Agilent 54610B, 54615B and 54616B 500 MHz Oscilloscopes

Product Overview

The high speed answer for low-speed budgets!

- **The industry's lowest-cost 500 MHz digital scope. (54610B)**
- **Single-shot bandwidths as high as 500 MHZ and sample rates up to 2 GSa/s**
- **1 ns peak detect at all sweep speeds. (54615B/16B)**

The 54610B, 54615B and 54616B oscilloscopes continue in the tradition of Agilent Technologies' popular 54600 series of digitizing scopes by delivering the comfortable feel of an analog oscilloscope with the power of a digital architecture. In addition, these oscilloscopes offer an incredibly high level of digitizing performance to give you confidence in your critical measurements at a fraction of the price that you might expect.

The Feel of Analog

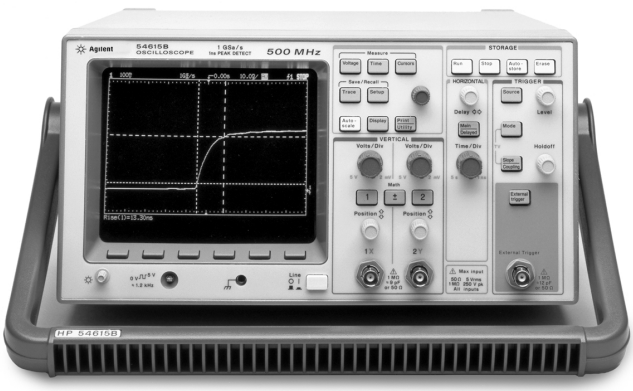
When you're troubleshooting, you want to stay focused on two things: your circuit and the scope's display. You don't want to waste time pressing buttons or waiting for the scope to update. That's why the straightforward front panel and real-time display make analog scopes such vital pieces of equipment for troubleshooting.

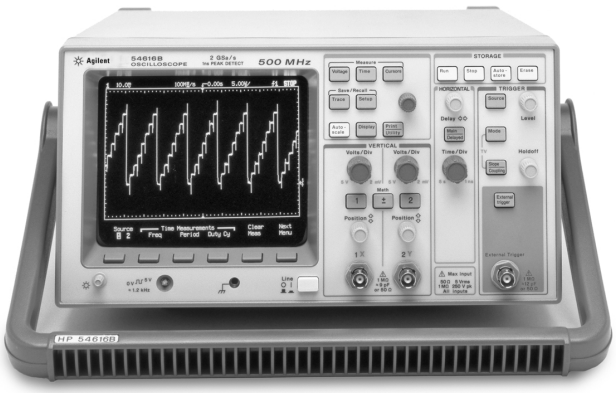
You'll feel right at home with these three digitizing oscilloscopes because they preserve the easy usability of analog. Front-panel controls look and function like the controls on your old analog scope. You don't have to change the way you work, which means you won't lose time getting used to a new style of test equipment.

In addition to front-panel controls, display quality is also a critical factor in selecting an oscilloscope. The multi-processor architecture used in these scopes has been designed for incredibly fast display updates, producing the interactive display responsiveness you require. When you make front panel setup changes, or if your input signal changes dynamically, you see the results instantly.

Another important aspect of analog oscilloscopes is variable display intensity as a function of waveform dynamics. Agilent's proprietary display system emulates this characteristic. Slowly changing portions of waveforms appear brighter on the display, while rapidly changing portions appear dimmer. No other digital scopes produce waveforms that provide this much visual information or look this similar to analog.

- 500 MHz bandwidth
- 20 MSa/s, 1 GSa/s and 2 GSa/s sample rates
- 1 ns peak detect (54615B/16B only)
- Analog feel and digital power for precise, accurate troubleshooting





Agilent Technologies

The Power of Digital

The power of digital opens up entirely new possibilities, such as pretriggering. Pretriggering lets you look back in time to see what was going on before the trigger event occurred. This can be valuable for example, in finding the cause of a system crash.

