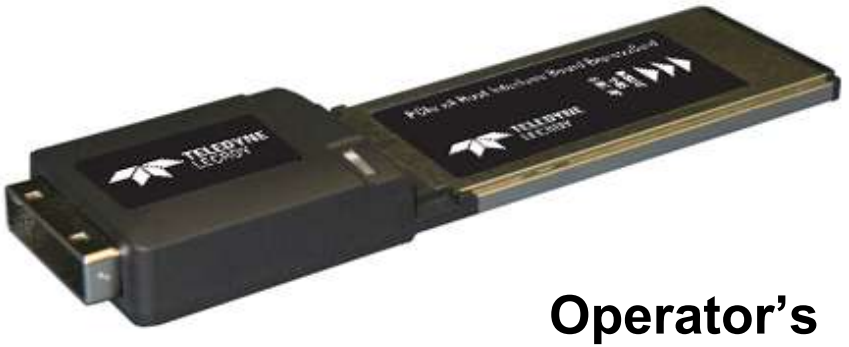
TELEDYNE LECROY
Everywhereyoulook™



Operator's Manual

LSIB-1 Host Interfaces

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Operator's Manual

January, 2013

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LSIB-1 Host Interfaces Operator's Manual

LSIB-OM-E Rev C
921923-00 Rev A

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Welcome

Thank you for purchasing an LSIB Host Interface accessory for your Teledyne LeCroy oscilloscope. Used properly, this piece of hardware provides reliable Oscilloscope and PC/Laptop network connections.

When your LSIB Host Interface accessory is delivered, verify all items on the packing list or invoice copy have been shipped to you. Contact your nearest Teledyne LeCroy customer service center or national distributor if anything is missing or damaged. You must contact us immediately for a replacement. If you have any problems with your product, please refer to the Technical Support contacts and support material at teledynelecroy.com, or at the back of this manual.

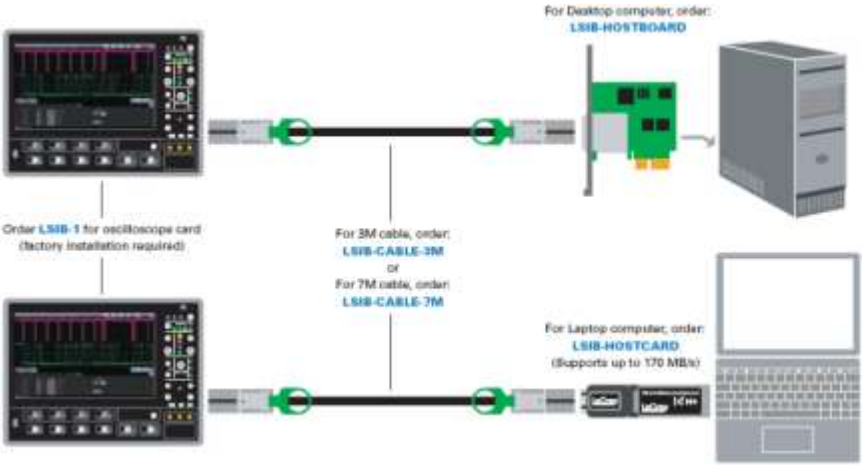
We truly hope these materials provide increased comprehension when using Teledyne LeCroy's fine products.

Sincerely,

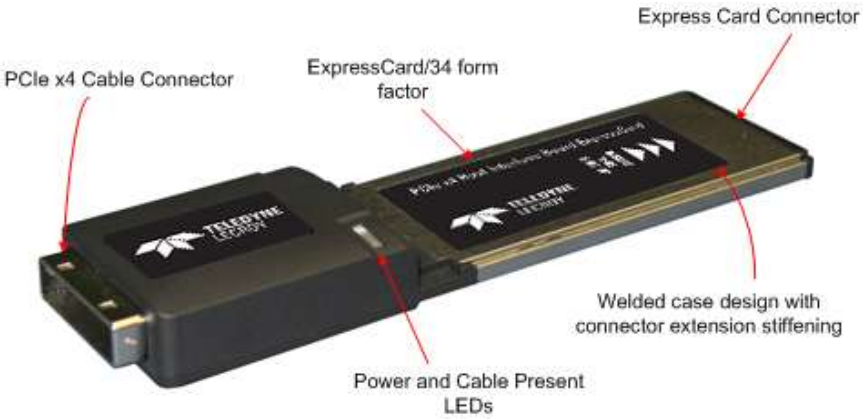
David C. Graef
Vice President and Chief Technology Officer
Teledyne LeCroy

Package Contents

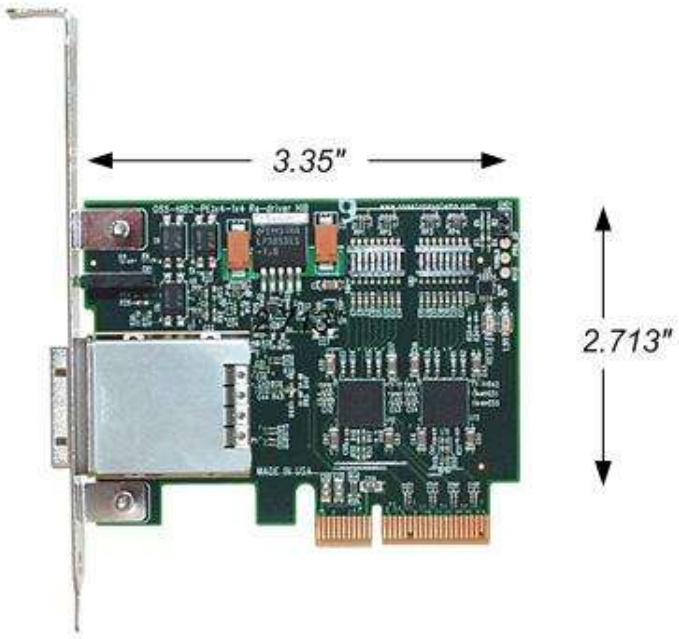
The package should contain your hardware based on what you ordered, LSIB-HOSTCARD (for laptops) or LSIB-HOSTBOARD (for PCs). It also contains the cable you ordered (either 3M or 7M). Your configuration should look similar to one of the following paths.



LSIB-HOSTCARD



LSIB-HOSTBOARD



LSIB-HOSTBOARD comes with a bracket for proper 4x motherboard installation.

LSIB-HOSTCARD or LSIB-HOSTBOARD comes with your choice of a 7M (pictured below) or 3M x4 connection cable.

Attach the cable to LSIB-HOSTCARD or LSIB-HOSTBOARD by pushing forward on the retractor ring to lock the cable into place.

Remove the cable by first pulling on the retractor ring which releases the locking mechanism.

