

CHAPTER W3

Creating Your Own Custom Startup

For most Windows users, system startup is an uneventful, unproductive part of the computing experience, and if most people think about startup at all, it's only to wish it wasn't so darned slow. For the rest of us, however, system startup is a time that's chock full of interesting possibilities. Most intriguingly, you can configure your PC to dual-boot between two different versions of Windows (for example, XP and Vista), or between Windows and some other operating system, such as Linux. You learn how that works in Chapter W6, "Dual-Booting Windows with Other Operating Systems." However, there are lots of other ways to customize your startups, and the tweaks in this chapter introduce you to them.

IN THIS CHAPTER

- Modify the Windows Startup Options
- Customize Startups with the System Configuration Utility
- Edit the Windows Boot Manager with BCDEDIT
- Perform a Custom Recovery Startup

Modify the Windows Startup Options

Vista

If your system can boot to two or more operating systems, you see a menu during startup. For Vista, the menu is similar to this:

XP

Choose the operating system or tool you want to start:
(Use the arrow keys to highlight your choice.)



Easy

```
Microsoft Windows XP Professional
Microsoft Windows Vista
```

To specify an advanced option for this choice, press F8.
Seconds until highlighted choice will be started automatically: 30

Tools:

```
Windows Memory Diagnostic
```

If you do nothing at this point, Windows Vista will boot automatically after 30 seconds. Otherwise, you select the operating system you want and then press the Enter key to boot it. (To switch between the operating system menu and the Tools menu, press the Tab key.)

In Windows XP, the menu you see at startup looks like this:

Please select the operating system to start:

```
Microsoft Windows XP Professional
Microsoft Windows
```

Use the up and down arrow keys to move the highlight to your choice.

Press ENTER to choose.

Seconds until highlighted choice will be started automatically: 30

Again, if you do nothing at this point, Windows XP boots automatically after 30 seconds. Otherwise, you highlight the operating system you want and then press Enter to boot it.

Note, too, that if your PC doesn't shut down properly, the next time you start your computer you'll likely see the following Windows Error Recovery menu:

```
Windows did not shut down successfully.
```

```
If this was due to the system not
responding, or if the system was shut
down to protect data, you might be
```

NOTE Yes, the Vista item uses the generic name "Microsoft Windows." To learn how to rename this to something more useful, see "Renaming an Entry," later in this chapter.

able to recover by choosing one of the Safe Mode configurations from the menu below:

(Use the arrow keys to highlight your choice.)

Safe Mode

Safe Mode with Networking

Safe Mode with Command Prompt

Start Windows Normally

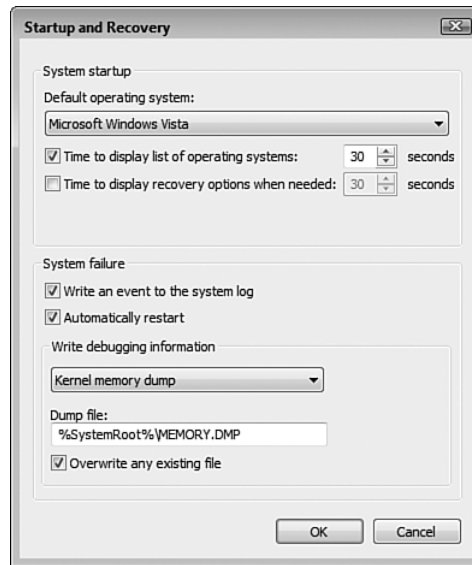
If you do nothing, Windows starts normally after 30 seconds. Otherwise, you select the startup option you want and press Enter.

You can customize how these menus work using the Startup and Recovery dialog box. You can choose the default operating system, set the maximum time the Windows Boot Manager menu is displayed, and set the maximum time the Windows Error Recovery menu recovery options are displayed.

