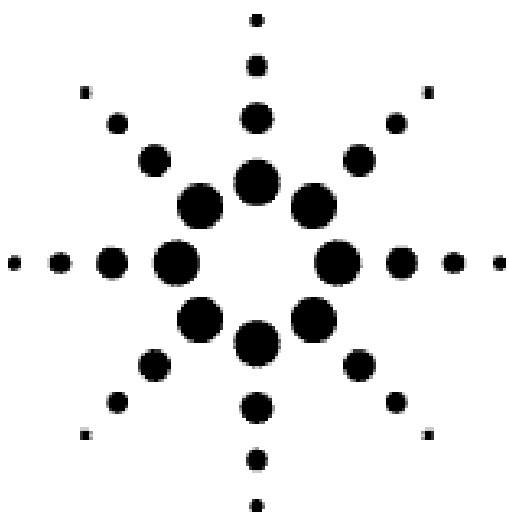


# Agilent Technologies 54540C

## Data Sheet



### Product Specifications

#### General Specifications

##### Maximum Sample Rate

HP 54540C 2 GSa/s (1 CH on), 1 GSa/s (2 CH on)  
500 MSa/s (3 or 4 CH on)

##### Number of Channels (all are simultaneous acquisition)

HP 54540C: 4

##### Record Length

32,768 pts (real time) maximum  
501 pts (repetitive)

##### Resolution

8 bits, 10 bits via HP-IB with averaging

#### Vertical Specifications

##### Repetitive Bandwidth

500 MHz (equivalent time) (rise time  $\leq$  700 ps)

##### Real Time Bandwidth

HP 54540C 125 MHz (3 or 4 CH) 250 MHz (2 CH)  
500 MHz (1 CH)

##### Sensitivity

1 mV/div to 5 V/div

##### dc Gain Accuracy

$\pm 1.25\%$  of full scale

##### Input Impedance

R: 1 Mohm  $\pm 1\%$  or 50 ohm  $\pm 1\%$   
C: 7 pF nominal

##### Input Coupling

ac, dc

#### Maximum Input

1 Mohm  $\pm$  250 V (dc + ac) [ac < 10 kHz]  
50 ohms: 5 V rms

#### Offset Range

Vertical Sensitivity Available Offset  
1 mV to 50 mV/div  $\pm$  2 V  
>50 mV to 250 mV/div  $\pm$  10 V  
>250 mV to 1.25 V/div  $\pm$  50 V  
>1.25 V/div to 5 V/div  $\pm$  250 V

#### Offset Accuracy

$\pm$ (1.25% of channel offset + 2% of full scale)

#### Voltage Measurement Accuracy

Dual Cursor  $\pm$ [(1.25%)(full scale)+(0.032)(V/div)]  
Single Cursor  $\pm$ [(1.25%)(full scale)+(offset accuracy)  
+(0.016)(V/div)]

#### Horizontal Specifications

Time Base Range  
500 ps/div to 5 s/div

#### Resolution

10 ps

#### Delta-t Accuracy

Repetitive: (> 8 averages) [(0.005%)(delta-t)+(100 ps  
+ 0.1 % of full scale)]  
Real Time [(0.005%)(delta-t)+(0.2)(sample period)]  
Peak Detect [(0.005%)(delta-t)+(1 sample period)]

#### Time Tag

Resolution 100 ps  
Accuracy  $\pm$ [0.005%(reading)+100ps]

Delay Range (posttrigger) 10E07 x sample period

Delay Range (pretrigger) 32K x (sample period)

#### Trigger Specifications

Sensitivity dc to 100 MHz 100 MHz to 500 MHz

Internal 0.5 div 1.0 div

External (54520C) 0.0225 x (signal range) 0.045 x (signal range)

Auxiliary dc to 50 MHz: 250 mVp-p

Pulse Width (minimum) 1 ns

#### Level Range

Internal  $\pm$ 1.5 X full scale from center screen

External (54520A/C)  $\pm$ 25V

Auxiliary  $\pm$ 5V

Modes Edge, pattern, glitch, time qualified pattern,  
line, state event-delayed, time-delayed, TV  
(NTSC, PAL, and user-definable formats)

Trigger Coupling dc, ac, low frequency reject

#### Display Characteristics

Display Mode "A" models feature monochrome CRT (Cathode Ray  
Tube) displays. "C" models feature flatpanel color



TFT (Thin Film Transistor) liquid-crystal displays.

