Most computer data loss is not really data loss at all, rather, the computer simply becomes confused as to where your data is currently located on the hard drive. Many things may cause this confusion, including: a virus, power surges, improper software installation, random hard drive miswrites, installation of a computer game and many other anomalies that can affect the partition, FAT and/or boot sector. Higher Ground Software's **Hard Drive Mechanic** is a low-cost do-it-yourself data recovery solution capable of returning your inaccessible files to you, by re-aligning or re-constructing the file system.

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Higher Ground Software, Inc.
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2

Welcome to The Hard Drive Mechanic™
Deluxe Manual and Gold Manual.

Note: This manual contains screens that indicate The Hard Drive Mechanic Deluxe However, with the exception that the SMART button is on the main screen for the 'Gold' product, most all functions are identical. If you have any questions contact Higher Ground at 770-997-8410.

This manual is a step by step guide to diagnosing and repairing your PC file syste problem(s). By following this manual you will be able to quickly identify and correct over 99% of your PC file system problem(s) in just minutes.

We will begin by running diagnostics to determine the file system problem(s). Once the problem(s) are identified we will move to the appropriate repair feature and initiate re-pair.

You will notice that on each button one letter is a different color or shade than the rest. The shaded or colored letter corresponds to the key you must press on the keyboard to execute that function.

Note: The Hard Drive Mechanic does not use the mouse.

Following is a brief description of the main functions:

Diagnostics – Used to determine the exact nature of the hard drive problem.

IDE Utilities – Used to determine if the problem is caused by the hard drives' electronics. **On the Gold Product, this does not appear, instead the button says S.M.A.R.T**
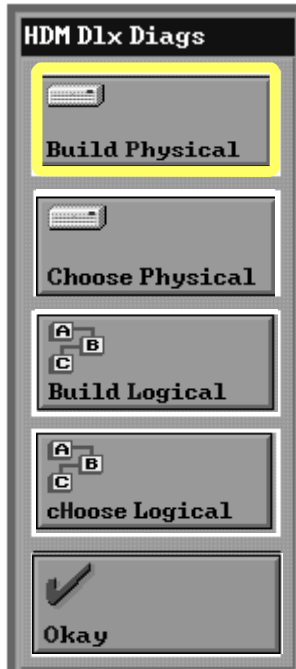
File System – Used to repair the damage.

Rescue Disc – Used to create rescue diskettes, which can reverse any action per-formed by **The Hard Drive Mechanic** in the event that it cannot fix a problem.

Single File Processor (S.F.P.) – Used as a last resort in the event the hard drives' files systems are unrecoverable.

Exit— Exits the program to DOS.

3

File System Diagnostics Page

HDM Deluxe

| Diagnostics | IDE Utilities | File System | Rescue Disc | S.F.P. | eXit |

Let Us Begin

HDM Dlx Diags

Build Physical

Choose Physical

Build Logical

cHoose Logical

Okay

STEP 1: Pres **'D'** for **Diagnostics**. The screen to the left will come up.

STEP 2: Pres **'P'** for **Build Physical.** The screen below will come up.

Note: This message may appear: "*Geometry Inconsistency: PARTITION TABLE AND BIOS TABLE CONFLICT.* "

If the message appears, press **O**kay.

STEP 3: Pres **O**kay.

Physical Drive Scan

Drive ID	80
Partition Test	Passed
Cylinder Test	Passed
Parameters	
Heads	255
Sectors	63
Cylinders	698
Status	Finished
Okay	

4

File System Diagnostics Page

HDM Deluxe

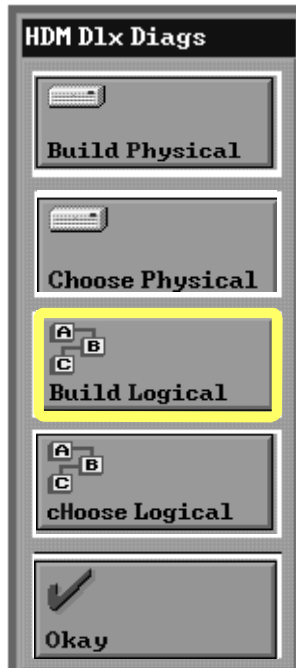| Diagnostics | IDE Utilities | File System | Rescue Disc | S.F.P. | eXit |

