

Crash Recovery

Why do computers crash? There are as many answers to that question as there are stars in the sky. Primarily the answers fall into a couple of categories. Hardware failure, software glitches and operator error. Regardless of the cause, you are stuck and the computer won't work.

This chapter, while being technical in nature, is intended to acquaint the user with the problems faced during a system crash and the steps which need to be taken before the crash.

The major focus is on operating system crashes. If programs develop problems, you may need to uninstall and reinstall the application.

Long before you think about recovery you should think of **prevention** along with the steps needed to **minimize data loss** and **reduce down time**.

Many computers come with programs pre-loaded. They are ready to run once you have followed the simple steps of plugging the hardware together.

Rarely does a computer live its whole life without hardware or software upgrades. Needs change from the time a computer is acquired. Adding hardware and software helps users meet these needs.

Many users acquire their first computer as a used computer. They receive the computer without any documentation or original copies of software. These users are in greatest jeopardy after a crash. Even worse, they have no tools with which to rebuild.

All software which is loaded on the computer (with the exception of freeware) has a license agreement. This license states that the user will not make copies (except for personnel archive purposes), and will not install the software on more than one machine unless they have obtained a additional site licenses. In addition, many licenses prohibit transferring title after registration. Each license is different and each must be read to ensure compliance.

A computer without software is as useful as a camera without film or a car without gas.

If you give away a computer, the license agreement might require you to remove software even if you will never use that software again. The new owner is expected to purchase and load their own copy of the software INCLUDING THE OPERATING SYSTEM. All too often this is not done. The new owner receives the computer with software still loaded but no copies of the original software. They may have made an

(illegal) agreement with the old owner to purchase new copies of the software, but after realizing that this might cost hundreds of dollars, they fail to make the purchases.

Hardware has its own group of problems. Many hardware items, especially those which predate Plug-n-play compatibility, require jumpers and switches to be set or installation programs to be run. If you received a computer without complete documentation, you are flirting with a future disaster. If you fall into this group, start now to locate the needed documentation. Failure to have the needed tools can lead to costly and extended down times.

Programs are easy to reload (as long you have the original copies). You should keep a log of the steps you took as you were loading programs. Note any problems you encountered and your work-around. This information will be very helpful.

Program updates - During the life of a program, manufacturers often create updates to fix known bugs, enhance features, and add functionality. Access to updates and free information from manufacturers is probably one of the most compelling reasons to obtain internet access.

Create a directory called service packs and place all updates in a separate subfolder under service packs. They can be installed from these directories. You might consider making a READ.ME file which includes the internet address or how you obtained the update along with any additional installation information.

Keep data files separate from program files and in separate directories.

These directories should not be in a subfolder of the main program. Uninstall programs might delete the program directory and all your data. Corel products, MS Office, e-mail and cd player programs collect a great deal of personal data.

See the chapter on System Tools

BIOS settings. Another problem faced, especially by older computers, is the loss of BIOS memory. BIOS memory is kept alive by a battery. At some point, all batteries die. The information in the BIOS's CMOS memory is at the heart of the information needed by your computer to start up. (A process called 'booting').

BIOS's today have come a long way. In the early days of PC's, the BIOS's had the brains of a brick and needed the operator to make all the settings. Today, due to the basic consistency of computers, the BIOS's can make several assumptions and create a basic setup which will work in most situations. Still, there is one area of computers which can vary drastically. That is the area which refers to the harddrive setup. Newer

hard-drives can be queried (interrogated) by the BIOS and return their correct setup parameters.

Older systems, some 486's and before, were built before the technology for large hard drives existed. They are not capable of recognizing drives larger than 540 or 850MB.

Some drive manufacturers supplied programs which would 'fool' the BIOS and allow larger drives to operate. I mention these facts about older systems because users of older systems might face additional recovery problems. I would recommend reading the chapter on purchasing a computer before spending large amounts of money recovering from a crash. You should have a list of all the BIOS settings. There are several commercial programs which can help you recover from a BIOS crash, but only if they are run before the crash.

The information you will need to supply to the BIOS about your hard drive (Cylinders, heads sectors and capacity) is usually written on a label on the hard drive. Unfortunately, you may have to take the computer apart to access this information.

During the boot-up process, many BIOS programs report their basic settings on the boot-up screen. Copy all this information down. It may take rebooting several times before you can record everything, but it will be worth it if you don't have to tear the computer apart.

