Installation / User Guide

R3.1

HGST a Western Digital Company.

Tool Development Team

Document History

R1.1	**Jun 22, 2005**	**Initial release**
R1.2	**Sep 01, 2005**	
R1.2.7	**Sep 14, 2005**	**Add notes for LOGIN procedure of Microdrive Generic Models**
R1.2.8	**Sep 30, 2005**	**Reconstruction to match with "NO DRIVE-LOGIN"**
R1.2.9	**Oct 12, 2005**	**Typo fixes**
R1.3	**Jun 01, 2006**	**Add "DO NOT RETURN TO HITACHI GST" comment in section 1.1, support New Brand-Type in section 1.2 and HiTest option sequence Guide as section 4.0 etc.**
R2.0	**Mar 15, 2007**	**Update for HiTest 2.0**
R2.1	**Feb 15, 2008**	**Add SAS adapter cards support as section 1.3.4**
R2.2	**Sep 12, 2008**	**Update for HiTest 2.10**
R2.2.1	**May 26, 2009**	**Add a note in section 1.3.1 to except XP Home edition because HiTest has not been tested on it.**
R2.3	**Jun 15, 2008**	**Add HiTest standard error code definition table**
R2.4	**Oct 03, 2011**	**Add/Except "Supported Products". Change "Minimum Requirements". Add Adapter Cards Supported**
R2.4	**Oct 03, 2011**	**Add/Except "Supported Products". Change "Minimum**
R2.5	**May 07, 2012**	**Change Logo & Company Name. Add Support Windows OS**
R2.6	**May 18, 2012**	**Change some contents (remove unnecessary parts).**
R2.7	**Oct 22, 2012**	**Change driver requirement in 'SATA Controller Windows Driver Installation. Add Uninstall procedure.**
R2.8	**Nov 26, 2012**	**Update "Change driver requirement in 'SATA Controller Windows Driver "**
R2.9	**Sep 26, 2013**	**Change supported SATA I/F configuration. Remove on-board SATA port and supported Highpoint Card.**
R3.0	**Apr 16, 2014**	**Update instruction for Windows 8 Update supported HBA.**
R3.1	**Dec 09, 2014**	**Remove Windows Xp from Supported OS Add supported SAS/FCL PCI HBA card page.**

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1.0 : HiTest Installation Guide

HiTest Installation Guide

1.1 : Introduction

HiTest is developed to support HGST HDD distributors or customers of distributors focused on customer Line Integration Reject or Field Reject Failure Diagnostics. This software can be given to distributors or their customers.

*Note
“Do not return to HGST” of disposition has two means.
NFF: No Failure Found.
There are no error records in a drive and
Head Amp and Servo Measurement are Good.
CID: Customer Induced Damage Failure (Handling Damage).
RRO Measurement is criteria over and
Seems that Disk Shift was caused by handling damage.

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1.2 : System Requirements - Hardware

1.2.1 : Minimum Requirements

Hardware / Software Pre-requisites for using HiTest for Corporate Level 1.0 Failure Analysis

Component	Minimum	Advise	Notes
Operating System	Windows 7 (32bit/64bit) Windows 8 (32bit/64bit) Windows 8.1 (32bit/64bit)		Not Support OS Windows 2000 Windows Xp 2003 Server 2008 Server
Processor	Pentium4 1.6 GHz	Generally higher the better. Very dependant on number of drives being tested	
Memory	1 GB	Generally higher the better.	
HDD	10GB	Minimal requirement	
Motherboard	1x IDE secondary master port for IDE test 1x PCI slot to install PATA, SATA, SCSI or FCL adaptor card 1x PCI-X slot to install SAS adaptor car	For testing multiple ATA drives the biggest req. is PCI slots. 4 or 5. This will probably dictate the spec of the board, higher PCI slots tend to be on higher spec boards	10x ports (5x PCI-IDE adaptor card) have been verified to work with HiTest.
Peripherals		CD-ROM or USB Memory, Bar code scanner (essential for high volume testing) capable of reading **BC39, BC128** and **BC412**	Bar code scanner will save a lot of time in logging drives that don't start. Barcode must be programmed to perform a carriage return after reading data.
Communication		USB (Memory Stick), Ethernet / Modem	USB could be used for loading such tools as DFT in the event that a floppy is too small or not available. Ethernet / Modem for updates through web or future implementations.
Graphics	800 x 600	1024 x 768 recommended, 64K colors	
PATA Test port on mother board		Can utilize on-board secondary Mater port. (Cannot test on Primary port)	
SATA Test port on mother board		The connection of SATA port on motherboard is not guaranteed due to potential of unexpected interruption from system BIOS or Operating System.	

1.2.2 : Recommended

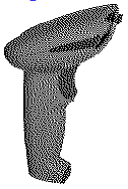
"HiTest" requires data entry for the drive Serial Number, Model ID and Customer Serial Numbers when the tested drive is DNR .(refer to 3.5) A barcode reader will increase the efficiency and accuracy of logging in such data. Following pages are the reference information for barcode readers and also adaptor cards and other suppliers that have been tested with HiTest.

(Rest of this page is intentionally left blank)

1.2.3 : Bar Code Reader Suppliers

There are many barcode readers available and below are just a few that we known to work. The only requirement is that it can read code types 39 and 128.

For Travelstar 40GN and 60GH only, one will require it to support code type 412.

Component	Supplier	Web site
Metrologic MS 5145 Eclipse		http://www.honeywellaidc.com/en-US/Pages/Product.aspx?category=Laser&cat=HSM&pid  =5145
IDAutomation P'nP USB		$99 on http://www.idautomation.com/scanners/ 
Barcode Reader	Opticon OPT-6125-USB	http://www.opticonusa.com/usb.htm 

1.2.4 : SATA Adapter Cards Supported

For Model HUS726060ALA640 or later

HighPoint http://www.highpoint-tech.com/	HighPoint Rocket RAID 2300 SATA controller Rocket RAID 2302 SATA controller Rocket RAID 2310 SATA controller Rocket RAID 2304 SATA controller
Rocket RAID 2300 	Rocket RAID 2310 
Sonnet http://www.sonnettech.com/	TEMPO SATA PRO EXPRESSCARD /34 

Up to HUS7240xxALx640 or HTS5410xxA7E630

HighPoint http://www.highpoint-tech.com/	HighPoint Rocket RAID 1520 SATA controller Rocket RAID 1540 SATA controller Rocket RAID 1542 SATA controller Rocket RAID 1640 SATA controller Rocket RAID 1740 SATA controller Rocket RAID 2300 SATA controller Rocket RAID 2302 SATA controller Rocket RAID 2310 SATA controller Rocket RAID 2304 SATA controller UDMA mode access is available with 1740/2300/2310 HBA only		
Rocket RAID 1540 	Rocket RAID 1740 	Rocket RAID 2300 	Rocket RAID 2310 
Sonnet http://www.sonnettech.com/	TEMPO SATA PRO EXPRESSCARD /34 		

1.2.5 : SATA Controller Windows Driver Installation

<RocketRaid 1740/2300/2302/2310/2314>

In order to access the HDD, driver is not required when SATA HBA (RocketRaid 1740 /2300 /2302 /2310 /2314) are used.

In addition, HBA Driver might cause a problem to overwrite the data of the HDD automatically. Therefore, please never install HBA Driver in a PC for HiTest.

