

➤ 9304C Series, 9310C Series, 9314C Series

Signal Capture



Acquisition System

Bandwidth (-3 dB):

- **9304C Series**
 - @ 50 Ω: DC to 200 MHz
 - @ 1 MΩ: DC to 160 MHz typical at probe tip
- **9310C/9314C Series):**
 - @ 50 Ω: DC to 400 MHz
 - @ 1 MΩ: DC to 230 MHz typical at probe tip

Number of Channels:

- **9304C/9314C Series:** four
- **9310C Series:** two

Number of Digitizers:

- **9304C/9314C Series:** four
- **9310C Series:** two

Max. Sample Rate: 100 MS/s simultaneously on each channel

Sensitivity: 2 mV/div to 5 V/div, fully variable

Scale Factors: Wide range of probe attenuation factors

Offset Range:

- 2.00–9.9 mV/div: ±120 mV
- 10.0–199 mV/div: ±1.2 V
- 0.2–5.0 V/div: ±24 V

DC Accuracy: ±2 % full scale (eight divisions) at 0 V offset

Vertical Resolution: 8 bits

Bandwidth Limiter: 30 MHz

Note: Where a particular model or a series is NOT mentioned, the specification concerned applies to all related models.

Model	9304C	9304CM	9310C	9310CM	9310CL	9314C	9314CM	9314CL
Number of Channels	Four		Two			Four		
Acquisition Memory per Channel	50 k	200 k	50 k	200 k	1 M	50 k	200 k	1 M

Input Coupling: AC, DC, GND



Input Impedance: 1 M Ω //15 pF (system capacitance using PP002) or 50 Ω \pm 1 %

Max. Input:

- 50 Ω : \pm 5 V DC (500 mW) or 5 V rms
- 1 M Ω : 250 V max (DC + peak AC \leq 10 kHz)

Acquisition Modes

Random Interleaved Sampling (RIS): For repetitive signals from 1 ns/div to 10 μ s/div

Single shot: For transient and repetitive signals from 50 ns/div

Sequence: Stores multiple events in segmented acquisition memories

Deadtime Between Segments: \leq 80 μ s

Number of Segments Available:

Model			Segments
9304C	9310C	9314C	2–200
9304CM	9310CM	9314CM	2–500
9310CL	9314CL		2–2000

Timebase System

Timebases: Main and up to four Zoom Traces

Time/Div Range: 1 ns/div to 1000 s/div

Clock Accuracy: \leq \pm 0.002%

Interpolator resolution: 10 ps

Roll Mode: Ranges 500 ms–1000 s/div

For > 50 000 points: 10–1000 s/div

External Clock: \leq 100 MHz on EXT input with ECL, TTL or zero crossing levels

Triggering System

Modes: Normal, Auto, Single, and Stop

Sources: CH1, CH2 (plus CH3 and CH4 on four-channel models), Line, Ext, Ext/10; Slope, Level and Coupling able to be set independently

Slope: Positive, Negative, Window (Bislope)

Coupling: AC, DC, HF (up to 500 MHz), LFREJ, HFREJ

Pre-trigger Recording: 0–100 % of full scale adjustable in 1 % increments



Post-trigger Delay: 0–10 000 divisions adjustable in 0.1 div increments

Holdoff by Time: 10 ns–20 s

Holdoff by Events: 0–99 999 999 events

Internal Trigger Range: ± 5 div

EXT Trigger Max Input:

➤ 50 Ω ± 1 %: ± 5 V DC (500 mW) or 5 V rms

➤ 1 M Ω /15 pF: 250 V max. (DC + peak AC ≤ 10 kHz)

EXT Trigger Range: ± 0.5 V (± 5 V with Ext/10)

Trigger Timing: Trigger Date and Time listed in “Memory Status” menu

SMART Trigger Types

Signal Width: Triggers on width between two limits of between 2.5 ns and 20 s

Signal Interval: Triggers on interval between two limits of between 10 ns and 20 s

Dropout: Triggers if the input signal drops out for a time-out longer than 25 ns–20 s

State/Edge Qualified: Triggers on any source only if a given state or transition — number of events, time interval — on another source

TV: Selection of both line (up to 1500) and field number (up to 8) for PAL, SECAM, NTSC or nonstandard video

Exclusion Trigger: Triggers only on shorter-than-normal (defined) aberrations

Autosetup

AUTOSETUP button: Sets timebase, trigger and sensitivity to display wide range of repetitive signals — amplitude 2 mV to 40 V; frequency above 50 Hz; Duty cycle greater than 0.1%

Autosetup Time: Around two seconds

Vertical Find: Automatically sets sensitivity and offset



Probes

Probe Model: One PP002 probe supplied per channel; FET probes, purchased separately, fully compatible with entire scope series

Probe calibration: Max 1 V into 1 M Ω , 500 mV into 50 Ω , frequency and amplitude programmable, pulse or square wave able to be selected, rise and fall time 1 ns typical (calibrator also offers trigger or Pass/Fail output)



Signal Viewing

Display

CRT: 12.5 x 17.5 cm (9" diagonal)
raster

Resolution: 810 x 696 points

Grids: 1, 2, or 4 grids.