The connectors on either end of the cables are identical and allow for upstream and downstream transfers.

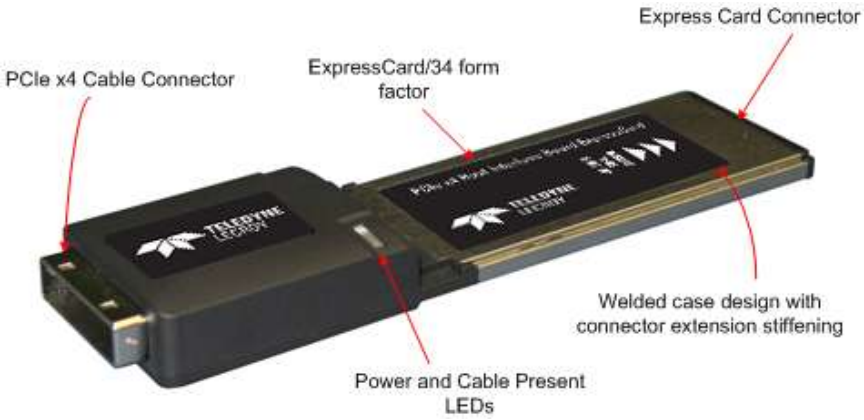
System Requirements

- **Operating System** - Windows 7 x86 and Windows 7 X64, Windows Vista x86, Windows Vista x64, Windows XP, or certain versions of Linux.
- **PC** - Your motherboard must support PCIe x4.
- **Laptop** - You must have a 34 Form Factor Expresscard slot.

LSIB-HOSTCARD Description, Unpacking, and Installation

Description

LSIB-HOSTCARD is a PCIe x1 ExpressCard/34 adapter that adds high-speed PCI Express (PCIe) expansion capability to your laptop. The PCIe cable port provides PCIe x1 connectivity to oscilloscopes configured with the LSIB-1 option.



Unpacking

1. If the carton is damaged upon receipt:
   - Request the carrier's agent be present when unpacking and inspecting the contents.
   - If the contents appear damaged, contact your local Teledyne LeCroy Corporation representative to obtain a Return Materials Authorization (RMA) number and further shipping instructions for any repair and/or replacement needs.

   If all is well, proceed to unpack the carton.

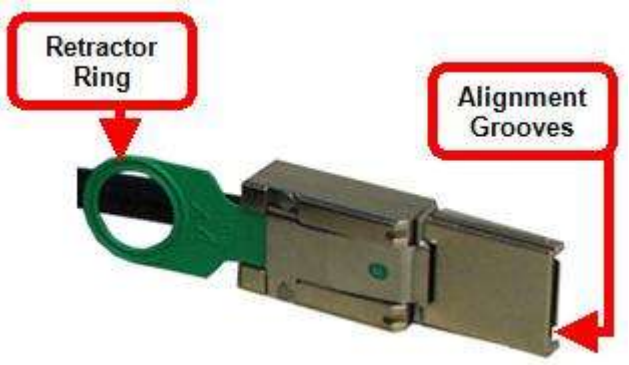
2. After unpacking, verify all items listed in the packing list are present.
3. Inspect the equipment for shipping damage.
4. Save all packing material for storage or return shipment of the equipment.
5. Remove LSIB-HOSTCARD from the anti-static bag.

Installation

1. Shut down the host laptop into which you are installing the card.
2. Remove the plastic filler plate (if necessary) from the ExpressCard slot and guide the card in place following the manufacturer's instructions.

NOTE: The card may be installed in any ExpressCard/34 (single wide) or ExpressCard/54 (double wide) slot.

3. Attach the cable by first pulling on the retractor ring which releases the locking mechanism. Connection ends are interchangeable and allow for upstream and downstream transfers.



4. Push the cable into the ExpressCard slot until it locks into place.
5. Attach the other end of the cable to the oscilloscope.

NOTE: Reverse these steps to remove the cable and the LSIB-HOSTCARD being sure to first pull the cable's retractor ring which releases the locking mechanism before removing the cable.

LSIB HOSTBOARD Description, Unpacking, and Installation

Description

LSIB-HOSTBOARD allows communication between a processor and an I/O port.

Unpacking

1. If the carton is damaged upon receipt:
    - Request the carrier's agent be present when unpacking and inspecting the contents.
    - If the contents appear damaged, contact your local Teledyne LeCroy Corporation representative to obtain a Return Materials Authorization (RMA) number and further shipping instructions for any repair and/or replacement needs.

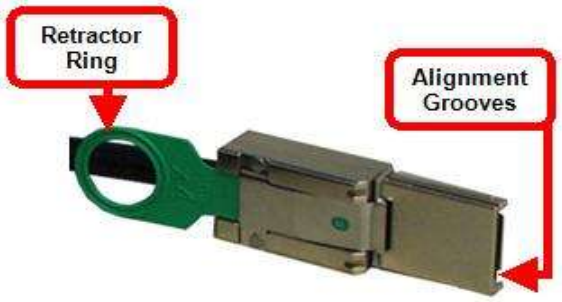
    If all is well, proceed to unpack the carton.
2. After unpacking, verify all items listed in the packing list are present.
3. Inspect the equipment for shipping damage.
4. Save all packing material for storage or return shipment of the equipment.
5. Remove LSIB-HOSTBOARD from the anti-static bag.

Installation

1. Shut down the host PC in which you are installing the card.
2. Open the chassis according to your PC documentation and let the power supply cool down (if necessary).
3. Install LSIB-HOSTBOARD into a PCIe x4, x8, x16 add-in card slot. Make sure the card is well seated and tighten the screw.

   NOTE: Motherboard manufacturers may limit the bandwidth to x1 speeds when up-plugging the Target Cable Adapter into an x8 or x16 slot. Be sure to check with the motherboard manufacturer for up-plugging details. A PCIe x4 board does not physically fit in a x1 slot.

4. Attach the cable by first pulling on the retractor ring which releases the locking mechanism. Connection ends are interchangeable and allow for upstream and downstream transfers.



5. Push the cable into the ExpressCard slot until it locks into place.
6. Attach the other end of the cable to the oscilloscope.

NOTE: Reverse these steps to remove the cable and the LSIB-HOSTBOARD being sure to first pull the cable's retractor ring which releases the locking mechanism before removing the cable.

Powering Sequence

The connection from the oscilloscope to the PC or Laptop is not "plug-and-play." You must first power on the oscilloscope, then the PC/Laptop. However, you do not have to wait for the oscilloscope software to fully load before powering on the PC.

NOTE: At power on, your PC/Laptop may indicate it has found new hardware. Be sure to click **Cancel** if prompted to install drivers. Install the drivers using the CD provided with the Interface. Do not disconnect cables while your Laptop/PC and the instrument are powering up.