However we encountered new problem when we used the RocketRaid 1740 /2300 /2302 /2310 /2314 card. That is beep sound problem. To solve this problem, driver installation is required. After installed the drivers you have to install RAID Management Utility. After that Audible Alarm set to Disable.

p.s. Windows OS does not recognize this Raid adapter even if you install the drivers. So the problem which "HiTest terminated on the way" would not occur.

< Except for RocketRaid 1740/2300/2302/2310/2314>

When we run the HiTest for SATA drive, we encounter the below problem once in a while. HiTest terminated on the way when "Format" or "Extended Drive Self Test" is executed. This phenomenon occurred since Windows OS issues some command to SATA drive to recognize SATA card .HiTest does not need the drivers and Windows OS does not recognize SATA card if not install the drivers .So we recommend this operation.

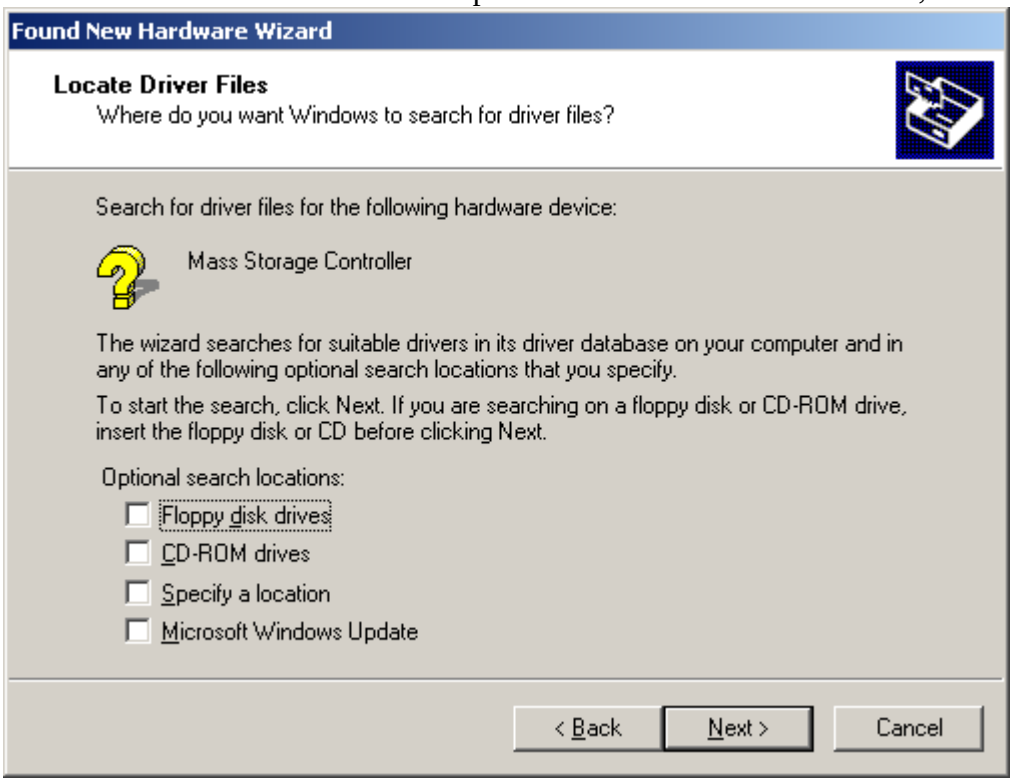
p.s. We have not confirmed this problem with SAS and PATA cards.

During the first boot of the test system after installing new IDE PCI Controllers, Windows will declare "Found New Hardware Wizard" and offer the option to install a driver. But the HiTest do not need windows interface adaptor board drivers. So you need not install I/F adaptor board drivers.

f you see the following "Found New Hardware Wizard", please proceed as following process.
At this stage click "Next>".

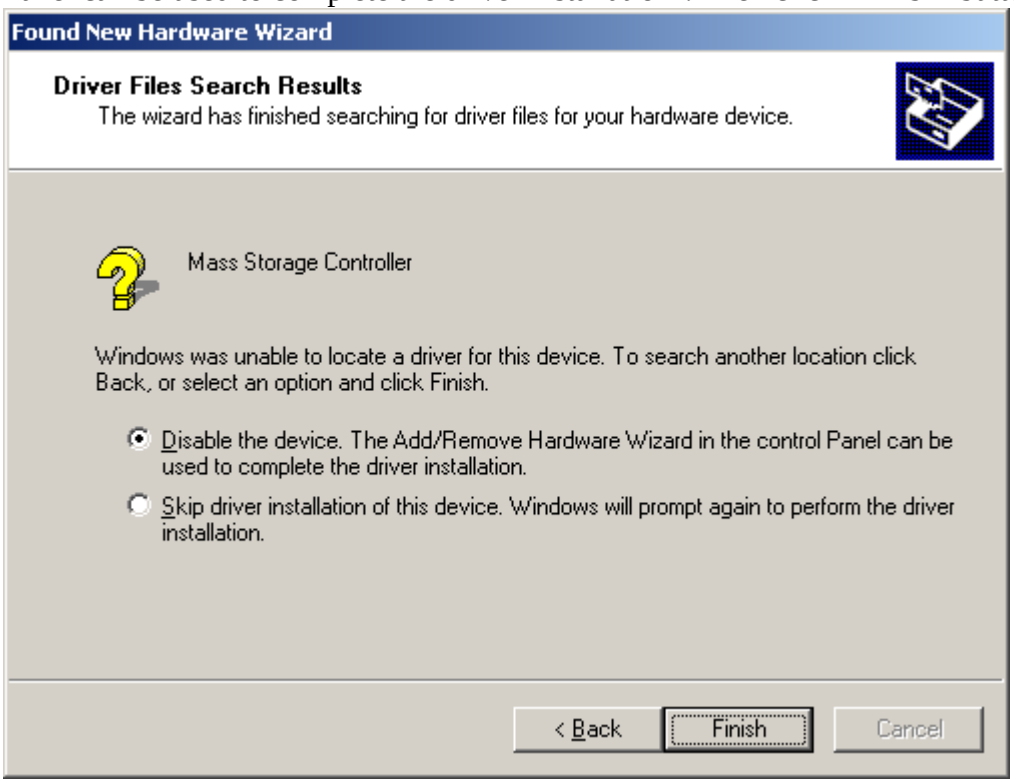
Please select the upper Radio Button "Search for a suitable driver for my device", then click "Next>" .

Please remove all check marks at "Optional search locations" as bellow, then click "Next>" button.



Please select the upper Radio Button "Disable the device. The Add/Remove Hardware Wizard in the control

Panel can be used to complete the driver installation". Then click "Finish" button.

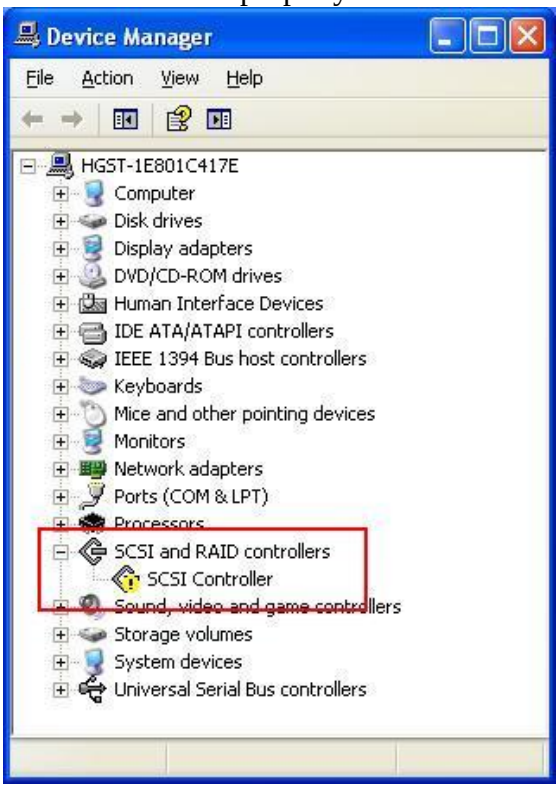


After that, Windows will not open "Found New Hardware Wizard" after next boot.