CONFIG.SYS & AUTOEXEC.BAT Windows does not need the information from either of these files to boot. However, MSDOS does. Use a program like Notepad to open and print the information from these files if they exist. They will be in the root directory of the C:\ drive. In a crash recovery situation, you will be booting from the floppy drive to MSDOS.

Final preparations check. Let's assume that you have taken all of the above steps. You still might not be ready for crash recovery. You will need to create a system bootable disk and **make sure it works**. The biggest problem faced by startup disks is the ability to read the CDROM. The second is not having a full tool bag of diagnostic tools which will run in an MSDOS (non-Windows) environment.

All might not be lost. Many computers sold today have the essential contents of the Windows CDROM loaded in a folder on the hard drive. Often it is in a folder called Win95, Windows95, etc. In this folder you should see a program called SETUP. (not C:\WINDOWS - that is the folder which is loaded after setup is run.)

If this recovery folder does not exist on your hard drive, you might consider creating it by copying the content of Win95 or Win98 folder from the CDROM. Windows 95

requires about 65MB of space. Windows 98 requires 105MB. Having this folder available from the command prompt (assuming that the hard drive is not corrupt) will greatly reduce reloading problems.

Creating and testing the disk If you don't know MSDOS, you will have a very difficult time recovering from a major crash.

Use Control Panel | Add/Remove Program | Startup Disk to prepare a crash recovery disk. You will need a blank floppy disk.

After following the directions on screen and making the disk, insert the disk in your floppy drive and reboot your system. Verify that it will boot your system to a DOS window. Verify that you can access your CDROM.

It is very important to ensure access to the CDROM. Windows is distributed on CDROMs. If you can't access the CDROM, you may not be able to rebuild Windows.

Verify that CMOS looks to A:\ first. This is a critical step. If your computer is set to boot from C:\ first and the hard drive is corrupt, you may not be able to access your recovery diskette. This is easy to test. Place the recovery disk in the floppy drive. Turn the system off using proper shut down procedures. Leave the floppy in the drive and boot the system. If all goes well, you will wind up in the black MSDOS screen. If you boot up into Windows, you have a problem. You will need to change your CMOS settings. On the first screen as you are starting your computer, there will be instructions on how to get to setup. Follow these directions. The steps to get into a setup must be taken as quickly as possible before the line "Starting Windows" appears.

Once in CMOS you will have to find an option which refers to your boot-up sequence. The boot-up sequence should be A:,C:, SCSI. Follow the instructions to exit and save the changes.

Once you can boot to the floppy, see if you can access the CDROM. If not, you are still in deep trouble.

Drive letter assignment. The recovery disk might assign a different letter to the CDROM as you are booting.. Press Esc to remove the Windows start up logo and display the system boot-up information.

Windows 95 version B and above creates a startup disk with several optional CDROM drivers. Try to find one which allows you to read your CDROM. If you are unsuccessful at finding a driver which will work, you have a real problem.

CD-ROMS often come with installation software. One of the install options might be to load DOS drivers or you might be asked a question like "Will you need CDROM access to your DOS programs?". Answer YES. This might be all you need to create command lines in your `CONFIG.SYS` & `AUTOEXEC.BAT` files. This is however not the final step.

You will have to copy these lines to the appropriate files on your recovery disk along with any files referenced by these command lines.

Many manufacturers list this information on their web sites. Some information that you will need to obtain the correct drivers includes model number, serial number and manufacturing date. Once again, you might have to open your computer and look on the CDROM label to obtain this information.

Alternate booting methods. Like everything else in your computer, there is more than one way to start your computer. If the source of your crash is not in the BIOS, you will see a line on the screen that states "*Starting Windows 9x*" (x being your version, either 95 or 98) It is at that exact instant, or a little before, that you have a 2-3 second windows of time to alter the boot process. Pressing F5 or F8 can allow you to control the boot process. If you intend to use this method, you need to have your finger poised over the function key waiting for the "Starting Windows" line to appear.

F5. This option will bypass your normal Windows start up files and load a minimal set of drivers. This is called booting into SAFE MODE. This is not designed as an area from which you can use your normal programs. It is intended as a tool to allow you access to make corrections to the system.

If you can't get into Safe Mode, you will have to use one of the F8 options.

F8. This option presents you with a menu screen from which you can select several optional ways to boot.