Laptop or PC Application and Driver Installation

Instead of using the installation CD provided with the Interface, the software can also be accessed from the Teledyne LeCroy website at teledynelecroy.com.

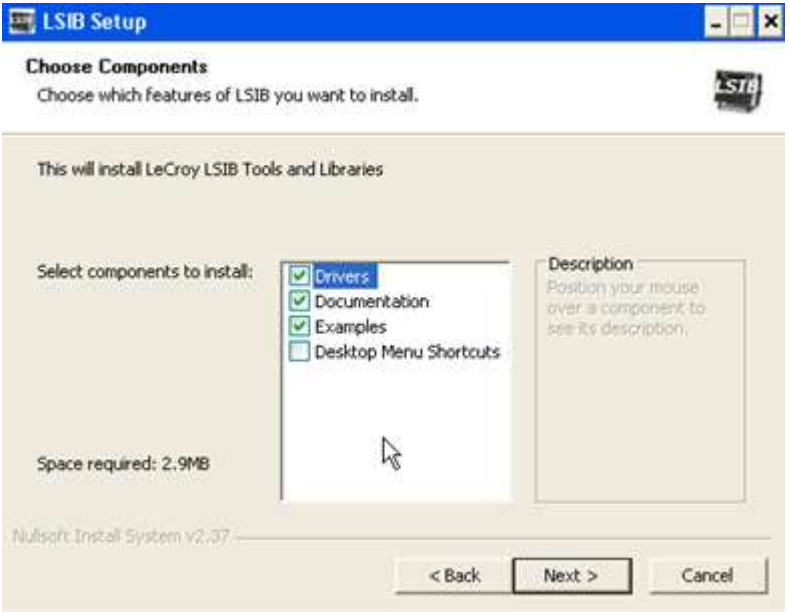
Cancel Found New Hardware Procedure on the Laptop or PC if Prompted

After installing the LSIB-HOSTCARD or LSIB-HOSTBOARD and powering on, if your computer shows a **Windows Found New Hardware** prompt, cancel the operation and instead run the installation CD.

NOTE: It's **very important** to use the installation CD and not the Found New Hardware function.

Insert the CD in the PC or Laptop and follow the prompts.

- Choose components - Drivers, Docs, and Example check boxes are checked by default and should be left this way. The Desktop Shortcut check box is unchecked by default. Include or exclude the shortcut as desired.



- One of the installation prompts has check boxes checked by default for viewing the **Readme** file and running the **Control Sample Setup...** when the installation is complete. It's recommended to leave these check boxes checked.

Laptop or PC Application, Linux Driver Installation, and Libraries

Instead of using the installation CD provided with the Interface, the software can also be accessed from the Teledyne LeCroy website at teledynelecroy.com.

Overview

The software for LSIB Linux consists of the following components and their associated include and make files.

- The kernel driver.
- A user library named **lecroylsiblib**.
- Three demo programs named **LSIBPerformance**, **LSIBexportsample**, and **LSIBcontrolsample**.

These are all supplied as source files, written in C/C++, and packaged in a bzip2 compressed tar file named **LSIB -xxxxxx.tz2**.

NOTE: You need to compile the source files and install them on your system.

Requirements

- The LSIB Linux driver requires the use of MTRRs (Memory Type Range Registers) to map the memory used for communications. This requires kernel version 2.6.20 or greater.
- The use of the MTRRs also require the CPU be a **64-bit AMD** or an **Intel** processor running a **64-bit version of Linux**.
- The gcc compilers.
- The kernel sources. These can be obtained by issuing the following Redhat Linux command:

  # yum install kernel-devel Kernel-headers

NOTE: You must have superuser privileges or be logged in as root for successful completion of the following instructions.

Installation Steps

1. Navigate to the complete set of LSIB files on your system. They are typically named **LSIB-xxxxxx.tz2**.

   cd /

   tar xvfj directory_path/LSIB_xxxxxx.tz2

2. Compile and install the driver and libraries.

   cd directory_path/LSIB_xxxxxx/LSIB

   make all

3. Install the driver.

   make install

4. Start the driver.

   make startdriver

   NOTE: At this point, you may need to shutdown the oscilloscope and the host computer/laptop. If so, be sure to power-up the oscilloscope first followed by the host computer/laptop after the shutdown. The driver is then loaded automatically during the system restart.

   The files in the Linux_ExpressNet-X.Y.ZZZ.tz2 file all untar into an LSIB subdirectory. Untar these files to the standard Linux system (/) location by logging in as root and doing the following:

   cd /

   tar xvfj directory_path/LSIB-xxxxxx.tz2

The resulting /LSIB directory contains the following Directories/Files.

- **driver** - The directory containing the LSIB Linux driver.
- **EnDemo** - Test application.
- **Include** - Directory containing the LSIB include files.
- **Lecroylsib** - Directory containing the LSIB library files.
- **Lsibcontrolsample** - Application demonstrating LSIB control functionality.
- **Lsibexportsample** - Application demonstrating LSIB export functionality.
- **Lsibperformance** - Application demonstrating link performance.
- **UNINSTALL** - A Perl script that removes all ExpressNet files on the system.

Samples and Demo Applications

Overview

Samples of LSIB setups and configurations are provided with your software installation. Examples demonstrate control and export functions and are located in the following locations:

- **Windows** - **Start** → **All Programs** → **Teledyne LeCroy** → **XStream** → **LSIB folder**.
- **Linux** - **directory_path/LSIB_xxxxxx/LSIB** .

NOTE: directory_path refers to the location where you unzipped the tar archive.

The samples provide the following functionality:

- **Control** – Creates a connection allowing you to control the oscilloscope using remote commands. (Currently, Scope Explorer is not supported).
- **Export** – demonstrates the transfer of data from the oscilloscope to the host PC, and converting the data to the TRC format on the host Laptop or PC.

The Performance demo application demonstrates the transfer rate by transferring waveforms using the LSIB Export functionality.

When the Application and Driver installation is complete, the Control Sample is automatically executed (unless specifically un-checked and configured not to during the installation).

NOTE: Running and reviewing the samples are a great way to verify the setup is configured correctly and the connection is working properly.

Control Sample

The Control sample automatically runs after installing LSIB on the host Laptop/PC. Alternatively, launch the sample from the following locations:

- **Windows** - **Start** → **All Programs** → **Teledyne LeCroy** → **XStream** → **LSIB folder**.
- **Linux** - **directory_path/LSIB_xxxxxx/LSIB**.

