

LECROY

X-STREAM

OSCILLOSCOPES



GETTING STARTED MANUAL

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LeCroy Corporation

700 Chestnut Ridge Road
Chestnut Ridge, NY 10977-6499
Tel: (845) 578 6020
Fax: (845) 578 5985

Internet: www.lecroy.com

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Introduction

This brief guide includes important safety and installation information for your new X-Stream oscilloscope along with brief operating procedures to get you started capturing, viewing, and analyzing your waveforms.

The information contained in this guide also appears in greater detail in the on-line Help manual. This searchable manual is resident in the scope.

Safety Requirements

This section contains information and warnings that must be observed to keep the X-Stream DSO operating in a correct and safe condition. You are required to follow generally accepted safety procedures in addition to the safety precautions specified in this section.

Safety Symbols

Where the following symbols appear on the X-Stream DSO's front or rear panels, or in this manual, they alert you to important safety considerations.



This symbol is used where caution is required. Refer to the accompanying information or documents in order to protect against personal injury or damage to the instrument.



This symbol warns of a potential risk of shock hazard.



This symbol is used to denote the measurement ground connection.



This symbol is used to denote a safety ground connection.



This symbol is used to denote a grounded frame or chassis terminal.



This symbol shows that the switch is a Standby (power) switch. When it is pressed, the DSO's state toggles between operating and Standby mode. This switch is not a disconnect device. The instrument can only be placed in a complete Power Off state by unplugging the power cord from the AC supply.



This symbol is used to denote "Alternating Current."

CAUTION

The CAUTION sign indicates a potential hazard. It calls attention to a procedure, practice or condition which, if not followed, could possibly cause damage to equipment. If a CAUTION is indicated, do not proceed until its conditions are fully understood and met.

WARNING The WARNING sign indicates a potential hazard. It calls attention to a procedure, practice or condition which, if not followed, could possibly cause bodily injury or death. If a WARNING is indicated, do not proceed until its conditions are fully understood and met.

CAT I Installation (Overvoltage) Category rating per EN 61010-1 safety standard. It is applicable to the oscilloscope front panel measuring terminals. CAT I rated terminals must only be connected to source circuits in which measures are taken to limit transient voltages to an appropriately low level.

Operating Environment

The X-Stream DSO is intended for indoor use and should be operated in a clean, dry environment with an ambient temperature within the range of 5 °C to 40 °C.



WARNING

The DSO must not be operated in explosive, dusty, or wet atmospheres.

Note: Direct sunlight, radiators, and other heat sources should be taken into account when assessing the ambient temperature.



CAUTION

Protect the DSO's display touch screen from excessive impacts with foreign objects.



CAUTION

Do not exceed the maximum specified front panel measuring terminals (CH1, CH2, CH3, CH4, AUX IN) voltage levels. Refer to "Specifications" in the on-line Help manual for more details.

Installation (Overvoltage) Category II refers to local distribution level, which is applicable for equipment connected to the mains supply (AC power source).

Installation (Overvoltage) Category I refers to signal level, which is applicable for equipment measuring terminals that are connected to source circuits in which measures are taken to limit transient voltages to an appropriately low level.

Pollution Degree 2 refers to an operating environment where normally only dry non-conductive pollution occurs. Occasionally a temporary conductivity caused by condensation must be expected.

Protection Class 1 refers to grounded equipment, in which protection against electric shock is achieved by Basic Insulation and by means of a connection to the protective earthing conductor in the building wiring.

Note:

The design of the X-Stream DSO has been verified to conform to EN 61010-1 safety standard per the following limits:

Installation (Overvoltage) Categories II (Mains Supply Connector) & I (Measuring Terminals)

Pollution Degree 2

Protection Class I

Cooling

The X-Stream DSO relies on forced air cooling with internal fans and ventilation openings. Care must be taken to avoid restricting the airflow around the apertures (fan holes) at the sides and rear of the DSO. To ensure adequate ventilation it is required to leave a 10 cm (4 inch) minimum gap around the sides and rear of the instrument.

 **CAUTION**

Do not block the ventilation holes located on both sides and rear of the DSO.

 **CAUTION**

Do not allow any foreign matter to enter the DSO through the ventilation holes, etc.

AC Power Source

100 to 240 Vrms (+/-10%) AC at 50/60 Hz; 115 Vrms (+/-10%) AC at 400 Hz; Automatic AC voltage selection; Installation Category: 300V CAT II

No manual voltage selection is required; the instrument automatically adapts to line voltage.

WaveMaster 8620A, 8420A SDA 18000, 11000, 9000, 6020, 4020	≤ 800 watts (800 VA) depending on accessories installed (internal printer, probes, PC port plug-ins, etc.)
WaveMaster 8600A, 8500A, 8400A WavePro 7000A Series SDA 6000A, 5000A, 4000A DDA-5005A, 3000A	≤ 650 watts (650 VA) depending on accessories installed (internal printer, probes, PC port plug-ins, etc.)

The power supply of the DSO is protected against short circuit and overload by a 5x20 mm fuse (T10.0 A/250 V).

Note:

The X-Stream DSO automatically adapts itself to the AC line input within the following ranges:

Voltage Range:	90 to 132 VAC	180 to 264 VAC
Frequency Range:	45 to 440 Hz	45 to 66 Hz

Power and Ground Connections

The X-Stream DSO is provided with a grounded cord set containing a molded three-terminal polarized plug and a standard IEC320 (Type C13) connector for making line voltage and safety ground connection. The AC inlet ground terminal is connected directly to the frame of the instrument. For adequate protection against electrical shock hazard, the power cord plug must be inserted into a mating AC outlet containing a safety ground contact.

In Standby mode the DSO is still connected to the AC supply. The instrument can only be placed in a complete Power Off state by physically disconnecting the power cord from the AC supply.

The DSO should be positioned to allow easy access to the socket-outlet. To disconnect the DSO from the AC supply, unplug the instrument's power cord from the AC outlet after the DSO is placed in Standby state.

See "Standby (Power) Switch and DSO Operational States" section for more information.

Standby (Power) Switch and DSO Operational States

The front Standby (Power) switch controls the operational state of the DSO. This toggle switch is activated by momentarily pressing and releasing it. The color of the LED below the switch indicates the status of the DSO as follows:

On (LED Green)* DSO is fully powered and operational

Standby (LED Off)* DSO is powered off (except for some "housekeeping" circuits)

Standby (LED Red) DSO's computer subsystems (hard drive, etc.) are in Standby (reduced Power mode). All other DSO subsystems are fully powered.

