HITACHI
Inspire the Next

Hitachi Feature Tool
Usage Instructions

To support World Wide Web release
of Hitachi Feature Tool

29 May, 2007

Table of Contents

What is the Hitachi Feature Tool?

The Hitachi Feature Tool is a utility, which allows the user control over some of the parameters of today's high performance ATA hard disk drives.

The features, which this release of the Feature Tool supports, are,

Change Acoustic Level
This function is generally referred to as Automatic Acoustic Management (AAM) and is available on the newer Hitachi Global Storage Technologies ATA drives and Legacy IBM ATA Hard disk drives.
The acoustic level of the drive can be modified to better suite the environment in which it is functioning.
The drive performance may vary as the acoustic level changes with increased acoustic management.

Change Advanced Power Mode
This feature allows you to change the default power saving mode of the drive. The device preserves the selected power mode across all forms of reset, that is Power on, Hardware and Software resets.

Change Cache Settings
Read and write caching are performance enhancement features of hard disk drives. Write cache allows the drive to write data out to the disk media some time after reporting to the system that the write operation had been completed. This data is protected provided power isn't removed from the drive.
Read caching is where data is read form the disk media and kept in its buffer in anticipation that the data that the system next requires is already in the buffer.

Change the Capacity
Change the predefined capacity of the drive. This option can be used in situations where there is a BIOS limitation and the drive is not recognised.

Change S.M.A.R.T. Operations
SMART (**S**elf-**M**onitoring, **A**nalysis and **R**eporting **T**echnology) is intended to protect user data by monitoring and storing critical performance and calibration parameters. SMART devices uses sophisticated analysis algorithms to predict the likelihood of near-tern degradation or fault conditions.

Change Ultra DMA Mode
Modern ATA drives are currently designed to function at bus speed up to 100 MB/sec. The bus speed associated with each Ultra DMA Mode is as follows.

UDMA Mode 0   -   ATA   16 (16.7 MB/sec)

UDMA Mode 1   -   ATA   25 (25 MB/sec)

UDMA Mode 2   -   ATA   33 (33 MB/sec)

UDMA Mode 3   -   ATA   48 (48 MB/sec)

UDMA Mode 4   -   ATA   66 (66 MB/sec)

UDMA Mode 5   -   ATA 100 (100 MB/sec)

UDMA Mode 6   -   ATA 133 (133 MB/sec)

Some older (Legacy) motherboard and Plug-in ATA adapters may not support the higher bus speeds and installing one of these newer ATA hard disk drives could cause a malfunction of your system. To resolve this incompatibility it may be required to reduce the bus speed that the drive is operating at to one which is more compatible with the Motherboard/Plug-in adapter.

Show Drive Temperature

This feature displays the current temperature inside the disk drive. The temperature around the disk drive is normally about 5 °C lower.

Change SATA Settings

This allows the user to change the Hard Drive's maximum supported interface speed or Enable / Disable Spread Spectrum Clocking.

Max capable drive interface speed – 1.5Gb/s or 3.0Gb/s

Spread Spectrum Clocking – Enable / Disable

<div style="border: 2px solid red;">

WARNING!
SWITCHING YOUR DRIVE TO SUPPORT 3.0Gb/s OR ENABLING SPREAD SPECTRUM CLOCKING ON YOUR DRIVE AND THEN USING IT IN A SYSTEM THAT CANNOT SUPPORT THESE FUNCTIONS, MAY RENDER YOUR DRIVE UNUSABLE IN THAT SYSTEM.

</div>

In the event that you do this, the only fix is to re-run Feature Tool on a system that supports those features and changing the settings back again.

If you are in any doubt as to the capabilities of your machine, do not change these settings. For further information and advice about your system, please contact your system manufacturer.

Supported Product / Feature Table

	AAM	APM	Cache	Clip	SMART	Temp	UDMA	SATA
Deskstar								
HDS7210xxKLA3xx	✓	✓①	✓②	✓	✓	✓	✓	✓
HDS7210xxKLATxx	✓	✓①	✓②	✓	✓	✓	✓	✗
HDT7250xxVLA3xx	✓	✓①	✓②	✓	✓	✓	✓	✓
HDT7250xxVLATxx	✓	✓①	✓②	✓	✓	✓	✓	✗
HDS7216xxPLA3xx	✓	✓①	✓②	✓	✓	✓	✓	✓
HDS7216xxPLATxx	✓	✓①	✓②	✓	✓	✓	✓	✗
HDS725050KLA3xx	✓	✓①	✓②	✓	✓	✓	✓	✓
HDS725050KLATxx	✓	✓①	✓②	✓	✓	✓	✓	✗
HDT7225xxDLA3xx	✓	✓①	✓②	✓	✓	✓	✓	✓
HDT7225xxDLATxx	✓	✓①	✓②	✓	✓	✓	✓	✗
HDS7280x0PLA3xx	✓	✓①	✓②	✓	✓	✓	✓	✓
HDS7280x0PLATxx	✓	✓①	✓②	✓	✓	✓	✓	✗
HDS724040KLSAxx	✓	✓①	✓②	✓	✓	✓	✓	✗
HDS724040KLATxx	✓	✓①	✓②	✓	✓	✓	✓	✗
HDS7225xxVLSAxx	✓	✓①	✓②	✓	✓	✓	✓	✗
HDS7225xxVLATxx	✓	✓①	✓②	✓	✓	✓	✓	✗
IC35L0xxAVV207	✓	✓①	✓②	✓	✓	✓	✓	✗
IC35L0xxAVVN07	✓	✓①	✓②	✓	✓	✓	✓	✗
IC35L0xxAVVA07	✓	✓①	✓②	✓	✓	✓	✓	✗
IC35L0xxAVER07	✓	✓①	✓②	✓	✓	✓	✓	✗
IBM-DTLA	✓	✓①	✓②	✓	✓	✓	✓	✗
IBM-DPTA	✗	✗	✓②	✓	✓	✓	✓③	✗
IBM-DJNA	✗	✗	✓②	✓	✓	✓	✓	✗
IBM-DTTA	✗	✗	✓②	✓	✓	✗	✓	✗
IBM-	✗	✗	✓②	✓	✓	✗	✓	✗
Travelstar								
HTS5425xxK9A3x	✓	✓①	✓②	✓	✓	✓	✓	✓
HTS5425xxK9SAx	✓	✓①	✓②	✓	✓	✓	✓	✓④
HTS7220xxK9A3x	✓	✓①	✓②	✓	✓	✓	✓	✓
HTS7220xxK9SAx	✓	✓①	✓②	✓	✓	✓	✓	✓④
HTS5412xxH9SAx	✓	✓①	✓②	✓	✓	✓	✓	✓④
HTS5412xxH9ATx	✓	✓①	✓②	✓	✓	✓	✓	✗
HTE5416xxJ9SAx	✓	✗	✓②	✓	✓	✓	✓	✓④
HTE5416xxJ9ATx	✓	✗	✓②	✓	✓	✓	✓	✗
HTS5416xxJ9SAx	✓	✓①	✓②	✓	✓	✓	✓	✓④
HTS5416xxJ9ATx	✓	✓①	✓②	✓	✓	✓	✓	✗
HTS4212xxH9ATx	✓	✓①	✓②	✓	✓	✓	✓	✗
HTE7210xxG9SAx	✓	✗	✓②	✓	✓	✓	✓	✗
HTE7210xxG9ATx	✓	✗	✓②	✓	✓	✓	✓	✗
HTS7210xxG9SAx	✓	✓①	✓②	✓	✓	✓	✓	✗
HTS7210xxG9ATx	✓	✓①	✓②	✓	✓	✓	✓	✗
HTE5410xxG9SAx	✓	✗	✓②	✓	✓	✓	✓	✓④
HTE5410xxG9ATx	✓	✗	✓②	✓	✓	✓	✓	✗
HTS5410xxG9SAx	✓	✓①	✓②	✓	✓	✓	✓	✓④
HTS5410xxG9ATx	✓	✓①	✓②	✓	✓	✓	✓	✗

HTS4240xxM9ATx	✓	✓①	✓②	✓	✓	✓	✓	✗
HTS7260xxM9ATx	✓	✓①	✓②	✓	✓	✓	✓	✗
HTS5480xxM9Atx	✓	✓①	✓②	✓	✓	✓	✓	✗
IC25x0xxATMR0x	✓	✓①	✓②	✓	✓	✓	✓	✗
IC25x0xxATCX0x	✗	✓①	✓②	✓	✓	✓	✓	✗
IC25x0xxATCS0x	✗	✓①	✓②	✓	✓	✓	✓	✗
IC25x0xxATDA0x	✗	✓①	✓②	✓	✓	✓	✓	✗
IBM-DJSA	✗	✓①	✓②	✓	✓	✓	✓	✗
IBM-DSHA	✗	✗	✓②	✓	✓	✗	✓	✗
IBM-DCLA	✗	✗	✓②	✓	✓	✗	✓	✗
IBM-DARA	✗	✗	✓②	✓	✓	✗	✓	✗
IBM-DCYA	✗	✗	✓②	✓	✓	✗	✓	✗
IBM-DCXA	✗	✗	✓②	✓	✓	✗	✓	✗
IBM-DBCA	✗	✗	✓②	✓	✓	✗	✓	✗
IBM-DKLA	✗	✗	✓②	✓	✓	✗	✗	✗
IBM-DADA	✗	✗	✓②	✓	✓	✗	✗	✗
IBM-	✗	✗	✓②	✓	✓	✗	✗	✗

Notes:

① BIOS can change these values on the next reboot, power on cycle or reset

② BIOS, RAID Controller or somePCI IDE Controllers can change these values on the next power on cycle or reset.

③ This function is only supported for the microcode levels A20J and A30A

④ Only Spread Spectrum Clocking is changeable

Creating a Feature Tool Diskette

Windows 9x, Me, NT, 2000 & XP

The Hitachi Feature Tool set-up program (**FeatureTool-install.exe**) includes IBM DOS2000 and the Hitachi Feature Tool programs. Running the set-up program creates an IBM DOS2000 bootable diskette that contains the Hitachi Feature Tool. In order to run the set-up program you will need to have access to a system that is running any of the following operating systems, Windows'95, Windows'98, Windows Millennium, Windows NT, Windows 2000 or Windows XP and a formatted 1.44-MB diskette.

It is recommended that before starting the set-up program, all open Windows applications should be closed.

The following represents two examples of how the Hitachi Feature Tool diskette can be created.

Method A.

1. Insert a formatted diskette into the Floppy drive, (**A:** or **B:**).

2. Using Windows Explorer, locate the program **FeatureTool-install.exe** downloaded from the Internet.

3. To start diskette creation: double-click on the program icon and follow the on screen instructions. **Note:** you have the option to select your country location and keyboard layout, the default for these options is United States.

Method B.

1. Click Start, and then select Run.

2. Click the Browse button to locate the **FeatureTool-install.exe** set-up program.

3. Click on the filename, and then click Open.

4. Click OK to run the **FeatureTool-install.exe** set-up program.

5. Insert a formatted 1.44-MB diskette into the required floppy drive (A or B if your system has 2 floppy drives), select the target floppy on the set-up screen then click next to continue.

