFP package leads. Infiniium's probes include an adapter that connects to the Wedge to simplify surface-mount probing.
Infiniium accessories	A complete line of accessories is available for Agilent Infiniium oscilloscopes, including alternative pointing devices, special probing solutions, and more. For complete information, visit our website at http://www.agilent.com/find/infiniium or see the *Agilent Infiniium Probes and Accessories* datasheet (5968-7141).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Options for Infiniium Oscilloscopes

VoiceControl

If you're making multi-channel measurements on target systems with densely packed ICs, your hands are tied up holding probes, making it difficult to turn knobs and press buttons on the front panel of your oscilloscope.

Infiniium's VoiceControl option solves this problem. Just speak into the collar-mounted microphone to operate your Infiniium's front-panel controls without using your hands. Simply tell the scope what you want it to do, using natural English language commands, such as "move channel two up" or "set channel one to 1.25 volts per division." Unlike most dictation programs, Infiniium's VoiceControl option is speaker- and gender-independent and does not require the oscilloscope to be trained to understand a particular user.

See "Ordering Information" for the minimum system configuration required for use of the VoiceControl option.

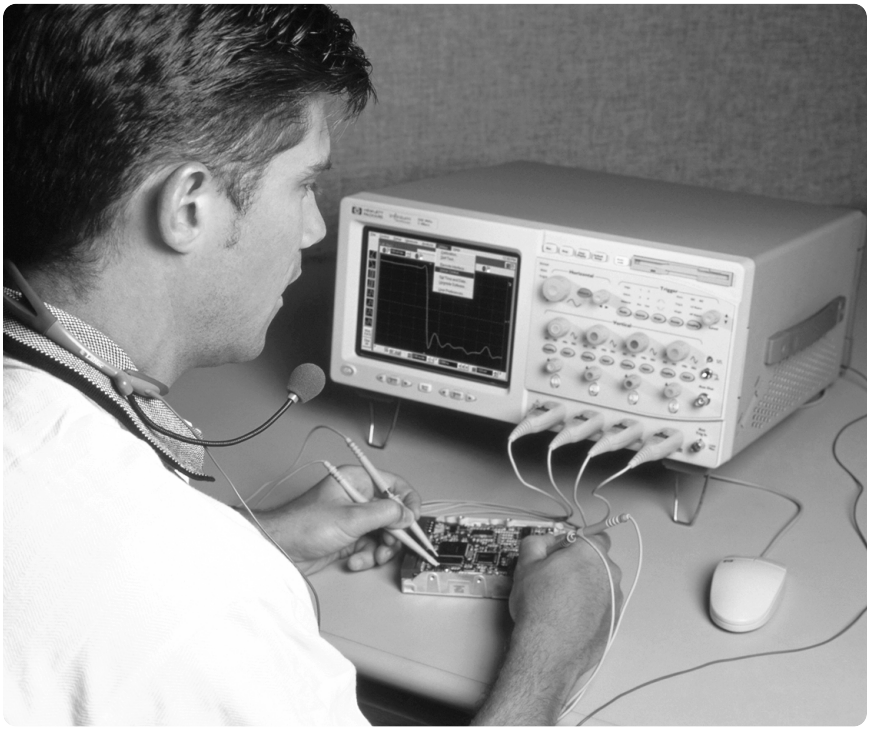


Figure 3. Use Infiniium's VoiceControl feature to control the scope, hands-free.

Control these Oscilloscope Features :

- Run, stop, print, autoscale, default setup, clear screen
- Vertical controls: volts/division, offset, coupling, input impedance, channel on/off
- Horizontal controls: time/division, delay, delayed sweep
- Trigger controls: mode, source, slope, sweep, coupling, trigger level
- Storage controls: save waveforms and screen images
- Waveform measurements
- "Undo" and "again" commands to retract or repeat last command
- Help for VoiceControl

Jump Start with an On-Screen Tutorial

Use the on-screen tutorial to quickly familiarize yourself with VoiceControl operation. The tutorial prompts you to speak commands and then it executes those commands, giving you immediate experience in using VoiceControl to operate your oscilloscope.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Options for Infiniium Oscilloscopes
Communication Mask Test Kit

Take the Frustration Out of Communications Testing

Now there's an easier way to prove your designs conform to industry standards with the communication mask test kit option. Infiniium's familiar Windows interface makes it easy for you to access the masks you need and configure your tests. Plus you'll find a variety of special features that save you time and trouble. The communication mask test kit comes with a set of electrical communication adapters to ensure convenient, reliable, and accurate connections to your device under test.

Simplify Testing with these Features:

- Over 20 industry standard ANSI T1.102, ITU-T G.703, and IEEE 802.3 communication signal mask templates
- FCC Part 68 Option A, B and C masks for "line build-out" testing of DS1/T1 signals
- Ability to load custom masks from ASCII text files
- Mask testing for positive and negative pulses
- GPIB programmability of mask test features for automated test applications
- Electrical communication adapters optimized for use with Agilent Infiniium oscilloscopes
- Automatic "isolated ones" triggering for all pulse mask templates
- One-button alignment for best fit of mask templates to test waveforms, virtually eliminating manual oscilloscope adjustments
- Automatic pass/fail comparison of mask templates to corresponding input waveforms
- Failure highlighting for fast identification of mask failure areas
- Flagging of out-of-specification waveform amplitudes for ANSI T1.102 masks
- Mask failure waveform characterization with features such as color-grade persistence, histograms, drag and drop measurements, and eye diagram measurements
- Screen annotation for complete documentation of measurements to electronic files or printers



Figure 4. A protective, hard-shell case stores all the software and accessories for the communication mask test kit.

Quickly Install and Configure

The communication mask template library comes on a single 3.5 inch floppy disk for easy installation onto Infiniium's hard disk drive. Using the communication mask test kit requires Infiniium system software A.03.00 or higher. Configuring a mask test is fast and easy, too. The mask test dialog box lets you select the oscilloscope channel and display masks contained in the mask template library. Once your test is configured, you can close the dialog box to maximize waveform viewing area and control your test directly using popup menus. You'll see an on-screen indication of the current mask and its data rate.

Communication Mask Template Library

Standard	Mask Template	Data Rate (Mb/s)
ANSI T1.102	DS1	1.544
	FCC Part 68.308 Options A,B,C	1.544
	DS1A	2.048
	DS1C	3.152
	DS2	6.312
	DS3	44.736
	STS1	51.840
	DS4NA	139.264
	STS3	155.520

Communication Mask Template Library

Standard	Mask Template	Data Rate (Mb/s)
ITU-T G.703	DS1	1.544
	E1	2.048
	DS2	6.312
	E2	8.448
	E3	34.368
	DS3	44.736
	E4	139.264
	STM1E	155.520
IEEE 802.3	10BASE-T	10
	100BASE-T	100

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Options for Infiniium Oscilloscopes
Communication Mask Test Kit (continued)

Automate Alignment of Mask to Test Signal
Once you've chosen the appropriate mask, simply click on the "Align" button to automatically perform a fast, exhaustive search for the optimum fit of the mask to the test signal. This feature virtually eliminates the need for manual adjustments to your oscilloscope and is especially valuable for production test applications.

Check Standards Compliance with "Compare" Tests
You can perform a "compare" test on positive or negative pulses to check the waveform's compliance with the mask standard. You can run the test until a single failure has occurred, a given number of waveforms have been captured, or a specific period of time has elapsed.

Automate "Isolated Ones" Triggering
It is necessary to isolate a pulse for mask testing to eliminate inter-symbol interference caused by adjacent pulses. Agilent simplifies this task through the use of "isolated ones" triggering for pulse mask templates, eliminating the need for sophisticated pattern generators. When you load in a pulse mask, Infiniium automatically sets up the trigger to capture an "isolated one" pattern as defined by a particular ANSI or ITU standard.

Connect to Your Device Under Test
Product compliance testing requires proper connection to your communications device. Included in the kit is a set of electrical termination adapters and adapter cables to ensure convenient, reliable, and accurate connections to your device under test.