HDM Dlx Diags

- Build Physical
- Choose Physical
- Build Logical
- cHoose Logical
- Okay
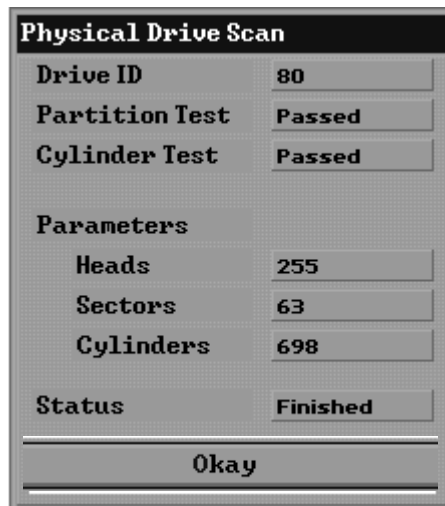
STEP 4: Pres **'L'** for **Build Logical**. The screen below will come up.

Note: This question may appear: "*Will this version of Windows support FAT32 file system?*
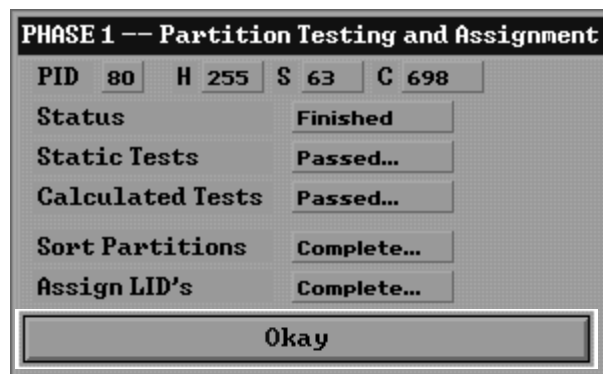
Answer: If your computer has Windows 98 or higher press **Y**es. If you computer has Windows 95 or lower press **N**o.

A series of tests called Phases will begin. The first test is pictured below.

Note: This question may appear*: "Has a FAT 16 - FAT32 conversion utility been used?*

Answer: Generally the answer to this question is **N**o. However if you have used such a utility, the answer is **Y**es.

Press **O**kay when this test is complete.

PHASE 1 -- Partition Testing and Assignment

| PID | 80 | H | 255 | S | 63 | C | 698 |

Status	Finished
Static Tests	Passed...
Calculated Tests	Passed...
Sort Partitions	Complete...
Assign LID's	Complete...
Okay	

5

File System Diagnostics Testing

Note: The following three testing phases will come up in succession. When each phase is complete press **O**kay.

```
PHASE 2 -- Boot Record Typing and Testing
 LID   c
 Type              FAT 32
 Status            Finished
 Static Tests      Passed...
 Calculated Tests  Passed...
            Okay
```

During Phases 2 and 3 this message may pop up: "*Will this version of windows support FAT32 file system?*

Answer: If your computer has Windows 98 or higher press **Y**es. If you computer has Windows 95 or lower press **N**o.

```
PHASE 3 -- File Allocation Table Testing
 LID   c
 Type              FAT 32
 Status            Finished
 Static Tests      Idle...
 Mirror/Size Tests Idle...
            Okay
```

During Phases 2 and 3 this message may pop up: "*Has a FAT 16 - FAT32 conversion utility been used?*

Answer: Generally, the answer to this question is **N**o. However if you have used such a utility, the answer is **Y**es.

```
PHASE 4 -- Geometry and Alignment Testing
 LID
 Type
 Status            Finished
 Correct           0
 Incorrect         0
            Okay
```
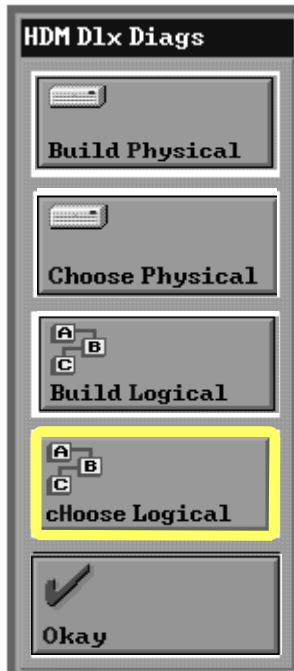
During Phase 4 this message may pop up: "*The Mechanic cannot determine the files system size, are there just a few files on the hard drive?*"

Answer: If there are more than a few files on your hard drive press **N**o.