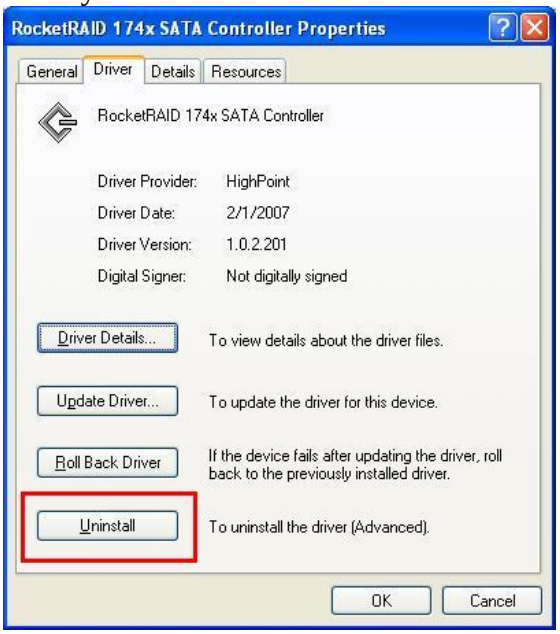
If you want to uninstall PCI HBA driver. Please refer to Next Page..

Check Device Manager

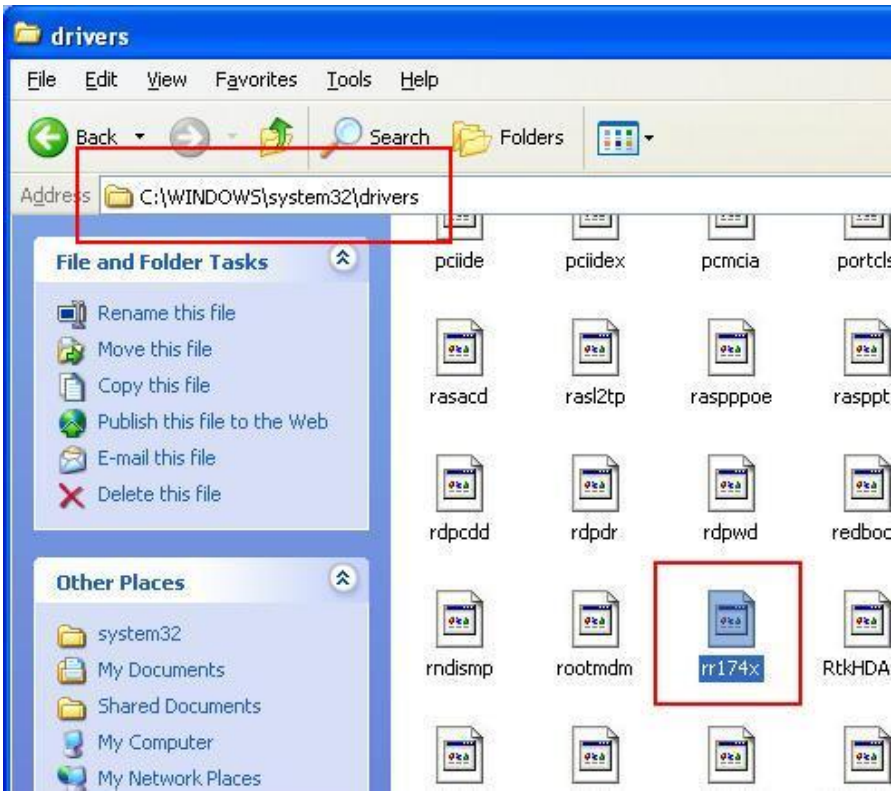
If driver of the PCI HBA was installed, DeviceManager shows the HBA name without exclamation mark. We expect HDD controller has exclamation mark.
Please right click and select Properties to show the device property



And Select Driver tab and Uninstall the device driver. Windows show dialog box to encourage system reboot when you uninstall device driver. Please click "No" to cancel Windows reboot.



Please go to installed drivers directory to delete registered device driver. Default setting of the directory is C:\\Winodow\system32\drivers (Case of Windows Xp 32 bit). This sample case deletes Highpoint Rocket RAID 1740 driver.



Then please reboot Windows system and recheck DeviceManger to check target device has exclamation mark. If Driver deleting was succeed, the device icon has exclamation mark.

Appendix

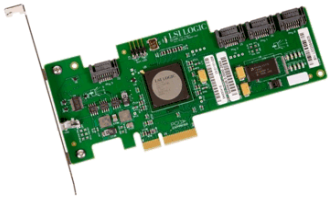
HBA Name	Driver Name
Rocket RAID 2300	2300_00.sys
Rocket RAID 2310	2300_00.sys

1.2.6 : SAS/FCL PCI Express HBA Card

HiTest supported SAS/FCL PCI Express HBA for HGST SAS/FCI HDD products

For SAS Interface

LSI Logic http://www.lsilogic.com	Card Name	Required PCI Bus
	LSI SAS3041E-R LSI SAS 9211-4i	x4 lane PCI Express 2.0
	LSI SAS 9200-8e	X8 lane PCI Express 2.0
Sonnet http://www.sonnettech.com/	TEMPO SAS PRO EXPRESSCARD /34	ExpressCard /34

LSI SAS3041E-R	LSI SAS 9211-4i	LSI SAS 9200-8e	TEMPO SAS PRO EXPRESSCARD /34
			

For FCL Interface

LSI Logic http://www.qlogic.com	Card Name	Required PCI Bus
	Qlogic QLE2460	x4 lane PCI Express 2.0

Qlogic QLE2460			
			

HiTest requires to use HBA driver for SAS/FCL products. Please download the SAS/FCL HBA driver from HBA Vendor Home page.