* Factory Settings

The DSO's factory settings result in only two basic DSO states: On (LED Green) or Standby (LED Off). In the case of Standby (LED Off), the DSO is powered off with the exception of some "housekeeping" circuitry (approximately 12 watts dissipation). The DSO can only be placed in a complete power off state by unplugging the instrument's power cord from the primary power source (AC outlet). It is recommended that the power cord be unplugged from the AC outlet if the DSO is not being used for an extended period of time.



WARNING

Electric Shock Hazard!

Any interruption of the protective conductor inside or outside of the DSO, or disconnection of the safety ground terminal creates a hazardous situation.

Intentional interruption is prohibited.



CAUTION

The outer shells of the front panel terminals (CH1, CH2, CH3, CH4, AUX IN, AUX OUT) are connected to the instrument's chassis and therefore to the safety ground.

The User has the ability to change the DSO original factory settings via the “Power Options Properties” menu in Windows by following the path: Settings – Power Options. Its important to note that the Windows Power Option named “Standby” provides control of only the DSO’s computer subsystems (CPU, hard drive, etc.) and does not affect the other subsystems within the DSO. In general, these other subsystems remain fully powered. For additional information on setting these Power Options, see the Windows Help menu or other related technical documentation. In terms of control buttons, this DSO uses only a power button/switch and therefore references to a sleep button are not applicable.

The DSO can always be placed in the Standby state (LED Off) Power Off (except for some “housekeeping” circuits) by pressing and holding in the Standby toggle switch for approximately 5 seconds.

Fuse Replacement

Set the DSO Standby (power) switch to Standby mode (LED off) and disconnect the power cord before inspecting or replacing the fuse. Open the black fuse holder (located at the rear of the instrument directly to the right of the AC inlet) using a small, flat-bladed screwdriver. Remove the old fuse, replace it with a new 5x20 mm IEC 127 Time Lag (“T” rated) 10 A / 250 V fuse, and reinstall the fuse holder.



WARNING

For continued fire protection at all line voltages, replace fuse with the specified type and rating only. Disconnect the power cord before replacing fuse.

Calibration

The recommended calibration interval is one year. Calibration should be performed by qualified personnel only.

Cleaning

Clean only the exterior of the X-Stream DSO, using a damp, soft cloth. Do not use chemicals or abrasive elements. Under no circumstances allow moisture to penetrate the instrument. To avoid electrical shock, unplug the power cord from the AC outlet before cleaning.



WARNING

No operator serviceable parts inside. Do not remove covers.

Refer servicing to qualified personnel.

Abnormal Conditions

Operate the X-Stream DSO only as intended by the manufacturer.

If you suspect the DSO's protection has been impaired, disconnect the power cord and secure the instrument against any unintended operation.

The DSO's protection is likely to be impaired if, for example, the instrument shows visible damage or has been subjected to severe transport stresses.

Proper use of the X-Stream DSO depends on careful reading of all instructions and labels.



WARNING

Any use of the DSO in a manner not specified by the manufacturer may impair the instrument's safety protection. The X-Stream DSO and related accessories should not be directly connected to human subjects or used for patient monitoring.

When Your Scope is Delivered

Check that You Have Everything

First, verify that all items on the packing list or invoice copy have been shipped to you. Contact your nearest LeCroy customer service center or national distributor if anything is missing or damaged. If there is something missing or damaged, and you do not contact us immediately, we cannot be responsible for replacement.

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Be Sure to Read this Warranty

The oscilloscope is warranted for normal use and operation, within specifications, for a period of three years from shipment. LeCroy will either repair or, at our option, replace any product returned to one of our authorized service centers within this period. However, in order to do this we must first examine the product and find that it is defective due to workmanship or materials and not due to misuse, neglect, accident, or abnormal conditions or operation.

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Spare and replacement parts, and repairs, all have a 90-day warranty.

The oscilloscope's firmware has been thoroughly tested and is presumed to be functional. Nevertheless, it is supplied without warranty of any kind covering detailed performance. Products not made by LeCroy are covered solely by the warranty of the original equipment manufacturer.

Windows License Agreement

LeCroy's agreement with Microsoft prohibits users from running software on LeCroy X-Stream oscilloscopes that is not relevant to measuring, analyzing, or documenting waveforms.

Take advantage of Maintenance Agreements

We offer a variety of services under the heading of Maintenance Agreements. These give extended warranty and allow you to budget maintenance costs after the initial three-year warranty has expired. Installation, training, enhancements, and on-site repairs — among other services —



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7.3 Indemnification. You will defend, indemnify and hold harmless LeCroy and its officers, directors, affiliates, contractors, agents, and employees from, against and in respect of any and all assessments, damages, deficiencies, judgments, losses, obligations and liabilities (including costs of collection and reasonable attorneys' fees, expert witness fees and expenses) imposed upon or suffered or incurred by them arising from or related to your use of the Software Product.

8. GENERAL PROVISIONS.

8.1 Compliance with Laws. You will comply with all laws, legislation, rules, regulations, and governmental requirements with respect to the Software Product, and the performance by you of your obligations hereunder, of any jurisdiction in or from which you directly or indirectly cause the Software Product to be used or accessed.

8.2 No Agency. Nothing contained in this EULA will be deemed to constitute either party as the agent or representative of the other party, or both parties as joint venturers or partners for any purpose.

8.3 Entire Agreement; Waiver; Severability. This EULA constitutes the entire agreement between the parties with regard to the subject matter hereof. No provision of, right, power or privilege under this EULA will be deemed to have been waived by any act, delay, omission or acquiescence by LeCroy, its agents, or employees, but only by an instrument in writing signed by an authorized officer of LeCroy. No waiver by LeCroy of any breach or default of any provision of this EULA by you will be effective as to any other breach or default, whether of the same or any other provision and whether occurring prior to, concurrent with, or subsequent to the date of such waiver. If any provision of this EULA is declared by a court of competent jurisdiction to be invalid, illegal or unenforceable, such provision will be severed from this EULA and all the other provisions will remain in full force and effect.