Agilent E2621A 100/110/120-Ohm Termination Adapter
The Agilent E2621A ac-coupled, balanced adapter allows connection to differential communications signals by terminating the signal into 100, 110, or 120 ohms. It also adapts various connector styles (for example, bantam, RJ-48C and Siemens) to the oscilloscope's 50-ohm BNC input. You can select the termination impedance using the built-in, three-way switch. The AutoProbe interface allows the Infiniium oscilloscope to recognize the E2621A and read the termination switch setting. Furthermore, Infiniium will flag you when the switch setting differs from the standard's required termination impedance.

Characteristics
The E2621A complies with the following ANSI T1.102 and ITU-T G.703 Standards:

DS1	(1.544 Mb/s)
DS1A	(2.048 Mb/s)
DS1C	(3.152 Mb/s)
DS2	(6.312 Mb/s)
E1	(2.048 Mb/s)

Bandwidth (-3 dB):	<10 kHz to >100 MHz
Rise Time: <3.5 ns	
Attenuation:	5X (-14 dB) ± 3% (50 kHz to 30 MHz)

Agilent E2622A 75-Ohm Termination Adapter
The E2622A dc-coupled, unbalanced adapter allows you to connect communications signals such as DS3 and E3 to the oscilloscope's 50-ohm BNC input. The AutoProbe interface allows Infiniium to recognize the E2622A and automatically configure itself.

Characteristics
The E2622A complies with the following ANSI T1.102 and ITU-T G.703 Standards:

DS3	(44.736 Mb/s)
DS4NA	(139.264 Mb/s)
STS1	(51.840 Mb/s)
STS3	(155.520 Mb/s)
STM1E	(155.520 Mb/s)
E1	(2.048 Mb/s)
E2	(8.448 Mb/s)
E3	(34.368 Mb/s)
E4	(139.264 Mb/s)

Bandwidth (-3 dB):	>1 GHz*
Rise Time:	<350 ps
Attenuation:	5X (-14 dB) ± 1.5%

* Full bandwidth only achievable with Agilent Technologies 54835A 1 GHz and 54845A 1.5 GHz oscilloscopes.



Figure 5. The Agilent E2621A ac-coupled, balanced adapter allows connection to differential communications signals by terminating the signal into 100, 110, or 120 ohms.



Figure 6. The Agilent E2622A dc-coupled, unbalanced adapter allows you to connect communications signals such as DS3 and E3 to the oscilloscope's 50-ohm BNC input.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Options for Infiniium Oscilloscopes
Software and Hardware Upgrades

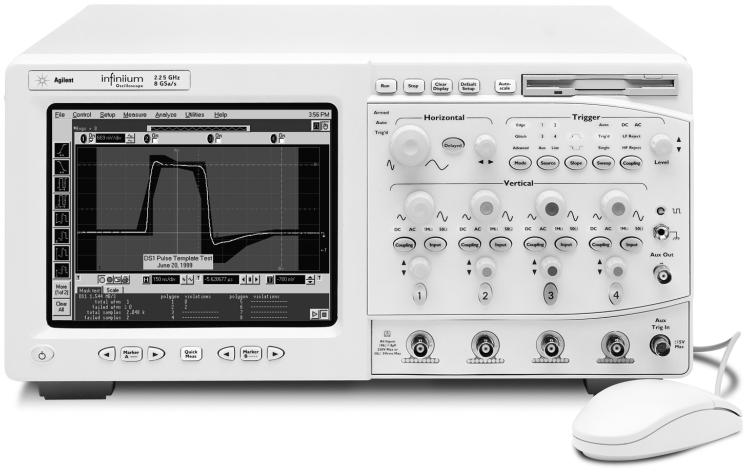


Figure 7. Increase your performance with an Infiniium upgrade.

Increase System Performance
We want to make sure your Infiniium continues to help you get your measurement job done faster. Agilent offers a variety of ways for you to update your existing Infiniium's software and hardware for increased performance.

Experience the Performance Difference:
- Increased waveform update rate on the scope screen
- Increased measurement speeds
- Increased GPIB throughput
- Easier file sharing and product updating
- Many new measurement features

Let Agilent Upgrade your Existing Hardware and Software
For a nominal charge, Agilent will upgrade the hardware and software in your Infiniium oscilloscope. The type of upgrade you need is determined by the serial number of your scope. (See “Ordering Information to determine if you should order the E2633-68701 or the E2633-68703”). Some upgrade items include:

- Updating the scope processor and installing additional RAM and a LAN card
- Installing a new LS-120 SuperDisk 120 MByte floppy drive (reads and writes to 3.5 inch floppies)
- Installing an updated version of the Infiniium scope application software
- Performing other product adjustments and changes as needed.

Do it Yourself with User Software Updating
You can update your Infiniium’s application software yourself at no cost. You have a choice of requesting an update kit from Agilent or downloading the files over the Internet. Either way, the updating process is quick and easy once you've received the proper files.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Options for Infiniium Oscilloscopes
USB (Universal Serial Bus) Test Option

USB 2.0 Pre-Compliance Testing Made Easy
The Agilent E2645A USB test option makes USB signal integrity pre-compliance testing as simple as capturing the signals with your oscilloscope. Infiniium has significantly reduced the work associated with USB pre-compliance testing by eliminating the need to transfer scope signals to a PC. The Infiniium USB test option features run-time MatLab embedded in the scope for use with the USB signal integrity scripts – a one-box solution.

Now USB signal integrity testing is as fast and easy as making an automatic measurement.

Simplify Testing with these Features:
- Embedded run-time MatLab works with USB scripts eliminating the need to transfer data to a PC for post-processing.
- Stored setups make scope configuration easy.
- Markers quickly bracket the packet of data for evaluation.
- Automatically generated pass/fail report is easy to share.
- In-the-scope solution reduces cost, speeds testing, improves efficiency and reliability.

Approved by the USB – IF Compliance Program
The USB-IF compliance program recognizes Infiniium as a recommended scope for use in pre-compliance testing. In addition, all MatLab scripts used with the USB test option come from the USB-IF organization.

For more information regarding the USB-IF compliance program and testing procedures, go to http://www.usb.org/developers/complian.html

Quickly Install
The E2645A USB test option comes on a single LS-120 floppy disk for easy installation onto Infiniium's hard disk drive. Using the USB test option requires Infiniium system software A.04.20 or higher.



Figure 8. The USB option eliminates the need to transfer data to a PC for post-processing.

Standard	Agilent Equipment	Additional Equipment
Low/Full Speed	• Infiniium oscilloscope: 54815A, 54825A, 54835A, 54845A, or 54846A • USB test option B30 (for new Infiniium models) or E2645A (on existing units) • Passive probes: order Option 004 with 54846A only (four 1161A probes). Other models come standard with four probes. • 1147A current probe	• Signal Quality InRush Drop/Droop (SQiDD) board or breakout board provided by customer. • USB-IF MatLab scripts located at: http://www.usb.org
High Speed	• Infiniium oscilloscope: 54846A only • USB test option B30 (for new Infiniium models) or E2645A (on existing units) • Passive probe option 004 (four 1161A probes). • 1147A current probe	• High-speed breakout board provided by the customer. • USB-IF MatLab scripts located at: http://www.usb.org • Tektronix P6248 differential probe with 1103 probe power supply provided by your local instrumentation distributor

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Options for Infiniium Oscilloscopes
USB Test Option (continued)

Testing as Simple as 1,2,3
Configuring your Infiniium scope for USB testing is fast and easy. Simply capture your low, full or high-speed data, run the test, and view the results.

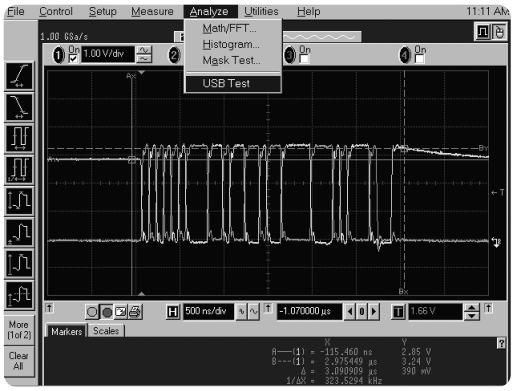


Figure 9. Capture the signal

Automatic USB Test
Click on USB Test in the Analyze menu. Choose the signal integrity, in-rush current or drop/droop test of interest. Then start the test – the data packet is automatically stored and the USB MatLab scripts are executed in Infiniium.

