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Defined Class Codes

USB defines class code information that is used to identify a device's functionality and to nominally load a device driver based on that functionality. The information is contained in three bytes with the names Base Class, SubClass, and Protocol. (Note that 'Base Class' is used in this description to identify the first byte of the Class Code triple. That terminology is not used in the USB Specification). There are two places on a device where class code information can be placed. One place is in the Device Descriptor, and the other is in Interface Descriptors. Some defined class codes are allowed to be used only in a Device Descriptor, others can be used in both Device and Interface Descriptors, and some can only be used in Interface Descriptors. The table below shows the currently defined set of Base Class values, what the generic usage is, and where that Base Class can be used (either Device or Interface Descriptors or both).

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Base Class	Descriptor Usage	Description
00h	Device	Use class information in the Interface Descriptors
01h	Interface	Audio
02h	Both	Communications and CDC Control
03h	Interface	HID (Human Interface Device)
05h	Interface	Physical
06h	Interface	Image
07h	Interface	Printer
08h	Interface	Mass Storage
09h	Device	Hub
0Ah	Interface	CDC-Data

0Bh	Interface	Smart Card
0Dh	Interface	Content Security
0Eh	Interface	Video
0Fh	Interface	Personal Healthcare
10h	Interface	Audio/Video Devices
11h	Device	Billboard Device Class
12h	Interface	USB Type-C Bridge Class
13h	Interface	USB Bulk Display Protocol Device Class
14h	Interface	MCTP over USB Protocol Endpoint Device Class
3Ch	Interface	I3C Device Class
DCh	Both	Diagnostic Device
E0h	Interface	Wireless Controller
EFh	Both	Miscellaneous
FEh	Interface	Application Specific
FFh	Both	Vendor Specific

Base Class 00h (Device)

This base class is defined to be used in Device Descriptors to indicate that class information should be determined from the Interface Descriptors in the device. There is one class code definition in this base class. All other values are reserved.

This value is also used in Interface Descriptors to indicate a null class code triple.

Base Class	SubClass	Protocol	Meaning
00h	00h	00h	Use class code info from Interface Descriptors

Base Class 01h (Audio)

This base class is defined for Audio capable devices that conform to the Audio Device Class Specification found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved. These class codes may only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
01h	xxh	xxh	Audio device

Base Class 02h (Communications and CDC Control)

This base class is defined for devices that conform to the Communications Device Class Specification found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved. Note that the Communication Device Class spec requires some class code values (triples) to be used in Device Descriptors and some to be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
02h	xxh	xxh	Communication device class

Base Class 03h (HID – Human Interface Device)

This base class is defined for devices that conform to the HID Device Class Specification found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved. These class codes can only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
03h	xxh	xxh	HID device class

Base Class 05h (Physical)

This base class is defined for devices that conform to the Physical Device Class Specification found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved. These class codes can only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
05h	xxh	xxh	Physical device class

Base Class 06h (Still Imaging)

This base class is defined for devices that conform to the Imaging Device Class Specification found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved.

Base Class	SubClass	Protocol	Meaning
06h	01h	01h	Still Imaging device

Base Class 07h (Printer)

This base class is defined for devices that conform to the Printer Device Class Specification found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved. These class codes can only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
07h	xxh	xxh	Printer device

Base Class 08h (Mass Storage)

This base class is defined for devices that conform to the Mass Storage Device Class Specification found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved. These class codes can only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
08h	xxh	xxh	Mass Storage device

Base Class 09h (Hub)

This base class is defined for devices that are USB hubs and conform to the definition in the USB specification. That specification defines the complete triples as shown below. All other values are reserved. These class codes can only be used in Device Descriptors.

Base Class	SubClass	Protocol	Meaning
09h	00h	00h	Full speed Hub
		01h	Hi-speed hub with single TT
		02h	Hi-speed hub with multiple TTs

Base Class 0Ah (CDC-Data)

This base class is defined for devices that conform to the Communications Device Class Specification found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values.Values outside of that defined spec are reserved. These class codes can only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
0Ah	xxh	xxh	CDC data device

Base Class 0Bh (Smart Card)

This base class is defined for devices that conform to the Smart Card Device Class Specification found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values.Values outside of that defined spec are reserved. These class codes can only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
0Bh	xxh	xxh	Smart Card device

Base Class 0Dh (Content Security)

This base class is defined for devices that conform to the Content Security Device Class Specification found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved. These class codes can only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
0Dh	00h	00h	Content Security device

Base Class 0Eh (Video)

This base class is defined for devices that conform to the Video Device Class Specification found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved. These class codes can only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
0Eh	xxh	xxh	Video device

Base Class 0Fh (Personal Healthcare)

This base class is defined for devices that conform to the Personal Healthcare Device Class Specification found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved. These class codes should only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
0Fh	xxh	xxh	Personal Healthcare device

Base Class 10h (Audio/Video Devices)

The USB Audio/Video (AV) Device Class Definition describes the methods used to communicate with devices or functions embedded in composite devices that are used to manipulate audio, video, voice, and all image- and sound-related functionality. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved. These class codes can only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
10h	01h	00h	Audio/Video Device – AVControl Interface
	02h	00h	Audio/Video Device – AVData Video Streaming Interface
	03h		
		00h	Audio/Video Device – AVData Audio Streaming Interface

Base Class 11h (Billboard Device)

This base class is defined for devices that conform to the Billboard Device Class Specification found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved. These class codes can only be used in Device Descriptors.

