

# LECROY

# X-STREAM

# OSCILLOSCOPES

---



---

**GETTING STARTED MANUAL**

**FEBRUARY 2006**




**LeCroy Corporation**

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

**Internet:** [www.lecroy.com](http://www.lecroy.com)

© 2006 by LeCroy Corporation. All rights reserved.

LeCroy, ActiveDSO, WaveLink, JitterTrack, WavePro, WaveMaster, WaveSurfer, and Waverunner are registered trademarks of LeCroy Corporation. Other product or brand names are trademarks or requested trademarks of their respective holders. Information in this publication supersedes all earlier versions. Specifications subject to change without notice.

<p>Manufactured under an ISO 9000 Registered Quality Management System Visit <a href="http://www.lecroy.com">www.lecroy.com</a> to view the certificate.</p>		<p>This electronic product is subject to disposal and recycling regulations that vary by country and region. Many countries prohibit the disposal of waste electronic equipment in standard waste receptacles. For more information about proper disposal and recycling of your LeCroy product, please visit <a href="http://www.lecroy.com/recycle">www.lecroy.com/recycle</a>.</p>
--	---	--

WM-GS-E Rev C  
914008-00 Rev A

<b>INTRODUCTION</b> .....	<b>5</b>
<b>SAFETY REQUIREMENTS</b> .....	<b>6</b>
<i>Safety Symbols</i> .....	<b>6</b>
<i>Operating Environment</i> .....	<b>7</b>
<i>Cooling</i> .....	<b>9</b>
<i>AC Power Source</i> .....	<b>9</b>
<i>Power and Ground Connections</i> .....	<b>10</b>
<i>Standby (Power) Switch and DSO Operational States</i> .....	<b>10</b>
<i>Fuse Replacement</i> .....	<b>11</b>
<i>Calibration</i> .....	<b>11</b>
<i>Cleaning</i> .....	<b>11</b>
<i>Abnormal Conditions</i> .....	<b>12</b>
<b>WHEN YOUR SCOPE IS DELIVERED</b> .....	<b>13</b>
<i>Check that You Have Everything</i> .....	<b>13</b>
<i>Be Sure to Read this Warranty</i> .....	<b>13</b>
<i>Windows License Agreement</i> .....	<b>13</b>
<i>Take advantage of Maintenance Agreements</i> .....	<b>13</b>
<i>End-User License Agreement for LeCroy® X-Stream Software</i> .....	<b>14</b>
<b>INSTALLATION</b> .....	<b>21</b>
<i>Hardware Connections for WaveMaster, WavePro, SDA, and DDA Models</i> .....	<b>21</b>
<b>SOFTWARE</b> .....	<b>22</b>
<i>Default Settings</i> .....	<b>22</b>
<i>Adding a New Option</i> .....	<b>22</b>
<i>Restoring Software</i> .....	<b>22</b>
Restarting the Application .....	<b>22</b>

Restarting the Operating System.....	22
<b>USING THE RECOVERY DISK – NON-WINDOWS XP SCOPES .....</b>	<b>23</b>
<b>SYSTEM RECOVERY – WINDOWS XP SCOPES .....</b>	<b>23</b>
<b>RECOVERY PROCEDURE .....</b>	<b>23</b>
Windows Activation.....	27
<b>CONNECTING TO A SIGNAL.....</b>	<b>30</b>
<i>Connecting the Adapters .....</i>	<i>31</i>
<b>PROBES.....</b>	<b>32</b>
<b>FRONT PANEL CONTROLS .....</b>	<b>33</b>
<i>Vertical Knobs and Buttons: .....</i>	<i>33</i>
<i>Horizontal Knobs and Buttons: .....</i>	<i>34</i>
<i>Trigger Knobs and Buttons: .....</i>	<i>34</i>
<i>Wavepilot Control Knobs and Buttons: .....</i>	<i>35</i>
<i>Special Features Buttons:.....</i>	<i>35</i>
<i>General Control Buttons: .....</i>	<i>36</i>
<b>ON-SCREEN TOOLBARS, ICONS, AND DIALOG BOXES .....</b>	<b>38</b>
<i>Toolbar Buttons .....</i>	<i>38</i>
<i>X-Stream DSO Icons .....</i>	<i>40</i>
<i>Dialog Boxes .....</i>	<i>40</i>
<b>SCREEN LAYOUT .....</b>	<b>41</b>
<i>Tool Bar .....</i>	<i>41</i>
<i>Signal Display Grid .....</i>	<i>41</i>
<b>TRACE DESCRIPTORS.....</b>	<b>42</b>
<i>To Turn On a Channel Trace .....</i>	<i>42</i>

**INTRODUCTION TO WAVESHAPe ANALYSIS.....44**

*Parameter Measurements..... 44*

*Measure Modes ..... 44*

*Standard Vertical Parameters ..... 44*

*Standard Horizontal Parameters..... 45*

*Custom Measurements with My Measure ..... 45*

**PARAMETER ANALYSIS .....46**

*Trend measurements ..... 46*

*Track View..... 46*

*JitterTrack View..... 46*

BLANK PAGE

### 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 and also supplied on CD-ROM, shipped with your 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 11000, 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:

<b>Voltage Range:</b>	90 to 132 VAC	180 to 264 VAC
<b>Frequency Range:</b>	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.