8.4 Governing Law; Jurisdiction; Venue. This EULA will be governed by and construed in accordance with the laws of the State of New York, USA, without regard to its choice of law provisions. The United Nations Convention on Contracts for the International Sale of Goods will not apply to this EULA. Exclusive jurisdiction and venue for any litigation arising under this EULA is in the federal and state courts located in New York, New York, USA and both parties hereby consent to such jurisdiction and venue for this purpose.

8.5 Assignment. This EULA and the rights and obligations hereunder, may not be assigned, in whole or in part by you, except to a successor to the whole of your business, without the prior written consent of LeCroy. In the case of any permitted assignment or transfer of or under this EULA, this EULA or the relevant provisions will be binding upon, and inure to the benefit of, the successors, executors, heirs, representatives, administrators and assigns of the parties hereto.

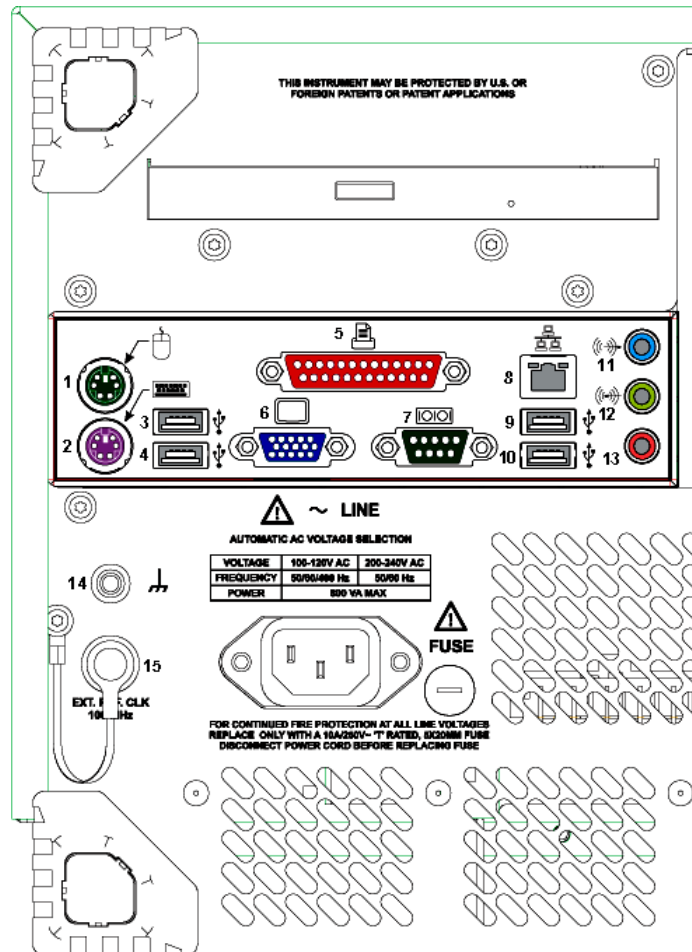
8.6 Notices. All notices or other communications between LeCroy and you under this EULA will be in writing and delivered personally, sent by confirmed fax, by confirmed e-mail, by certified mail, postage prepaid and return receipt requested, or by a nationally recognized express delivery service. All notices will be in English and will be effective upon receipt.

8.7 Headings. The headings used in this EULA are intended for convenience only and will not be deemed to supersede or modify any provisions.

8.8 Acknowledgment. Licensee acknowledges that (a) it has read and understands this EULA, (b) it has had an opportunity to have its legal counsel review this EULA, (c) this EULA has the same force and effect as a signed agreement, and (d) issuance of this EULA does not constitute general publication of the Software Product or other Confidential Information.

Installation

Hardware Connections for WaveMaster, WavePro, SDA, and DDA Models



Rear Panel Diagram: (1) Mouse Port; (2) Printer Port; (3) USB Port; (4) USB Port; (5) Centronics Port; (6) External VGA Monitor; (7) RS-232-C Port; (8) Ethernet Port; (9) USB Port; (10) USB Port; (11) Line In; (12) Speakers; (13) Microphone; (14) Ground Connector; (15) 100 MHz External Clock Input with Grounded EMI Shield installed (required when port is not in use)

SOFTWARE

You can find out the scope's software and hardware configuration as follows:

1. In the tool bar, touch **Utilities**.
2. In the dialog area, touch **Status**.

Default Settings

You can reset the scope to default settings by simply pressing the **DEFAULT SETUP** button on the front panel. The default settings are as follows:

Vertical	Timebase	Trigger
50 mV/div	50.0 ns/div	DC, C1, 0 mV level
0 V offset	10.0 GS/s	edge trigger positive edge
	0 s delay	Auto trigger mode

Adding a New Option

To add a software option you will need a code to enable the option. Call LeCroy Customer Support at 1-800-553-2769 to place an order and receive the code.

Restoring Software

Restarting the Application

Upon initial power-up, the scope will load the application software automatically. If you exit the application and want to reload it, touch the scope shortcut icon on the desktop.

If you minimize the application, touch the scope logo button in the task bar at the bottom of the screen, then touch **Maximize**.

Restarting the Operating System

If you need to restart the Windows® operating system, you will have to reboot the scope by pressing and holding the power switch in for 10 seconds, then turning the power back on.

Using the Recovery Disk – non-Windows XP Scopes

Your oscilloscope comes with a recovery disk to be used in the event that it becomes necessary to reload the operating software. Follow the instructions displayed on-screen when loading the recovery software.

System Recovery – Windows XP Scopes

Your oscilloscope was designed to operate very reliably for many years. However, the application software that operates the instrument runs on a Windows platform. The loading or incomplete removal of additional Windows applications may eventually cause problems in the stability of the operating system. In severe cases, it may be necessary to reload the base operating system and oscilloscope application. This can be done by using a recovery routine to restore a clean copy of the image originally installed on the C: drive. Any user data and calibration data located within the D: partition will not be affected by the recovery process.

LeCroy has provided a recovery application, along with a backup image, in an extra partition on the instrument's hard drive. The recovery process is easy to perform, using the instructions provided below.

After the recovery procedure is done, you must activate Windows, either by internet connection to Microsoft's Web site or by telephone. For this you will need to supply the Windows Product Key number, which is affixed to the rear of the scope.

Note: The recovery process will produce a replica of the operating system and oscilloscope application software to the revision levels that were current at the time the oscilloscope was manufactured. Any further revisions of the application software, Windows operating system, and virus scan definition files will not be upgraded automatically. After completion of the disk image recovery, it is highly recommended that you search the vendors' Web sites to upgrade the individual components to their current revision level. The current oscilloscope application software can be downloaded directly from the LeCroy Web site at www.lecroy.com.