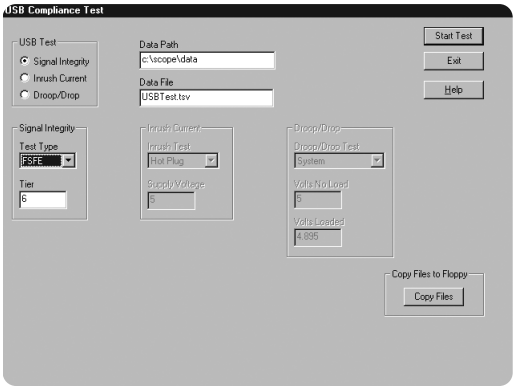


Figure 10. Run the test

Pass/Fail Reports at the Click of the Mouse
Now it is easier than ever to share the results of your test. The final pass/fail test results are displayed on the scope screen, ready to be printed, stored to disk or shared over the LAN or web – all in Infiniium, all at the click of a mouse.

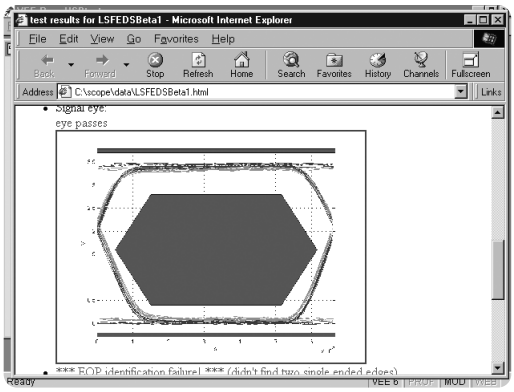


Figure 11. Review the results

The Infiniium USB test option should be used for your internal signal integrity pre-compliance testing. Official USB compliance testing, including electrical and Gold Suite tests for certification, leads to inclusion on the USB-IF integrator's list, and is done only at sanctioned USB-IF test labs or USB-IF compliance workshops. Please review all requirements at the USB-IF web site http://www.usb.org.

USB Test	Test Type	Report Output	
Signal integrity	FSFE	Overall result	Signal eye
	LSFE	EOP width measurement	Signaling rate measurement
	LSNE	Crossover voltage measurement	Jitter measurement
	HSFE	Signal data diagram	Eye diagram
	HSNE		
Inrush Current	Hot Plug	Overall result	
	HP Config	Inrush current measurement	
	HP Resume	Inrush current graph	
	LP Config		
	LP Resume		
Drop/Droop	System	Overall Result	
	Self Powered Hub	Voltage no load measurement	Voltage loaded measurement
	Bus Powered Hub	Drop measurement	Droop measurement

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Performance Characteristics

Agilent Technologies 54810A, 54815A, 54820A and 54825A General-Purpose Oscilloscopes

Acquisition	
Maximum Sample Rate	
Real Time	54810A/15A: 1 GSa/s on each channel 54820A/25A: 2 GSa/s on each channel
Maximum Effective Sample Rate	
Equivalent Time	100 GSa/s
Memory Depth	32,768 points/channel
Memory Depth Modes	
Auto	Optimized for best combination of update rate and display quality
Manual	Selectable from 16 to 32,768 points
Sampling Modes	
Real Time	Successive single shot acquisitions
Equivalent Time	Random repetitive sampling (higher time resolution at faster sweep speeds)
Peak Detect	Captures and displays narrow pulses or glitches 1 ns or wider at sample rates of 250 MSa/s or less
Filters	
9-bit Bandwidth (BW) Limit Filter	BW = Sample Rate/20
Sin(x)/x Interpolation	BW= Sample Rate/4. On/Off selectable Finite Impulse Response (FIR) digital filter. Digital signal processing adds points between acquired data points to enhance measurement accuracy and waveform display quality.
Averaging	Selectable from 2 to 4096
Vertical	
Number of Channels	54810A/20A: 2 (simultaneous acquisition) 54815A/25A: 4 (simultaneous acquisition)
Analog Bandwidth (-3dB)*	500 MHz
System Bandwidth with	
1160A 10:1 passive probe	500 MHz
1161A 10:1 passive probe	N/A
1162A 1:1 passive probe	25 MHz
1163A 10:1, 500 Ω passive probe	500 MHz
1152A 2.5 GHz, 0.6 pF active probe	500 MHz
1153A 200 MHz differential probe	200 MHz
1154A 500 MHz differential probe	350 MHz
1159A 1 GHz differential probe	445 MHz
Real Time Bandwidth*	54810A/15A: 250 MHz 54820A/25A: 500 MHz
Rise Time[1]	54810A/15A: 700 ps (Equivalent Time) 1.4 ns (Real Time) 54820A/25A: 700 ps

Notes

[1] Rise time figures are calculated from $t_r = 0.35/\text{bandwidth}$.

* Denotes Warranted Specifications, all others are typical. Specifications are valid after a 30-minute warm-up period and ±10°C from firmware calibration temperature.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Agilent Technologies 54810A, 54815A, 54820A and 54825A
General-Purpose Oscilloscopes (continued)

Vertical (continued)

Sensitivity[2]	
1 MΩ	1 mV/div to 5 V/div
50 Ω	1 mV/div to 5 V/div
Expand About	Choose between expanding about center screen or ground. This applies to channels, memories, or math functions.
Input Impedance*	1 MΩ ± 1% (~8 pF), or 50 Ω ± 1%
VSWR (50 Ω)	N/A
Input Coupling	dc, ac (7 Hz, available in 1 MΩ only)
Maximum Input Voltage*	
1 MΩ	± 250 V (dc + ac) [ac<10 kHz], CAT I
50 Ω	5 Vrms, CAT I
Hardware Bandwidth Limit (-3 dB)	On/Off selectable, 30 MHz
Channel-to-Channel Isolation (with channels at equal sensitivity)	dc to 50 MHz: 50 dB 50 MHz to 500 MHz: 40 dB
Offset Range	Vertical Sensitivity — Available Offset 1 mV to 49 mV/div — ± 2 V > 50 mV to 249 mV/div — ± 10 V > 250 mV to 1.24 V/div — ± 50 V 1.25 V to 5 V/div — ± 250 V
Dynamic Range	± 12 div from center screen
Full Resolution Channel Scales	All volts/division settings ≥ 7 mV/div
dc Gain Accuracy*[2,3]	± 1.25% of full scale at full resolution channel scale
Resolution[2]	
Real Time	8 bits (0.4% of full scale), 12 bits or greater with sufficient averaging
Equivalent Time	8 bits (0.4% of full scale), 12 bits or greater with sufficient averaging
Offset Accuracy*[2]	± (1.25% of channel offset + 2% of full scale) at full resolution channel scale
dc Voltage Measurement Accuracy*[2,3]	
Dual Cursor	±[(dc gain accuracy)+(resolution)]
Single Cursor	±[(dc gain accuracy)+(offset accuracy)+(resolution/2)]
Example (Single cursor accuracy, 70 mV signal,10 mV/div, 0 offset)	Accuracy = ±[1.25% (80 mV) + (1.25% (0)+2% (80 mV)) + (0.4%/2) (80 mV)] = ±2.8 mV
AutoProbe Interface	AutoProbe is an intelligent communication and power link between compatible probes and Infiniium scopes. AutoProbe completely configures the scope for the attached probe. For instance, it identifies the probe type and sets up the proper input impedance, attenuation ratio, probe power and offset range, as needed.

Notes

[2] Magnification is used below 7 mV/div range. Below 7 mV/div, full scale is defined as 56 mV.

[3] The dc gain accuracy decreases 0.08% of full scale per degree C from the firmware calibration temperature.

