Alazar Front Panel
Quick Start Guide

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Contents

1 Introduction

Alazar Front Panel is a program which allows you to acquire, display and save data with any AlazarTech digitizer. It has the following capabilities:

- Dual-channel acquisition with one board.
- Single and dual-ported acquisition, depending on the board capabilities.
- Display a 'math' channel, presenting various operations on the currently displayed records, including FFT.
- Save and load data from file.

2 Installation

There are two ways to install Alazar Front Panel:

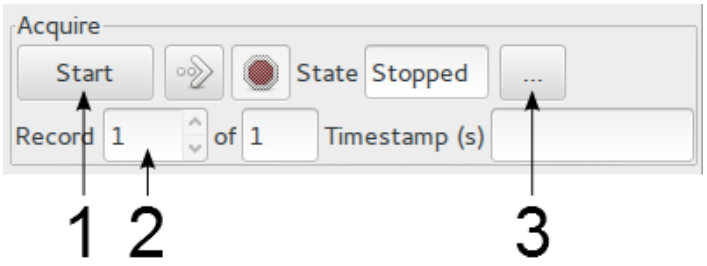
1. Run the installation script named `install.sh` located in the ATS-LINUX directory.
2. Install the application's package manually. Depending on the GNU/Linux distribution that you are using, you will be provided with an RPM, Debian, or TGZ package. Refer to your distrbution's documentation for information as to how to install a package. Please note that the installation of this package requires the `libats` package to be already installed and up to date.

Once installed, it is possible to run the application by typing `/usr/local/bin/AlazarFrontPanel` at a terminal, or simply `AlazarFrontPanel` if `/usr/local/bin` is in your `$PATH` environment variable.

3 Making Acquisitions

When launched for the first time, Alazar Front Panel detects the boards installed on the computer, and configures itself accordingly. Hence, there is no need to configure the application to make a simple acquisition.
Figure 1 shows the 'Acquire' section of the main window of the application. Simply press the 'Start' button to begin an acquisition. Press the 'Stop' button when you are done acquiring data.

Figure 1- Acquire section

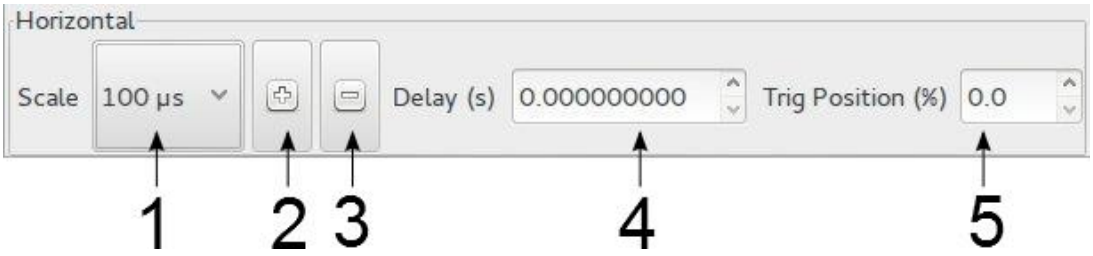


1. Start and stop the acquisition
2. Select the record displayed on screen
3. Display the acquisition configuration dialog

Change the time scale to expand or contract the signal horizontally. Select a time scale in seconds per horizontal division from the horizontal scale combo box, or by pressing the buttons

to expand or contract the horizontal scale. The horizontal controls are located in the ‘Horizontal’ section at the right side of the main window.

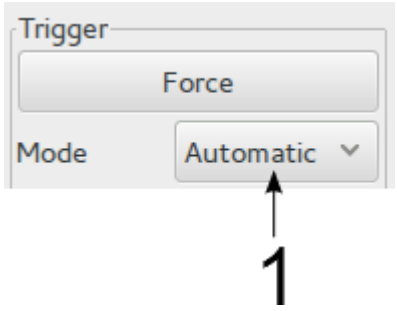
Figure 2 - Horizontal configuration section



1. Select the time scale in seconds per horizontal division.
2. Contract the horizontal time scale by selecting the next item from the corresponding combo box.
3. Expand the horizontal time scale by selecting the previous item from the corresponding combo box.
4. Adjust the value of ‘Trigger Delay’ in seconds.
5. Adjust the trigger position in fraction of record length.

