

Knowledge Base

## How to Add OEM Plug and Play Drivers to Windows Installations

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The information in this article applies to:

- Microsoft Windows 2000 Server
- Microsoft Windows 2000 Advanced Server
- Microsoft Windows 2000 Professional

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**IMPORTANT:** This article contains information about modifying the registry. Before you modify the registry, make sure to back it up and make sure that you understand how to restore the registry if a problem occurs. For information about how to back up, restore, and edit the registry, click the following article number to view the article in the Microsoft Knowledge Base:

[256986](#) Description of the Microsoft Windows Registry

### SUMMARY

This article describes the steps to add Original Equipment Manufacturer (OEM)-supplied drivers to Windows installations. This article only includes drivers that are typically installed during graphical user interface (GUI)-mode Setup or after Setup by Plug and Play enumeration. This permits you to pre-load OEM Plug and Play drivers that you can use if the associated hardware is added to the system later.

This article describes how to add OEM Plug and Play drivers in the following situations:

- Unattended Setup
- Sysprep Setup
- Remote Installation Service (RIS) installations
- Riprep images
- Existing Windows installations

For additional information about adding OEM supplied mass-storage devices during text-mode Setup, click the following article number to view the article in the Microsoft Knowledge Base:

[220845](#) Adding Third-Party or Updated Driver During Windows Setup

### MORE INFORMATION

Drivers that are installed during the "Installing Devices" portion of GUI-mode Setup have to be found in certain locations. At this point, Setup is installing the devices by using Plug and Play IDs that have been enumerated by Windows Plug and Play. Setup searches a pre-defined path on the drive, looking in .inf files to find the best match for the Plug and Play ID of the device. By default, this path is defined in the following registry location and is set to %SystemRoot%\Inf:

HKKEY\_LOCAL\_MACHINE\Software\Microsoft\Windows\CurrentVersion\DevicePath: REG\_EXPAND\_SZ: %SystemRoot%\Inf

Setup uses this path to locate .inf files for device installation. After Setup, this path is also used for any new hardware that is found and installed. If you modify this key during Setup by using the Sysprep.inf or Unattended answer file, the value is saved and is also used after Setup.

The following sections contain steps to add OEM-supplied drivers to unattended or Sysprep Setup installations of Windows.

#### Unattended Setup

When you add drivers to unattended Setup, follow these steps. If the OEM-supplied drivers are not digitally signed, you may receive a message about the drivers during Setup. For additional information about how to disable this message, click the article number below to view the article in the Microsoft Knowledge Base:

[236029](#) How to Set the Driver Signing Policy for Windows 2000 Unattended Setup

1. Create your distribution share on a network server by copying the contents of the Windows installation CD-ROM I386 folder. You can use Setupmgr.exe to create this share and your Unattended.txt file. You can find Setupmgr.exe on the Windows CD-ROM in the Support\Tools folder in the Deploy.cab file and the Unattend.doc file that contains information about Windows unattended Setup.
2. Create a %oem%\\$1\Drivers folder in the I386 folder. You may want to create additional folders in the Drivers subfolder, depending on the hardware that you want to install (for example, network adapter, modem, or video). The \$1 folder resolves to %SystemDrive%. During text-mode Setup, these folders and files are copied to the %SystemDrive%\Drivers folders. For example:
 

```

\i386
  \oem$
    - - \ $1
      - - - \Drivers
        - - - - \network adapter
        - - - - \MODEM
        - - - - \VIDEO
      
```
3. Copy all the OEM-supplied driver files for the device in the folders that you created in the previous step.
4. Add the OemPnPDriversPath = Driver\_Paths entry in the [Unattended] section of the Setup answer file. You can list multiple paths in this key by separating them with a semicolon (;). For example:

[Unattended]

OemPnPDriversPath = "Drivers\network adapter;Drivers\Modem;Drivers\Video"

**NOTE:** The %SystemDrive% environment variable string is automatically inserted before each of the listed search paths.

5. Save the answer file.

During GUI-mode Setup when the system is searching .inf files for Plug and Play IDs, it also looks in the paths that are noted in the OemPnPDriversPath and the standard default path of %WinDir%\Inf. The %WinDir%\Inf path is listed first in the search order, but if you have a device that is supported by more than one .inf file (Windows may include a driver that offers generic functionality), Setup

continues to search all paths that are specified in the OemPnPDriversPath entry. Although it may find multiple matches, Plug and Play uses the .inf file that has the best match, and then installs the associated device driver to support the device.

### Sysprep Setup

Adding OEM-supplied drivers to a Windows Sysprep Setup is similar to the steps in the "Unattended Setup" section of this article, except that you do not have to create the distribution share. To add drivers to the mini-wizard of Sysprep, follow these steps.