**NOTE: THE WARRANTY BELOW REPLACES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS, OR ADEQUACY FOR ANY PARTICULAR PURPOSE OR USE. LECROY SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTRACT OR OTHERWISE. THE CUSTOMER IS RESPONSIBLE FOR THE TRANSPORTATION AND INSURANCE CHARGES FOR THE RETURN OF PRODUCTS TO THE SERVICE FACILITY. LECROY WILL RETURN ALL PRODUCTS UNDER WARRANTY WITH TRANSPORT PREPAID.**

### 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.

LeCroy shall not be responsible for any defect, damage, or failure caused by any of the following: a) attempted repairs or installations by personnel other than LeCroy representatives, or b) improper connection to incompatible equipment or c) for any damage or malfunction caused by the use of non-LeCroy supplies. Furthermore, LeCroy shall not be obligated to service a product that has been modified or integrated where the modification or integration increases the task duration or difficulty of servicing the oscilloscope.

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 —



are available through special supplemental support agreements. Inquire at your LeCroy customer service center or national distributor.

#### **End-User License Agreement for LeCroy® X-Stream Software**

**IMPORTANT-READ CAREFULLY: THIS END-USER LICENSE AGREEMENT (“EULA”) IS A LEGAL AGREEMENT BETWEEN THE INDIVIDUAL OR ENTITY LICENSING THE SOFTWARE PRODUCT (“YOU” OR “YOUR”) AND LECROY CORPORATION (“LECROY”) FOR THE SOFTWARE PRODUCT(S) ACCOMPANYING THIS EULA, WHICH INCLUDE(S): COMPUTER PROGRAMS; ANY “ONLINE” OR ELECTRONIC DOCUMENTATION AND PRINTED MATERIALS PROVIDED BY LECROY HEREWITH (“DOCUMENTATION”); ASSOCIATED MEDIA; AND ANY UPDATES (AS DEFINED BELOW) (COLLECTIVELY, THE “SOFTWARE PRODUCT”). BY USING AN INSTRUMENT TOGETHER WITH OR CONTAINING THE SOFTWARE PRODUCT, OR BY INSTALLING, COPYING, OR OTHERWISE USING THE SOFTWARE PRODUCT, IN WHOLE OR IN PART, YOU AGREE TO BE BOUND BY THE TERMS OF THIS EULA. IF YOU DO NOT AGREE TO THE TERMS OF THIS EULA, DO NOT INSTALL, COPY, OR OTHERWISE USE THE SOFTWARE PRODUCT; YOU MAY RETURN THE SOFTWARE PRODUCT TO YOUR PLACE OF PURCHASE FOR A FULL REFUND. IN ADDITION, BY INSTALLING, COPYING, OR OTHERWISE USING ANY MODIFICATIONS, ENHANCEMENTS, NEW VERSIONS, BUG FIXES, OR OTHER COMPONENTS OF THE SOFTWARE PRODUCT THAT LECROY PROVIDES TO YOU SEPARATELY AS PART OF THE SOFTWARE PRODUCT (“UPDATES”), YOU AGREE TO BE BOUND BY ANY ADDITIONAL LICENSE TERMS THAT ACCOMPANY SUCH UPDATES. IF YOU DO NOT AGREE TO SUCH ADDITIONAL LICENSE TERMS, YOU MAY NOT INSTALL, COPY, OR OTHERWISE USE SUCH UPDATES.**

**THE PARTIES CONFIRM THAT THIS AGREEMENT AND ALL RELATED DOCUMENTATION ARE AND WILL BE DRAFTED IN ENGLISH. LES PARTIES AUX PRÉSENTÉS CONFIRMENT LEUR VOLONTÉ QUE CETTE CONVENTION DE MÊME QUE TOUS LES DOCUMENTS Y COMPRIS TOUT AVIS QUI S’Y RATTACHÉ, SOIENT REDIGÉS EN LANGUE ANGLAISE.**

#### **1. GRANT OF LICENSE.**

1.1 License Grant. Subject to the terms and conditions of this EULA and payment of all applicable fees, LeCroy grants to you a nonexclusive, nontransferable license (the “License”) to: (a) operate the Software Product as provided or installed, in object code form, for your own internal business purposes, (i) for use in or with an instrument provided or manufactured by LeCroy (an “Instrument”), (ii) for testing your software product(s) (to be used solely by you) that are designed to operate in conjunction with an Instrument (“Your Software”), and (iii) make one copy for archival and back-up purposes; (b) make and use copies of the Documentation; provided that such copies will be used only in connection with your licensed use of the Software Product, and such copies may not be republished or distributed (either in hard copy or electronic form) to any third party; and (c) copy, modify, enhance and prepare derivative works (“Derivatives”) of the source code version of those portions of the Software Product set forth in and identified in the Documentation as “Samples” (“Sample Code”) for the sole purposes of designing, developing, and testing Your Software. If you are an entity, only one designated individual within your organization, as designated by you, may exercise the License; provided that additional individuals within your organization may assist with respect to reproducing and distributing Sample Code as



permitted under Section 1.1(c)(ii). LeCroy reserves all rights not expressly granted to you. No license is granted hereunder for any use other than that specified herein, and no license is granted for any use in combination or in connection with other products or services (other than Instruments and Your Software) without the express prior written consent of LeCroy. The Software Product is licensed as a single product. Its component parts may not be separated for use by more than one user. This EULA does not grant you any rights in connection with any trademarks or service marks of LeCroy. The Software Product is protected by copyright laws and international copyright treaties, as well as other intellectual property laws and treaties. The Software Product is licensed, not sold. The terms of this printed, paper EULA supersede the terms of any on-screen license agreement found within the Software Product.

