Signal Capture

Acquisition System

Bandwidth (–3 dB)

- **LC334, LC374 Series:** @ 50 Ω: DC to 500 MHz @ 1 MΩ DC: DC to 500 MHz typical at probe tip
- **LC534, LC574 Series:** @ 50 Ω: DC to 1 GHz @ 1 MΩ DC: DC to 500 MHz typical at probe tip
- **LC564, LC584 Series:** @ 50 Ω: DC to 1 GHz (2 mV/div: DC to 200 MHz, 5 mV/div: DC to 600 MHz); @ 1 MΩ DC: DC to 500 MHz typical at probe tip
- **LC684 Series:** @ 50 Ω: DC to 1.5 GHz (2 mV/div: DC to 200 MHz, 5 mV/div: DC to 600 MHz); @ 1 MΩ DC: DC to 500 MHz typical at probe tip

With PP005 passive probe as standard for all models; active probes optional.

Number of Channels: 4

Number of Digitizers: 4

Max. Sample Rate Window (Also see tables on the following pages.)

- **LC334, LC534 Series:** 4 ms @ 2 GS/s in single-shot mode
- **LC374 Series:** 0.25 ms @ 2 GS/s in single-shot mode
- **LC574 Series:** 2 ms @ 4 GS/s in single-shot mode
- **LC564 Series:** 62.5 µs @ 4 GS/s
- **LC584 Series:** 2 ms @ 8 GS/s
- **LC684 Series:** 2 ms @ 8 GS/s

Sensitivity

- **LC334 Series:** 2 mV/div to 5 V/div, 50 Ω, fully variable 2 mV/div to 5 V/div, 1 MΩ, fully variable
- **LC374, LC534, LC574, LC564, LC584 Series:** 2 mV/div to 1 V/div, 50 Ω, fully variable 2 mV/div to 10 V/div, 1 MΩ, fully variable
- **LC684 Series:** 2 mV/div to 1 V/div, 50 Ω, fully variable 2 mV/div to 2 V/div, 1 MΩ, fully variable

***Note:** Where a particular series is NOT mentioned, the specification applies to all LeCroy color DSOs. Where the series is mentioned without reference to a particular model, the specification applies to all models in the series.*

Specifications are liable to change without notice. For the most up-to-date information, consult the latest product data sheets, available from LeCroy offices.

Offset Range

- **LC334 Series:** 2.00 to 9.99 mV/div: ±120 mV
  10.0 to 199 mV/div: ±1.2 V
  0.2 to 5.0 V/div: ±24 V
- **LC374, LC534, LC574, LC564, LC584 Series:**
  2.00 to 4.99 mV/div: ±400 mV
  5.00 to 99 mV/div: ±1 V
  0.1 to 0.99 V/div: ±10 V
  1.0 to 10 V/div: ±100 V (1 MΩ only)
- **LC684 Series:** 2.00 to 4.99 mV/div: ±400 mV
  5.0 to 99 mV/div: ±1.0 V
  0.1 to 1.0 V/div: ±10 V
  5.0 to 100 mV/div: ±1.0 V
  102 mV to 2.0 V/div (1 MΩ only): ±20 V

Maximum Sample Rate and Acquisition Memories
LC334, LC374, LC534, LC574 Series

Channels Used (Peak Detect ON/OFF) on Series…	Max. Sample Rate	Memory per Channel (in Points)			Active Channels
		Model			
		A	AM	AL	
Any Channel (Peak Detect OFF)					
LC334, LC534 Series	500 MS/s	100 k	500 k	2 M	All
LC374 Series	1 GS/s	100 k	–	–	
LC574 Series	1 GS/s	100 k	500 k	2 M	
Any Channel (Peak Detect ON)					
LC334, LC534 Series	100 MS/s data + 400 MS/s peaks	50 k data + 50 k peaks	250 k data + 250 k peaks	1 M data + 1 M peaks	All
LC374 Series					
LC574 Series					
Paired Channels (Peak Detect OFF)					
LC334, LC534 Series	1 GS/s	250 k	1 M	4 M	CH 2 & CH 3
LC374 Series	2 GS/s	250 k	–	–	
LC574 Series	2 GS/s	250 k	1 M	4 M	
All Channels Combined (Peak Detect OFF)					
LC334, LC534 Series (by PP093 Adapter)	2 GS/s	500 k	2 M	8 M	One
LC374 Series (*without* external adapter)	2 GS/s on CH 2	500 k	–	–	
LC574 Series (by PP093 Adapter)	4 GS/s	500 k	2 M	8 M	

