Future Technology Devices International Ltd.

Application Note AN_174

Determining USB Peripheral Device Class

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This document will demonstrate how a USB peripheral device class can be obtained. This information can be helpful in determining if the peripheral is supported by the current Vinculum host controller firmware.

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1   Introduction

Many users enquire if a certain device is supported by the Vinculum host controllers. Although the VNC2 generation supports all USB transfer types (Control, Bulk, Interrupt and Isochronous) the real answer to the question depends on the device class reported back by the device and whether a VOS driver currently exists for that device class or has still to be created. This document will demonstrate to users how a device class can be determined.

2 What are Device Classes?

Not all USB peripherals are the same. Each device type is defined by a number referred to as the device class. The class definitions are defined and controlled by the USB Implementers Forum. For example a keyboard is a Human Interface Device (HID) class device and therefore has device class 0x03. A full list of device classes can be found at: http://www.usb.org/developers/defined_class

The device class is reported back to the USB host controller during device enumeration as part of the device descriptors.

3 Determining the Device Class

3.1 Using PC Utilities

The simplest method to read the device class is to plug the peripheral into a windows PC and use the free USBVIEW utility from the FTDI website: http://www.ftdichip.com/Support/Utilities/usbview.zip

Set the utility to display "Config Descriptors" under the options tab and then select the required device from the device tree.
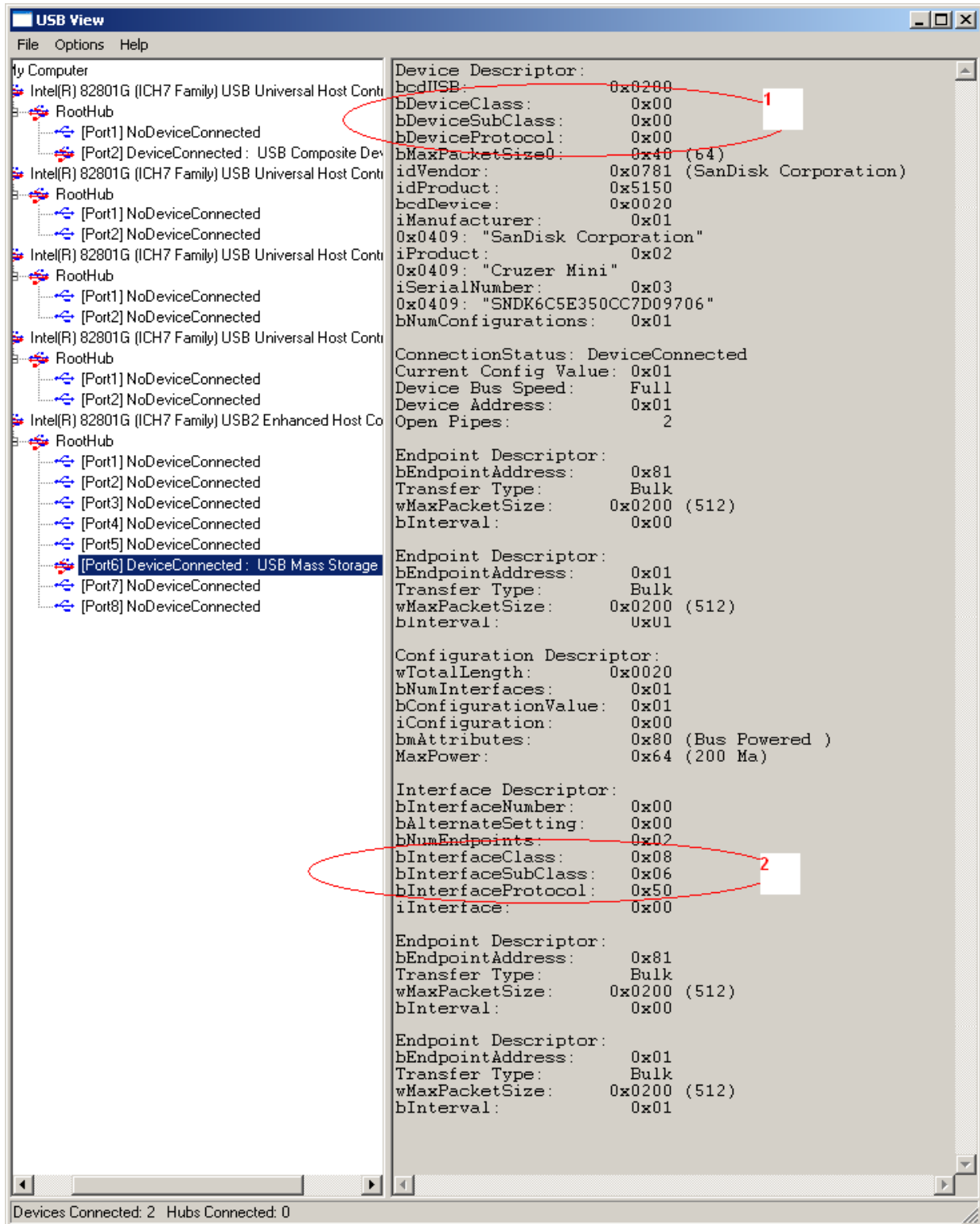

Figure 1: USBVIEW Screenshot

The key information to look for first is:

> bDeviceClass
> bDeviceSubClass
> bDeviceProtocol

This is highlighted at the top of the screenshot in figure 1.