**1.2 Upgrades.** If the Software Product is labeled as an “upgrade,” (or other similar designation) the License will not take effect, and you will have no right to use or access the Software Product unless you are properly licensed to use a product identified by LeCroy as being eligible for the upgrade (“Underlying Product”). A Software Product labeled as an “upgrade” replaces and/or supplements the Underlying Product. You may use the resulting upgraded product only in accordance with the terms of this EULA. If the Software Product is an upgrade of a component of a package of software programs that you licensed as a single product, the Software Product may be used and transferred only as part of that single product package and may not be separated for use on more than one computer.

**1.3. Limitations.** Except as specifically permitted in this EULA, you will not directly or indirectly (a) use any Confidential Information to create any software or documentation that is similar to any of the Software Product or Documentation; (b) encumber, transfer, rent, lease, time-share or use the Software Product in any service bureau arrangement; (c) copy (except for archival purposes), distribute, manufacture, adapt, create derivative works of, translate, localize, port or otherwise modify the Software Product or the Documentation; (d) permit access to the Software Product by any party developing, marketing or planning to develop or market any product having functionality similar to or competitive with the Software Product; (e) publish benchmark results relating to the Software Product, nor disclose Software Product features, errors or bugs to third parties; or (f) permit any third party to engage in any of the acts proscribed in clauses (a) through (e). In jurisdictions in which transfer is permitted, notwithstanding the foregoing prohibition, transfers will only be effective if you transfer a copy of this EULA, as well as all copies of the Software Product, whereupon your right to use the Software product will terminate. Except as described in this Section 1.3, You are not permitted (i) to decompile, disassemble, reverse compile, reverse assemble, reverse translate or otherwise reverse engineer the Software Product, (ii) to use any similar means to discover the source code of the Software Product or to discover the trade secrets in the Software Product, or (iii) to otherwise circumvent any technological measure that controls access to the Software Product. You may reverse engineer or otherwise circumvent the technological measures protecting the Software Product for the sole purpose of identifying and analyzing those elements that are necessary to achieve Interoperability (the “Permitted Objective”) only if: (A) doing so is necessary to achieve the Permitted Objective and it does not constitute infringement under Title 17 of the United States Code; (B) such circumvention is confined to those parts of the Software Product and to such acts as are necessary to achieve the Permitted Objective; (C) the information to be gained thereby has not already been made readily available to you or has not been provided by LeCroy within a reasonable time after a written request by you to LeCroy to provide such information; (D) the information gained is not used for

any purpose other than the Permitted Objective and is not disclosed to any other person except as may be necessary to achieve the Permitted Objective; and (E) the information obtained is not used (1) to create a computer program substantially similar in its expression to the Software Product including, but not limited to, expressions of the Software Product in other computer languages, or (2) for any other act restricted by LeCroy's intellectual property rights in the Software Product. "Interoperability" will have the same meaning in this EULA as defined in the Digital Millennium Copyright Act, 17 U.S.C. §1201(f), the ability of computer programs to exchange information and of such programs mutually to use the information which has been exchanged.

1.4 Prerelease Code. Portions of the Software Product may be identified as prerelease code ("Prerelease Code"). Prerelease Code is not at the level of performance and compatibility of the final, generally available product offering. The Prerelease Code may not operate correctly and may be substantially modified prior to first commercial shipment. LeCroy is not obligated to make this or any later version of the Prerelease Code commercially available. The License with respect to the Prerelease Code terminates upon availability of a commercial release of the Prerelease Code from LeCroy.

## **2. SUPPORT SERVICES.**

At LeCroy's sole discretion, from time to time, LeCroy may provide Updates to the Software Product. LeCroy shall have no obligation to revise or update the Software Product or to support any version of the Software Product. At LeCroy's sole discretion, upon your request, LeCroy may provide you with support services related to the Software Product ("Support Services") pursuant to the LeCroy policies and programs described in the Documentation or otherwise then in effect, and such Support Services will be subject to LeCroy's then-current fees therefor, if any. Any Update or other supplemental software code provided to you pursuant to the Support Services will be considered part of the Software Product and will be subject to the terms and conditions of this EULA. LeCroy may use any technical information you provide to LeCroy during LeCroy's provision of Support Services, for LeCroy's business purposes, including for product support and development. LeCroy will not utilize such technical information in a form that personally identifies you.

## **3. PROPRIETARY RIGHTS.**

3.1 Right and Title. All right, title and interest in and to the Software Product and Documentation (including but not limited to any intellectual property or other proprietary rights, images, icons, photographs, text, and "applets" embodied in or incorporated into the Software Product, collectively, "Content"), and all Derivatives, and any copies thereof are owned by LeCroy and/or its licensors or third-party suppliers, and is protected by applicable copyright or other intellectual property laws and treaties. You will not take any action inconsistent with such title and ownership. This EULA grants you no rights to use such Content outside of the proper exercise of the license granted hereunder, and LeCroy will not be responsible or liable therefor.

3.2 Intellectual Property Protection. You may not alter or remove any printed or on-screen copyright, trade secret, proprietary or other legal notices contained on or in copies of the Software Product or Documentation.