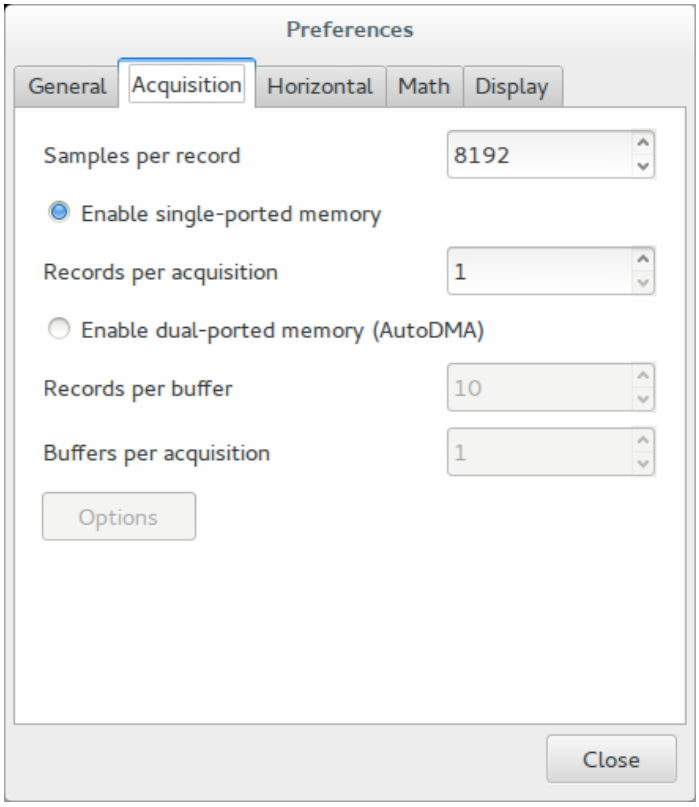
Once you have a suitable trigger level, select the ‘Normal’ trigger mode from the trigger combo box to stabilize the waveform within a sample record. The trigger mode combo box is located in the ‘Trigger’ section in the main window.

Figure 3 - Trigger section



In order to change acquisition parameters such as the number of samples per record and the acquisition mode, press the button labeled ‘…’ located in the ‘Acquire’ section of the main window. Figure 4 displays the dialog that opens.
Further AutoDMA options are found in a dialog which opens when the ‘Options’ button is pressed. All the changes made to the configuration are saved when Alazar Front Panel closes and recalled when it opens. If you’d like to start from a clean state, select the “Load Defaults” menu item located under the “Settings” menu.

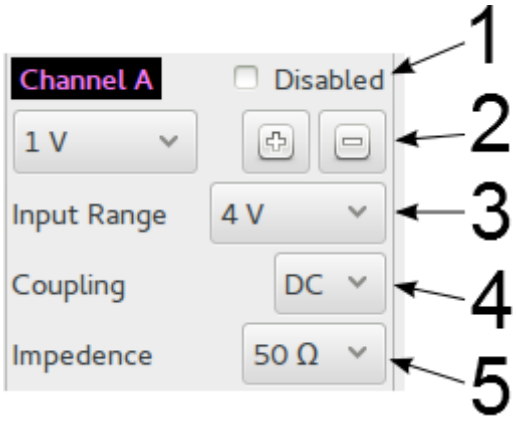
Figure 4 - Acquisition preferences dialog



4 Configuring Input Channels

Alazar Front Panel draws an arrowhead marker in the left margin of the graticule to indicate the vertical position of each enabled input channel. They are labeled A and B. Draw the marker vertically with the left-mouse button to move the channel up or down.
Use the controls from the 'Vertical' section of the main window to configure the input channels parameters.