Formats: YT, XY and both together

Graticules: Internally generated; separate intensity control for grids and waveforms

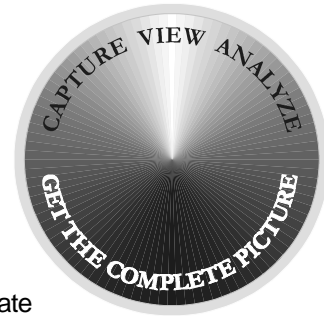
Waveform Style: Vectors, which can be switched on and off, connect individual sample points highlighted as dots

Modes: Normal, XY, Variable or Infinite Persistence

Real-time Clock: Date, hours, minutes, seconds

Vertical Zoom: Up to 5x Vertical Expansion (50x with averaging, up to 40 μ V sensitivity)

Horizontal Zoom:



Model			Zoom Factor
9304C	9310C	9314C	1000x
9304CM	9310CM	9314CM	5000x
9310CL	9314CL		20 000x

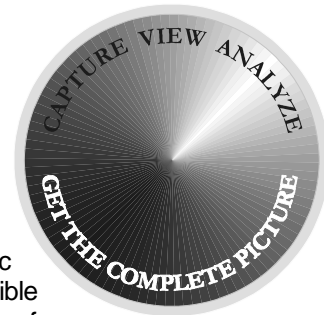
Signal Analysis

Waveform Processing

Processing Functions: Add, Subtract, Multiply, Divide, Negate, Identity and Summation Averaging; four functions performable at one time

Average: Summed averaging of up to 1000 waveforms in the basic instrument; up to 10^6 averages possible with optional WP01 Advanced Waveform Math Package

Extrema: Roof, Floor or Envelope values of from 1 to 10^6 waveforms with optional WP01 Advanced Waveform Math Package



ERES: Low-Pass digital filter provides up to 11 bits vertical resolution; sampled data always available, even when trace turned off; any of above modes usable without destroying data — with WP01 Option

FFT: Spectral Analysis with five windowing functions and FFT averaging, with optional WP02 Spectrum Analysis Package

Histogramming and Trending: With optional WP03 Parameter Analysis Package, in-depth diagnostics on waveform parameters

Internal Memory

Waveform Memory: Up to four 16-bit Memories (M1, M2, M3, M4)

Processing Memory: Up to four 16-bit Waveform Processing Memories (A, B, C, D)

Setup Memory: Four non-volatile memories; optional cards for high-capacity waveform and setup storage

Cursor Measurements

Relative Time: Arrow cursors measure time and voltage differences relative to each other

Relative Voltage: Horizontal bars measure voltage differences up to $\pm 0.2\%$ full-scale in single-grid mode

Absolute Time: Cross-hair marker measures time relative to trigger and voltage with respect to ground

Absolute Voltage: Reference bar measures voltage with respect to ground

Interfacing

Remote Control: By GPIB and RS-232-C for all front-panel controls, internal functions

RS-232-C Port: Asynchronous up to 115.2 Kb/s for computer or terminal control, or printer or plotter connection

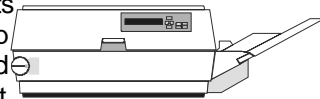
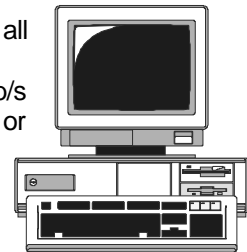
GPIB Port: (IEEE-488.1) Configurable as talker/listener for computer control and fast data transfer; command language compliant with IEEE-488.2

Centronics Port: Hardcopy interface

PC Card (PCMCIA I/III Ports): Optional for memory cards, flash cards and removable hard disks

Floppy Disk: High density 3.5-inch floppy disk drive (DOS format)

Hardcopy: TIFF and BMP formats available for import to Desktop Publishing programs; printers and plotters — HP DeskJet, HP ThinkJet, QuietJet, LaserJet, PaintJet, and EPSON printers; HP 7400 and 7500 series, or HPGL compatible plotters





Specifications

- Optional internal, high-resolution graphics printer
Output Formats: Binary, or ASCII waveform output compatible with spreadsheets, MATLAB™, MathCad™

General

Auto-calibration: Ensures specified DC and timing accuracy
Temperature: 5 to 40 °C (41 to 104 °F) rated
Humidity: 80 % for temperatures up to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C
Altitude: Up to 2000 m (6560 ft) operating, 40 °C max
Power: 90–250 V AC, 45–66 Hz, 150 W
Battery Backup: Front-panel settings maintained for two years
Dimensions: (HWD) 8.5 x 14.5 x 16.25 inches / 264 x 397 x 453 mm
Weight: 12.5 kg (27.5 lb.) net, 18 kg (40 lb.) shipping
Warranty: Three years

Conformity

EMC: EN 50082-1 conformity
Safety: Designed to comply with EN 61010-1; UL and cUL listed, File E 170588: Protection Category I, Installation (Over-Voltage) Category II, Pollution Degree 2
See Declaration of Conformity for further details.

➤ **9344C Series, 9350C Series, 9354C Series**

Signal Capture

Acquisition System



Bandwidth (-3 dB):

- **9344C Series**
 - @ 50 Ω: DC to 500 MHz
 - 100 mV/div: 400 MHz
 - 50 mV/div and below: 350 MHz
 - @ 1 MΩ: DC to 500 MHz typical at tip of optional FET probe AP020
- **9350C/9354C Series:**
 - @ 50 Ω: DC to 500 MHz
 - 100 mV/div: 400 MHz
 - 50 mV/div and below: 350 MHz
 - @ 1 MΩ: DC to 500 MHz typical at tip of optional FET probe AP020

Number of Channels:

- **9344C/9354C Series:** four
- **9350C Series:** two

Number of Digitizers:

- **9344C/9354C Series:** four
- 9350C Series:** two

9344C Series					
CHANNELS USED (PEAK DETECT ON/OFF)	MAX SAMPLE RATE	MEMORY PER CHANNEL (IN POINTS) PER MODEL			ACTIVE CHANNELS
		C	CM	CL	
All (Peak Detect Off)	250 MS/s	50k	250k	2M	All
All (Peak Detect ON)	100 MS/s data	25k data	100k data	1M data	All
	200 MS/s peak	25k peak	100k peak	1M peak	
Two Channels Paired (Peak Detect OFF)	500 MS/s	100k	500k	4M	CH 2 and CH 3
Four Channels Combined (Peak Detect OFF)	1000 MS/s	250k	500k	4M	CH 2