Here are the steps to follow:

1. In Vista, select Start, type **systempropertiesadvanced**, press Enter, and then enter your User Account Control credentials; in XP select Start, Run, type **control sysdm.cpl,,3**, and then click OK. The System Properties dialog box appears with the Advanced tab displayed.
2. Click the Settings button in the Startup and Recovery group. Windows displays the Startup and Recovery dialog box; the Vista version is shown in Figure W3.1.
3. Use the Default Operating System list to click the operating system that Windows Boot Manager highlights by default at startup. (In other words, this is the operating system that runs automatically if you do not make a choice in the Windows Boot Manager menu.)
4. Use the Time to Display List of Operating Systems spin box to set the interval after which Windows Boot Manager launches the default operating system. If you don't want Windows Boot Manager to select an operating system automatically, deactivate the Time to Display List of Operating Systems check box.

CAUTION You might be tempted to shorten the Windows Boot Manager interval to just a second or two, but I don't recommend it. That time is so short that it will be easy to miss the menu when it appears, which is a hassle when you want to dual-boot.

**FIGURE W3.1**

Use the *Startup and Recovery* dialog box to customize some aspects of the Windows startup.

5. Use the *Time to Display Recovery Options When Needed* spin box to set the interval after which Windows Error Recovery starts Windows normally. Note that in Vista the associated check box is deactivated, so you need to activate it to modify the time. If you don't want Windows Error Recovery to start Windows normally automatically, deactivate the *Time to Display Recovery Options When Needed* check box.
6. Click *OK* to return to the *System Properties* dialog box.
7. Click *OK* to put the new settings into effect.

Customize Startups with the System Configuration Utility

Vista

XP



Easy

For more detailed startup customization, you can modify many more aspects of startup by using the *System Configuration* utility. How you use this program changed significantly between XP and Vista, so I'll cover each OS separately in the next two sections.

Using System Configuration in Vista

To start System Configuration in Vista, follow these steps:

1. Select Start, type `msconfig`, and press Enter. The User Account Control dialog box appears.
2. Enter your User Account Control credentials. The System Configuration window appears.
3. Select the Boot tab, shown in Figure W3.2.

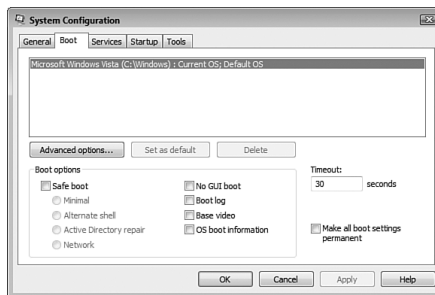


FIGURE W3.2

In Vista's System Configuration utility, use the Boot tab to customize your startup.

The large box near the top of the tab displays the OS installations on the current computer. You see `Current OS` beside the Vista installation you are running now; you see `Default OS` beside the OS that's set up as the default. There are four main tasks you can perform:

- Click the Set as Default button to set the highlighted Vista installation as the default for the Windows Boot Manager menu.
- Use the Timeout text box to set the maximum time that Windows Boot Manager waits before selecting the default OS.
- Use the check boxes in the Boot Options group to set the following startup options for the currently highlighted OS:

Safe Boot: Minimal—Boots Windows Vista in *Safe mode*, which uses only a minimal set of device drivers. Use this switch if Windows Vista won't start, if a device or program is causing Windows Vista to crash, or if you can't uninstall a program while Windows Vista is running normally.

Safe Boot: Minimal (Alternate Shell)—Boots Windows Vista in Safe mode but also bypasses the Windows Vista GUI and boots to the command prompt instead. Use this switch if the programs you need to repair a problem can be run from the command prompt or if you can't load the Windows Vista GUI.

Safe Boot: Active Directory

Repair—Boots Windows Vista in Safe mode and restores a backup of the Active Directory service (this option applies only to domain controllers).

