



# **Troubleshooting Common System Configuration Issues**

## **Windows\* 95/98 INF Update Utility Bus Master IDE Driver for Windows 95**

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**Revision History**

<b>Rev</b>	<b>Comments</b>	<b>Date</b>
1.0	Initial Release	20 Jul 98
2.0	Support for Intel Bus Master IDE driver for Windows* 95 version 3.02; other changes	14 Aug 98
2.1	Updated references to DMACHECK.EXE, available from Microsoft	31 Aug 98

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## Scope of this document

This document discusses common system configuration issues related to the use of the Windows\* 95/98 INF Update Utility for Intel® chipsets and the Intel Bus Master IDE driver for Windows 95.

The issues discussed in this guide are only relevant to systems using the Intel® 430FX/VX/HX/TX and 440FX/LX/EX/BX/GX chipsets and Windows 95 or Windows 98. Please note that the Intel Windows 95/98 INF Update Utility and Bus Mastering IDE Drivers for Windows 95 do NOT support Beta or pre-release versions of Windows operating system.

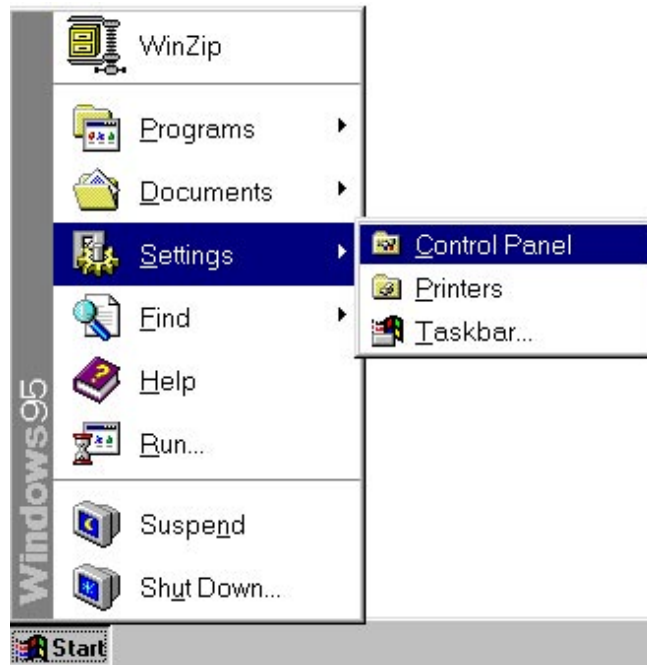
Most of the issues are related to either software configuration or hardware implementation. Intel is not responsible for the software written by third party vendors or the implementation of Intel® components in the products of third party manufacturers.

Customers should always contact the place of purchase or system/software manufacturer with support questions about their specific hardware or software configuration.

## How to Identify the Operating System Version

To determine which version of Windows 95 or Windows 98 is installed on your computer:

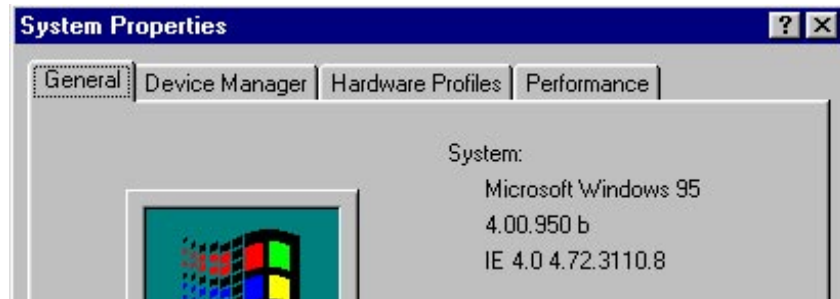
- Click on Start / Settings / Control Panel



- Double-click on the System icon



- On the General tab, look for the operating system version, as shown below.



Here's how to translate the version codes:

Windows 95	4.00.950	Original retail version
	4.00.950 a	OEM Service Release (OSR) 1
	4.00.950 b	OEM Service Release (OSR) 2.0 without USB supplement and OSR 2.1 with USB supplement
	4.00.950 c	OEM Service Release (OSR) 2.5
Windows 98	4.10.1998	Original retail version
Windows NT	See Note	See Note

**Note:** Intel does not supply bus mastering support for Windows NT 4.0. Windows NT 4.0 has native bus mastering support with Service Pack 3. See Page 16 for additional information.

## How to Identify the Intel® Chipset

If you're not sure which Intel® chipset is being used in your system, you'll need to look at the motherboard for the chipset markings.

**Note:** Some system manufacturers may void your warranty if you open the case. Check with the manufacturer if you have any concerns about this before proceeding.

**Caution:** Make sure you disconnect the power before opening the case. Avoid touching any of the components inside the system.