Note: In some cases this test may take 15 to 30 minutes or more.

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File System Diagnostics Page

HDM Deluxe

Diagnostics	IDE Utilities	File System	Rescue Disc	S.F.P.	eXit

HDM Dlx Diags

- Build Physical
- Choose Physical
- Build Logical
- cHoose Logical
- Okay

STEP 6: Pres 'H' for **cHoose Logical.**

Note: The screen below will come up. This screen allows you to target the failed drive.

Choose Logical Drive

LID	Phase 1	Phase 3
C	Phase 2	Phase 4
Okay		

STEP 7: In succession press **1**,**2**,**3**,and **4** to determine the results of each phase test.

Note: Tests always begin with the 'C' drive:

If a drive other than the 'C' drive has failed the test in a phase, use the *up arrow* or *down arrow* keys on the keyboard to move to the next drive.

Example: You have drives C, D and E. On Phase 2 drive E failed. Use the *up arrow* or *down arrow* to select the failed drive. Press enter on the keyboard. The failed drive will appear below the **LID** field.

**STEP 8:** Pres   **O**kay. Failed drive will load.

STEP 9: Pres   **O**kay.

File System Diagnostics is now complete

Hardware Diagnostics Testing pg. 1

HDM Deluxe

Diagnostics | IDE Utilities | File System | Rescue Disc | S.F.P. | eXit

STEP 1: Pres **'I'** for **IDE Utilities** to begin Hardware Diagnostics. Or if you are using 'The Mechanic Gold' Press '**S**' for SMART.

Note: The following screen will come up.

Found IDE Device(s)

HDM Deluxe found 1 IDE ATA devices. Press 'Okay' button to continue.
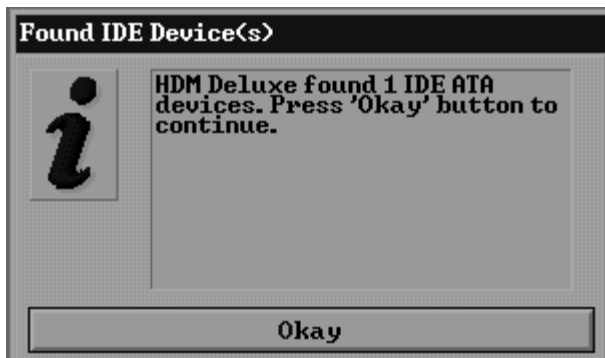
Okay

STEP 2: Pres **O**kay. The following screen will come up.

HDM Dlx IDE Utils

IDE Identifier

Internal Diags

S.M.A.R.T.

Okay

STEP 3: Pres **'D'** for **Internal Diags**. The Internal Diagnostics screen will come up.

Note: If you see the word 'failure' anywhere on this screen contact **Higher Ground Software** at 770-997-8410.

STEP 4: Pres **O**kay.

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Hardware Diagnostics Testing pg. 2

HDM Deluxe

| Diagnostics | IDE Utilities | File System | Rescue Disc | S.F.P. | eXit |

HDM Dlx IDE Utils

- IDE Identifier
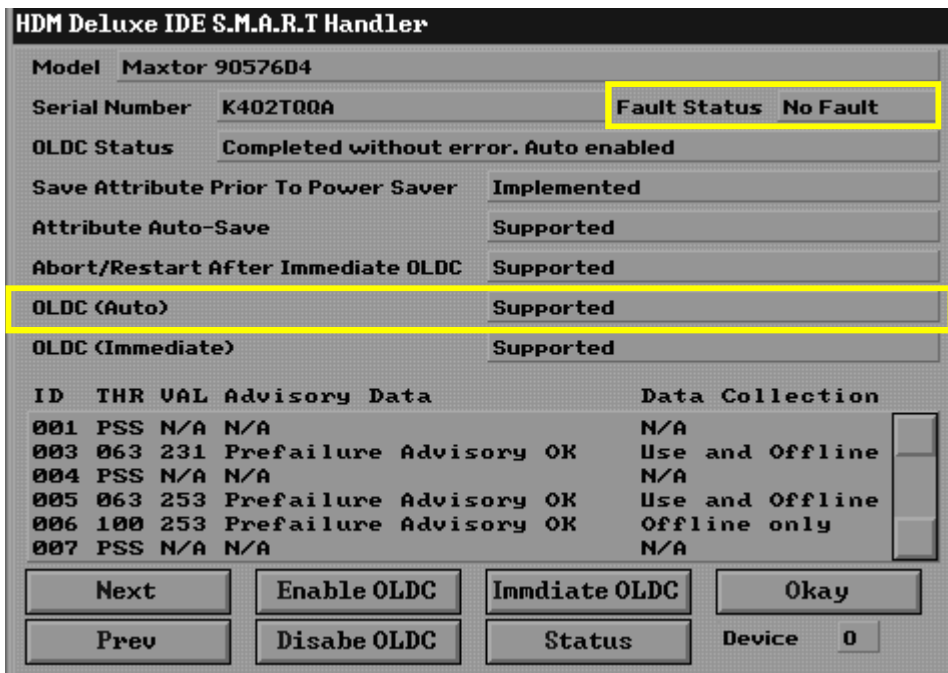- Internal Diags
- S.M.A.R.T.
- Okay