Maximum Sample Rate and Acquisition Memories
LC564, LC584 Series

Channels Used on Series…	Max. Sample Rate	Memory per Channel (in Points)				Active Channels
		Model				
		A	AM	AL	AXL	
Any Channel						
LC564 Series	2 GS/s	100 k	–	–	–	All
LC584 Series	2 GS/s	100 k	500 k	2 M	4 M	
Paired Channels						
LC564 Series	4 GS/s	250 k	–	–	–	CH 2 & CH 3
LC584 Series	4 GS/s	250 k	1 M	4 M	8 M	
All Channels Combined						
LC584 Series	8 GS/s	500 k	2 M	8 M	16 M	One (CH 2, or any displayed channel in Auto-Combine Mode)

Maximum Sample Rate and Acquisition Memories LC684 Series						
Channels Used	Max. Sample Rate	Memory per Channel (in Points)				Active Channels
		Model				
		D	DM	DL	DXL	
Any Channel						
LC684 Series	2 GS/s	100 k	500 k	2 M	4 M	All
Paired Channels						
LC684 Series	4 GS/s	250 k	1 M	4 M	8 M	CH2 & CH3
All Channels Combined						
LC684 Series (by PP096 Adapter)	8 GS/s	500 k	2 M	8 M	16 M	One

Scale Factors: There is a wide range of probe attenuation factors available.

DC Accuracy: ±1% typical; guaranteed ≤ ±2% full scale (eight divisions) at 0 V offset

- **LC564, LC584 Series:** ±(1% full scale + 1% offset value) at gain ≥10 mV/div
- **LC684 Series:** ±(2% full scale + 1% offset value) at gain ≥10 mV/div

Vertical Resolution: 8 bits

Bandwidth Limiter

- **LC334 Series:** 30 MHz
- **LC374, LC534, LC574 Series:** 25 MHz, 200 MHz
- **LC564, LC584, LC684 Series:** 25 MHz and 200 MHz typical

Input Coupling: AC, DC, GND

Input Impedance:

- **LC334 Series:** 10 MΩ//15 pF (system capacitance using PP005)
- **LC374, LC534, LC574, LC564, LC584 Series:** 10 MΩ//11 pF (system capacitance using PP005), or 50 Ω ±1%
- **LC684 Series:** 10 MΩ//11 pF (system capacitance using PP005), or 50 Ω ±1.25%

Max. Input: 50 Ω: ±5 V DC (500 mW) or 5 V rms

- **LC334:** 1 MΩ — 250 V max (DC + peak AC ≤10 kHz)
- **LC374, LC534, LC574, LC564, LC584 Series:** 1 MΩ: 400 V max. (DC + peak AC ≤10kHz)
- **LC684 Series:** 1 MΩ: 100 V (DC + peak AC @ 10 kHz)

SMARTMemory: The total memory management system dynamically manages acquisition memory to guarantee that signals are always sampled at the highest possible sample rate and that system RAM and microprocessor resources are always optimally employed.

System Random Access Memory:

Models					System RAM (Mbytes)
LC334A	LC374A	LC534A	LC574A		8
LC334AM	LC534AM	LC564A	LC574AM		
LC334AL	LC534AL	LC564A	LC584A	LC584AM	16
LC684D		LC684DM			16
LC574AL	LC584AL	LC584AXL			64
LC684DL		LC684DXL			64

Acquisition Modes

Random Interleaved Sampling (RIS): for repetitive signals from:

- **LC334, LC534 Series:** 1 ns/div to 5 µs/div
- **LC374, LC574 Series:** 1 ns/div to 2 µs/div
- **LC564, LC584, LC684 Series:** 200 ps/div to 1 µs/div

Single Shot: for transient and repetitive signals from:

- **LC334, LC534 Series:** 10 ns/div
- **LC374, LC574 Series:** 1 ns/div, all channels active
- **LC564, LC584, LC684 Series:** 2 ns/div, all channels active

Peak Detect ***(NOT ON LC564, LC584, OR LC684 SERIES)*****:** At 400 MS/s, peak detect can capture high-speed events as low as 1 ns, while simultaneously capturing normally sampled data. (However, with a resolution of 2.5 ns there is no guarantee that all high-speed events less than 2.5 ns in duration will be captured with Peak Detect.)

Sequence: This stores multiple time-stamped events in segmented acquisition memories.