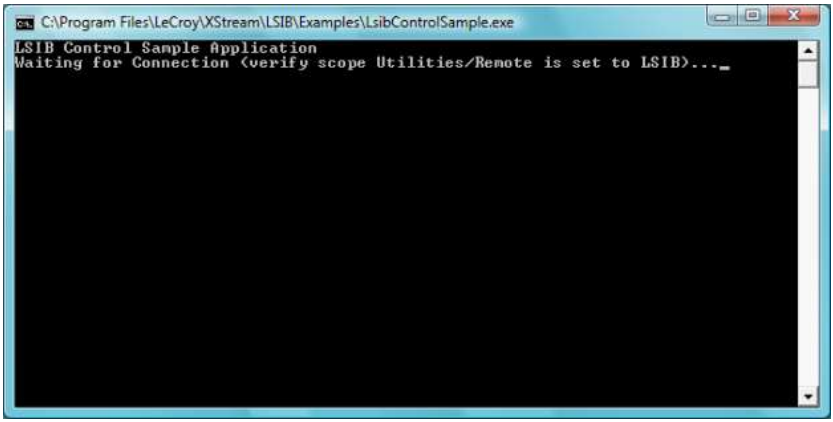
NOTE: **directory_path** refers to the location where you unzipped the tar archive.

Use the Control Sample by completing the following steps:

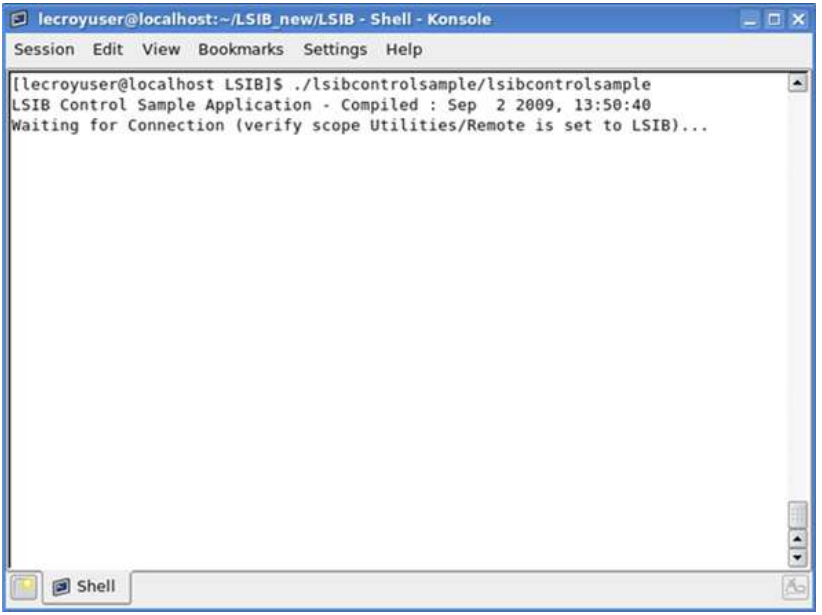
On Your Laptop/PC

1. Confirm that the remote control interface indicates that it's Waiting for Connection as follows.

WINDOWS



LINUX



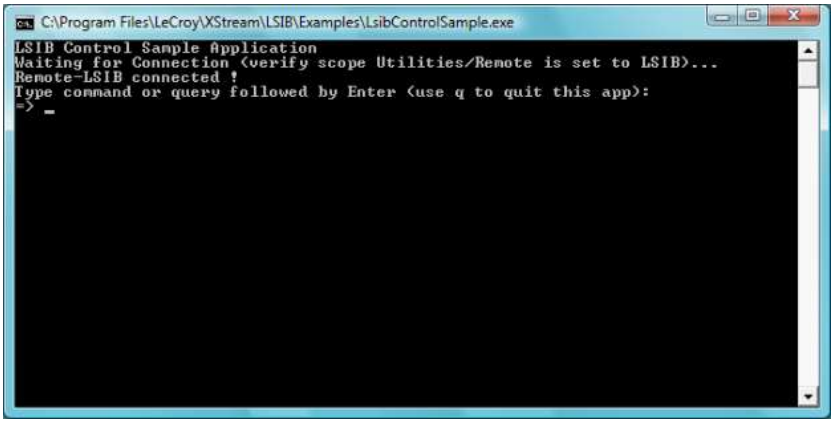
On The Oscilloscope

2. Go to **Utilities** → **Utilities Setup...**. On the Remote tab, click the **LSIB** button.

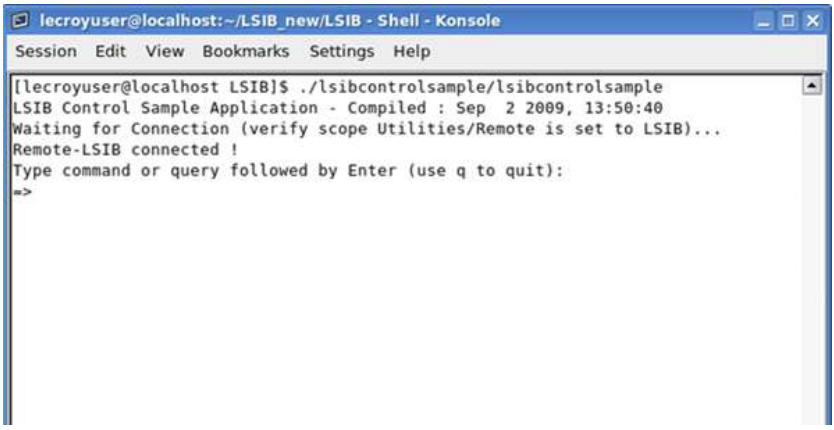
On Your Laptop/PC

3. Verify the remote control interface on the host Laptop/PC shows the LSIB is connected.

WINDOWS

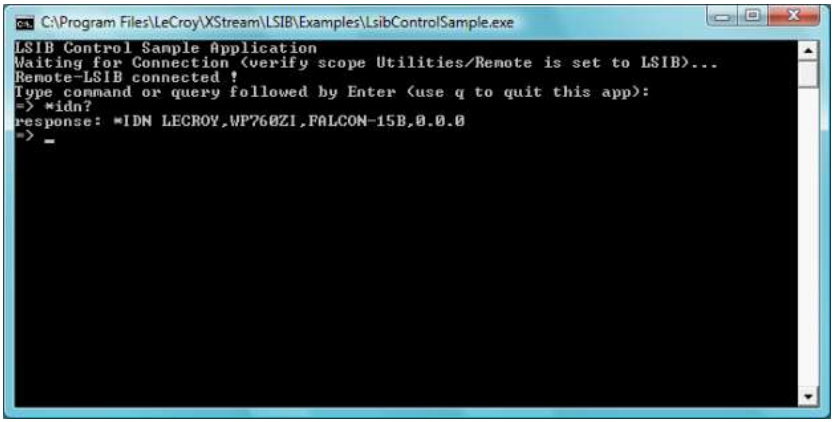


LINUX

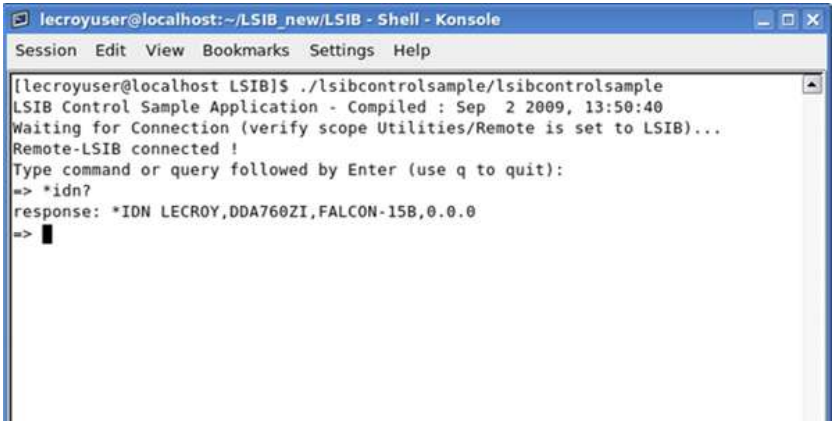


4. With the connection made between the host Laptop/PC and the oscilloscope, use the remote control interface to verify connectivity. Type **`*IDN?`** and press enter. You should see the following response.

WINDOWS



LINUX



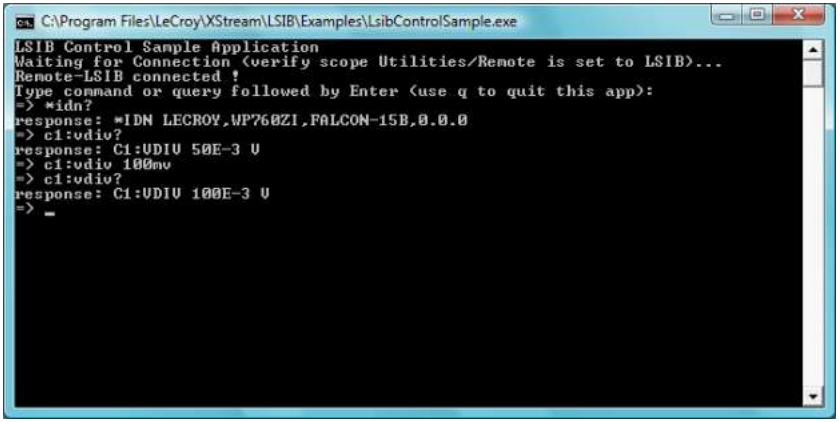
Remote Control Commands

NOTE: Legacy remote control commands may be used via the Remote Interface. Please refer to the Remote Control and Automation manuals for more information.

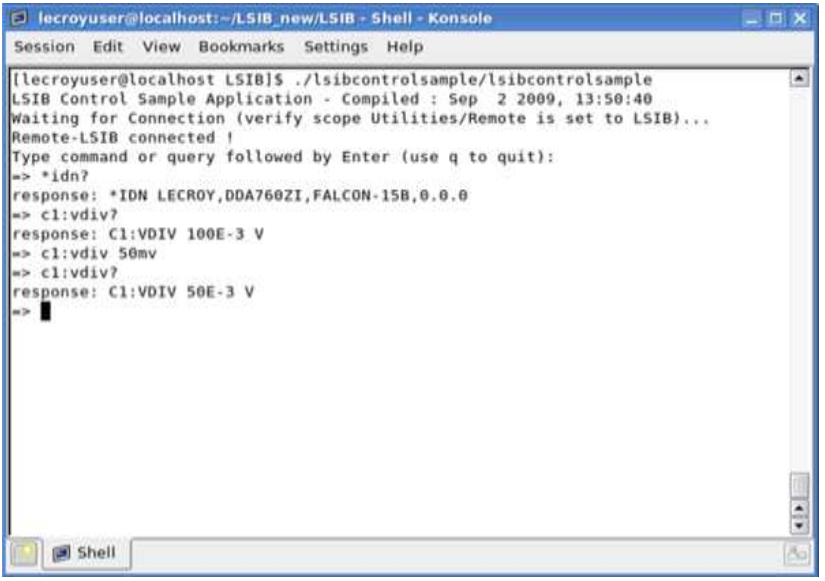
Enter a remote command to test the connection is operating correctly. Some examples of remote control commands include:

- `C1:VDIV?` - Queries the Volt/Div the oscilloscope is setup on Channel 1.
- `C1:VDIV 100mv` - Sets C1 of the oscilloscope to 100 mv/div.

WINDOWS



LINUX



When finished, press **q** to quit the console.

Export Sample

The Export sample allows for transmitting waveforms in the TRC format to the host Laptop/PC. Launch the sample from the following locations:

- **Windows** - **Start** → **All Programs** → **Teledyne LeCroy** → **XStream** → **LSIB folder**.
- **Linux** - **directory_path/LSIB_xxxxxx/LSIB**.

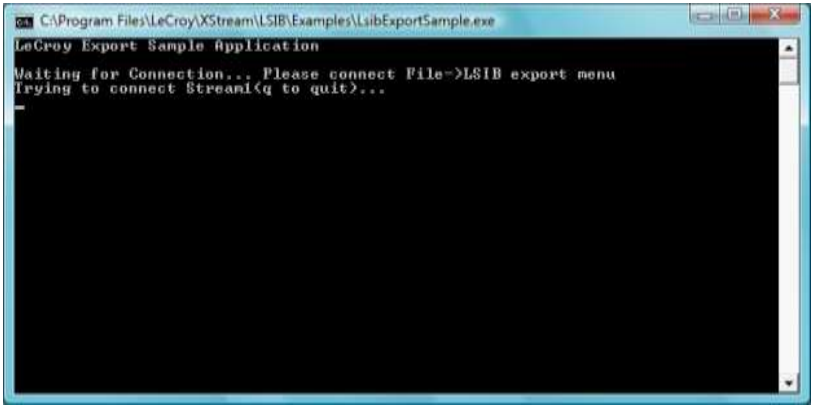
Note: **directory_path** refers to the location where you unzipped the tar archive.