STEP 5: Pres **'S'** for **S**MART utilities. The Screen below will come up.

Note: The **Fault Status** field should say 'No Fault'. If it says anything other than that, call Higher Ground Software at 770-997-8410.

If the **OLDC (Auto)** field reads 'Supported', Press **'E'**. This will turn on your **S.M.A.R.T** technology to assist in monitoring for future hard drive failure.

STEP 6: Pres **O**kay.

Hardware Diagnostics is now complete.

HDM Deluxe IDE S.M.A.R.T Handler

Model   Maxtor 90576D4

Serial Number   K402TQQA   **Fault Status   No Fault**

OLDC Status   Completed without error. Auto enabled

Save Attribute Prior To Power Saver   Implemented

Attribute Auto-Save   Supported

Abort/Restart After Immediate OLDC   Supported

OLDC (Auto)   Supported

OLDC (Immediate)   Supported

ID	THR	VAL	Advisory Data	Data Collection
001	PSS	N/A	N/A	N/A
003	063	231	Prefailure Advisory OK	Use and Offline
004	PSS	N/A	N/A	N/A
005	063	253	Prefailure Advisory OK	Use and Offline
006	100	253	Prefailure Advisory OK	Offline only
007	PSS	N/A	N/A	N/A

| Next | Enable OLDC | Immdiate OLDC | Okay |
| Prev | Disabe OLDC | Status | Device   0 |

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File System Back-Up

Note: If you choose to make a rescue disk proceed to **STEP 1** . **This step is advised but not required.** If you choose to bypass this step proceed to **STEP 2** . If it has been previously determined by **The Mechanic** that your file system is unfixable and you need to move all of your files to another drive, press **'S'**. This will take you to the **Single File Processor** screen. **Skip the following steps and turn to page 15.**

STEP 1A: Press **'R'** to create the rescue disk(s). The screen to the left will come up.

STEP 1B: Press **'S'.** Follow the disc insertion tasks.

STEP 1C: Press **O**kay.

STEP 1D: Press **'F'** to move to The Repair Process.

OR

STEP 2A: Press **'F'** to move to The Repair Process.

INCOMPLETE PAGE # IN NOTE BOX MUST BE ADDED.

The Repair Process

Phase 1 failure: If the Phase 1 test failed, press **'P'**. Go to **Page 13, Step 1** of the manual. If this is your second failure of Phase 1 go to **Page 13, Step 2.**

Phase 2 failure: If the Phase 2 test failed, press **'D'**. Go to **Page 12, Step 1** of the manual. If this is your second failure of Phase 2 go to **Page 12, Step 2.**

Phase 3 failure: If the Phase 3 test failed, press **'F'**. Go to **Page 14**, **Step 1** of the manual. If this is your second failure of Phase 3 go to **Page 14, Step 2.**

Phase 4 failure: If the Phase 4 test failed, press **'F'**. Go to **Page 14** of the manual. First read the note below.

Note: If the **F.A.T (File Allocate Table)** screen is blank or contains garbage contact **Higher Ground Software** at 770-997-8410.

PAGE #S MUST BE CORRECTED

The Boot Record Repair Screen

(Initial Repair Steps)

STEP 1: Pres '**R**' for **R**epair.

Note: The following message will pop up: *"You are about to write data to your hard drive! Doing so may cause more damage. Are you sure you want to write to your boot record?*

STEP 1A: Press **Y**es **only** if the drive letter in the box next to **MEM** corresponds with the drive you selected earlier for repair.