Precise, dependable results are yet another benefit of the digital architecture. With the timebase ranging from 5 s/div all the way down to 1 ns/div, you'll get more insight into waveform details. Plus, a horizontal accuracy delivers more dependable results allowing you to measure critical timing specs more accurately than is possible with analog scopes.

Why put up with faint traces or flickering displays? These digital displays are bright and stable, so there's no squinting, no need for a viewing hood, no more headaches. You'll see what you need to see, across a wide range of sweep speeds and input frequencies.

The power of the digital architecture also allows many automated features not possible in the analog domain. These productivity enhancing features help you get your job done easier and faster:

- Autoscale frees you from manually rescaling the scope every time you. move the probe from test point to test point. Simply press the Autoscale key, and the scope will automatically set voltage, time, and trigger parameters for you.
- With Autostore, the waveform displays at full brightness while all previously-acquired waveforms remain on the scope's screen at half brightness. This allows you to see a history of waveform activity while simultaneously viewing the current waveform. This is a great tool for analyzing worst-case jitter and noise, or for permanently capturing infrequent waveform anomalies.
- Automatic measurements of voltage, frequency, and time, plus user-defined cursor measurements make waveform characterization fast and easy.
- Save and recall traces and setups for quick and easy testing and waveform comparisons.
- With one of the optional modules, a hardcopy of the screen is as easy as connecting a printer and pressing the PRINT key.
- All setups and measurements can be remotely controlled for test automation and analysis using one of the optional GPIB or RS-232/ parallel modules.
- Even when operating at slow sweep speeds, the 54615B and 54616B's 1 ns peak detect mode will ensure capture of fast transient events that you might otherwise miss.

Measurement Confidence

The analog-like feel and automated digital features will surely make the art of troubleshooting fast and easy. But do these scopes have the level of performance to confidently capture your high-speed single-shot and repetitive signals? No other oscilloscope, analog or digital, has the combined level of performance of the Agilent 54610B, 54615B and 54616B at this price. With these scopes, you can have confidence in your measurements. You won't have to worry about possibly missing high-speed information, such as narrow glitches.

Even though the 54610B is the least expensive 500 MHz oscilloscope on the market, it has analog performance that is similar to higher cost oscilloscope. The 54610B is ideal for production line test applications.

The 54615B and 54616B combine 500 MHz bandwidth, 1 GSa/s and 2 GSa/s sampling, and 1 ns digital peak detect on both channels simultaneously to ensure high-fidelity capture of single-shot or repetitive waveforms. In fact, when using the scopes' 1 ns digital peak detect, they effectively maintain a 1 GSa/s sample rate on all timebase ranges. You now have the ability to always capture glitches as narrow as 1 ns regardless of the scopes' sweep rate.

Because of finite amounts of high-speed acquisition memory, digitizing scopes ordinarily reduce real time sampling rates in order to capture longer spans of time on the slower sweep ranges. When this happens, waveform anamolies such as narrow glitches can be missed if they occur between the actual samples. This is a common worry and concern among many digitizing scope users. The 54615B samples and stores all information at a maximum rate of 1 GSa/s on all sweep speeds faster than 1 microsecond per division. The 54616B can sample at 2 GSa/s at all sweep speeds faster than 500 nanoseconds per division. On the slower sweep speeds, these scopes do indeed, reduce realtime sample rate, thereby increasing the uncertainty of capturing narrow events. However, by engaging the 1 ns peak detect mode, the 54615B and 54616B effectively maintain a 1 GSa/s sample rate even on the slowest sweep speeds. This means that single-shot, 1 ns events won't be missed, even when set up to view extremely slow waveform activity.

Optional Enhancement Modules

Adding enhanced capabilities to your Agilent 54615B and 54616B scope is now as easy as snapping on a module. It's easy to add direct hard copy, PC connectivity, remote control, and advanced measurement capabilities, such as Fast Fourier Transform (FFT) and waveform template testing. You'll solve problems and boost productivity in ways that just aren't possible with ordinary scopes.