9350C/9354C Series					
CHANNELS USED (PEAK DETECT ON/OFF)	MAX SAMPLE RATE	MEMORY PER CHANNEL (IN POINTS) PER MODEL			ACTIVE CHANNELS
		C	CM	CL	
All (Peak Detect OFF)	500 MS/s	50k	250k	2M	All
All (Peak Detect ON)	100 MS/s data	25k data	100k data	1M data	All
	400 MS/s peak	25k peak	100k peak	1M peak	2.5 ns peak detect
Two Channels Paired (Peak Detect OFF)	1 GS/s	100k	500k	4M	9350C/M/L
					9354C/M/L
					CH 1
					CH 2 + CH 3
FOUR-CHANNEL MODELS ONLY					
Four Channels Combined by PP092 Adapter (Peak Detect OFF)	2 GS/s	250k	1M	8M	CH 2 (PP092 input)
9354CTM					
All (Peak Detect OFF)	500 MS/s	500 000			All
Two Channels Paired (Peak Detect OFF)	1 GS/s	1M			CH 2 and CH 3
All Peak Detect ON	100 MS/s data	250k data			All
	400 MS/s peak	250k peak			2.5 ns peak detect
Four Channels Combined by PP092 Adapter (Peak Detect OFF)	2 GS/s	2M			CH 2 (PP092 input)

Sensitivity: 2 mV/div to 5 V/div, fully variable

Scale Factors: Wide range of probe attenuation factors

Offset Range:

- 2.00–9.9 mV/div: ±120 mV
- 10.0–199 mV/div: ±1.2 V
- 0.2–5.0 V/div: ±24 V

DC Accuracy: typically 1%

Vertical Resolution: 8 bits

Bandwidth Limiter: 30 MHz

Input Coupling: AC, DC, GND

9344C Series, 9350C Series, 9354C Series



Input Impedance: 50 Ω \pm 1 % or 1 M Ω //15 pF (system capacitance using PP002)

Max. Input:

- 50 Ω : \pm 5 V DC (500 mW) or 5 V rms
- 1 M Ω : 250 V max (DC + peak AC \leq 10 kHz)

Acquisition Modes

Random Interleaved Sampling (RIS): For repetitive signals from 1 ns/div to 2 μ s/div

- **9344C Series, 9350CM/CL, 9354CM/CL/CTM:** For repetitive signals from 1 ns/div to 5 μ s/div

Single shot:

- **9344C Series:** For transient and repetitive signals from 20 ns/div (all channels active)
- **9350C, 9354C Series:** For transient and repetitive signals from 10 ns/div (all channels active)

Peak Detect:

- **9344C Series:** Captures and displays 5 ns glitches and other high-speed events
- **9350C, 9354C Series:** Captures and displays 2.5 ns glitches and other high-speed events

Sequence: Stores multiple events in segmented acquisition memories

Deadtime Between Segments: \leq 80 μ s

Number of Segments Available:

Model				Segments
9344C	9350C	9354C		2–200
9344CM	9350CM	9354CM	9354CTM	2–500
9344CL	9350CL	9354CL		2–2000

Timebase System

Timebases: Main and up to four Zoom Traces

Time/Div Range: 1 ns/div to 1000 s/div

Clock Accuracy: \leq 10 ppm

Interpolator resolution: 10 ps

Roll Mode:

- **9344C:** Ranges 500 ms–1000 s/div
- **9350C, 9354C Series:** Ranges 500 ms–1000 s/div; $>$ 50 000 points: 10–1000 s/div

External Clock: \leq 100 MHz on EXT input with ECL, TTL or zero crossing levels



Triggering System

Modes: Normal, Auto, Single, and Stop
Sources: CH1, CH2 (plus CH3 and CH4 on four-channel models), Line, Ext, Ext/10; Slope, Level and Coupling able to be set independently
Slope: Positive, Negative
Coupling: AC, DC, HF (up to 500 MHz), LFREJ, HFREJ
Pre-trigger Recording: 0–100 % of full scale adjustable in 1 % increments
Post-trigger Delay: 0–10 000 divisions adjustable in 0.1 div increments
Holdoff by Time: 10 ns–20 s
Holdoff by Events: 0–99 999 999 events
Internal Trigger Range: ± 5 div
EXT Trigger Max Input:
➤ 50 Ω ± 1 %: ± 5 V DC (500 mW) or 5 V rms
➤ 1 M Ω /15 pF: 250 V max. (DC + peak AC ≤ 10 kHz)
EXT Trigger Range: ± 0.5 V (± 5 V with Ext/10)
Trigger Timing: Trigger Date and Time listed in “Memory Status” menu



SMART Trigger Types

Signal or Pattern Width: Triggers on width between two limits of between 2.5 ns and 20 s
Signal or Pattern Interval: Triggers on interval between two limits of between 10 ns and 20 s
Dropout: Triggers if the input signal drops out for a time-out longer than 25 ns–20 s
State/Edge Qualified: Triggers on any source only if a given state or transition — number of events, time interval — on another source
TV: Selection of both line (up to 1500) and field number (up to 8) for PAL, SECAM, NTSC or nonstandard video
Exclusion Trigger: Triggers only on shorter-than-normal (defined) aberrations
Pattern Trigger:
➤ **Two-channel models:** Triggers on the logic combination of the three inputs CH 1, CH 2 and EXT Trigger, where each source can be defined as High, Low or Don't Know and the trigger as the pattern's beginning or end
➤ **Four-channel models:** Triggers on the logic combination of the five inputs CH 1, CH 2, CH 3, CH 4 and EXT Trigger, where each source can be defined as High, Low or Don't Know and the trigger as the pattern's beginning or end