**3.3 Confidentiality.** Except for the specific rights granted by this EULA, neither party shall use or disclose any Confidential Information (as defined below) of the other party without the written consent of the disclosing party. A party receiving Confidential Information from the other shall use the highest commercially reasonable degree of care to protect the Confidential Information, including ensuring that its employees and consultants with access to such Confidential Information have agreed in writing not to disclose the Confidential Information. You shall bear the responsibility for any breaches of confidentiality by your employees and consultants. Within ten (10) days after request of the disclosing party, and in the disclosing party's sole discretion, the receiving party shall either return to the disclosing party originals and copies of any Confidential Information and all information, records and materials developed therefrom by the receiving party, or destroy the same, other than such Confidential Information as to which this EULA expressly provides a continuing right to the receiving party to retain at the time of the request. Either party may only disclose the general nature, but not the specific financial terms, of this EULA without the prior consent of the other party; provided either party may provide a copy of this EULA to any finance provider in conjunction with a financing transaction, if such provider agrees to keep this EULA confidential. Nothing herein shall prevent a receiving party from disclosing all or part of the Confidential Information as necessary pursuant to the lawful requirement of a governmental agency or when disclosure is required by operation of law; provided that prior to any such disclosure, the receiving party shall use reasonable efforts to (a) promptly notify the disclosing party in writing of such requirement to disclose, and (b) cooperate fully with the disclosing party in protecting against any such disclosure or obtaining a protective order. Money damages will not be an adequate remedy if this Section 4.3 is breached and, therefore, either party shall, in addition to any other legal or equitable remedies, be entitled to seek an injunction or similar equitable relief against such breach or threatened breach without the necessity of posting any bond. As used herein, "Confidential Information" means LeCroy pricing or information concerning new LeCroy products, trade secrets (including without limitation all internal header information contained in or created by the Software Product, all benchmark and performance test results and all Documentation) and other proprietary information of LeCroy; and any business, marketing or technical information disclosed by LeCroy, or its representatives, or you in relation to this EULA, and either (i) disclosed in writing and marked as confidential at the time of disclosure or (ii) disclosed in any other manner such that a reasonable person would understand the nature and confidentiality of the information. Confidential Information does not include information (A) already in the possession of the receiving party without an obligation of confidentiality to the disclosing party, (B) hereafter rightfully furnished to the receiving party by a third party without a breach of any separate nondisclosure obligation to the disclosing party, (C) publicly known without breach of this EULA, (d) furnished by the disclosing party to a third party without restriction on subsequent disclosure, or (e) independently developed by the receiving party without reference to or reliance on the Confidential Information.

#### **4. TERMINATION.**

This EULA will remain in force until termination pursuant to the terms hereof. You may terminate this EULA at any time. This EULA will also terminate if you breach any of the terms or conditions of this EULA. You agree that if this EULA terminates for any reason, the License will immediately terminate and you will destroy all copies of the Software Product (and all Derivatives), installed or otherwise, the Documentation, and the Confidential Information (and all derivatives of any of the

foregoing) that are in your possession or under your control. The provisions of Sections 1.3, 4, 6, 7, 8, and 9 will survive any termination or expiration hereof.

#### **5. U.S. GOVERNMENT RESTRICTED RIGHTS.**

If any Software Product or Documentation is acquired by or on behalf of a unit or agency of the United States Government (any such unit or agency, the "Government"), the Government agrees that the Software Product or Documentation is "commercial computer software" or "commercial computer software documentation" and that, absent a written agreement to the contrary, the Government's rights with respect to the Software Product or Documentation are, in the case of civilian agency use, Restricted Rights, as defined in FAR §52.227.19, and if for Department of Defense use, limited by the terms of this EULA, pursuant to DFARS §227.7202. The use of the Software Product or Documentation by the Government constitutes acknowledgment of LeCroy's proprietary rights in the Software Product and Documentation. Manufacturer is LeCroy Corporation, 700 Chestnut Ridge Road, Chestnut Ridge, NY 10977 USA.

#### **6. EXPORT RESTRICTIONS.**

You agree that you will not export or re-export the Software Product, any part thereof, or any process or service that is the direct product of the Software Product (the foregoing collectively referred to as the "Restricted Components"), to any country, person, entity or end user subject to U.S. export restrictions. You specifically agree not to export or re-export any of the Restricted Components (a) to any country to which the U.S. has embargoed or restricted the export of goods or services, which currently include, but are not necessarily limited to Cuba, Iran, Iraq, Libya, North Korea, Sudan and Syria, or to any national of any such country, wherever located, who intends to transmit or transport the Restricted Components back to such country; (b) to any end user who you know or have reason to know will utilize the Restricted Components in the design, development or production of nuclear, chemical or biological weapons; or (c) to any end-user who has been prohibited from participating in U.S. export transactions by any federal agency of the U.S. government. You warrant and represent that neither the BXA nor any other U.S. federal agency has suspended, revoked or denied your export privileges. It is your responsibility to comply with the latest United States export regulations, and you will defend and indemnify LeCroy from and against any damages, fines, penalties, assessments, liabilities, costs and expenses (including reasonable attorneys' fees and court costs) arising out of any claim that the Software Product, Documentation, or other information or materials provided by LeCroy hereunder were exported or otherwise accessed, shipped or transported in violation of applicable laws and regulations.

#### **7. RISK ALLOCATION.**

7.1 No Warranty. THE SOFTWARE PRODUCT IS NOT ERROR-FREE AND THE SOFTWARE PRODUCT AND SUPPORT SERVICES IS/ARE BEING PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND. LECROY, FOR ITSELF AND ITS SUPPLIERS, HEREBY DISCLAIMS ALL WARRANTIES, WHETHER EXPRESS OR IMPLIED, ORAL OR WRITTEN, WITH RESPECT TO THE SOFTWARE PRODUCT OR ANY SUPPORT SERVICES INCLUDING, WITHOUT LIMITATION, ALL IMPLIED WARRANTIES OF TITLE OR NON-INFRINGEMENT, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ACCURACY, INTEGRATION, VALIDITY, EXCLUSIVITY, MERCHANTABILITY, NON-INTERFERENCE WITH ENJOYMENT,

FITNESS FOR ANY PARTICULAR PURPOSE, AND ALL WARRANTIES IMPLIED FROM ANY COURSE OF DEALING OR USAGE OF TRADE. YOU ACKNOWLEDGE THAT NO WARRANTIES HAVE BEEN MADE TO YOU BY OR ON BEHALF OF LECROY OR OTHERWISE FORM THE BASIS FOR THE BARGAIN BETWEEN THE PARTIES.