Dead Time between Segments: 30 µs typical, 65 µs max. (or < 30 µs, 50 µs max. on ***LC334, LC534, LC574, AND LC684 SERIES***)

Number of Segments Available:

Models					No. Segments
LC334A	LC374A	LC534A	LC574A		2 to 500
LC564A	LC584A	LC684D			2 to 1000
LC334AM, AL	LC534AM, AL	LC574AM, AL	LC584AM	LC684DM	2 to 2000
LC584AL, AXL	LC684DL	LC684DXL			2 to 6000

Timebase System

Timebases: main and up to four Zoom Traces

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

- **LC564 Series:** 1 ns/div at 4 GS/s, and 2 ns/div at 2 GS/s, to 1000 s/div
- **LC584, LC684 Series:** 500 ps/div at 8 GS/s

Clock Accuracy: ≤10 ppm

- **LC684 Series:** <10 ppm

Interpolator Resolution: 10 ps

- **LC684 Series:** 5 ps

Roll Mode:

- **LC334, LC374, LC534, LC574 Series:** for >500 000 points: 10 to 1000 s/div
- **LC564, LC584, LC684 Series:** ranges from 500 ms/div to 1000 s/div

External Clock:

- **LC334, LC374, LC534, LC574 Series:** ≤100 MHz (20 to 100 MHz for *LC374 AND LC574 SERIES*) on EXT input with ECL, TTL, or zero crossing levels. Optional (CKTRIG) 50 to 500 MHz rear panel fixed-frequency clock input.
- **LC564, LC584, LC684 Series:** CKTRIG option includes rear panel fixed-frequency clock input, DC to 500 MHz (<20 ns rise/fall time)

External Reference: There is an optional (CKTRIG) 10 MHz rear panel input.

Triggering System

Modes: NORMAL, AUTO, SINGLE, and STOP.
Sources: CH1, CH2, CH3, CH4, Line, Ext, Ext/10 (Ext/5 on ***LC564, LC584 , AND LC684 SERIES***). Slope, Level, and Coupling are unique to each source.
Slope: Positive, Negative

- **LC564, LC584, LC684 Series:** Positive, Negative, Bi-Slope (Window in and out)

Coupling: AC, DC, HF, LFREJ, HFREJ
Pre-trigger Recording: 0 to 100% of full scale (adjustable in 1% increments)
Post-trigger Delay: 0 to 10 000 divisions (adjustable in 0.1-div increments)
Hold-off by Time: 10 ns to 20 s

- **LC564, LC584, LC684 Series:** 2 ns to 20 s

Holdoff by Events: 1 to 99 999 999
Internal Trigger Range: ±5 screen divisions
EXT Trigger Max. Input:

- **LC334 Series:** 10 MΩ//15 pF (LC334A system capacitance using PP002): 250 V max. (DC + peak AC ≤10 kHz); 50 Ω ±1%: ±5 V DC (500 mW) or 5 V rms
- **LC374, LC534, LC574 Series:** 10 MΩ//11 pF (system capacitance using PP005): 400 V (DC + peak AC ≤10 kHz); 50 Ω ±1%: ±5 V DC (500 mW) or 5 V rms
- **LC564, LC584A Series:** 10 MΩ//11 pF at probe tip (PP005): 400 V (DC + peak AC ≤10 kHz); 50 Ω ±1%: ±5 V DC (500 mW) or 5 V rms
- **LC684 Series:** 10 MΩ//11 pF at probe tip (PP005): 100 V (DC + peak AC ≤10 kHz); 50 Ω ±3%: ±5 V DC (500 mW) or 5 V rms

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

- **LC564, LC584A Series:** ±1.2 V on EXT; ±6 V with Ext/5
- **LC684 Series:** ±0.5 V; ±2.5 V with EXT/5

Trigger Timing: Trigger Date and Time are listed in the "Memory Status" Menu.
Trigger Comparator: There is an optional (CKTRIG) ECL rear panel output. Alternatively, the calibrator output can provide a trigger output or a PASS/FAIL test output.

SMART Trigger Types

Pattern: The oscilloscope triggers on the logic combination of 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 Care.” The Trigger can be defined as the beginning or end of the specified pattern.

Signal or Pattern Width: The oscilloscope triggers on the width between two selectable limits from 2.5 ns to 20 s. Typically it triggers on glitches 1 ns wide.

- **LC564, LC584, LC684 Series:** The oscilloscope triggers on glitches as short as 600 ps or on pulse widths 600 ps to 20 s.

Signal or Pattern Interval: The oscilloscope triggers on the interval between two selectable limits from 10 ns to 20 s.

- **LC564, LC584, LC684 Series:** 2 ns to 20 s

Dropout: The oscilloscope triggers if the input signal drops out for longer than a time-out from 25 ns to 20 s.

