

➤ 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 |



Specifications

| 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

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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: =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: =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: =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,

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where each source can be defined as High, Low or Don't Know and the trigger as the pattern's beginning or end



Specifications

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

Gaticules: 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 |

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| | | | |
|---------|--------|--------|----------|
| 9354CTM | | | 50 000x |
| 9344CL | 9350CL | 9354CL | 100 000x |



Signal Analysis

Waveform Processing

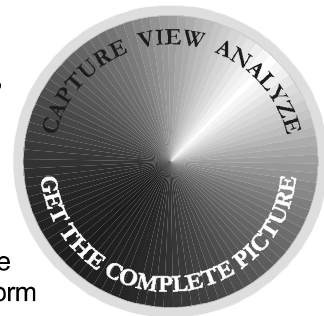
Processing functions: Add, Subtract, Multiply, Divide, Negate, Identity, Summation Averaging, and Sine x/x; four functions performable at one time **Average:** Summed averaging of up to 1000 waveforms in the basic instrument; up to 10^6 averages possible with optional WP01 Advanced Waveform Math Package

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

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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

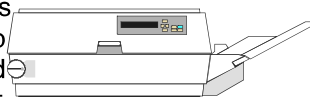
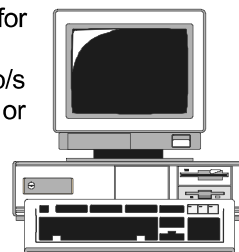
PC Card (PCMCIA II/III Ports): Optional for memory cards, flash cards and removable hard disks

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, 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.