7.2. Limitation of Liability. LECROY'S LIABILITY FOR DAMAGES FOR ANY CAUSE WHATSOEVER, REGARDLESS OF THE FORM OF ANY CLAIM OR ACTION, SHALL NOT EXCEED THE GREATER OF THE AMOUNT ACTUALLY PAID BY YOU FOR THE SOFTWARE PRODUCT OR U.S.\$5.00; PROVIDED THAT IF YOU HAVE ENTERED INTO A SUPPORT SERVICES AGREEMENT WITH LECROY, LECROY'S ENTIRE LIABILITY REGARDING SUPPORT SERVICES WILL BE GOVERNED BY THE TERMS OF THAT AGREEMENT. LECROY SHALL NOT BE LIABLE FOR ANY LOSS OF PROFITS, LOSS OF USE, LOSS OF DATA, INTERRUPTION OF BUSINESS, NOR FOR INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES OF ANY KIND, WHETHER UNDER THIS EULA OR OTHERWISE ARISING IN ANY WAY IN CONNECTION WITH THE SOFTWARE PRODUCT, THE DOCUMENTATION OR THIS EULA. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. THESE LIMITATIONS ARE INDEPENDENT FROM ALL OTHER PROVISIONS OF THIS EULA AND SHALL APPLY NOTWITHSTANDING THE FAILURE OF ANY REMEDY PROVIDED HEREIN.

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.

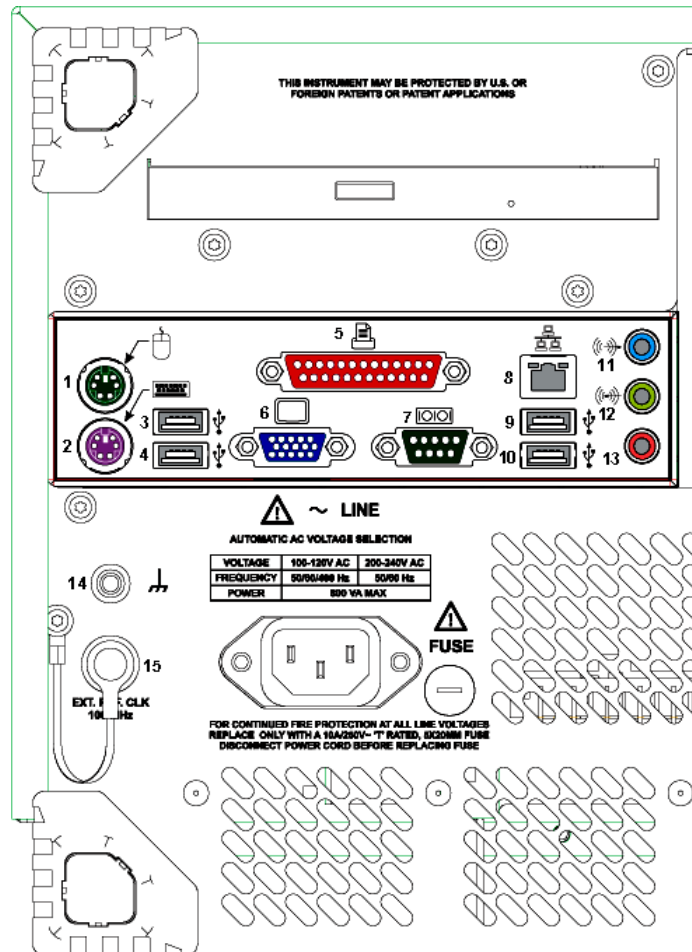
8.6 Notices. All notices or other communications between LeCroy and you under this EULA will be in writing and delivered personally, sent by confirmed fax, by confirmed e-mail, by certified mail, postage prepaid and return receipt requested, or by a nationally recognized express delivery service. All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

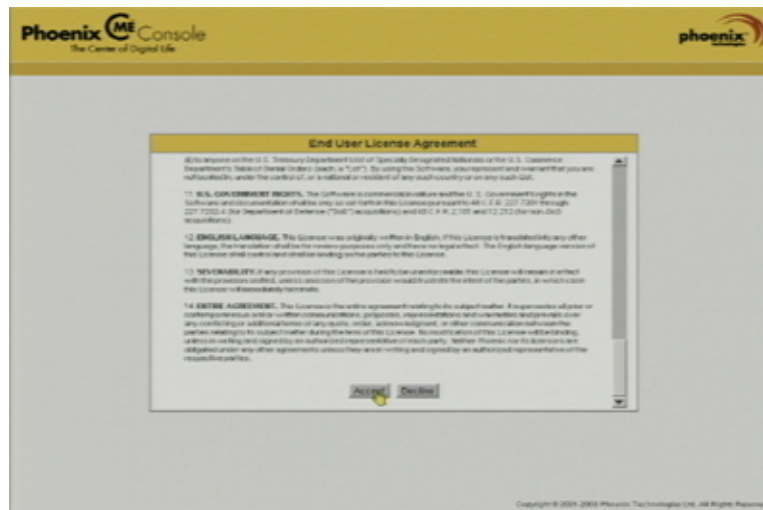
#### RECOVERY PROCEDURE

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.