Figure 5 - Input channel configuration



1. Enable or disable the channel
2. Adjust the vertical range of the channel

3. Adjust the input range of the channel. By default, this value is modified automatically by the application based on the vertical range. This is configurable by cliquing the 'Settings | Preferences" menu item, and then unchecking the 'Set ChA/B input range from vertical scale value' checkbox.
4. Change the input channel's coupling
5. Adjust the input impedance.

5 Configuring the Math Channel

The math channel can display one of the following functions, applied to the currently displayed record:

1. Sum of A and B channels
2. Difference between A and B channels
3. Product of A and B channels
4. FFT of A or B channel
5. Even distribution histogram of A or B channel

To display the math channel, uncheck the 'Disabled' checkbox next to 'Math' in the 'Vertical' section of the main window.

1. Hide or display the math channel
2. Change the math channel's vertical range
3. Modify the function that the math channel uses

6 Saving and Loading Files

To save the currently displayed capture, select 'Save' from the 'File' menu of the application or press 'Ctrl+s'. A capture file with the `.atb` extension is created in the `~/AlazarData` directory.
Capture files can be loaded by selecting the 'Open' item from the 'File' menu, or by pressing 'Ctrl+o'.

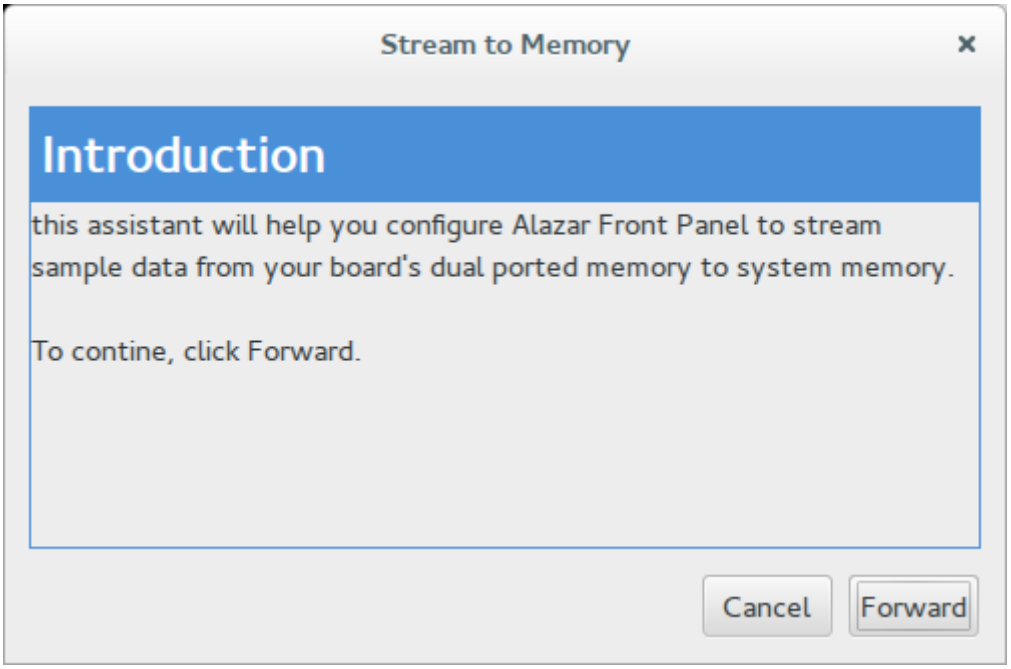
7 Stream to Memory Assistant

The Stream to Memory assistant displays a series of property pages that allow you to configure Alazar Front Panel to stream sample from the dual-ported memory of your digitizer to the system memory of your computer. It is accessed by pressing the 'Stream to Memory' item of the 'Tools' menu.

The maximum amount of data that can be streamed corresponds to the maximum available memory on your computer. Once the acquisition is done, it is possible to browse through the various buffers and records, as well as save all the binary data to disk at once.