Use the Export Sample by completing the following steps:

On Your Laptop/PC

1. Confirm the remote control interface on the host Laptop/PC indicates that it's Waiting for Connection as follows.

WINDOWS



LINUX

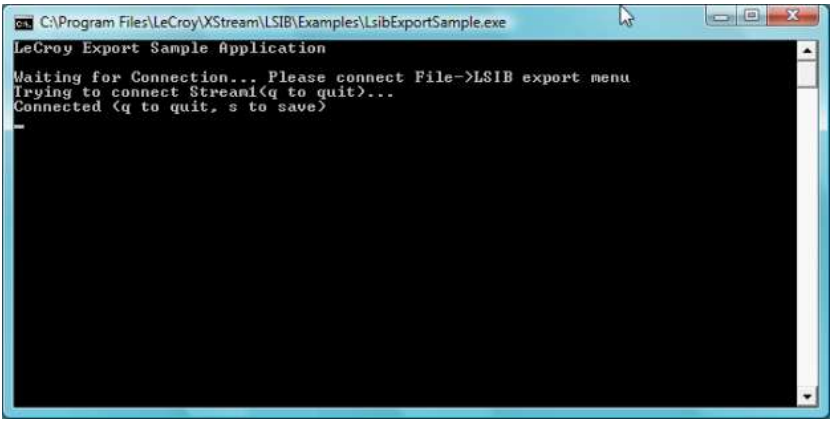
On The Oscilloscope

1. Setup your oscilloscope for LSIB Export mode by choosing **File** → **Save Waveform**.
2. Click the **LSIB Export** tab on the lower part of the screen and select the appropriate data stream for your performance test. Data Stream 1 is selected in the following example.

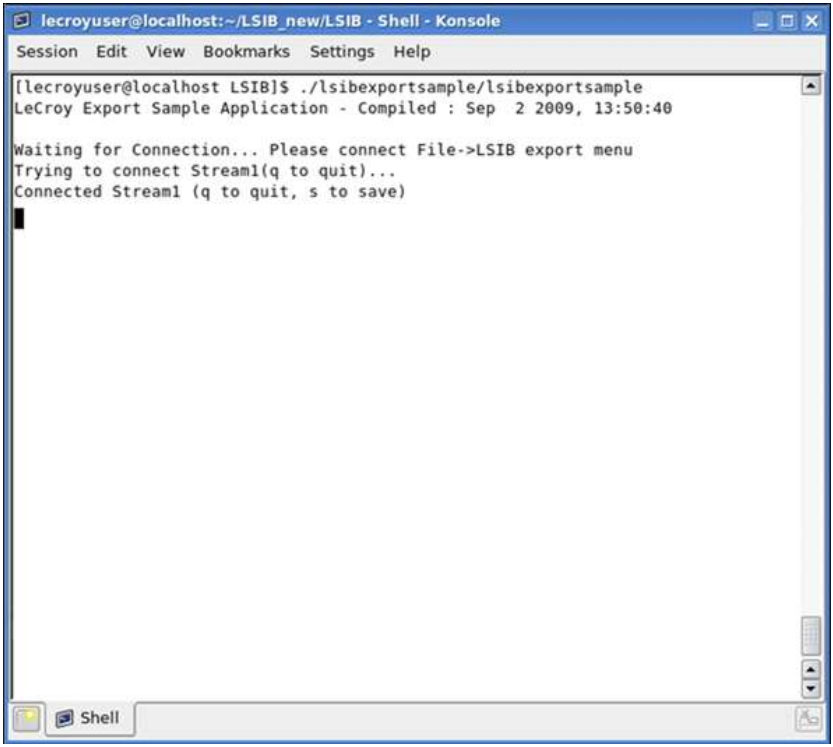
On Your Laptop/PC

3. Confirm the remote control interface on the host Laptop/PC shows that the oscilloscope and host PC are connected.

WINDOWS



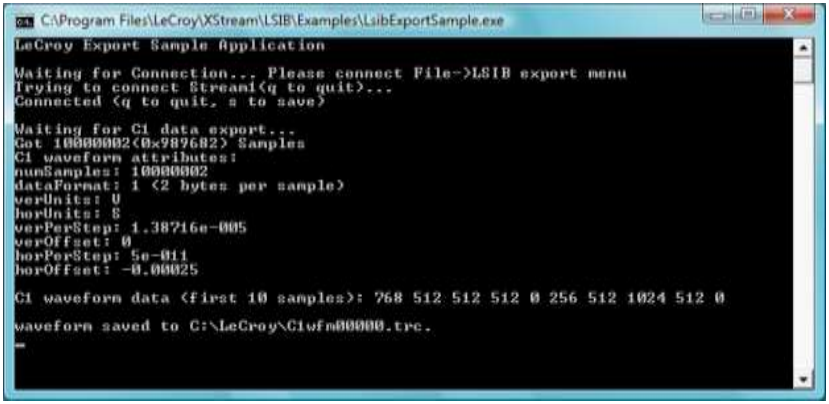
LINUX


lecroyuser@localhost:~/LSIB_new/LSIB - Shell - Konsole
Session Edit View Bookmarks Settings Help
[lecroyuser@localhost LSIB]$ ./lsibexportsample/lsibexportsample
LeCroy Export Sample Application - Compiled : Sep 2 2009, 13:50:40
Waiting for Connection... Please connect File->LSIB export menu
Trying to connect Stream1(q to quit)...
Connected Stream1 (q to quit, s to save)
Shell

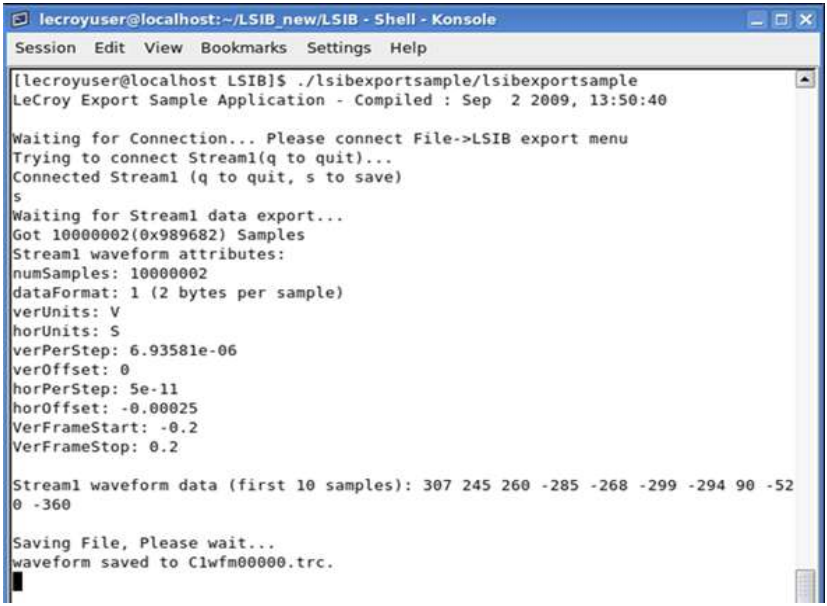
Transmitting Waveforms

When the **s** key is pressed, the application fetches a waveform from the oscilloscope, prints some of the header on the console, converts the data into the TRC format, and saves it in the **C:\Teledyne LeCroy** folder.

