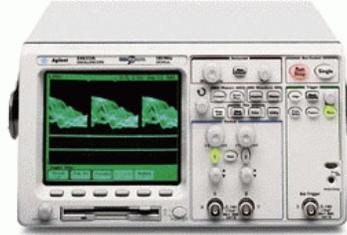


# 54622A Portable DSO

Agilent 54600 Scopes (54621A/D, 54622A/D, 54624A)

## Frequently-Asked Questions (FAQs):



### What is the memory depth?

The Agilent 54600 series uses the typical memory depth of **2 MB**. In some cases, it is possible to get up to **4 MB** of data on a *single* scope channel (and up to 8 MB of data on a single logic pod). The table outlines the max memory depth and sample rate for different scope settings and capture modes.

	1 scope channel	2 scope channels*	1 logic pod	2 logic pods
Single Mode	200 MSa/s <b>4 MB</b> memory/ch	<b>200 MSa/s</b> <b>2 MB</b> memory/ch	400 MSa/s 8 MB memory/ch	400 MSa/s 4 MB memory/ch
Run/Stop Mode	200 MSa/s 2 MB memory/ch	<b>100 MSa/s **</b> <b>1 MB</b> memory/ch	400 MSa/s 4 MB memory/ch	200 MSa/s 2 MB memory/ch
<b>Deep Stop:</b> Run/Stop with <b>2nd</b> Trigger available	200 MSa/s 2 MB memory/ch	<b>200 MSa/s</b> <b>1 MB</b> memory/ch	400 MSa/s 4 MB memory/ch	200 MSa/s 2 MB memory/ch

\* Note that **all scope channels have separate A/D converters** but there will be sharing of the memory. On a 2 channel scope there is 4 MB of memory for the scope channels and channels 1 and 2 will **share** that 4 MB. (On a 4 channel scope there is 8 MB of memory for the scope channels and 4 A/D converters. If channels 1 and 2 are on, they will share 4 MB of memory and likewise channels 3 and 4 will share the other 4 MB of memory).

\*\* When the **Stop** button is pressed, the scope looks for another trigger event in an attempt to take a 200 MSa/s long acquisition before stopping. If it doesn't get a trigger within a small amount of time, it stops anyway and gives you data sampled at **100 MSa/s**. The scope is designed like this to give the user a high waveform *update rate* by sharing memory between the current acquisition and the previous acquisition. This apparent limitation is of little consequence because the user can always elect to use **Single** mode whenever the signal is *not repetitive*.

### Why is deep memory valuable?

The size of a digital oscilloscope's waveform acquisition memory (called the scope's **memory depth** or **record length**) is not usually listed up front along with analog bandwidth, sample rate, and vertical resolution in the scope's specs even though it can greatly affect the scope's performance. Unfortunately, except for an almost intuitive feeling that a **deep** memory (**long** record length) is probably better than a short one, the effects of memory depth on a scope's performance is complex particularly the *relationship* between the memory depth, sampling interval (sample rate), and the time span being viewed.

However mysterious its value is, deep memory is an absolute requirement for an oscilloscope that will be used to *capture*, *view* and *measure* mixed analog and digital designs or single-shot events. Its major advantage is that it allows **higher** sampling rates (and consequently shorter sampling intervals between digitized points) to be maintained which means higher horizontal resolutions. The bottom line is that every digitized sample point must be stored in the scope's memory, and if the memory is limited, then the sample rate must be decreased when long time spans are to be captured. Consider capturing 10 ms of time (1 ms/div timebase setting) with 3 different scopes with 3 different memory depths:

Time Span	Memory Depth	Time between Samples	Sample Rate
10 ms	1,000	10 us	100 KSa/s
10 ms	10,000	1 us	1 MSa/s
10 ms	<b>2,000,000</b>	5 ns	<b>200 MSa/s</b>

This means that even though a maximum sample rate may be specified, it will be maintained *only* if there is sufficient memory depth to store the digitized samples. The time span, the amount of time needed to capture the information about the signal, is determined by the application. The scope's memory depth and sampling rate must then be selected to meet the specific needs of the measurement.

With the new Agilent 54600 scope series **2MB** of deep memory, it is possible to capture 10 ms of data (scope setting of 1 ms/div) and still capture and resolve **5 ns** details. And with the new acquisition and display technology, all 2MB of deep memory are mapped to the high-resolution display. Intensity values are maintained on frequency of occurrence and are mapped to the 32 levels of intensity.