7.1 Introduction

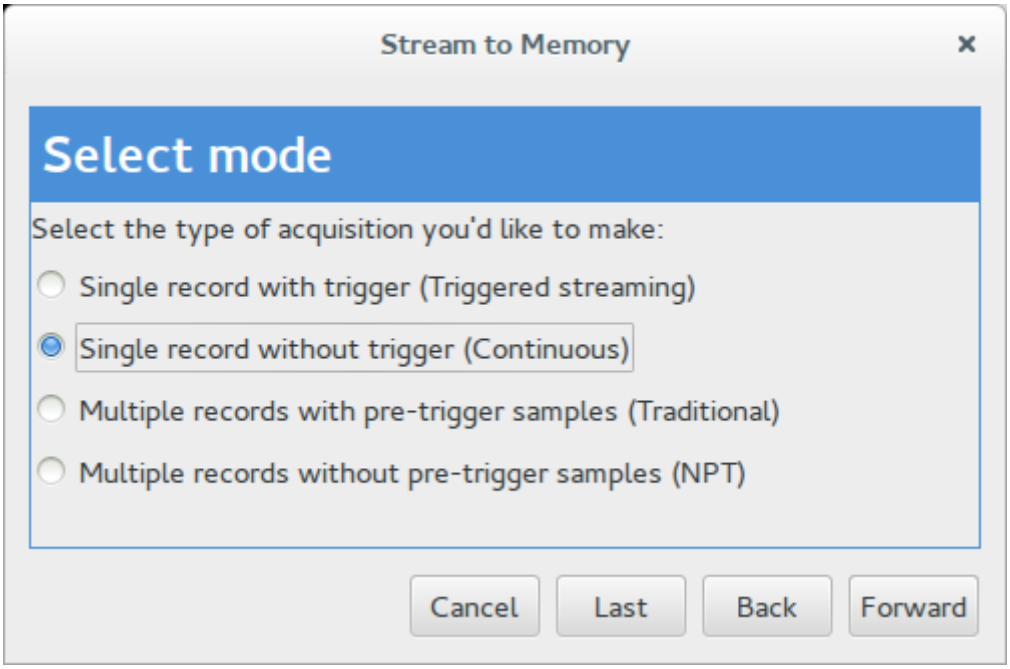
Figure 6 - Stream to Memory Introduction



This is the first page of the Stream to Memory assistant. Press ‘Forward’ to go to the next page, or ‘Cancel’ to close this assistant without acquiring data.

7.2 Mode selection

Figure 7 - Mode selection



The 'Select Mode' page allows you to select the type of acquisition that you'd like to perform.

Single record with trigger (Triggered streaming)
Check this radio button to acquire a single, continuous record per enabled channel. The system will wait for a trigger event before beginning the acquisition, and the acquisition will contain no pre-trigger samples.

Single record without trigger (Continuous)
Check this radio button to acquire a single, continuous record per enabled channel. The system will not wait for a trigger event before beginning the acquisition.

Multiple records with pre-trigger samples (Traditional)
Check this radio button to acquire one or more records per enabled channel. The system will wait for a trigger event before each record, and the records may contain pre-trigger samples.

Multiple records without pre-trigger samples (NPT)
Check this radio button to acquire one or more records per enabled channel. The system will wait for a trigger event before each record, but the records contain no pre-trigger samples.