Since the calibration data for the oscilloscope is stored in the D: drive, the current calibration constants will not be overwritten during the recovery process.

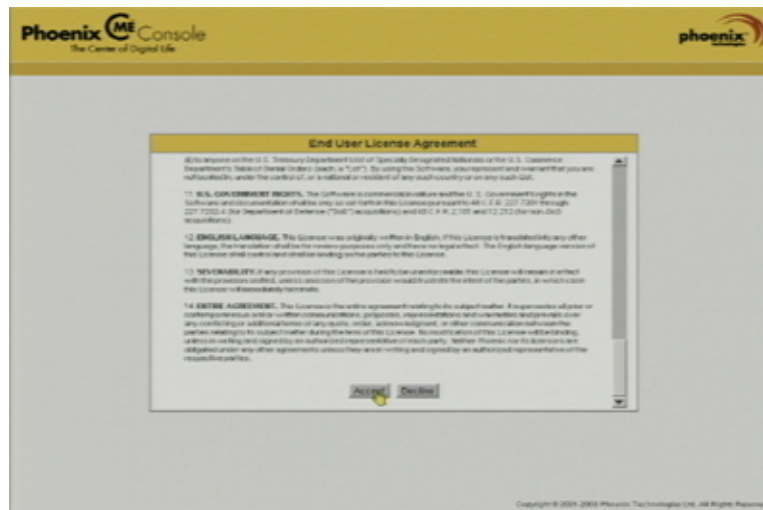
RECOVERY PROCEDURE

1. Connect an network cable to the LAN port at the rear of the scope if you intend to activate windows through the internet.
2. Connect a keyboard and a mouse to the scope.
3. Apply power to the scope.

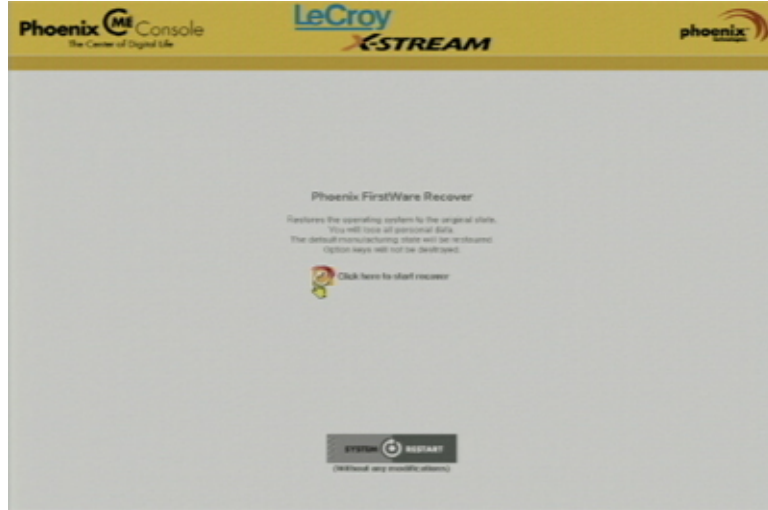
- As soon as the LeCroy logo appears on the screen, press and hold down the **F4** key until the recovery software logo appears momentarily:



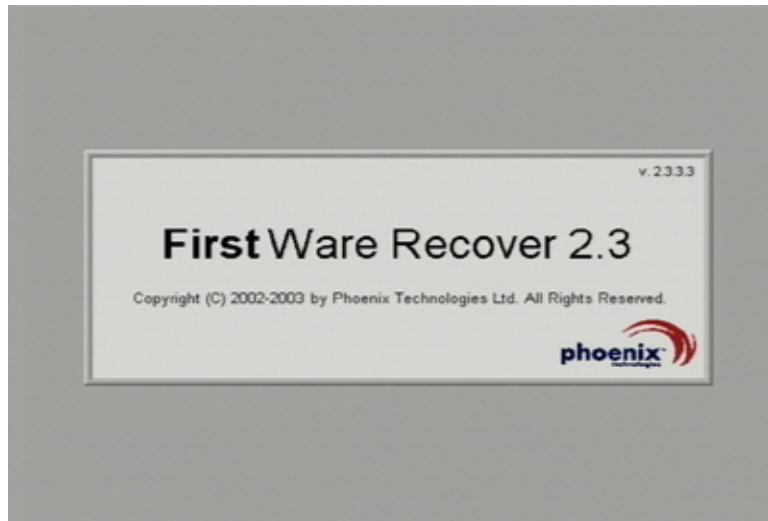
- Then the cME console End User License Agreement is displayed. Read the agreement, and click **Accept**:



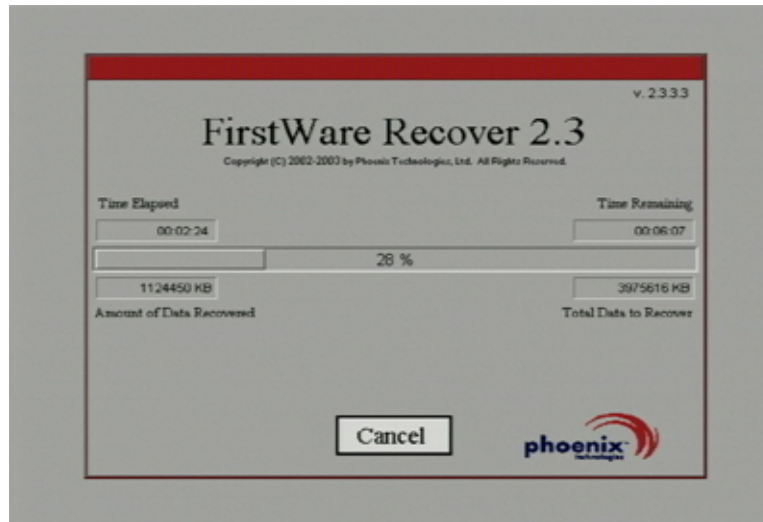
- The Phoenix cME Console main page is displayed. Click **Click here to start recover**:



- The FirstWare Recover splash screen is displayed momentarily:

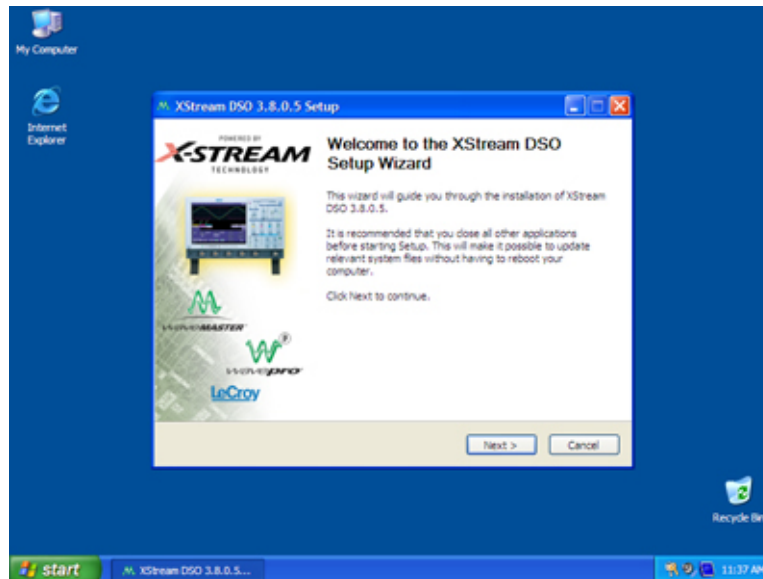


- The recovery starts, and the FirstWare Progress screen is displayed. No further selections are required. The recovery takes about 10 minutes.



Note: The screen will blank on occasion for prolonged periods. This is normal and is not an indication of any malfunctioning of the recovery process.

- After the recovery is completed, the X-Stream software installer screen appears. Click **Next** to continue:



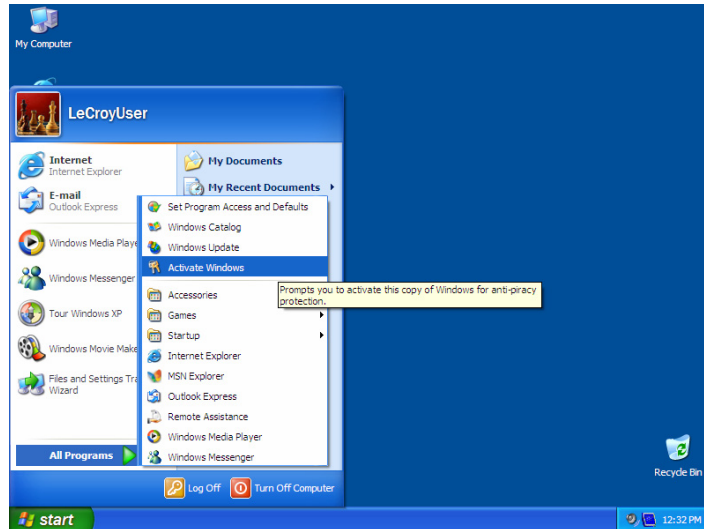
- When the X-Stream installation is completed, reboot the scope.

Now you must activate Windows by internet connection to Microsoft's Web site or by telephone. For this you will need to supply the Windows Product Key number, which is affixed to the rear of the scope.

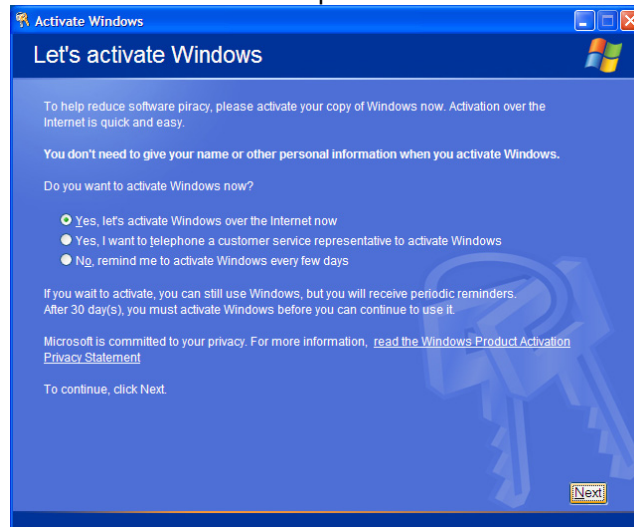
Windows Activation

1. Click **Start** in the task bar, then select **All Programs** → **Activate Windows**.

Note: After Windows Activation is completed, this selection will no longer appear in the All Programs menu.

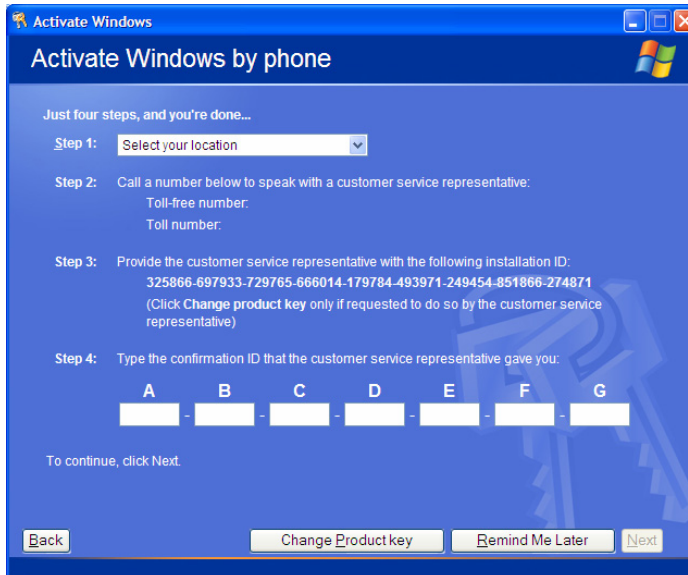


2. Select an activation method: internet or phone. Then click **Next**.

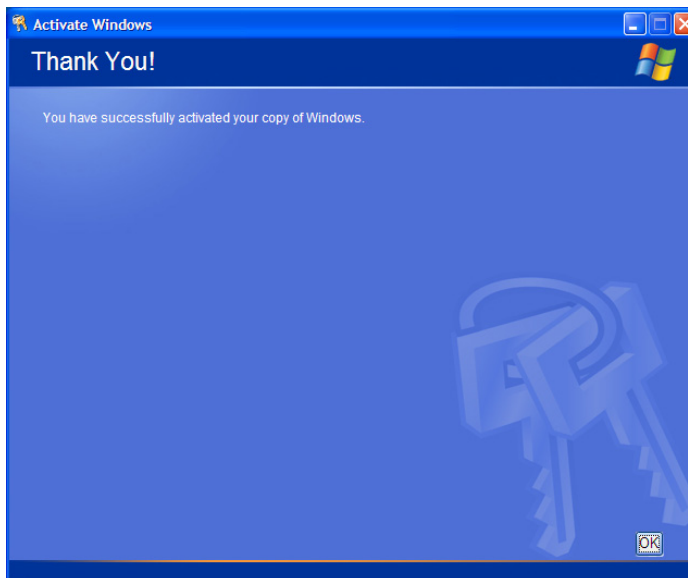


3. If you elected to activate by internet, enter the Activation ID (Product Key) number when prompted to do so, then click **Next**. Windows Activation will begin.

