

AQ32 CooCox IDE Application Development

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Overview

Half the battle in becoming familiar with a new board such as the AQ32 with the STM32F407 chip 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. SOC Robotics has prepared a simple USB CDC example template project for the AQ32 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 STM32F407 on the AQ32 board. We created this template both for ourselves and users interested in developing applications for the STM32F407 running on the AQ32.

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
```

this 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 Dfuse

Download and install DfuSe V3.0.3 - a link to the ST website is provided below. DfuSe is a DFU programming utility consisting of two utilities - DfuSe Demonstration and DFU File Manager. DFU File Manager converts a .hex file to .dfu - DfuSe Demo communicates with the target and downloads the .dfu file. DfuSe will require an .inf driver for proper use. Download DfuSe here:

<http://www.st.com/web/en/catalog/tools/FM147/CL1794/SC961/SS1533/PF257916>

Installing the ST Virtual COM driver

In order to communicate with the AQ32 as a CDC serial device a 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 1.7.5

CooCox is an open source integrated IDE for embedded application development. The latest version is 1.7.5. 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 AQ32 USB CDC example.

Installing AQ32 Template with USB CDC Support from SOC Robotics

SOC Robotics has prepared a template project for the AQ32 board that includes a USB CDC example 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/AQ32%20CooCox%20CDC%20Project.zip

Loading the Application

Follow the example tutorials to become familiar with the CooCox IDE environment.

Compiling the application generates a .hex file. This file must be converted into a .dfu file using the DFU File Manager. To load the .dfu file into the AQ32 the AQ32 must first be placed in DFU mode by installing a jumper on the BOOT0 pin located near to the right of the PWM output pins and re-powering the board. If this is the first time powering the board Windows will attempt to install a DFU driver. This driver is located in the DfuSe installation folder.

Once Windows identifies the AQ32 as an STM DFU device use DfuSe Demonstration Utility to download the .dfu image. Remove the BOOT0 jumper and re-power the board.

Windows will now ask for an STM Virtual COM CDC driver which can be found in the DfuSe directory or has been downloaded as described above. Now use a Terminal Emulator such as Hyperterminal to communicate with the AQ32. The application waits for user input before entering the top level command loop flashing the blue and green LEDs rapidly.

That's it.