

1 Overview

1.1 Location `$<AMDAPPSDKSamplesInstallPath>\samples\opencl\cl\1.x`

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

`$<AMDAPPSDKSamplesInstallPath>\samples\opencl\bin\x86\` for 32-bit builds, and
`$<AMDAPPSDKSamplesInstallPath>\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 <code>cpu</code> or <code>gpu</code> .
-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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