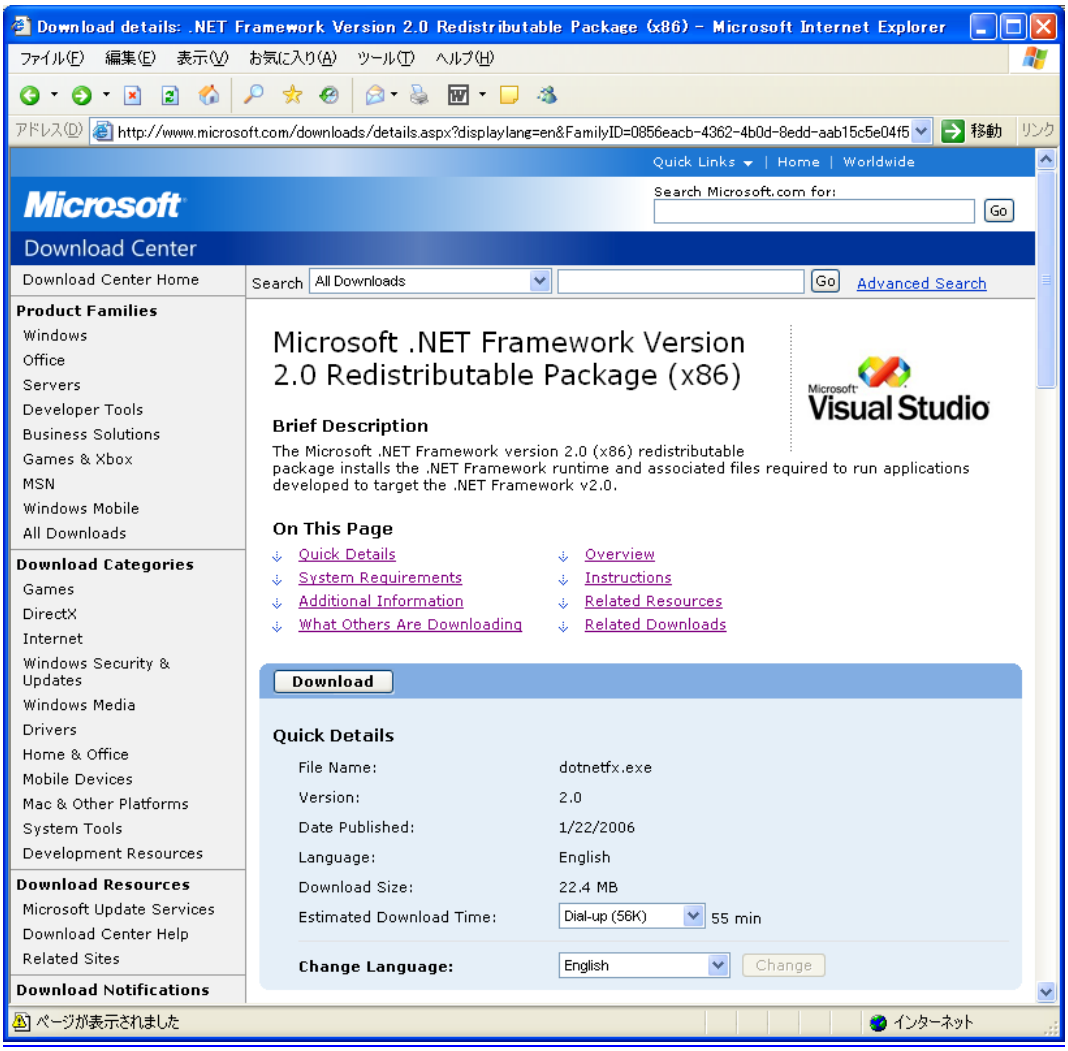
SAS/FCL don't need to set up port configuration which is described in the section 2.1.2.

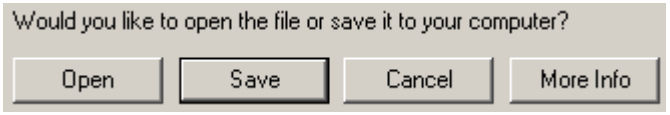
1.3 : System Requirements - Software

1.3.1 : Microsoft .NET Framework Redistributable Package version 2.0

From HiTest Version 2.00, .NET Framework 2.0 is required on Windows Xp
If operation system of HiTest installed machine is Windows 7, please skip this part.
In case of operation system is Windows 8 or Windows 8.1, please go to next page.

This package must be installed prior to the installation of HiTest. The install package is available from your technical support representative or the following URL.
http://www.microsoft.com/downloads/details.aspx?displaylang=en&FamilyID=0856eacb-4362-4b0d-8edd-aab15c5e04f5





Start the installation by clicking “Download”. Run directly from the web by selecting Open or Save to your hard drive for installation later.

Follow the on screen instructions for installation until complete.

Important * HiTest does not work with .NET framework 4.5 which is installed by Windows8 & Windows 8.1 default installation. Please install .NET framework 3.5.

If test PC cannot use Internet, please Install ".Net" from Windows 8/8.1 install CD/DVD.

Open command prompt as administrator. And run command line as below.
dism.exe /online /enable-feature /featurename:NetFX3 /All /Source:D:\sources\sxs /limitaccess
D:\ is optical drive letter. It will be changed by machine configuration

See also

http://msdn.microsoft.com/en-us/library/hh506443

1.3.2 : HiTest Installation

The latest releases of HiTest install package can be obtained from your local technical support representative of the HGST.

Double Click the **"Setup.exe"** file and follow the on screen instructions until installation is complete.

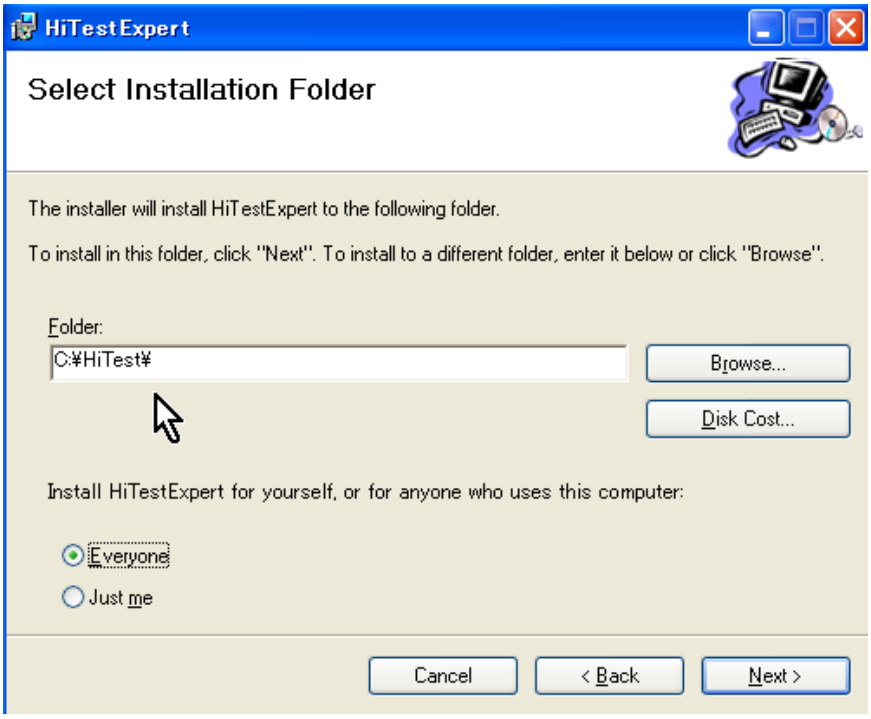
You have now installed the HiTest application on your system.

You should see the following shortcut in your Windows Programs listing;

And the following shortcut icon on your desktop;

Caution when you want to install HiTest on Windows7 and Windows 8

HiTest can be run on Windows7 when you installed HiTest program to "C:\HiTest " folder. If you install to the default "C:\Program Folder\HiTest " folder, unexpected problem may occur.



2.0. : HiTest User Guide

HiTest User Guide

2.1 : First Time Setup

2.1.1 : Launch HiTest

Double click the 

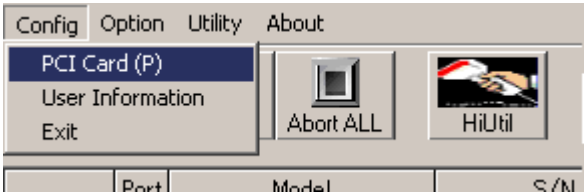
icon on your desk top. Log-in information is required here that will be used in the summary data and must be entered accurately if report generation is to be accurate and efficient.

