USB CDC-ECM Class for Ethernet over USB

This application note shows how to create a USB device compliant to the standard USB Communications Device Class (CDC) and the Ethernet Control Model (ECM) Subclass on an XMOS multicore microcontroller.

The code associated with this application note provides an example of using the XMOS USB Device Library (XUD) and associated USB class descriptors to provide a framework for the creation of a USB device emulating Ethernet.

This example USB CDC-ECM implementation provides an emulated Ethernet interface running over high speed USB. It supports the standard requests associated with ECM model of the USB CDC specification.

The demo application handles the Ethernet frames received from the USB endpoitns and hosts a HTTP web server acting as another virtual network device. A standard web browser from host PC can open the web page served from the USB device. The web page provides a statistics of different packets like ICMP, TCP, UDP etc received through the Ethernet frames from the host PC. This demonstrates a simple way in which Ethernet over USB applications can easily be deployed using an xCORE-USB device.

The demo application code can be extended to bridge an actual Ethernet interface by adding MAC and MII software layers. This enables you to create USB to Ethernet Adaptors using xCORE-USB device.

Note: This application note provides a standard USB CDC-ECM class device and as a result does not require external drivers to run on Linux and Mac. Windows doesn't support USB ECM model natively and thus requires third party drivers.

Required tools and libraries

- xTIMEcomposer Tools - Version 13.0
- XMOS USB library - Version 1.3.2rc0

Required hardware

This application note is designed to run on an XMOS xCORE-USB series device.

The example code provided with the application has been implemented and tested on the xCORE-USB sliceKIT (XK-SK-U16-ST) but there is no dependancy on this board and it can be modified to run on any development board which uses an xCORE-USB series device.

Prerequisites

- This document assumes familiarity with the XMOS xCORE architecture, the Universal Serial Bus 2.0 Specification and related specifications, the XMOS tool chain and the xC language. Documentation related to these aspects which are not specific to this application note are linked to in the references appendix.
- For descriptions of XMOS related terms found in this document please see the XMOS Glossary[1].
- For the full API listing of the XMOS USB Device (XUD) Library please see the document XMOS USB Device (XUD) Library[2].
- For information on designing USB devices using the XUD library please see the XMOS USB Device Design Guide for reference[3].

XMOS®

[1] http://www.xmos.com/published/glossary
[2] http://www.xmos.com/published/xuddg
[3] http://www.xmos.com/published/xmos-usb-device-design-guide

Copyright 2014 XMOS Ltd.

Copyright © 2014, All Rights Reserved.

Xmos Ltd. is the owner or licensee of this design, code, or Information (collectively, the "Information") and is providing it to you "AS IS" with no warranty of any kind, express or implied and shall have no liability in relation to its use. Xmos Ltd. makes no representation that the Information, or any particular implementation thereof, is or will be free from any claims of infringement and again, shall have no liability in relation to any such claims.