The chipset can be composed of multiple components. The key items to identify are the System Controller (“North Bridge”) and the PIIXn (PCI to ISA IDE Accelerator or “South Bridge”) components. The table below shows the combinations that make up the various Intel® chipsets:

Chipset	North Bridge (system controller)	South Bridge (PIIX)
430FX	82437FX	82371FB (PIIX)
430VX	82437VX	82371SB (PIIX3)
430HX	82439HX	82371SB (PIIX3)
440FX	82441FX	82371SB (PIIX3)
430TX	82439TX	82371AB (PIIX4)
440LX	82443LX	82371AB (PIIX4)
440LX	82443LX	82371EB (PIIX4E)
440EX	82443EX	82371EB (PIIX4E)
440BX	82443BX	82371EB (PIIX4E)
440GX	82443GX	82371EB (PIIX4E)

# Windows 95/98 INF Update Utility for Intel® Chipsets

## Description

The Windows 95/98 INF Update Utility for Intel® chipsets was developed for updating certain versions of Windows 95 or Windows 98. This update allows the operating system to correctly identify the Intel® chipset components and properly configure the system.

The utility modifies several of the Windows INF files, depending on the release of Windows 95/98 and which Intel® 82371xB (PIIXn) component is present in the system. The following table lists the files that are updated:

	Windows 95 versions		Windows 98
	4.00.950 (Retail) 4.00.950 a (OSR 1) 4.00.950 b (OSR 2)	4.00.950 b (OSR 2.1) 4.00.950 c (OSR 2.5)	4.10.1998 (Retail)
MSHDC.INF	X	X	N/A
MACHINE.INF	X	X	N/A
USB.INF	N/A	X	N/A

Note: The Windows 98 INF Update Utility does not modify Windows 98 system INF files.

For details, refer to the README.TXT file supplied with the Windows 95/98 INF Update for Intel® chipsets.

## Do You Need the INF Update Utility?

Find your operating system version and Intel® chipset in the table below:

Chipset	Operating System version				
	4.00.950	4.00.950a	4.00.950b	4.00.950c	4.10.1998
430FX	no	no	no	no	no
430VX	YES	YES	no	no	no
430HX	YES	YES	no	no	no
440FX	YES	YES	YES	YES	no
430TX	YES	YES	YES	YES	no
440LX/BX/EX	YES	YES	YES	YES	no
440GX	YES	YES	YES	YES	YES

Note: The Windows 98 INF Update Utility is only needed if you are running Windows 98 with the 440GX chipset.

“YES” means the listed operating system version may not have properly recognized the Intel® chipset.

“No” means the operating system should properly recognize the chipset. Do not run the INF update utility.

You can confirm whether the INF Update Utility is needed by seeing whether Windows is using its default Hard Disk Controller drivers:

- Click on Start / Settings / Control Panel
- Double-click on the System icon
- Select the Device Manager tab and expand the listing for Hard Disk Controllers

If the Hard Disk Controllers listed are:

Primary IDE Controller (single FIFO)  
Standard Dual PCI IDE Controller  
Standard IDE/EIDE controller

Windows did not properly identify the Intel® chipset and you will need to run the INF Update Utility.

## Obtaining and Installing the Utility

The Windows 95/98 INF Update Utility for Intel® chipsets can be downloaded from the Intel website at <http://developer.intel.com/design/software/drivers/platform/440.htm>

Separate utilities are available for Windows 95 (95SETUPEX.EXE) and Windows 98 (98SETUPEX.EXE). Each is approximately 600KB. The files are self-extracting archives that include the utility software and documentation. An included README.TXT file covers topics such as system requirements, contents of the distribution package, installation instructions, troubleshooting hints and other notes.

Please review the README.TXT document before installing the software.

Before installing the Windows 95/98 INF Update Utility for Intel® chipsets, you also should confirm that all devices in the System Properties / Device Manager / Hard Disk Controllers listing are enabled. There should be no yellow exclamation points or red “X”s, which could indicate a certain device is disabled or experiencing a driver conflict.

Note: This utility should only be used on desktop systems. The utility must not be executed on notebook or portable systems with or without a docking station. It is assumed that all the devices in the system are enabled (there are no yellow exclamation points or red “X”s in the Windows Device Manager). This utility may not work properly if there are devices in the system that are disabled.

## Confirming the INF Update is Installed

After installing the INF update utility, Device Manager should indicate your system is now using the Intel Hard Disk Controller driver (without the Intel Bus Master driver). The Hard Disk Controllers listing should show:



The entry for the Intel® 82371xB will correspond to the South Bridge (PIIX) component in your system. If these entries do not appear, or other symptoms are observed, see the following troubleshooting section. Note: xB can represent one of AB, SB, FB, or AB/EB, depending on the PIIXn component.



## Troubleshooting

After installing the Windows 95/98 INF Update Utility for Intel® chipsets, the following common symptoms may be seen depending on the system configuration:

- Intel® 82371xB PCI Bus Master IDE Controller still not listed in Device Manager
- Yellow exclamation points (!) on both Primary and Secondary IDE Controllers and/or system running under MS-DOS\* Compatibility Mode
- Yellow exclamation point (!) on Secondary IDE Controller
- No Primary and Secondary IDE Controllers listed in Device Manager

The following sections detail each of these symptoms, as well as possible causes and resolutions.

### **Symptom: Intel® 82371xB PCI Bus Master IDE Controller still not listed in Device Manager**

After running the INF Update Utility, the Hard Disk Controllers have not changed and fail to state:



#### *Possible Causes:*

All of the system requirements were not met (as previously listed in this document)

Before installing the Windows 95/98 INF Update Utility, it is essential to meet all the system requirements as discussed in the earlier sections. Also, refer to the README.TXT file before installation. If the utility still fails, it could be possibly be due to the following causes.