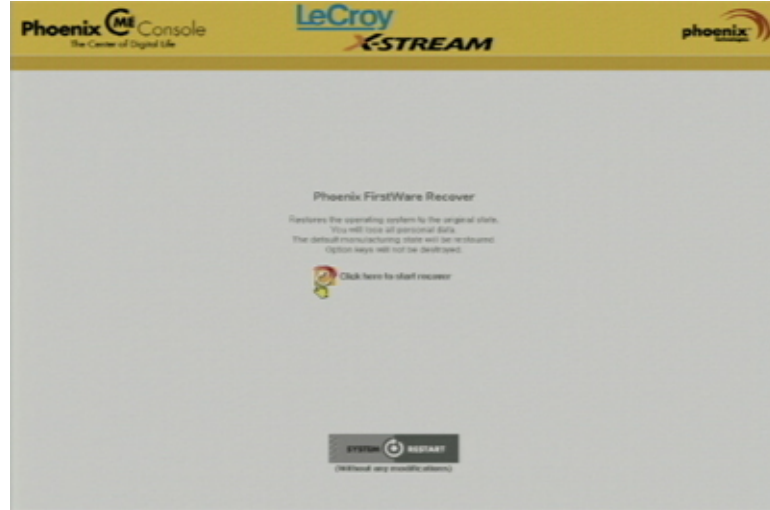
- As soon as the LeCroy logo appears on the screen, press and hold down the **F4** key until the recovery software logo appears momentarily:



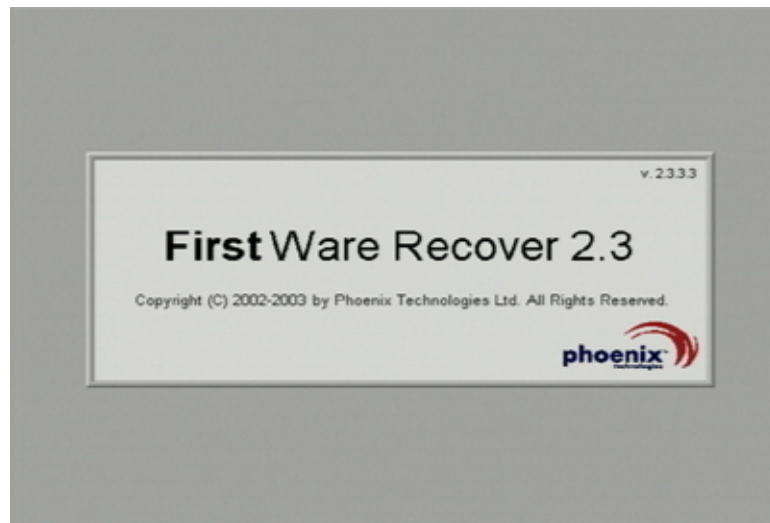
- Then the cME console End User License Agreement is displayed. Read the agreement, and click **Accept**:



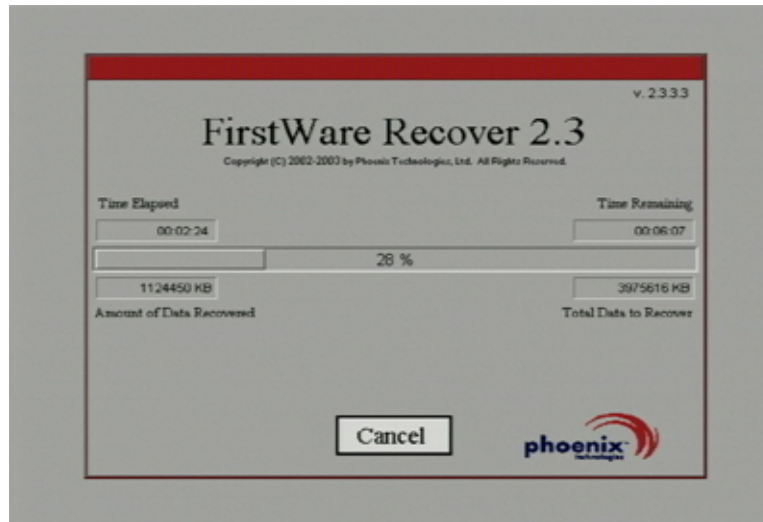
- The Phoenix cME Console main page is displayed. Click **Click here to start recover**:



- The FirstWare Recover splash screen is displayed momentarily:

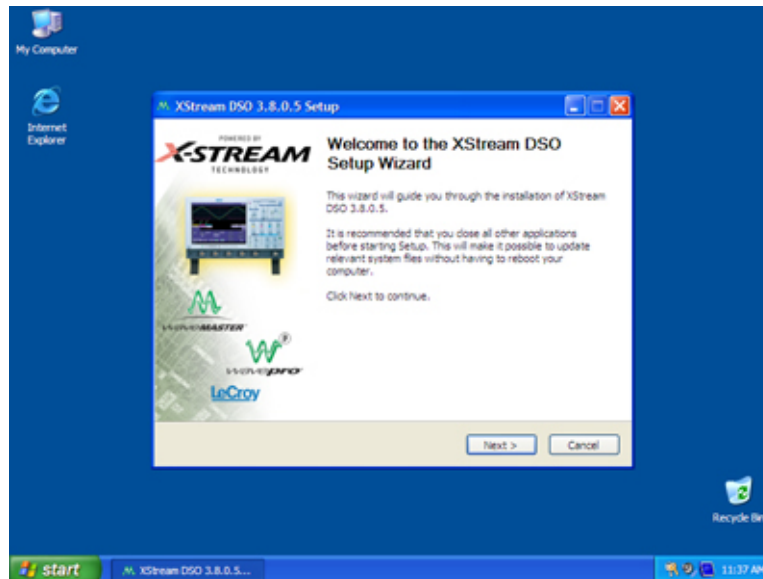


- The recovery starts, and the FirstWare Progress screen is displayed. No further selections are required. The recovery takes about 10 minutes.