- **LC564, LC584, LC684 Series:** 2 ns to 20 s

Qualified: The oscilloscope triggers on any source only if a given state (or transition) has occurred on another source. (The delay between these events can be defined as a number of events on the trigger channel or as a time interval.)

TV: This allows selection of up to 1500 lines, and odd or even fields synchronized for PAL, SECAM, NTSC, or nonstandard video.

Runt ***(LC564 LC584, AND LC684 SERIES ONLY)*****:** The oscilloscope triggers on positive or negative runts between two selectable limits from 600 ps to 20 s.

Slew Rate ***(LC564, LC584, AND LC684 SERIES ONLY)*****:** The oscilloscope triggers on rising or falling edges between 600 ps and 20 s.

Exclusion Triggering: This can be performed in Glitch, Interval, Runt, and Slew-Rate trigger modes. The oscilloscope triggers on intermittent faults by specifying the normal width, period, level, or slew of a signal. It will trigger only on aberrations that are shorter or longer than normal.

Autosetup

This automatically sets sensitivity, vertical offset, and timebase on all display channels.

Autosetup Time: 2 to 3 seconds

Vertical Find: This automatically sets sensitivity and offset for selected channel.

Probes

LC334: One PP005 probe is supplied per channel: DC to 350 MHz typical at probe tip, 500 V max.

LC374, LC534, LC574A, LC564, LC584, LC684 Series: One PP005 probe is supplied per channel: DC to 500 MHz typical at probe tip, 500 V max.

Probe calibration: 1 V max. into 1 MΩ, 500 mV into 50 Ω; frequency and amplitude can be programmed; pulse or square wave can be selected; rise and fall time: 1 ns typical.

Signal Viewing

Display

Screen Type: Color 10-inch Raster Scan CRT, 0.26 mm dot pitch.

- **LC684 Series:** 10.4" TFT-LCD

Resolution: 640 x 480 points

Display Area: 170 mm x 125 mm

- **LC684 Series:** 212 mm X 160 mm

Controls: There are rear panel presets for position, brightness, and contrast; and front panel menu controls for brightness and color selection.

Grid Styles: Single, Dual, Quad, Octal, XY, Single + XY, Dual + XY, and Full Screen (enlarged view of each grid style)

Graticules: Internally generated, they have a separate intensity control for grids and waveforms, and offer selectable blending of grid with displayed traces.

Waveform Style: Choose from Dot Join with optional sample point highlight, or Dots only.

Persistence Modes: Color Graded and Analog Persistence; infinite or variable with decay over time

- **LC334A Series**: Analog Persistence is available only when all four channels are combined.

Trace Display: Choose from opaque or transparent modes, with overlap management.

Number of Traces: 8 (any mix of channels, memories, or Math functions)

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

External Monitor: A rear panel 15-pin socket is available for VGA compatible monitor.

Vertical Zoom: up to five times vertical expansion (50 times with averaging, up to 40 μV/div sensitivity)

Horizontal Zoom:

- **LC334A, LC534A:** up to 2 or 2.5 points/division
- **LC374A, LC574A:** up to 0.4 or 0.5 points/division
- **LC564, LC584, LC684 Series:** up to 0.4 points/division

Signal Analysis

Processing System

Microprocessor: 96 MHz PowerPC™ 603e
- **LC584AXL, LC684DXL:** 192 MHz PowerPC™

Video Memory: 1 Mbyte
Cache Memory: 32 kbytes
Persistence Data Map Memory: 16 bits per displayed pixel (64 000 levels)

Waveform Processing

Up to four processing functions may be performed simultaneously. Standard functions available are: Add, Subtract, Multiply, Divide, Negate, Identity, Summation Averaging and Sine x/x, Integral, Derivative, Square Root, Ratio, and Absolute Value. The source information for a math function trace can be data from an acquisition channel or from another math function trace. This allows display of traces that 'daisy chain' math functions.
Average: up to 10^6 averages
Extrema: Roof, Floor, or Envelope values from 1 to 10^6 sweeps
ERES: Six low-pass digital filters provide up to 11-bit vertical resolution. Sampled data is always available, even when a trace is turned off.
FFT: Spectrum Analysis with five windowing functions and FFT averaging
Resample: This deskew feature allows a signal to be resampled and adjusted in time relative to another signal.
Statistical Diagnostics: The Parameter Analysis package permits in-depth diagnostics on waveform parameters. With this package, live histogramming of any waveform parameter measurement is possible. The histogram can be autoscaled to display the center and width of the distribution. Any of the above processes can be invoked without losing the data. Trending is also available with this package, which is standard on the LC574, LC584, and LC684 Series, and optional on all other models.