Agilent 54600-Series Scope Modules

54650A	GPIB Interface Module
54652B	RS-232/Parallel Interface Module
54657A	Measurement/ Storage Module with GPIB Interface
54659B	Measurement/ Storage Module with RS-232 and Parallel Interfaces

The 54657A and 54659B Measurement/Storage modules allow you to add flexible, high-performance tools such as FFT to view signals in the frequency domain. Having both time and frequency perspectives gives you an entirely new level of power for locating and understanding circuit failures. Common problems such as harmonic distortion, which is difficult or impossible to see in the time domain, become much easier to see when you use the FFT to look at the frequency domain.

This module also adds time-domain features that make catching intermittent failures easy. Unattended signal monitoring and failure detection features allow you to simply set up the scope and walk away. It will monitor the signal by comparison to a waveform mask template. When the failure mode appears, the scope will capture the signal and follow your instructions for time stamping, printing, or storing the signal for later analysis. The measurement/storage module provides other features to make your work easier, including measurements of channel-to-channel delay and phase, user-definable voltage levels for timing measurements, and extended math functions and cursor readout.

PC Connectivity Made Easy

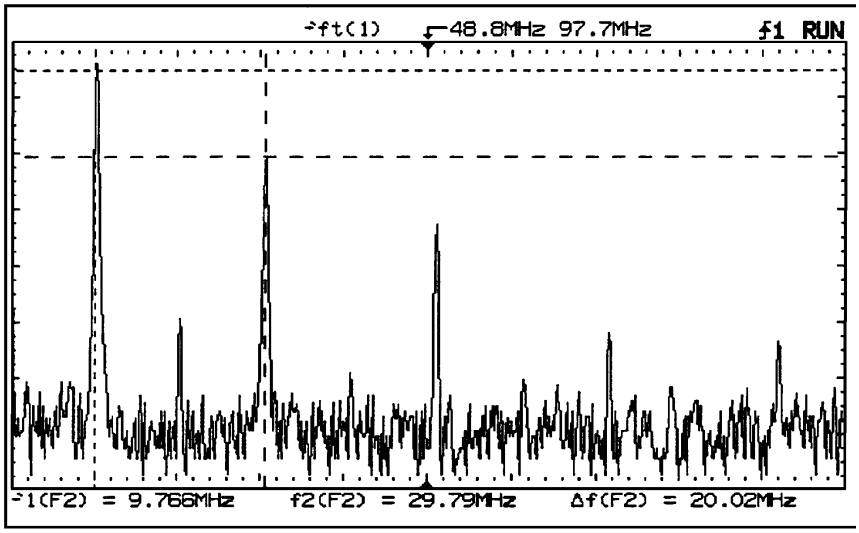
Receive Agilent IntuiLink software FREE with the purchase of any module. Use it to retrieve waveform images, waveform data, and automatic measurements into Microsoft Excel and Word with no programming. Or, for customers already using the BenchLink Scope, use the optional, standalone application to transfer screen images or data from the 54610B, 54615B or 54616B oscilloscopes to the PC. From there, the Windows Clipboard makes it a snap to create polished reports by moving scope results into your Windows applications. And for archiving, just store the images on disk in either PCX or TIF formats, with time and date stamps, too.

IntuiLink for the 54600-series scope lets you transfer the waveform data (stored as time/ voltage pairs) for analysis in your favorite analysis/statistical package. You can also use scope waveforms as input for arbitrary waveform generation by teaming up the Agilent 33120A Arbitrary Waveform Generator and the Agilent IntuiLink software for Arb .