Autosetup

AUTOSETUP button: Sets timebase, trigger and sensitivity to display wide range of repetitive signals — amplitude 2 mV to 40 V; frequency above 50 Hz; duty cycle greater than 0.1%

Autosetup Time: Around two seconds

Vertical Find: Automatically sets sensitivity and offset



Probes

Probe Model: One PP002 probe supplied per channel, DC to 250 MHz typical at probe tip, 600 V max.; FET probes, purchased separately, fully compatible with entire scope series

Probe calibration: Max 1 V into 1 MΩ, 500 mV into 50 Ω, frequency and amplitude programmable, pulse or square wave able to be selected, rise and fall time 1 ns typical (calibrator also offers trigger or Pass/Fail output)

Signal Viewing

Display

CRT: 12.5 x 17.5 cm (9" diagonal) raster

Resolution: 810 x 696 points

Grids: 1, 2, or 4 grids.

Formats: YT, XY and both together

Graticules: Internally generated; separate intensity control for grids and waveforms

Waveform Style: Vectors, which can be switched on and off, connect individual sample points highlighted as dots

Modes: Normal, XY, Variable or Infinite Persistence

Real-time Clock: Date, hours, minutes, seconds

Vertical Zoom: Up to 5x Vertical Expansion (50x with averaging, up to 40 μV sensitivity, with optional WP01 Advanced Waveform Math Package)

Horizontal Zoom: Waveforms can be expanded to give 2–2.5 points/div



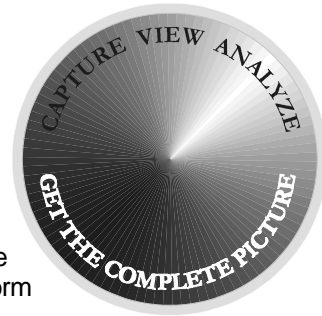
Model			Zoom Factor
9344C	9350C	9354C	2000x
9344CM	9350CM	9354CM	10 000x
9354CTM			50 000x
9344CL	9350CL	9354CL	100 000x



Signal Analysis

Waveform Processing

Processing functions: Add, Subtract, Multiply, Divide, Negate, Identity, Summation Averaging, and Sine x/x; four functions performable at one time
Average: Summed averaging of up to 1000 waveforms in the basic instrument; up to 10^6 averages possible with optional WP01 Advanced Waveform Math Package



Extrema: Roof, Floor or Envelope values of from 1 to 10^6 waveforms with optional WP01 Advanced Waveform Math Package

ERES: Low-Pass digital filter provides up to 11 bits vertical resolution; sampled data always available, even when trace turned off; any of above modes usable without destroying data — with WP01 Option

FFT: Spectral Analysis with five windowing functions and FFT averaging, with optional WP02 Spectrum Analysis Package

Histogramming and Trending: With optional WP03 Parameter Analysis Package, in-depth diagnostics on waveform parameters

Internal Memory

Waveform Memory: Up to four 16-bit Memories (M1, M2, M3, M4)

Processing Memory: Up to four 16-bit Waveform Processing Memories (A, B, C, D)

Setup Memory: Four non-volatile memories; optional cards or disks for high-capacity waveform and setup storage

Cursor Measurements

Relative Time: Arrow cursors measure time and voltage differences relative to each other

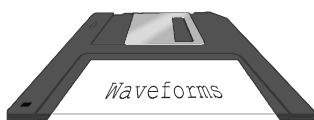
Relative Voltage: Horizontal bars measure voltage differences up to $\pm 0.2\%$ full-scale in single-grid mode

Absolute Time: Cross-hair marker measures time relative to trigger and voltage with respect to ground

Absolute Voltage: Reference bar measures voltage with respect to ground

9344C Series, 9350C Series, 9354C Series

Interfacing



Remote Control: By GPIB and RS-232-C for all front-panel controls, internal functions

RS-232-C Port: Asynchronous up to 115.2 Kb/s for computer or terminal control, or printer or plotter connection

GPIB Port: (IEEE-488.1) Configurable as talker/listener for computer control and fast data transfer; command language compliant with IEEE-488.2

Centronics Port: Hardcopy interface

PC Card (PCMCIA II/III Ports): Optional for memory cards, flash cards and removable hard disks

Floppy Disk: High density 3.5-inch floppy disk drive (DOS format)

Hardcopy: TIFF and BMP formats

available for import to Desktop

Publishing programs; printers and

plotters: HP DeskJet, HP ThinkJet,

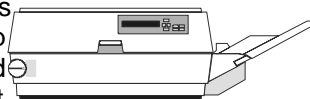
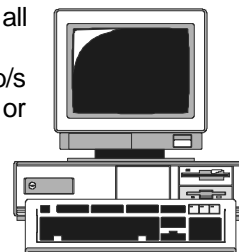
QuietJet, LaserJet, PaintJet, and

HP 7400 and 7500 series, or HPGL compatible plotters

➤ Optional internal, high-resolution graphics printer

Output Formats: Binary, or ASCII waveform output compatible with

spreadsheets, MATLAB, Mathcad



General

Auto-calibration: Ensures specified DC and timing accuracy

Temperature: 5 to 40 °C (41 to 104 °F) rated

Humidity: 80 % for temperatures up to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C

Altitude: Up to 2000 m (6560 ft) operating, 40 °C max

Power: 90–250 V AC, 45–66 Hz, 230 W

Battery Backup: Front-panel settings maintained for two years

Dimensions: (HWD) 8.5 x 14.5 x 16.25 inches / 264 x 397 x 453 mm

Weight: 13 kg (28.6 lb.) net, 18.5 kg (40.7 lb.) shipping

Warranty: Three years

Conformity

EMC: EN 50082-1 conformity

Safety: Designed to comply with EN 61010-1; UL and cUL listed, File E 170588: Protection Category I, Installation (Over-Voltage) Category II, Pollution Degree 2

See Declaration of Conformity for further details.



