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## 1 Overview

For Microsoft® Windows® platforms, the AMD APP SDK installer installs the following packages on your system by default (unless you choose to customize the install):

1. AMD APP SDK Runtime package.
2. AMD APP SDK Developer package. This includes:
  - the OpenCL™ compiler,
  - AMD CAL header files and compile-time libraries, and
  - pointers to the latest versions of the developer documentation. (See the AMD APP SDK v2 folder in the All Programs panel of Windows Start. This also contains links to the AMD Math Libraries.)
3. AMD APP SDK v2 Samples package. This includes:
  - sample applications,
  - sample documentation.

Additional samples not included in the AMD APP SDK v2 Samples package can be found at:  
<http://developer.amd.com/samples/opencv/Pages/default.aspx>

4. AMD APP Profiler package.
5. AMD APP KernelAnalyzer package.

For Linux® platforms, the AMD APP SDK consists of one package. To ensure proper installation, be sure to follow the instructions provided in the *AMD APP SDK Installation Notes*.

The AMD APP SDK Developer installation includes the following folders:

- `bin` - This includes tools for compiling OpenCL applications, as well as the OpenCL dynamic library for running them.
- `lib` - This contains the base OpenCL runtime library to which the applications link on Windows systems, as well as import libraries to author CAL applications.
- `include` - This contains the header files for the OpenCL and CAL runtimes.
- `docs` - This contains developer documentation for the AMD APP SDK. Additional developer documentation is available online at:  
<http://developer.amd.com/gpu/AMDAPPSDK/documentation/Pages/default.aspx>

The AMD APP SDK runtime installation for Windows adds the variable `AMDAPPSDKROOT` to your environment. This points to the location where you have installed the SDK development package. The Windows installer also adds the locations of the OpenCL dynamic libraries to your system

PATH variable, so applications know where to find it. For Linux, you must set up the paths and environment manually. This is explained in Section 2.2, “On Linux.”

The AMD APP SDK Samples installation includes the following folders:

- `bin` - This includes pre-built binaries and dynamic libraries for running AMD APP samples.
- `lib` - This contains AMD APP SDK utility libraries to which sample applications link.
- `include` - This contains the header files for utilities and tools used by the samples.
- `samples` - This contains OpenCL and CAL sample applications.
- `make` - This contains the definitions and rules for `make`.

The AMD APP SDK Samples installer for Windows adds the variable `AMDAPPSDKSAMPLESROOT` to your environment. This points to the location where you have installed the SDK Samples package.

The AMD APP SDK Samples installation includes the following folders:

- `tools` - This contains the AMD APP Profiler and ancillary programs.

## 2 How to Build a Sample

Ensure that the AMD APP SDK Samples package has been installed before proceeding.

### 2.1 On Windows

#### 2.1.1 OpenCL

Building With Visual Studio Solution Files –

The samples installation contains a Microsoft Visual Studio 2008 solution file (`OpenCLSamples.sln`) and a Microsoft Visual Studio 2010 solution file (`OpenCLSamplesVS10.sln`). These are located at `$(AMDAPPSDKSAMPLESROOT)\samples\opencl\`. The solution file contains the entire sample project. To build a sample:

1. Open the `OpenCLSamples.sln` file with Microsoft Visual Studio 2008 Professional Edition or open the or `OpenCLSamplesVS10.sln` with Microsoft Visual Studio 2010 Professional Edition.
2. Select *Build > Build Solution* to build all solutions.
3. Select the project file in the Solutions Explorer.
4. Right-click on the project file, and select *Build* to build a particular sample.

Building With VS Compiler Using `make` Files –

1. Open the Visual Studio command prompt. (Ensure `make.exe` is in the PATH. This executable can be from cygwin or MinGW. Open the 32-bit Visual Studio command prompt for 32-bit builds; open the 64-bit Visual Studio command prompt for 64-bit builds.)
2. Go to the `InstallSampleDir\samples` directory to build all samples. To build samples individually, go to the `InstallSampleDir\samples\opencl\cl\app` directory.
3. For 64-bit builds, use `make`; for 32-bit builds, use `make bitness=32`.

### Building With Intel Compiler Using `make` Files -

1. Open the Intel Visual Studio command prompt. (Ensure `make.exe` is in the path. This executable can be from cygwin or MinGW. Open the 32-bit Intel Visual Studio command prompt for 32-bit builds; open the 64-bit Intel Visual Studio command prompt for 64-bit builds.)
2. Go to the `InstallSampleDir\samples` directory to build all samples. To build samples individually, go to the `InstallSampleDir\samples\openc1\cl\app` directory.
3. At the command line, enter `make clean`.
4. Build the sample using the command `make intel=1 sample_Name`.
5. For 64-bit systems use `make intel=1` to build 64-bit targets, and `make intel=1 bitness=32` to build 32-bit targets. (If your OS is 64-bit, it builds 64-bit targets by default, but to build 32-bit targets, it is necessary to explicitly specify `bitness=32`.)

### Building With MinGW + GCC Using `make` Files -

1. Open the command window (Start > Run, then type `cmd.exe`).
2. Add MinGW bin and Msys bin to PATH:  
`PATH=C:\MinGW\bin;C:\MinGW\msys\1.0\bin;%PATH%`
3. Go to the `InstallSampleDir\samples` directory.
4. `make bitness=32`.

### Building With MinGW-x64 + GCC Using `make` Files -

1. Open the command window (Start > Run, then type `cmd.exe`).
2. Add MinGW64 bins to PATH: `PATH=C:\MinGW64\bin;C:\MinGW\msys\1.0\bin;%PATH%`
3. Go to the `InstallSampleDir\samples` directory.
4. `make bitness=64`.

Note: To use Msys under MinGW64-x64:

- a. Open the `fstab` file (available at `msys/1.0/etc/`)
- b. Modify according to your MinGW64-w64 path. For example, modify  
`C:\MinGW\ /mingw` to `C:\MinGW64\ /mingw`

## 2.1.2 CAL

The samples installation contains a Microsoft Visual Studio 2008 solution file, `samples.sln`, and a Microsoft Visual Studio 2010 solution file, `samples_vs10.sln`. These files are located at `$(AMDAPPSDKSAMPLESROOT)\samples\cal\`. This solution file contains the entire sample project. To build a sample:

1. Open the `samples.sln` file with Microsoft Visual Studio 2008 Professional Edition, or open the `samples_vs10.sln` file with Microsoft Visual Studio 2010 Professional Edition.
2. Select *Build > Build Solution* to build all solutions.
3. Select the individual project file in the Solutions Explorer.
4. Right-click on the project file, and select *Build* to build a particular sample.

## 2.2 On Linux

### 2.2.1 OpenCL

#### Building With GCC –

This samples installation contains makefiles to build samples. To build a sample:

1. Ensure the library path is set to find `libOpenCL.so`. If it is not set, follow the instructions in the *AMD APP SDK Installation Notes*, section 2.2, step 4.
2. Go to the `samples` directory if you want to build all the samples, or go to a particular sample directory, and type `make`. If no options are specified, `make` builds for the native platform in debug configuration. To select release configuration, add the option `release = 1`. To force a 32-bit build on a 64-bit platform, add the option `bitness=32`.
3. Executables are generated in the `bin` directory at the samples installation root, as well as inside the `bin` directory of the samples: `AMDAPPSDKSAMPLESROOT/samples/openc1/bin`.

#### Building With the Intel Compiler –

1. Use the option `intel=1`; all other options are same as above.

### 2.2.2 CAL

This samples installation contains makefiles to build samples. To build a sample:

1. Ensure the library path is set to find `libaticalrt.so` and `libatical.so` (these are shipped as part of the display driver). If it is not set, use `export` (in bash shells) to set it.
2. Go to the `samples` directory if you want to build all the samples, or go to a particular sample directory, and type `make`.
3. Executables are generated in the `bin` directory of the samples (`AMDAPPSDKSAMPLESROOT/samples/cal/bin`).

## 3 How to Run the Application

This section describes how to run the application that was just built.

### 3.1 On Windows

#### 3.1.1 OpenCL

There are three ways to run the application: by using Microsoft Visual Studio 2008 Professional Edition, or using Microsoft Visual Studio 2010 Edition, or by using the command line.

#### Using Visual Studio

1. Open `OpenCLSamples.sln` with Microsoft Visual Studio 2008 Professional Edition, or `OpenCLSamplesVS10.sln` with Microsoft Visual Studio 2010 Professional Edition, and build it.
2. Select the desired project file in the Solutions Explorer.
3. Right-click on it, and select *Set as StartUp Project*. To run the application, press `Ctrl+F5`. To run the application in debug mode, simply press `F5`.

### Using the Command Line

1. Open a command prompt.
2. Go to the `$(AMDAPPSDKSAMPLESROOT)/samples/ocl/bin.`
3. Go into the appropriate architecture directory (x86 or x86\_64).
4. Run the samples by typing the name of their executables. See the individual sample documents for their respective command line arguments.

#### 3.1.2 CAL

There are three ways to run the application: by using Microsoft Visual Studio 2008 Professional Edition, using Microsoft Visual Studio 2010 Professional Edition, or by using the command line.

#### Using Visual Studio

1. Open `samples.sln` with Microsoft Visual Studio 2008 Professional Edition, or open `samples_vs10.sln` with Microsoft Visual Studio 2010 Professional Edition, and build it.
2. Select the desired project file in the Solutions Explorer.
3. Right-click on it, and select *Set as StartUp Project*. To run the application, press Ctrl+F5. To run the application in debug mode, simply press F5.

#### Using the Command Line

1. Open a command prompt.
2. Go to the `$(AMDAPPSDKSAMPLESROOT)/samples/cal/bin.`
3. Run the samples by typing the name of their executables. See the individual sample documents for their respective command line arguments.

## 3.2 On Linux

### 3.2.1 OpenCL

1. Ensure the path is set to include the location of `libOpenCL.so`.
2. Open a terminal window.
3. Go to the `$(AMDAPPSDKSAMPLESROOT)/samples/ocl/bin/` directory.
4. Go into the appropriate architecture directory (x86 or x86\_64).
5. Run the samples by typing the name of their executables. You may have to prepend the executable name with `./`. See the individual sample documents for their respective command line arguments.

### 3.2.2 CAL

1. Ensure the path is set to include the location of `libaticalrt.so` and `libatical.so` (these are shipped as part of the display driver).
2. Open a terminal window.
3. Go to the `$(AMDAPPSDKSAMPLESROOT)/samples/cal/bin/` directory.
4. Go into the appropriate architecture directory (x86 or x86\_64).

5. Run the samples by typing the name of their executables. You may have to prepend the executable name with `./`. See the individual sample documents for their respective command line arguments.

## 3.3 Sample Code

### 3.3.1 OpenCL

The simplest OpenCL sample in the SDK is the *Template* sample. It is for developers that are new to OpenCL programming. See the Template sample documentation (in `$(AMDAPPSDKSAMPLESROOT)/samples/ocl/cl/app/Template/docs`), which explains the workflow for setting up a basic AMD APP application using OpenCL. The *Template* sample is included for instructional purposes.

There are two kinds of OpenCL samples in the AMD APP SDK. One is written using native OpenCL calls (in `$(AMDAPPSDKSAMPLESROOT)/samples/ocl/cl`); the other is written using the AMD C++ bindings to OpenCL (in `$(AMDAPPSDKSAMPLESROOT)/samples/ocl/cpp_cl`).

Most of the OpenCL samples make use of a utility library called the AMD APP SDK Utility Library (SDKUtil). This library provides commonly used routines, such as parsing command line options, loading and writing bitmap images, printing formatted output, comparing results, and reading files. This is an object-oriented library that is structured as a set of classes. The SDKUtil `cpp` files and headers are available in the `$(AMDAPPSDKSAMPLESROOT)\samples\ocl\SDKUtil` folder.

### 3.3.2 CAL

To learn more about the CAL samples, see the *HelloCAL* and *Tutorial* samples.

## 4 Important Notes

- For SDK 2.4, the following values are returned when querying strings from OpenCL:

`CL_PLATFORM_VERSION`: OpenCL 1.1 AMD-APP-SDK-v2.4 (*version id*)

`CL_PLATFORM_NAME`: AMD APP

`CL_PLATFORM_VENDOR`: Advanced Micro Devices, Inc.

- Check the Platform Vendor string, not the Platform Name, to determine AMD hardware. For example code that shows how to check and use the `CL_PLATFORM_VENDOR` string, see the AMD APP v2 Samples.

## 5 Supported Devices

The following table shows the devices supported by the current version of the AMD APP SDK, as well as the computing features they support.

Product Line	Card	Double-Precision	UAV	Compute Kernel (Shader)
<i>AMD Radeon™ HD</i>	6970	Yes	Yes	Yes
	6950	Yes	Yes	Yes
	6870	No	Yes	Yes
	6850	No	Yes	Yes
	6790	No	Yes	Yes
	6670	No	Yes	Yes
	6570	No	Yes	Yes
	6450	No	Yes	Yes
<b>Global Buffer</b>				
<i>ATI Radeon™ HD</i>	5970	Yes	Yes	Yes
	5870	Yes	Yes	Yes
	5850	Yes	Yes	Yes
	5830	Yes	Yes	Yes
	5770	No	Yes	Yes
	5750	No	Yes	Yes
	5670	No	Yes	Yes
	5570	No	Yes	Yes
	5470	No	Yes	Yes
	4890 *	Yes	Yes	Yes
	4870 X2 *	Yes	Yes	Yes
	4870 *	Yes	Yes	Yes
	4850 X2 *	Yes	Yes	Yes
	4850 *	Yes	Yes	Yes
	4830 *	Yes	Yes	Yes
	4770 *	No	Yes	Yes
	4670 *	No	Yes	Yes
	4650 *	No	Yes	Yes
4550 *	No	Yes	Yes	
4350 *	No	Yes	Yes	
<i>ATI FirePro™</i>	V8800	Yes	Yes	Yes
	V8750 *	Yes	Yes	Yes
	V8700 *	Yes	Yes	Yes
	V7800	Yes	Yes	Yes
	V7750 *	No	Yes	Yes
	V5800	Yes	Yes	Yes
	V5700 *	No	Yes	Yes
	V4800	Yes	Yes	Yes
	V3800	Yes	Yes	Yes
	V3750 *	No	Yes	Yes
<i>AMD FireStream™</i>	9270 *	Yes	Yes	Yes
	9250 *	Yes	Yes	Yes

Product Line	Card	Double-Precision	UAV	Compute Kernel (Shader)
ATI Mobility Radeon™ HD	5870	No	Yes	Yes
	5850	No	Yes	Yes
	5830	No	Yes	Yes
	5770	No	Yes	Yes
	5750	No	Yes	Yes
	5730	No	Yes	Yes
	5650	No	Yes	Yes
	5470	No	Yes	Yes
	5450	No	Yes	Yes
	5430	No	Yes	Yes
	4870 *	Yes	Yes	Yes
	4860 *	Yes	Yes	Yes
	4850X2 *	Yes	Yes	Yes
	4850 *	Yes	Yes	Yes
	4830 *	Yes	Yes	Yes
	4670 *	No	Yes	Yes
	4650 *	No	Yes	Yes
	4500 Series *	No	Yes	Yes
	4300 Series *	No	Yes	Yes
ATI Mobility FirePro™	M7820	Yes	Yes	Yes
	M7740 *	No	Yes	Yes
	M5800	Yes	Yes	Yes
ATI Radeon™ Embedded	E4690 Discrete GPU *	No	Yes	Yes

\* = beta only.

We are constantly qualifying additional devices. For an up-to-date list of supported devices, please visit <http://developer.amd.com/stream>.

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