6. Follow the on-screen instructions.

Linux

The Hitachi Feature Tool image file (e.g. **FeatureTool-install-img.bin**) includes IBM PC DOS2000 and the FTOOL.EXE Utility

Running the Linux Disk Dump (DD) utility creates an IBM PC DOS 2000 bootable diskette that contains the Hitachi FTOOL Utility.

A formatted 1.44-MB diskette is required to create the Hitachi Feature Tool diskette.

To create the bootable Feature Tool diskette under Linux:

1. Download the Feature Tool image file (**FeatureTool-install-img.bin**) into a known directory on your PC.

2. Insert a formatted 1.44-MB diskette into your floppy disk drive.

3. Make sure that the floppy disk is un-mounted.

4. Change directory to where you saved the image file.

5. Run the Disk Dump (DD) utility with the following parameters:
   DD if=FeatureTool-install-img.bin of=/dev/fd0 bs=8k

6. The bootable Feature Tool diskette will now be created, Note this could take a couple of minutes.

7. Once the creation of the bootable diskette is complete you may need to edit the Autoexec.bat file to map the keyboard for your country.

   e.g. Change UK to US in the following line to go from a UK (United Kingdom) keyboard layout to a US (United States) layout.
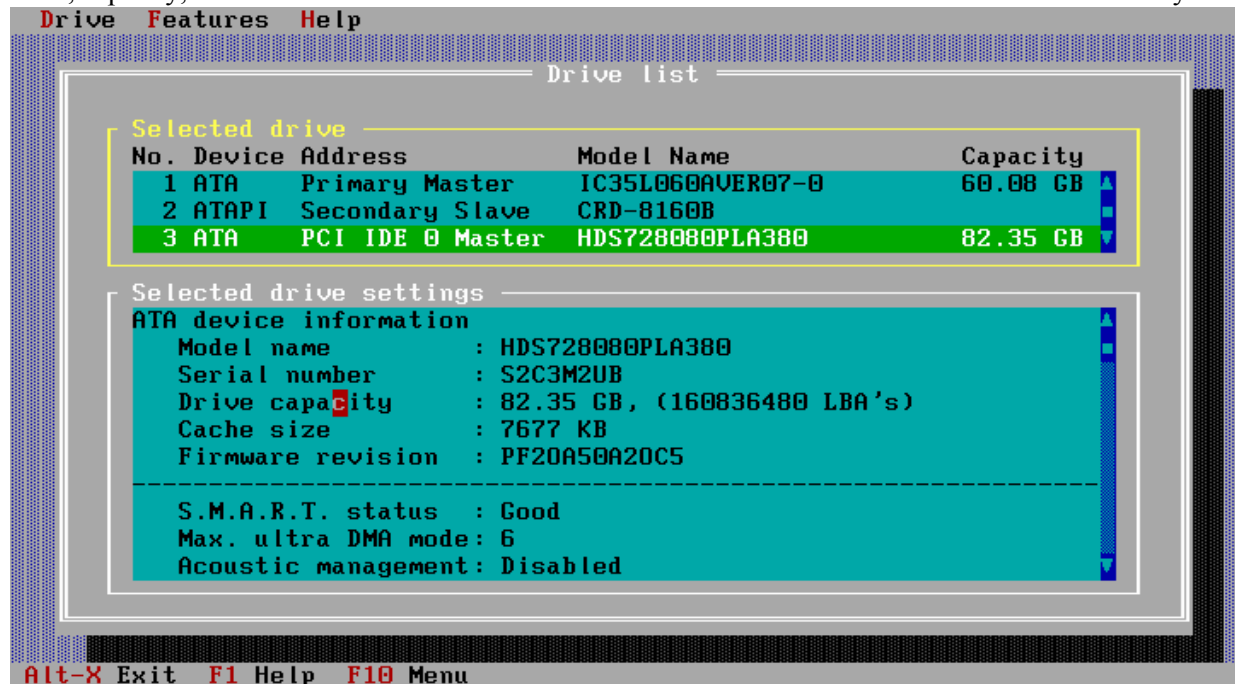
   KEYB **UK**,A:\DOS\KEYBOARD.SYS
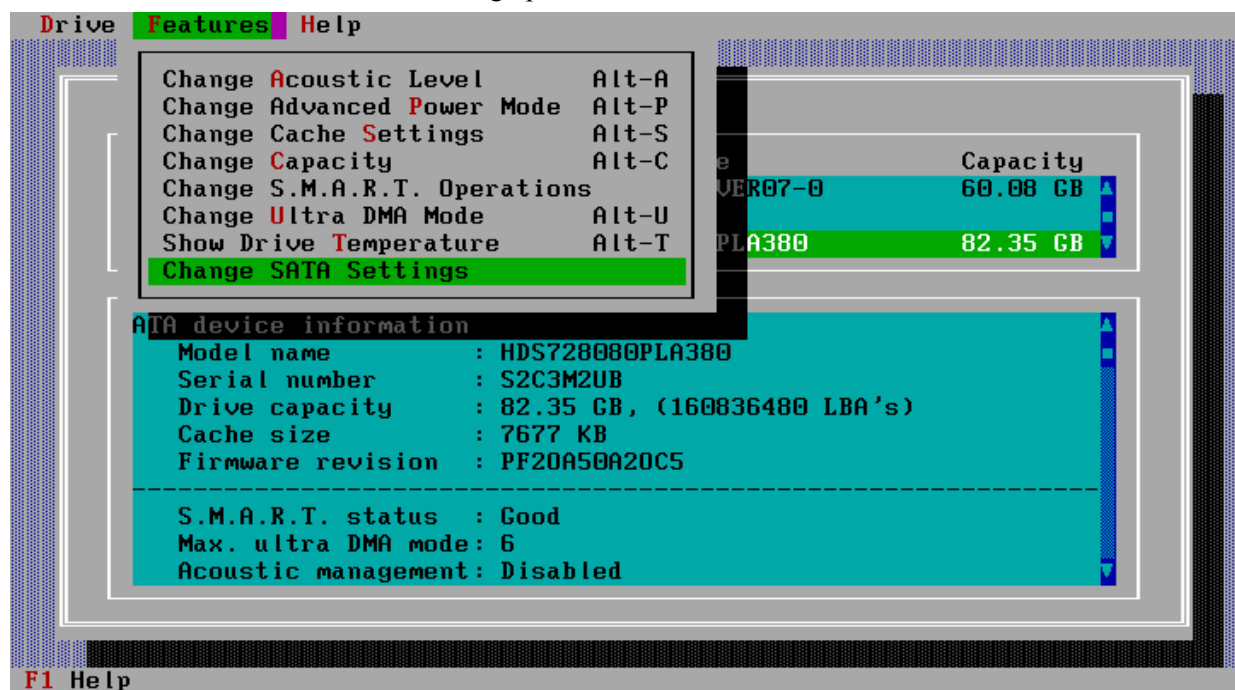
Running the Hitachi Feature Tool

Place the prepared floppy disk in the system containing the drive to be modified and boot the system either by a) power cycling, b) pressing the reset button or c) pressing the <Ctrl><Alt><Del> keys.

When the system boots the Hitachi Feature Tool program will load automatically and present you with a License Agreement, which you must accept to proceed.

You will then be presented with the drive list screen as shown below. This screen list all the ATA devices installed in the system and provide additional details for each such as serial number, firmware level, capacity, current acoustic mode level and the Ultra DMA mode to which the drive is currently set.

```
 Drive  Features  Help

                        ═ Drive list ═
   ┌ Selected drive ──────────────────────────────────────┐
   │ No. Device Address        Model Name        Capacity  │
   │   1 ATA    Primary Master IC35L060AVER07-0   60.08 GB │
   │   2 ATAPI  Secondary Slave CRD-8160B                  │
   │   3 ATA    PCI IDE 0 Master HDS728080PLA380  82.35 GB │
   └──────────────────────────────────────────────────────┘
   ┌ Selected drive settings ─────────────────────────────┐
   │ ATA device information                                │
   │    Model name          : HDS728080PLA380              │
   │    Serial number       : S2C3M2UB                     │
   │    Drive capacity      : 82.35 GB, (160836480 LBA's)  │
   │    Cache size          : 7677 KB                      │
   │    Firmware revision   : PF20A50A20C5                 │
   │   ─────────────────────────────────────────────────  │
   │    S.M.A.R.T. status   : Good                         │
   │    Max. ultra DMA mode : 6                            │
   │    Acoustic management : Disabled                     │
   └──────────────────────────────────────────────────────┘

 Alt-X Exit   F1 Help   F10 Menu
```

To navigate this screen the mouse can be used or alternatively use the cursor keys and the tab key. To modify a drive feature first select the drive using the mouse or cursor keys then select the pull down "Features" menu. This can be achieved with the mouse or <**Alt-F**> key combination. You will see a screen as shown below with the following options,

```
 Drive  Features  Help

        ┌─────────────────────────────────────┐
        │ Change Acoustic Level        Alt-A  │
        │ Change Advanced Power Mode    Alt-P  │
        │ Change Cache Settings        Alt-S  │
        │ Change Capacity              Alt-C  │
        │ Change S.M.A.R.T. Operations        │    VER07-0    60.08 GB
        │ Change Ultra DMA Mode        Alt-U  │
        │ Show Drive Temperature       Alt-T  │    PLA380     82.35 GB
        │ Change SATA Settings                │
        └─────────────────────────────────────┘
     ┌ ATA device information ──────────────────────────────┐
     │    Model name          : HDS728080PLA380             │
     │    Serial number       : S2C3M2UB                    │
     │    Drive capacity      : 82.35 GB, (160836480 LBA's) │
     │    Cache size          : 7677 KB                     │
     │    Firmware revision   : PF20A50A20C5                │
     │   ─────────────────────────────────────────────────  │
     │    S.M.A.R.T. status   : Good                        │
     │    Max. ultra DMA mode : 6                           │
     │    Acoustic management : Disabled                    │
     └──────────────────────────────────────────────────────┘

 F1 Help
```

From the pull-down menu select the drive feature to be modified, for more detail on how to change each feature select from the links below.

Acoustic Level, Advanced Power Mode , Cache Settings, Capacity, S.M.A.R.T. Operations, Ultra DMA mode, Drive Temperature or SATA Settings

NOTE: The Hitachi Feature Tool is designed for use with Hitachi Global Storage Technologies and Legacy IBM ATA Hard Disk Drives only.

Navigation shortcut's,

Several options for navigating through this utility, the easiest being the use of a mouse. For each selectable option in the different menus a highlighted character is provided which when used with the Alt key gives a quick selection option. The list below represents some of the Alt + (Highlighted key) combinations available in the program.

Esc.   Return to previous menu from any sub-menu
F1 or Alt+H   - Help
F10   **-** Menu options
Alt+A **-** Change drive Acoustic level
     Alt+O - OK / Enter
     Alt+C - Cancel
     Alt+T **-** Select Test option
       D **-** Disable acoustic management
       E **-** Enable acoustic management
       n **-** Enable acoustic management - user defined level
Alt+S   - Change cache settings
     W - Select/Deselect write cache
     R - Select/Deselect read cache
   Alt+ O - OK/enter
   Alt+ C - Cancel
   Alt+ D - Reset to default values
Alt+C **-** Change drive Capacity options
     Alt+C - Cancel
     Alt+O **-** Capacity options
   M - Select Maximum capacity
3   **-** Select 32GB capacity
8   **-** Select 8GB capacity
   Alt+P   - Change Advance Power Mode
  Alt+C - Cancel
     Alt+O - OK
    Alt+T - Show Drive Temperature
   Alt+T **-** Test mode
Alt+O - OK
Alt+D **-** Drive pull down menu
Alt+ F **-** Features pull down menu
Alt+U **-** Change Ultra DMA Mode
   Alt+C - Cancel
     Alt+O - OK
**Alt+X** **-** Exit the Hitachi Feature Tool.