#### NOIDE Statement exists in the Registry

Sometimes, on an unsuccessful system bootup, Windows 95 will put a flag in the registry to bypass further attempts to load the protected mode drivers.

Resolution: Check for the NOIDE flag in the registry by editing the registry with the following procedure.

**Important Note** Using the Registry Editor incorrectly can cause serious problems that may require you to reinstall the operating system. It may not be possible to resolve these problems. Use Registry Editor at your own risk.

- Click Start / Run, type REGEDIT (this is the system registry editor program), and click OK
- Go to HKEY\_LOCAL\_MACHINE\SYSTEM\CURRENT CONTROL SET\SERVICES\VXD\IOS
  - Look for a 'NOIDE 01' entry
  - Click once on 'NOIDE 01'
  - Select Edit
  - Select Delete
- Reboot the system

Windows 95 will detect the newly found hardware and ask to reboot two times. Immediately check Device Manager / Hard Disk Controllers again to ensure everything is correct.

If there is no NOIDE statement in the registry and the Hard Disk Controllers are still not updated, then a virus likely exists in the hard drive's boot sector.

### Boot Sector Virus

Resolution: A Boot Sector Virus can be removed by running a virus scan on the system. Note that some anti-virus software packages are unable to detect boot sector viruses. The best recommendation is to run multiple anti-virus software programs to detect and remove the virus from the system.

If these steps still do not fix the problem, contact the system manufacturer for possible system issues.

### **Symptom: Yellow exclamation points on both Primary and Secondary IDE Controllers** **Symptom: System running under MS-DOS Compatibility Mode**

After installing the Windows 95/98 INF Update Utility for Intel® chipsets, exclamation points appear as shown in the Device Manager listings for Hard Disk Controllers:



This indicates that the protected mode drivers for the hard disk controllers failed to load. To confirm that the hard drives are instead using real mode drivers:

- Click on Start / Settings / Control Panel
- Double-click the System icon
- Select the Performance tab

The Performance tab will state that “One or more hard drives are running in MS-DOS\* compatibility mode”.

Resolution: The first thing to do is remove the ‘Intel 82371xB PCI Bus Master IDE Controller’ from the Device Manager.

- In Device Manager: Click on ‘Intel 82371xB PCI Bus Master IDE Controller’ and click ‘Remove’
- Reboot the system as quickly as possible as Windows will freeze the system in a short time.

This will deinstall the driver and upon reboot try to reload the protected mode driver. If the symptoms persist, it could be due to one of the following possible causes:

#### *Possible Causes:*

#### Conflicting Real Mode Drivers

**Important Note** Editing system files incorrectly can cause serious problems. Because of this, the following procedure should only be performed by an experienced user under extreme caution.

When the AUTOEXEC.BAT and CONFIG.SYS files include lines such as `DEVICE=` , the system is loading real mode drivers. The most frequent occurrence is a real mode driver for a CD-ROM drive (i.e., MSCDEX). Also, if Windows was upgraded from any previous version, various AUTOEXEC.BAT and CONFIG.SYS lines may be loaded.

In most cases it is recommended to use the protected mode drivers (when available) for Windows 95/98 to prevent the possible issues of conflicting real mode and protected mode drivers.

**Resolution:** Rename the AUTOEXEC.BAT and CONFIG.SYS files to another extension, such as AUTOEXEC.OLD and CONFIG.OLD. This effectively 'hides' the files upon next bootup. Another option is to remark out (using REM) all lines in the AUTOEXEC.BAT and CONFIG.SYS files.

**Note:** After using either of these techniques, the drivers included in these files will no longer be loaded at bootup. This may mean that certain devices and/or applications may not have the necessary driver support to function as designed. If this occurs, you may have to restore the original AUTOEXEC.BAT and CONFIG.SYS files by changing the new extensions back to .BAT and .SYS respectively. It may be necessary to modify individual lines in these files for specific devices and/or applications. Please contact the manufacturers of your specific devices and/or applications for further details on correct driver configuration.

If you were successful in removing the real mode drivers, the system should load without them. Re-check Device Manager for yellow exclamation points.

If yellow exclamation points still exist on both Primary and Secondary IDE controllers after a reboot, the system may contain a NOIDE statement in the registry or may have a boot sector virus.

#### NOIDE Statement exists in the Registry

Sometimes, on an unsuccessful system bootup, Windows 95 will put a flag in the registry to bypass further attempts to load the protected mode drivers.

**Resolution:** Check for the NOIDE flag in the registry by editing the registry with the following procedure.

**Important Note** Using the Registry Editor incorrectly can cause serious problems that may require you to reinstall the operating system. It may not be possible to resolve these problems. Use Registry Editor at your own risk.

- Click Start / Run, type REGEDIT (this is the system registry editor program), and click OK
- Go to HKEY\_LOCAL\_MACHINE\SYSTEM\CURRENT CONTROL SET\SERVICES\VXD\IOS
  - Look for a 'NOIDE 01' entry
  - Click once on 'NOIDE 01'
  - Select Edit
  - Select Delete
- Reboot the system

Windows 95 will detect the newly found hardware and ask to reboot two times. Immediately check Device Manager / Hard Disk Controllers again to ensure everything is correct.

If there is no NOIDE statement in the registry and the Hard Disk Controllers are still not updated, then a virus likely exists in the hard drive's boot sector.