Enhanced TV/Video Trigger for Precision Video Measurements

With the addition of Option 005, your 54610B, 54615B or 54616B oscilloscope has the ability to trigger and perform highly detailed measurements on the video components of your system. You will gain the following features:

- IRE Graticule
- Video Autoscale: Scales the display to the IRE graticule
- Cursor readout in IRE units
- NTSC, PAL, PAL-M, SECAM, and generic video formats
- Triggering on any specified line of video
- Trigger modes of:
  Selected line number
  All lines
  Field 1
  Field 2
  All Fields
- Full bandwidth vertical output
- TV trigger output



FFT measurement with the 54657A or 54659B Measurement Storage module

Agilent 54610B, 54615B and 54616B Performance Specifications and Characteristics

Vertical System

Channels	2
Bandwidth (-3dB) [1]	dc to 500 MHz
AC Coupled [1]	10 Hz to 500 MHz
Max sample rate:	54610B 20 MS/s
	54615B 1 GS/s
	54616B 2 GS/s
Sensitivity	2mV/div to 5 V/div
Accuracy [2]	±2%
Vernier Accuracy [2]	±2%
Rise Time	700 ps (calculated)
Coupling	dc, ac, and ground
Input R	1 MΩ or 50 Ω
Input C	~ 9 pF
Bandwidth Limit	approximately 30 MHz
Inversion	CH 1 and CH 2
CMRR	≥ 20 dB at 50 MHz
Dynamic Range	± 12 div from center screen
Maximum Input	250 V (dc + peak ac) for 5 Vms in 50 Ω mode
50 Ω Protection	Protects 50 Ω load from excessive voltage
Probe Sense	Automatic readout of 1X, 10X, 20X, and 100X probes

Voltage Measurement Accuracy

Single Cursor [3]	Vertical Accuracy ± 1.2% of full scale ± 0.5% of position value
Dual Cursor [3]	Vertical Accuracy ± 0.4% of full scale

Math Functions CH1 + or - CH2

Horizontal System

Main and Delayed

Main Sweep Range	5 s/div to 1 ns/div
Delayed Sweep Range	Up to 200X main sweep, as fast as 1 ns/div
Accuracy	54610B ± 0.01%
	54615B/16B ±0.005%
Resolution	54610B 25 ps
	54615B/16B 20 ps
Delay Jitter	54610B 10 ppm
	54615B/16B ≤ 1 ppm
Pretrigger Delay (negative time)	
54610B	≥ 10 divison
54615B	The greater of 30 µs or 60 div, not to exceed 100s
54616B	The greater of 15 µs or 60 div, not to exceed 100s
Posttrigger Delay (Trigger to start of sweep)	The greater of 10 ms 20,000 div, not to exceed 100 s
Time Skew	Adjustable over a range of ± 25 ns to remove effects of cabling and probe delays
Roll Mode	At sweep speeds of 200 ms/div or slower, waveform data moves across the display from right to left with no dead time. Display can be free running (non triggered) or triggered to stop on a trigger event.

Time Measurement Accuracy

Cursor accuracy	± 0.005% of reading.
Δt & 1/Δt	± 0.2% of full scale, ± 100 ps

Trigger System

Internal Triggering

Sensitivity (Ch 1 and 2)	
dc to 100 MHz:	0.5 div or 5 mV
100 MHz to 500 MHz:	1 div or 10 mV
Coupling	ac, dc, HF reject, LF reject, and noise reject (LF & HF reject -3dB at approx. 50 kHz)
Modes	Auto, Autolevel, Normal, Single, & TV

External Triggering

Range	± 2V
Sensitivity	
dc to 100 MHz:	< 75mV
100 MHz to 500 MHz:	< 150mV
Coupling	dc, ac
Input R&C	1 MΩ, ~12 pF or 50 Ω selectable
Maximum Input	250 V (dc + peak ac) or 5 Vrms in 50 Ω mode
50 Ω Protection	Protects 50 Ω load from excessive voltage
Probe Sense	Automatic readout of 1X, 10X, 20X, and 100X probes
TV Triggering	TV line and field. 0.5 div of composite sync for stable display (Ch 1 and Ch 2)
Line Counting	Delay time calibrated in NTSC and PAL line numbers
All Field Trigger	Oscilloscope triggers on the vertical sync pulse in both fields, allowing use with noninterlaced video
Holdoff	Adjustable from 300 ns to approximately 13 ns