Modes Averaging from 2 to 2048, envelope, infinite & variable persistence from 500 ms to 10 s, connect the dots, peak detect

Graticules full grid, axes, frame, or no graticule  
Measurements

Automatic 23 measurements on front panel or over HP-IB:

Rise time V p-p V dc rms  
Fall time V min Preshoot  
Frequency V max Overshoot  
Period V avg Voltage at time  
- Width V base Time at min voltage  
+ Width V amptd Time at max voltage  
Duty cycle V top Time at voltage  
Delta time V ac rms

User-Definable

Both upper and lower thresholds can be set from -25% to 125% for all automatic measurements

Modes

Continuous, statistics, limit test, or waveform compare

Math/Analysis Functions Operators

add, subtract, multiply, versus, integrate, differentiate, invert magnify, and FFT

Additional Characteristics

Peak Detect Captures and displays glitches or other high-speed events as narrow as 1 ns in real-time mode at sample rates of 250 MSa/s or less with sequential single-shot turned off.

Sequential Captures successive single-shot events without Single Shot capturing the dead time in between, and stores up to 400 Kbytes of waveform data.

Sequential Single-shot Throughput

Record Waveforms Stored Max Number of  
Length Per Second Waveforms Stored  
50 1333 4395  
500 1111 739  
8000 294 49  
32,000 90 12

Waveform Store

4 nonvolatile, 2 pixel (volatile), and segmentable memory for storing measurement failure waveforms or sequential single-shot waveforms.

Screen Update Rate (typical at 500 ns/div)

record length (points)  
Real Time 500 8K 16K 32K  
updates/s. 150 110 84 58  
Repetitive normal 8 avgs 128 avgs



updates/s: 150 91 91

### Optional Capabilities

#### Optional Telecommunication-Mask Application

Make telecom mask-template measurements to ANSI, CCITT, and ISDN standards using the HP 54520 or 54540 series oscilloscopes equipped with Option 001. Option 001 features 21 standard masks stored on a flexible disk. You can automatically trigger on positive isolated ones in live traffic for many standard telecom signals. The scope will automatically best-fit the test signal to many masks and give automatic pass-fail comparisons of the mask to its corresponding input signal.

For more information on Option001, Telecommunications Masks Applications ask your HP Sales representative for HP Product Overview 5963-1859E (international version) or 5963-1859 EUS (US version).

### Optional Active Probing

The HP 1144A active probe features 800-MHz bandwidth, 2-pF input capacitance, and 1-Mohm input resistance. The HP 1145A two-channel active probe features 750-MHz bandwidth, 2-pF input capacitance, and 1 Mohm input resistance and is designed for easy connection to surface mount devices.

#### I/O Characteristics

HP-IB Fully programmable, complies with IEEE 488.2  
RS-232 Bidirectional serial communication  
Centronics Talk-only parallel communication for HP PCL compatible printers

#### Hardcopy Supported Printers

Color "C" Models Monochrome "A" Models  
HP 540 Centronics Thinkjet HP-IB, RS232  
HP 560C Centronics HP 540 Centronics  
HP 560C, Centronics  
B/W only

#### Supported Plotters:

HP Color Pro HP-IB HP 7440A HP-IB  
HP 7475A HP-IB HP 7475A HP-IB  
HP 7470A HP-IB HP 7470A HP-IB  
HP 7550A HP-IB HP 7550A HP-IB

#### Disk Drive

DOS-compatible, 3-1/2" disk drive to store and recall setups, waveforms, and screen images (TIFF, PCX, and EPS). The disk drive is also utilized to download the oscilloscope's operating-system software and can be used to upgrade the scope's software as future upgrades become available. A free software-upgrade notification service is offered to registered users.

#### Front Panel Setups

9 (nonvolatile memories)



#### FFT Characteristics

Frequency Range dc to: 250 MHz (3-4 ch on)  
500 MHz (2 ch on)  
1 GHz (1 ch on)

#### Frequency Resolution

Minimum (max samp rate)/(512pts): 997 kHz (3-4 ch)  
1.95 MHz (2 ch)  
3.9 MHz (1 ch)  
Maximum (min samp rate)/(32,768 pts): 0.305 MHz

Maximum (min samp rate)/(32,768 pts):  
0.305 MHz

#### Horizontal Magnify

Specify the frequency that is displayed at center screen, and magnify the frequency-domain display about that point.

#### Freq. Accuracy

[1/2 (sample frequency) (1/32768)]  
+ (5 x 10E-5)(signal frequency)

#### Amplitude Display

Power in dBm

#### Windowing

Hanning, Flattop, Rectangular

#### Environmental Characteristics

Power Voltage 115/230 Vac, -25% to +15%, 48 to 440Hz,  
350 VA maximum

Weight Net: approximately 11.8 kg (26lb)  
Shipping: Approximately 21.3 kg (47 lb)

Dimensions Height: 218 mm (8.6 in)  
Width: 440 mm (17.3 in)  
Depth: 367 mm (14.5 in)