Base Class	SubClass	Protocol	Meaning
11h	00h	00h	Billboard Device

Base Class 12h (USB Type-C Bridge Device)

This base class is defined for devices that conform to the USB Type-C Bridge Device Class Specification found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved. These class codes can only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
12h	00h	00h	USB Type-C Bridge Device

Base Class 13h (USB Bulk Display Protocol Device Class)

This base class is defined for devices that conform to the "VESA USB BDP Device Specification" found at the VESA website. This specification defines the usable set of SubClass and Protocol values. Values outside of this defined spec are reserved. These class codes can only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
13h	00h	00h	USB BDP Device

Base Class 14h (MCTP over USB Protocol Endpoint Device Class)

This base class is defined for devices that conform to the "MCTP over USB" found at the DMTF website as DSP0283. This specification defines the usable set of SubClass and Protocol values. Values outside of this defined spec are reserved. These class codes can only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
14h	00h	01h: MCTP 1.x 02h: MCTP 2.x	MCTP Management-controller and Managed-Device endpoints
	01h	01h: MCTP 1.x 02h: MCTP 2.x	MCTP Host Interface endpoint

Base Class 3Ch (I3C Device Class)

This base class is defined for devices that conform to the USB I3C Device Class Specification found on this USB-IF website. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved. These class codes can only be used in Interface Descriptions.

Base Class	SubClass	Protocol	Meaning
3Ch	00h	00h	I3C Device

Base Class DCh (Diagnostic Device)

This base class is defined for devices that diagnostic devices. This class code can be used in Device or Interface Descriptors.

Trace is a form of debugging where processor or system activity is made externally visible in real-time or stored and later retrieved for viewing by an applications developer, applications program, or, external equipment specializing observing system activity.

Design for Debug or Test (Dfx). This refers to a logic block that provides debug or test support (E.g. via Test Access Port (TAP)).

DvC: Debug Capability on the USB device (Device Capability)

Base Class	SubClass	Protocol	Meaning

DCh	01h	01h	USB2 Compliance Device. Definition for this device can be found at http://www.intel.com/technology/usb/spec.htm (http://www.intel.com/technology/usb/spec.htm)
	02h	00h	Debug Target vendor defined. Please see http://www.intel.com/content/www/us/en/io/universal-serial-bus/extensible-host-controler-interface-usb-xhci.html (http://www.intel.com/content/www/us/en/io/universal-serial-bus/extensible-host-controler-interface-usb-xhci.html) for more info.
		01h	GNU Remote Debug Command Set. Please see http://www.intel.com/content/www/us/en/io/universal-serial-bus/extensible-host-controler-interface-usb-xhci.html (http://www.intel.com/content/www/us/en/io/universal-serial-bus/extensible-host-controler-interface-usb-xhci.html) for more info.
	03h	00h	Undefined
		01h	Vendor defined Trace protocol on DbC.
	04h	00h	Undefined
		01h	Vendor defined Dfx protocol on DbC.
	05h	00h	Vendor defined Trace protocol over General Purpose (GP) endpoint on DvC.
		01h	GNU Protocol protocol over General Purpose (GP) endpoint on DvC. http://www.gnu.org/software/gdb/ (http://www.gnu.org/software/gdb/)
	06h	00h	Undefined
		01h	Vendor defined Dfx protocol on DvC.
	07h	00h	Undefined
		01h	Vendor defined Trace protocol on DvC.

| | 08h | 00h | Undefined |

Base Class E0h (Wireless Controller)

This base class is defined for devices that are Wireless controllers. Values not shown in the table below are reserved. These class codes are to be used in Interface Descriptors, with the exception of the Bluetooth class code which can also be used in a Device Descriptor.

Base Class	SubClass	Protocol	Meaning
E0h	01h	01h	Bluetooth Programming Interface. Get speci from www.bluetooth.com (http://www.blue
		02h	UWB Radio Control Interface. Definition for Specification in Chapter 8.
		03h	Remote NDIS. Information can be found at: http://www.microsoft.com/windowsmok (http://www.microsoft.com/windowsmobile
		04h	Bluetooth AMP Controller. Get specific infor (http://www.bluetooth.com/).
	2h	01h	Host Wire Adapter Control/Data interface. D Wireless USB Specification in Chapter 8.
		02h	Device Wire Adapter Control/Data interface. Wireless USB Specification in Chapter 8.
		03h	Device Wire Adapter Isochronous interface. Wireless USB Specification in Chapter 8.

