

# Disk Concepts and Troubleshooting

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When you start a computer from the hard disk, the system BIOS code identifies the startup disk and reads the MBR. The master boot code in the MBR searches for the active, primary partition on the hard disk. If the first hard disk on the system does not contain an active partition, or if the master boot code cannot locate the system partitions boot sector to start the operating system, the MBR displays one of the following error messages:

Invalid partition table.

Error loading operating system.

Missing operating system.

There might not be an active partition on the hard disk that you want to use to start the computer, or the wrong partition might be identified as the active partition. In this case, use an MS-DOS startup floppy disk to start the computer and use the MS-DOS tool Fdisk to set or change the active partition.



## Note

Fdisk can only set primary partitions as the active partition. If MBR corruption prevents Fdisk from setting or changing the active partition, you might need to use a third-party, low-level disk editor that can work under MS-DOS to make this change manually. The partition table field that needs to be changed is the **System ID** field. For more information about the fields in the partition table, see Master Boot Record earlier in this chapter.

## Restoring the MBR

Occasionally the MBR can become corrupted. This can be caused by human error, hardware problems, power fluctuations, viruses, and other factors.

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## Replacing the MBR with a Disk Editor

You need to replace the MBR if it becomes corrupted and you can no longer access any volumes on that disk. If you have backed up the MBR using a tool such as DiskProbe, you can use it to restore the MBR on a non-startable disk. Restoring the backup MBR rewrites the entire sector, including the partition table. However, DiskProbe only runs under Windows 2000 and Windows NT. It does not run under MS-DOS, Windows 95, or Windows 98.

If the MBR on the startup disk is corrupted, you will likely not be able to start Windows 2000 or DiskProbe. For more information about restoring backed up MBRs with DiskProbe, see the document Dskprtrb.doc in the folder C:\Program Files\Support Tools.

If DiskProbe is not available to you, you can use an MS-DOSbased, third-party, low-level disk editor to restore the backup MBR.

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## Replacing the MBR with the Recovery Console

You can also use the Recovery Console to rewrite the MBR to resolve a corrupted MBR on a startup disk.

To start the Recovery Console, start the computer from the Windows 2000 Setup CD or the Windows 2000 Setup floppy disks. If you do not have Windows 2000 Setup floppy disks and your computer cannot start from the CD, use another Windows 2000-based computer to create the setup disks. For information about creating the Windows 2000 Setup floppy disks, see Windows 2000 Professional Help.

Start the computer and enter Windows 2000 Setup. Press ENTER at the **Setup Notification** screen to go to the **Welcome to Setup** screen. Press R to repair a Windows 2000 installation, and then press C to use the Recovery Console.

The Recovery Console displays all valid installations of Windows 2000 on the computer. To access the hard disk, press the number key representing the Windows 2000 installation you want to repair (typically represented as 1: C:\WINNT), and then press ENTER.



### Note

If you press ENTER without typing a number, the Recovery Console quits and restarts the computer.

The Recovery Console may also show valid installations of Windows NT. However, the results of attempting to access a Windows NT installation can be unpredictable.

The Recovery Console then prompts you for the Administrator password.



### Note

To access the hard disks with Recovery Console, you must know the password for the local Administrator account. If you do not have the correct password, or if the security database for the installation of Windows 2000 you are attempting to access is corrupted, Recovery Console does not allow access to the local disks.

To replace the MBR, at the Recovery Console command prompt, type:

### **fixmbr**

Verify if you want to proceed. Depending upon the location and the cause of the corruption within the damaged MBR, this operation can cause the data on the hard disk to become inaccessible. Press Y to proceed, or N to cancel.

### Important

Running **Fixmbr** overwrites only the master boot code, leaving the existing partition table intact. If the corruption in the MBR affects the partition table, running **Fixmbr** might not resolve the problem.

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## Last Resort Alternatives

As a last resort, using a disk editor tool, you can try to copy an MBR from another disk. However, since the partition table is part of the MBR, the new MBR is not likely match the existing partition scheme of the original MBR. If you used DiskMap to save a record of the original partition table, you might be able to manually recreate the partition table in the new MBR.

When you have copied an MBR from another computer of the same type (for example, another computer made by the same manufacturer with identical disk controllers), use a disk editor tool, such as DiskProbe, to edit the partition table information. Verify your work carefully.



### Caution

Overwriting the existing MBR with one from another system and manually recreating the partition table is only recommended for the most advanced users. The likelihood for permanently losing data is very high.

After you have replaced the MBR and edited the partition table, check that it is now functional. If the MBR is still not functional after you have verified that the edits were correct, the problem might be caused by either a hardware problem, such as incorrect SCSI termination or disk controller error, or by a virus.

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## Replacing the Boot Sector

You need to replace the boot sector if it becomes corrupted. The procedure you follow depends upon whether the corrupted boot sector is from the boot volume.

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## Replacing the Boot Sector with a Disk Editor

If the boot sector is not from the boot volume on the hard disk, there are several methods that can be used to replace it. If you backed up the boot sector with DiskProbe, restoring it with DiskProbe is the fastest method.

For NTFS volumes, there is another alternative. When you create or reformat an existing volume as an NTFS volume, NTFS writes a duplicate of the boot sector at the end of the volume (on volumes formatted with Windows 2000 and Windows NT 4.0) or at the logical center of the volume (on disks formatted with Windows NT 3.51 and earlier). You can use DiskProbe to locate and copy this sector to the beginning of the volume. There are also third-party MS-DOS-based disk tools that you can use to locate and copy this backup boot sector to the primary boot sector on the volume.

For specifically replacing corrupted boot sectors from boot volumes, DiskProbe is not always an available option. Unless you have created a Windows 2000 startup floppy disk, you cannot start Windows 2000, which is required by DiskProbe. You can use an MS-DOSbased, third-party, low-level disk editor to restore the backup up boot sector.

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## Replacing the Boot Sector with the Emergency Repair Process

If the boot sector cannot find Ntldr, Windows 2000 cannot start. This condition can be caused by moving, renaming, or deleting Ntldr, corruption of Ntldr, or corruption of the boot sector. Under these circumstances, the computer might not respond to input or might display one of the following error messages:

A disk read error occurred.

NTLDR is missing.

NTLDR is compressed.

If Ntldr is damaged or missing, or if the boot sector is corrupted, you can resolve either problem by starting the Emergency Repair Process and following the prompts for repairing the installation using the Emergency Repair Disk (ERD). For more information about running the Emergency Repair Process and using the ERD, see [Troubleshooting Tools and Strategies](#) in this book.

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## Replacing the Boot Sector with the Recovery Console

You can also use the Recovery Console to replace the corrupted boot sector. To replace the boot sector.

If you do not specify a particular drive, the Recovery Console replaces the boot sector of the boot partition. If another volumes boot sector is corrupted, enter the **Fixboot** command, followed by a space, and then specify the drive letter with a colon.

For more information about starting the Recovery Console, see [Replacing the MBR with the Recovery Console](#) earlier in this chapter. For more detailed information about the Recovery Console, see [Troubleshooting Tools and Strategies](#) in this book.

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