* Denotes Warranted Specifications, all others are typical. Specifications are valid after a 30-minute warm-up period and ±10°C from firmware calibration temperature.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Agilent Technologies 54810A, 54815A, 54820A and 54825A
General-Purpose Oscilloscopes (continued)

Horizontal	
Main Time Base Range	500 ps/div to 20 s/div
Horizontal Position Range (pre-trigger)	0 to -1 s or one full screen width, whichever is larger
Horizontal Position Range (post-trigger)	0 to 1 s or one full screen width, whichever is larger
Delayed Sweep Range	1 ps/div to current main time base setting
Delayed Sweep Delay Range	Within main time base acquisition record
Resolution	10 ps
Time Base Accuracy	50 ppm (0.005%)
Δt Accuracy*	
Real Time Mode[4]	±[(0.005%)(Δt) + (0.2)(sample period)]
Equivalent Time Mode (≥ 16 avgs.)	±[(0.005%)(Δt) + (full scale/(2 X memory depth)) + 60ps]
Peak Detect Mode	±[(0.005%)(Δt)+(1 sample period)]
Example (Equivalent Time Mode (≥ 16 avgs.), 9 ns signal, 1 ns/div, 1 channel)	Accuracy = ±[(0.005%)(9 ns)+((10 ns)/(2 x 32,768))+ 60ps] = ±[(450 x 10^{-15})+(152 x 10^{-15})+(60 x 10^{-12}] = 61 ps
Jitter, RMS	N/A

Trigger	
Sensitivity*[2]	
Internal (normal)	
dc to 100 MHz	0.5 div
100 MHz to 500 MHz	1.0 div
500 MHz to 1 GHz	N/A
Internal (noise reject)	
dc to 100 MHz	1.0 div
100 MHz to 500 MHz	1.5 div
External (54810/20A)	
dc to 100 MHz	0.0225 x (signal range)
100 MHz to 500 MHz	0.045 x (signal range)
Auxiliary (54815/25/35/45A)	
dc to 500 MHz	300 mV_{p-p}
Maximum Input Voltage*	1 MΩ: ±250 V (dc + ac) [ac<10 kHz],
External (54810/20A)	CAT I, 50 Ω: 5 Vrms, CAT I
Auxiliary (54815/25)	2.5 kΩ: ±15 V, CAT I
Minimum Pulse Width (internal, external)	1 ns at > 1.0 div
Level Range	
Internal	± 12 div from center screen
External (54810/20A)	± 1 V, ± 5 V, ± 25 V
Auxiliary (54815/25)	± 5 V

Notes

[2] Magnification is used below 7 mV/div range. Below 7 mV/div, full scale is defined as 56 mV.

[4] For bandwidth limited signals, t_r >=1.4 x sample interval.

* Denotes Warranted Specifications, all others are typical. Specifications are valid after a 30-minute warm-up period and ±10°C from firmware calibration temperature.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Agilent Technologies 54810A, 54815A, 54820A and 54825A
General-Purpose Oscilloscopes (continued)

Trigger (continued)

Sweep Modes	Auto, triggered, single
Trigger Coupling	dc, ac (7 Hz), low frequency reject (50 kHz), high frequency reject (50 kHz)
Trigger Holdoff Range	60 ns – 320 ms
Trigger Modes	Edge, Glitch, Pattern, State, Delay by Time, Delay by Events, Violation (Setup/Hold Time, Pulse Width, Transition), Video, Line
Glitch	Select positive or negative polarity, width. Captures glitches as narrow as 500 ps.
Pattern	Select inputs as High, Low or X (don't care) to create pattern. Trigger when pattern is entered, exited, present > t, present < t, or present over a range of time. Captures patterns as narrow as 500 ps.
State	Select one channel as clock, specify other inputs as High, Low or X. Logic Type: AND or NAND. Setup time is 1 ns and hold time is 0 ns.
Delay by Time	Time: 30 ns to 160 ms. The trigger is qualified by an edge. After the delay, a rising/falling edge on any one selected input will generate the trigger.
Delay by Events	Events: 1 to 16,000,000 rising or falling edges. The trigger is qualified by an edge. After the delay, a rising/falling edge on any one selected input will generate the trigger.
Violation Trigger	
Setup/Hold	Modes: Setup, Hold or Setup and Hold. Select clock, thresholds, setup and/or hold time. Edges must be ≥ 1.5 ns. The difference in slew rates between clock and data must be less than a 2:1 ratio.
Pulse Width	Triggers on pulse width > t or < t. Captures pulses as narrow as 500 ps.
Transition	Select rise time or fall time, present > t or present < t thresholds. Captures edges as fast as 800 ps.
Accuracy (time) for Glitch, Pulse Width and Time-Qualified Pattern	1.5 ns – 20 ns: ±(20% setting + 500 ps) 20 ns – 160 ms: ±(3% setting + 2 ns)
Video Triggering	525 lines/60 Hz (NTSC), 625 lines/50 Hz (PAL), 875 lines/60 Hz. Trigger on Field 1 or Field 2, any line. User defined triggering: user can specify sync pulse level, width and polarity, edge number.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Agilent Technologies 54810A, 54815A, 54820A and 54825A
General-Purpose Oscilloscopes (continued)

Measurements	
Automatic Parametrics	27 automatic measurements: V_{p-p}, V_{min}, V_{max}, V_{avg}, V_{amptd}, V_{base}, V_{top}, V_{rms}, Preshoot, Overshoot, V_{upper}, V_{middle}, V_{lower}, Rise Time, Fall Time, Period, Frequency, Positive Width, Negative Width, Duty Cycle, Delta Time, T_{max}, T_{min}, FFT Frequency, FFT Magnitude, FFT Delta Frequency, FFT Delta Magnitude, Channel-Channel phase, FFT phase. Over GPIB only: V_{time}, T_{volts}
Threshold Definition	Selectable 10%, 20%, 50%, 80%, 90% or Custom (in % or absolute voltage). Independent thresholds can be set for each channel.
Top-Base Definition	Standard or custom (in absolute voltage)
Statistics	On/Off selectable. Current measurement, mean and standard deviation
Histograms	Use vertical and horizontal waveform markers to define region to analyze. Can use in vertical (for timing and jitter measurements) or horizontal (noise and amplitude change) modes. Measurements included: mean, standard deviation, peak-to-peak value, median, total hits, peak (area of most hits), and mean ± 1,2, and 3 sigma.
Eye Diagram Measurements	Eye diagram display mode allows triggering on both the negative-going and positive-going edges of a signal. Eye diagram measurements include eye height, eye width, jitter, crossing percentage, Q factor, and duty cycle distortion.
Mask Testing	Allows pass/fail testing to user-defined or Agilent-supplied waveform templates. Up to 8 regions of polygons allowed. Mask inversion inverts mask around baseline. Test modes include test forever, test to specified time or event limit, and stop on failure. You can also mask test on a channel or a waveform math function for differential inputs. AutoMask allows user to define tolerance range in time/voltage or percentage and create a mask template from a captured waveform. Masks can be automatically aligned with the incoming signal. All masks can be manually scaled via controls or the mouse.
Communications Mask Test Kit Option	Model E2625A and Option 100 provide a set of ITU-T G.703, ANSI T1.102, and IEEE 802.3 industry standard masks for compliance testing.
USB Test Option	Model E2645A and option B30 provide USB 2.0 signal integrity, inrush current, and drop/droop pre-compliance testing (requires scripts provided by USB-IF organization).
Measurement Toolbar	16 Drag and Drop automatic measurement icons
QuickMeas+	Allows user to configure a button below the display for the following functions: QuickMeas: activates 4 preselected automatic measurements. QuickPrint: prints out screen. QuickScreen: saves screen image to file; multiple button pushes increment filename suffix (for example, Data01, Data02, etc.). QuickWaveform: saves waveform data to a file on the disk drive; multiple button pushes increment filename suffix. QuickSetup: loads in a specific instrument setup file.
QuickMeas+ on Trigger	Allows user to perform the QuickMeas+ feature when a trigger event occurs.
Marker Modes	Manual Markers, Track Waveform Data, Track Measurements
Waveform Math	4 functions f1-f4. Select from Add, Subtract, Multiply, Divide, Invert, Magnify, Versus, Min, Max, Integrate, Differentiate, FFT Magnitude. Any of the Waveform Math functions (for example, FFT) can be averaged.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Agilent Technologies 54810A, 54815A, 54820A and 54825A
General-Purpose Oscilloscopes (continued)