➤ **9370C Series, 9374C Series**

Signal Capture



Acquisition System

Bandwidth (-3 dB):

- @ 50 Ω: DC to 1 GHz
10 mV/div and above
- @ 1 MΩ: DC to 500 MHz typical
at PP005 probe tip
 - 1 GHz FET probe optional

Number of Channels, Digitizers:

- **9374C Series:** four
- **9370C Series:** two

Sensitivity:

- 50 Ω: 2 mV/div to 1 V/div, fully variable
- 1 MΩ: 2 mV/div to 10 V/div, fully variable

Scale Factors: Wide range of probe attenuation factors

9370C/9374C Series							
CHANNELS USED (PEAK DETECT ON/OFF)	MAX SAMPLE RATE	MEMORY PER CHANNEL (POINTS)				ACTIVE CHANNELS	
		Model					
		C	CM	CTM	CL		
All (Peak Detect OFF)	500 MS/s	50k	250k	500k	2M	All	
All (Peak Detect ON)	100 MS/s data	25k data	100k data	250k data	1M data	All	
	400 MS/s peak	25k peak	100k peak	250k peak	1M peak	2.5 ns peak detect	
Two Channels Paired (Peak Detect OFF)	1 GS/s	100k	500k	1M	4M	9370C/M/L	9374C/M/L/TM
						CH 1	CH 2 + CH 3
FOUR-CHANNEL MODELS ONLY							
Four Channels Combined by PP093 Adapter (Peak Detect OFF)	2 GS/s	250k	1M	2M	8M	One (PP093 input)	



Offset Range:

- 2.00–4.99 mV/div: ±400 mV
- 5–99 mV/div: ±1 V
- 0.1–1 V/div: ±10 V
- 1–10 V/div: ±100 V (1 MΩ Only)

DC Accuracy: typically 1%

Vertical Resolution: 8 bits

Bandwidth Limiter:

- 25 MHz
- 200 MHz

Input Coupling: AC, DC, GND

Input Impedance: 50 Ω ±1 %, or 1 MΩ//15 pF typical, system capacitance at tip of PP005 probe

Max. Input:

- 50 Ω: ±5 V DC (500 mW) or 5 V rms
- 1 MΩ: 400 V max (DC + peak AC ≤10 kHz)

Acquisition Modes

Random Interleaved Sampling (RIS): For repetitive signals from 1 ns/div to 5 μs/div

Single shot: For transient and repetitive signals from 10 ns/div (all channels active)

Peak Detect: Captures and displays 2.5 ns glitches and other high-speed events

Sequence: Stores multiple events in segmented acquisition memories

Deadtime Between Segments: ≤80 μs

Number of Segments Available:

Model		Segments
9370C	9374C	2–200
9370CM	9374CM	2–500
9370CL	9374CL	2–2000
	9374CTM	

Timebase System

Timebases: Main and up to four Zoom Traces

Time/Div Range: 1 ns/div to 1000 s/div

Clock Accuracy: ≤10 ppm

Interpolator resolution: 10 ps

Triggering System



SMART Trigger Types

Roll Mode:

- Ranges 500 ms–1000 s/div
- For >50 000 points: 10–1000 s/div

External Clock:

- ≤100 MHz on EXT input with ECL, TTL or zero crossing levels
- Optional 50–500 MHz rear panel fixed frequency clock input

Modes: Normal, Auto, Single, and Stop

Sources: CH1, CH2 (plus CH3 and CH4 on four-channel models), Line, Ext, Ext/10; Slope, Level and Coupling able to be set independently

Slope: Positive, Negative

Coupling: AC, DC, HF, LFREJ, HFREJ

Pre-trigger Recording: 0–100 % of full scale adjustable in 1 % increments

Post-trigger Delay: 0–10 000 divisions adjustable in 0.1 div increments

Holdoff by Time: 10 ns–20 s

Holdoff by Events: 0–99 999 999 events

Internal Trigger Range: ±5 div

EXT Trigger Max Input:

- 50 Ω ±1 %: ±5 V DC (500 mW) or 5 V rms
- 1 MΩ/15 pF: 400 V max. (DC + peak AC ≤10 kHz)

EXT Trigger Range: ±0.5 V (±5 V with Ext/10)

Trigger Timing: Trigger Date and Time listed in “Memory Status” menu

Signal or Pattern Width: Triggers on width between two limits of between 2.5 ns and 20 s

Signal or Pattern Interval: Triggers on interval between two limits of between 10 ns and 20 s

Dropout: Triggers if the input signal drops out for a time-out longer than 25 ns–20 s

State/Edge Qualified: Triggers on any source only if a given state or transition — number of events, time interval — on another source

TV: Selection of both line (up to 1500) and field number (up to 8) for PAL, SECAM, NTSC or nonstandard video

Exclusion Trigger: Triggers only on shorter-than-normal (defined) aberrations

Autosetup



Pattern:

- **Two-channel models:** Triggers on the logic combination of the three inputs CH 1, CH 2 and EXT Trigger, where each source can be defined as High, Low or Don't Know and the trigger as the pattern's beginning or end
- **Four-channel models:** Triggers on the logic combination of the five inputs CH 1, CH 2, CH 3, CH 4 and EXT Trigger, where each source can be defined as High, Low or Don't Know and the trigger as the pattern's beginning or end