1. Normal - Ha! If the computer booted normally, you wouldn't have ventured into these options.
2. Logged (\BOOTLOG.TXT) - Here you have an option of writing a text file which chronicles the programs, drivers and steps which were taken during the boot process and if they were successfully implemented. However, unless you have a DOS editor, you may not be able to read the entire file. The internal DOS command `type`, will only allow you to view the last 25 lines of the file. To use the pipe `|more` requires that access to this file be in the path statement. (See the chapter on PATH for more details)
3. Safe Mode - same as F5

4. Step by Step configuration. From here you will have to answer several questions about what you want to load. This is pretty much an on screen version of BOOTLOG.TXT.
5. Command Prompt Only. From here you will have access only to internal DOS commands.
6. Safe Mode Command Prompt Only - See step 5.

Windows 98 has a far superior crash recovery disk than Windows 95.

First I will present information on Windows 95 then Windows 98.

Thus far, this chapter has targeted general information and the steps you need to do to prepare. The balance of this chapter is quite technical in nature.

The following is a listing of a crash recovery disk that is modified to cover several generic computers. The file TED.COM is an old DOS editor. You will need a text editor. Notepad, Write and other Windows editors won't work in DOS. The MSDOS version of EDIT.COM required several support files and takes a huge amount of floppy space.

```
Volume in drive A is CDROM BOOT
Volume Serial Number is 16F2-442E
```

Directory of A:\

```
COMMAND  COM           93,812   08-24-96  11:11a  COMMAND.COM
AUTOEXEC  BAT             148     10-06-98  11:47a  AUTOEXEC.BAT
DRIVERS   <DIR>
FDISK    EXE           63,116   08-24-96  11:11a  FDISK.EXE
FORMAT   COM           49,543   08-24-96  11:11a  FORMAT.COM
TED      COM           12,320   03-02-91   5:01p  TED.COM
PKUNZIP  EXE           29,378   02-01-93   2:04a  PKUNZIP.EXE   [not needed]
SCANDISK EXE          143,818  05-11-98   8:01p  SCANDISK.EXE
MSCDEX   EXE           25,361   05-31-94   6:22a  MSCDEX.EXE   [see \drivers]
TWEAK    <DIR>
CONFIG   SYS            1,279   10-06-98  11:39a  CONFIG.SYS
          9 file(s)          418,775 bytes
```

[should add DEFRAG.COM and HIMEM.SYS]

[You can by pass the \DRIVER folder and place the CDROM driver in the root directory of the floppy.]

Directory of A:\drivers

```
.          <DIR>           08-22-95   6:10p  .
..         <DIR>           08-22-95   6:10p  ..
MTMCDAI   SYS            15,783   01-28-96   1:51a  MTMCDAI.SYS
MSCDEX    EXE           25,361   05-31-94   6:22a  MSCDEX.EXE
LMT55A    SYS            13,984   09-12-94   1:30a  LMT55A.SYS
NEC_IDE   SYS            23,508   03-12-95   4:03a  NEC_IDE.SYS
SGIDECD   SYS            25,482   01-03-95  11:12a  SGIDECD.SYS
```

```
PLEXTOR  SYS          9,648  03-12-95  5:14a  PLEXTOR.SYS
ASPIFCAM SYS          4,293  03-12-95  5:14a  ASPIFCAM.SYS
ATASPI16 SYS          7,629  03-14-95  2:10a  ATASPI16.SYS
FDATAACD SYS         16,122  03-30-95  3:50p  FDATAACD.SYS
VIDE-CDD SYS          7,229  04-25-95  6:38p  VIDE-CDD.SYS
DCAM18XX EXE         44,321  07-15-94  1:20p  DCAM18XX.EXE
INT4BCAM SYS          2,849  07-15-94  1:28p  INT4BCAM.SYS
FDCD     SYS          42,005  10-19-94  10:49a  FDCD.SYS
NECCDR   SYS          39,449  09-27-93  1:43p  NECCDR.SYS
AOATAPI  SYS          21,360  09-06-97  11:22a  AOATAPI.SYS
          15 file(s)          299,023 bytes
```

Directory of A:\tweak [removed for this printout]

A:\CONFIG.SYS - this is a minimal CONFIG.SYS file
device=a:\himem.sys [make sure this file is added to the floppy drive.]
DEVICE=d:\CDROM\AOATAPI.SYS /D:IDECD000 /Q [This is an example line. Make
sure that this line is set correctly for your computer.