FFT	
Frequency Range[5]	54820A/54825A: dc to 1 GHz (Sample rate/2) 54810A/54815A: dc to 500 MHz (Sample rate/2)
Frequency Accuracy	(1/2 frequency resolution)+(5x10^{-6})(signal frequency)
Amplitude Display	Power in dBm
Signal-to-Noise Ratio	70 dB at 32K memory depth. Noise floor varies with memory depth and with averaging.
Window Modes	Hanning, Flattop, Rectangular
Display	
Display	8.4 inch diagonal color active matrix LCD module incorporating amorphous silicon TFTs
Annotation	Up to 12 labels, with up to 100 characters each, can be inserted in the waveform display area. Labels can be saved to and recalled from image files and setup files.
Active Display Area	6.73 inch x 5.04 inch (33.92 sq. in.); 171 mm x 128 mm (21,888 sq. mm)
Waveform Viewing Area	4.10 inch x 6.25 inch (25.6 sq. in.); 104 mm x 159 mm (16,536 sq. mm) in full screen mode
Display Modes	Full screen or split screen (split grid into two halves)
Display Resolution	640 pixels horizontally x 480 pixels vertically
Persistence	Minimum, variable (Up to 6 levels of gray scale, 100 ms to 40 s), infinite, color grade
Color Grade Infinite Persistence	Previous sweeps are stored in differing colors based on the number of times each pixel is illuminated. User can turn on or off, and can define colors to be used. This allows easy visual recognition of waveform behavior over time.
Display Update Rate	
Measurement Conditions	Real time mode, minimum persistence display mode, triggered sweep mode, no interpolation, markers off, math off, connect the dots off, 1 channel acquisition, 50 ns/div, statistics on
Waveforms/Sec	>2,100
V_{p-p} Measurements/Sec	>130

Notes

[5] FFT amplitude readings are affected by input amplifier roll-off (-3 dB at 500 MHz, with amplitude decreasing as frequency increases above 500 MHz).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Agilent Technologies 54810A, 54815A, 54820A and 54825A
General-Purpose Oscilloscopes (continued)

Computer System/Storage	
CPU	AMD K6-2 400 MHz microprocessor
Disk Drives	5 GByte internal hard drive. Storage capacity is limited only by disk space. 3.5 inch 120 MByte LS-120 SuperDisk floppy drive (reads/writes to standard 3.5 inch floppies). Store and recall setups, waveforms, and store screen images to both the hard drive and the floppy drive.
File Types	
Waveforms	Internal Y values; X and Y values in ASCII or Microsoft Excel formats
Images	BMP, PCX, TIF, GIF, EPS or PS formats
Mouse	Standard mouse supplied. Supports any Microsoft mouse-compatible pointing device, serial or PS/2
Waveform Memories	4 nonvolatile waveform memories
I/O	
LAN	Enables data/setup file transfers and use of network printers; supports Microsoft Networking; 10/100 Mbps operation that complies with IEEE 802.3 Ethernet and ISO/IEC 8802-3 Ethernet standards; TCP/IP protocol and RJ-45 connector
GPIB	Fully programmable, complies with IEEE 488.2
RS-232 (serial)	2 ports: COM1, COM2. Printer and pointing device support
Centronics	Printer support
Printers	Full support of HP DeskJet and LaserJet printers.
PS/2 Port	For PS/2 mouse
USB Port	For any USB device
Keyboard Port	Standard keyboard for file naming and waveform annotation, scope control
Video Output	15 pin VGA, full color
Auxiliary Output	dc (±2.5 v); square wave (715 Hz [±5%], 350 mV_{p-p} [±5%]); trigger output (350 mV_{p-p} [±5%], frequency varies with occurrence of trigger)
General Characteristics	
Temperature	
Operating	0°C to +50°C
Non-operating	–40°C to +70°C
Humidity	
Operating	Up to 95% relative humidity (non-condensing) at +40°C
Non-operating	Up to 90% relative humidity 0 at +65°C
Altitude	
Operating	Up to 4,600 meters (15,000 ft.)
Non-operating	Up to 15,300 meters (50,000 ft.)
Vibration	
Operating	Random vibration 5-500 Hz, 10 minutes per axis, 0.3 g (rms)
Non-operating	Random vibration 5-500 Hz, 10 minutes per axis, 2.41 g (rms); resonant search 5-500 Hz, swept sine, 1 octave/minute sweep rate, (0.75 g), 5 minute resonant dwell at 4 resonances per axis.
Power	Voltage: 100-240 VAC, ± 10%, Cat II, 47 to 440 Hz; Max power dissipation: 390 W
Weight	Net: 10.6 kg (23.4 lb), Shipping: 13.6 kg (30 lb)
Dimensions (excluding handle)	Height: 216 mm (8.50 in); Width: 437 mm (17.19 in); Depth: 440 mm (17.34 in)
Safety	Meets IEC1010-1 +A2, CSA certified to C22.2 No.1010.1, Self certified to UL 3111

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Performance Characteristics

Agilent Technologies 54835A, 54845A, and 54846A
High-Performance Oscilloscopes

Acquisition	
Maximum Sample Rate	
Real Time	54835A: 2 channel mode: 4 GSa/s; 4 channel mode: 2 GSa/s 54845A: 2 channel mode: 8 GSa/s; 4 channel mode: 4 GSa/s 54846A: 2 channel mode: 8 GSa/s; 4 channel mode: 4GSa/s
Maximum Effective Sample Rate	
Equivalent Time	500 GSa/s
Memory Depth	2 channel mode: 65,536 points/channel 4 channel mode: 32,768 points/channel
Memory Depth Modes	
Auto	Optimized for best combination of update rate and display quality
Manual	Selectable 2 channel mode: from 16 to 65,536 points/channel 4 channel mode: from 16 to 32,768 points/channel
Sampling Modes	
Real Time	Successive single shot acquisitions
Equivalent Time	Random repetitive sampling (higher time resolution at faster sweep speeds)
Peak Detect	N/A
Filters	
9-bit Bandwidth (BW) Limit Filter	BW = Sample Rate/20
(Sin(x)/x Interpolation	BW= Sample Rate/4. On/Off selectable Finite Impulse Response (FIR) digital filter. Digital signal processing adds points between acquired data points to enhance measurement accuracy and waveform display quality.
Averaging	Selectable from 2 to 4096
Vertical	
Number of Channels	4 (simultaneous acquisition)
Analog Bandwidth (–3dB)*	54835A: 50 Ω: 1.0 GHz; 1 MΩ: 500 MHz (with 1161A probe) 54845A: 50 Ω: 1.5 GHz; 1 MΩ: 500 MHz (with 1161A probe) 54846A: 50Ω: 2.25 GHz; 1MΩ: 500 MHz (with 1161A probe)
Rise Time[1]	54835A: 50 Ω: 350 ps; 1 M Ω: 700 ps 54845A: 50 Ω: 233 ps; 1 MΩ: 700 ps 54846A: 50 Ω; 178 ps; 1 MΩ: 700 ps

Notes

[1] Rise time figures for 54835A/45A calculated from $t_r = 0.35/\text{bandwidth}$. Rise time figures for 54846A calculated from $t_r = 0.41/\text{bandwidth}$.