## Boot Sector Virus

**Resolution:** A Boot Sector Virus can be removed by running a virus scan on the system. Note that some anti-virus software packages are unable to detect boot sector viruses. The best recommendation is to run multiple anti-virus software programs to detect and remove the virus from the system.

For more information on this issue, please refer to Article ID #130179 “Troubleshooting MS-DOS Compatibility Mode on Hard Disks” on the Microsoft support website (<http://support.microsoft.com>). If these steps still do not fix the problem, contact the system manufacturer for possible system issues.

### ***Symptom: Yellow exclamation point on Secondary IDE Controller***

A yellow exclamation point will appear on the Secondary IDE Controller if there is no device connected to the IDE controller. This is normal and will not affect overall system performance. If there is at least one device connected to the cable then the exclamation point signifies that the protected mode driver for the Primary IDE Controller loaded correctly but the protected mode driver for the Secondary IDE Controller failed to load. This is usually due to resource conflicts with the Secondary IDE Controller and another device. The sections below discuss possible causes and resolutions:

#### Secondary IDE port not enabled in the BIOS

**Resolution:** The first thing to check is that both IDE ports are enabled in BIOS. A menu item in the CMOS setup allows user to disable the secondary IDE port. Make sure the Secondary IDE port is enabled.

#### Sound Card or IDE Controller card conflicting with the IDE Port

Some early sound cards and IDE controller cards included an IDE port. This IDE port will conflict with the Secondary IDE port on the motherboard. The result is the BIOS will disable the Secondary IDE port due to these conflicts (or the sound card IDE device, depending on the boot order).

**Resolution:** If the system has an IDE controller card, remove this card and use the motherboard IDE ports.

To determine if the sound card has an IDE port, examine the sound card for an IDE interface. Also look in Device Manager / Hard Disk Controllers to see if a third IDE controller is listed (the sound card IDE). If a third IDE controller exists, one of the IDE ports must be disabled -- either the sound card's IDE port or the secondary IDE port. This will make the disabled port inaccessible by the operating system or devices.

**Note:** When using the Intel driver, it is recommended to only enable two IDE ports at a time.

To disable the secondary IDE port: Use the BIOS setup utility to disable the secondary IDE port; or using Device Manager (OSR 2.0), click on the Secondary IDE Controller, Settings, and choose Disable.

To disable the sound card IDE port, consult the sound card hardware manual. Often a jumper can be changed on the sound card or Device Manager can be used to disable the IDE port. For other possible ways to disable the sound card's IDE port, please contact the card manufacturer.

You also can remove the sound card to determine if the problem is due to a conflicting IDE port. Removing the sound card removes the IDE port from the system.

## CD-ROM on the Secondary IDE Port / Non ATAPI Compliant CD-ROM Drives

If the lone device on the Secondary IDE port is a CD-ROM, make sure that the jumper on the CD-ROM is set to Master. However, some CD-ROM drives have been verified as unable to operate on an IDE channel as a secondary master. This problem has been isolated to CD-ROM drives that do not comply with the ATAPI specification. A description can be found at <http://developer.intel.com/design/motherbd/idecdrom.htm>

Resolution: Change the CD-ROM to a slave off another device on either the primary or secondary IDE interface. If the CD-ROM is recognized, there is a high percentage that this is the issue. The recommended solution in these cases is to use the CD-ROM as a slave device to another master. If this does not work, check for real mode and protected mode driver conflicts.

## Conflicting Real Mode and Protected Mode Drivers

**Important Note** Editing system files incorrectly can cause serious problems. Because of this, the following procedure should only be performed by an experienced user under extreme caution.

When the AUTOEXEC.BAT and CONFIG.SYS files include lines such as `DEVICE=`, the system is loading real mode drivers. The most frequent occurrence is a real mode driver for a CD-ROM drive (i.e., MSCDEX). Also, if Windows was upgraded from any previous version, various AUTOEXEC.BAT and CONFIG.SYS lines may be loaded.

In most cases it is recommended to use the protected mode drivers (when available) for Windows 95/98 to prevent the possible issues of conflicting real mode and protected mode drivers.

Resolution: Rename the AUTOEXEC.BAT and CONFIG.SYS files to another extension, such as AUTOEXE.OLD and CONFIG.OLD. This effectively 'hides' the files upon next bootup. Another option is to remark out (using `REM`) all lines in the AUTOEXEC.BAT and CONFIG.SYS files.

**Note:** After using either of these techniques, the drivers included in these files will no longer be loaded at bootup. This may mean that certain devices and/or applications may not have the necessary driver support to function as designed. If this occurs, you may have to restore the original AUTOEXEC.BAT and CONFIG.SYS files by changing the new extensions back to `.BAT` and `.SYS` respectively. It may be necessary to modify individual lines in these files for specific devices and/or applications. Please contact the manufacturers of your specific devices and/or applications for further details on correct driver configuration.

If you were successful in removing the real mode drivers, the system should load without them. Re-check Device Manager for yellow exclamation points.

