

# Digital Oscilloscopes

## 9450A Portable, Dual-Channel Digital Oscilloscope

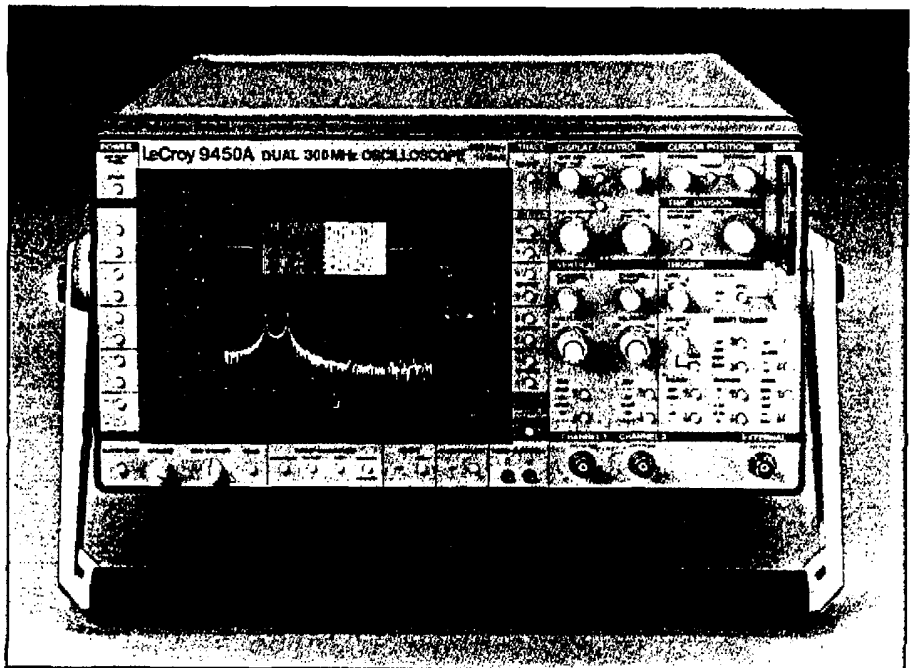
### Main Features

- 50K memory per channel
- Automatic PASS/FAIL testing on templates and parameters
- Segmentable memories with trigger point time stamps
- FASTGLITCH trigger mode
- Signal processing and FFT analysis
- Optional high speed memory card
- Unmatched display quality
- TV trigger and XY display

### The Ultimate Instrument for Design and Test

The LeCroy 9450A combines high bandwidth, fast sampling rates, high fidelity, extensive trigger capabilities and signal processing. Aimed at meeting the demands of researchers and engineers working in fields as diverse as telecommunications, electronic design and test, lasers, computers, NDT, physics and defense, the 9450A will rapidly become an indispensable measurement tool in any laboratory.

Like all LeCroy oscilloscopes, the 9450A is designed to serve as a range of different instruments: oscilloscope, transient recorder, counter/timer, frequency meter, signal averager, data logger and digital voltmeter. It offers the highest performing data acquisition and processing system available in any portable instrument.



The 9450A is shown measuring a frequency shift keyed signal. The FFT of the waveform is shown in the lower trace, indicating peaks at 1 MHz and 1.5 MHz.

### Functional Description

The LeCroy 9450A Dual-channel Digital Oscilloscope is a powerful high-resolution instrument for waveform recording and sophisticated analysis. It provides a bandwidth of 300 MHz, and sampling rates of up to 400 MS/sec for transients and 10 GS/sec for repetitive waveforms. The instrument features high-fidelity, 8-bit ADCs, 50K of non-volatile acquisition memory per channel, 200K of additional waveform storage memory, extensive pulse parameter analysis, and a highly sophisticated trigger system to capture the most complex signals,

including spikes and glitches. It is fully programmable over GPIB or RS-232-C interfaces. Hard copies are made at the touch of a button on a wide range of digital plotters and printers.

### ANALOG FEEL, DIGITAL PRECISION

The 9450A employs Flash technology in its two high-resolution, 8-bit ADCs (one per channel) which digitize waveforms with speed and precision. By combining this technology with ease of use, LeCroy's portable instrument provides the best features of both analog and digital oscilloscopes.

The front-panel controls of the 9450A have been laid out in the style of an analog oscilloscope, making it easy to use from the very first moment. The analog feel is enhanced by the rapid instrument response and the fact that waveforms are presented instantly on a bright high-resolution screen. For automated test applications all the front-panel controls, including cursor positions and internal functions, are fully programmable over RS-232-C or GPIB interfaces.

Capturing and measuring signals has never been easier. For repetitive signals an auto-setup facility finds and displays signals in less than 2 seconds. For one-time phenomena the 9450A's long 50K memories and extensive triggering capabilities enable signals to be captured the very first time, even when signal speed and duration are uncertain.

### **LONG NON-VOLATILE MEMORIES**

Only long memories allow high-fidelity recording over extended periods of time. On equal time-base settings the 9450A, with 50K of memory per channel, will sample waveforms up to 50 times faster than an oscilloscope with only 1K of memory. Faster sampling means better single-shot bandwidth, better time resolution and the power to expand waveforms up to 1000 times to see details that completely elude other digital oscilloscopes. In addition, when segmented, the 9450A's non-volatile acquisition memories can store up to 200 waveforms/channel (complete with date and time stamps).

### **TRIGGER**

Push-button control enables the user to choose the appropriate trigger functions for his signal: standard triggering for basic measurements and advanced triggering to meet highly sophisticated requirements.

The standard trigger facility provides all the conventional trigger functions. Front-panel controls select and adjust parameters such as pre- and post-trigger settings, trigger level, slope, mode and coupling. To help users quickly determine the 9450A's trigger mode and conditions, LeCroy has created a series of illustrative trigger graphics.

SMART triggering offers a solution to even the most intricate triggering problems. For example, FASTGLITCH trigger can be used to locate and reveal glitches and spikes less than 2.5 nsec wide. Time-qualified trigger is ideal for ranging applications and can be used to ignore unwanted signal reflections. Other trigger features include hold-off (by time or number of events), gated triggering and conditional triggering, qualified trigger, and trigger delayed by time or number of events.

### **PASS/FAIL**

The PASS/FAIL routine enables the oscilloscope to compare a source trace against a tolerance mask while simultaneously testing a set of extracted parameters.

For instance, the oscilloscope can be set up to PASS if:

1. The waveform in Channel 1 is contained in the mask in Memory C (all points inside the mask).
2. The frequency in Channel 2 is less than 10 kHz.
3. The maximum value of Function F is more than 1.45 V.
4. The RMS value in Channel 1 is less than 850 mV.

If any of these four conditions is not satisfied, the test will FAIL.

Whether the test PASSES or FAILs, the oscilloscope can, if the user wishes, perform any or all of the following actions:

- Stop the acquisition.
- Make a screen dump.
- Store a trace to Memory D.
- Store the selected traces to the memory card.
- Emit a "beep".
- Send a pulse from the rear-panel accessory port.

The mask envelope can also be generated inside the oscilloscope.