* Denotes Warranted Specifications, all others are typical. Specifications are valid after a 30-minute warm-up period and ±5°C from firmware calibration temperature.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Performance Characteristics

Agilent Technologies 54835A, 54845A, and 54846A
High-Performance Oscilloscopes (Continued)

Vertical (continued)

Sensitivity[2]		
1 MΩ	2 mV/div to 2 V/div	
50 Ω	2 mV/div to 1 V/div	
Expand About	Choose between expanding about center screen or ground. This applies to channels, memories, or math functions.	
Input Impedance*	1 MΩ ± 1% (~12 pF), or 50 Ω ± 1.5%	
VSWR (50 Ω)	54835A: dc to 500 MHz: 1.3; 500 MHz to 1 GHz: 1.5 54845A: dc to 500 MHz: 1.3; 500 MHz to 1 GHz: 1.5; 1 GHz to 1.5 GHz: 1.75 54846A: dc to 500 MHz: 1.3; 500 MHz to 1 GHz: 1.5; 1 GHz to 1,5 GHz: 1.75; 1.5 GHz to 2.25 GHz: 2.25	
Input Coupling	dc, ac (7 Hz, available in 1 MΩ only)	
Maximum Input Voltage*		
1 MΩ	± 100 V (dc + ac) [ac<10 kHz], CAT I	
50 Ω	5 Vrms, CAT I	
Hardware Bandwidth Limit (–3 dB)	N/A	
Channel-to-Channel Isolation (with channels at equal sensitivity)	dc to 100 MHz: 40 dB > 100 MHz to 1 GHz: 28 dB 1 GHz to 2.25 GHz: 24 dB	
Offset Range	Vertical Sensitivity 1 MΩ: 2 mV/div to 100 mV/div 100 mV/div to 2 V/div 50 Ω: all	Available Offset ± 4 V ± 40 V > ± 12 div
Dynamic Range	±8 div from center screen	
Full Resolution Channel Scales	10, 20, 50, 100, 200, 500, 1000 mV/div (plus 2000 mV/div in 1 MΩ)	
dc Gain Accuracy*[2]	± 1% of full scale at full resolution channel scale	
Resolution[2]		
Real Time	8 bits (0.4% of full scale), 12 bits or greater with sufficient averaging	
Equivalent Time	8 bits (0.4% of full scale), 12 bits or greater with sufficient averaging	
Offset Accuracy*[2]	± (1% of channel offset + 1% of full scale) at full resolution channel scale	
dc Voltage Measurement Accuracy*[2]		
Dual Cursor	±[(dc gain accuracy)+(resolution)]	
Single Cursor	±[(dc gain accuracy)+(offset accuracy)+(resolution/2)]	
Example (Single cursor accuracy, 70 mV signal,10 mV/div, 0 offset)	Accuracy = ±[1% (80 mV) + (1%(0 V)+1% (80 mV)) + (0.4%/2) (80 mV)] = ±1.76 mV	
AutoProbe Interface	AutoProbe is an intelligent communication and power link between compatible probes and Infiniium scopes. AutoProbe completely configures the scope for the attached probe. For instance, it identifies the probe type and sets up the proper input impedance, attenuation ratio, probe power and offset range, as needed.	

Notes

[2] Magnification is used below 10 mV/div range and between major attenuation settings. Full scale is defined as the major attenuator setting above an intermediate setting. (Major settings 50 Ω: 10 mV, 20 mV, 50 mV, 100 mV, 200 mV, 500 mV, 1 V, 1 MΩ: all of the above plus 2 V)

* Denotes Warranted Specifications, all others are typical. Specifications are valid after a 30-minute warm-up period and ±5°C from firmware calibration temperature.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Agilent Technologies 54835A, 54845A, and 54846A
High-Performance Oscilloscopes (Continued)

Horizontal	
Main Time Base Range	100 ps/div to 20 s/div
Horizontal Position Range (pre-trigger)	0 to –1 s or one full screen width, whichever is larger
Horizontal Position Range (post-trigger)	0 to 1 s or one full screen width, whichever is larger
Delayed Sweep Range	1 ps/div to current main time base setting
Delayed Sweep Delay Range	Within main time base acquisition record
Resolution	2 ps
Time Base Accuracy	70 ppm (.007%)
Δt Accuracy*	
Real Time Mode[4]	±[(0.007%) (Δt)+(0.2) (sample period)]
Equivalent Time Mode (≥ 16 avgs.)	±[(0.007%) (Δt)+(full scale/(2 x memory depth))+ 30 ps]
Peak Detect Mode	N/A
Example (Equivalent Time Mode (≥ 16 avgs.), 9 ns signal, 1 ns/div, 1 channel)	Accuracy = ±[(0.007%) (9 ns)+((10 ns)/(2 x 65,536))+ 30 ps] = ±[(630 x 10^{-15})+(76 x 10^{-15})+(30 x 10^{-12}] = 31 ps
Jitter, RMS	8 ps ± 0.005% (delay setting)

Trigger	
Sensitivity*[2]	
Internal (normal)	
dc to 100 MHz	0.5 div
100 MHz to 500 MHz	1.0 div
500 MHz to 1 GHz	1.5 div
Internal (noise reject)	
dc to 100 MHz	N/A
100 MHz to 500 MHz	
External	
dc to 100 MHz	N/A
100 MHz to 500 MHz	
Auxiliary	
dc to 500 MHz	300 mV_{p-p}
Maximum Input Voltage*	
External	N/A
Auxiliary	2.5 kΩ: ±15 V, CAT I
Minimum Pulse Width (internal, external)	500 ps at > 1.0 div
Level Range	
Internal	± 8 div from center screen
External	N/A
Auxiliary	± 5 V

Notes

[2] Magnification is used below 10 mV/div range and between major attenuation settings. Full scale is defined as the major attenuator setting above an intermediate setting. (Major settings 50 Ω: 10 mV, 20 mV, 50 mV, 100 mV, 200 mV, 500 mV, 1 V, 1 MΩ: all of the above plus 2 V)

[4] For bandwidth limited signals, t_r >=1.4 x sample interval.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Agilent Technologies 54835A, 54845A, and 54846A
High-Performance Oscilloscopes (Continued)

Trigger (continued)

Sweep Modes	Auto, triggered, single
Trigger Coupling	dc, ac (7 Hz), low frequency reject (50 kHz), high frequency reject (50 kHz)
Trigger Holdoff Range	60 ns – 320 ms
Trigger Modes	Edge, Glitch, Pattern, State, Delay by Time, Delay by Events, Violation (Setup/Hold Time, Pulse Width, Transition), Video, Line
Glitch	Select positive or negative polarity, width. Captures glitches as narrow as 500 ps.
Pattern	Select inputs as High, Low or X (don't care) to create pattern. Trigger when pattern is entered, exited, present > t, present < t, or present over a range of time. Captures patterns as narrow as 500 ps.
State	Select one channel as clock, specify other inputs as High, Low or X. Logic Type: AND or NAND. Setup time is 1 ns and hold time is 0 ns.
Delay by Time	Time: 30 ns to 160 ms. The trigger is qualified by an edge. After the delay, a rising/falling edge on any one selected input will generate the trigger.
Delay by Events	Events: 1 to 16,000,000 rising or falling edges. The trigger is qualified by an edge. After the delay, a rising/falling edge on any one selected input will generate the trigger.
Violation Trigger	
Setup/Hold	Modes: Setup, Hold or Setup and Hold. Select clock, thresholds, setup and/or hold time. Edges must be ≥ 1.5 ns. The difference in slew rates between clock and data must be less than a 2:1 ratio.
Pulse Width	Triggers on pulse width > t or < t. Captures pulses as narrow as 500 ps.
Transition	Select rise time or fall time, present > t or present < t, thresholds. Captures edges as fast as 800 ps.
Accuracy (time) for Glitch, Pulse Width and Time-Qualified Pattern	1.5 ns – 20 ns: ±(20% setting + 500 ps) 20 ns – 160 ms: ±(3% setting + 2 ns)
Video Triggering	525 lines/60 Hz (NTSC), 625 lines/50 Hz (PAL), 875 lines/60 Hz. Trigger on Field 1 or Field 2, any line. User defined triggering: user can specify sync pulse level, width and polarity, edge number.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Agilent Technologies 54835A, 54845A, and 54846A
High-Performance Oscilloscopes (Continued)