STEP 1B: Press **O**kay. Move to the next repair phase or reboot your PC.

(Second Failure Repair Steps)

STEP 2: Pres '**C**' for **C**lean.

Note: The following message will pop up: *"You are about to write data to your hard drive! Doing so may cause more damage. Are you sure you want to clean your boot record?*

STEP 2A: Press **Y**es **only** if the drive letter in the box next to **MEM** corresponds with the drive you selected earlier for repair.
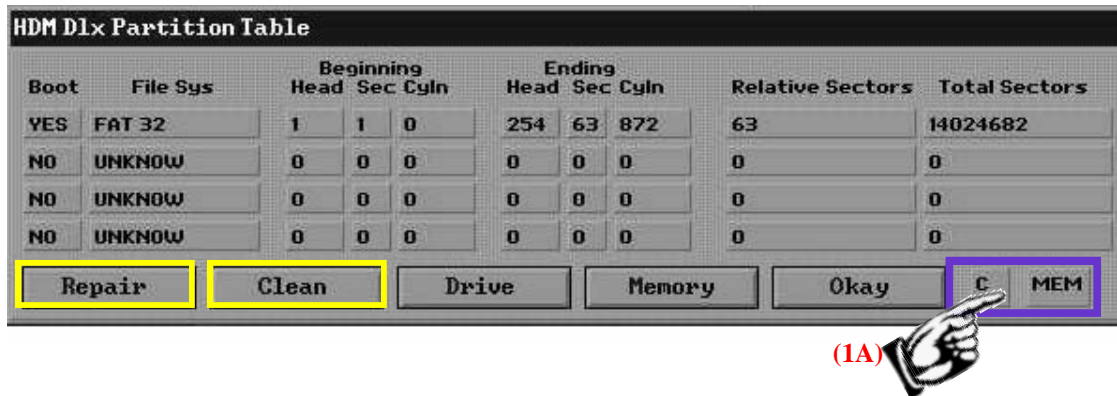
STEP 2B: Press '**R**' for **R**epair.

Note: The following message will pop up: *"You are about to write data to your hard drive! Doing so may cause more damage. Are you sure you want to write to your boot record?*

STEP 2C: Press **Y**es.

STEP 2D: Press **O**kay. Move to the next repair phase or reboot your PC.

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The Partition Table Repair Screen

Boot	File Sys	Beginning Head	Sec	Cyln	Ending Head	Sec	Cyln	Relative Sectors	Total Sectors
YES	FAT 32	1	1	0	254	63	872	63	14024682
NO	UNKNOW	0	0	0	0	0	0	0	0
NO	UNKNOW	0	0	0	0	0	0	0	0
NO	UNKNOW	0	0	0	0	0	0	0	0

(Initial Repair Steps)

STEP 1: Pres 'R' for **R**epair.

Note: The following message will pop up: *"You are about to write data to your hard drive! Doing so may cause more damage. Are you sure you want to write to your Partition Table?*

STEP 1A: Press **Y**es **only** if the drive letter in the box next to **MEM** corresponds with the drive you selected earlier for repair.

STEP 1B: Press **O**kay. Move to the next repair phase or reboot your PC.

(Second Failure Repair Steps)

STEP 2: Pres 'C' for **C**lean.

Note: The following message will pop up: *"You are about to write data to your hard drive! Doing so may cause more damage. Are you sure you want to clean your Partition Table?*

STEP 2A: Press **Y**es **only** if the drive letter in the box next to **MEM** corresponds with the drive you selected earlier for repair.
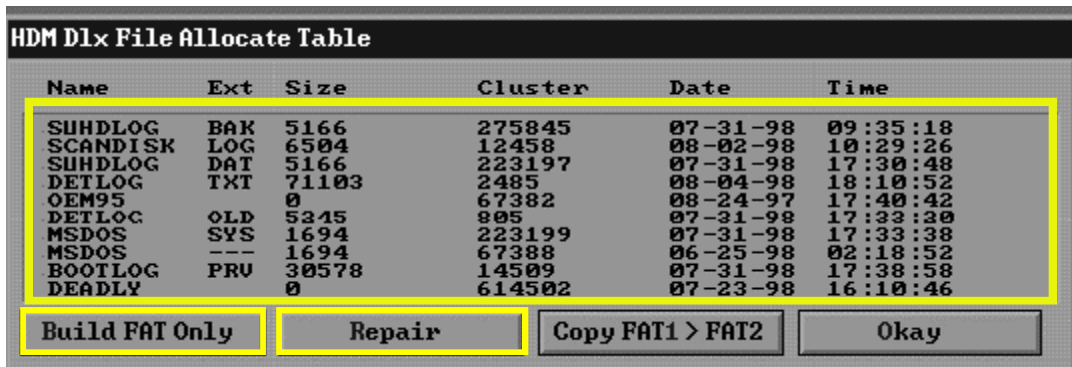
STEP 2B: Press 'R' for **R**epair.