Back
Press this button to go back to the previous page

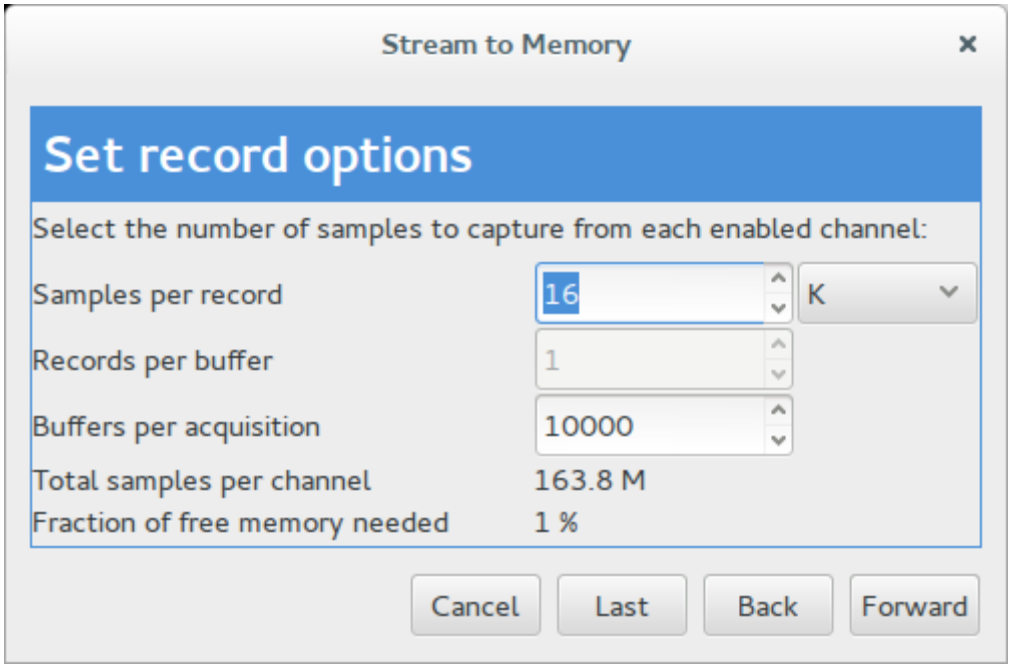
Forward
Press this button to go forward to the next page

Last
Press this button to go to the last page.

Cancel
Press this button to close this assistant without saving data.

7.3 Set record options

Figure 8 - Set record options



This property page allows you to define the acquisition length. Note that it is limited only by the available system memory.

Samples per record
In dual-ported memory mode, an acquisition is split into DMA transfers that move sample data from on-board to PC host memory while, at the same time, on-board memory is filled with acquisition data.
Enter the size of each DMA transfer in samples. It is important to keep this value as large as possible to reduce the risk of buffer overrun errors. The default value is 8 K samples.

Records per buffer
Enter the number of records per buffer. This value is locked to one in 'Continuous' and 'Triggered Streaming' modes.

Buffers per acquisition
Enter the number of DMA transfers per acquisition.

Total samples per channel
This value is the product of the Samples per transfer, Records per buffer and Buffers per acquisition values. It defines the total number of samples transferred from the board per enabled channel during the acquisition.

Fraction of free memory needed
This indicates the total space required by the acquisition as a fraction of the available main memory. The acquisition cannot proceed if this value is 100% or above.

Back
Press this button to go back to the previous page

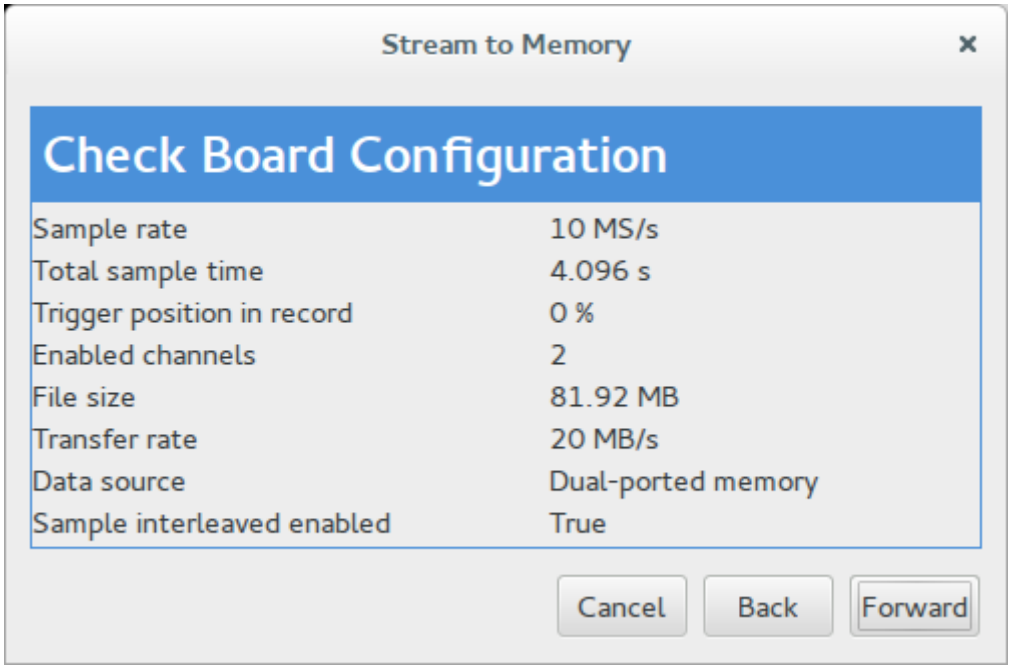
Forward
Press this button to go forward to the next page