For the first time user, the PCI Check screen will appear. Please refer to the relevant sections for further advice.

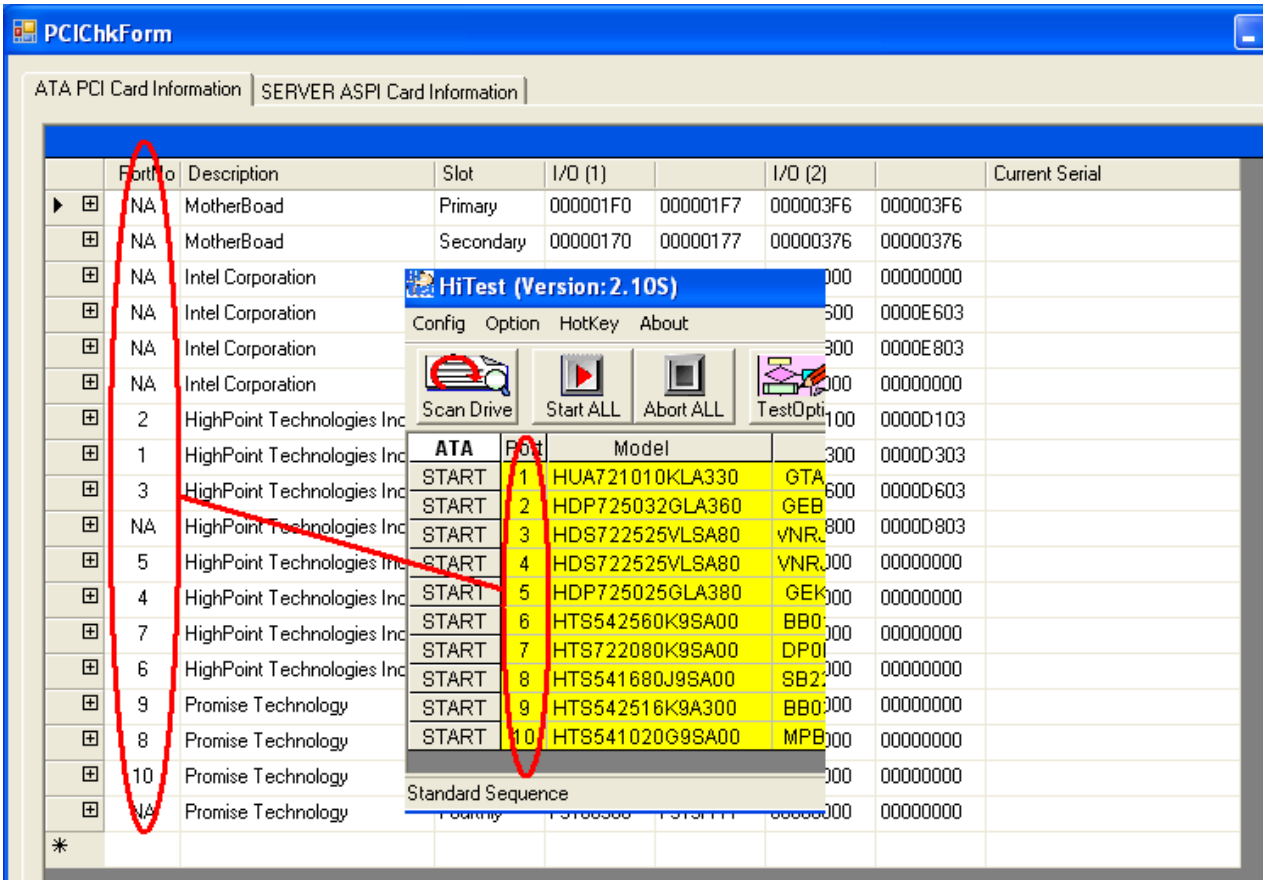
2.1.2 : IDE PCI Card - Port Setup

HiTest supports up to 10 port addresses through which it can test a drive. These will include any detected controllers resident in the host PC (on the motherboard) as well as added PCI controllers, for PATA and SATA. With some modern systems there can be to sets of PATA as well as SATA controllers on-board which can consume most of the available ports, thus, when one adds PCI controllers they may not be visible on the HiTest screen.
In this event one can re-order the port assignments in the PCI Card setup window as described below;

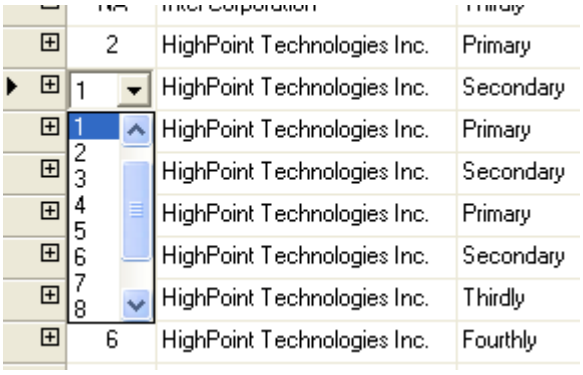
From the main HiTest window select the Config drop down menu ad choose the PCI Card (P) option.



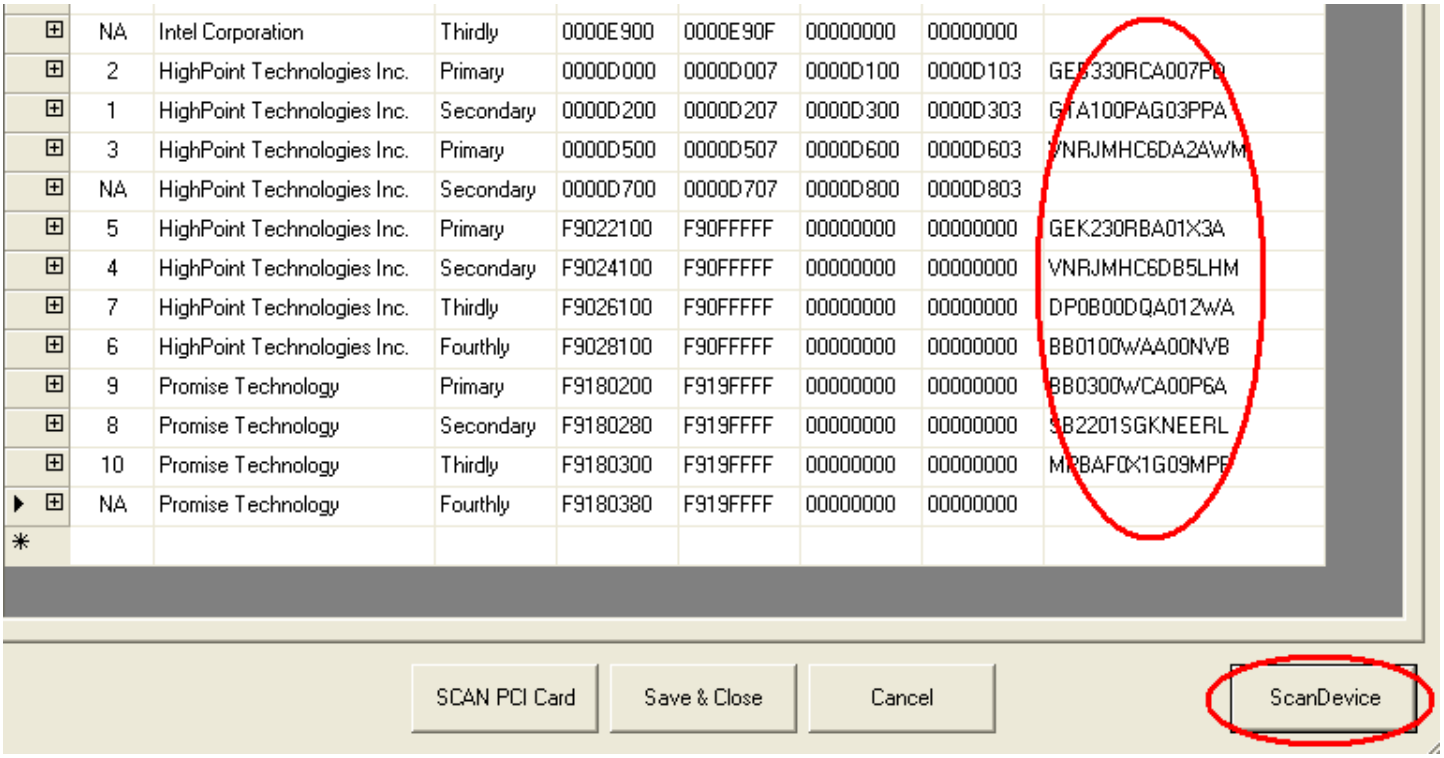
The ports defined in the PCI Card Information (0 to 9) equate to the Ports defined in the HiTest main window (1 to 10)