Thus, there are two benefits of deep memory with the new Agilent 54600 scopes. First, the long time spans can be captured and then **zoomed in** on for detailed analysis. Second, the 2MB deep memory is displayed to the high definition display with **32 levels of intensity** for more insight into the signal. This is particularly valuable when dealing with mixed analog and digital designs where slow analog events required long time spans and fast digital control signals require the ability to maintain the sample rate so interactions may be viewed in detail.

## What is meant by "superior horizontal resolution"?

We have focused the new 54600 Series display system where the resolution is available. Horizontal accuracy is typically **.005%** while vertical accuracy is **2%**, showing that there is more accuracy in the horizontal than in the vertical system of the scope's hardware. But traditionally, the displays were stuck at comparable VGA specs of 500 or 640 horizontal pixels. The new Agilent 54600 Series have doubled this with the new display so the waveform area is **1000** pixels horizontally and **256** (for 8 bits) vertically. This means that when we **map** the 2-MB deep memory to the **32 levels of intensity**, we have nearly twice the horizontal resolution for this mapping, giving a much more detailed view of the signal. Hence, we have superior horizontal resolution by tuning our display to take advantage of the hardware's resolution.

## What is MegaZoom and what does it do for me?

MegaZoom delivers **2 MB** of deep memory behind every channel, without the sluggish response and complex operation that had to be tolerated with other deep memory scopes. Thanks to multiple processors and proprietary ASICs MegaZoom deep memory responds instantly to changes in the signal with update rates of up to **25 million vectors per second** per channel as well as to changes in settings from the front panel. And unlike other scopes, MegaZoom deep memory is *not* a *special* mode: it operates with the same familiar controls used for regular scope measurements.

## What does the '25 million vectors per second per channel' update rate mean?

Throughput in the past has been specified as triggers per second or points per second. The old 54645A and 54645D scopes had extremely fast update rates of up to 3 million points per second. This specification of points per second was used to show how much information was being put onto the display for viewing.

But now we are specifying the new series as "**vectors per second**" as we are drawing not just points, but vectors, or short lines, of varying intensity. Note that a line is composed of a start and end point, so our spec "vectors per second" is even better than the old "points per second". Each vector is a short line with an intensity corresponding to the frequency of occurrence, if you would, this is almost like the old analog scope's glow of the phosphor with intensity or intensity being associated with strength or re-occurrence of the signal. Old analog scopes would show infrequently occurring parts of a signal very faintly sometimes requiring the use of a scope hood for viewing. Strong, repeating parts of the signal would be shown on the old analog scope very brightly these many levels of intensity due to the glow of the phosphor were what gave the old analog scopes their depth of insight into signals. Now, the new Agilent 54600 Series *emulates* this by mapping the 2-MB of deep memory to vectors with 32 levels of intensity on a display with superior horizontal resolution.

Meanwhile, we have changed our spec to show that it is even better than just 25 million "points" per second it is 25 million "**lines**" or **vectors per second** of **varying intensity** that reflects strength of the signal. And, this is 25 million vectors per second per channel, meaning each channel has this unique fast update rate!

### **I can save and recall waveform IMAGES on the 546xx. Can I save and recall waveform DATA from memory also?**

**No**, it is not possible to save data to the scope's memory.

When the Digitize command executes, it flushes the data, arms the trigger, and acquires the specified channel(s). The waveforms stored in memory save only the image, not the data. An array stores each *pixel* value on the display as being either on or off. By contrast, the data captured with Digitize can store many times more data points than the number of display pixels on the screen. An example of the difference between saving the data and saving the image, is that you could use infinite persistence and recall a screen image which has multiple values on the screen.

### **Do I need to have Microsoft Excel® or Word® in order to use Agilent BenchLink XL (= IntuiLink)?**

**Yes**. Note that without Excel/Word 97 or later, the Scope Toolbar will not be available for use.

However, you can use the software components included with Agilent BenchLink XL in any environment that supports ActiveX, but this will require that you do some programming.

### **I lost my Agilent 54600 Scope Toolbar in Excel (or Word). How can I get it back?**

1. From the 'Tools' menu in Excel or Word, select 'Add-Ins'.
2. From the 'Add-Ins' dialog box, select 'HP 54600 Scope Toolbar' and click OK.
  - \Program Files\Agilent IntuiLink\54600
  - If the Toolbar is not visible, go to the 'View/Toolbars' menu and select 'HP 54600 Scope'.

### **I get an "Unable to communicate with instrument" error when I press the buttons on the Agilent 54600 Scope Toolbar. What's wrong?**

First, make sure that you have the proper interface cable connected between the oscilloscope and your PC.

From the Agilent Scope Toolbar, press the 'Connect to Scope' button.

To ensure proper operation, click 'Search' from the 'Search Instruments' property page, select an instrument from the list, and then click on 'OK' or 'Apply'.