Note: The following message will pop up: *"You are about to write data to your hard drive! Doing so may cause more damage. Are you sure you want to clean your partition table?*

STEP 2C: Press **Y**es.

STEP 2D: Press **O**kay. Move to the next repair phase or reboot your PC.

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The File Allocation Table (F.A.T.) Repair Screen


```
HDM Dlx File Allocate Table

Name        Ext   Size    Cluster   Date       Time

 SUHDLOG    BAK   5166    275845    07-31-98   09:35:18
 SCANDISK   LOG   6504    12458     08-02-98   10:29:26
 SUHDLOG    DAT   5166    223197    07-31-98   17:30:48
 DETLOG     TXT   71103   2485      08-04-98   18:10:52
 OEM95            0       67382     08-24-97   17:40:42
 DETLOG     OLD   5345    805       07-31-98   17:33:30
 MSDOS      SYS   1694    223199    07-31-98   17:33:38
 MSDOS      ---   1694    67388     06-25-98   02:18:52
 BOOTLOG    PRV   30578   14509     07-31-98   17:38:58
 DEADLY           0       614502    07-23-98   16:10:46

 Build FAT Only      Repair      Copy FAT1 > FAT2      Okay
```

Note: If the above screen is blank or has garbage **STOP** and call **Higher Ground Software at 770-997-8410.**

(Initial Repair Steps)

STEP 1: Pres **'R'** for **Repair**.

Note: The Following message will pop up: *"You are about to write data to your hard drive! Doing so may cause more damage. Are you sure you want to write to your F.A.T.?*

STEP 1A: Press **Y**es.

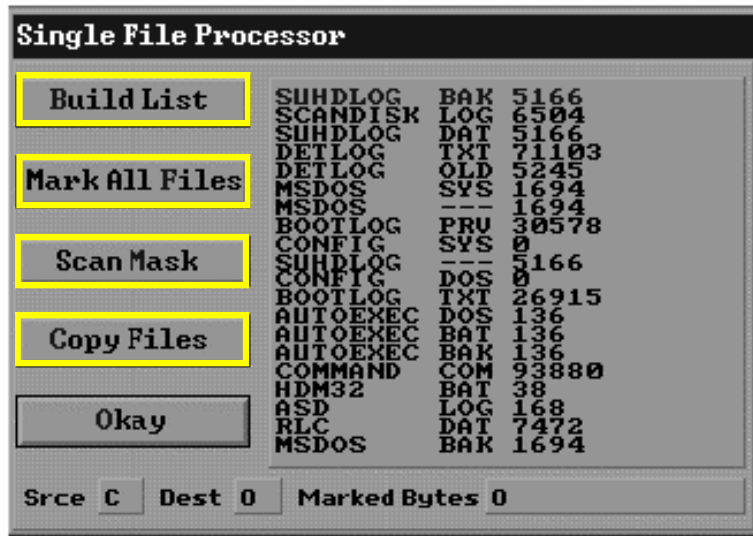**STEP 1B:** Press **O**kay. Move to the next repair phase or reboot your PC.

(Second Failure Repair Steps)

STEP 2: Pres **'B'** for **Build FAT Only**.

This message will pop up: *"You are about to write data to your hard drive! Doing so may cause more damage. Are you sure you want to Build your FAT?*

STEP 2A: Press **O**kay. Exit the program and reboot your PC.

