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USB device class drivers included in Windows

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> **Important**
>
> This topic is for programmers. If you are a customer experiencing USB problems, see Fix USB-C problems in Windows

This article lists the Microsoft-provided drivers for the supported USB device classes.

- Microsoft-provided drivers for USB-IF approved device classes.
- For composite devices, use USB Generic Parent Driver (Usbccgp.sys) that creates physical device objects (PDOs) for each function.
- For non-composite devices or a function of a composite device, use WinUSB (Winusb.sys).

If you are installing USB drivers: You don't need to download USB device class drivers. They're installed automatically. These drivers and their installation files are included in Windows. They're available in the \Windows\System32\DriverStore\FileRepository folder. The drivers are updated through Windows Update.

If you are writing a custom driver: Before writing a driver for your USB device, determine whether a Microsoft-provided driver meets the device requirements. If a Microsoft-provided driver isn't available for the USB device class to which your device belongs, then consider using generic drivers, Winusb.sys or Usbccgp.sys. Write a driver only when necessary. More guidelines are included in Choosing a driver model for developing a USB client driver.

USB device classes

USB device classes are categories of devices with similar characteristics and that perform common functions. The USB-IF defines those classes and their specifications. Each device class is identified by a USB-IF approved class, subclass, and protocol codes, all of which are provided by the IHV in device descriptors in the firmware. Microsoft provides in-box drivers for several of those device classes, called *USB device class drivers*. If a device that belongs to a supported device class is connected to a system, Windows automatically loads the class driver, and the device functions with no other driver required.

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Hardware vendors shouldn't write drivers for the supported device classes. Windows class drivers might not support all of the features that are described in a class specification. If some of the device's capabilities aren't implemented by the class driver, vendors should provide supplementary drivers that work with the class driver to support the entire range of functionality provided by the device.

For general information about USB-IF approved device classes see the USB Common Class Specification

The current list of USB class specifications and class codes is documented in the USB-IF Defined Class Code List.

Device setup classes

Windows categorizes devices by *device setup classes*, which indicate the functionality of the device.

Microsoft defines setup classes for most devices. IHVs and OEMs can define new device setup classes, but only if none of the existing classes apply. For more information, see System-Defined Device Setup Classes.

Two important device setup classes for USB devices are as follows:

- **USBDevice** {88BAE032-5A81-49f0-BC3D-A4FF138216D6}: IHVs must use this class for custom devices that don't belong to another class. This class isn't used for USB host controllers and hubs.
- **USB** {36fc9e60-c465-11cf-8056-444553540000}: IHVs must not use this class for their custom devices. This is reserved for USB host controllers and USB hubs.

The device setup classes are different from USB device classes discussed earlier. For example, an audio device has a USB device class code of 01h in its descriptor. When connected to a system, Windows loads the Microsoft-provided class driver, *Usbaudio.sys*. In Device Manager, the device is shown under is **Sound, video and game controllers**, which indicates that the device setup class is Media.

Microsoft-provided USB device class drivers

Expand table

USB-IF class code	Device setup class	Microsoft-provided driver and INF	Windows support	Description
Audio (01h)	**Media** {4d36e96c-e325-11ce-bfc1-08002be10318}	Usbaudio.sys Wdma_usb.inf	Windows 11 Windows 10 for desktop editions (Home, Pro, Enterprise, and Education) Windows 10 Mobile Windows 8.1	Microsoft provides support for the USB audio device class with the Usbaudio.sys driver. For more information, see "USBAudio Class System Driver" in Kernel-Mode WDM Audio Components. For more information about Windows audio support, see the Audio Device Technologies for Windows website.
Communications and CDC Control (02h)	**Ports** {4D36E978-E325-11CE-BFC1-08002BE10318}	Usbser.sys Usbser.inf	Windows 11 Windows 10 for desktop editions Windows 10 Mobile	In Windows 10, a new INF, Usbser.inf, has been added that loads Usbser.sys automatically as the function driver. For more information, see USB serial driver (Usbser.sys)
Communications and CDC Control (02h)	**Modem** {4D36E96D-E325-11CE-BFC1-08002BE10318} Supports Subclass 02h (ACM)	Usbser.sys Custom INF that references mdmcpq.inf	Windows 11 Windows 10 for desktop editions Windows 8.1	In Windows 8.1 and earlier versions, Usbser.sys isn't automatically loaded. To load the driver, you need to write an INF that references the modem INF (mdmcpq.inf) and includes [Install] and [Needs] sections.You can enable CDC and Wireless Mobile CDC (WMCDC) support by setting a registry value, as described in Support for the Wireless Mobile Communication Device Class.When CDC support is enabled, the USB Common Class Generic Parent Driver enumerates interface collections that correspond to CDC and WMCDC Control Models, and assigns physical device objects (PDO) to these collections.
Communications and CDC Control	**Net** {4d36e972-e325-11ce-	UsbNcm.sys UsbNcm.inf	Windows 11	Microsoft provides the UsbNcm.sys driver to operate devices that comply with Usb NCM. The source code for this driver

