Getting Started with FlyCapture 2.3 and ARM

Technical Application Note TAN2012001

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1.1. Subject

Technical Application Note (TAN2012001): Getting Started with FlyCapture 2.3 and ARM

1.2. Applicable Product(s)

- **FlyCapture SDK Version 2.3**
- **Point Grey USB 2.0 cameras**

1.3. Application Note Description

With the release of version 2.3 of the FlyCapture SDK, users can program and operate Point Grey USB 2.0 imaging cameras on an ARM device in a Linux environment. This Application Note explains the components and steps that are necessary to get started with FlyCapture 2.3 and ARM as well as the limitations of using FlyCapture2 on an ARM device.

1.4. Intended Audience

This Technical Application Note is intended for users of Point Grey USB 2.0 imaging cameras who want to program and operate cameras on an ARM device in a Linux environment.

Testing is ongoing. Wherever possible limitations have been noted; however, as more testing is completed this information may change. All possible configurations of ARM and Point Grey USB 2.0 cameras may not experience the same results.

1.5. Overview

The following topics are covered:

1.6. Supported System Configuration

Before installing FlyCapture, you must have the following prerequisites:

- Pandaboard, Beagleboard, or other OMAP4 device with an ARMv7 Cortex processor (including Cortex-A7, -A8, and -A9).
  Pandaboard is the recommended device. (www.pandaboard.org)
  Pandaboard and Beagleboard are the only devices supported by testing
- Linux distribution on the Pandaboard. The recommended version is Ubuntu 11.10. (http://cdimage.ubuntu.com/releases/11.10/release/)
- A Point Grey USB 2.0 camera, either Chameleon or FireflyMVU
  Other Point Grey imaging cameras (FireWire, USB 3.0, GigE, or CameraLink) are NOT supported.
- An external power supply such as a powered USB hub or GPIO power cable.
  The Beagleboard does not provide enough power to operate the camera. The Pandaboard may provide enough power depending on other peripheral devices attached.

1.7. Configuring the Operating System and Installing the Required Libraries

For step by step Ubuntu installation instructions on the Pandaboard see the Quick Start Guide at Omapedia.org. (For more information about using Ubuntu and Pandaboard, see the Omapedia.org Ubuntu Main Page.)

For FlyCapture2 to run on a Linux Ubuntu system, the following dependencies must be installed:

- libgtkmm-2.4-dev
- libglademm-2.4-dev
- libusb-1.0

These libraries are usually packaged with Ubuntu distributions or updates. If they are not pre-installed, use the `apt-get` console command, as in the following example:

Ubuntu 10.10:

```
user$: sudo apt-get install libgtkmm-2.4-dev libglademm-2.4-dev libusb-1.0-0
```

The raw1394 *module that is installed with the* libraw1394-8 *package may not load after a reboot, causing a FlyCapture bus event error and failure to start an application. To fix, add* raw1394 *to the* /etc/modules *file. If problems persist, add* video1394 *as well.*

1.8. Installing the FlyCapture SDK

To install the FlyCapture2 SDK:

1. Download FlyCapture2 SDK from the Point Grey Downloads webpage. You will need a downloads account to access the Download links.
2. Copy your flycapture-<version>_arm.tar.gz package on a network or USB drive then copy it to a location on the Pandaboard.
3. Untar the installation package:

   ```
   tar xvfz flycapture-<version>_arm.tar.gz
   ```

4. Copy all libraries to system folders:

   ```
   cd flycapture-<version>_arm/lib
   sudo cp libflycapture* /usr/lib
   cd flycapture-<version>_arm/
   ```

5. Configure permissions to run Point Grey cameras:

   ```
   sudo sh flycap2-conf
   ```

6. Follow the instructions of the script. This installs all the FlyCapture2 libraries, example code, sample applications, and documentation. Additionally, the script prompts you to configure udev so that devices can be used by a particular user. If you choose to configure devices, the script changes permissions on the nodes by overwriting the default Ubuntu permissions and giving the user full read and write access to the device nodes.
7. Restart your board for the user permissions to take effect.

1.9. Compiling the Examples

The FlyCapture SDK includes a number of example applications to help get you started in programming common API tasks. Example files are installed under `flycapture-<version>_arm/bin` (where you extracted the package).

We suggest copying the extracted folder and sub-folders to a location with write access.

To compile the examples, install the GNU C++ (g++) compiler that is included with the build-essential package:

```
user$ sudo apt-get install build-essential
```

Some of the examples are GUI-based. The gtk and glade libraries are required to build these examples. These libraries should already be installed under Section 1.7. Note that the **FlyCaptureGUI** example must be built before the **FlyCap2** or **FlyCapture2GUITest** examples can be built.

To compile a specific example, run the makefile located in the example directory. Binaries are copied to the bin directory, and libraries are copied to the lib directory. For example:

```
user$ cd <extraction folder>/FlyCapture-<version>-arm/src/FlyCapture2Test
user$ make
```

You can also use a cross compiler to build examples for the target architecture. A cross compiler that works well is CodeSourcery.

Alternatively, you can set up an ARM emulator using QEmu, install Ubuntu on it, and build your software on the virtual machine.

1.10. Limitations Using ARM

Linux users do **not** have access to Microsoft Windows-only technologies such as:

- DirectShow
- Cognex AIK
- Twain
- Managed .NET API
- ActiveX

FlyCapture2 on an ARM device does **not** support:

- Image.Convert() calls—there is no IPP on ARM
- OpenGL
- Point Grey FireWire cameras
- Point Grey GigE cameras
- Point Grey USB 3.0 cameras
- Point Grey CameraLink cameras
- UpdatorGUI tool

Additional ARM device limitations:

- No color processing—as Chameleon and FireflyMVU do not support on-board color processing only monochrome is available
- Speed of the processor will affect the maximum available frame rate. The maximum frame rates achieved with a Windows configuration may not be available.

1.11. Viewing Images and Videos

We suggest the following tools for image and video viewing. Point Grey does not officially endorse these tools.

For image viewing:

- gimp
- ImageJ

For video viewing:

- VLC media player

For working with Glade files:

- Glade

1.12. Removing FlyCapture

Uninstall by manually removing the FlyCapture files, as in the following example:

```
user$: sudo rm /usr/lib/libflycapture*
```

Delete any extracted files or newly compiled files on your system.

1.13. Additional Downloads and Support

Point Grey Research Inc. endeavors to provide the highest level of technical support possible to our customers. Most support resources can be accessed through the Support section of our website.

Creating a Customer Login Account

The first step in accessing our technical support resources is to obtain a Customer Login Account. This requires a valid name and email address. To apply for a Customer Login Account go to the Downloads page.

Knowledge Base

Our Knowledge Base contains answers to some of the most common support questions. It is constantly updated, expanded, and refined to ensure that our customers have access to the latest information.

Product Downloads

Customers with a Customer Login Account can access the latest software and firmware for their cameras from our Downloads page. We encourage our customers to keep their software and firmware up-to-date by downloading and installing the latest versions.

Contacting Technical Support

Before contacting Technical Support, have you:

1. *Read the product documentation and user manual?*
2. *Searched the Knowledge Base?*
3. *Downloaded and installed the latest version of software and/or firmware?*

If you have done all the above and still can't find an answer to your question, contact our Technical Support team.