Safe Boot: Network—Boots Windows Vista in Safe mode but also includes networking drivers. Use this switch if the drivers or programs you need to repair a problem exist on a shared network resource, if you need access to email or other network-based communications for technical support, or if your computer is running a shared Windows Vista installation.

No GUI Boot—Tells Windows Vista not to load the VGA display driver that is normally used to display the progress bar during startup. Use this switch if Windows Vista hangs while switching video modes for the progress bar, or if the display of the progress bar is garbled.

Boot Log—Boots Vista and logs the boot process to a text file named `ntbtlog.txt` that resides in the `%SystemRoot%` folder. Move to the end of the file and you might see a message telling you which device driver failed. You probably need to reinstall or roll back the driver using Device Manager. Use this switch if the Windows Vista startup hangs, if you need a detailed record of the startup process, or if you suspect (after using one of the other Startup menu options) that a driver is causing Windows Vista startup to fail.

Base Video—Boots Vista using the standard VGA mode: 640×480 with 256 colors. This is useful for troubleshooting video display driver problems. Use this switch if Windows Vista fails to start using

NOTE The shell loaded by the `/safeboot:` switch is determined by the value in the following Registry key:
`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\SafeBoot\AlternateShell`
The default value is `CMD.EXE` (the command prompt).

NOTE `%SystemRoot%` refers to the folder into which Windows Vista was installed. This is usually `C:\Windows`.

any of the Safe mode options, if you recently installed a new video card device driver and the screen is garbled, the driver is balking at a resolution or color depth setting that's too high, or if you can't load the Windows Vista GUI. After Windows Vista has loaded, you can reinstall or roll back the driver, or you can adjust the display settings to values that the driver can handle.

OS Boot Information—Displays the path and location of each device driver as it loads, as well as the operating system version and build number, the number of processors, the system memory, and the process type.

- Click the Advanced Options button to display the BOOT Advanced Options dialog box shown in Figure W3.3. You can set the following options:

Number of Processors—In a multiprocessor system, specifies the maximum number of processors that Windows Vista can use. Activate this check box if you suspect that using multiple processors is causing a program to hang.

Maximum Memory—Specifies the maximum amount of memory, in megabytes, that Windows Vista can use. Use this value when you suspect a faulty memory chip might be causing problems.

PCI Lock—Activate this check box to tell Vista not to dynamically assign hardware resources for PCI devices during startup. The resources assigned by the BIOS during the POST are locked in place. Use this switch if installing a PCI device causes the system to hang during startup.

Detect HAL—Activate this check box to force Vista to detect the computer's *hardware abstraction layer* (HAL) at startup. The HAL is a software layer that resides between the computer's hardware and the operating system kernel, and its job is to hide hardware differences so that the kernel can run on a variety of hardware. If you force Vista to detect the HAL, it can use the HAL to interact with the computer's hardware at startup. This is useful if dealing with the hardware directly is causing startup problems.

Debug—Enables remote debugging of the Windows Vista kernel. This sends debugging information to a remote computer via one of your computer's ports. If you use this switch, you can use the Debug Port list to specify a serial port, IEEE 1394 port, or USB port. If you use a serial port, you can specify the transmission speed of the

debugging information using the Baud Rate list; if you use an IEEE 1394 connection, activate Channel and specify a channel value; if you use a USB port, type the device name in the USB Target Name text box.

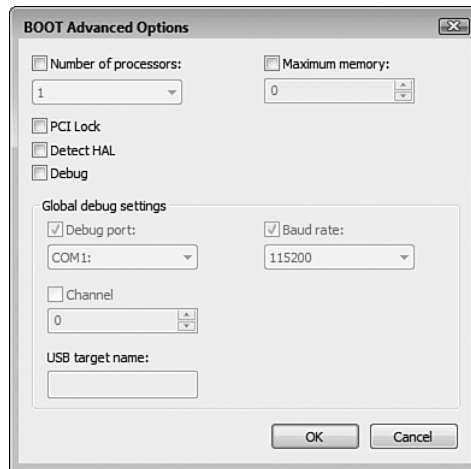


FIGURE W3.3

In the Boot tab, click Advanced Options to display the dialog box shown here.