## ***Symptom: No Primary and Secondary IDE Controllers listed in Device Manager***

Under Hard Disk Controllers in Device Manager, one of the following is listed:

```
Intel 82371xB PCI Bus Mastering IDE controller
Intel PIIX IDE Controller (Bus Mastering not supported)
```

Without:

```
Primary IDE controller (dual fifo)
Secondary IDE controller (dual fifo)
```

*Possible Cause:* The system may not have been optimally set up before installing the Windows 95/98 INF Update Utility.

Resolutions:

- Boot into Safe Mode (press [F8] when you see the message "Starting Windows95") and remove all of the Hard Disk Controllers in Device Manager
- There may be an IDE controller card or sound card that is using the IDE controller resources. Remove the IDE controller or sound card that may be causing this conflict and reboot
- The Windows registry may be corrupt. Reinstall Windows 95/98.

## Uninstalling the Windows 95/98 INF Update Utility

The following procedures can be used to restore the original INF files that were updated by the Windows 95/98 INF Update Utility for Intel® chipsets:

The original INF files are backed up as MSHDC.xxx, MACHINE.xxx, or USB.xxx where xxx is a 3 digit number. The utility attempts to save the original INF files as \*.000. If that file name is being used, the program will increment the file extension until it finds a number that is not in use.

For example, to restore the original "MSHDC.INF" file:

1. Make copy of the MSHDC.INF file      C:> copy MSHDC.INF MSHDC.NEW
2. Restore the original "MSHDC.INF" file   C:> cd \<Windows 95 Path>\INF\  
  C:>\<Windows 95 Path>\INF> copy MSHDC.000  
  MSHDC.INF
3. Repeat steps 1 and 2 for MACHINE.INF and/or USB.INF
4. Run Control Panel / System / Device Manager
5. Click on "View Devices by Connection"
6. Click on Plug and Play BIOS.
7. Click on PCI bus, select Remove, and click Yes to restart the system.
8. Windows 95 will display messages when various hardware components in the system are recognized. When prompted to install a driver, select the Windows default driver or appropriate device drivers from a disk provided by the hardware manufacturer. Select Yes when prompted to restart the system (this may occur several times).
9. Re-install any custom drivers from disks provided by the hardware manufacturer, if needed.

# Intel Bus Master IDE Driver for Windows 95

## Description

Bus Mastering IDE technology implements logic circuitry on your motherboard that, when configured properly with other elements of your system, can reduce the work of the microprocessor in retrieving and storing data on your hard disk drive or other IDE device.

## Do You Need the Intel Bus Master IDE driver?

### Windows 95

The Intel Bus Master IDE driver for Windows 95 is not required in all circumstances. This driver was created for users with a specific system configuration:

- System based on 430FX/VX/HX/TX or 440FX/LX/BX/EX/GX chipset
- Using retail Windows 95 (4.00.950) or OEM Service Release 1 (4.00.950a)

Find your operating system version and Intel® chipset in the table below to determine how you should enable Bus Mastering (if you wish to use this feature):

Chipset	Operating System version				
	4.00.950	4.00.950a	4.00.950b	4.00.950c	4.10.1998
430FX	YES	YES	no	no	no
430VX	YES	YES	no	no	no
430HX	YES	YES	no	no	no
440FX	YES	YES	no	no	no
430TX	YES	YES	no	no	no
440LX/BX/EX	YES	YES	no	no	no
440GX	YES	YES	no	no	no

“YES” means the Intel Bus Master Drivers for Windows 95 can be used in this configuration.

“No” means the Intel driver should NOT be used.

**Important note** Users running Windows 95 OSR 2.0 or later (4.00.950b or 4.00.95c) or Windows 98 (4.10.1998) should NOT use the Intel Bus Master IDE driver. Bus Mastering should be enabled using the native operating system drivers. See the following section on “Enabling Bus Mastering using native Microsoft drivers”.

### Windows 98

Intel does not have Bus Master driver support for Windows 98 because it is not necessary. Like Windows 95 OSR 2.0 or later, Windows 98 also has an easy option to enable bus mastering by following these directions:

1. Click Start / Settings / Control Panel
2. Double-click on the System icon
3. Select the Device Manager tab

4. Click on the device type (i.e., hard drive, CD-ROM, etc.)
5. Select your device
6. Click Settings
7. Click the DMA checkbox then reboot the system.

Contact Microsoft for support of any system issues related to Windows 98.

### **Windows NT 4.0**

Intel does not supply bus mastering support for Windows NT 4.0. Windows NT 4.0 has native bus mastering support with Service Pack 3.

<b>Note:</b> Please read and observe the warnings displayed when using the DMACHECK utility
---

To enable bus mastering in Windows NT 4.0:

1. Install Service Pack 3, which can be obtained from Microsoft.
2. Run the DMACHECK.EXE utility from the support\utils\i386\ directory. The DMACHECK.EXE utility is also available for download as a self-extracting compressed file at:  
<ftp://ftp.microsoft.com/softlib/mslfiles/DMACHCKI.EXE>  
<http://support.microsoft.com/download/support/mslfiles/DMACHCKI.EXE>  
<http://support.microsoft.com/support/kb/articles/Q191/7/74.ASP>
3. When DMACHECK.EXE is run, it will indicate whether DMA is enabled on either IDE channel. Click on the Enabled radio button to enable DMA for each drive and any other DMA-capable devices in the system.
4. Reboot the system.
5. Execute the DMACHECK.EXE utility again to verify that DMA was enabled.
6. If the drive is DMA-capable and DMA is not enabled at this point, this failure must be corrected before proceeding.