USB-IF class code	Device setup class	Microsoft-provided driver and INF	Windows support	Description
(02h)	bfc1-08002be10318} Supports Subclass 0Dh (NCM)		Windows Server 2022	is available at NCM-Driver-for-Windows.
Communications and CDC Control (02h)	**Net** {4d36e972-e325-11ce-bfc1-08002be10318} Supports Subclass 0Eh (MBIM)	cxwmbclass.sys wmbclass.sys Netwmbclass.inf	Windows 11 Windows 10 for desktop editions Windows 8.1	Microsoft provides the wmbclass.sys driver, for mobile broadband devices. See, MB Interface Model.
HID (Human Interface Device) (03h)	**HIDClass** {745a17a0-74d3-11d0-b6fe-00a0c90f57da}	Hidclass.sys Hidusb.sys Input.inf	Windows 11 Windows 10 for desktop editions Windows 10 Mobile Windows 8.1	Microsoft provides the HID class driver (Hidclass.sys) and the miniclass driver (Hidusb.sys) to operate devices that comply with the USB HID Standard. For more information, see HID Architecture and Minidrivers and the HID class driver. For more information about Windows support for input hardware, see the Input and HID - Architecture and Driver Support website.
Physical (05h)	-	-	-	Recommended driver: WinUSB (Winusb.sys)
Image (06h)	**Image** {6bdd1fc6-810f-11d0-bec7-08002be2092f}	Usbscan.sys Sti.inf	Windows 11 Windows 10 for desktop editions Windows 8.1	Microsoft provides the Usbscan.sys driver that manages USB digital cameras and scanners for Windows XP and later operating systems. This driver implements the USB component of the Windows Imaging Architecture (WIA). For more information about WIA, see Windows Image Acquisition Drivers and the Windows Imaging Component website. For a description of the role that Usbscan.sys plays in the WIA, see WIA Core Components.

USB-IF class code	Device setup class	Microsoft-provided driver and INF	Windows support	Description
Printer (07h)	**USB** Usbprint.sys enumerates printer devices under the device setup class: **Printer** {4d36e979-e325-11ce-bfc1-08002be10318}.	Usbprint.sys Usbprint.inf	Windows 11 Windows 10 for desktop editions Windows 8.1	Microsoft provides the Usbprint.sys class driver that manages USB printers. For information about implementation of the printer class in Windows, see the Printing - Architecture and Driver Support website.
Mass Storage (08h)	**USB**	Usbstor.sys	Windows 11 Windows 10 for desktop editions Windows 10 Mobile Windows 8.1	Microsoft provides the Usbstor.sys port driver to manage USB mass storage devices with Microsoft's native storage class drivers. For an example device stack that is managed by this driver, see Device Object Example for a USB Mass Storage Device. For information about Windows storage support, see the Storage Technologies website.
Mass Storage (08h)	**SCSIAdapter** {4d36e97b-e325-11ce-bfc1-08002be10318}	SubClass (06) and Protocol (62)Uaspstor.sys Uaspstor.inf	Windows 11 Windows 10 for desktop editions Windows 10 Mobile Windows 8.1	Uaspstor.sys is the class driver for SuperSpeed USB devices that support bulk stream endpoints.
Hub (09h)	**USB** {36fc9e60-c465-11cf-8056-444553540000}	Usbhub.sys Usb.inf	Windows 11 Windows 10 for desktop editions Windows 10 Mobile	Microsoft provides the Usbhub.sys driver for managing USB hubs. For more information about the relationship between the hub class driver and the USB stack, see USB host-side drivers in Windows.