- If you elected to activate by phone, select the country the scope is located in. Then dial the number provided. You will be asked to repeat over the phone the installation ID listed on the screen; then a 7-part number will be provided to you to enter in the empty boxes at the bottom of the screen. Click **Next** when you are done.



- When activation is completed, an acknowledgement screen will appear. Click **OK**.



6. Check the revision levels of the X-Stream software, virus definitions, and Windows updates. Visit the vendors' Web sites and download all necessary updates.

Connecting to a Signal

WavePro 7000A series and the DDA 3000 have LeCroy's ProBus interface connectors. ProBus compatible probes may be directly connected to the input connectors. The ProBus connector is also directly compatible with standard male BNC connectors. Passive probes and cables terminated with BNC connectors may be directly connected to the inputs.

WaveMaster, SDA series, and DDA 5005A utilize a ProLink interface, which supports the higher bandwidths these instruments are capable of measuring. ProLink compatible probes may be directly connected to the front panel connectors. LeCroy's ProLink Adapters (LPA) give you the ability to connect cables terminated in SMA or BNC connectors to the instrument.



(1) BMA-to-SMA Adapter; (2) BMA-to-BNC Adapter



(1) ProLink Female Connector; (2) ProLink-to-SMA Adapter Installed; (3) ProLink-to-BNC Adapter Installed

Note: When connecting a lower bandwidth ProBus active probe to the instrument, be sure to use a ProLink BMA-to-BNC adapter (item 3 in the figure). Do not plug the probe directly into the front panel connector (item 1) without an adapter.

Connecting the Adapters

The mating end of the ProLink adapter has four fastening clips, as shown here:



When installing an adapter on the instrument's connector panel, align the male 6-pin connector with the female connector and push the adapter straight in. There will be some resistance and you'll hear clicks as the four clips slide into place. Then tighten the captive screws.

When removing an adapter, loosen the two captive screws. Push down on the adapter to unseat the clips. This will require some force and will be initially noisy, but no damage will result to the connector, the floating female BMA connector, or the pins, which can be 15 degrees off axis when being mated or unmated.

Probes

LeCroy offers a variety of passive and active probes for use with your X-Stream scope. Visit www.lecroy.com for specifications and ordering information.

Current Probes	Current Probes measure the current passing through a wire; current probes do not use the "traditional" probing style of placing a tip onto a test point. Rather, a wire is placed inside of the "jaw" of the probe, which then allows the probe to measure the current (in Amps).
Active Probes	There are two different types of active probes: "single-ended" and "differential." Single-ended: A single-ended active probe is associated with measuring voltages at high frequencies. Measurement with an active probe requires a test point and a ground point. The ground (also called earth) acts as a zero reference for the test point measurement.
Differential Probes	Differential active probes are like two probes in one. Instead of measuring a test point in relation to a ground point (like single-ended active probes), differential probes measure the difference in voltage of a test point in relation to another test point.
Passive Probes	Passive probes measure voltages at lower frequencies (<400 MHz). They have higher input capacitance (input C) and do not need power to operate (unlike active probes). At higher frequencies, higher input capacitance loads the test circuit, attenuating the signal. This is why active probes are used in high frequency applications. Passive probes also measure voltage in reference to ground.
High Voltage Probes	These are active single ended probes that are designed to measure high voltages (safely). They measure the voltage in reference to ground.

Front Panel Controls

The control buttons of the X-Stream DSO front panel are logically grouped into analog and special functional areas. Analog functions are included in the **Horizontal**, **Trigger**, and **Vertical** groups of control buttons and knobs.

Sometimes you may want to change a value without using the numeric keypad. In that case, simply touch once inside the data entry field in the scope dialog area (the field will be highlighted in yellow), then use the **ADJUST** group of buttons and single knob to dial in values into the selected field.

By default, the control knob makes coarse adjustments (that is, digits to the left of the decimal



point). Press the **FINE** button to adjust digits to the right of the decimal point. To enter exact values, you can also display a keypad by touching twice inside the data entry field. Then



use the keypad to type in the value. The **SELECT** button steps through a dialog from one control to the next.

The following table provides an explanation of the front panel buttons and knobs:

Vertical Knobs and Buttons:	
	<p>OFFSET – Adjusts the vertical offset of a channel.</p>
	<p>VOLTS/DIV – Adjusts the Volts/Division setting (vertical gain) of the channel selected.</p>
	<p>CHANNEL BUTTONS – Turn a channel on or off. These buttons activate the dialog that lets you change the channel's setup conditions including coupling, gain, and offset. They are used also to select multiple grids, to automatically set the gain (Find Scale), or to automatically display a zoom of the signal. Press twice to toggle the trace on and off.</p>

Horizontal Knobs and Buttons:



DELAY – Horizontally positions the scope trace on the display so you can observe the signal prior to the trigger time. *Delay* adjusts the pre- and post-trigger time.

TIME/DIVISION – Sets the time/division of the scope timebase (acquisition system). LeCroy's SMART Memory automatically optimizes the memory and sample rate for maximum resolution.

SMART MEMORY – Calls up the SMART Memory dialog from the Horizontal setup menus.

ZERO DELAY – Sets the horizontal delay to zero. The trigger point is positioned at the middle of the display grid.

SETUP – Activates the TIMEBASE menu to allow you to select acquisition conditions, including the sample mode, maximum memory length, etc.

Trigger Knobs and Buttons:



LEVEL – Selects the trigger threshold level. The Level is indicated in the **Trigger** label.