A:\CONFIG.SYS

```
[menu]
menuitem=Teac,Teac Quad Speed CDROM
menuitem=Nec,NEC Double Speed/Nec Quad Speed CDROM's
menuitem=Mits4x,Mitsumi Quad Speed/Six Speed/Eight Speed CDROM's
rem menuitem=Med6x,Mediavision Six Speed/Sony Quad Speed CDROM's
menuitem=Memor32,Dave's Memorex CDROM
menuitem=Aztec4x,Aztec Quad Speed/Aztec Six Speed CDROM's
menuitem=4plex,Plextor Four Speed CDROM
menuitem=6plex,Plextor Six Speed CDROM
menuitem=Acer4x,Acer Quad Speed Six Speed/Eight Speed /Sanyo Quad Speed
CDROM's
menuitem=None,No CD-Rom Drive
```

```
[4plex]
DEVICE=a:\drivers\DCAM18XX.EXE /APM
DEVICE=a:\drivers\INT4BCAM.SYS
DEVICE=a:\drivers\ASPIFCAM.SYS /D /O
DEVICE=a:\drivers\FDCD.SYS /D:MSCD0001
```

```
[6plex]
device=a:\drivers\aspifcam.sys
device=a:\drivers\plextor.sys /d:mscd0001
```

```
[aztec4x]
device=a:\drivers\sgidecd.sys /d:mscd0001
```

```
[mits4x]
device=a:\drivers\mtmcdai.sys /d:mscd0001
```

```
rem [med6x]
[Memor32]
rem device=a:\drivers\ataspil6.sys /c:170,15,376 /v
rem device=a:\drivers\fdatacd.sys /d:mscd0001
device=a:\drivers\AOATAPI.SYS /D:IDECD000 /Q
```

```
[nec]
device=a:\drivers\nec_ide.sys /d:mscd0001

[teac]0
device=a:\drivers\lmt55a.sys /d:mscd0001 /t:2 /p:300

[acer4x]
DEVICE=a:\drivers\VIDE-CDD.SYS /D:MSCD0001

[None]
Lastdrive=Z
```

A:AUTOEXEC.BAT

```
rem @echo off
path=A:\;c:\win98rk;a:\;c:\windows;c:\windows\command;d:\dos [Just an
example]
a:\drivers\mscdex.exe /d:IDECD000 [a line similar to this is needed by the
CDROM]
```

Windows 98 recovery disk

Windows98 creates a RAMDISK for the recovery process. This can be very helpful. A RAMDISK uses system RAM instead of the hard drive. Windows 98 contains more recovery utilities than Windows 95. These files are saved in a compressed format. Before they can be used they must be expanded. The assumption is that your hard disk is corrupt and unuseable. Therefore, a RAMDISK is created and the files are loaded there. Still, with its expanded capabilities, all the utilities you need might not be there. There is also a possibility that you won't be able to read the CDROM.

Directory of A:\ recovery disk using the command `dir a: /v/s`

```
Volume in drive A has no label
Volume Serial Number is 279A-6581
```

```
Directory of A:\
File Name           Size           Allocated      Modified      Accessed      Attrib
AUTOEXEC.BAT       1,103          1,536          05-11-98     8:01p        12-26-99     A
CONFIG.SYS         629            1,024          05-11-98     8:01p        12-26-99     A
SETRAMD.BAT        1,416          1,536          05-11-98     8:01p        12-26-99     A
README.TXT         15,608         15,872         05-11-98     8:01p        12-26-99     A
FINDRAMD.EXE       6,855          7,168          05-11-98     8:01p        12-26-99     A
RAMDRIVE.SYS       12,663         12,800         05-11-98     8:01p        12-26-99     A
ASPI4DOS.SYS       14,386         14,848         05-11-98     8:01p        12-26-99     A
BTCDDROM.SYS       21,971         22,016         05-11-98     8:01p        12-26-99     A
ASPICD.SYS         29,620         29,696         05-11-98     8:01p        12-26-99     A
BTDOSM.SYS         30,955         31,232         05-11-98     8:01p        12-26-99     A
ASPI2DOS.SYS       35,330         35,840         05-11-98     8:01p        12-26-99     A
ASPI8DOS.SYS       37,564         37,888         05-11-98     8:01p        12-26-99     A
ASPI8U2.SYS        40,792         40,960         05-11-98     8:01p        12-26-99     A
FLASHPT.SYS        64,425         64,512         05-11-98     8:01p        12-26-99     A
```

EXTRACT	EXE	93,242	93,696	05-11-98	8:01p	12-26-99	A
FDISK	EXE	63,900	64,000	05-11-98	8:01p	12-26-99	A
DRVSPACE	BIN	68,871	69,120	05-11-98	8:01p	12-26-99	A
COMMAND	COM	93,880	94,208	05-11-98	8:01p	12-26-99	A
HIMEM	SYS	33,191	33,280	05-11-98	8:01p	12-26-99	A
OAKCDROM	SYS	41,302	41,472	05-11-98	8:01p	12-26-99	A
EBD	CAB	272,206	272,384	05-11-98	8:01p	12-26-99	A