Note: The scenario described above will also occur if you connect your GPIB cable to a different oscilloscope at a *different GPIB address*.

**If I select 'Connect to Scope' icon from the Agilent 54600 Scope Toolbar, then click 'Search' from the 'Search Instruments' property page, it tells me that no instruments were found. What's wrong?**

The first time you perform a search (click the 'Search' button from the 'Search Instruments' property page), the application searches all GPIB and RS-232 (COM) ports on your PC.

If you add additional ports to your PC, or if an instrument was disabling a port at the time of your first search, you will need to go to the 'Search Criteria' property page.

If the search does not find any type of communication, there may be something wrong with the way those ports were registered with the computer.

**From the 'Get Waveform Data' button on the Agilent 54600 Scope Toolbar, can I choose a specific number of data points?**

**No.** The values available from the dialog box reflect the most frequently-used number of points available from the oscilloscope.

**Can I change the oscilloscope settings (volts/div, time/div, etc.) from the Agilent 54600 Scope Toolbar?**

**No.** For specific instrument control, you can use the 'HP54600Scope' ActiveX Custom Control (included with Agilent BenchLink XL = IntuiLink) in a program.

**When I store oscilloscope settings from the 'Save/Load Scope Settings' button on the Agilent 54600 Scope Toolbar, what settings get stored?**

Timebase Menu:

Channel Menu:

Trigger Menu:

Display Menu:

Trace Menu:

Measure Menu:

Math Menu:

Digital Menu (54645D only):

Note that the interface mode, interface address, waveform format, and waveform source **do not** get saved.

**Can I use the Agilent 54600 Scope Toolbar when Excel® or Word® is embedded in an application?**

**No.** the Agilent 54600 Scope Toolbar *does not* support this behavior.

*Note that the toolbar will work in a Word document that contains an embedded Excel worksheet, but it will not insert data into the embedded worksheet.*

**Can I record an Agilent 54600 Toolbar macro in Microsoft Word®?**

**No.** Although the Agilent 54600 Scope Toolbar does support macro recording in Excel, this capability is not available in Word. However, the macros that are recorded from the Toolbar in Excel will work in the Word environment, but they cannot be recorded from Word. If you wish to do any automation in Word, you must use the 'HP54600Scope' ActiveX Custom Control in VBA for Word.

## When I record an Excel® macro I get two extra lines of code at the end of the macro that set the active cell to 'bold' and then to 'not-bold'. Are these lines of code vital to the operation of the code or can I delete them?

These two lines of code are included to prevent some lines of code from being deleted when the Agilent 54600 Scope Toolbar is recorded along with other worksheet user keystrokes. These lines of code do not add any functionality to the macro and can be deleted once the macro has been created.

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How hard is it to **upgrade** the software (= scope firmware)?

**Good news!** The system software for the new series of scopes is stored in Flash ROM that *can be upgraded* from a single 1.44-MB floppy disk. The latest version of software is available from the following web sites:

Upgrade 54620-series software: <http://www.agilent.com/find/5462xsw>

The system software should be downloaded to a clean floppy disk. Put the disk in the scope's disk drive. Press the Utility key on the front panel.

Press the Floppy softkey. Look at the disk and ensure that only the new system software is on the disk. Then, press Load File. The scope will go blank and the download of the new code takes about 5 minutes. There will be some flashing of LEDs on the front panel. When the code is loaded, cycle power on the scope and check the revision date of the new firmware. Also check the Cal Status. It should not be necessary to re-calibrate the scope, but if there is a problem, the Cal Status will report. Calibration is very easy, as it requires no external signal sources. Just make sure the Calibration Protect switch on the rear panel is set to unprotect and perform the calibration from the Utility menu.

Troubleshooting Agilent 54620-series Application Software download **problems**:

If you have problems loading the application file into the oscilloscope, try the following:

1. Does the file on the floppy disk have the correct suffix? The oscilloscope will only recognize applications files that end in **jzp**
2. Is the application file on the floppy the correct size? Compare the size on the floppy with the file size on the web page. If not, download the file again.
3. Try loading the file onto a new floppy disk. The disk may have become corrupt.
4. If the scope will no longer power up, try turning the scope power off, insert the floppy disk into the scope drive, then press and hold the Save/Recall and Utility keys down while powering on the scope. The scope will try to read the application disk. If the scope is reading the disk, the Run/Stop and Single keys will alternately flash.
5. If all else fails, contact your Agilent service representative for help.

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WEB site: <http://www.agilent.com>

Test & Measurements > Basic & General Purpose Instruments >

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In the Library: Frequently-Asked Questions (FAQs)