USB-IF class code	Device setup class	Microsoft-provided driver and INF	Windows support	Description
			Windows 8.1	
Hub (09h)	**USB** {36fc9e60-c465-11cf-8056-444553540000}	Usbhub3.sys Usbhub3.inf	Windows 11 Windows 10 for desktop editions Windows 8.1	Microsoft provides the Usbhub3.sys driver for managing SuperSpeed (USB 3.0) USB hubs. The driver is loaded when a SuperSpeed hub is attached to an xHCI controller. See USB host-side drivers in Windows.
CDC-Data (0Ah)	-	-	-	Recommended driver: WinUSB (Winusb.sys)
Smart Card (0Bh)	**SmartCardReader** {50dd5230-ba8a-11d1-bf5d-0000f805f530}	Usbccid.sys (Obsolete)	Windows 10 for desktop editions	Microsoft provides the Usbccid.sys mini-class driver to manage USB smart card readers. For more information about smart card drivers in Windows, see Smart Card Design Guide. The WUDFUsbccidDriver.dll UMDF driver replaces the Usbccid.sys driver.
Smart Card (0Bh)	**SmartCardReader** {50dd5230-ba8a-11d1-bf5d-0000f805f530}	WUDFUsbccidDriver.dll WUDFUsbccidDriver.inf	Windows 8.1	WUDFUsbccidDriver.dll is a user-mode driver for USB CCID Smart Card Reader devices.
Content Security (0Dh)	-	-	-	Recommended driver: USB Generic Parent Driver (Usbccgp.sys). Some content security functionality is implemented in Usbccgp.sys. See Content Security Features in Usbccgp.sys.
Video (0Eh)	**Image** {6bdd1fc6-810f-11d0-bec7-08002be2092f}	Usbvideo.sys Usbvideo.inf	Windows 11 Windows 10 for desktop editions	Microsoft provides USB video class support with the Usbvideo.sys driver. For more information, see "USB Video Class Driver" under AVStream Minidrivers.
Personal Healthcare (0Fh)	-	-	-	Recommended driver: WinUSB (Winusb.sys)

USB-IF class code	Device setup class	Microsoft-provided driver and INF	Windows support	Description
Audio/Video Devices (10h)	-	-	-	-
Diagnostic Device (DCh)	-	-	-	Recommended driver: WinUSB (Winusb.sys)
Wireless Controller (E0h) Supports Subclass 01h and Protocol 01h	Bluetooth{e0cbf06c-cd8b-4647-bb8a-263b43f0f974}	Bthusb.sys Bth.inf	Windows 11 Windows 10 for desktop editions Windows 10 Mobile	Microsoft provides the Bthusb.sys miniport driver to manage USB Bluetooth radios. For more information, see Bluetooth Design Guide.
Miscellaneous (EFh)	**Net** {4d36e972-e325-11ce-bfc1-08002be10318} Supports SubClass 04h and Protocol 01h	Rndismp.sys Rndismp.inf	Windows 11 Windows 10 for desktop editions Windows 8.1	Microsoft recommends that hardware vendors build USB NCM compatible devices instead. USB NCM is a public USB-IF protocol that offers better throughput performance. The RNDIS facility centers the management of all 802-style network cards in a single class driver, Rndismp.sys. For a detailed discussion of remote NDIS, see Overview of Remote NDIS. The mapping of remote NDIS to USB is implemented in the Usb8023.sys driver. For more information about networking support in Windows, see Networking and Wireless Technologies.
Application Specific (FEh)	-	-	-	Recommended driver: WinUSB (Winusb.sys)
Vendor Specific (FFh)	-	-	Windows 11 Windows 10 for desktop editions	Recommended driver: WinUSB (Winusb.sys)

USB-IF class code	Device setup class	Microsoft-provided driver and INF	Windows support	Description
			Windows 10 Mobile	

Related topics

- Microsoft-provided USB drivers