14

Disaster Recover —The Single File Processor

```
Single File Processor

  ┌──────────────┐   SUHDLOG    BAK   5166
  │ Build List   │   SCANDISK   LOG   6504
  └──────────────┘   SUHDLOG    DAT   5166
                     DETLOG     TXT   71103
  ┌──────────────┐   DETLOG     OLD   5245
  │Mark All Files│   MSDOS      SYS   1694
  └──────────────┘   MSDOS      ---   1694
                     BOOTLOG    PRV   30578
  ┌──────────────┐   CONFIG     SYS   0
  │ Scan Mask    │   SUHDLOG    ---   5166
  └──────────────┘   CONFIG     DOS   0
                     BOOTLOG    TXT   26915
  ┌──────────────┐   AUTOEXEC   DOS   136
  │ Copy Files   │   AUTOEXEC   BAT   136
  └──────────────┘   AUTOEXEC   BAK   136
                     COMMAND    COM   93880
  ┌──────────────┐   HDM32      BAT   38
  │    Okay      │   ASD        LOG   168
  └──────────────┘   RLC        DAT   7472
                     MSDOS      BAK   1694

  Srce C │ Dest 0 │ Marked Bytes 0
```

Note: If you are selecting **ALL** files to move to another hard drive go to **STEP 1**.

OR

If selecting **Specific** files go to **STEP 2.**

STEP 1: Pres   **B** for **Build List.** Move to **STEP 3.**

Note: This function scans the drive for all files and can take anywhere from 2 hours to 2 days to complete. Once it is complete you may scroll through the list using the ↑or ↓ keys.

STEP 2: Pres   **M** for **Scan Mask.** Move to **STEP 1.**

Note: This function allows you to select specific files. For example: ***.doc** will select only **.doc** extension files while **Ti?.*** will give you all files starting with the letters **'Ti'**. To select multiple files, separate them with a comma.

STEP 3: Pres   **F** for **Mark All Files.**

Note: You may scroll through your entire list and Unmark or Mark specific files for retrieval.
*Pressing `M' on your keyboard will mark a file for retrieval.
*Pressing `U' on your keyboard will unmark a file for retrieval.

STEP 4: Pres   **C** for **Copy files**.

Note: There must be a least two physical drives on the system in order for the copy command to work. The destination hard drive must have sufficient space in order to accommodate all the files.

STEP 5: Pres   **O**kay. Exit the program. Reboot your PC.

This Completes The Hard Drive Mechanic Disaster Recovery.

Appendix

Smart Screen Functions and Fields

Following is a short description of the functions and fields.

- The **Model** field is the manufacturer and model number of the drive(s).
- The **Serial Number** field is the serial number of the hard drive.
- The **Fault Status** field indicates whether the **S.M.A.R.T** technology has or has not detected a problem. There may or may not be a message in this space if the **OLDC (Auto)** field is **'Not Supported'**.
- The **OLDC (Offline Data Collection) Status** field indicates the results of the tests. (In the above red rectangle you may use the arrow keys to scroll for additional tests).
- The **Save Attribute Prior to Power Saver** monitors for power saver and saves prior to its execution.
- The **Attribute Auto-Save** saves the current attributes.
- The **Abort/Restart After Immediate OLDC** Resets after pressing immediate OLDC.
- The **OLDC (Auto)** field indicates **'Supported'** if the drive allows for constant monitoring of the S.M.A.R.T. technology and **'Not Supported'** if it does not. This function is turned on by pressing the **Enable OLDC** button and turned off by pressing the **Disable OLDC** button.
- The **OLDC (Immediate)** field is used to instantly check the condition of the hard drive. This function is used if the **OLDC (Auto)** is **'Not Supported'** and initiated by pressing the **Immediate OLDC** button.
- Enable OLDC button turns on self monitoring
- Disable OLDC button turns off self monitoring
- Immediate OLDC executes a check if auto monitoring is not supported.

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Single File Processor (S.F.P) Functions

Note: This function is only used as a last resort. The **Single File Processor** is designed to recover files when the file system cannot be repaired. This field will locate and copy all files on the hard drive and relocate the files to a separate hard drive.

Single File Processor

Build List	
Mark All Files	
Scan Mask	
Copy Files	
Okay	

```
SUHDLOG    BAK  5166
SCANDISK   LOG  6504
SUHDLOG    DAT  5166
DETLOG     TXT  71103
DETLOG     OLD  5245
MSDOS      SYS  1694
MSDOS      ---  1694
BOOTLOG    PRU  30578
CONFIG     SYS  0
SUHDLOG    ---  5166
CONFIG     DOS  0
BOOTLOG    TXT  26915
AUTOEXEC   DOS  136
AUTOEXEC   BAT  136
AUTOEXEC   BAK  136
COMMAND    COM  93880
HDM32      BAT  38
ASD        LOG  168
RLC        DAT  7472
MSDOS      BAK  1694
```

Srce **C** Dest **0** Marked Bytes **0**

This letter indicates the damaged drive.