Using System Configuration in XP

To start System Configuration in XP, follow these steps:

1. Select Start, Run, type `msconfig`, and then click OK. The System Configuration window appears.
2. Select the BOOT.INI tab, shown in Figure W3.4.

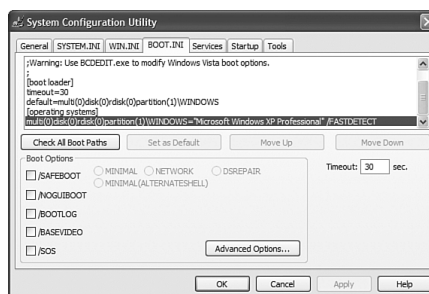


FIGURE W3.4

In XP's System Configuration utility, use the BOOT.INI tab to customize startup.

The large box near the top of the tab displays the current `BOOT.INI` text. You can't edit this text directly, however. All you can do is the following:

- Click Check All Boot Paths to check the paths of each operating system to ensure they're valid.
- Click Set as Default to set the highlighted operating system as the default for startup.
- Click Move Up to move the highlighted operating system higher in the menu.
- Click Move Down to move the highlighted operating system lower in the menu.
- Use the Timeout text box to adjust the `timeout` value of `BOOT.INI`.
- Use the check boxes in the Boot Options group to set the startup options for the currently highlighted OS. Note that these options are identical to the ones I went through in the previous section for Vista (although Vista has a few new ones that you can ignore), so refer to that section for the details.

Edit the Windows Boot Manager with BCDEDIT

Vista



The specifics of the Vista Windows Boot Manager menu are determined by the *Boot Configuration Data* (BCD), a new data store that replaces the `BOOT.INI` file used in previous versions of Windows. `BOOT.INI` still exists, but it's used only for loading the legacy operating systems in multiboot setups.

When you use the Startup and Recovery feature or the System Configuration utility in Vista, what you're really doing is modifying certain aspects of the BCD store. For even more control over the BCD store, Vista offers the `BCDEDIT` command-line utility.

Note that `BCDEDIT` is an Administrator-only tool, so you must run it under the Administrator account (not just any account in the Administrators group). The easiest way to do this is to elevate your privileges when running the Command Prompt. (That is, select Start, type **command**, right-click Command Prompt, click Run As Administrator, and then enter your UAC credentials.)

Table W3.1 summarizes the switches you can use with `BCDEDIT`.

Table W3.1 Switches Available for the BCDEDIT Command-Line Tool

Switch	Description
/bootdebug	Toggles boot debugging for a boot application on and off
/bootems	Toggles Emergency Management Services for a boot application on and off
/bootsequence	Sets the one-time boot sequence for the boot manager
/copy	Makes a copy of an entry
/create	Creates a new entry
/createstore	Creates a new and empty BCD store
/dbgsettings	Sets the global debugger settings
/debug	Toggles kernel debugging for an operating system entry
/default	Sets the default entry
/delete	Deletes an entry
/deletevalue	Deletes an entry value
/displayorder	Sets the order in which Boot Manager displays the operating system entries
/ems	Enables or disables Emergency Management Services for an operating system entry
/emssettings	Sets the global Emergency Management Services settings
/enum	Lists the entries in the BCD store
/export	Exports the contents of the BCD store to a file
/import	Restores the BCD store from a backup file created with the /export switch
/set	Sets an option value for an entry
/store	Specifies the BCD store to use
/timeout	Sets the Boot Manager timeout value
/toolsdisplayorder	Sets the order in which Boot Manager displays the Tools menu
/types	Displays the data types required by the /set and /deletevalue commands.
/v	Displays all entry identifiers in full, instead of using well-known identifiers