Automatic Acoustic Management

Automatic Acoustic Management (AAM) is available on all IBM Deskstar hard disk drives starting with the IBM DTLA (Deskstar 40GV and Deskstar 75GXP) and all Hitachi DeskStar/TravelStar drives. Changing the acoustic mode setting of the drive allows the user to make the acoustic level of the drive more suited for their working environment. The acoustic management level of the drive can be changed from the lowest setting (Quite Seek Mode) to the maximum performance level (Normal Seek Mode). The drive performance and acoustic level may increase with increasing acoustic management level setting.

As can be seen from the screen below you have three options for automatic acoustic management, it can be **disabled**, set to the **recommended** value (normal) or **user defined**.
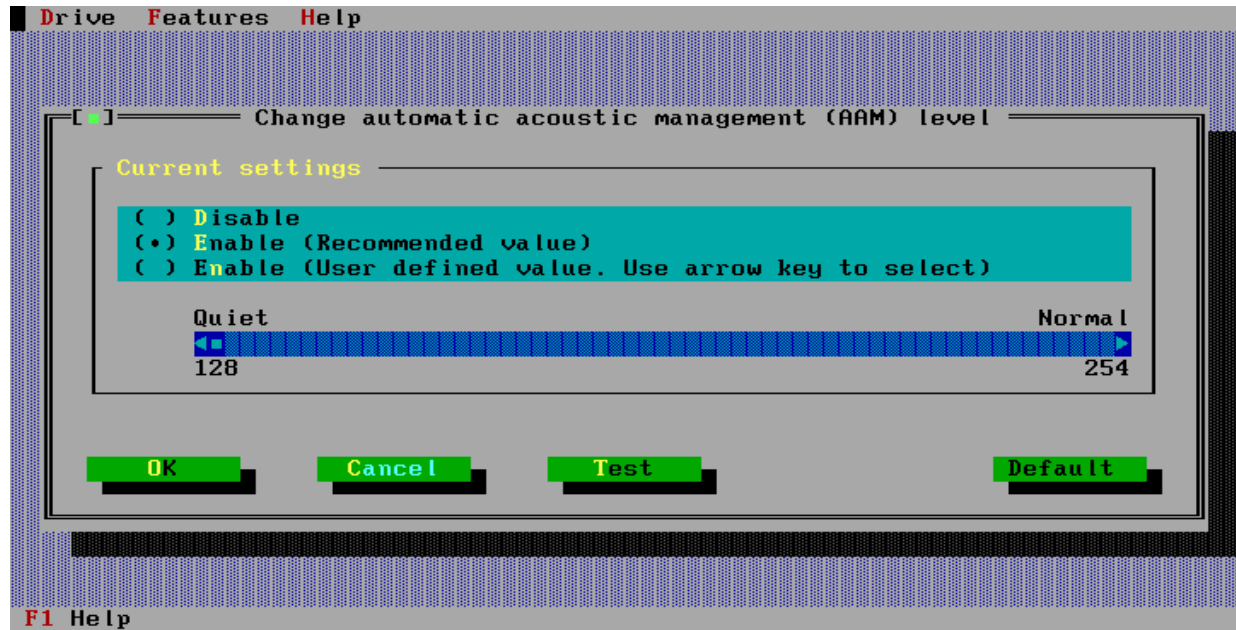
When the user-defined option is selected (see below), sliding the marker along the thermometer scale sets the acoustic value, this can be achieved by using either the mouse or the cursor keys. The text displayed above the middle of the thermometer indicates the current acoustic level setting and the range of values that comprise either the "quiet seek mode" or the "normal seek mode". The middle value below the thermometer indicates the current set value, and will be seen to change as the slider is moved from the **quiet** end of the scale to the **normal** end.
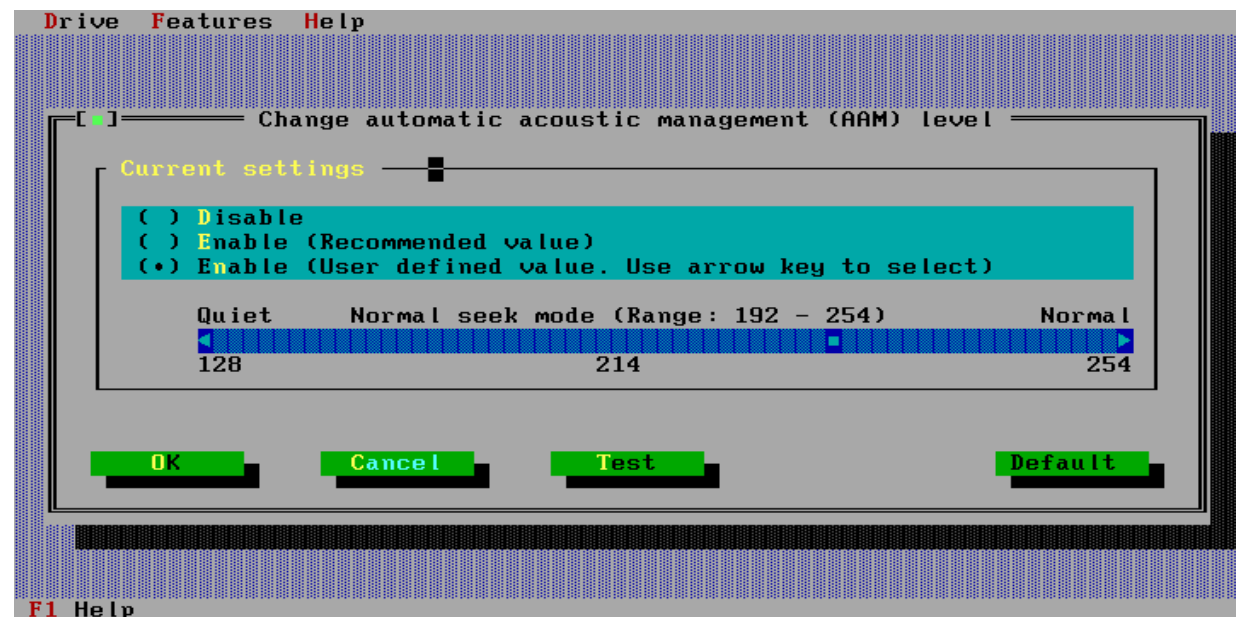
The **Test** option allows you to assess the effect changing the automatic acoustic management level will have prior to making the change permanent. To use this option select Test (**Alt + T**) or tab to the Test button and press enter. The following screen will be displayed.

Use the cursor keys to slide the marker along the thermometer scale as you do this you will see the seek rate change (i.e. the speed at which the LBA values change). When you are happy with your setting select the **OK** button to set that value and return to the change screen above. You can now select **OK** again the actually change the setting in the drive.
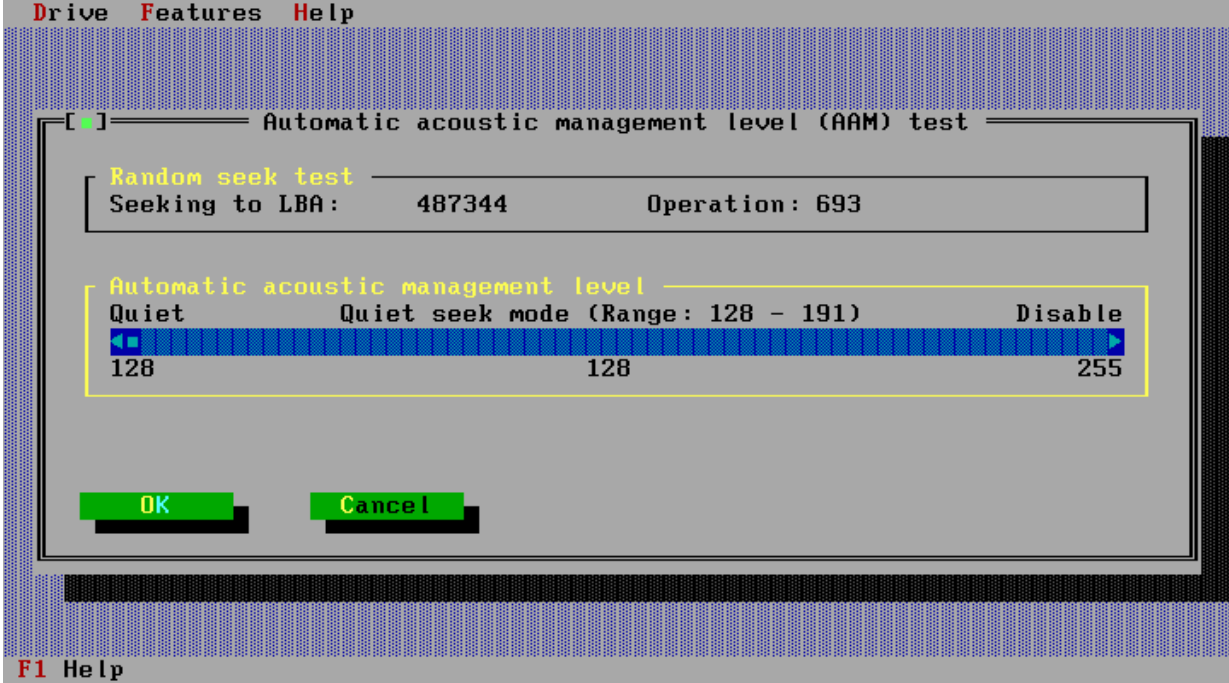
If the drive selected doesn't support the option you are trying to change you will see a screen that is similar to that shown below.

Advanced Power Management

This feature allows you to change the default power saving mode of the drive. The device preserves the selected power mode across all forms of reset, that is Power on, Hardware and Software resets.

APM is a technology that adaptively adjusts the power saving feature of New Hitachi and Legacy IBM hard disk drives to suit your working style. Power is saved by idling the actuator arm, additional power is saved by unloading the actuator arm and heads from the disk to the off-ramp. The technology actively adjusts the trade-off between disk delay and power consumption. This program allows you to change the aggressiveness of the power saving.