X-Y Operation

Bandwidth	X and Y same as vertical system
Phase Difference	± 3° at 100 kHz (54610B)
	± 3° at 10 MHz (54615B/16B)

Display System

Display	7-in raster CRT
Resolution	255 vertical by 500 horizontal points
Controls	Front-panel intensity control
Graticule	8x10 grid or frame
Autostore	Saves previous sweeps in half bright display and the most recent sweep in full bright

Acquisition System

Max Sample Rate	20 MSa/s (54610B)
(single shot)	1 GSa/s (54615B)
	2 GSa/s (54616B)
Resolution	8 bits
Simultaneous Channels	2
Record Length	≤ 4,000 (54610B)
	≤ 5,000 (54615B/16B)
Usable Single-Shot Bandwidth	2 MHz (54610B) 250 MHz (54615B) 500 MHz (54616B)
Peak Detect	50 ns glitch capture (54610B)
	1 ns glitch capture (54615B/16B)
Average	Number of averages selectable at 8, 64, 256

Advanced Functions

Automatic Measurements	Measurements are continuously updated
Voltage	V_{avg}, V_{rms}, V_{p-p}, V_{top}, V_{base}, V_{min}, and V_{max}
Time	Frequency, Period, +Width, -Width, Duty Cycle, Rise Time, and Fall Time
Cursors	Manually or automatically placed

Setup Functions

Autoscale	Sets the vertical and horizontal deflection and the trigger level. Requires a signal with > 0.5% duty cycle, > 49 Hz frequency, and > 20 mV_{p-p}
Trace Memory	Two volatile pixel memories

[1] Upper bandwidth reduced 2 MHz per degree Celsius above 35°C.
[2] Temperature ± 10°C from calibration.
[3] Magnification is used below 7 mV/div range. Below 7 mV/div dull scale is defined as 56 mV full scale.

General

Power Line Requirements

Line Voltage Range	100 Vac to 240 Vac
Line Voltage Selection	Automatic
Line Frequency	45 Hz to 440 Hz
Max Power Consumption	220 VA (54610B) 300 VA (54615B/16B)

Environmental Characteristics

The instruction meets the requirements to MIL-T-28800E for Type III, Class 3, Style D equipment as described below.

Ambient Temperature

Operation	-10°C to +55°C
Nonoperation	-51°C to +71°C

Humidity [1]

Operating	95% RH at 40°C for 24 Hrs
Nonoperating	90% RH at 65°C for 24 Hrs

Altitude

Operating	to 4,500 m (15,000 ft.)
Nonoperating	to 15,000 m (50,000 ft.)

EMI (commercial) CISPR11 Group 1 Class A

EMI (MIL-T-28800E) EMI meets the requirements in accordance with MIL-T-28800E (prior to Interim Amendment 1) and MIL-STD 461C as described below.

CE01	Part 2 narrow band requirements up to 15 kHz
CE03	Part 2
CS01	Part 2
CS02	Part 2 limited to 100 MHz
CS06	Part 5 limited to 400 V
RE01	Part 5 measured at 6 inches, exceptioned from 19 kHz to 50 kHz.
RE02	Part 2 (limited to 1 GHz) full limits of Class A1c and A1f, with Option 002 installed. Without Option 002 installed 10 dB relaxation, 14 kHz to 100 kHz.
RS03	Part 2, limited to 1V/meter from 14 kHz to 1 GHz. Slight trace susceptibility from 450 MHz to 600 MHz and at 950 MHz.

Vibration

Operating	15 minutes along each of the 3 major axes; 0.025 inch p-p displacement, 10 Hz to 55 Hz in one minute cycles. Held for 10 minutes at 55 Hz (4 g at 55Hz).
Nonoperating	Survival random vibration, 5 Hz to 500 Hz at 2.41 g rms

Shock Operating: 30 g, 1/2 sine, 11 ms duration, 3 shocks per axis along major axis, total of 18 shocks.