WINDOWS



LINUX



When finished, press **q** to quit the console.

Performance Demo Application

The main purpose of the Performance Demo Application is to demonstrate the transfer rate of waveforms sent using the LSIB Export functionality. Launch the Demo Application from the following locations:

- **Windows** - **Start** → **All Programs** → **Teledyne LeCroy** → **XStream** → **LSIB folder**.
- **Linux** - **directory_path/LSIB_xxxxxx/LSIB**.

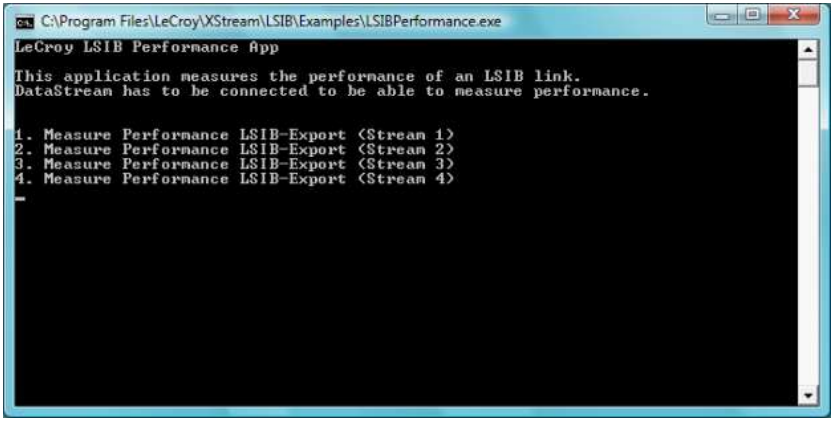
Note: **directory_path** refers to the location where you unzipped the tar archive.

Run the Performance Demos by completing the following steps:

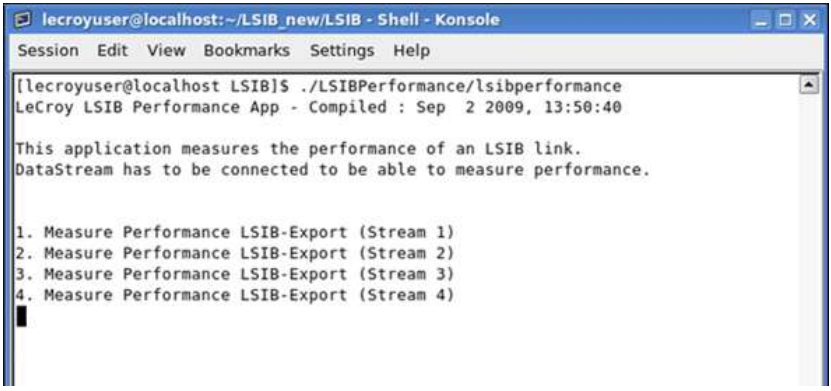
On Your Laptop/PC

1. Confirm that after launching the Performance Demo Application, the following screen is shown:

WINDOWS



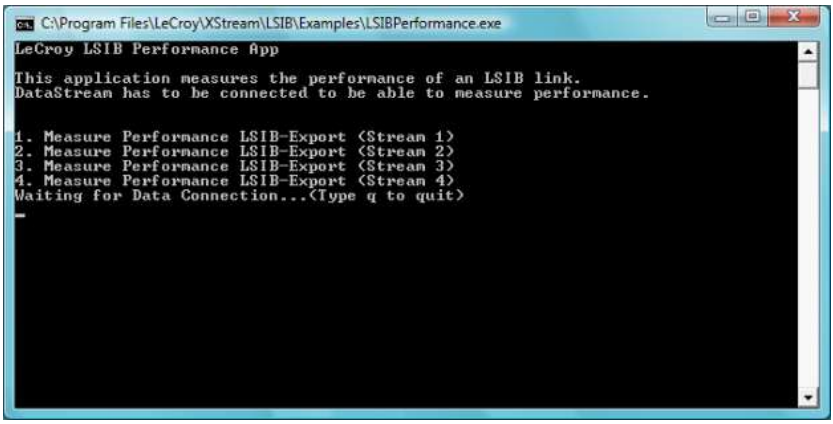
LINUX



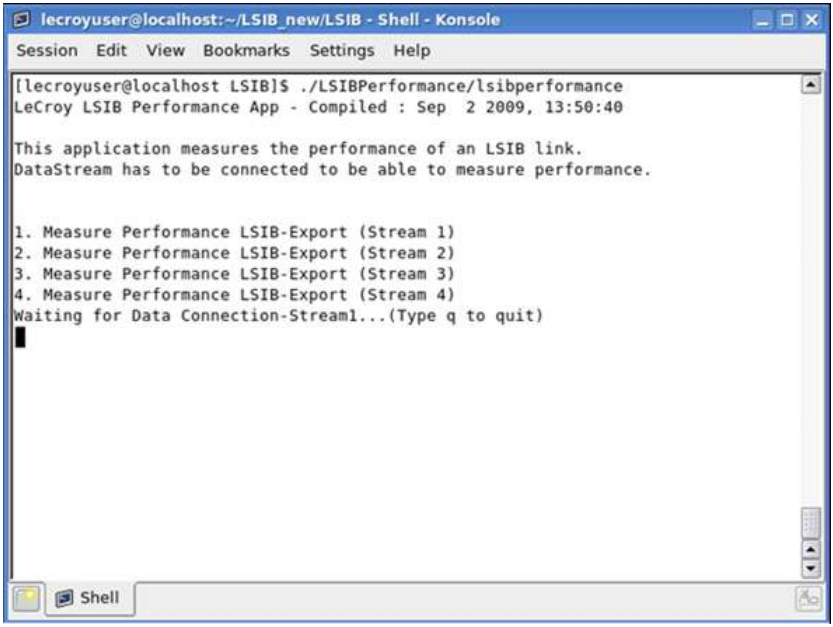
2. Choose the data stream you want to use for porting the information from the oscilloscope by selecting **1**, **2**, **3**, or **4**.

   The application measures data throughput and transfers waveforms from the oscilloscope and the host Laptop/PC. It also measures the transfer rate.