AUTOSETUP button: Sets timebase, trigger and sensitivity to display wide range of repetitive signals — amplitude 2 mV–40 V; frequency above 50 Hz; duty cycle greater than 0.1%

Autosetup Time: Around two seconds

Vertical Find: Automatically sets sensitivity and offset

Probe Model: One PP005 probe supplied per channel (10:1, 10 M Ω /11 pF, 500 V max input); FET probes, purchased separately, fully compatible with entire scope series

Probe calibration: Max 1 V into 1 M Ω , 500 mV into 50 Ω , frequency and amplitude programmable, pulse or square wave able to be selected, rise and fall time 1 ns typical (calibrator also offers trigger or Pass/Fail output)

Signal Viewing

Display

CRT: 12.5 x 17.5 cm (9" diagonal)
raster

Resolution: 810 x 696 points

Grids: 1, 2, or 4 grids.

Formats: YT, XY and both together

Graticules: Internally generated;
separate intensity control for grids and waveforms

Waveform Style: Vectors, which can be switched on and off, connect individual sample points highlighted as dots

Modes: Normal, XY, Variable or Infinite Persistence

Real-time Clock: Date, hours, minutes, seconds





Specifications

Vertical Zoom: Up to 5x Vertical Expansion (50x with averaging, up to 40 μ V sensitivity, with optional WP01 Advanced Waveform Math Package)

Horizontal Zoom: Waveforms can be expanded to give 2–2.5 points/div.

Model		Zoom Factor
9370C	9374C	2000x
9370CM	9374CM	10 000x
9374CTM		50 000x
9370CL	9374CL	100 000x

Signal Analysis

Waveform Processing

Processing functions: Add, Subtract, Multiply, Divide, Negate, Identity, Summation Averaging, and Sine x/x; four functions performable at one time

Average: Summed averaging of up to 1000 waveforms in the basic instrument; up to 10^6 averages possible with optional WP01 Advanced Waveform Math Package

Extrema: Roof, Floor or Envelope values of from 1 to 10^6 waveforms — with WP01 Option

ERES: Low-Pass digital filter provides up to 11 bits vertical resolution; sampled data always available, even when trace turned off; any of above modes usable without destroying data — with WP01 Option

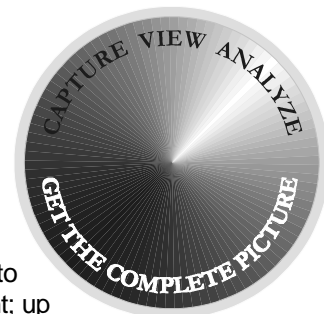
FFT: Spectral Analysis with five windowing functions and FFT averaging, with optional WP02 Spectrum Analysis Package

Histogramming and Trending: With optional WP03 Parameter Analysis Package, in-depth diagnostics on waveform parameters

Waveform Memory: Up to four 16-bit Memories (M1, M2, M3, M4).

Processing Memory: Up to four 16-bit Waveform Processing Memories (A, B, C, D).

Setup Memory: Four non-volatile memories; optional cards or disks for high-capacity waveform and setup storage



Internal Memory

Cursor Measurements

Relative Time: Arrow cursors measure time and voltage differences relative to each other

Relative Voltage: Horizontal bars measure voltage differences up to $\pm 0.2\%$ full-scale in single-grid mode

Absolute Time: Cross-hair marker measures time relative to trigger and voltage with respect to ground

Absolute Voltage: Reference bar measures voltage with respect to ground

Interfacing

Remote Control: By GPIB and RS-232-C for all front-panel controls, internal functions

RS-232-C Port: Asynchronous up to 115.2 Kb/s for computer or terminal control, or printer or plotter connection

GPIB Port: (IEEE-488.1) Configurable as talker/listener for computer control and fast data transfer; command language compliant with IEEE-488.2

Centronics Port: Hardcopy interface

PC Card (PCMCIA I/III Ports): Optional for memory cards, flash cards and removable hard disks

Floppy Disk: High density 3.5-inch floppy disk drive (DOS format)

Hardcopy: TIFF and BMP formats

available for import to Desktop

Publishing programs; printers and

plotters: HP DeskJet, HP ThinkJet,

QuietJet, LaserJet, PaintJet, and EPSON printers; HP 7400 and 7500 series, or HPGL compatible plotters

➤ Optional internal, high-resolution graphics printer

Output Formats: Binary, or ASCII waveform output compatible with spreadsheets, MATLAB, Mathcad

General

Auto-calibration: Ensures specified DC and timing accuracy

Temperature: 5 to 40 °C (41 to 104 °F) rated

Humidity: 80 % for temperatures up to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C

Altitude: Up to 2000 m (6560 ft) operating, 40 °C max

Power: 90–250 V AC, 45–66 Hz, 230 W

Battery Backup: Front-panel settings maintained for two years

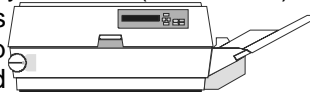
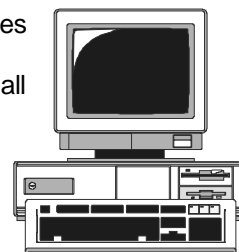
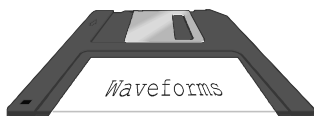
Dimensions: (HWD) 8.5 x 14.5 x 16.25 inches / 264 x 397 x 453 mm

Weight: 13 kg (28.6 lb.) net, 18.5 kg (40.7 lb.) shipping

Warranty: Three years

Conformity

EMC: EN 50082-1 conformity



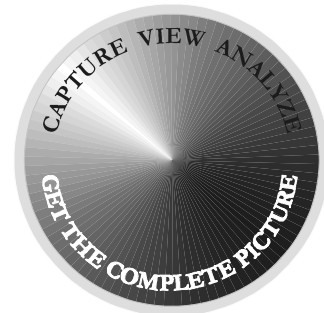


Specifications

Safety: Designed to comply with EN 61010-1; UL and cUL listed, File E 170588: Protection Category I, Installation (Over-Voltage) Category II, Pollution Degree 2
See Declaration of Conformity for further details.

