How to Implement Compatible IDs in Printing Devices

Compatible ID Support Guidelines   
for Printing Devices

September 18, 2013

Abstract

This paper provides information about the use of compatible identifiers (IDs) in printers for the Windows® family of operating systems. It provides guidelines that independent hardware vendors (IHVs) should follow to implement support for compatible IDs in their new printing devices.

This information applies to:

|  |  |
| --- | --- |
| * Windows 8.1 * Windows 8 * Windows 7 | * Windows Server 2008 R2 * Windows Server 2012 * Windows Server 2012 R2 |

References and resources discussed here are listed at the end of this paper.

For the latest information, see:   
 [How to Implement Compatible IDs in Printing Devices](http://www.microsoft.com/whdc/device/print/CIDPrintDev.mspx)

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Document History

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| --- | --- | --- | --- | --- |
| Date | Change |  |  |  |
| January 20, 2009 | First publication | | | |
| April 18, 2013 | Update to compatible ID character selection | | | |
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# Overview

In Windows® 7, the parsing of IEEE 1284 identifier (ID) strings that are reported by printing devices has expanded to include compatible IDs. Compatible IDs let independent hardware vendors (IHVs) specify a generic ID for a family or class of devices that a single driver supports. This does not affect or change the existing hardware ID that is generated for printers. Therefore, legacy printing devices and drivers continue to function correctly.

Device manufacturers can categorize new printing devices through a single compatible ID and associate devices generically to a single driver without a specific hardware ID match. This lets device manufacturers ship a driver package that will continue to support devices that have not yet been developed, without requiring an update to the package’s information (INF) file.

For more information about compatible IDs and hardware IDs, see [Device Identification Strings](http://msdn.microsoft.com/en-us/library/windows/hardware/ff541224(v=vs.85).aspx).

# Choosing a Compatible ID

Construct a compatible ID by using the following guidelines, which are explained in detail later in this paper. This section provides a summary of these guidelines:

* The compatible ID should always start with the name of the organization that defines the compatible ID. This helps ensure that no collisions occur between values from different companies. For example, any compatible ID that is defined by a company named Contoso would start with “Contoso”.
* The compatible ID must contain only the following ASCII characters:

Lowercase alphabetical characters (a through z)

Uppercase alphabetical characters (A through Z)

Numeric characters (0 through 9)

Underscores, dots and dashes

Any leading or trailing white space is ignored and should not be considered part of the compatible ID.

White space in between characters in a compatible ID must not be used to avoid potential mismatching. Please note that all white space in compatible ID (except leading/trailing) will be converted to underscores during enumeration.

* The compatible ID must not exceed 180 characters long.
* The compatible ID should be chosen to represent a family or class of devices that can all be used with the same driver. Generally, printing devices should be assigned the same compatible ID if:

They use the same driver.

They are managed by the same application or service that the IHV developed.

They use the same print processors and color profiles.

Any functional differences between printing devices can be resolved by the driver during device installation or ordinary operation.

Follow the last guideline to minimize the number of compatible IDs that are required to support your printing devices and to maximize the functionality that the driver exposes for the devices that it supports. For example, if you introduce a new line of printers that requires a new driver, you should give these devices a new compatible ID to prevent Plug and Play from matching the device with an incorrect driver.

**Note**Making changes to a driver that supports a compatible ID requires you to evaluate the effect of the change on all devices that have the same compatible ID.

Choose compatible IDs that fit the engineering practices and product families of your company. Drivers that support these compatible IDs can be used for many years, and the devices can also have very long service lives. Do not use the same compatible ID for devices that cannot be driven by any older driver that claims to support that compatible ID.

# Updating the Printer’s Firmware

In Windows versions earlier than Windows 7, printers report an IEEE 1284 ID to the operating system during the Plug and Play setup of the device. This ID contains multiple fields, and the operating system uses those fields to generate a hardware ID for the printer. The Plug and Play subsystem uses this ID to match the device with a driver.

Windows has supported the concept of a compatible ID for some time, and it was used primarily for matching devices with class drivers, such as storage devices or human interface devices (HIDs).

For printers that are attached through the Universal Serial Bus (USB) or Web Services on Devices (WSD) interfaces, Windows 7 can now identify and use an IEEE 1284–compatible ID that is specified in the printer’s firmware. If a printing device reports an IEEE 1284–compatible ID, the Plug and Play subsystem uses this ID to match the device with a driver.

**Note** In Windows 7, compatible ID support is available only for printing devices that are connected through USB and WSD.

The following is an example of an IEEE 1284 string that is returned by a device and includes a compatible ID:

MANUFACTURER:Contoso Manufacturing;

COMMAND SET:PCL,PJL,PS,XHTML-Print+xml;

MODEL:LaserBeam 9;

COMMENT:Anything you like;

ACTIVE COMMAND SET:PCL;

COMPATIBLEID:CONTOSOClass1

Compatible IDs are specified as a key/value pair. The compatible ID can use a key of either “CID” or “COMPATIBLEID”. Both keys are equivalent. The value should specify a single compatible ID. If the firmware specifies multiple compatible IDs, the operating system uses only the first ID.

The compatible ID value field can include the following ASCII characters:

* Lowercase alphabetical characters (a through z)
* Uppercase alphabetical characters (A through Z)
* Numeric characters (0 through 9)
* Underscores, dots and dashes

The compatible ID value field cannot include the following ASCII characters:

* Colon character (:)
* Comma character (,)
* Semicolon character (;)

The operating system ignores any leading or trailing white-space characters that are within the compatible ID value field, but still counts these characters as part of the overall length of the value field. For example, the operating system ignores any space (0x20) or tab (0x09) characters that are within the value field.

