



ATI STREAM COMPUTING SAMPLE

Scan of Large Arrays

1 Overview

1.1 Location `$(ATISTREAMSDKSAMPLESROOT)\samples\opencl\cl\app`

1.2 How to Run See the *Getting Started* guide for how to build samples. You first must compile the sample.

Use the command line to change to the directory where the executable is located. The default executables are placed in `$(ATISTREAMSDKSAMPLESROOT)\samples\opencl\bin\x86` for 32-bit builds and `$(ATISTREAMSDKSAMPLESROOT)\samples\opencl\bin\x86_64\` for 64-bit builds.

Type the following command(s).

1. `ScanLargeArrays`
This performs a scan on default array size: 64.
2. `ScanLargeArrays -h`
This prints the help message.

1.3 Command Line Options [Table 1](#) lists, and briefly describes, the command line options.

Table 1 Command Line Options

Short Form	Long Form	Description
-h	--help	Shows all command options and their respective meanings.
-q	--quiet	Quiet mode. Suppresses all text output.
-e	--verify	Verify results against reference implementation.
-v	--verbose	Verbose output.
-t	-timing	Print timing.
-x	--width	Specify length of array.
	--device	Devices on which the program is to be run. Acceptable values are <code>cpu</code> or <code>gpu</code> .

2 Implementation Details

The scan is based on a prefix sum; however, the scan is done block-wise, then all blocks are combined into a single result array.

The large array (`size > 2 * MAX_BLOCK_SIZE`), is divided into blocks. Each block is scanned by a thread block. The sum of each block is written to an auxiliary array. The auxiliary array of the block sums is also scanned, which generates an array of block increments. This array is added to all elements of their respective blocks.

3 Reference

Guy E. Blelloch, "Prefix Sums and Their Applications" in: J. H. Reif, *Synthesis of Parallel Algorithms* (Morgan Kaufmann: San Francisco, CA, 1993)

<http://www.cs.cmu.edu/afs/cs.cmu.edu/project/scandal/public/papers/CMU-CS-90-190.html>

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