If you want to modify the Port Number assignment, click the PortNo column and select the number from drop down list and Save & Close.
When you select the number which is already assigned, warning message is displayed.

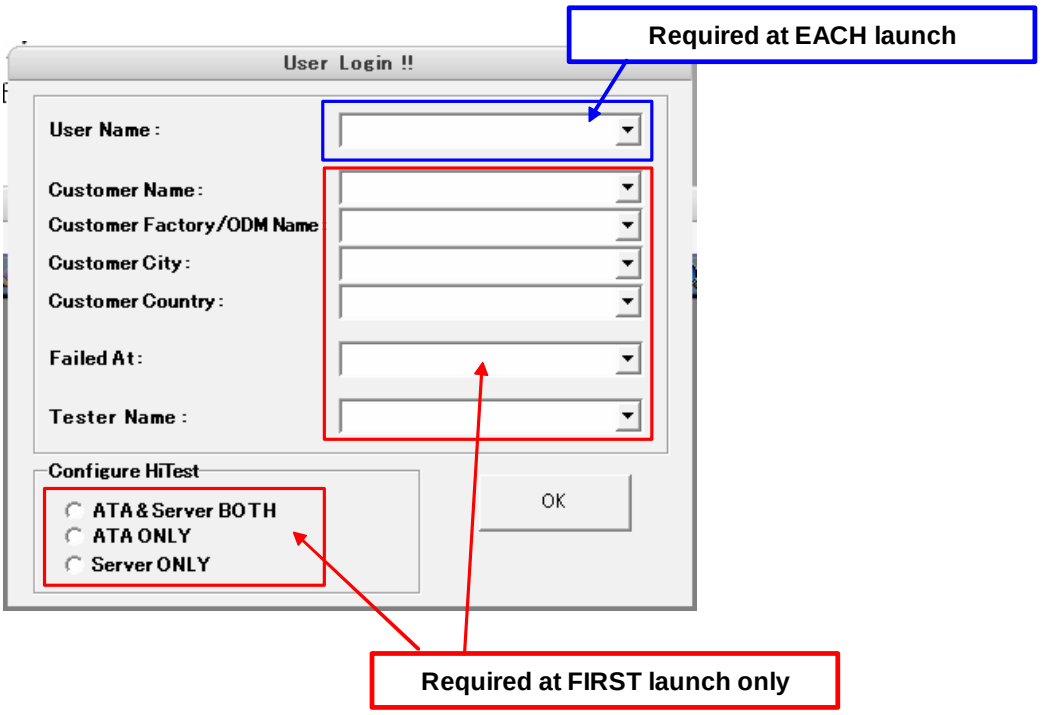


Device scan function is added.
When "Scan Device" button is clicked, connected drives are scanned and serial number is displayed. It is help for the Port No. setting. The port which Port No is assigned to "NA", scan is not performed.



2.1.3 : User Login

During the launch of HiTest / Login one will be asked to enter various data about the User and their Location. HiTest is an integral part of the Failure Analysis process. It's main purpose is to test Hard Disk Drives to a common routine and to record those details for pareto analysis. For those purposes to be meaningful it is essential that the information be entered consistently and accurately.
The User Login information allows the individual drive test data to be linked to a particular Customer / User. The details one enters must be consistent for all tests performed for that user.



User Name	Full name of the person testing these drives. If the user changes during a day without a reboot, one must re-enter the user name in the User Information through the HiTest drop down menus.
Customer Name	This should be the name of the company where this installation of HiTest s being run. It must be kept consistent for all instances of this company across all geographies.
Customer Factory or ODM	This is a name or acronym used to define this site location within the company defined in the "Customer name" field. This must be kept consistent for all entries made at this location.
Customer City	The City where this location is situated.
Customer Country	The country where this location is situated.
Failed At	Segment - where drive failed. (ie. Line=Line integration)
Tester Name	Tester No.1, PC1, etc..

Note:
The fields are designed for alpha-numeric characters. Please refrain from using any other characters such as ",", "." and "-"

2.1.4 : User Login Requirements for GENERIC Customer

Before one tests any products, it is essential for HiTest to gather information about the user and location that the tests are to be conducted. These details will be sorted in the results files for each drive tested.

The following details will help your Customer Support representative, and subsequently the HGST FA Labs, to understand where the drive has failed and returned from. It will help to understand if there are certain trends in returns;

For example, Customer A has 2 PC's running and PC1 is exhibiting more DNR (Drive Not Ready) errors than PC2. This could indicate hardware issues with that system and not real drive failures.
Or Customer B has multiple locations and one location is showing a significantly higher failure rate than the other locations. This could indicate a unique problem at that location or a specific system or environment that the drive is being used in, and not real drive failures.

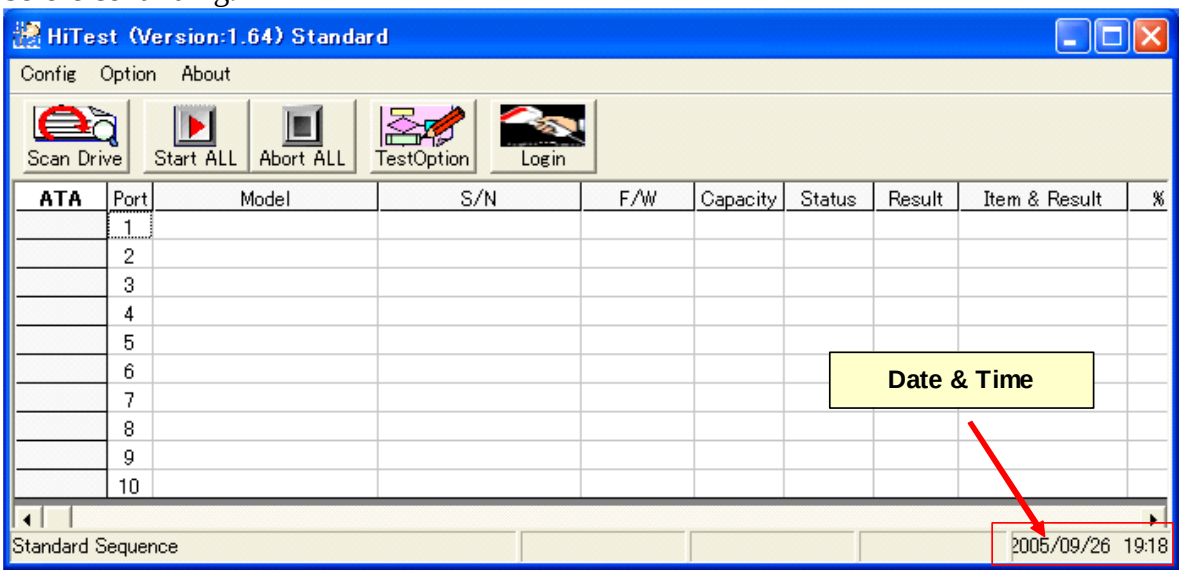
All of this will help to isolate any issues quickly and improve overall quality.