To help you understand how BCDEDIT works, let's examine the output that appears when you run BCDEDIT with the /enum switch:

```
Windows Boot Manager
-----
Identifier:          {bootmgr}
Type:                10100002
Device:              partition=C:
```

```
Description:           Windows Boot Manager
Inherit options:       {globalsettings}
Boot debugger:        No
Default:              {current}
Display order:        {ntldr}
                     {current}
                     {a8ef3a39-a0a4-11da-bedf-97d9bf80e36c}
Tools display order:  {memdiag}
Timeout:              30
```

Windows Legacy OS Loader

```
-----
Identifier:           {ntldr}
Type:                 10300006
Device:               partition=C:
Path:                 \ntldr
Description:          Earlier version of Windows
Boot debugger:        No
```

Windows Boot Loader

```
-----
Identifier:           {current}
Type:                 10200003
Device:               partition=C:
Path:                 \Windows\system32\winload.exe
Description:          Microsoft Windows Vista
Locale:               en-US
Inherit options:      {bootloadersettings}
Boot debugger:        Yes
Windows device:       partition=D:
Windows root:         \Windows
Resume application:   {c105ff07-b93e-11da-82e5-ae629af91d6e}
No Execute policy:   OptIn
Kernel debugger:      No
EMS enabled in OS:    No
```

Windows Boot Loader

```
-----
Identifier:           {a8ef3a39-a0a4-11da-bedf-97d9bf80e36c}
Type:                 10200003
```

```

Device:                partition=G:
Path:                  \Windows\system32\winload.exe
Description:           Microsoft Windows Vista
Locale:                en-US
Inherit options:       {bootloadersettings}
Boot debugger:         No
Windows device:        partition=G:
Windows root:          \Windows
Resume application:    {a8ef3a3a-a0a4-11da-bedf-97d9bf80e36c}
No Execute policy:     OptIn
No integrity checks:   Yes
Kernel debugger:       No
EMS enabled in OS:     No

```

As you can see, this BCD store has four entries: one for Windows Boot Manager, one for a legacy Windows install (on partition C:), and two for Vista installs (on my test machine, partitions D: and G:). Notice that each entry has an Identifier setting, and these IDs are unique to each entry. All IDs are actually 32-digit globally unique identifiers (GUIDs) such as the one shown earlier for the second Windows Boot Loader item:

```
a8ef3a39-a0a4-11da-bedf-97d9bf80e36c
```

The other entries have GUIDs, as well, but by default BCDEDIT works with a collection of *well-known identifiers*, including the following (type `bcdedit id /?` to see the complete list):

```

bootmgr    The Windows Boot Manager entry
ntldr      An entry that uses a legacy operating system loader
            (NTLDR) to boot previous versions of Windows
current     The entry that corresponds to the operating system that is
            currently running
default    The entry that corresponds to the Windows Boot Manager
            default operating system
memdiag    The Windows Memory Diagnostics entry

```

If you want to see the full GUIDs for every entry, add the `/v` (verbose) switch:

```
bcdedit /enum /v
```

It would take dozens of pages to run through all the BCDEDIT switches, so I'll just give you a couple of examples so you can get a taste of how this powerful utility operates.

Making a Backup Copy of the BCD Store

Before you do any work on the BCD store, you should make a backup copy. That way, if you make an error when you change something in the BCD, you can always restore the backup copy to get your system back to its original state.

You create a backup copy using the `/export` switch. For example, the following command backs up the BCD store to a file named `bcd_backup` in the root folder of drive C:

```
bcdedit /export c:\bcd_backup
```

If you need to restore the backup, use the `/import` switch, as in this example:

```
bcdedit /import c:\bcd_backup
```

Renaming an Entry

The names that Windows Boot Manager assigns to the boot applications leave a lot to be desired. For a legacy operating system entry, for example, the default Legacy (pre-Longhorn) Microsoft Windows Operating System name is overly long and not particularly descriptive (and, bizarrely, uses Microsoft's long-forgotten codename for Windows Vista: Longhorn). A simpler name such as Windows XP Pro or Windows Millennium would be much more useful. Similarly, all Vista installations get the same name: Microsoft Windows, which can be quite confusing. Names such as Vista Home Premium and Vista Ultimate would be much more understandable.