Last
Press this button to go to the last page

Cancel
Press this button to close this assistant without acquiring data.

7.4 Check Board Configuration

Figure 9 - Check Board Configuration



This page allows you to review the current board configuration, as set by the regular acquisition controls. If these parameters are not correct, press ‘Cancel’ and modify them as explained in the sections 3 and 4 of this document.

Sample rate
This indicates the number of samples per second per channel that will be acquired by the board.

Total sample time
The duration of the acquisition, not taking into account the delays between trigger events

Trigger position in record
The ratio between pre-trigger and post-trigger samples

Enabled channels
The number of active channels

File size
The size of the file that would result from saving data on disk

Transfer rate
The theoretical average data transfer rate from the board to main memory

Data source
Displays wether the on-board memory is used.

Sample interleave enabled
Displays wether samples are interleaved in the transferred buffers.

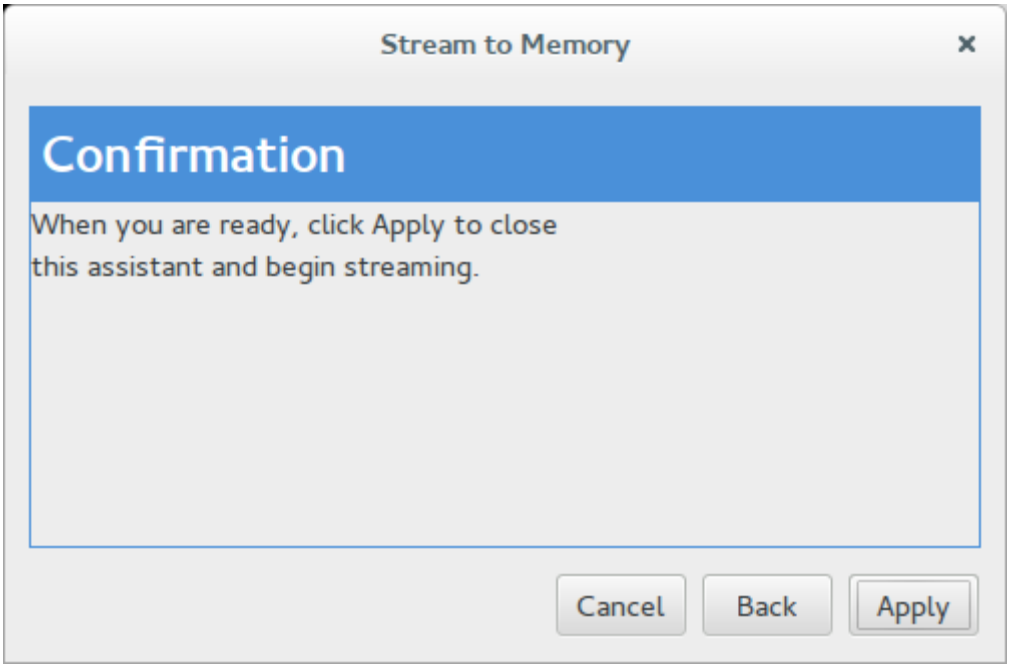
Forward
Click this button to go to the next page.

Back
Click this button to go to the previous page.

Cancel
Click this button to close the assistant without acquiring data.