**NOTE:** To add OEM third-party mass-storage drivers to the Sysprep image that you use to start the computer, you need version 1.1 of Sysprep. To download the latest Sysprep tool and documentation, visit the following Microsoft Web site:

<http://www.microsoft.com/windows2000/downloads/deployment/sysprep/>

1. On the root of the volume where the %WinDir% folder is located, create a folder structure to hold the OEM-supplied drivers. For example:

```
\Drivers
- - \network adapter
- - \VIDEO
\Sysprep
\WINNT
```

2. Copy the OEM-supplied drivers to their appropriate subfolders.
3. Add the OemPnPDriversPath = Driver\_Paths entry in the [Unattended] section of the Sysprep.inf file. You can list multiple paths in this key by separating them with a semicolon (;). For example:

```
[Unattended]
OemPnPDriversPath = "Drivers\network adapter;Drivers\Video"
```

**NOTE:** The %SystemDrive% environment variable string is automatically inserted before each of the listed search paths.

If you do not want the OEM-supplied drivers to remain on the volume after the mini-wizard is complete, you can add the folder structure that you created in the previous step under the Sysprep folder. You have to adjust the OemPnPDriversPath = key appropriately. The Sysprep folder (and its subfolders) is automatically removed after Setup is complete.

Save the Sysprep.inf file in the Sysprep folder and run Sysprep.exe. Any Plug and Play devices (including those found by using the OEM driver .inf files) are automatically installed during the mini-setup wizard on the target computers. Note that you do not have to specify the **-pnp** command-line switch unless there are earlier (ISA) devices on the target computers. If you use the **-pnp** command-line switch, a full Plug and Play re-enumeration of all devices is performed, which adds 5-10 minutes to the Sysprep mini-wizard process. Also, if you specify additional mass-storage controllers by using Sysprep version 1.1, the **-pnp** command-line switch may cause some additional hard disk controllers to appear in Device Manager. For additional information, click the article numbers below to view the articles in the Microsoft Knowledge Base:

[253340](#) Non-Present SCSI Devices Appear in Device Manager When You Are Using Sysprep Version 1.1

[216937](#) Windows 2000 System Preparation Tool and Answer File Usage

**NOTE:** If the OEM-supplied drivers are not digitally signed, the mini-wizard postpones the installation of the device until an administrator logs on to the computer. This is referred to as client-side versus server-side installation, which occurs during mini-wizard Setup.

For additional information, click the article number below to view the article in the Microsoft Knowledge Base:

[256204](#) Unsigned Drivers Not Installed During Sysprep Mini-Wizard Without -pnp Switch

### RIS Installations

Adding OEM Plug and Play drivers to RIS installations involves the same steps that are listed in the "Unattended Setup" section of this article, with two small adjustments:

1. Put the \$oem\$ folder at the same level as the \I386 folder of the RIS image. For example:

```
RemoteInstall\Setup\%language\Images\%dir_name%\i386
RemoteInstall\Setup\%language\Images\%dir_name%\$oem$\$1\Drivers
\network adapter
\MODEM
\VIDEO
```

2. Modify the RIS image default template (Ristndrd.sif). In the [Unattended] section, change the OemPreinstall = key value from **No** to **Yes**, and then add the OemPnPDriversPath = Driver\_Path entries. You can list multiple paths in this key by separating them with a semicolon (;). For example:

```
[Unattended]
OemPreinstall = Yes
OemPnPDriversPath = "Drivers\network adapter;Drivers\Modem;Drivers\Video"
```

**NOTE:** The %SystemDrive% environment variable string is automatically inserted before each of the listed search paths.

**NOTE:** If one of the OEM-supplied drivers is for a network card device, the RIS server must have this file available when it restarts in text-mode Setup. For additional information about this process, click the article number below to view the article in the Microsoft Knowledge Base:

[246184](#) How to Add Third-Party OEM Network Adapters to RIS Installations

3. Stop and restart the BINL service on the RIS server, type the following at the command prompt:
  - o net stop "boot information negotiation layer"
  - o net start "boot information negotiation layer"

### Riprep Images

Riprep and Sysprep share much of the same functionality, so adding OEM Plug and Play drivers to computers that will be imaged involves steps similar to those that are used for Sysprep. Before you run Riprep against the image computer to copy it to the RIS server, follow these steps:

1. Create a folder called Sysprep on the %SystemDrive% folder (this is most likely drive C because Riprep.exe can only copy one volume/partition).

- On the root of the same volume, create a folder structure to hold the OEM-supplied drivers. For example:

```

\Drivers
- - \network adapter
- - \VIDEO
\Sysprep
\WINNT

```

- Copy the OEM-supplied drivers to their appropriate subfolders.
- Create a Sysprep.inf file in the Sysprep folder, and then add the [Unattended] and OemPnPDriversPath = Driver\_Path entries. You can list multiple paths in this key by separating them with a semicolon (;). For example:

```

[Unattended]
OemPnPDriversPath = "Drivers\network adapter;Drivers\Video"

```

**NOTE:** The %SystemDrive% environment variable is automatically inserted before each of the listed search paths that are specified.