➤ **9384C Series**

Signal Capture



Acquisition System

Bandwidth (-3 dB):

- @ 50 Ω: DC to 1 GHz
10 mV/div and above
- @ 1 MΩ: DC to 500 MHz typical
at PP005 probe tip
 - 1 GHz FET probe optional

Number of Channels: four

Number of Digitizers: four

Sensitivity:

- 50 Ω: 2 mV/div to 1 V/div, fully variable
- 1 MΩ: 2 mV/div to 10 V/div, fully variable

Scale Factors: Wide range of probe attenuation factors

Offset Range:

- 2.00–4.99 mV/div: ±400 mV
- 5–99 mV/div: ±1 V
- 0.1–1 V/div: ±10 V
- 1–10 V/div: ±100 V (1 MΩ Only)
- ±20 V over the full sensitivity range using AP 020 FET probe

9384C Series					
CHANNELS USED (PEAK DETECT ON/OFF)	MAX SAMPLE RATE	MEMORY PER CHANNEL (IN POINTS)			ACTIVE CHANNELS
		Model			
		C	CM/CTM	CL	
All (Peak Detect OFF)	1 GS/s	100k	500k	2M	All
All (Peak Detect ON)	100 MS/s data	50k data	250k data	1M data	All
	400 MS/s peak	50k peak	250k peak	1M peaks	2.5 ns peak detect
Two Channels Paired (Peak Detect OFF)	2 GS/s	200k	1M	2M	CH 2 + CH 3
Four Channels Combined by PP094 Adapter (Peak Detect OFF)	4 GS/s	400k	2M	8M	One (PP094 input)



Acquisition Modes

DC Accuracy: typically 1% at 10 mV and above

Vertical Resolution: 8 bits

Bandwidth Limiter:

- 25 MHz
- 200 MHz

Input Coupling: AC, DC, GND

Input Impedance: 50 Ω ±1 %, or 1 MΩ/11 pF typical

Max. Input:

- 50 Ω: ±5 V DC
- 1 MΩ: 400 V max (DC + peak AC ≤10 kHz)

Random Interleaved Sampling (RIS): For repetitive signals from 1 ns/div to 2 μs/div

Single shot: For transient and repetitive signals from 1 ns/div (all channels active)

Peak Detect: Captures and displays 2.5 ns glitches and other high-speed events

Sequence: Stores multiple events, time-stamped, in segmented acquisition memories

Deadtime Between Segments: ≤80 μs

Number of Segments Available:

Model			Segments
9384C			2–500
9384CM	9384CTM	9384CL	2–2000

Timebase System

Timebases: Main and up to four Zoom Traces

Time/Div Range: 1 ns/div to 1000 s/div

Clock Accuracy: ≤10 ppm

Interpolator resolution: 10 ps

Roll Mode:

- Ranges 500 ms–1000 s/div
- For >50 000 points: 10–1000 s/div

Triggering System

Modes: Normal, Auto, Single, and Stop

Sources: CH1, CH2, CH3, CH4, Line, Ext, Ext/10; Slope, Level and Coupling able to be set independently

Slope: Positive, Negative

Coupling: AC, DC, HF, LFREJ, HFREJ

Pre-trigger Recording: 0–100 % of full scale adjustable in 1 % increments



Post-trigger Delay: 0–10 000 divisions adjustable in 0.1 div increments

Holdoff by Time: 10 ns–20 s

Holdoff by Events: 0–99 999 999 events

Internal Trigger Range: ± 5 div

EXT Trigger Max Input:

➤ 50 Ω ± 1 %: ± 5 V DC (500 mW) or 5 V rms

➤ 1 M Ω /15 pF: 400 V max. (DC + peak AC ≤ 10 kHz)

EXT Trigger Range: ± 0.5 V (± 5 V with Ext/10)

Trigger Timing: Trigger Date and Time listed in “Memory Status” menu

SMART Trigger Types

Signal or Pattern Width: Triggers on width between two limits of between < 2.5 ns (1 ns typical) or pulse widths between < 2.5 ns and 20 s exclusive

Signal or Pattern Interval: Triggers on interval between two limits of between 10 ns and 20 s

Dropout: Triggers if the input signal drops out for a time-out longer than 25 ns–20 s

State/Edge Qualified: Triggers on any source only if a given state or transition — number of events, time interval — on another source

TV: Selection of both line (up to 1500) and field number (up to 8) for PAL, SECAM, NTSC or nonstandard video

Exclusion Trigger: Triggers only on shorter-than-normal (defined) aberrations

Pattern: Triggers on the logic combination of the five inputs CH 1, CH 2, CH 3, CH 4 and EXT Trigger, where each source can be defined as High, Low or Don't Know and the trigger as the pattern's beginning or end

Autosetup

AUTOSETUP button: Sets timebase, trigger and sensitivity to display wide range of repetitive signals — amplitude 2 mV–40 V; frequency above 50 Hz; duty cycle greater than 0.1%

Autosetup Time: Around two seconds

Vertical Find: Automatically sets sensitivity and offset



Probes

Probe Model: One PP005 probe supplied per channel (10:1, 10 M Ω //11 pF, 500 V max input); FET probes, purchased separately, fully compatible with entire scope series

Probe calibration: Max 1 V into 1 M Ω , 500 mV into 50 Ω , frequency and amplitude programmable, pulse or square wave able to be selected, rise and fall time 1 ns typical (calibrator also offers trigger or Pass/Fail output)



Signal Viewing

Display

CRT: 12.5 x 17.5 cm (9" diagonal) raster

Resolution: 810 x 696 points

Grids: 1, 2, or 4 grids.