21 file(s) 979,909 bytes
0 dir(s) 985,088 bytes allocated

Total files listed:

21 file(s) 979,909 bytes
0 dir(s) 985,088 bytes allocated
249,344 bytes free
1,457,664 bytes total disk space, 82% in use

A:\autoexec.bat

```
@ECHO OFF
set EXPAND=YES
SET DIRCMD=/O:N
set LglDrv=27 * 26 Z 25 Y 24 X 23 W 22 V 21 U 20 T 19 S 18 R 17 Q 16 P 15
set LglDrv=%LglDrv% O 14 N 13 M 12 L 11 K 10 J 9 I 8 H 7 G 6 F 5 E 4 D 3 C
cls
call setramd.bat %LglDrv%
set temp=c:\
set tmp=c:\
path=%RAMD%\;a:\;%CDROM%\
copy command.com %RAMD%\ > NUL
set comspec=%RAMD%\command.com
copy extract.exe %RAMD%\ > NUL
copy readme.txt %RAMD%\ > NUL

:ERROR
IF EXIST ebd.cab GOTO EXT
echo Please insert Windows 98 Startup Disk 2
echo.
pause
GOTO ERROR

:EXT
%RAMD%\extract /y /e /l %RAMD%: ebd.cab > NUL
echo The diagnostic tools were successfully loaded to drive %RAMD%.
echo.

IF "%config%"=="NOCD" GOTO QUIT
IF "%config%"=="HELP" GOTO HELP
LH %ramd%\MSCDEX.EXE /D:miscd001 /L:%CDROM%
echo.
GOTO QUIT

:HELP
cls
call help.bat
echo Your computer will now restart and the startup menu will appear.
```

```
echo.  
echo.
```

```
restart.com  
GOTO QUIT
```

```
:QUIT  
echo To get help, type HELP and press ENTER.  
echo.  
rem clean up environment variables  
set CDROM=  
set LglDrv=
```

A:\CONFIG.SYS

```
[menu]
menuitem=CD, Start computer with CD-ROM support.
menuitem=NOCD, Start computer without CD-ROM support.
menuitem=HELP, View the Help file.
menudefault=CD,30
menucolor=7,0
```

```
[CD]
device=himem.sys /testmem:off
device=oakcdrom.sys /D:miscd001
device=btosm.sys
device=flashpt.sys
device=btcdrom.sys /D:miscd001
device=aspi2dos.sys
device=aspi8dos.sys
device=aspi4dos.sys
device=aspi8u2.sys
device=aspicd.sys /D:miscd001
```

```
[NOCD]
device=himem.sys /testmem:off
```

```
[HELP]
device=himem.sys /testmem:off
```

```
[COMMON]
files=10
buffers=10
dos=high,umb
stacks=9,256
devicehigh=ramdrive.sys /E 2048
lastdrive=z
```

d:\randisk directory

Volume in drive G is MS-RAMDRIVE
Directory of G:\

ATTRIB	EXE	15,252	05-06-98	8:01p
CHKDSK	EXE	28,096	05-06-98	8:01p
COMMAND	COM	93,880	05-11-98	8:01p
DEBUG	EXE	20,554	05-06-98	8:01p
DIRGLST	LST	865	12-27-99	5:49a
EDIT	COM	69,902	05-06-98	8:01p
EXT	EXE	13,299	05-06-98	8:01p
EXTRACT	EXE	93,242	05-11-98	8:01p
FORMAT	COM	49,575	05-06-98	8:01p
HELP	BAT	36	05-06-98	8:01p
MSCDEX	EXE	25,473	05-06-98	8:01p
README	TXT	15,608	05-11-98	8:01p
RESTART	COM	20	05-06-98	8:01p
SCANDISK	EXE	143,818	05-06-98	8:01p
SCANDISK	INI	7,329	05-06-98	8:01p
SYS	COM	18,967	05-06-98	8:01p
		16 file(s)	595,916 bytes	

0 dir(s) 1,485,824 bytes free

Changing the rules again. Well, not really. Remember that while you are in the black screen that you are in MSDOS. You don't have a taskbar, therefore no Start button and no way to access the shutdown procedure. No problem! As long as you are not accessing the floppy or hard drives you can simply turn off the power to the computer to shut it down in MSDOS. By accessing, I mean that the floppy drive light is off and that you can not hear hard drive activity and that the drive light is not flashing.