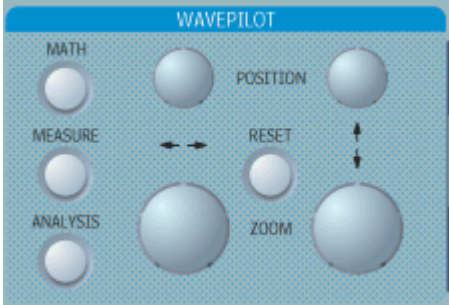


SETUP – Activates the trigger setup menu to select the trigger type and the trigger conditions.










STOP – Prevents the scope from triggering on a signal. If you boot up the instrument with the trigger in Stop mode, the message "no trace available" will be displayed. Press **AUTO** to display your trace.



AUTO – Triggers the scope after a time-out, even if the trigger conditions are not met.

NORMAL – Triggers the scope each time a signal is present that meets the conditions set for the type of trigger selected.

SINGLE – Arms the scope to trigger once (single-shot acquisition) when the input signal

	<p>meets the trigger conditions set for the type of trigger selected. If the scope is already armed, it will force a trigger.</p>
<p>Wavepilot Control Knobs and Buttons:</p>	
	<p>→→ POSITION – Adjusts the horizontal position of a zoom trace on the display. The zoom region is highlighted in color on the source trace.</p> <p>→→ ZOOM – Adjusts the horizontal zoom (magnification factor) of the selected zoom trace.</p> <p>↑↓ POSITION – Adjusts the vertical position of the selected zoom trace on the display.</p> <p>↑↓ ZOOM – Adjusts the vertical zoom (magnification factor) of the selected zoom trace on the display.</p> <p>RESET – Resets the zoom factors.</p> <p>MATH – Provides access to the Math setup dialog.</p> <p>MEASURE – Provides access to the Measure setup dialog.</p> <p>ANALYSIS – Provides access to the Analysis setup dialog.</p>
<p>Special Features Buttons:</p>	
	<p>AUTO SETUP – Automatically sets the scope's horizontal timebase (acquisition system), vertical gain and offset, as well as trigger conditions, to display a wide variety of signals.</p>
	<p>CURSORS – The center button calls up the "Standard Cursors" setup dialog. The other two buttons control the placement of the cursors on your waveform.</p>

	<p>DEFAULT SETUP – Sets the scope's horizontal timebase (acquisition system), vertical gain and offset, and trigger conditions to default settings.</p>
	<p>DRIVE ANALYSIS – This button is found on DDA instruments in place of Default Setup. When pressed, it displays the DDA setup dialogs.</p>
	<p>SERIAL DATA ANALYSIS – This button is found on Serial Data Analyzers in place of Default Setup. When pressed, it displays the SDA setup dialogs.</p>
	<p>HELP – Displays the on-line Help manual. You can choose to receive control help, or to search for the information you need using the Table of Contents and Index. Control Help displays help for a particular button, menu item, data field, etc. contained in the dialogs.</p>
	<p>SAVE/RECALL – Calls up the dialogs for saving and recalling waveforms and setups, and for disk utilities.</p>
	<p>ANALOG PERSIST – Provides a three dimensional view of the signal: time, voltage, and a third dimension related to the frequency of occurrence, as shown by a color-graded (thermal) or intensity-graded display.</p>
	<p>QUICKZOOM (toggle switch) –Automatically displays magnified views of up to four signal inputs on multiple grids. With four input signals, the signals are displayed along with four zoom traces, each on its own grid. This button turns off all other traces.</p>
<p>General Control Buttons:</p>	
	<p>PRINT SCREEN – Prints the displayed screen to a file, a printer, the clipboard, or attaches it as an e-mail. You can select the device and format it in the Utilities → Hardcopy dialog.</p>
	<p>UTILITIES – For setup of scope features including hardcopy devices and formats, date and time, and remote control interfaces, etc.; or for checking status, options, etc.</p>




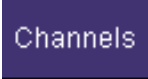
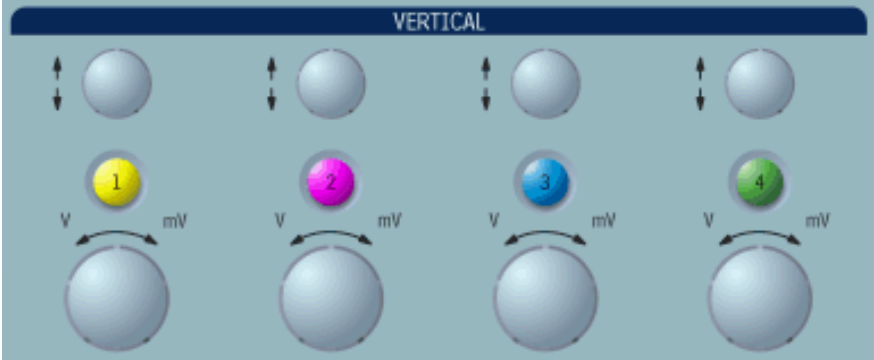

	TOUCH SCREEN – (toggle switch) Activates or deactivates the touch screen.
	CLEAR SWEEPS – Clears data from multiple sweeps (acquisitions) including: persistence trace displays, averaged traces, parameter statistics, and Histicons. During waveform readout, cancels readout.
	STANDBY Lamp – The STANDBY lamp indicates when the scope has placed itself in standby mode. In this mode, current settings are retained.



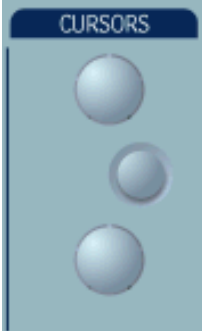

On-screen Toolbars, Icons, and Dialog Boxes


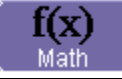
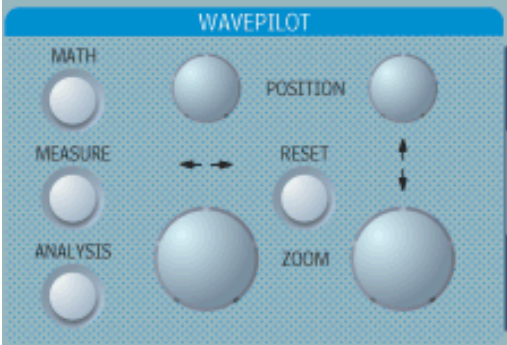
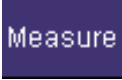
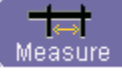




Toolbar Buttons

The toolbar buttons at the top of the scope's display are designed for quick setup of common functions. Many of these buttons give you access to the same functions as do the front panel buttons.