When APM is selected from the features menu, you will be presented with the screen below. From here you can disable APM or select from one of the valid levels by means of the cursor keys.
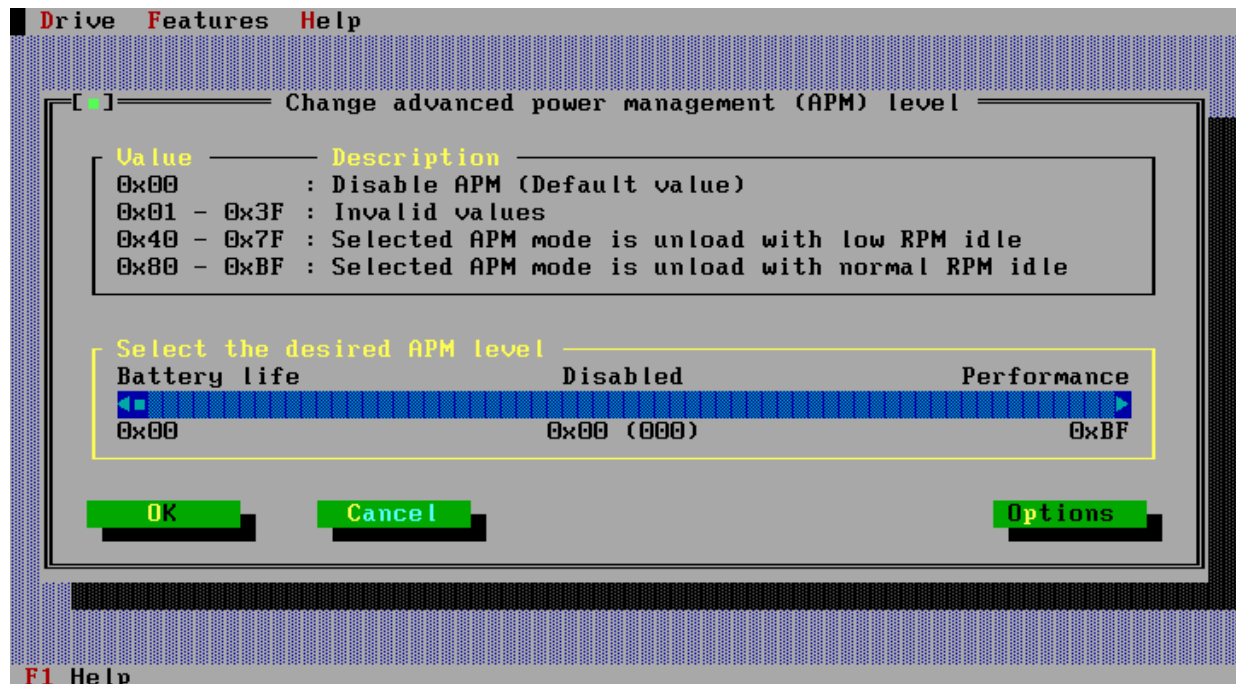
Selection of a pre-defined APM mode can also be made using the **options** button, as can be seen in the screen below.
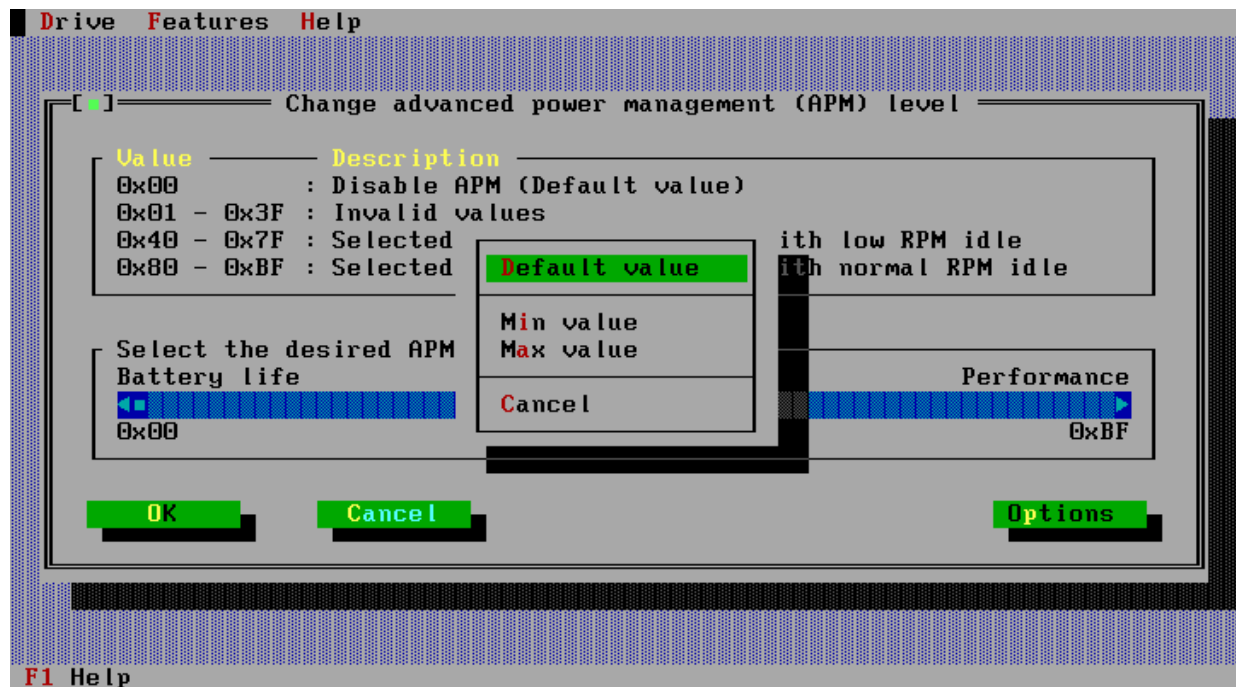
If the selected disk drive does not have or support changing the advance power mode then when this option is selected the following screen will be displayed.
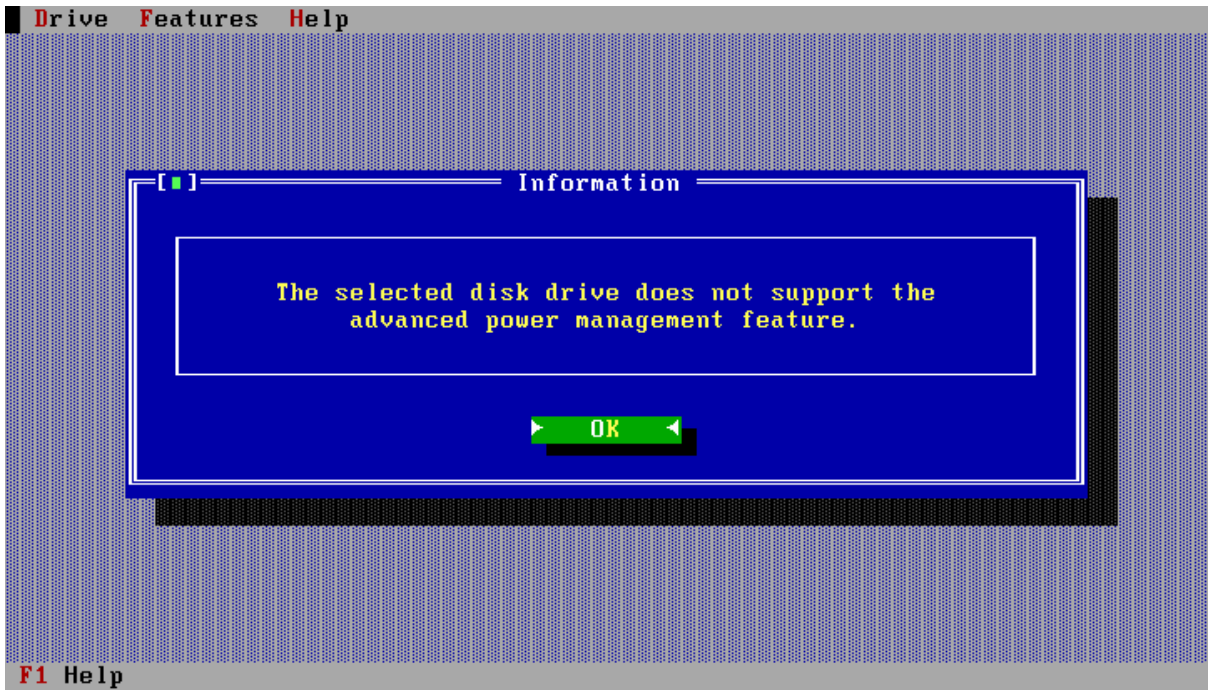
Cache Management

Write cache is a performance enhancement whereby the device reports completion of the write command (Write Sectors, Write DMA and Write Multiple) to the host as soon as the device has received all of the data into its buffer. The device assumes responsibility to write the data subsequently onto the disk. While writing data after completing the acknowledgement of a write command, neither soft nor hard resets will affect its operation. But power-off terminates the writing operation immediately and any unwritten data will be lost.

Flush cache, Soft reset, Standby, Standby Immediate and Sleep are executed after the completion of writing to disk media on enabling the write cache function. The host system can confirm the completion of a write cache operation by issuing flush cache command, Soft reset, Standby command, Standby Immediate command or Sleep command, and then, by confirming its completion.

To enable or disable a cache function select the **Features** option from the menu bar, then the **Change Cache Settings** option. You will then be presented with a screen as shown below. To change a setting simply 'Tab' or use the short cut 'Alt. + (highlighted letter)' to highlight the parameter you wish to change, use the space bar to select/deselect the item. When you have made your choice select **OK** to enable the change.
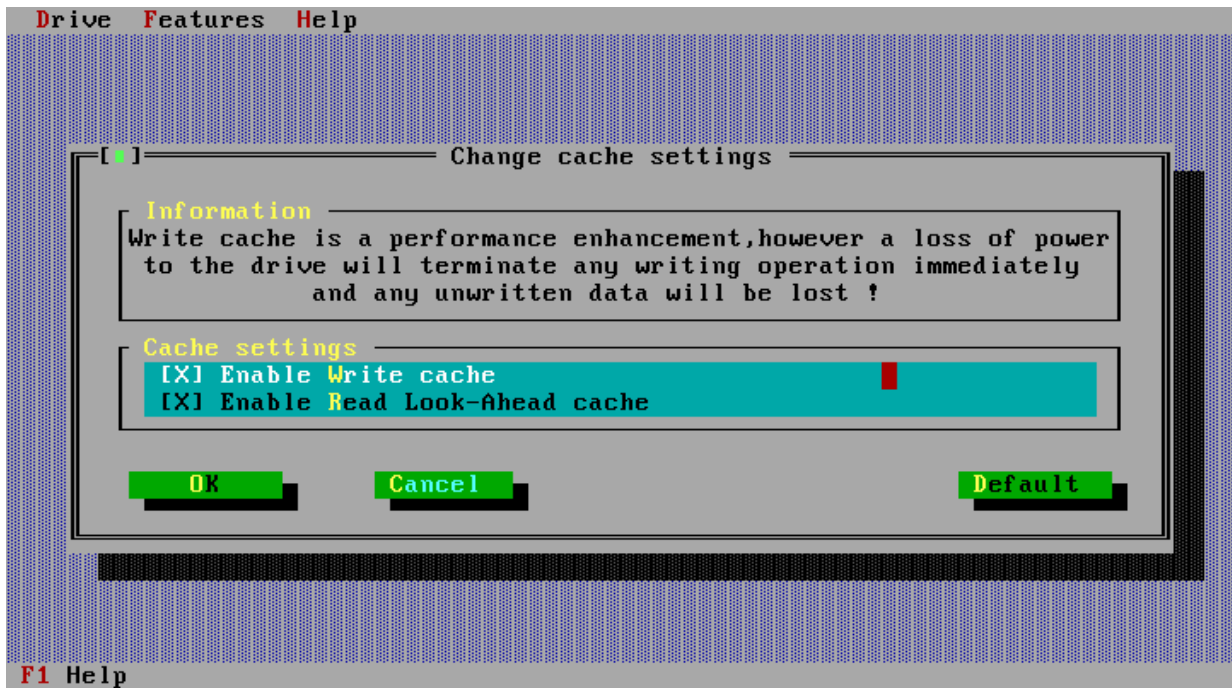
When the changes have been completed successfully you will be presented with a screen as shown below.

```
┌─[■]══════════════ Information ═══════════════
│  ┌────────────────────────────────────────┐
│  │                                         │
│  │       Cache successfully changed.       │
│  │                                         │
│  └────────────────────────────────────────┘
│              ►   OK   ◄
│
```

Note:
On some systems changes made to the drive cache settings are only enabled whilst there is power on the drive. Powering the system off then back on will reset the cache value to the drive defaults. This type of behaviour is mainly seen in 2.5" (mobile) hard disk drives. A simple check to find out if you system exhibits this characteristic is to power cycle the system after making your changes and re-loading the Hitachi Feature Tool utility and check if the changes previously made have been reset.