User Name	Full name of the person testing these drives. If the user changes during a day without a reboot, one must re-enter the user name in the User Information through the HiTest drop down menus.
Customer Name	This should be the name of the company where this installation of HiTest s being run. It must be kept consistent for all instances of this company across all geographies.
Customer Factory or ODM	This is a name or acronym used to define this site location within the company defined in the "Customer name" field. This must be kept consistent for all entries made at this location.
Customer City	The City where this location is situated.
Customer Country	The country where this location is situated.
Failed At	Segment - where drive failed. (ie. Line=Line integration)
Tester Name	Tester No.1, PC1, etc..

2.2 : Ready to Start

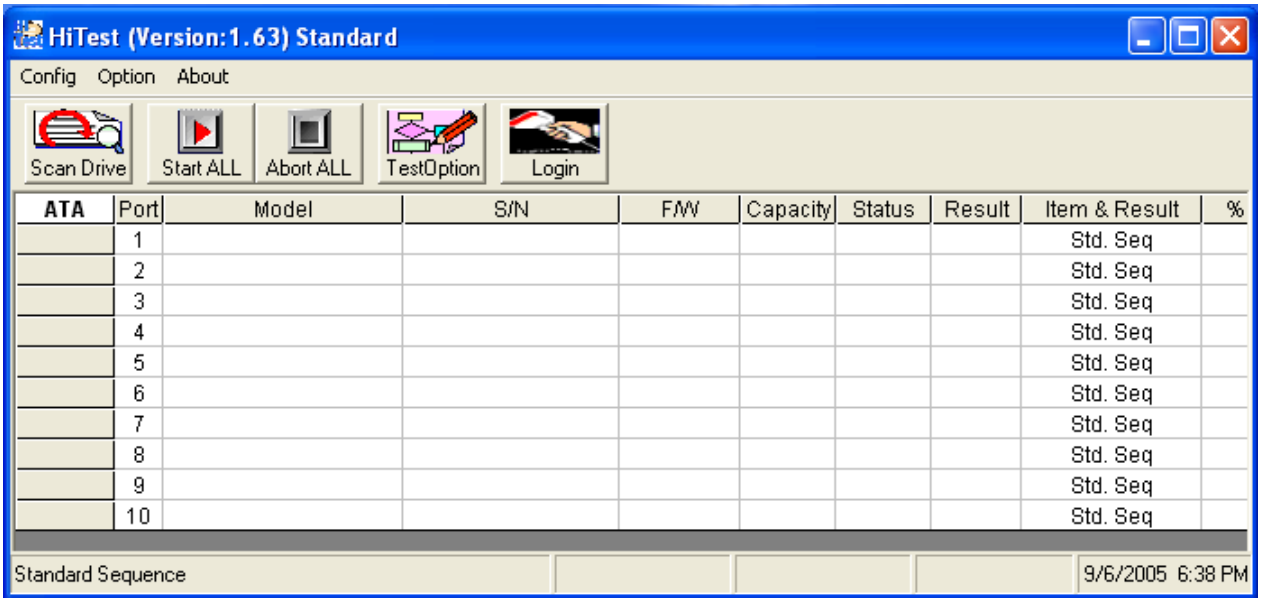
Once the User Login completed, the main HiTest screen will appear and you can start testing drives.

NOTE: Please check that the Date and Time are reported correctly. If not, please correct in the system settings before continuing.



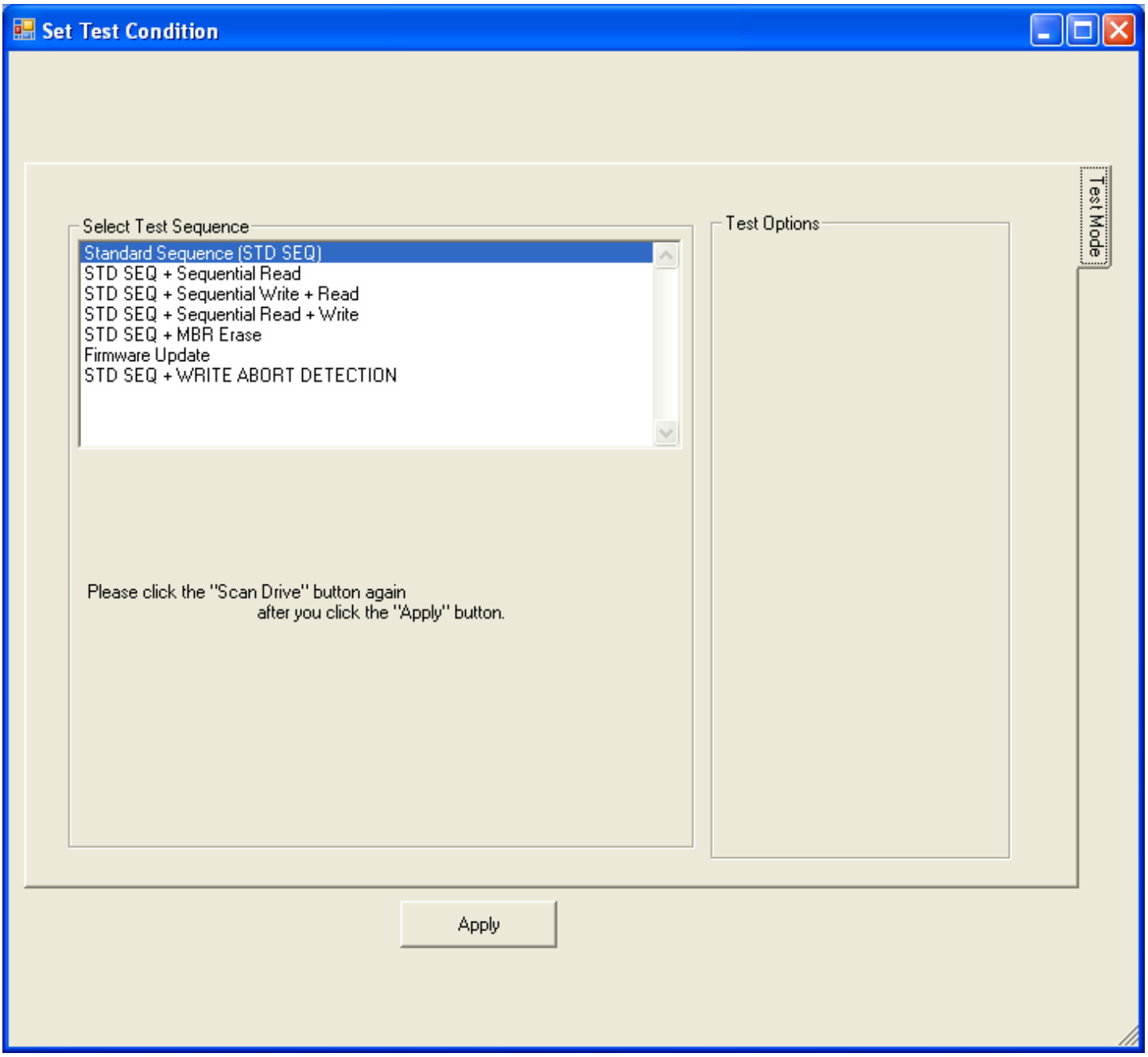
3.0: Start Testing
3.1: HiTest Test Option Selection

