STM32F303 F3 Discovery USB CDC Application Development

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Overview

Half the battle in becoming familiar with the STM32F303 chip on the F3 Discovery board is getting input down to the board and output back to the desktop. Typically this means using a USB connection operating as a CDC device, serial drivers on the embedded and desktop side, high level format conversion functions such as scanf and printf and an easy to use, non-dedicated hardware, programming utility like DfuSE. SOC Robotics has prepared a simple USB CDC example template project for the F3 Discovery board that accomplishes that task based on ST supplied libraries and the CooCox IDE for Windows. The example project gets you to hello world fast so you can begin exploring the power of the STM32F303 on the F3 Discovery. We created this template both for ourselves (we have a few projects using this chip in the works) and users interested in developing applications for the STM32F303/373.

Installing ARM Tool chain

First install the pre-built ARM GNU Tool chain for ARM Cortex-M & Cortex-R processors (Cortex-M0/M0+/M3/M4, Cortex-R4/R5/R7). The tool chain is available here: https://launchpad.net/gcc-arm-embedded

Test the tool chain by entering a command window and execute the following command:

    arm-none-eabi-gcc –version

which should return:

```
arm-none-eabi-gcc (GNU Tools for ARM Embedded Processors) 4.7.4 20130913 (release)
[ARM/embedded-4_7-branch revision 202601]
Copyright (C) 2012 Free Software Foundation, Inc.
This is free software; see the source for copying conditions.  There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
```

If you get a command not recognized error then the correct path to the tool chain is not set. Edit the path environment variable with the correct path. If a different ARM tool chain is identified then it must be removed or the path to it removed.

Installing STLink and DFuSe

Download and install STLink and DFuSe. STlink is a programming utility while DFuSe is a DFU programming utility. DFuSe is useful for programming F3 based boards with DFU support. The F3 Discovery board is programmed using ST-Link. Both ST-Link and DFuSe will require .inf drivers for proper use. Download ST-Link and DFuSe here:

http://www.st.com/web/catalog/tools/FM146/CL1984/SC724/SS1677/PF251168

https://code.google.com/p/armazila/downloads/detail?name=um0412.zip&can=2&q=

Installing the ST Virtual COM driver

In order to communicate with the STM32F303/307 as a CDC serial device an ST Virtual COM driver must be installed on the Windows machine. Download the driver here:

http://www.st.com/web/en/catalog/tools/PF257938

Installing CooCox 1.7.7

CooCox is an integrated IDE for embedded application development. The latest version is 1.7.7. Download the IDE here: http://www.coocox.org/index.html

Follow the installation procedure on the website. Be sure to point the IDE to the correct ARM tool chain before compiling the USB CDC example.

Installing F3 Discovery Template with USB CDC Support from SOC Robotics

SOC Robotics has prepared a template project for the F3 Discovery board that includes USB CDC support with full printf and scanf support so you can start developing immediately without worrying how to get output back to the desktop.

Download the template project here:

www.soc-robotics.com/downloads/F3%20Discovery%20CDC%20Example.zip

Loading the Application

Follow the example tutorials to become familiar with the CooCox IDE environment. The project comes with the example application pre-compiled.

IF you make any changes to the application re-compile the application to generate a new .hex file. Downloaded this file to the F3 target using ST-Link. Re-power the board by removing the ST-Link USB connection and re-attach – this starts the USB CDC application example.

The F3 has a User USB connector beside the USB ST-Link connector – connect a USB connector to the desktop while still connecting the ST-Link USB connector – the ST-Link connection provides power. Windows will ask for an ST Virtual COM CDC driver that can be found in the directory downloaded above. Now use a Terminal Emulator such as Hyperterminal to communicate with the F3 Discovery board. There are a few simple text functions such as a timing loop to see how fast the sinf function is.

That's it.