Base Class EFh (Miscellaneous)

This base class is defined for miscellaneous device definitions. Values not shown in the table below are reserved. The use of these class codes (Device or Interface descriptor) are specifically annotated in each entry below.

Base Class	SubClass	Protocol	Meaning

EFh	01h	01h	Active Sync device. This class code can be used in either Device or Interface Descriptors. Contact Microsoft for more information on this class.
		02h	Palm Sync. This class code can be used in either Device or Interface Descriptors.
	02h	01h	Interface Association Descriptor. The usage of this class code triple is defined in the Interface Association Descriptor ECN that is provided on www.usb.org (http://www.usb.org/). This class code may only be used in Device Descriptors.
		02h	Wire Adapter Multifunction Peripheral programming interface. Definition can be found in the Wireless USB Specification in Chapter 8. This class code may only be used in Device Descriptors
	03h	01h	Cable Based Association Framework. This is defined in the Association Model addendum to the Wireless USB specification. This class code may only be used in Interface Descriptors.

04h	01h	RNDIS over Ethernet.
		Connecting a host to the Internet via Ethernet mobile device. The device appears to the host as an Ethernet gateway device.
		This class code may only be used in Interface Descriptors.
	02h	RNDIS over WiFi.
		Connecting a host to the Internet via WiFi enabled mobile device. The device represents itself to the host as an 802.11 compliant network device.
		This class code may only be used in Interface Descriptors.
	03h	RNDIS over WiMAX
		Connecting a host to the Internet via WiMAX enabled mobile device. The device is represented to the host as an 802.16 network device.
		This class code may only be used in Interface Descriptors.
	04h	RNDIS over WWAN
		Connecting a host to the Internet via a device using mobile broadband, i.e. WWAN (GSM/CDMA).
		This class code may only be used in Interface Descriptors.
	05h	RNDIS for Raw IPv4
		Connecting a host to the Internet using raw IPv4 via non-Ethernet mobile device. Devices that provide raw IPv4, not in an Ethernet packet, may use this form to in lieu of other stock types.
		This class code may only be used in Interface Descriptors.

	06h	RNDIS for Raw IPv6
		Connecting a host to the Internet using raw IPv6 via non-Ethernet mobile device. Devices that provide raw IPv6, not in an Ethernet packet, may use this form to in lieu of other stock types.
		This class code may only be used in Interface Descriptors.
	07h	RNDIS for GPRS
		Connecting a host to the Internet over GPRS mobile device using the device's cellular radio
05h	00h	USB3 Vision Control Interface	Machine Vision Device conforming to the USB3 Vision specification. This standard covers cameras and other related devices that are typically used in machine vision, industrial, and embedded applications.
	01h	USB3 Vision Event Interface	Reference: http://visiononline.org/ (http://visiononline.org/)
	02h	USB3 Vision Streaming Interface	This class code may only be used in Interface Descriptors.
06h	01h	STEP. Stream Transport Efficient Protocol for content protection.
	02h	STEP RAW. Stream Transport Efficient Protocol for Raw content protection.

07h	01h	Command Interface in IAD	The DVB Common Interface (DVB-CI) specification describes a system whereby a removable CI Conditional Access Module (CICAM), given the appropriate usage rights, unscrambles protected pay-TV content and routes it over the same interface back to a TV receiver for display. An interface association for a DVB-CI function will contain a DVB-CI Command Interface for command, control, and status information, it may contain a DVB-CI Media Interface for audiovisual data streams, and it may also contain a CDC EEM interface to provide bridged networking to the CICAM.
	01h	Command Interface in Interface Descriptor	
	02h	Media Interface in Interface Descriptor	
			Reference: https://www.dvb.org/standards/dvb-ci-plus

Base Class FEh (Application Specific)

This base class is defined for devices that conform to several class specifications found on the USB-IF website. That specification defines the usable set of SubClass and Protocol values. Values outside of that defined spec are reserved. These class codes can only be used in Interface Descriptors.

Base Class	SubClass	Protocol	Meaning

FEh	01h	01h	Device Firmware Upgrade. Device class definition provided on www.usb.org (http://www.usb.org/).
	02h	00h	IRDA Bridge device. Device class definition provided on www.usb.org (http://www.usb.org/).
	03h	00h	USB Test and Measurement Device. Definition provided in the USB Test and Measurement Class spec found on www.usb.org (http://www.usb.org/).
		01h	USB Test and Measurement Device conforming to the USBTMC USB488 Subclass Specification found on www.usb.org.

Base Class FFh (Vendor Specific)

This base class is defined for vendors to use as they please. These class codes can be used in both Device and Interface Descriptors.

Base Class	SubClass	Protocol	Meaning
FFh	xxh	xxh	Vendor specific

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