Internal Memory

Waveform Memory: This features up to four 16-bit memories (M1, M2, M3, M4), whose length corresponds to the length of the channel acquisition memory.
Zoom and Math Memory: Up to four 16-bit Waveform Processing Memories (A, B, C, D), whose length corresponds to the length of the channel acquisition memory
Setup Memory: Four non-volatile memories (optional memory cards, flash disks, or removable hard disks may also be used for high-capacity waveform and setup storage.)

Cursor Measurements

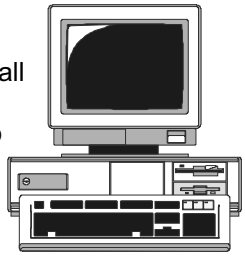
Relative Time: A pair of arrow cursors measures time differences and voltage differences relative to each other.
Relative Voltage: A pair of line cursors measures voltage differences.
Absolute Time: A cross-hairs marker measures time relative to the trigger and voltage (with respect to ground).
Absolute Voltage: A reference bar measures voltage with respect to ground.

Automatic Measurements

A wide range of pulse parameter measurements is available, categorized for ease of use. The categories include Pulse, Horizontal, and Vertical parameters. Basic statistical measurements such as average, highest, lowest, and standard deviation (included as standard) can be made on these parameter measurements in order to understand their distribution.

Pass/Fail Testing and Waveform Limit testing (using masks) can be performed. Test conditions can be expressed as either waveform parameter limits, waveform shape limits (mask), or a combination of both. Any failure can cause preprogrammed actions such as Hardcopy, Save, GPIB service request, logic pulse out, audible beep, or a combination of these.

Interfacing



Remote Control: GPIB and RS-232-C for all front panel controls; internal functions
RS-232-C Port: Asynchronous; up to 115.2 kBaud for computer or terminal control, 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

Shielded cables less than 3 m in length are required to conform to EMC Directive 89/336/EEC.

PC Card (PCMCIA I/II/III Ports): optional for memory cards, flash cards, or removable hard disks
Floppy Disk: high density 3.5-inch floppy disk drive (DOS format)
VGA Compatible Display: 15-pin, D-type, VGA-compatible connector for external color display. You may experience flickering if you connect an LCD projector to the VGA output.
Hardcopy: TIFF and BMP formats available for export to Desktop Publishing programs; HPGL protocol for vector graphics
Printers and Plotters:

- **B/W Printers:** HP LaserJet™, HP DeskJet™ 500, Epson™ FX
- **Color Printers:** HP DeskJet™ 550C; Epson™ Stylus; Canon 200, 600, 800 Series
- **Plotters:** HP 7470, HP 7550
- **Internal:** high-resolution graphics printer — standard or optional depending on model; stripchart output format with 2 m per division also available

Output Formats: Binary, or ASCII waveform output compatible with spreadsheets, MATLAB™, and MathCad™

General

Auto-calibration: Ensures specified DC and timing accuracy
Temperature (operating): 5 to 40 °C (41 to 104 °F)
Humidity (operating): ≤80% RH (non-condensing)
Altitude (operating): ≤2000 m (6560 ft) at 40 °C ambient
Shock and Vibration: Conforms to selected sections of MIL-PRF-28800F, Class 3

Power: 90 to 132 VAC, or 180 to 250 VAC, 45 to 66 Hz, automatic voltage selection, 400 W max. (**LC684 Series:** 350 W max.)
Battery Backup: front panel settings maintained for two years
Dimensions: (HWD) 10.4 x 15.65 x 17.85 inches (264 x 397 x 453 mm)
Weight: 44 lb. (20 kg) net; 61.6 lb (28 kg) shipping

- **LC684 Series:** 35 lb (16 kg) net, 53 lb (24 kg) shipping

Warranty: 3 years

Conformity

CE Declaration of Conformity: The oscilloscope meets requirements of EMC Directive 89/336/EEC for Electromagnetic Compatibility, and Low Voltage Directive 73/23/EEC for Product Safety.

- **EMC:** EN 50081-1:1992 (Emissions); EN 50082-1:1997 (Immunity)
- **Low Voltage Directive:** Conforms to EN 61010-1:1993 + Amd. 2:1995, Safety requirements for electrical equipment for measurement, control, and laboratory use.
  The oscilloscope has been qualified to the following EN 61010-1 category:
  Installation (Overvoltage) Category II
  Pollution Degree 2

See Declaration of Conformity for further details.

- **UL and cUL Certifications:** UL Standard UL 3111-1; Canadian Standard CSA-C22.2 No. 1010.1-92

UL and cUL Listing File: E 170588

# # #