Measurements	
Automatic Parametrics	27 automatic measurements: V_{p-p}, V_{min}, V_{max}, V_{avg}, V_{amptd}, V_{base}, V_{top}, V_{rms}, Preshoot, Overshoot, V_{upper}, V_{middle}, V_{lower}, Rise Time, Fall Time, Period, Frequency, Positive Width, Negative Width, Duty Cycle, Delta Time, T_{max}, T_{min}, FFT Frequency, FFT Magnitude, FFT Delta Frequency, FFT Delta Magnitude, Channel-Channel phase, FFT phase. Over GPIB only: V_{time}, T_{volts}
Cycle-to-cycle Jitter Measurement	Automatically measure the minimum and maximum cycle-to-cycle jitter in your signals
Threshold Definition	Selectable 10%, 20%, 50%, 80%, 90% or custom (in % or absolute voltage). Independent thresholds can be set for each channel.
Top-Base Definition	Standard or custom (in absolute voltage)
Statistics	On/Off selectable. Current measurement, mean and standard deviation
Histograms	Use vertical and horizontal waveform markers to define region to analyze. Can use in vertical (for timing and jitter measurements) or horizontal (noise and amplitude change) modes. Measurements included: mean, standard deviation, peak-to-peak value, median, total hits, peak (area of most hits), and mean ± 1,2, and 3 sigma.
Eye Diagram Measurements	Eye diagram display mode allows triggering on both the negative-going and positive-going edges of a signal. Eye diagram measurements include eye height, eye width, jitter, crossing percentage, Q factor, and duty cycle distortion.
Mask Testing	Allows pass/fail testing to user-defined or Agilent-supplied waveform templates. Up to 8 regions of polygons allowed. Mask inversion inverts mask around baseline. Test modes include test forever, test to specified time or event limit, and stop on failure. You can also mask test on a channel or a waveform math function for differential inputs. AutoMask allows user to define tolerance range in time/voltage or percentage and create a mask template from a captured waveform. Masks can be automatically aligned with the incoming signal. All masks can be manually scaled via controls or the mouse.
Communications Mask Test Kit Option	Model E2625A and Option 100 provide a set of ITU G.703 and ANSI T1.102 industry standard masks for compliance testing.
USB Test Option	Model E2645A and option B30 provide USB 2.0 signal integrity, inrush current, and drop/droop pre-compliance testing (requires scripts provided by USB-IF organization).
Measurement Toolbar	16 Drag and Drop automatic measurement icons
QuickMeas+	Allows user to configure a button below the display for the following functions: QuickMeas: activates 4 preselected automatic measurements. QuickPrint: prints out screen. QuickScreen: saves screen image to file; multiple button pushes increment filename suffix (for example, Data01, Data02, etc.). QuickWaveform: saves waveform data to a file on the disk drive; multiple button pushes increment filename suffix. QuickSetup: loads in a specific instrument setup file.
QuickMeas+ on Trigger	Allows user to perform the QuickMeas+ feature when a trigger event occurs.
Marker Modes	Manual Markers, Track Waveform Data, Track Measurements
Waveform Math	4 functions f1-f4. Select from Add, Subtract, Multiply, Divide, Invert, Magnify, Versus, Min, Max, Integrate, Differentiate, FFT Magnitude. Any of the Waveform Math functions (for

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Agilent Technologies 54835A, 54845A, and 54846A
High-Performance Oscilloscopes (Continued)

FFT	
Frequency Range[5]	54835A: 2 channel mode: dc to 2 GHz; 4 channel mode: dc to 1 GHz 54845A: 2 channel mode: dc to 4 GHz; 4 channel mode: dc to 2 GHz 54846A: 2 channel mode: dc to 4 GHz; 4 channel mode: dc to 2 GHz
Frequency Accuracy	(1/2 frequency resolution)+($7x10^{-5}$) (signal frequency)
Amplitude Display	Power in dBm
Signal-to-Noise Ratio	70 dB at 32K memory depth. Noise floor varies with memory depth and with averaging.
Window Modes	Hanning, Flattop, Rectangular

Display	
Display	8.4 inch diagonal color active matrix LCD module incorporating amorphous silicon TFTs
Annotation	Up to 12 labels, with up to 100 characters each, can be inserted in the waveform display area. Labels can be saved to and recalled from image files and setup files.
Active Display Area	6.73 inch x 5.04 inch (33.92 sq. in.); 171 mm x 128 mm (21,888 sq. mm)
Waveform Viewing Area	4.10 inch x 6.25 inch (25.6 sq. in.); 104 mm x 159 mm (16,536 sq. mm) in full screen mode
Display Modes	Full screen or split screen (split grid into two halves)
Display Resolution	640 pixels horizontally x 480 pixels vertically
Persistence	Minimum, variable (Up to 6 levels of gray scale, 100 ms to 40 s), infinite, color grade
Color Grade Infinite Persistence	Previous sweeps are stored in differing colors based on the number of times each pixel is illuminated. User can turn on or off, and can define colors to be used. This allows easy visual recognition of waveform behavior over time.
Display Update Rate	
Measurement Conditions	Real time mode, minimum persistence display mode, triggered sweep mode, no interpolation, markers off, math off, connect the dots off, 1 channel acquisition, 50 ns/div, statistics on
Waveforms/Sec	>2,100
V_{p-p} Measurements/Sec	>130

Notes

[5] FFT amplitude readings are affected by input amplifier roll-off. 54835A: (–3 dB at 1 GHz, with amplitude decreasing as frequency increases above 1 GHz). 54845A: (–3 dB at 1.5 GHz, with amplitude decreasing as frequency increases above 1.5 GHz.).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Agilent Technologies 54835A, 54845A, and 54846A
High-Performance Oscilloscopes (Continued)

Computer System/Storage	
CPU	AMD K6-2 400 MHz microprocessor
Disk Drives	5 GByte internal hard drive. Storage capacity is limited only by disk space. 3.5 inch 120 MByte LS-120 SuperDisk floppy drive (reads/writes to standard 3.5 inch floppies). Store and recall setups, waveforms, and store screen images to both the hard drive and the floppy drive.
File Types:	
Waveforms	Internal Y values; X and Y values in ASCII or Microsoft Excel formats
Images	BMP, PCX, TIF, GIF, EPS or PS formats
Mouse	Standard mouse supplied. Supports any Microsoft mouse-compatible pointing device, serial or PS/2
Waveform Memories	4 nonvolatile waveform memories
I/O	
LAN	Enables data/setup file transfers and use of network printers; supports Microsoft Networking; 10/100 Mbps operation that complies with IEEE 802.3 Ethernet and ISO/IEC 8802-3 Ethernet standards; TCP/IP protocol and RJ-45 connector
GPIB	Fully programmable, complies with IEEE 488.2
RS-232 (serial)	2 ports: COM1, COM2. Printer and pointing device support
Centronics	Printer support
Printers	Full support of HP DeskJet and LaserJet printers.
PS/2 Port	For PS/2 mouse
USB Port	For any USB device
Keyboard Port	Standard keyboard for file naming and waveform annotation, scope control
Video Output	15 pin VGA, full color
Auxiliary Output	dc (±2.5 v); square wave (715 Hz [±5%], 350 mV_{p-p} [±5%]); trigger output (350 mV_{p-p} [±5%], frequency varies with occurrence of trigger)
General Characteristics	
Temperature	
Operating	10°C to +40°C
Non-operating	–40°C to +70°C
Humidity	
Operating	Up to 95% relative humidity (non-condensing) at +40°C
Non-operating	Up to 90% relative humidity at +65°C
Altitude	
Operating	Up to 4,600 meters (15,000 ft.)
Non-operating	Up to 15,300 meters (50,000 ft.)
Vibration	
Operating	Random vibration 5-500 Hz, 10 minutes per axis, 0.3 g (rms)
Non-operating	Random vibration 5-500 Hz, 10 minutes per axis, 2.41 g (rms); resonant search 5-500 Hz, swept sine, 1 octave/minute sweep rate, (0.75 g), 5 minute resonant dwell at 4 resonances per axis.
Power	Voltage: 100-240 VAC, ± 10%, Cat II, 47 to 440 Hz; Max power dissipation: 390 W
Weight	Net: 12.0 kg (26.5 lb), Shipping: 15 kg (33 lb)
Dimensions (excluding handle)	Height: 216 mm (8.50 in); Width: 437 mm (17.19 in); Depth: 440 mm (17.34 in)
Safety	Meets IEC1010-1 +A2, CSA certified to C22.2 No.1010.1, Self certified to UL 3111

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Ordering Information

General-Purpose Infiniium Oscilloscopes

Agilent Model	Channels	Bandwidth	Sample Rate	Memory Depth
54810A	2	500 MHz	1 GSa/s	32K
54815A	4	500 MHz	1 GSa/s	32K
54820A	2	500 MHz	2 GSa/s	32K
54825A	4	500 MHz	2 GSa/s	32K