If you are using an OEM-built system, please contact the OEM for troubleshooting specific issues related to the system.



## Uninstalling the Intel Bus Master IDE driver

### *Important note for users of Windows 98*

When upgrading from Windows 95 to Windows 98, it is critical to uninstall the Intel Bus Master IDE driver if it is currently present on the system. The Intel Bus Master IDE driver is only intended for Windows 95 and is NOT supported under Windows 98. If the Windows 95 Bus Master IDE driver is not removed before installing Windows 98, the system may experience erratic and unconventional behavior. In order to remove the Intel Bus Master IDE driver in Windows 98, run the Intel Bus Master IDE driver for Windows 95 available at <http://developer.intel.com/design/chipsets/drivers/busmastr/> and select deinstall when prompted. This will uninstall the driver from Windows 98. After uninstalling the driver, Device Manager should show the following:



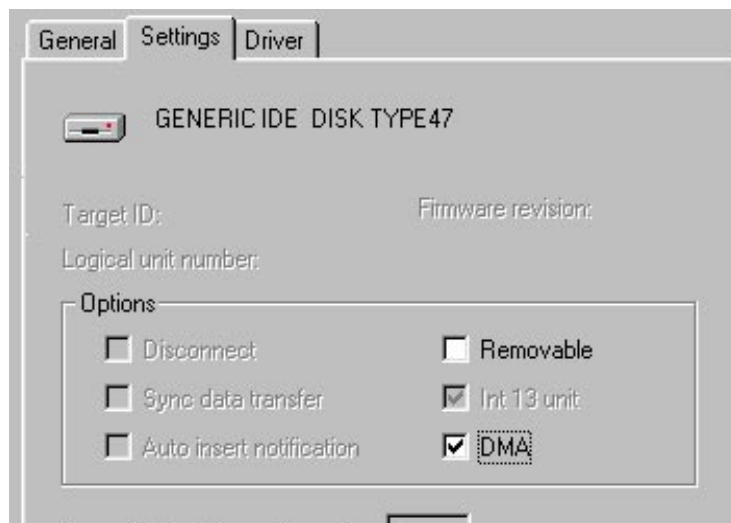
Please refer to the Enabling Bus Mastering using native Microsoft drivers section above for directions on how to enable the operating system's native bus master driver.

## Enabling Bus Mastering using native Microsoft drivers

This section applies only to users with **Windows 95 OSR 2.0 or later** (4.00.950b or 4.00.950c) or **Windows 98**

The Intel Bus master IDE driver for Windows 95 should NOT be used with Windows 95 OEM Service Release 2 (OSR2) or later or with Windows 98. In these configurations, use the bus master drivers that are native to the operating system. This can be done using the DMA checkbox in the Windows 95/98 Device Manager:

- Remove the Intel Bus Master IDE Driver (if it was previously installed) by running the install program and choosing the deinstall option when prompted. The Intel Bus Master IDE driver for Windows 95 is located on the web at <http://developer.intel.com/design/chipsets/drivers/busmastr/>
- Click on Start / Settings / Control Panel
- Double-click on the System icon
- Select the Device Manager tab and double-click on your device (hard drive, CD-ROM, etc.)
- Click the Settings tab
- Check the DMA checkbox and click OK



- Reboot the system

The Windows native bus master drivers have now been installed. Information on related issues can be found in these Knowledge Base articles on Microsoft's web site (<http://www.microsoft.com>):

Article ID	Title
Q171353	Computer with Ultra DMA IDE Controller May Hang
Q161642	Auto Insert Notification May Prevent Automatic Suspend
Q160800	"Fatal Exception Error" with Iomega IDE Zip Drives
Q154976	Error Message Running Jet Database Engine Stress Test
Q154436	Errors Accessing Hard Disk with Spin-Down Enabled
Q154435	Windows 95 IDE Support for SMART, DMA, and ATAPI Tape Drives
Q153471	Problems with Removable IDE Drives in Windows 95

Contact Microsoft\* for information on the native Bus Master drivers or questions related to these or other issues.

## Troubleshooting

### ***Symptom: DMA checkbox does not appear***

#### *Possible Causes:*

- the DMA checkbox will not appear if the Intel Bus Master IDE driver was installed on Windows 95 version 4.00.950b or later, and the system was upgraded to Windows 98. You should enable bus mastering using the driver native to the operating system.
- the IDE device may not be DMA capable.
- if the IDE device is DMA capable, the BIOS may not be configuring the device to support DMA transfers. If this is the case, contact your system or BIOS vendor.

## Using the Intel Bus Master IDE driver for Windows 95

This section applies only to users with **Retail Windows 95** (4.00.950) or **Windows 95 OSR1** (4.00.950a)

### System requirements

To use Bus Master IDE technology, your system must meet ALL of the following requirements:

- A bus-mastering capable Intel® chipset: 430FX/VX/HX/TX or 440FX/EX/LX/BX/GX
- A multi-tasking operating system: Windows 95 version 4.00.950 or 4.00.950a
- A bus mastering capable IDE device (disk drive, CD-ROM) that supports DMA transfers

Before installing the Intel Bus Master IDE driver, see the README.TXT file which is packaged with the driver.

