

## Signal Capture

### Acquisition System

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

#### Bandwidth (-3 dB)

- **LC564DL:** @ 50 Ω: DC to 1 GHz
  - **LC554DL:** @ 50 Ω: DC to 500 MHz
- @ 1 MΩ dependent on probe used

**Number of Channels:** 4

**Number of Digitizers:** 4

**Sensitivity:** 2 mV/div to 1 V/div, 50 Ω, fully variable

**Scale Factors:** Choice of over 12 probe attenuation factors selectable through front panel menus.

**Offset Range:** ±20 V across the whole sensitivity range with the AP020/AP022 active probe in use.

2.00 to 4.99 mV/div: ±400 mV

5.00 to 99 mV/div (50 Ω only): ±1 V

5.00 to 100 mV/div (1 MΩ only): ±1 V

0.1 to 1.0 V/div (50 Ω only): ±10 V

102 mV to 2.0 V/div (1 MΩ only): ±20 V

**DC Accuracy:** ±(2% full scale + 1% offset value) typical

**Vertical Resolution:** 8 bits

**Bandwidth Limiter:** 25 MHz, 200 MHz typical

**Input Coupling:** AC (> 10 HZ typical), DC, GND

**Input Impedance:** 10 MΩ // 11 pF typical (system capacitance using PP005), or 50 Ω ±1.25%

**Max. Input Voltage:** 1 MΩ: 100 V (DC + peak AC @10 kHz)

50 Ω: ±5 VDC (500 mW) or 5 V rms

### Acquisition Modes

**Random Interleaved Sampling (RIS):** 25 GS/s for repetitive signals from 200 ps/div to 1 μs/div

**Single Shot:** for transient and repetitive signals, 1 ns/div (2 Ch.), 2 ns/div (4 Ch)

**Sequence:** This stores multiple time-stamped (1 ns resolution) events in segmented acquisition memories.

**Dead Time between Segments:** 30 μs typical

**Number of Segments Available:** 2 to 2000



## Addendum: LC564/LC554

Model	Channels	Bandwidth	Sample Rate	Max. Record Length
LC564DL	4	1 GHz	2 GS/s on 4 ch. 4 GS/s on 2 ch.	1 Mpt on 4 ch. 2 Mpt on 2 ch.
LC554DL	4	500 MHz	2 GS/s on 4 ch. 4 GS/s on 2 ch.	1 Mpt on 4 ch. 2 Mpt on 2 ch.

### Timebase System

**Timebases:** main and up to four Zoom Traces

**Time/Div Range:** 500 ps/div (at 8 GS/s), 1 ns/div (at 4 GS/s), 2 ns/div (at 2 GS/s) to 1000 s/div

### Triggering System

**Modes:** NORMAL, AUTO, SINGLE, and STOP.

**Sources:** CH1, CH2, CH3, CH4, Line, Ext, Ext/5. Slope, Level, and Coupling are unique to each source.

**Slope:** Positive, Negative, Bi-Slope (Window in and out)

**Coupling:** AC (> 10 Hz), DC, HF (175 MHz to > 1 GHz), LFREJ (> 50 kHz), HFREJ (< 100 MHz)

**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:** 2 ns to 20 s

**Hold-off by Events:** 1 to 99 999 999

**Internal Trigger Range:**  $\pm 5$  screen divisions

**Maximum Trigger Frequency:** DC to full bandwidth of scope

**EXT Trigger Max. Input:** 50  $\Omega$   $\pm 3\%$ :  $\pm 5$  V DC (500 mW) or 5 V rms; 100 V (DC + peak AC  $\leq 10$  kHz); 10 M $\Omega$  // 11 pF at probe tip (PP005)

**EXT Trigger Range:**  $\pm 0.5$  V;  $\pm 2.5$  V with Ext/5

**Max External Trigger Frequency:** 750 MHz in 50  $\Omega$  when using 50  $\Omega$  coupling

**Trigger Output:** Optional ECL rear panel output (option CKTRIG). The calibrator output can provide a trigger status signal or a Pass/Fail test output.



## Addendum: LC564/LC554

### SMART Trigger Types

Basic Triggers	
Edge/Slope/Window/Line	Triggers when signal meets slope and level condition.
SMART Triggers	
State or Edge Qualified	Triggers on any input source only if a defined state or edge occurred on another input source. Delay between sources is selectable by time or events.
Dropout	Triggers if signal drops out for longer than a selected time between 2 ns and 20 s.
Pattern	Logic combination of 5 inputs (4 channels and external trigger input); Each source can be high, low, or don't care. Trigger at start or end of the pattern.
TV-Video	Triggers on odd or even fields for NTSC, PAL, SECAM, or nonstandard video (up to 1500 lines).
SMART Triggers with Exclusion Technology	
Signal or Pattern Width	Triggers on glitches, selectable pulse widths, or on intermittent faults.
Signal or Pattern Interval	Triggers on intervals selectable between 2 ns and 20 s.
Slew Rate	Triggers on edge rates; select limits for dV, dt, and slope.
Runt	Positive or negative runts defined by two selectable voltage limits and two selectable time limits.