Device Capacity

This feature allows you to change the capacity of the selected drive. Two options are available
Change the capacity and make this change permanent
Make a temporary change, change will be lost when the drive (system) is power cycled.

To make a change to the drive capacity you firstly need to decide if the change is to be temporary or permanent, then tab to the new capacity change box. Type in the new capacity value for the drive (to do this you need to either delete the indicated value and type in the new value **OR** press the **Insert key** and overtype the given value). Select **OK** to confirm your change.

```
 Drive  Features  Help


  ┌[ ]════════════════════ Change capacity ═══════════════════
  │          ┌── Manufacturing values ── Current values ──┐
  │          │ Capacity  :   185.28 GB         185.28 GB   │
  │          │ Max LBA   :   361882079         361882079   │
  │          └                                             ┘
  │
  │          ┌─ Enter new capacity ──────────────────────────────┐
  │          │ (•) Save permanently                              │
  │          │ ( ) Do not save (Changes are lost on the next power cycle) │
  │          │                                                   │
  │          │ New capacity (GByte):  185.28                     │
  │
  │
  │      ▐███  OK  ███▌        ▐█ Cancel ██▌        ▀        ▐█ Options ██▌
  │
  │
  └───────────────────────────────────────────────────────────────

 F1 Help
```
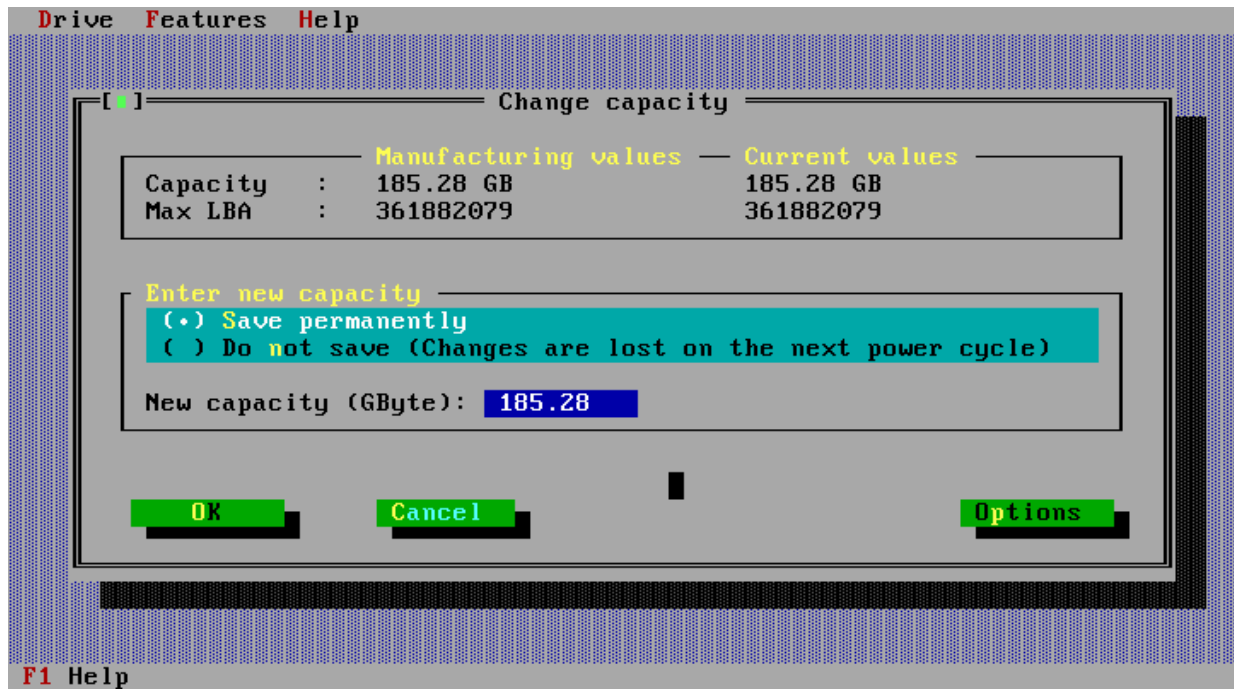
Some of the older Motherboards BIOS's don't support the larger capacity ATA drives, which are now available. The **Options** button provides a quick means of changing the drive capacity to just below the known boundary limits of 8GB, 32GB and 128GB, it also provides a quick means of resetting the drive to its maximum capacity.

The screen shot on the next page shows the available options, as before these options can be selected by use of the cursor keys or via the hot-keys (**Alt +**).

Pre-defined capacities

```
 Drive  Features  Help



  [ ]                         Change capacity
                      Manufacturing values — Current values
        Capacity   :    185.28 GB              185.28 GB
        Max LBA    :    361882079              361882079

                                 Maximum Capacity
          Enter new capacity
          (•) Save permanent      128 GByte
          ( ) Do not save (C      32 GByte            ext power cycle)
                                  8 GByte
          New capacity (GByte
                                 Cancel



          OK              Cancel                        Options



 F1 Help
```
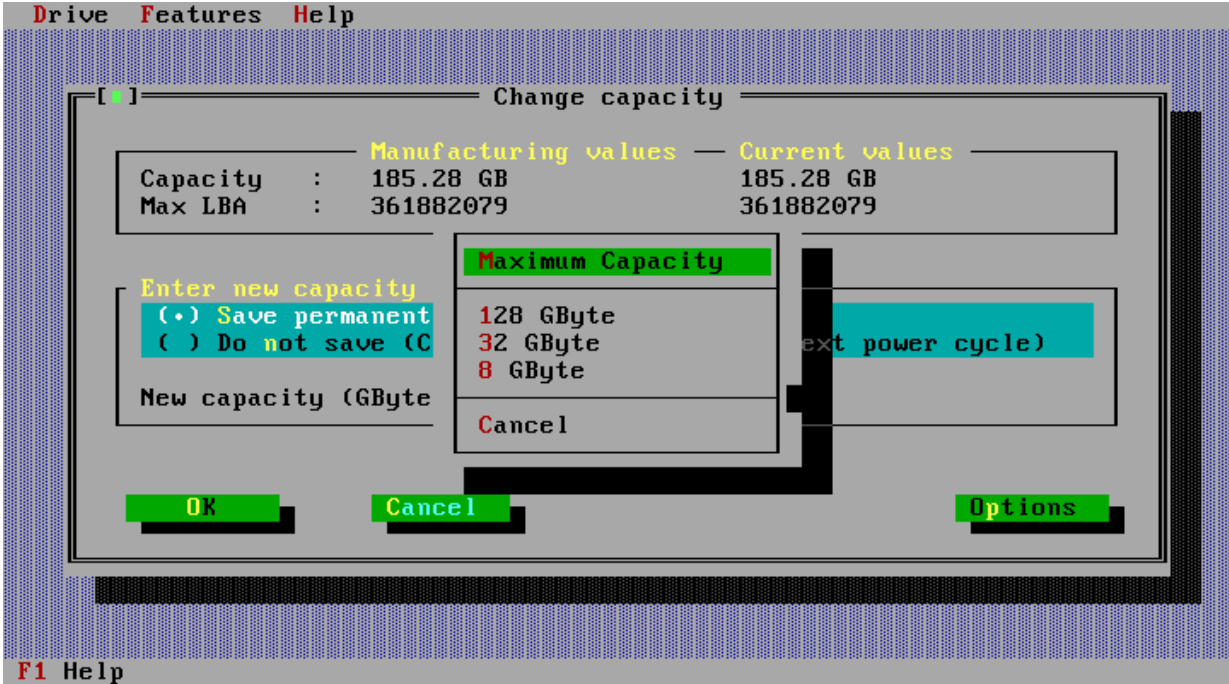
S.M.A.R.T.