The number in this box indicates the destination drive.

The number in this box indicates the total number of bytes to be copied to the destination drive.

This field shows all files found. You can scroll using your arrow keys to look at the entire list.

Build List
This function scans the drive for all file names or file names matching the **Scan Mask** template.

Mark All Files
This function selects all files listed for retrieval.

Scan Mask
This function allows you to select specific files for removal.

Copy files
This function will move all selected files to the new drive.

NOTE: There must be a least two physical drives on the system in order for the copy function to work.

IDE Identifier Functions

HDM Deluxe IDE Identify Drives

Model	Maxtor 90576D4		
Serial Number	K402TQQA	Rev	WAS82739

MFM Encoded	Yes	Heads	16
Sector Type		Sectors	63
Seek Time	< 15usec	Cylinders	11166
DMA Xfer	Yes	R/W SPI	16
Xfer Rate		UNF BP Track	0
RS Tolerance	< 0.5%	UNF BP Sector	0
I/O Access	16	Buffer Size	262144

DMA Timing Mode	2	PIO Timing Mode	2
Cycle Time	480	Cycle Time	383
DIOR/DIOW 16 bit	240	DIOR/DIOW 16 bit	125
DIOW Data Setup	100	DIOW Data Setup	45
DIOW Data Hold	30	DIOW Data Hold	20
DIOR Data Setup	150	DIOR Data Setup	35
DIOR Data Hold	5	DIOR Data Hold	5
Buffer Type	Dual Port, BISYNCHRONOUS, CACHED		

Next **Prev** **Okay** Device 0

These button allows you to cycle through all hard drives.

Note: This screen identifies all hard drive(s) in the PC along with their specifications, manufacturer, model and serial number.

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Boot Record Repair Functions

Note: This screen shows the boot sector, file system type and volume label information.

HDM D1x Boot Record							
	Version	MSWIN4.1					
File System Type	FAT32		Volume Label	NO NAME			
Bytes Per Sector	512		Root Directory	2			
Sectors Per Cluster	8		Total Heads	255			
Sectors Per Track	63		Reserved Sectors	32			
Sectors Per FAT	10956		Total Sectors	11229372			
Repair	Clean	Drive	Memory	Okay		C	MEM

This is your drive setup information.

The letter in this box indicates which partition you are viewing.

This box indicates whether the information presented is in the memory or the hard drive.

Repair: This function repairs the boot record.

Clean: This function erases the boot record.

Drive: This function reads the information as reported by the currently loaded partition table.

Memory: This function displays the changes the **Mechanic** will make once you press **R**epair.

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The Partition Table Repair Screen

Note: This screen shows all current partitions loaded into memory.

HDM Dlx Partition Table										
Boot	File Sys	Beginning			Ending			Relative Sectors	Total Sectors	
		Head	Sec	Cyln	Head	Sec	Cyln			
YES	FAT 32	1	1	0	254	63	872	63	14024682	
NO	UNKNOW	0	0	0	0	0	0	0	0	
NO	UNKNOW	0	0	0	0	0	0	0	0	
NO	UNKNOW	0	0	0	0	0	0	0	0	

Repair   Clean   Drive   Memory   Okay   C   MEM

This information shows you the various partitions on your drive and their file system type.

This information shows you the head sector and cylinder information associated with each partition.

The letter in this box indicates whether the information presented here is in memory or reported by the drive itself.

Repair: This function repairs the partition.

Clean: This function erases the partition.

Drive: This function reads the information as reported by the currently loaded partition table.

Memory: This function displays the changes **The Mechanic** will make once you press **R**epair.

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The File Allocation Table (F.A.T.) Repair Screen

Note: This screen shows up to ten (10) files along with their extension, size, cluster location, date and time.

This information shows up to 10 file names, extensions and file sizes.

This information shows the file cluster location, date and time the files were created.

Build FAT only: Rebuilds the damaged FAT.

Repair: Repairs the damaged FAT.

Copy FAT1>FAT2 : This function copies FAT2 to FAT1.

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