Size (excluding handle)

Height	172 mm (6.8 in)
Width	322 mm (12.7 in)
Depth	317 mm (12.5 in)
Weight	6.6 kg (145 lbs)

Safety CSA Certification, IEC ----- 1010

Warranty 3 years (additional 2 years with option W50)

54650A GPIB Interface Module

Provides full remote control and hard copy to GPIB printers and plotters. Programming is in accordance with IEEE 488.2. With the addition of this module, the scope's two pixel memories become nonvolatile. An operating and programming manual and a programming examples disk are supplied.

Specifications	The interface capabilities of the 54600-series oscilloscope with this module installed are as defined by IEEE 488.1 as SH1, AH1, T5, L4, SR1, RL1, PP1, DC1, DT1, CO, and E2
Printer/Plotter Supported	All HP GPIB printers and HP-GL compatible plotters.

54652B RS-232/Parallel Interface Module

Provides full remote control via RS-232 and printing via parallel in one module. The RS-232 can also be configured for printing when not being used for remote control.

Specifications

Connector Type RS-232	9 pin (M) DTE port, works with 34398A RS-232 cable
Protocols	Xon/Xoff, hardware
Databits	8
Parity	None
Baud Rates	1200, 2400, 9600, or 19200
Printer/Plotter	All HP RS-232 printers and HP-GL compatible plotters
Connector Type	25 pin (F) connector, works with C2950A parallel printer cable
Supported Printers	All HP parallel printers and Epson FX-80 or HP PCL compatible printers.

54657A and 54659B Measurement/ Storage Modules

With the addition of these modules, the 54600-series oscilloscope will provide all of the following features.

19 Automatic Measurements consisting of:

Voltage	V_{amp}, V_{avg}, V_{rms}, V_{p-p}, V_{pre}, V_{ovr}, V_{top}, V_{base}, V_{min}, and V_{max}
Time	Delay, Duty Cycle, Frequency, Period, Phase Angle, Rise Time, Fall time, + Width, and - Width
Thresholds	User selectable among 10%-90%, 20%-80%, or absolute voltage levels.
Cursor Readout Modes	Voltage or percentage; Time or phase angle

Waveform Math Functions

Function 1	Addition, subtraction, and multiplication
Function 2	Differentiation, integration, and FFT

FFT

Windows	Exponential, flat top, Hanning and rectangular
Samples	1024 points
Trace Memory	Up to 100 nonvolatile memories
Memories 1–3	High-speed storage without compression
Memories 4–100	Storage with compression. Storage time is approximately 7 seconds. Number of traces that can be stored is a function of complexity, with the minimum being 4 highly complex traces and the maximum being 96.
Memory Labeling	An on-screen text editor is provided for creating labels up to 20 characters. Each label contains the date and time it was saved.
Real Time Clock	24-hour format with battery backup. Can be set from front panel.

Unattended Waveform Monitoring

Testing Method	Comparison to waveform mask
Number of Masks	2

Mask Generation	Automask, controlled from the front panel, generates a mask from a displayed waveform with selectable tolerance. Mask editor function allows pixel-by-pixel editing and line drawing. Smoothing function performs a running average of 3 pixels.
Test Region	Pixel-by-pixel selectable
Fail Region	Inside: signal fails if it falls inside the region bounded by the mask template
	Outside: signal fails if it falls outside the region bounded by the mask
Action on Failure	Save failed trace to memory with date and time of the failure
	Print failed trace with date and time of the failure
	Count the failure and maintain pass/fail statistics while continuing the test