### Autosetup

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

**Autosetup Time:** approximately 3 seconds

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



### Probes

One PP005 probe supplied per channel

**Optional Probes:** 1 GHz active probe (AP020); 2.5 GHz active probe (AP022); 1 GHz active differential probe (AP034)

**Probe Calibration:** 1 V max. into 1 M $\Omega$ ; 500 mV into 50  $\Omega$ ; frequency and amplitude can be programmed; pulse or square wave can be selected; rise and fall time: 1 ns typical. Alternatively, the calibrator output can provide a trigger output or a Pass/Fail test output.

## Signal Viewing

### Display

**Screen Type:** Color 10.4 inch TFT LCD

**Resolution:** VGA (640 x 480 pixels)

**Display Area:** 212 mm x 160 mm

**Controls:** Rear panel presets for position, brightness, and contrast. Menu controls for brightness and color selection.

**Graticules:** Internally generated; separate intensity control for grids and waveforms; selectable blending of grid with displayed traces.

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

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

**Persistence Modes:** Color Graded Persistence and Analog Persistence; infinite or variable with decay over time. In color graded persistence, a color spectrum from red through violet is used to map signal intensity. With Analog Persistence, the brightness level of a single color denotes signal intensity. Each trace's persistence data is stored in 64k levels.

**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  $\mu\text{V}/\text{div}$  sensitivity)

**Horizontal Zoom:** up to 0.4 points/division

**Auto Scroll:** Use Auto Scroll to automatically "play" the captured signal to identify anomalies quickly and easily. With a selectable zoom expansion and scrolling speed, you can set up Auto Scroll to match your signal viewing needs. The scrolling speed can be adjusted during the scan to focus on the more interesting characteristics of the signal. "Reverse" enables you to quickly review any part of the signal.



# Signal Analysis

### Processing System

**Microprocessor:** 96 MHz PowerPC™ 603e

**Video Memory:** 1 Mbyte

**System Memory:** 16 Mbytes

**Persistence Data Map Memory:** 16 bits per displayed pixel (64k levels)

### Waveform Processing

Up to four processing functions can be performed simultaneously. Functions available are: Add, Subtract, Multiply, Divide, Negate, Identity, Summation Averaging and Sine x/x, Integral, Derivative, Square Root, Ratio, Absolute Value, and the following advanced 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 (Rectangular, Von Hann, Hamming, Flat Top, and Blackman-Harris) and FFT averaging

**Statistical Diagnostics:** The Parameter Analysis package permits in-depth diagnostics on waveform parameters. With this package, live histogramming and trending of any waveform parameter measurement is possible. The histogram can be autoscaled to display the center and width of the distribution. This package is standard. **Any of these processes can be invoked without the loss of data.**

### Internal Memory

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

**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.

### Automated Measurements

The following parametric measurements are available, together with their Average, Highest, Lowest values and Standard Deviation.

amplitude	duty	period
area	fall	phase
base	f 80 – 20%	peak-to-peak
cmean	f@level	rise
cmedian	first	r 20 – 80%
crms	frequency	r@level
csdev	last	rms
cycles	maximum	std dev
delay	mean	t@level
$\Delta c2d-$ $\Delta c2d+$ (setup)(hold)	median	top
$\Delta delay$	minimum	width
$\Delta t@level$	overshoot+	
duration	overshoot-	

### Interfacing



**Pass/Fail:** Pass/Fail testing allows any five items (parameters and/or masks) to be tested against selectable thresholds. Waveform Limit testing is performed using masks that may be defined inside the instrument, or by downloading templates created on a PC. Any failure will cause a pre-programmed action such as hardcopy printout, save to internal memory, save to mass storage device (card or disk), GPIB SRQ, or pulse out.

**Remote Control:** All front panel control functions are possible through GPIB and RS-232-C.

**RS-232-C Port (standard):** Asynchronous; up to 115.2 kBaud for computer or terminal control, printer or plotter connection

**GPIB Port (standard):** (IEEE-488.2) configurable as talker/listener for computer control and fast data transfer

**Centronics Port:** hardcopy parallel interface

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

**Hardcopy:** Screen dumps are activated by a front panel button or by remote control.

**Printers and Plotters:**

- **B/W Printers:** LaserJet™, DeskJet™ 500, Epson™ FX
- **Color Printers:** DeskJet™ 550C; Epson™ Stylus; Canon 200, 600, and 800 Series
- **Hard Copy Formats:** TIFF b/w, TIFF color, HPGL, BMP color and BMP compressed
- **Internal:** optional high-resolution graphics printer; stripchart output formats capable of up to 200 cm/div

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

### General

**Auto-calibration:** Ensures specified DC and timing accuracy.

**Auto-calibration time:** < 500 ms

**Recommended Factory Calibration Interval:** 1 year

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

**Humidity (operating):** ≤ 80% RH (non-condensing)

**Altitude (operating):** up to 4600 m (15 092 ft) at 25 °C (77 °F) max.

**Shock and Vibration:** Conforms to MIL-PRF-28800F, Class 3 limits



## Addendum: LC564/LC554

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**Power:** 90 to 132 VAC, or 180 to 250 VAC, 45 to 66 Hz, automatic voltage selection, 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:** 35 lbs (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

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