S.M.A.R.T. - **S**elf-**M**onitoring, **A**nalysis and **R**eporting **T**echnology is intended to protect user data and prevent unscheduled system downtime that may be caused by predictable degradation and/or fault of the disk device. By monitoring and storing critical performance and calibration parameters, S.M.A.R.T. devices employ sophisticated data analysis algorithms to predict the likelihood of near-term degradation or fault conditions.
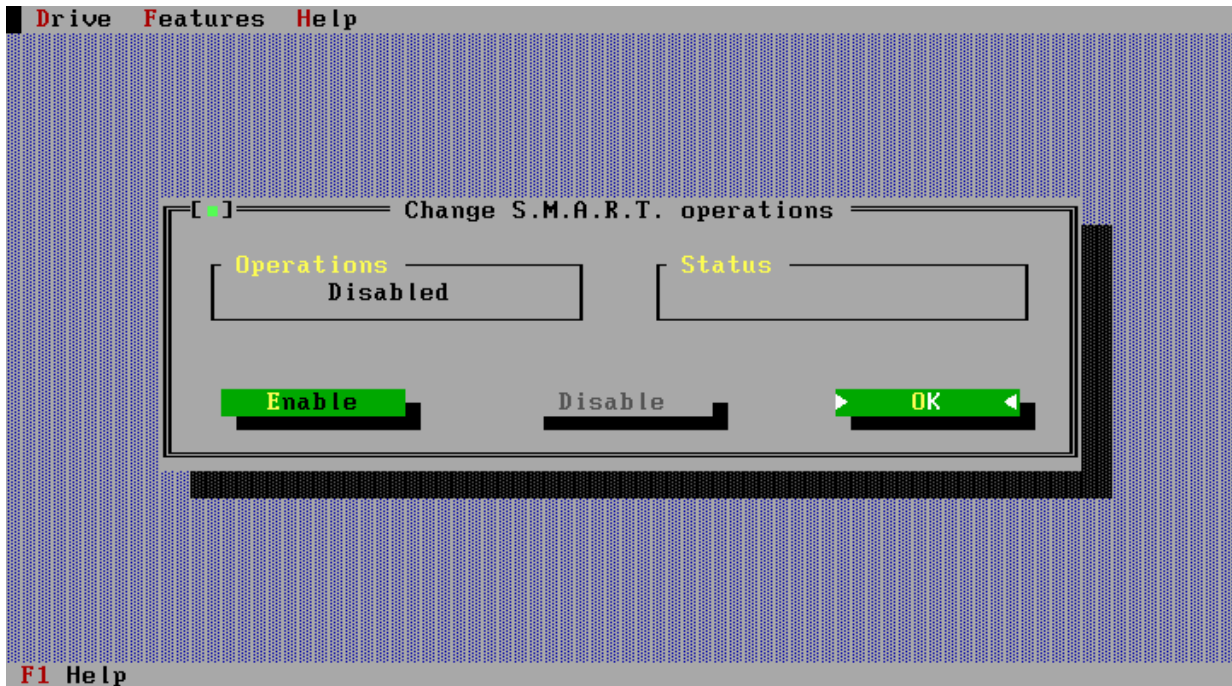
To enable/disable S.M.A.R.T., select the drive that you wish to change. Then from the Features menu select Change S.M.A.R.T. Operations, you will be presented with a screen similar to that shown above. S.M.A.R.T. can now be enabled or disabled on the selected drive by selecting the required function and hitting the enter key. When SMART is enabled you will see the status in the Status box.
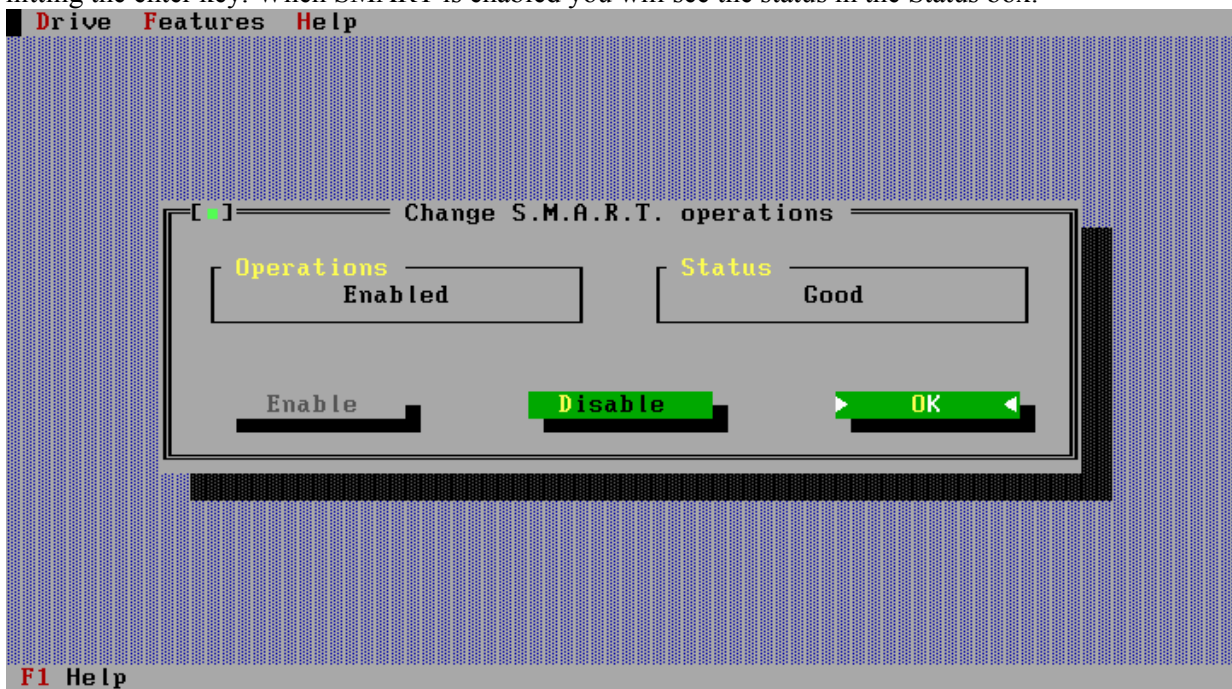
Note: on some system if SMART monitoring is enabled in the system BIOS then disabling SMART with this utility will be effective only until the next re-boot.

Ultra DMA Mode

When the change Ultra DMA Mode option is selected from the drop-down menu or by use of the hot-keys (**Alt + U**) you will be presented with a screen as shown below. The number of UDMA option settings which you will be presented with is determined by the maximum UDMA mode that the selected drive supports, e.g. if your drive is only capable of supporting up to Mode 4 (66 MB/sec) then you will only see UDMA modes 0 to 4 listed.

```
 Drive  Features  Help
  ┌[■]══════════ Change the maximum Ultra DMA mode ══════════
  │ ┌ Information ──────────────────────────────────────────┐
  │ │ Do not increase the Ultra DMA capability of your IBM hard disk │
  │ │    unless all the system components required for Ultra DMA     │
  │ │                  support are present !                          │
  │ └───────────────────────────────────────────────────────┘
  │ ┌ Select the maximum Ultra DMA mode ─────────────────────┐
  │ │ ( ) Disable ultra DMA support                          │
  │ │ ( ) Ultra DMA mode 0 - ATA 16 (16.7 MB/s)              │
  │ │ ( ) Ultra DMA mode 1 - ATA 25 (25 MB/s)               │
  │ │ ( ) Ultra DMA mode 2 - ATA 33 (33 MB/s)               │
  │ │ ( ) Ultra DMA mode 3 - ATA 48 (48 MB/s)               │
  │ │ ( ) Ultra DMA mode 4 - ATA 66 (66 MB/s)               │
  │ │ (•) Ultra DMA mode 5 - ATA 100 (100 MB/s) - Default value │
  │ └───────────────────────────────────────────────────────┘
  │        OK                  Cancel
  
 F1 Help
```

The current UDMA Mode setting of the selected drive will be highlighted, to change to a new setting use the cursor up/down keys to select the desired value, then tab to the **OK** button and press enter.
When the change has been effected you will see the following screen, please follow the indicated instruction to complete the mode change.

```
 Drive  Features  Help

       ┌[■]══════════════ Information ═══════════════┐
       │                                              │
       │     Ultra DMA mode changed successfully.     │
       │                                              │
       │    In order for the change to take effect,   │
       │       you MUST power off your system.        │
       │                                              │
       │   Pressing the CTRL-ALT-DEL key is not enough ! │
       │                                              │
       │              ►   OK   ◄                      │
       │                                              │
       └──────────────────────────────────────────────┘

 F1 Help
```
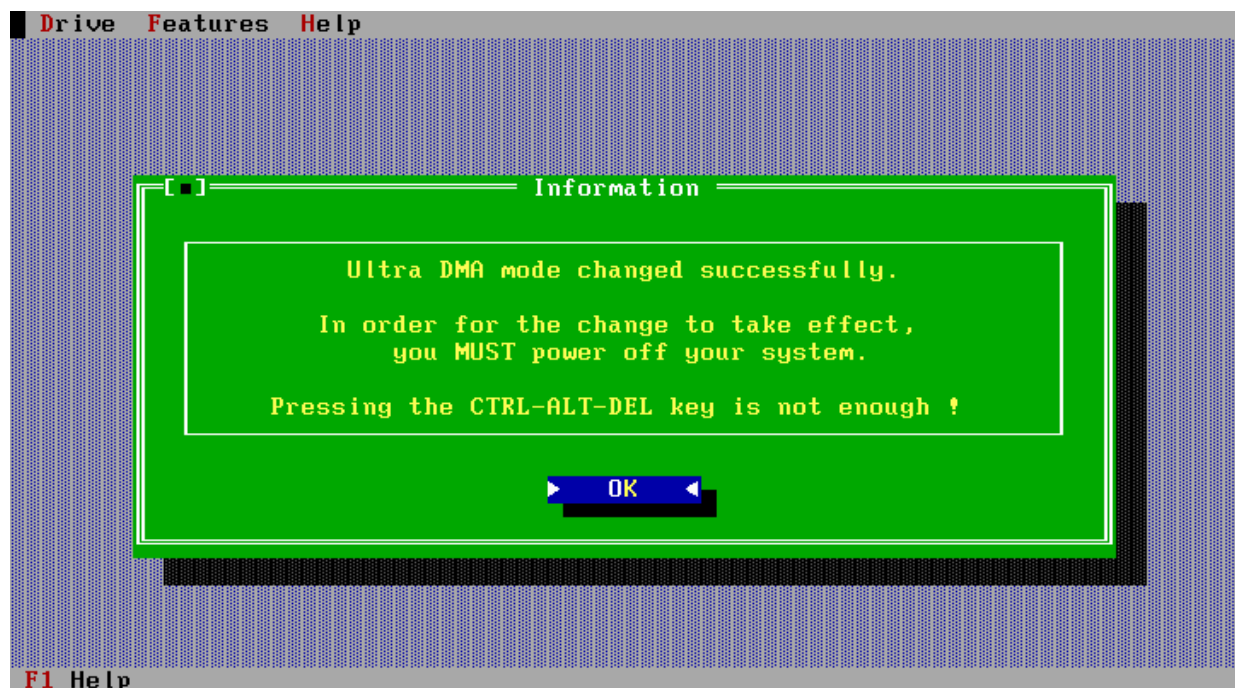
NOTE: This utility supports changing the UDMA setting of Legacy IBM and the new Hitachi

Travelstar and Deskstar drives only and only those drives on which the UDMA is a changeable parameter. The following IBM Hard disk drives support changeable UDMA modes, IBM DPTA (Deskstar 34GXP & 37GP) and IBM DJSA (Travelstar 20GN, 30GT & 32GH) and newer Hitachi/IBM ATA Hard Disk Drives.

If you attempt to change the UDMA setting of a hard disk drive that doesn't support changing of this feature or on a non-IBM/Hitachi drive you will be presented with a screen displaying the following message,

The Ultra DMA mode cannot be changed with this program.

If your hard disk drive is very old it may not support UDMA in which case if you try and make a change using this utility you will see the following screen.
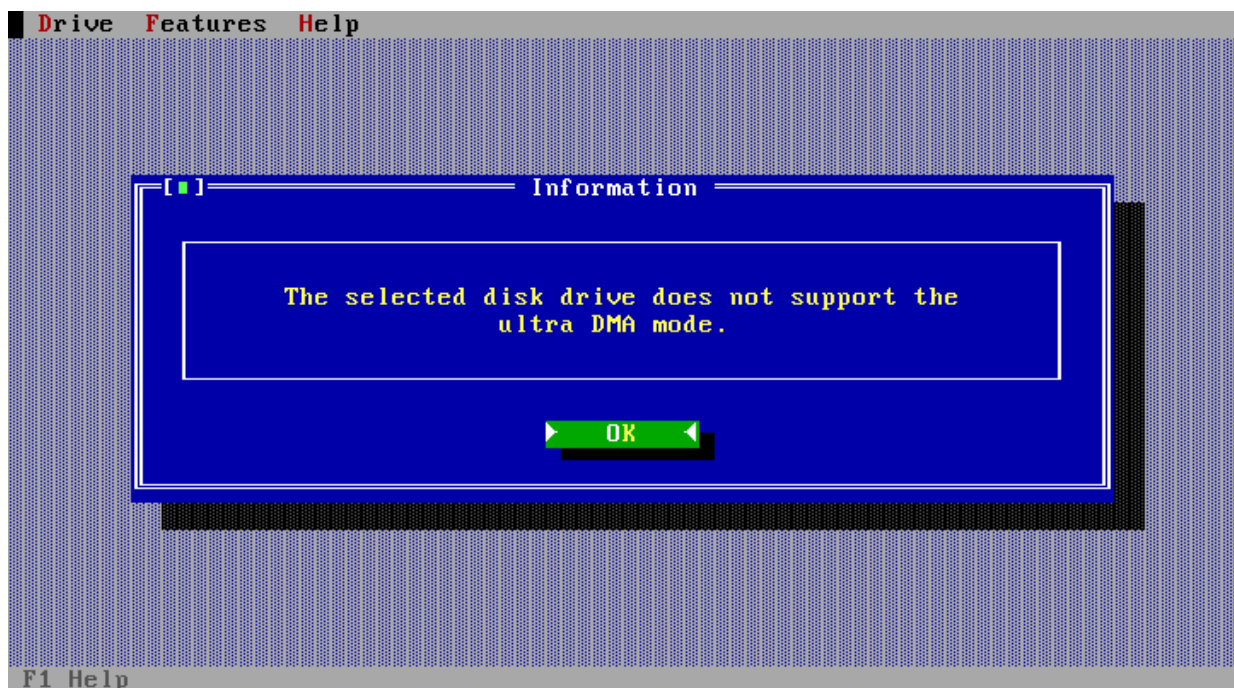
Drive Temperature Monitoring