Hard Copy and Programmability Interface

54657A: GPIB
54659B: RS-232 and Parallel

Opt. 005 Enhanced TV/Video Triggering

Video Autoscale	Scales the display to the NTSC IRE Graticules
Video Formats	NTSC, PAL, PAL-M, SECAM, and Generic
Trigger Modes	Line (number) of Field 1, 2, or alternate fields
	All Lines
	Field 1 (defined as that field with 3 lines of vertical sync starting at line 4) is actually color field 1 or 3
	Field 2 (defined as that field with 3 lines of vertical sync starting at the midpoint of line 3) is actually color field 2 or 4
	All Fields
Trigger Sources	Video trigger from either CH1 or CH2
Trigger Sensitivity	Video trigger requires >0.5 divisions of composite sync
Vertical Out	Rear panel BNC (f)
	Source impedance: 50 Ω Signal source selected by internal trigger source
	Amplitude: Approx. 90 mVp-p into 50 Ω for a full scale display
TV Trigger Out	Rear-panel BNC (f)
	Amplitude: TTL
	Delay from input: Approximately 40 ns

IntuiLink Software Operating Characteristics

Agilent IntuiLink Software for the 54600-series scopes

PC Connectivity Made Easy
Receive IntuiLink software for the 54600 FREE with the purchase of any module listed above. Use it to retrieve waveform images, waveform data—even automatic measurements—directly into Microsoft Excel and Word without programming. Additionally, an ActiveX control simplifies programming in Visual Basic, VBA, Visual C++, Agilent VEE, and National Instruments LabVIEW.

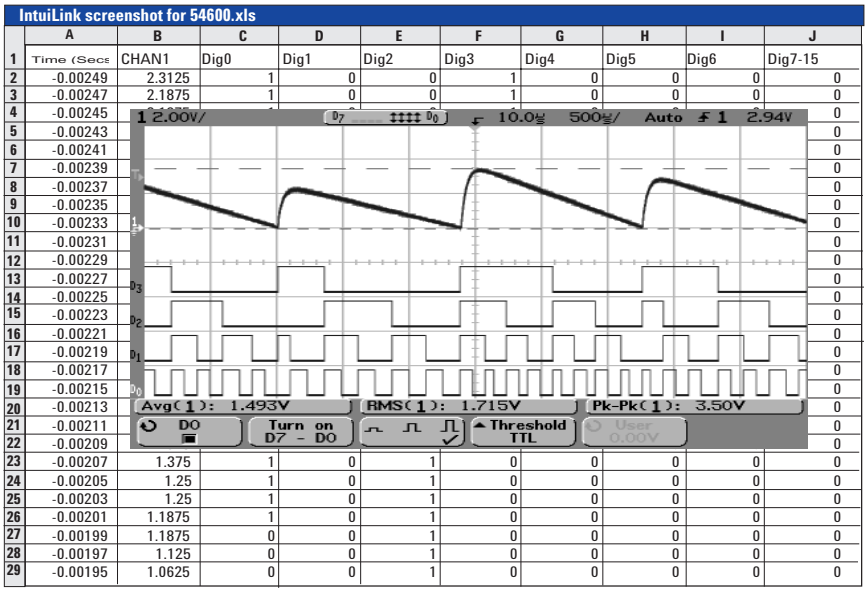
For more comprehensive information on IntuiLink, please see the IntuiLink datasheet with Agilent publication number 5980-3115EUS or visit the URL:

www.agilent.com/find/intuilink

34810B BenchLink Scope Standalone Option
Screen Image Capture
Oscilloscope screen images (pixel-based representation of scope screen) can be shown on a computer's display and copied to the Clipboard or saved in PCX or TIF formats. Time and date of capture, as well as the scope used, can be saved as part of the image.

Waveform Data Capture
Waveform data (arranged in time-voltage pairs) can be shown on a computer's display. Data can be copied to the Clipboard or saved in comma-separated (*.csv) or tab-separated (.prn) ASCII format. Paste from the Clipboard using time-voltage data. You can define number of points transferred per waveform, as well as the color of the waveform on the computer screen.

Instrument Setup
Instrument front-panel setups can be saved to a file for later recall.