To rename an entry using BCDEDIT, use the following syntax:

```
bcdedit /set {id} description "name"
```

Here, replace `id` with the entry identifier (the GUID or the well-known identifier, if applicable) and replace `name` with the new name you want to use. For example, the following command replaces the current name of the legacy operating system entry (`ntldr`) with Windows XP Pro:

```
bcdedit /set {ntldr} description  
"Windows XP Pro"
```

TIP GUIDs are 32-character values, so typing them by hand is both time-consuming and error-prone. To avoid this, first run the `bcdedit /enum` command to enumerate the BCD entries, and then scroll up until you see the GUID of the entry you want to work with. Pull down the system menu (click the upper-left corner of the window or press Alt+Spacebar), select Edit, Mark, click and drag over the GUID to select it, and then press the Enter key to copy it. Begin typing your BCDEDIT command and when you get to the part where the identifier is required, pull down the system menu again and select Edit, Paste.

Perform a Custom Recovery Startup

Vista

XP



What do you do if disaster strikes and you can't boot your PC, even in Safe mode? Or what if you don't want to boot your PC because you know it has been affected by a virus, Trojan horse, or some other species of malware? Windows gives you three options:

- **Boot using the last known good configuration**—Each time Windows starts successfully in Normal mode, the system makes a note of which *control set*—the system's drivers and hardware configuration—was used. If you make driver or hardware changes and then find that the system won't start, you can tell Windows to boot using the control set that worked the last time (that is, the control set that doesn't include your most recent hardware changes). This is the *last known good configuration*, and the theory is that by using the previous working configuration, your system should start because it's bypassing the changes that caused the problem. Restart your computer, wait until the initial Power On Self Test (POST) operations are complete (most systems beep when the POST is done), and then press F8 to display the Advanced Boot Options menu. (If your PC boots into a list of operating systems, instead, press F8 at that menu.) Select the Last Known Good Configuration option.
- **Restore your system to a previous state**—To revert the system to a previous configuration when you could start Windows successfully, you need to use the System Restore feature. Windows creates automatic restore points each day and when you perform certain actions (such as installing an uncertified device driver). To revert your system to one of those restore points, select Start, All Programs, Accessories, System Tools, System Restore.
- **Boot to the Windows install disc and run the recovery options**—The Windows Vista DVD offers a utility called System Recovery Options, which enables you to launch recovery tools or access the command line. Similarly, the Windows XP CD includes the Recovery Console, a command-line tool that enables you to launch recovery tools, stop and start services, and replace corrupted system files. Insert the Windows install disc, restart your PC, and when your system prompts you to boot from the DVD, press the required key or key combination. After a few minutes the initial install screen appears:

Windows Vista—Click Next, click Repair Your Computer, choose your Vista OS, and then click Next to see the System Recovery Options window, shown in Figure W3.5.

**FIGURE W3.5**

Vista's System Recovery Options window offers several tools to help you get your system back on its feet.

Windows XP—Press **R** to choose the To Repair a Windows XP Installation Using Recovery Console option, type the number that corresponds to your main XP installation, type your Administrator account password, and then press Enter to start the Recovery Console command line.

TIP If your system won't boot from the Windows install disc, you need to adjust the system's BIOS settings to allow this. Restart the computer and look for a startup message that prompts you to press a key or key combination to modify the BIOS settings (which might be called *Setup* or something similar). Find the boot options and either enable an optical drive-based boot or make sure that the option to boot from the optical drive comes before the option to boot from the hard disk. If you use a USB keyboard, you may also need to enable an option that lets the BIOS recognize keystrokes after the POST but before the OS starts.