Formats: YT, XY and both together

Graticules: Internally generated; separate intensity control for grids and waveforms

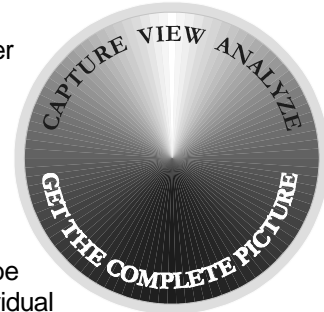
Waveform Style: Vectors, which can be switched on and off, connect individual sample points highlighted as dots

Modes: Normal, XY, Variable or Infinite Persistence

Real-time Clock: Date, hours, minutes, seconds

Vertical Zoom: Up to 5x Vertical Expansion (50x with averaging, up to 80 μ V sensitivity, with optional WP01 Advanced Waveform Math Package)

Horizontal Zoom: Waveforms can be expanded to give 2–2.5 points/div.



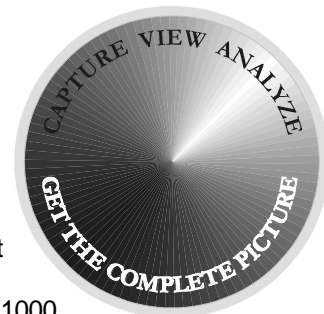
Model		Zoom Factor
9384C		2000x
9384CM	9384CTM	10 000x
9384CL		80 000x

Signal Analysis

Waveform Processing

Processing functions: Add, Subtract, Multiply, Divide, Negate, Identity, Summation Averaging, and Sine x/x; four functions performable at one time

Average: Summed averaging of up to 1000 waveforms in the basic instrument; up to 10^6 averages possible with optional WP01 Advanced Waveform Math Package



Extrema: Roof, Floor or Envelope values of from 1 to 10^6 waveforms — with WP01 Option

ERES: Low-Pass digital filter provides up to 11 bits vertical resolution; sampled data always available, even when trace turned off; any of above modes usable without destroying data — with WP01 Option

FFT: Spectral Analysis with five windowing functions and FFT averaging, with optional WP02 Spectrum Analysis Package

Histogramming and Trending: With optional WP03 Parameter Analysis Package, in-depth diagnostics on waveform parameters

Internal Memory

Waveform Memory: Up to four 16-bit Memories (M1, M2, M3, M4).

Processing Memory: Up to four 16-bit Waveform Processing Memories (A, B, C, D).

Setup Memory: Four non-volatile memories; optional cards or disks for high-capacity waveform and setup storage

Cursor Measurements

Relative Time: Arrow cursors measure time and voltage differences relative to each other

Relative Voltage: Horizontal bars measure voltage differences up to $\pm 0.2\%$ full-scale in single-grid mode

Absolute Time: Cross-hair marker measures time relative to trigger and voltage with respect to ground

Absolute Voltage: Reference bar measures voltage with respect to ground

Interfacing

Remote Control: By GPIB and RS-232-C for all front-panel controls, internal functions

RS-232-C Port: Asynchronous up to 115.2 Kb/s for computer or terminal control, or printer or plotter connection

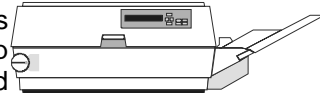
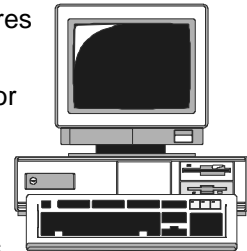
GPIB Port: (IEEE-488.1) Configurable as talker/listener for computer control and fast data transfer; command language compliant with IEEE-488.2

Centronics Port: Hardcopy interface

PC Card (PCMCIA II/III Ports): Optional for memory cards, flash cards and removable hard disks

Floppy Disk: High density 3.5-inch floppy disk drive (DOS format)

Hardcopy: TIFF and BMP formats available for import to Desktop Publishing programs; printers and



plotters: HP DeskJet, HP ThinkJet, QuietJet, LaserJet, PaintJet, and EPSON printers; HP 7400 and 7500 series, or HPGL compatible plotters

➤ Optional internal, high-resolution graphics printer

Output Formats: Binary, or ASCII waveform output compatible with spreadsheets, MATLAB, Mathcad

General

Auto-calibration: Ensures specified DC and timing accuracy

Temperature: 5 to 40 °C (41 to 104 °F) rated

Humidity: 80 % for temperatures up to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C

Altitude: Up to 2000 m (6560 ft) operating, 40 °C max

Power: 90–250 V AC, 45–66 Hz, 350 W

Battery Backup: Front-panel settings maintained for two years

Dimensions: (HWD) 8.5 x 14.5 x 16.25 inches / 264 x 397 x 453 mm

Weight: 13 kg (28.6 lb.) net, 18.5 kg (40.7 lb.) shipping

Warranty: Three years

Conformity

EMC: EN 50082-1 conformity

Safety: Designed to comply with EN 61010-1; UL and cUL listed, File E 170588: Protection Category I, Installation (Over-Voltage) Category II, Pollution Degree 2

See Declaration of Conformity for further details.