Ordering Information

54610B Two-channel, 500 MHz, 20 MSa/s oscilloscope (includes two 10073B 10:1 passive probes and user's guides)

54615B Two-channel, 500 MHz, 1 GSa/s Oscilloscope (Includes two 10073B 10:1 passive probes and user's guides)

54616B Two-channel, 500 MHz, 2 GSa/s Oscilloscope (Includes two 10073B 10:1 passive probes and user's guides)

Options

Opt. 001 RS-03 Magnetic interface shielding added to CRT

Opt. 002 RE-02 Display Shield added to CRT (to reduce radiated interface)

Opt. 0B0 Delete Manual

Opt. W50 Additional 2-year warranty starting at

Opt. 1BP Mil Std 45662A cal with test data

Opt. 005 Enhanced TV/Video measurements and triggering

Opt. 090 Delete probes

Opt. 101 10098A Accessory pouch & front panel cover

Opt. 103 54654A Operator's training kit

Opt. 104 1185A Carrying case

Opt. 1CM 5062-7345 Rack mount kit

Opt. 106 34810B BenchLink scope (v1.4 or greater) for Windows

Interface, Measurement and Storage Modules (all modules ship with free IntuiLink scope software for easy transfer of images and data to Microsoft Excel and Word)

54650A GPIB Interface module

54652B RS-232/Parallel interface module

54657A GPIB Measurement/ storage module

54659B RS-232/Parallel measurement/ storage module

E2657A Measurement connectivity kit for GPIB, Includes 54657A GPIB measurement/storage module, 34810B BenchLink Scope software and 10833A GPIB cable.

E2659A Measurement connectivity kit for RS-232, Includes 54659A RS-232/parallel measurement/ storage module, 34810B BenchLink Scope software and 34398A RS-232 cable kit.

Accessories

1183A Testmobile

10098A Front panel cover and pouch (also orderable as Option 101)

10072A SMT probe tips for 1007X probes (supplied with 8 grabbers)

10070C 1:1 Passive probe

10073C 10:1 500 MHz passive probe

10076A 4 kV 250 MHz high voltage probe

10077A Accessory kit for 10076A high voltage probe

1144A 800MHz Active probe

1141A 200MHz Differential probe

1142A Probe control and power module for 1141A

N2774A 50 MHz current probe

N2775A power supply for N2774A

Agilent Technologies
Warranty and Related Literature

Agilent hardware products are warranted against defects in materials and workmanship for a period of one year from date of shipment. Some newly manufactured Agilent products may contain remanufactured parts, which are equivalent to new in performance. If you send us a notice of such defects during the warranty period, we will either repair or replace hardware products that prove to be defective.

Agilent software and firmware products that are designated by Agilent for use with a hardware product are warranted for a period of one year from date of shipment to execute their programming instructions when properly installed. If you send us notice of defects in materials or workmanship during the warranty period, we will repair or replace these products, so long as the defect does not result from buyer supplied hardware or interfacing. The warranty period is controlled by the warranty statement included with the product and begins on the date of shipment.

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.

By internet, phone, or fax, get assistance with all your test & measurement needs

Online assistance:
www.agilent.com/find/assist

Phone or Fax
United States:
(tel) 1 800 452 4844

Canada:
(tel) 1 877 894 4414
(fax) (905) 282-6495

Europe:
(tel) (31 20) 547 2323
(fax) (31 20) 547 2390

Japan:
(tel) (81) 426 56 7832
(fax) (81) 426 56 7840

Latin America:
(tel) (305) 269 7500
(fax) (305) 269 7599

Australia:
(tel) 1 800 629 485
(fax) (61 3) 9210 5947

New Zealand:
(tel) 0 800 738 378
(fax) 64 4 495 8950

Asia Pacific:
(tel) (852) 3197 7777
(fax) (852) 2506 9284

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

Printed in USA May 15, 2001

5968-7292EN

Agilent Technologies