WINDOWS



LINUX


lecroyuser@localhost:~/LSIB_new/LSIB - Shell - Konsole
Session Edit View Bookmarks Settings Help
[lecroyuser@localhost LSIB]$ ./LSIBPerformance/lsibperformance
LeCroy LSIB Performance App - Compiled : Sep 2 2009, 13:50:40
This application measures the performance of an LSIB link.
DataStream has to be connected to be able to measure performance.
1. Measure Performance LSIB-Export (Stream 1)
2. Measure Performance LSIB-Export (Stream 2)
3. Measure Performance LSIB-Export (Stream 3)
4. Measure Performance LSIB-Export (Stream 4)
Waiting for Data Connection-Stream1...(Type q to quit)
Shell

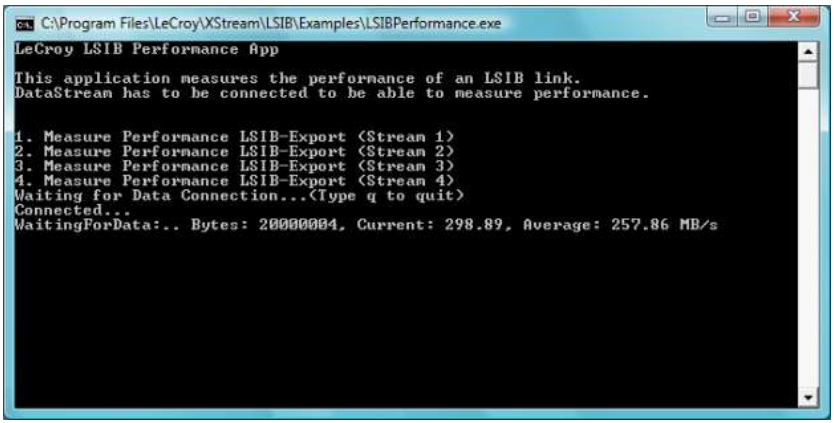
On Your Oscilloscope

3. Set up the oscilloscope for LSIB Export mode by accessing **File** → **Save Waveform**.
4. Click the **LSIB Export** tab on the lower part of the screen and select the data stream that was used for your performance test.

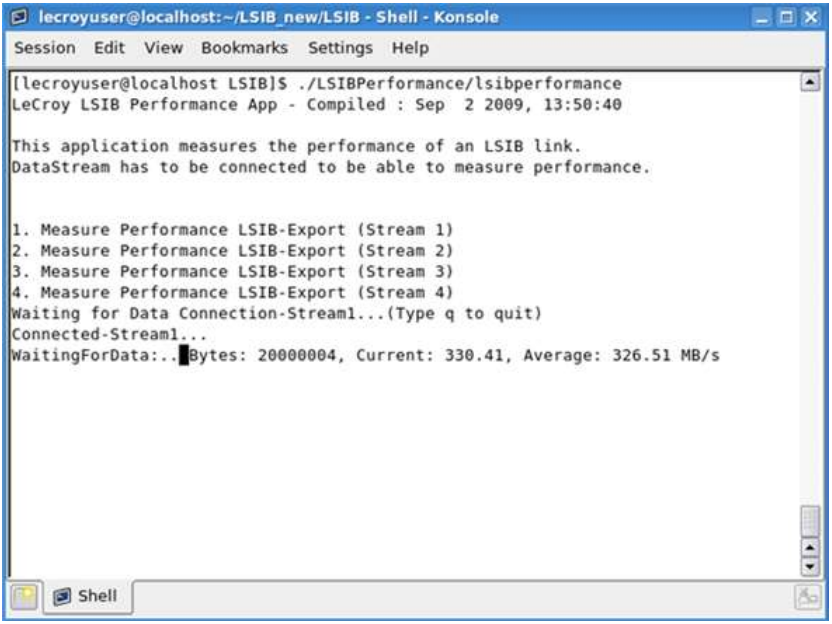
   Data Stream 1 is selected in the following example.

NOTE: You should see the word "connected" to the right of the selected data stream (as shown above). If not, you may need to increase the Timeout value on the host machine. Be aware that the acquisition memory settings affect data transfer rate.

WINDOWS



LINUX


lecroyuser@localhost:~/LSIB_new/LSIB - Shell - Konsole
Session Edit View Bookmarks Settings Help
[lecroyuser@localhost LSIB]$ ./LSIBPerformance/lsibperformance
LeCroy LSIB Performance App - Compiled : Sep 2 2009, 13:50:40
This application measures the performance of an LSIB link.
DataStream has to be connected to be able to measure performance.
1. Measure Performance LSIB-Export (Stream 1)
2. Measure Performance LSIB-Export (Stream 2)
3. Measure Performance LSIB-Export (Stream 3)
4. Measure Performance LSIB-Export (Stream 4)
Waiting for Data Connection-Stream1...(Type q to quit)
Connected-Stream1...
WaitingForData:..Bytes: 20000004, Current: 330.41, Average: 326.51 MB/s
Shell

Compiling Custom Code

Code samples and explanations located in the documentation and folders like Examples and Lib (in the **Program Files** → **Teledyne LeCroy** → **XStream** → **LSIB** folder) are meant to give way to your own customizations.

Code for the examples is located in the **Program Files** → **Teledyne LeCroy** → **XStream** → **LSIB** → **Examples** → **CPlusPlus** → **LSIB ControlSample or LSIB ExportSample** folders. Open .sln files using Visual Studio. Code adjustments may be necessary if using a compiler other than Visual Studio's.

Some considerations...

- Make code change adjustments in the Lib folder (32 or 64 Bit based on your Laptop or PC's configuration).
- The include file must be added to the include path (API definitions are located in this file).
- For more detail regarding the API, please refer to the **API Reference** help files also located inside your installation.
- A Visual C++ Express Edition can be downloaded from **www.microsoft.com/express**.

Specifications

NOTE: Specifications are subject to change without notice.

Please refer to the Teledyne LeCroy website at teledynelecroy.com for the most current specification information regarding your product.

Certifications

This section contains LSIB-1 Host Interface's Electromagnetic Compatibility (EMC), Safety and Environmental certifications.

EC Declaration of Conformity - EMC

This oscilloscope accessory meets intent of EC Directive 2004/108/EC for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

EN 61326-1:2006, EN 61326-2-1:2006 EMC requirements for electrical equipment for measurement, control, and laboratory use.

EC Declaration of Conformity – Low Voltage

This oscilloscope accessory meets intent of EC Directive 2006/95/EC for Product Safety. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

EN 61010-1:2010 Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements

EN 61010-2:030:2010 Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-030: Particular requirements for testing and measuring circuits

EC Declaration of Conformity - Restriction of Hazardous Substances (RoHS)

The accessory has been classified as Industrial Monitoring and Control Equipment, and is outside the scope of the 2011/65/EU RoHS Directive (Exempt until July 2017, per Article 4).

End-of-Life Handling

This oscilloscope accessory 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 Teledyne LeCroy product, please visit teledynelecroy.com/recycle.

ISO Certification

Manufactured under an ISO 9000 Registered Quality Management System. Visit teledynelecroy.com to view the certificate.

Contact Teledyne LeCroy

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