Many device classes can be determined from these fields.

In the example shown the values are defied as 0x00. This indicates that the values are defined in the interface class section and as such the user must then check:

> bInterfaceClass
> bInterfaceSubClass
> binterfaceProtocol

This is highlighted at the bottom of the screenshot in figure 1.

0x08 in the bInterfaceClass in the example defines the device as Mass Storage class.

In this case the class is supported by both VNC1L and VNC2 firmware drivers.

If the class is returned as 0xFF then this is vendor specific and as such the device normally uses a vendor supplied driver as opposed to a generic USB driver. Such devices, with the exception of FTDI devices, are unlikely to appear as part of the generic Vinculum library.

To allow the Vinculum device to support such a class would require the user to obtain the device API and create their own driver.

3.2 Using the VNC2 firmware

The Vinculum device, VNC2, is supplied with an IDE and sample projects. One of these projects is called "USBDescriptors.vproj".

If a VNC2 device is available then this project can be built and loaded onto the device to allow the descriptors of any device plugged into the USB ports of the VNC2 to be read out over the UART interface.

Using a utility such as HyperTerminal the printout follows a similar format to USBVIEW.

A getting started guide for VNC2 tools is available at:
http://www.ftdichip.com/Support/Documents/AppNotes/AN_142_Vinculum-II_Tool_Chain_Getting_Started_Guide.pdf

4 Classes of devices currently supported by the Vinculum firmware

Classes of devices supported by the Vinculum firmware at the time of writing (corresponds to toolchain release version 1.4.0) are:

Class	VNC1L	VNC2
Bulk Only Mass Storage (BOMS)	YES	YES
Human Interface Device (HID)	YES	YES
Printer	YES	YES
Hub	YES	YES
Communication Device Class (CDC)	YES	YES
FTDI peripherals	YES	YES
Video	No	Under Consideration
Audio	No	Under Consideration
Wireless controller	No	Under Consideration

5   Contact Information

Head Office – Glasgow, UK

Future Technology Devices International Limited
Unit 1, 2 Seaward Place, Centurion Business Park
Glasgow G41 1HH
United Kingdom

Tel: +44 (0) 141 429 2777
Fax: +44 (0) 141 429 2758

E-mail (Sales)	sales1@ftdichip.com
E-mail (Support)	support1@ftdichip.com
E-mail (General Enquiries)	admin1@ftdichip.com
Web Site URL	http://www.ftdichip.com
Web Shop URL	http://www.ftdichip.com

Branch Office – Taipei, Taiwan

Future Technology Devices International Limited (Taiwan)
2F, No 516, Sec. 1 NeiHu Road
Taipei 114
Taiwan, R.O.C.
Tel: +886 (0) 2 8797 1330
Fax: +886 (0) 2 8751 9737

E-mail (Sales)	tw.sales1@ftdichip.com
E-mail (Support)	tw.support1@ftdichip.com
E-mail (General Enquiries)	tw.admin1@ftdichip.com
Web Site URL	http://www.ftdichip.com

Branch Office – Hillsboro, Oregon, USA

Future Technology Devices International Limited (USA)
7235 NW Evergreen Parkway, Suite 600
Hillsboro, OR 97123-5803
USA
Tel: +1 (503) 547 0988
Fax: +1 (503) 547 0987

E-Mail (Sales)	us.sales@ftdichip.com
E-mail (Support)	us.support@ftdichip.com
E-mail (General Enquiries)	us.admin@ftdichip.com
Web Site URL	http://www.ftdichip.com

Branch Office – Shanghai, China

Future Technology Devices International Limited (China)
Room 408, 317 Xianxia Road,
ChangNing District,
ShangHai, China

Tel: +86 (21) 62351596
Fax: +86(21) 62351595

E-mail (Sales)	cn.sales@ftdichip.com
E-mail (Support)	cn.support@ftdichip.com
E-mail (General Enquiries)	cn.admin1@ftdichip.com
Web Site URL	http://www.ftdichip.com

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Distributor and Sales Representatives

Please visit the Sales Network page of the FTDI Web site for the contact details of our distributor(s) and sales representative(s) in your country.

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Appendix A – References

A.1 Websites

FTDI home page
http://www.ftdichip.com/index.html

Vinculum II Home page
http://www.ftdichip.com/Products/ICs/VNC2.htm

USB Implementers Forum Device Class List
http://www.usb.org/developers/defined_class

A.2 Technical Documentation

What is USB? – Technical Note
http://www.ftdichip.com/Support/Documents/TechnicalNotes/TN_110%20What%20is%20USB.pdf

VNC2 tools getting started guide
http://www.ftdichip.com/Support/Documents/AppNotes/AN_142_Vinculum-II_Tool_Chain_Getting_Started_Guide.pdf

A.3 Utilities

USBVIEW
http://www.ftdichip.com/Support/Utilities/usbview.zip

Appendix B– Revision History

Version 1.0   First Release   2011-05-23