**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:



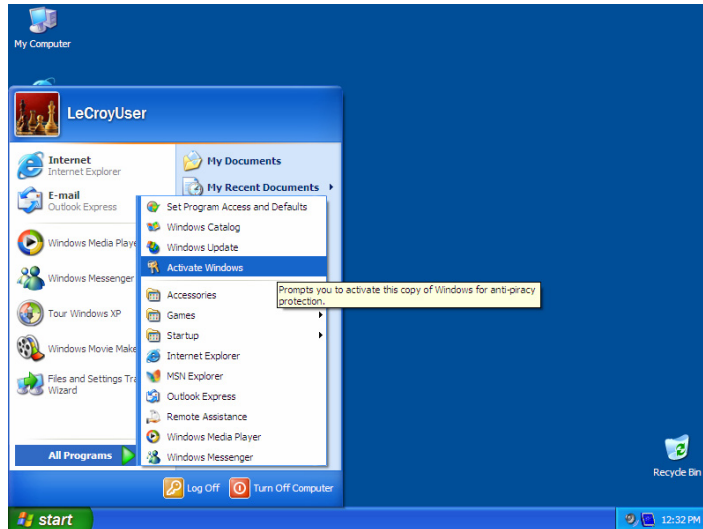
- When the X-Stream installation is completed, reboot the scope.

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.

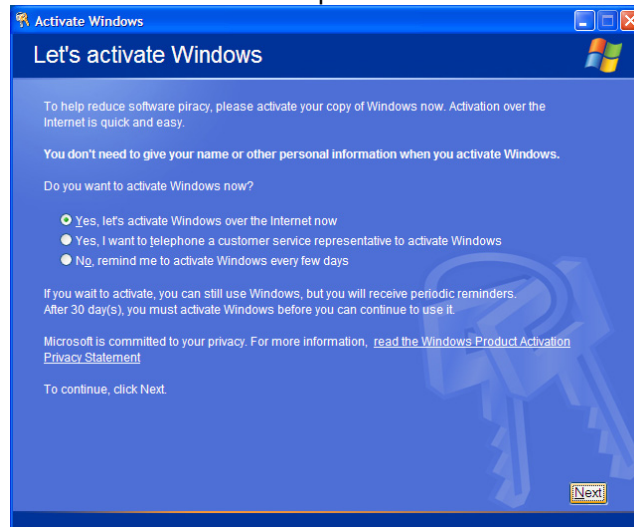
## Windows Activation

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.

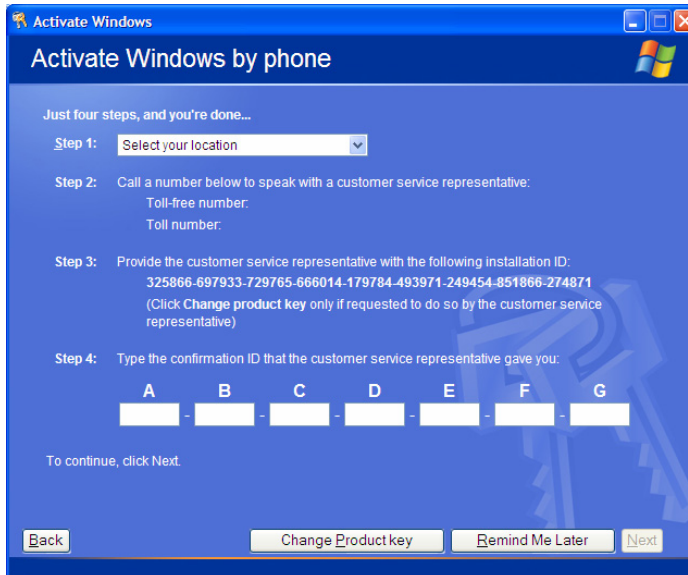


2. Select an activation method: internet or phone. Then click **Next**.

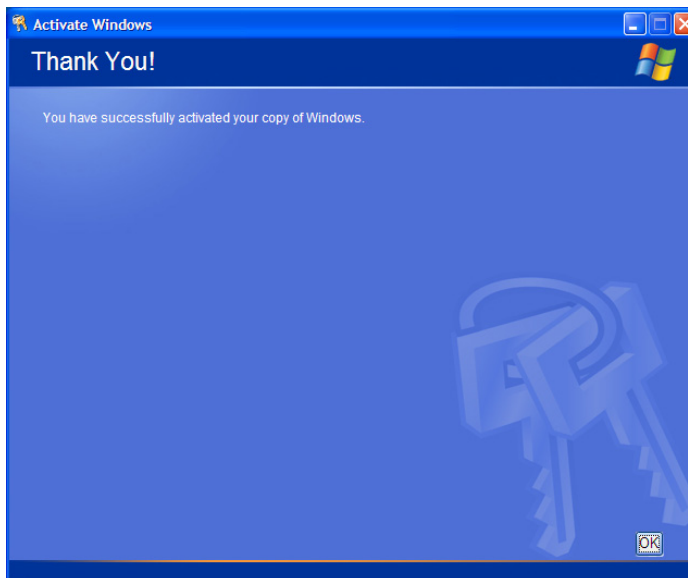


3. If you elected to activate by internet, enter the Activation ID (Product Key) number when prompted to do so, then click **Next**. Windows Activation will begin.

4. 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.



5. 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](http://www.lecroy.com) for specifications and ordering information.

<b>Current Probes</b>	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).
<b>Active Probes</b>	There are two different types of active probes: "single-ended" and "differential." <b>Single-ended:</b> 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.
<b>Differential Probes</b>	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.
<b>Passive Probes</b>	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.
<b>High Voltage Probes</b>	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><b>OFFSET</b> – Adjusts the vertical offset of a channel.</p>
	<p><b>VOLTS/DIV</b> – Adjusts the Volts/Division setting (vertical gain) of the channel selected.</p>
	<p><b>CHANNEL BUTTONS</b> – 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

	meets the trigger conditions set for the type of trigger selected. If the scope is already armed, it will force a trigger.
<b>Wavepilot Control Knobs and Buttons:</b>	
	<p><b>→→ POSITION</b> – Adjusts the horizontal position of a zoom trace on the display. The zoom region is highlighted in color on the source trace.</p>
	<p><b>→→ ZOOM</b> – Adjusts the horizontal zoom (magnification factor) of the selected zoom trace.</p>
	<p><b>↑↓ POSITION</b> – Adjusts the vertical position of the selected zoom trace on the display.</p>
	<p><b>↑↓ ZOOM</b> – Adjusts the vertical zoom (magnification factor) of the selected zoom trace on the display.</p>
	<p><b>RESET</b> – Resets the zoom factors.</p>
	<p><b>MATH</b> – Provides access to the Math setup dialog.</p>
	<p><b>MEASURE</b> – Provides access to the Measure setup dialog.</p>
	<p><b>ANALYSIS</b> – Provides access to the Analysis setup dialog.</p>
<b>Special Features Buttons:</b>	
	<p><b>AUTO SETUP</b> – 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><b>CURSORS</b> – 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><b>DEFAULT SETUP</b> – Sets the scope's horizontal timebase (acquisition system), vertical gain and offset, and trigger conditions to default settings.</p>
	<p><b>DRIVE ANALYSIS</b> – This button is found on DDA instruments in place of Default Setup. When pressed, it displays the DDA setup dialogs.</p>
	<p><b>SERIAL DATA ANALYSIS</b> – This button is found on Serial Data Analyzers in place of Default Setup. When pressed, it displays the SDA setup dialogs.</p>
	<p><b>HELP</b> – 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><b>SAVE/RECALL</b> – Calls up the dialogs for saving and recalling waveforms and setups, and for disk utilities.</p>
	<p><b>ANALOG PERSIST</b> – 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><b>QUICKZOOM</b> (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><b>General Control Buttons:</b></p>	
	<p><b>PRINT SCREEN</b> – 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><b>UTILITIES</b> – 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>


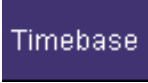

	<b>TOUCH SCREEN</b> – (toggle switch) Activates or deactivates the touch screen.
	<b>CLEAR SWEEPS</b> – Clears data from multiple sweeps (acquisitions) including: persistence trace displays, averaged traces, parameter statistics, and Histicons. During waveform readout, cancels readout.
	<b>STANDBY Lamp</b> – 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



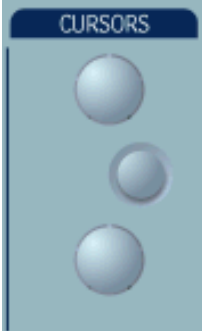

### Toolbar Buttons


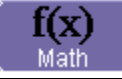
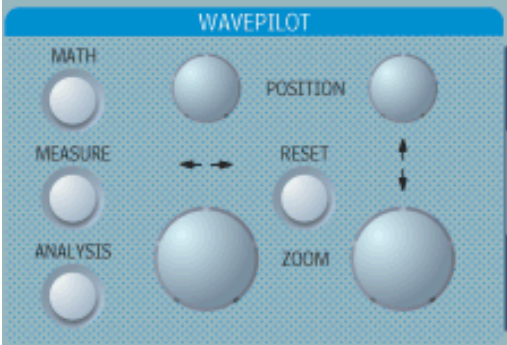
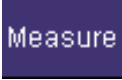
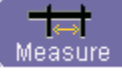




The toolbar buttons at the top of the scope's display are designed for quick setup of common functions. Many of these buttons give you access to the same functions as do the front panel buttons.

**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

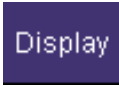
The X-Stream DSO screen is divided into three areas:

- tool bar
- signal display area
- dialog area

### Tool Bar

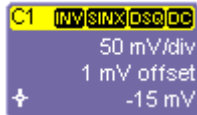
The top of the screen contains a toolbar of commonly used functions. Whenever you touch one of these buttons, the dialog area at the bottom of the screen switches to show the setup for that function.

### 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.

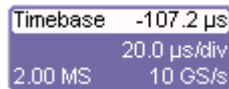
## Trace Descriptors

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.

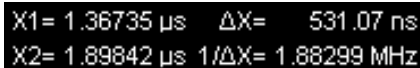
Besides channel traces, math and parameter measurement labels are also displayed. Labels are displayed only for traces that are turned on.



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.

§ § §