High-Performance Infiniium Oscilloscopes

Agilent Model	Channels	Bandwidth	Sample Rate	Memory Depth
54835A	4	1 GHz	4 GSa/s (2 channel mode)	64K (2 channel mode)
			2 GSa/s (4 channel mode)	32K (4 channel mode)
54845A	4	1.5 GHz	8 GSa/s (2 channel mode)	64K (2 channel mode)
			4 GSa/s (4 channel mode)	32K (4 channel mode)
54846A	4	2.25 GHz	8 GSa/s (2 channel mode)	64K (2 channel mode)
			4 GSa/s (4 channel mode)	32K (4 channel mode)

All of the above models include:

Mouse, Infiniium mouse pad, keyboard,
User's Quick Start Guide in English language*,
Service Guide, Programmer's Guide, Programmer's Quick Reference Guide,
Information System in English, French, German, Japanese, Korean, Chinese, and Simplified Chinese
Two 1160A 10:1 10 MΩ passive probes (54810A, 54820A),
Four 1160A 10:1 10 MΩ passive probes (54815A, 54825A),
Four 1161A 10:1 10 MΩ passive probes (54835A, 54845A),No probes are included with the 54846A
Accessory pouch (54810-68701), US power cord, three-year warranty

* Other languages also available

Probing and Triggering Options

Agilent Option	Description
090	Delete standard probes two 1160A probes for the 54810A/20A four 1160A probes for the 54815A/25A four 1161A probes for the 54835/45A
001	Additional standard probes two 1160A probes for the 54810A/15A/20A/25A two 1161A probes for the 54835/45A
002	Add one 1162A 1:1 passive probe
003	Add one 1163A 10:1 500 Ω, low C passive probe
004	Add four 1161A probes for the 54846A
008	Add one 1153A 200 MHz differential probe
009	Add one 1154A 500 MHz differential probe
010	Add one 1159A 1 GHz differential probe
012	Add one 1156A 1.5 GHz active probe
013	Add one 1157A 2.5 GHz active probe (for 54835/45/46A)
014	Add one 1158A 4 GHz active probe (for 54845/46A)
016	Add one EZ-probe positioner (E2654A)
A6J	ANSI Z540 compliant calibration
1CM	Add one rackmount kit (E2609A)
UL5	Add one touchpad pointing device (E2612A)
UL9	Add one cordless trackball (E2647A)
ULA	Add one cordless keyboard and mouse (E2648A)
W50	Five-year, customer-return, repair coverage (additional 2 years)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Ordering Information

Communications Mask Test Kit Options

Agilent Model/Option	Description
100	Communication mask test kit for new Infiniium oscilloscopes. Includes all the individual items listed below and a hard shell case for storage of all kit accessories
E2625A	Communication mask test kit for existing Infiniium oscilloscopes. Same kit as Option 100; requires version 3.0 or later of the Infiniium software

The following items, included in Option 100 and Model E2625A, can be ordered separately.

E2626A	Mask Template Library on 1.44 MByte, 3.5 inch floppy disk (requires version 3.0 software)
E2621A	100/110/120-ohm balanced termination adapter with bantam (f) connector
E2622A	75 ohm unbalanced termination adapter with BNC (f) connector
E2623A	Bantam (m) to Siemens (f) adapter cable – 30 cm long
E2624A	Dual-bantam (m) to RJ-48C (m) adapter cable – 35 cm long
E2627A	RJ-48C (f) to RJ-48C (f) adapter/coupler
E2628A	Bantam (m) to BNC (f) adapter; for system verification/calibration of the E2621A adapter and the Infiniium oscilloscope
E2629A	BNC (m) to BNC (f) 50-to-75-ohm adapter; for system verification of the E2622A adapter and the Infiniium oscilloscope
8120-1838	BNC (m) to BNC (m) cable - 30 cm long

Logic Analyzer/Oscilloscope Time Correlation Fixture

Agilent Model/Option	Description
E5850A	The Agilent E5850A time correlation fixture allows you to cross-trigger and time-correlate measurements between an Agilent 16700 logic analyzer and an Infiniium oscilloscope to solve the following types of problems more effectively: • Verifying signal integrity • Tracking down problems caused by signal integrity • Verifying correct operation of A/D and D/A converters • Verifying correct logical relationships between the analog and digital portions of a design.

VoiceControl Options

Agilent Model/Option	Description
200	VoiceControl for new Infiniium oscilloscopes
E2635A	User installable retrofit kit for existing Infiniium oscilloscopes that have an "E2633A" product tag, or serial number prefix US3919 or higher
E2633-68704	VoiceControl upgrade kit for existing Infiniium oscilloscopes that do not have an "E2633A" product tag or have a serial number prefix less than US3919. This kit lets you add VoiceControl software and VoiceControl hardware (sound card, collar-mounted microphone). Installation and calibration prices not included. Please contact your Agilent representative for pricing.

To use the retrofit kit, you must have the following minimum Infiniium configuration: 300 MHz CPU, 64 MB RAM, Windows 98, Version A03.50 or greater of the application software, LS-120 120 MB SuperDisk.

To determine if your Infiniium meets these configuration criteria, look at the back of your unit. If the serial number of your unit starts with US3919 or higher, you meet these requirements. If there is a product tag with "E2633A," "E2633-68703," or "E2633-68701," you meet the requirements.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Ordering Information

USB Test Option

Agilent Model/Option	Description
B30	USB test option for new Infiniium oscilloscopes
E2645A	User installable retrofit kit for existing Infiniium oscilloscopes that have an "E2633A" product tag, or serial number prefix US3919 or higher

To use the retrofit kit, you must have the following minimum Infiniium configuration: 300 MHz CPU, 64 MB RAM, Windows 98, Versions A04.20 or greater of the application software, LS-120 120 MB SuperDisk.

To determine if your Infiniium meets these configuration criteria, look at the back of your unit. If the serial number of your unit starts with US3919 or higher, you meet these requirements. Or if there is a product tag with "E2633A," "E2633-68703," or "E2633-68701," you meet the requirements.

If you do not meet the minimum requirements, you must order an Infiniium oscilloscope performance upgrade in addition to the E2645A. (See "Infiniium Software and Hardware Upgrade" for information on selecting the right upgrade option for your Infiniium.)

Infiniium Software and Hardware Upgrade

You can find your scope's serial number by looking on the back of your scope.

Agilent Option	Description
E2633-68703	Order E2633-68703 for existing Infiniium oscilloscopes with serial number prefixes beginning with US3845. This kit lets you upgrade your oscilloscope to Windows 98 and a later version of the Infiniium application software, and replace the 1.44 MB floppy drive with an LS-120 SuperDisk 120 MB floppy. Installation and calibration prices are not included. Please contact your Agilent representative for pricing of upgrades performed at the Service Center.
E2633-68701	E2633-68701 should be ordered for existing Infiniium oscilloscopes with serial number prefixes less than US3844. This kit lets you upgrade to all E2633-68703 features, a 300 MHz processor, 64 MB RAM, and a LAN card. Installation and calibration prices are not included. Please contact your Agilent representative for pricing on upgrades performed at the Service Center.

*To receive your free Infiniium software update, go to our Infiniium web site: **www.agilent.com/find/Infiniium_software**

Please contact your Agilent representative for pricing.

Related Literature

Agilent Technologies Infiniium 54800 Series Oscilloscopes	Color Brochure	5980-2388EN/EUS
Agilent Technologies Infiniium Oscilloscopes Probes and Accessories	Data Sheet	5968-7141EN/EUS
Agilent Technologies E5850A Logic Analyzer/Oscilloscope Time Correlation Fixture	Photo Card	5988-1684EN

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Agilent Technologies' Test and Measurement Support,

Services, and Assistance
Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

Our Promise
Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage
Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

For more assistance with your test & measurement needs or to find your local Agilent office go to

www.agilent.com/find/assist

Or contact the test and measurement experts at Agilent Technologies

1 800 452 4844 (8am-8pm EST)

For more information about the Infiniium 54800 Series, log onto www.agilent.com/find/Infiniium

Product specifications and descriptions in this document subject to change without notice.

©Agilent Technologies, Inc. 2001
Printed in USA
September 17, 2001

5980-2397EN

• **Microsoft, Windows, MS-DOS, and Excel** are registered trademarks of Microsoft Corporation.
• **Java** is a U.S. registered trademark of Sun Microsystems
• **Netscape** is a U.S. trademark of Netscape Communications Corporation.

Agilent Technologies

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP