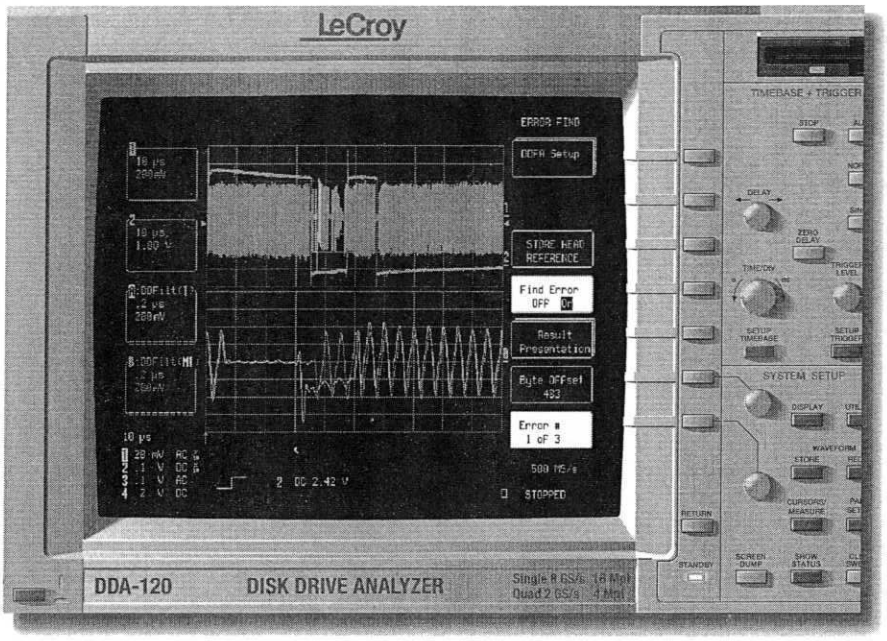
Disk Drive Analyzers



Main Features

- *Drive Specific Triggers*
- *Automatic PRML Channel Error Identification*
- *PRML Data Channel Quality Analysis*
- *Servo Bursts Analysis*
- *User Selected or Defined Drive Filtering*
- *IDEMA® Standard Measurements (TAA, PW50, Overwrite, etc.)*
- *Asymmetry Measurements*
- *Drive Analysis Graphs*
- *1 GHz Bandwidth*
- *Up to 8 GS/s Single-Shot Sample Rate*
- *16 Million Points of Acquisition Memory*
- *64 Mbyte System RAM*
- *9" Color Display with 8 Traces*

LeCroy Disk Drive Analyzers (DDA) are designed to meet the specific capture, view and analysis needs required by engineers and technicians performing disk drive analysis. The DDA family provides all the capabilities of LeCroy LC family of oscilloscopes enhanced with a rich set of disk drive specific capabilities defined in the language of drive engineers.

Included with LeCroy Disk Drive Analyzers are PRML data channel analysis tools, servo wedges analysis tools, customized triggers for capture of disk drive signals, a rich set of drive-specific signal measurement parameters, and drive analysis graphs.

These allow you to rapidly evaluate the quality of your drive signals. Find signal errors and determine the causes of errors or of insufficient quality.

An intuitive user interface has been designed for easy access to the DDA disk drive capabilities. In addition, the instrument still retains nearly identical operation to LeCroy's popular LC oscilloscopes for when you are not taking advantage of the DDA family's drive specific capabilities.

LeCroy Disk Drive Analyzers are designed to save engineers valuable time in troubleshooting and problem-solving.

The Disk Drive Analyzers are integrated and powerful systems providing the capability to:

- Capture the key events with high res olution for longer time intervals
- View data like never before, giving you more information more quickly, with a large, color CRT and advanced display techniques
- Analyze your signal to get answers quickly and more accurately with a powerful processing system and math packages.

9" Color Display

The DDA series has a very large, sharp oscilloscope screen that is 50% larger in total viewing area than a 7" screen.

Its powerful features include Analog Persistence, Color-Graded Persistence, Full Screen mode, Opaque or Transparent display, color association and personal color schemes. These provide the user with outstanding benefits that accelerate visual processing and effective communication of on-screen information.

High-Speed Acquisition

The design and debug of fast digital systems and the need to capture fast transient signals require high speed signal capture. The high 8 GS/s sample rate (DDA-120), 1 GHz bandwidth and long memory of the DDA series provide a flexible solution for capturing and viewing fast glitches and rise/fall-times.

Large Sample Rate Window

Having a high sample rate in a data acquisition system is only the first step to preserving data integrity. The time window over which this sample rate is available is also of critical importance. Long acquisition memory maintains the instrument's highest sample rate for large time windows allowing the user to sample long signals with high horizontal resolution.

With 16 million points of acquisition memory, the maximum sample rate of these disk drive analyzers of 8 GS/s is maintained for a time window of 2 ms. This sample rate window enables the user to record long signals with high resolution.

Optimum Performance

SMARTMemory is a Total Memory Management system that dynamically allocates resources of microprocessor power, acquisition memory and processing RAM. The intelligent management provided by SMARTMemory guarantees optimal usage of the disk drive analyzer resources.

The PowerPC microprocessor at the heart of these DSOs drives the system to produce results fast, providing rapid waveform update and super panel responsiveness.

Quick Diagnoses

Capturing and viewing waveforms is fundamental to an oscilloscope. Productivity improvements are accessible by using built-in math functions to assist troubleshooting and diagnoses of circuit problems.

The signal analysis capability of the Disk Drive Analyzer is enhanced by advanced waveform math, spectrum analysis, and waveform parameter analysis. This analysis capability greatly increases the speed with which circuit problems are clearly identified and solved.

Analog Persistence

At a push of the green button the user can switch between an analog view and a digital view of signals on these oscilloscopes.

The depth of signal information can be explored along the third dimension of the waveform display to give the user a complete picture of waveform activity.

Full Screen Grid

These LeCroy disk drive analyzers not only have a very large 9" screen but also provide a display mode with an extra-large grid. In Full Screen mode, all of the screen area is used to display signals.

8-Trace Display

8-trace display with any combination of math functions, zooms, reference memories or channels.

Octal grid display in normal and Full Screen display modes, with and without parameters displayed.

Autoscroll

Autoscroll displays the captured signal with a zoom expansion and automatically moves it across the screen. Scroll speed, starting point and pausing are freely selectable.

Easy Documentation

All waveform data and results of analysis can be quickly saved to floppy disk, memory card, ATA flash card, or a removable hard disk. This provides an efficient way to archive information and facilitates easy documentation of results.

An internal graphics printer outputs screen dumps in seconds providing the user with an immediate and clear record of signal activity.

Signal Capture

Acquisition System

Bandwidth (-3 dB):
@ 50 Ω: DC to 1 GHz
@ 1 MΩ: DC to 500 MHz typ. at PP005 probe tip; DC to 1 GHz at probe tip with optional AP020 1 GHz FET probe

No. of Channels: 4

Sample Rate
DDA-120: 8 GS/s (1 Ch), 4 GS/s (2 Ch), 2 GS/s (4 Ch)
DDA-110: 4 GS/s (1 Ch), 2 GS/s (2 Ch), 1 GS/s (4 Ch)

Acquisition Memory:
See table below.

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

Scale factors: Choice of over 12 probe attenuation factors selectable via front panel menus.

Offset Range:

2.00 - 4.99 mV/div:	±400 mV
5.00 - 99 mV/div:	±1 V
0.1 - 0.99 V/div:	±10 V
1.0 - 10 V/div:	± 100 V (1 MΩ only)

±20 V across the whole sensitivity range when using the AP020 FET probe.

DC Accuracy: ± (2% FS + 1.6% offset value) for gain setting >10 mV/div.

Vertical Resolution: 8 bits

Bandwidth Limiter: 25 MHz and 200 MHz typical.

Input Coupling: AC (>10 Hz typ.), DC, GND

Input Impedance: 10 MΩ//15 pF max (using PP005 probe) or 50 Ω ±1%.

Max Input Voltage:
1 MΩ: 400V (DC + peak AC @ 10 kHz)

50 Ω: ± 5 V DC (500 mW) or 5 V RMS

Acquisition Modes

For repetitive signals from 200 ps/div to 1 µs/div.

Random Interleaved Sampling (RIS)
DDA-120: 25 GS/s
DDA-110: 10 GS/s
Single shot: For transient and repetitive signals from 0.5 ns/div (4 ch), 1 ns/div (2 ch), 2ns/div (1 ch) for the DDA-120, DDA-110 from 1 ns/div (4 ch), 2 ns/div (2 ch), 5 ns/div (1 ch).

Sequence: Stores multiple events - each of them time stamped - in segmented acquisition memories.

Dead Time Sequence Mode:
60 µs max.

Number of Segments Available:
2 - 1000

Timebase System

Timebases: Main and up to 4 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 1,000 s/div

Clock Accuracy: ≤10 ppm

Interpolator resolution: 10 ps

Manual Roll Mode: 500 ms/div to 1,000 s/div

External Clock: 50 to 500 MHz rear panel fixed frequency clock input. (<20 ns rise/falltime).

External Reference: 10 MHz rear-panel input.

Additional Information

Interfacing

Remote Control: All front-panel controls, as well as all internal functions are possible by GPIB and RS-232-C.

RS-232-C Port (Standard):
Asynchronous up to 115.2 kBaud for computer/terminal control or printer/plotter connection.

GPIB Port (Standard): (IEEE-488.2) Configurable as talker/listener for computer control and fast data transfer.

Centronics Port: Hard copy parallel interface.

Hard copy: Screen dumps are activated by a front-panel button or via remote control. Supported external printers:

B/W: LaserJet, DeskJet, Epson

Color: DeskJet, Epson, Canon BJC

Internal, high-resolution graphics printer is included for screen dumps; stripchart output formats up to 2 m/div are achievable.

Hard copy Formats: TIFF b/w, TIFF color, BMP color and BMP compressed.

Output Formats: ASCII waveform output. Compatible with spreadsheets, MATLAB, MathCad. Binary output is also available.

General

Auto-calibration ensures specified DC and timing accuracy.

Calibration Time: <500 ms

Recommended Factory Calibration Interval: 1 year

Temperature: 5° to 40°C rated accuracy (41° to 104°F). 0° to 45°C operating (32° to 113°F).

Humidity: <80% non-condensing.

Altitude: Up to 4600 m (operating), 40°C (104°F) max.

Shock and Vibration: Conforms to selected sections of MIL-PRF-28800F, Class 3.

Power: 90-250V AC, 45-400 Hz, 500 W.

Battery Backup: Front-panel settings maintained for two years.

Dimensions:
(HWD) 10.4" x 15.65" x 17.85", 264 mm x 397 mm x 453 mm.

Weight: typ. 20 kg (44 lbs) net, typ. 28 kg (61.6 lbs) shipping.

Warranty: Three years.

Active Channels	Max. Sampling Rate DDA-120	Max. Sampling Rate DDA-110	Maximum Record Length
4	2 GS/s	1 GS/s	4 M
2	4 GS/s	2 GS/s	8 M
1	8 GS/s	4 GS/s	16 M