7.5 Confirmation

Figure 10 - Stream to Memory Confirmation page



This is the last page of the Stream to Memory assistant

Apply
Press this button to apply the current settings, close this assistant, and begin the acquisition.

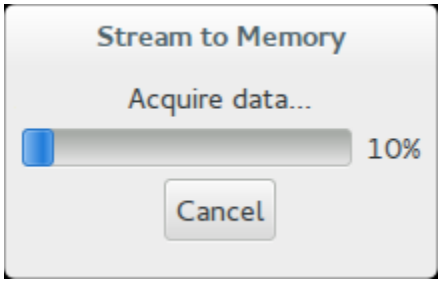
Cancel
Press this button to close this assistant without acquiring data.

Back
Press this button to go to the previous page.

7.6 Progress dialog

Once you press 'Apply' on the final page of the assistant, a window displaying the state of progression of the acquisition appears. Press 'Cancel' on this dialog to stop the acquisition before it ends.

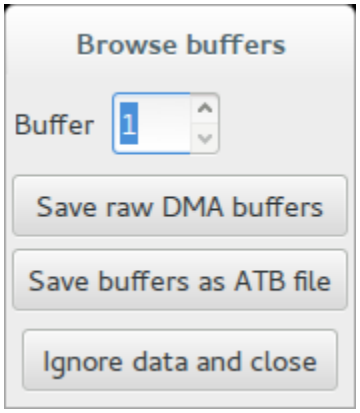
Figure 11 - Stream to Memory progress window



7.7 Browse and save buffers

As soon as the Stream to Memory ends, a new dialog opens, which allows you to browse through all the acquired buffers, and save all the acquisition to a file at once.

Figure 12 - Browse buffers



Buffer
Choose the currently displayed buffer. Once a buffer is selected, use the regular controls from the main window to explore various records and specific locations.

Save raw DMA buffers
Press this button to save all the acquisition to a file at once. The DMA buffers are written to disk contiguously without modification. This means that the actual layout of the data depends on the acquisition configuration. The ATS-SDK Guide contains the information needed to reconstruct buffers from this binary file. Please note that a binary file cannot be opened directly by Alazar Front Panel, since the information relative to the acquisition parameters is not present.

Save buffers as ATB file
Press this button to save all the acquisition as a file in the ATB format. This file can be later opened by Alazar Front Panel, or AlazarDSO.

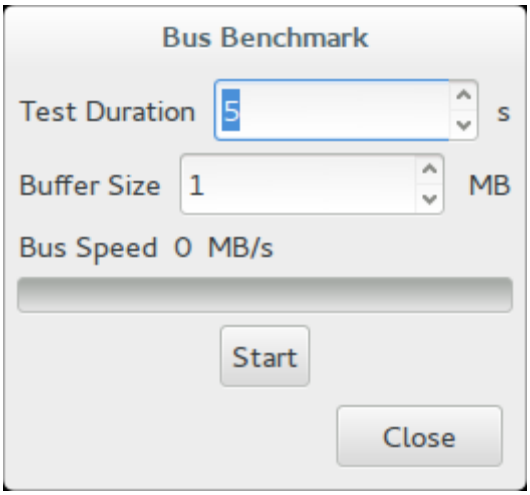
Ignore data and close
Press this button to close the 'Browse buffers' dialog. Please note that it is not possible to cancel this operation. All unsaved data is lost when this button is pressed.

8 Bus Benchmark Tool

The Bus Benchmark Tool allows you to measure the average transfer rate from your AlazarTech digitizer boards to host memory. This wizard may be used to verify that your computer is capable of the sustained transfer rates required for streaming.

Note that the digitizer board does not transfer data from its analog to digital converters during this test. The board generates data internally, and transfers this data to host memory at a rate that is limited only by the speed of the host bus interface and memory controller.

Figure 13 - Bus Benchmark



Test Duration
Change this value to modify the duration of the benchmark.

Buffer Size
This parameter determines the amount of data in each DMA transfer.

Start
Press this button to start the test. The ‘Bus Speed’ label will indicate the average transfer speed when the test is finished.

Close
Press this button to close this dialog.