### New features of the Intel Bus Master IDE driver ver 3.02

- Adds support for CD-R, CD-RW, UDMA CD-ROM, LS-120, and hard drives over 8.4 GB
- Implements a command parser for all ATA/ATAPI commands from ASPI, to counteract a condition in which the data flow direction was indeterminate
- Implements a feature to flush hard disk drive write cache at system shutdown, to prevent data loss in the case the hard disk drive experiences power loss before its write cache has been written to disk
- Enables multi-block ATAPI CD-ROM transfers
- Configures all ATAPI tape drives for their fastest possible PIO mode (the Intel PIIX Bus Master IDE driver no longer configures this device class for DMA transfers)
- Adds support for DMA-capable BIOSes
- Installer program fixes a problem with Windows 95 enumeration after driver install, prompting user for location of IDEATAPI.MPD file
- Installer program allows removal of existing Intel Bus Master IDE driver under the Windows 98 operating system.

### Steps to take before installing the Intel Bus Master driver

#### *Resolve Conflicts in Device Manager*

Before installing the Intel Bus Master Drivers, there should be NO conflicts (i.e., yellow exclamation points) in Device Manager / Hard Disk Controllers. The Hard Disk Controllers listing should state:



If this does not agree with your configuration, use the Windows 95/98 INF Update Utility. Also, resolve any yellow exclamation points based on the relevant sections of this document.

## Remove All Real Mode Drivers

**Important Note** Editing system files incorrectly can cause serious problems. Because of this, the following procedure should only be performed by an experienced user under extreme caution.

When the AUTOEXEC.BAT and CONFIG.SYS files include lines such as DEVICE= , the system is loading real mode drivers. The most frequent occurrence is a real mode driver for a CD-ROM drive (i.e., MSCDEX). Also, if Windows was upgraded from any previous version, various AUTOEXEC.BAT and CONFIG.SYS lines may be loaded.

In most cases it is recommended to use the protected mode drivers (when available) for Windows 95/98 to prevent the possible issues of conflicting real mode and protected mode drivers.

**Resolution:** Rename the AUTOEXEC.BAT and CONFIG.SYS files to another extension, such as AUTOEXE.OLD and CONFIG.OLD. This effectively ‘hides’ the files upon next bootup. Another option is to remark out (using REM) all lines in the AUTOEXEC.BAT and CONFIG.SYS files.

**Note:** After using either of these techniques, the drivers included in these files will no longer be loaded at bootup. This may mean that certain devices and/or applications may not have the necessary driver support to function as designed. If this occurs, you may have to restore the original AUTOEXEC.BAT and CONFIG.SYS files by changing the new extensions back to .BAT and .SYS respectively. It may be necessary to modify individual lines in these files for specific devices and/or applications. Please contact the manufacturers of your specific devices and/or applications for further details on correct driver configuration.

## Issues during installation

### **Symptom: Cannot find IDEATAPI.MPD file**

*Possible cause:* Not using the latest version of the Intel Bus Master IDE driver for Windows 95

*Resolution:* The issue is fixed in the latest driver, at <http://developer.intel.com/design/chipsets/drivers/busmastr/>

## Confirming the Intel Bus Master IDE driver for Windows\* 95 is Installed

To confirm that the Intel Bus Master IDE driver for Windows 95 has been loaded, Device Manager / Hard Disk Controllers should show:

```
Intel 82371xB PCI Bus Master IDE Controller
Primary Bus Master IDE controller
Secondary Bus Master IDE controller
```

There is no “dual FIFO” notation after either the primary or secondary IDE controller listing. Verify that the following files exist on system:

```
<Windows 95 directory>\SYSTEM\IOSUBSYS\IDEATAPI.MPD
<Windows 95 directory>\SYSTEM\IOSUBSYS\PIIXVSD.VXD
<Windows 95 directory>\INF\IDEATAPI.INF
```

## Troubleshooting

After installing the Intel Bus Master driver, you may experience certain symptoms that could make your system unstable. Before proceeding, make sure that your system complies with all system configuration requirements previously discussed in this document.

Here is a list of some of the common symptoms:

- Windows 95 freezes on boot up after installing the Intel Bus Master Driver
- Devices connected to the IDE ports are not detected or functioning properly with or without yellow exclamation points under Hard Disk Controllers
- No DMA check box in Device Manager

### ***Symptom: Windows 95 freezes on Boot Up After Installing the Intel Bus Master Driver***

*Possible Cause:* There are real mode drivers in CONFIG.SYS that are conflicting with the bus master driver.

Resolution: Use REM to 'remark out' all of the real mode drivers

*Possible Cause:* There are conflicts in Device Manager / Hard Disk Controllers because the Windows 95 INF Update Utility was not installed before the installation of the Intel Bus Master Driver

Resolution: Uninstall the Intel Bus Master Driver, run the Windows 95 INF Update Utility, then re-install the Intel Bus Master Driver.

*Possible cause:* There is a conflict between Creative Labs' AWE 32/64 drivers and the Intel Bus Master Driver.

Resolution: Change the AWE 32/64 base card I/O address to 220h, change the AWE 32/64 wavetable I/O address to 620h. If these addresses do not work, change the base card I/O address while keeping the wavetable I/O address exactly 400h above. This solution has resolved all known issues concerning this specific conflict. Contact Creative Labs for further details regarding their drivers.