Hard disk drives are designed to operate within a per-defined environment of temperature and humidity. If the drive(s) are operated outside of this environment then the performance and reliability are likely to deteriorate. Thus it is essential that the system or enclosure that the drive(s) are installed in is capable of providing a level of cooling that will maintain the correct operational environment for the drives. For most Hitachi GST drives the operational temperature range is 5 to 55 degrees Celsius (^{o}C). This feature allows the temperature inside the drive to be monitored, this inside drive temperature is normally approx. 5 ^{o}C higher that the air temperature around the drive.
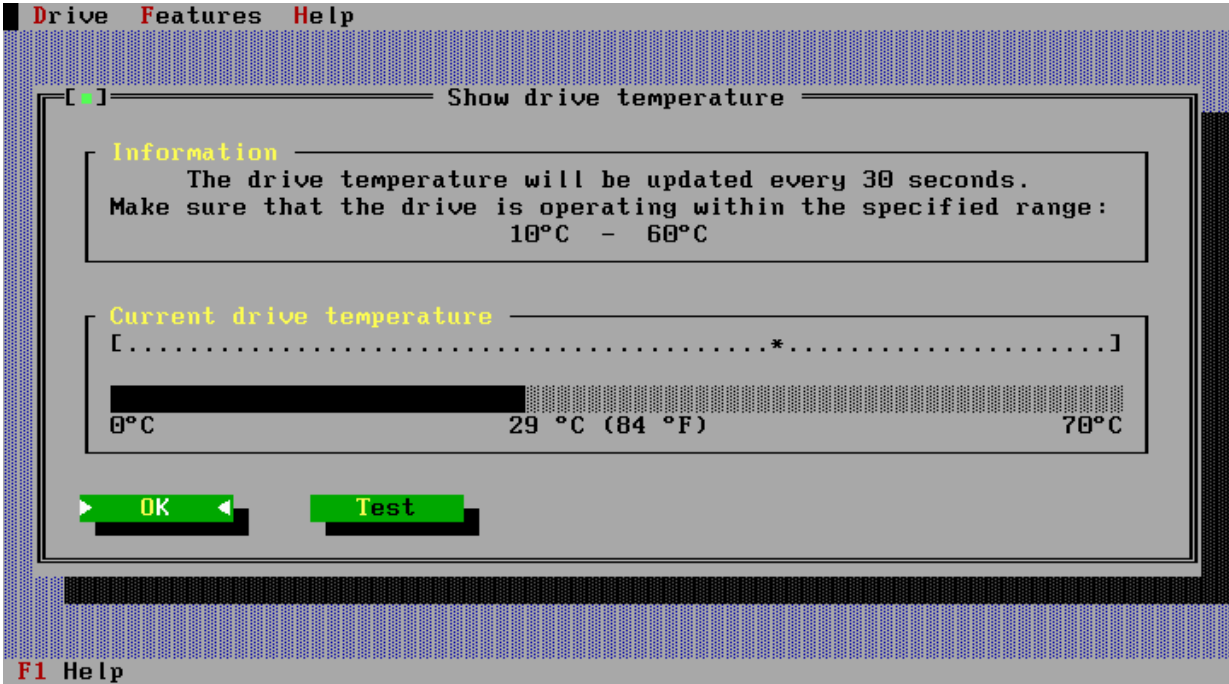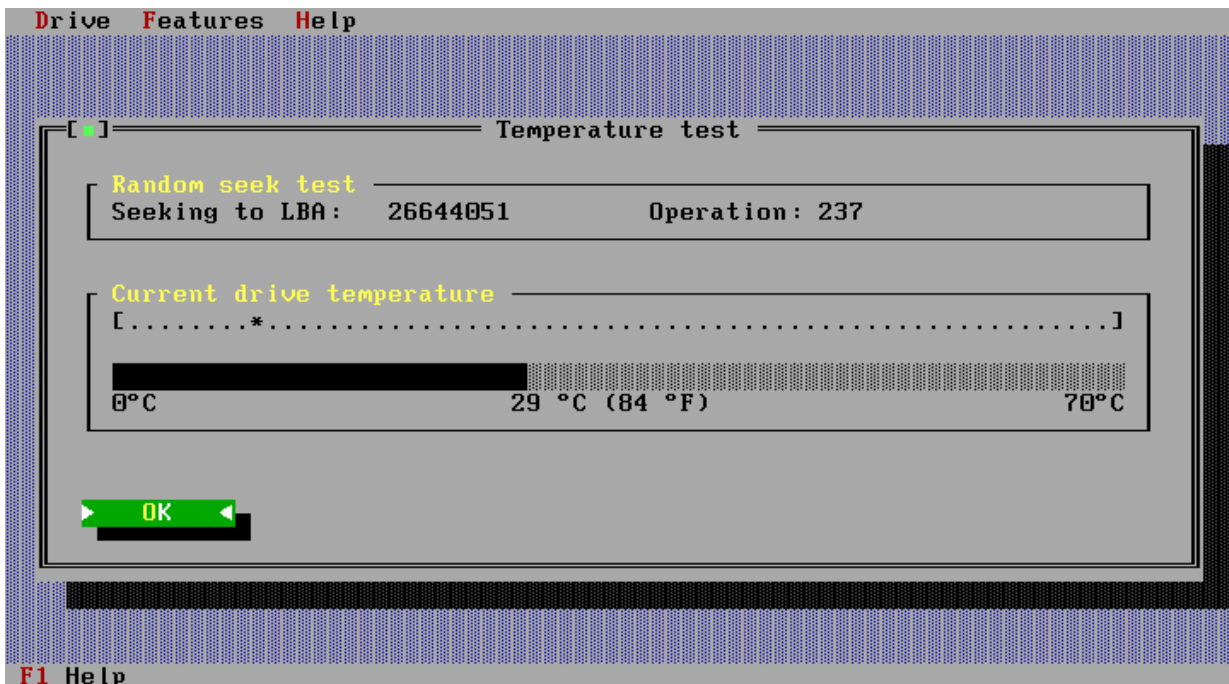
```
 Drive  Features  Help


   [■]══════════════════ Show drive temperature ══════════════
    ┌ Information ──────────────────────────────────────────┐
    │      The drive temperature will be updated every 30 seconds.
    │   Make sure that the drive is operating within the specified range:
    │                    10°C  -  60°C
    └───────────────────────────────────────────────────────┘

    ┌ Current drive temperature ────────────────────────────┐
    │ [..............................................*..................]
    │
    │ ███████████████████████████░░░░░░░░░░░░░░░░░░░░░░░░░░░░
    │ 0°C                        29 °C (84 °F)              70°C
    └───────────────────────────────────────────────────────┘

       ► OK ◄            Test


 F1 Help
```

As a guide to evaluating if under normal operating conditions your system/enclosure will provide adequate cooling the **Test** option can be used. This test displays the current disk drive temperature (updated every 30 sec) during a random seek test, see the screen below. With this function you can simulate a high disk operation and determine the maximum temperature your drives will reach in your system and environment.

```
 Drive  Features  Help


   [■]══════════════════ Temperature test ════════════════════
    ┌ Random seek test ─────────────────────────────────────┐
    │ Seeking to LBA:    26644051        Operation: 237
    └───────────────────────────────────────────────────────┘

    ┌ Current drive temperature ────────────────────────────┐
    │ [.......*.........................................................]
    │
    │ ███████████████████████████░░░░░░░░░░░░░░░░░░░░░░░░░░░░
    │ 0°C                        29 °C (84 °F)              70°C
    └───────────────────────────────────────────────────────┘


       ► OK ◄


 F1 Help
```

SATA Settings

> **WARNING!**
> **SWITCHING YOUR DRIVE TO SUPPORT 3.0Gb/s OR ENABLING SPREAD SPECTRUM CLOCKING ON YOUR DRIVE AND THEN USING IT IN A SYSTEM THAT CANNOT SUPPORT THESE FUNCTIONS, MAY RENDER YOUR DRIVE UNUSABLE IN THAT SYSTEM.**

Early generation SATA drives where introduced supporting 1.5Gb/s interface transfer speeds. Advances in technology have introduced a new standard that can support transfer speeds of up to 3.0Gb/s. Hitachi Global Storage Technologies latest SATA products (Deskstar 7K80 onwards) support up to 3.0Gb/s. Unfortunately some Host controllers in the market have yet to support the latest standard in it's entirety, thus if drives set to support these recent features were to be attached to those Hosts the drive may not be able to boot. For this reason Hitachi GST has taken the step to deliver these drives set to support 1.5Gb/s and with Spread Spectrum Clocking disabled. Only if you are completely confident that your system supports either of these features should you consider setting them. If you are in any doubt you must contact your system manufacturer for advice.
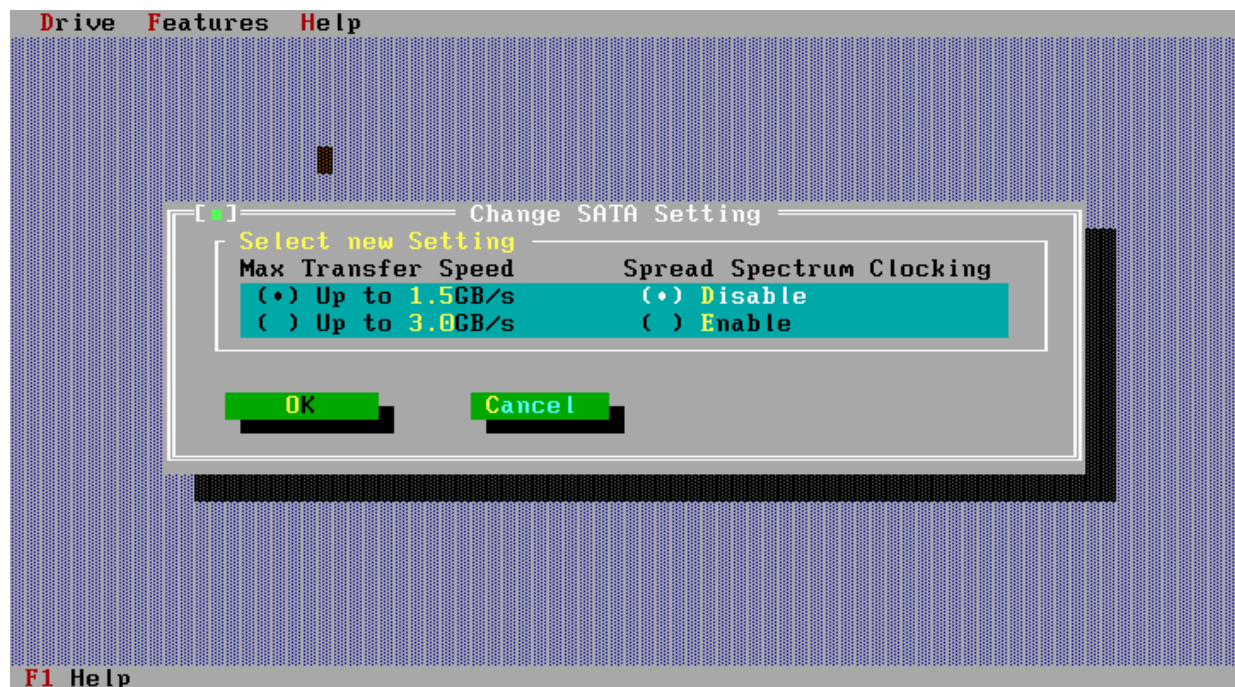
Select the required options (a dot will appear in the brackets against those selected) and select the **OK** button.