White spaces between characters in a compatible ID will be converted to underscores during enumeration. For example, “Contoso Class1” will be reported as “Contoso\_Class1”.

In Windows 7, the maximum length of a Plug and Play ID is 200 characters. However, because the Plug and Play subsystem can prefix bus enumerators, terminators, and other values, the full length of the Plug and Play ID is not fully available to the device. For compatible IDs, the Plug and Play subsystem prefixes a bus-specific enumerator value (USBPRINT or WSDPRINT) and a keyword (1284\_CID) that indicate that the ID is a compatible ID that is reported through IEEE 1284. Because of this, any compatible ID that the firmware reports must not exceed 180 characters.

For example, if a USB device reports a compatible ID of “CONTOSOClass1”, the Plug and Play subsystem creates the following compatible ID:

USBPRINT\1284\_CID\_CONTOSOClass1

For additional information about reporting IEEE 1284 IDs from WSD printers, see [Implementing Web Services on Devices for Printing and Scanning](http://msdn.microsoft.com/en-us/library/windows/hardware/gg463146.aspx).

# Updating the Printing Device’s INF File

The following INF changes are required to take advantage of the compatible IDs that are reported by a printer.

When the operating system reports a compatible ID for an IEEE 1284–based printer, it adds the bus enumerator and a CID keyword to the front of the compatible ID value that is specified in the printer firmware. For example, if a device reports a compatible ID of “CONTOSOClass1”, the resulting IDs reported to the operating system depend on the bus enumerator:

* For a USB attached device, the compatible ID is USBPRINT\1284\_CID\_CONTOSOClass1
* For a WSD attached device, the compatible ID is WSDPRINT\1284\_CID\_CONTOSOClass1

When the compatible ID is used by or shown in the operating system, it contains the additional bus enumerator and keyword.

In the INF file for a printing device, the name of the printer is specified in the INF Models section, followed by the name of the installation section to run and the hardware IDs of the device. For more information about the INF Models section, see [INF Models Section](http://msdn.microsoft.com/en-us/library/windows/hardware/ff547456(v=vs.85).aspx).

The following shows an example of an INF Models section for a print device that has a hardware ID of “USBPRINT\CONTOSOModel\_7”:

“Contoso Printer Model 7” = InstallSection, USBPRINT\CONTOSOModel\_7

The format for supporting compatible IDs is similar.

For typical print drivers, we require the following. This ensures that these drivers outrank any print class drivers.

* The printer description should be generic so that it applies to any printer that might load the driver.
* The compatible ID should be placed into the hardware ID field in the INF, including the bus enumerator and the CID keyword that are added to the original value that was specified.
* Multiple compatible IDs should never be specified in the same line in an INF. This will result in a lower ranking which could cause behavior issues.

The following shows an example of an INF Models section for a printing device with a compatible ID of “USBPRINT\1284\_CID\_CONTOSOClass1”:

“Contoso Laser Printer” = InstallSection,USBPRINT\1284\_CID\_CONTOSOClass1

For print class drivers, we require the following. This ensures that these drivers have the lowest possible rank for the hardware.

* The printer description should be generic so that it applies to any printer that might load the driver.
* The hardware ID field should be left blank. This helps ensure that specific drivers that are written for the specific device always take precedence over the more generic compatible ID match.
* The compatible ID should be after the blank hardware ID, including the bus enumerator and CID keyword that are added to the original value that was specified in the printer firmware.
* Multiple compatible IDs should never be specified in the same line in an INF. This will result in a lower ranking which could cause behavior issues.

The following shows an example of an INF Models section for a print class driver with a compatible ID of “USBPRINT\1284\_CID\_CONTOSOClass1”:

“Contoso Laser Printer” = InstallSection,,USBPRINT\1284\_CID\_CONTOSOClass1

This lets the Plug and Play subsystem find and rank the compatible ID match accordingly. A hardware ID match is ranked higher than a compatible ID match if both drivers are available and otherwise identical.

For more information on driver ranking, see [How Windows Ranks Drivers](http://msdn.microsoft.com/en-us/library/windows/hardware/ff546225(v=vs.85).aspx).

For more information about how to write INF files, see [Overview of INF Files](http://msdn.microsoft.com/en-us/library/windows/hardware/ff549520(v=vs.85).aspx).

# Resources

#### Windows Hardware Developer Center:

Implementing Web Services on Devices for Printing and Scanning specification

<http://msdn.microsoft.com/en-us/library/windows/hardware/gg463146.aspx>

Overview of INF Files

<http://msdn.microsoft.com/en-us/library/windows/hardware/ff549520(v=vs.85).aspx>

Device Identification Strings

<http://msdn.microsoft.com/en-us/library/windows/hardware/ff541224(v=vs.85).aspx>

INF Models Section

<http://msdn.microsoft.com/en-us/library/windows/hardware/ff547456(v=vs.85).aspx>

How Windows Ranks Drivers

<http://msdn.microsoft.com/en-us/library/windows/hardware/ff546225(v=vs.85).aspx>

**Information about the Microsoft Windows family:**

<http://www.microsoft.com/windows>.

**IEEE Standard 1284:**

<http://www.undocprint.org/formats/communication_protocols/ieee_1284>