### ***Symptom: Devices connected to the IDE ports are not detected or functioning properly with or without yellow exclamation points under Hard Disk Controllers in Device Manager***

*Possible Cause:* It is likely that the system has unsupported devices installed.

Resolution: Remove any unsupported device(s), uninstall the Intel Bus Master Driver, then re-install either the unsupported device or the Intel Bus Master Driver. If this does not resolve the problem, make sure the system requirements and configurations are met, as noted earlier.

### ***Symptom: No DMA Check Box in Device Manager***

When trying to enable bus mastering in Windows 95 version 4.00.950 or 4.00.950a, there is no DMA checkbox in Device Manager / [device type] (hard drive, CD-ROM, etc.) / [device]

*Possible Cause:* Windows 95 versions 4.00.950 and 4.00.950a do not have native bus mastering support. As a result, the DMA checkbox does not appear after installing the Intel Bus Master IDE driver for Windows 95. The Intel driver uses DMA as the default whenever possible.

**Symptom (with Intel® 430VX/HX): Windows 95 detects the 82371FB instead of the 82371SB/PIIX3**

*Possible Cause:* The Intel Bus Master driver was not properly uninstalled. There is NO impact on system performance due to this change in identification strings.

Resolution: From the Device Manager / Hard Disk Controllers listing:

1. Select 'Intel 82371FB PCI IDE Controller'
2. Click on the Settings tab
3. Click the Update Driver button
4. Choose to view all drivers
5. Click on the 82371SB IDE Controller
6. Reboot your computer

## **Uninstalling the Intel Bus Master Driver**

The Bus Master driver installation Setup program includes an option to uninstall the driver. The installation program can be found at: <http://developer.intel.com/design/chipsets/drivers/busmastr/>

## Other System Issues

When using Intel® chipsets, there are certain other system conflicts which have not been discussed in the previous sections of this document

### ***Intel® 430TX chipset and Seagate Hard Drives***

If the system consists of the Intel® 430TX chipset with Seagate Hard Drives, please note any incompatibility issues detailed on Seagate's web site at: <http://www.seagate.com/support/disc/faq/inteltx.shtml>

### ***Hard Drive running in MS-DOS Compatibility Mode***

To verify if the hard drive is operating under MS-DOS compatibility mode, go to the System Performance tab.

- Click Start / Settings / Control Panel
- Double-click the System icon
- Select the Performance tab

A statement such as “Compatibility Mode Paging reduces overall system performance” suggests one or more hard drives may be running in MS-DOS compatibility (16 bit) mode. This is not the recommended mode of operation and will lead to a system performance loss.

#### *Possible Causes:*

- An “unsafe” device driver, memory-resident program, or virus hooked the INT21h or INT13h chain before Windows 95 loaded.
- The hard disk controller in your computer was not detected by Windows 95.
- The hard disk controller was removed from the current configuration in Device Manager.
- There is a resource conflict between the hard disk controller and another hardware device.
- The Windows 95 protected-mode driver is missing or damaged.
- The Windows 95 32-bit protected-mode disk drivers detected an unsupported configuration or incompatible hardware.

### ***Yellow exclamation point on PCI-to-ISA Bridge***

*Possible Cause:* This conflict is typically caused by a Plug and Play BIOS that reports both a PCI and an ISA bus. The BIOS does a PCI scan and finds the PCI to ISA bridge which then finds the ISA bus. As a result, there is a resource conflict reported when the BIOS does another scan of the ISA bus. This is typical of some BIOS types.

There is NO actual resource conflict and the yellow exclamation point is cosmetic and should not have any impact on the system or its performance. To remove the yellow exclamation point, try contacting the motherboard manufacturer for a BIOS update that will report only the PCI bus.



## ***AGP memory conflict in Device Manager***

*Possible Cause:* In Windows 95, Device Manager specifies that the AGP controller and the AGP video solutions both use the same memory range and reports a conflict. This is because AGP technology was introduced after the original version of Windows 95 was released and the operating system was not designed with the knowledge of AGP.

*Resolution:* It has been confirmed that there is no real conflict and the video will work fine in Windows 95. This issue has been resolved in Windows 98. Contact Microsoft for further details.

## ***Unable to Use USB Ports and Devices in Windows 98***

This issue is specific to the Windows 98 operating system. Please refer to the following article in Microsoft's Knowledge Base at <http://support.microsoft.com/> for details.

Article ID: Q181250  
Title: Unable to Use USB Ports and Devices in Windows 98

## ***USB Conflicts***

*Symptom:* Yellow exclamation point next to Intel 82371AB/EB PCI to USB Universal Host Controller

*Cause:* USB is disabled in the BIOS and/or the Windows 95 USB supplement was not installed before the Windows\*95 INF update utility was installed.

*Resolution:* Make sure that USB is enabled in the BIOS and that the USB supplement is installed prior to running the Windows 95 INF update utility. The USB supplement can only be installed on Windows\* 95 OSR 2.0 or later and is natively integrated into Windows 98. If you are using Windows 95 OSR 2.1 or OSR 2.5, the USB supplement should be listed at Start / Control\_Panel / Settings / Add\_Remove programs / USB\_supplement.

Note: The USB supplement cannot be installed on retail and OSR1 versions of Windows 95.