If you neglect to select either of the options one will be advised with the following message;
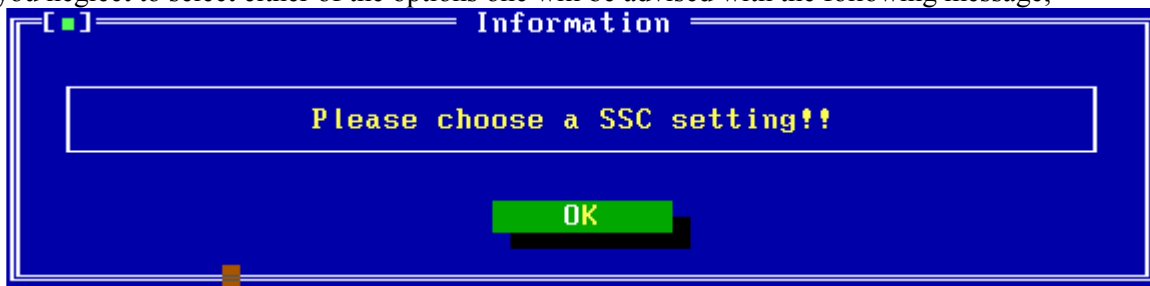
If either 3.0Gb/s or Spread Spectrum Clocking Enable were selected then one of the following warnings will be presented:

```
┌─[■]════════════════════ Warning ════════════════════┐
│                                                      │
│  ┌────────────────────────────────────────────────┐ │
│  │                 WARNING!                        │ │
│  │ Setting this drive to 3.0Gb/s on a system that  │ │
│  │    doesn't support, it may render your drive    │ │
│  │               unusable.                         │ │
│  │                    ▌                            │ │
│  │  Please contact your system manufacturer for    │ │
│  │     further advice if you are not completely    │ │
│  │               sure.                             │ │
│  └────────────────────────────────────────────────┘ │
│                                                      │
│          ┌──────────┐      ┌──────────┐              │
│          │    OK    │      │  Cancel  │              │
│          └──────────┘      └──────────┘              │
└──────────────────────────────────────────────────────┘

┌─[■]════════════════════ Warning ════════════════════┐
│                                                      │
│  ┌────────────────────────────────────────────────┐ │
│  │                 WARNING!                        │ │
│  │  Enabling spread spectrum clocking on a system  │ │
│  │  that doesn't support, it may render your drive │ │
│  │               unusable.                         │ │
│  │                                                 │ │
│  │  Please contact your system manufacturer for    │ │
│  │     further ▌advice if you are not completely   │ │
│  │               sure.                             │ │
│  └────────────────────────────────────────────────┘ │
│                                                      │
│          ┌──────────┐      ┌──────────┐              │
│          │    OK    │      │  Cancel  │              │
│          └──────────┘      └──────────┘              │
└──────────────────────────────────────────────────────┘
```
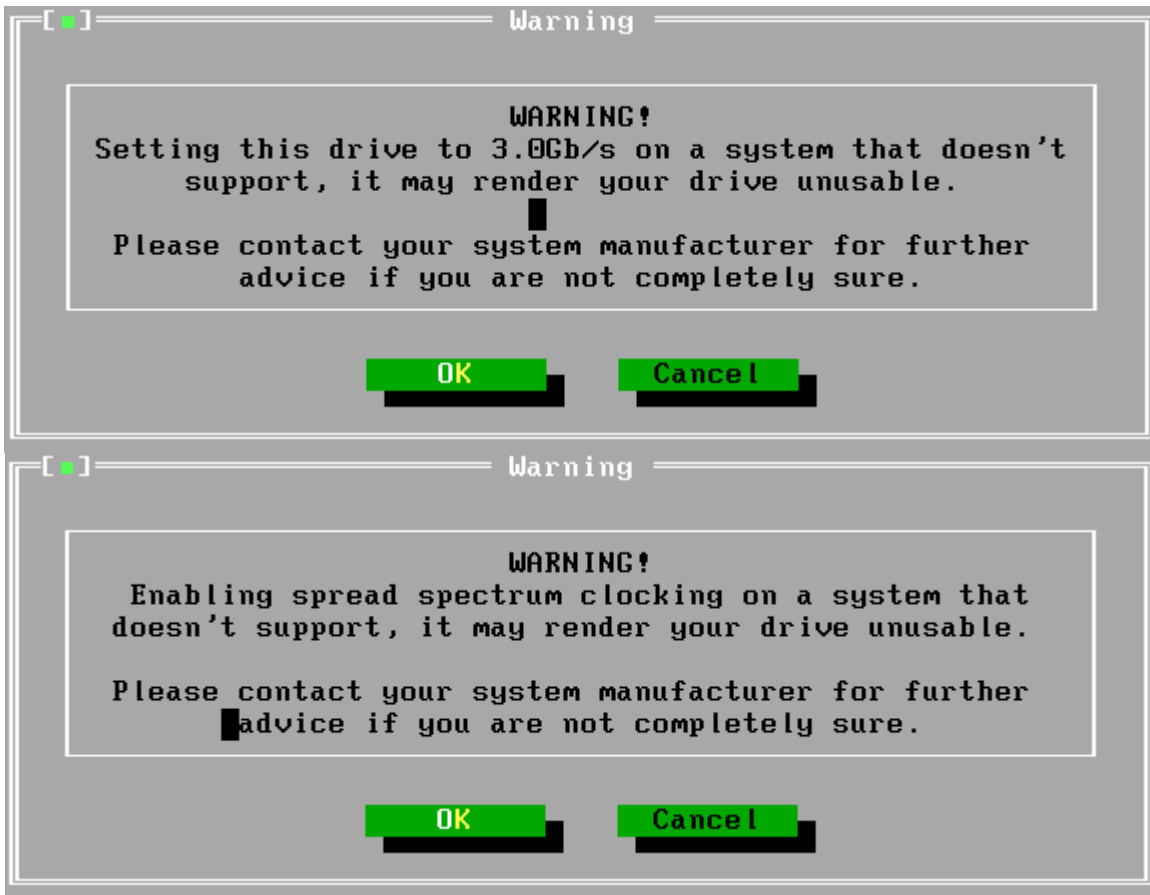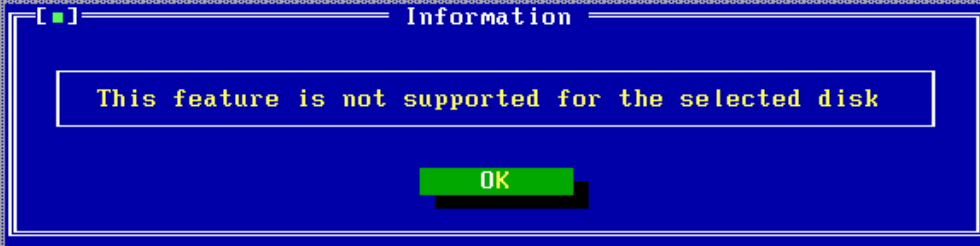
If you accept the responsibility to continue and the changes have been made the following screen will appear;

```
 Drive  Features  Help

        ┌─[■]═══════════════ Information ═══════════════┐
        │                                               │
        │  ┌─────────────────────────────────────────┐  │
        │  │     SATA Setting changed successfully.   │  │
        │  │                                          │  │
        │  │   In order for the change to take effect,│  │
        │  │       you MUST power off your system.    │  │
        │  │                                          │  │
        │  │  Pressing the CTRL-ALT-DEL key is not    │  │
        │  │              enough !                    │  │
        │  │                                          │  │
        │  │            ┌──────────┐                  │  │
        │  │            │    OK    │                  │  │
        │  │            └──────────┘                  │  │
        │  │ ▌                                        │  │
        │  └─────────────────────────────────────────┘  │
        └───────────────────────────────────────────────┘

 F1 Help
```

Once the Feature Tool has declared the operation to be successful, one must power cycle the drive. This must be achieved by a complete system shutdown and switched back on again.

If the drive you are attempting to perform these functions on doesn't support them, the following window appearing will tell you so.

Drive Features Help

┌─[■]═══════════════════ Information ═══════════════════
│
│   ┌──┐
│   │ This feature is not supported for the selected disk │
│   └──┘
│
│   OK

F1 Help

Appendix

Hardware Support and Restrictions

The Hitachi Feature Tool supports hard disk drives manufactured by Hitachi Global Storage Technologies and Legacy IBM ATA hard disk drives attached to IBM compatible PC's systems. This utility also supports the above hard disk drives when installed in systems via PCI-to-ATA adapters from Promise Technologies (UDMA/33, UDMA/66 and UDMA/100), CMD, Silicon Image and Highpoint (HPT366, HPT370, HPT372 & HPT374) also motherboards which utilises the Promise, Silicon Image and Highpoint Chipsets.

On a small number of systems, which utilises the Promise UDMA/100 or the Highpoint HPT370 chipset drives attached, as master on either of the Primary/Secondary ports may not be detected. In the event that your system displays this behaviour and you wish the use the feature tool it is suggested that you perform on of the following actions.
If no other drives are attached to that bus (cable) temporarily jumper the drive as a Slave and perform the required changes after which you can revert to the original jumper settings.
If your system also has UDMA/66 ports the drive can be temporarily attached to one of these ports whilst you make your changes, after which the drive can be reconnected to the UDMA/100 port.

The *Promise FastTrak100 TX2* and *Maxtor Ultra ATA/133* PCI-to-ATA Raid controllers are not supported by this utility.

Whilst every effort is made to ensure Feature Tools runs on all controllers there will be some that we haven't encountered yet or can't support for some reasons. If you encounter problems or have questions please contact the Support Centre through the Hitachi GST web site or through your Technical Support representative.

Use with Non-Hitachi /IBM Products

This tool is provided for use only with Legacy IBM ATA hard disk drives and new ATA drives manufactured by Hitachi Global Storage Technologies, however some of the supported parameters of other manufacturer hard disk drives e.g. drive capacity may be changed. Hitachi doesn't support the use of this tool to change any parameters on ATA drives not manufactured by Hitachi Global Storage Technologies or by IBM and should a user choose to do this, it is done at their own risk.

System Influences

The BIOS, RAID controller and some PCI IDE controller can change some values on the next reboot, power on cycle or reset.