

## 1 Overview

**1.1 Location** \$(AMDAPPSDKSAMPLESROOT)\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 pre-compiled sample executable is at \$(AMDAPPSDKSAMPLESROOT)\samples\opencl\bin\x86\ for 32-bit builds, and \$(AMDAPPSDKSAMPLESROOT)\samples\opencl\bin\x86\_64\ for 64-bit builds.

Type the following command(s).

1. AtomicCounter  
This runs the program with the default option -x = 1024.
2. AtomicCounter -h  
This prints the help file.

**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 meaning.
	--device	Devices on which the program is to be run. Acceptable values are cpu or gpu.
-q	--quiet	Quiet mode. Suppresses all text output.
-e	--verify	Verify results against reference implementation.
-t	--timing	Print timing.
	--dump	Dump binary image for all devices.
	--load	Load binary image and execute on device.
	--flags	Specify compiler flags to build the kernel.
-p	--platformId	Select platformId to be used (0 to N-1, where N is the number of available platforms).
-d	--deviceId	Select deviceId to be used (0 to N-1, where N is the number of available devices).
-v	--version	AMD APP SDK version string.
-i	--iterations	Number of iterations for kernel execution.
-x	--length	Length of the input array.

## 2 Implementation

This algorithm finds the occurrences of a given value in an unsorted input array. The algorithm is implemented in two ways:

- Global atomics (cl\_khr\_global\_int32\_base\_atomics).
- Atomic counters (cl\_ext\_atomic\_counters\_32).

IT then compares the performances between these two implementations.

## 3 Results

Here are the results for a system with a Cypress GPU, running under 64-bit Win7.

```
AtomicCounters.exe -e -q -t -x 16777216 -i 100
```

Elements	Occurrences	AtomicsCounter (sec)	GlobalAtomics (sec)
16777216	3359805	0.00144894	0.0732824

```
AtomicCounters.exe -e -q -t -x 16777216 -i 100 (here input array filled with same value)
```

Elements	Occurrences	AtomicsCounter (sec)	GlobalAtomics (sec)
16777216	16777216	0.0014425	0.357597

Using the Atomic Counters clearly shows the performance level that can be achieved using AMD GPUs.

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