**NOTE:** If the device has already been recognized by the operating system as a known or unknown device, you must remove the device through Device Manager before you run sysprep or the updated drivers are not installed on startup during mini-setup.

- Run Riprep.exe from the \\RisServer\Reminst\Admin\1386 folder on the client computer to copy the image to the selected RIS server. Riprep looks in the Sysprep folder for a Sysprep.inf file, reads the OemPnPDriversPath= key, and then updates the computer's HKEY\_LOCAL\_MACHINE\Software\Microsoft\Windows\CurrentVersion\Devicepath registry entry before it copies the registry up to the server so that it can be used during the mini-Setup wizard.

**NOTE:** The default Riprep.sif file that is created during this process is not affected by the entry in the Sysprep.inf file that was created in the previous steps.

- Stop and then restart the BINL service on the RIS server. Type the following lines at a command prompt:
  - "net stop "boot information negotiation layer" (without the quotation marks)
  - "net start "boot information negotiation layer" (without the quotation marks)

**NOTE:** If one of the OEM-supplied drivers is for the primary network card, the RIS server must also have this file available from a typical RIS flat image before the Riprep image is downloaded. If this is the case, you must also follow the procedure described in the "RIS Installations" section of this article, or use the procedure described in the following Microsoft Knowledge Base article:

[246184](#) How to Add Third-Party OEM Network Adapters to RIS Installations

If the image is already created and you want to add OEM-supplied Plug and Play drivers, Microsoft recommends that you use RIS to download the image to a computer, follow the steps listed in the previous "Riprep Images" section, and then Riprep the image back to the RIS server.

**NOTE:** One side effect is that the driver paths are entered two times in the Software\Microsoft\Windows\CurrentVersion\DevicePath key.

For additional information, click the article number below to view the article in the Microsoft Knowledge Base:

[258862](#) Riprep.exe Adds Duplicate Paths to the Registry

## Existing Windows Installations

You may have to add new hardware devices to existing Windows-based computers that require OEM-supplied drivers. Although this process requires you to install the new device, you may want the OEM-supplied drivers to be distributed in a controlled fashion or to be centrally located on one server. To do so, follow these steps:

- Decide if you want to copy the drivers locally or if you want to store them on a central distribution server. If you want to store the drivers locally on the computer's hard disk, you must have a procedure to copy the drivers to the computer (for example, using logon scripts, Microsoft Systems Management Server (SMS) batch jobs, or other methods).
- After the distribution method is determined, obtain the path for the device drivers. If you want to copy them locally, the path may be C:\Drivers\network adapter. If you want them copied to a centrally located server, the path may be \\ServerName\Drivers\network adapter (where Drivers is a shared folder).
- The DevicePath key in the local computer's registry has to be updated to reflect the new OEM driver locations. You must have an automated method of remotely updating the registry key. You can use Regedit files in combination with logon scripts or an SMS batch job. The default value is located in the following registry key:

```
HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\DevicePath: REG_EXPAND_SZ: %SystemRoot%\Inf
```

- Edit the DevicePath key by using Regedt32.exe so that path where the drivers are located is included in the search path.

**WARNING:** If you use Registry Editor incorrectly, you may cause serious problems that may require you to reinstall your operating system. Microsoft cannot guarantee that you can solve problems that result from using Registry Editor incorrectly. Use Registry Editor at your own risk.

For example, if the drivers are copied locally to the root of the drive on which the %WinDir% folder resides (Drivers\network adapter), the DevicePath final value should read:

```
DevicePath: REG_EXPAND_SZ: %SystemRoot%\Inf; %SystemRoot%\Drivers\network adapter
```

If the drivers are kept on a centrally located server or distribution point, you have to add the UNC path to the OEM-supplied drivers. For example:

```
DevicePath: REG_EXPAND_SZ: %SystemRoot%\Inf; \\ServerName\ShareName\Drivers\network adapter
```

**NOTE:** %SystemRoot% is not automatically appended because the Setup process does not add the values. You must manually type the value of %SystemRoot% if you edit the registry.

After you have completed these steps and new hardware is installed, when a user logs on, Plug and Play locates the new hardware and searches the device paths you specified to locate the OEM-supplied drivers. Note that all the rules that apply to signed/unsigned drivers also apply to devices that are installed after Setup. If the OEM-supplied drivers for the new device are not digitally signed and a non-administrator user logs on to the computer after the new hardware is installed, the user cannot complete the installation of the device until an administrator logs on to the computer. For additional information, click the article number below to view the article in the Microsoft Knowledge Base:

[219435](#) Non Administrator Permissions to Load and Unload Device Drivers

**NOTE:** If the device has already been recognized by the operating system as a known or unknown device, you must remove the device through Device Manager before you run sysprep or the updated drivers are installed on startup during mini-setup.

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