Table of Equivalent Functions

<p>Trigger</p>	
<p>Display</p>	
<p>Cursors</p>	
<p>Zoom</p>	

X-Stream DSO Icons

The icons that you see in the dialog areas of the scope are touch sensitive. When selected, an icon changes color to show that it is active. The **Trigger** setup dialog is an example of this functionality.

Other icons, for example those located at the bottom of the **Vertical Adjust** setup dialog, are quick links to other functions, such as **Math** and **Measure**.

Dialog Boxes

The dialog area occupies the bottom one-third of the screen. To expand the signal display area, you can minimize each dialog box by touching the **Close** tab at the right of the dialog box.

Screen Layout

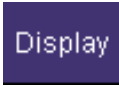
The X-Stream DSO screen is divided into three areas:

- tool bar
- signal display area
- dialog area

Tool Bar

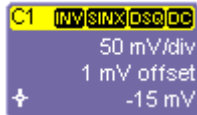
The top of the screen contains a toolbar of commonly used functions. Whenever you touch one of these buttons, the dialog area at the bottom of the screen switches to show the setup for that function.

Signal Display Grid

You can set up the signal display area by touching  in the toolbar. The display dialog offers a choice of grid combinations and a means to set the grid intensity.

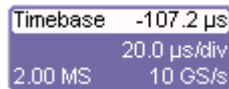
Trace Descriptors

Vertical and horizontal trace descriptors, or labels, are displayed below the grid. They provide a summary of your channel, timebase, and trigger settings. To make adjustments to these settings, touch the respective label to display the setup dialog for that function.



Channel trace labels show the vertical settings for the trace, as well as cursor information if cursors are in use. In the title bar of the label are also included indicators for (SinX)/X interpolation, waveform inversion (INV), deskew (DSQ), coupling (DC/GND), bandwidth limiting (BWL), and averaging (AVG). These indicators have a long and short form.

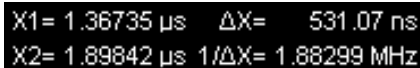
Besides channel traces, math and parameter measurement labels are also displayed. Labels are displayed only for traces that are turned on.



The title bar of the **TimeBase** label shows the trigger delay setting. Time per division and sampling information is given below the title bar.




The title bar of the **Trigger** label shows the trigger mode: Auto, Normal, or Stopped. Below the title bar is given the coupling (DC), trigger type (Edge), source (C1), level (0 mV), and slope (Positive).



Shown below the TimeBase and Trigger labels is setup information for horizontal cursors, including the time between cursors and the frequency.

To Turn On a Channel Trace

1. On the front panel, press a channel select button, such as , to display the trace label for that input channel.
2. To turn on a math function trace, touch **Math** in the toolbar, then **Math Setup...** in the drop-down menu. Touch the **On** checkbox for the trace you want to activate.
3. You can also turn on traces for math functions, parameters, and memory traces without leaving the Vertical Adjust dialog by touching the icons at the bottom of the Vertical Adjust dialog:



Whenever you turn on a channel, math, or memory trace via the toolbar, the dialog at the bottom of the screen automatically switches to the vertical setup or math setup dialog for that selection. You can configure your traces from here, including math setups.



C1 Vertical Adjust

The channel number appears in the Vertical Adjust tab of the "Vertical Adjust" dialog, signifying that all controls and data entry fields are dedicated to the selected trace.

Introduction to WaveShape Analysis

This section is a brief reference to the basic tools available to perform WaveShape Analysis in the time, frequency, and statistical domains.

Parameter Measurements

WaveShape Analysis typically begins with the measurement of parameters. Parameter measurement tools determine a wide range of waveform properties. Use them to automatically calculate many attributes of your waveform, like rise time, rms voltage, and peak-to-peak voltage, for example.

There are parameter modes for the amplitude and time domains, custom parameter groups, and parameters for pass and fail testing. You can make common measurements on one or more waveforms.

Measure Modes

The selections for Measure Mode allow you to quickly apply parameters for standard vertical and standard horizontal setups, and custom setups.

Pass and fail parameters can be customized, too. You can accumulate and display statistics on each parameter's average, lowest, highest, and standard deviation.

Standard Vertical Parameters

These are the default Standard Vertical Parameters:

Vertical	Description
mean	Mean
sdev	Standard deviation
max	Maximum
min.	Minimum
ampl	Amplitude
pkpk	Peak-to-peak
top	Top
base	Base

Standard Horizontal Parameters

These are the default Standard Horizontal Parameters:

Horizontal	
freq	Frequency
period	Period
width	Width
rise	Risetime
fall	Fall time
delay	Delay from trigger
duty	duty cycle
npoints	Number of points in waveform

Custom Measurements with My Measure

You can choose to customize up to eight parameters by touching **My Measure** and then selecting the measurements desired.

Parameter Analysis

Trend measurements

A trend of a measurement parameter is a line graph with a measurement point from each subsequent signal acquisition plotted on the graph.

1. In the toolbar, touch **Measure**, then **Measure Setup...** in the drop-down menu.
2. Touch one of parameter tabs **P1** through **P8**.
3. Touch inside the **Source1** data entry field and select an input waveform from the pop-up menu.
4. Touch inside the **Measure** data entry field and select a parameter from the pop-up menu.
5. Touch the **Trend** button at the bottom of the dialog.

Track View

A Track View of a measurement parameter is a unique and specialized graph that is time correlated to the signal being measured. The Track View applies to a single-shot acquisition and plots the variation of a parameter (such as width) for each cycle in time-correlated sequence with the waveform. Track View lets you locate a problematic signal feature including width, period, amplitude, and more.

1. In the toolbar touch **Measure**, then **Measure Setup...** in the drop-down menu.
2. Touch one of parameter tabs **P1** through **P8**.
3. Touch inside the **Source1** data entry field and select an input waveform from the pop-up menu.
4. Touch inside the **Measure** data entry field and select a parameter from the pop-up menu.
5. Touch the **Track** button at the bottom of the dialog.

JitterTrack View

A JitterTrack View is similar to a Track View but is applicable to a specialized set of timing parameter measurements used to analyze cycle-to-cycle timing variation, including clock jitter, and to aid in tracking the variation to its source. JitterTrack is available with the optional XMAP or JTA2 WaveShape Analysis packages.

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