HiTest's prime function is to perform level 1.0 Failure Analysis. This involves collecting parametric data from the drive in order to assess if the drive is fundamentally good or defective.
Drives that are NFF (No Failure Found) are parametrically good, however in order to be confident that the drive can be returned to a user environment one must test the entire user area.
The following describes the process for setting the test routine to include a Read Verify to all sectors of the drive for all drives that have passed the standard sequence as NFF.



Click Test Option button 

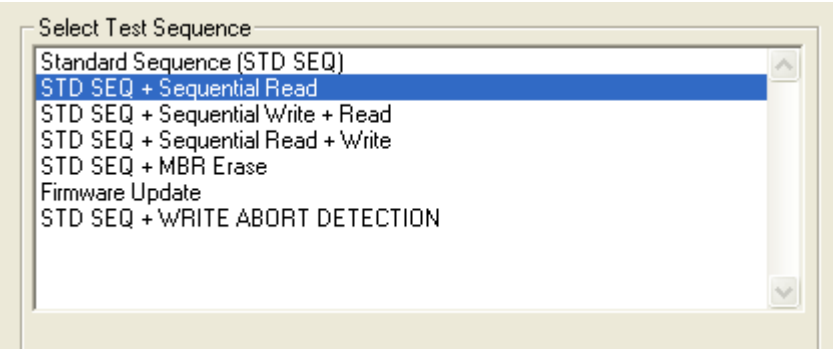
, then following screen will open.



Basically, Optional sequence can be run only after the Standard Sequence (STD SEQ).
Even if you choose the "STD SEQ + WRITE ABORT DETECTION", the Standard Sequence will be executed before write abort detection step.
As an exception, only "Firmware Update" is performed without the Standard Sequence.

"STD SEQ + Sequential xxx" options are performed only when the result of STD SEQ is NFF-XXX.
" STD SEQ + WRITE ABORT DETECTION" option is performed only when the result of STD SEQ is RHE=1.
*Note
About "Firmware Update" and “WRITE ABORT DETECTION" option explains in chapter 4 more detail.

Please choose the optional sequence from the list shown here.
The following sample screen shows when the Sequential Read is selected. The option will be run after test sequence.



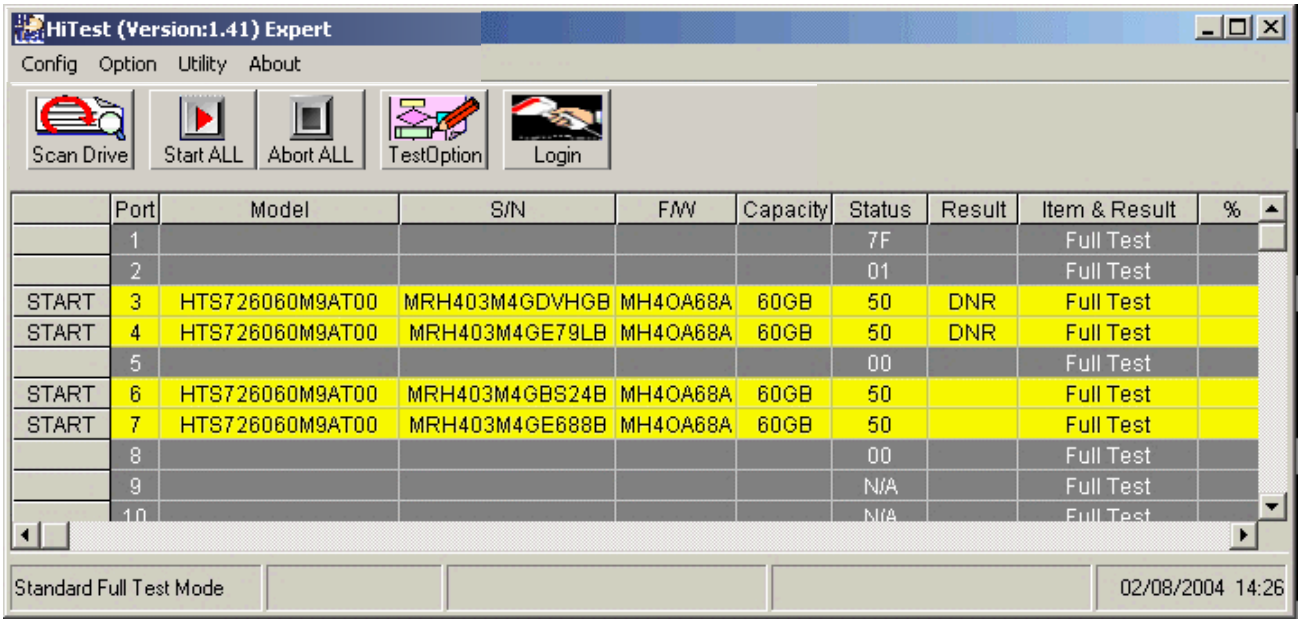
Click Apply button 

,

3.2 : Testing a Drive

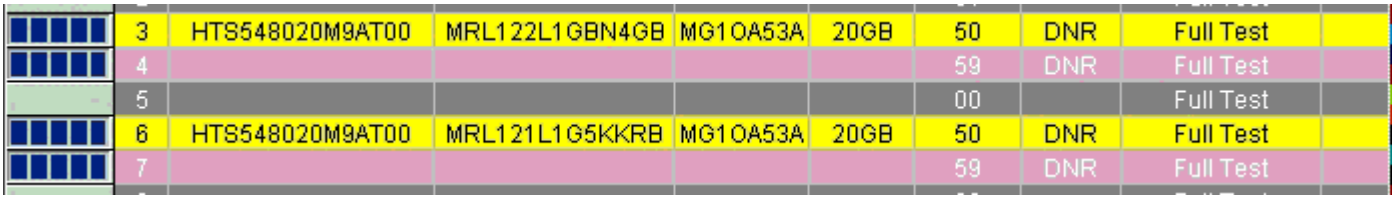
Once the drive has been "logged in". One can attach it to the bus and run HiTest.
Attach the drive as a Master drive to an approved Controller port. One can attach multiple drives and test multiple drives at the same time. Once all drives to be tested are attached, apply power.
Allow some time for the drives to spin up and make them known on the bus, then, on the HiTest screen, click the 

button.
A successful scan of all attached drives will result in a screen like this;



All rows turning YELLOW, indicating a successful scan and awaiting test start.

If the Result field holds a "DNR", please push this button once again.
If the drive is a true DNR then the HiTest program will eventually classify it as such and present the row as follows;



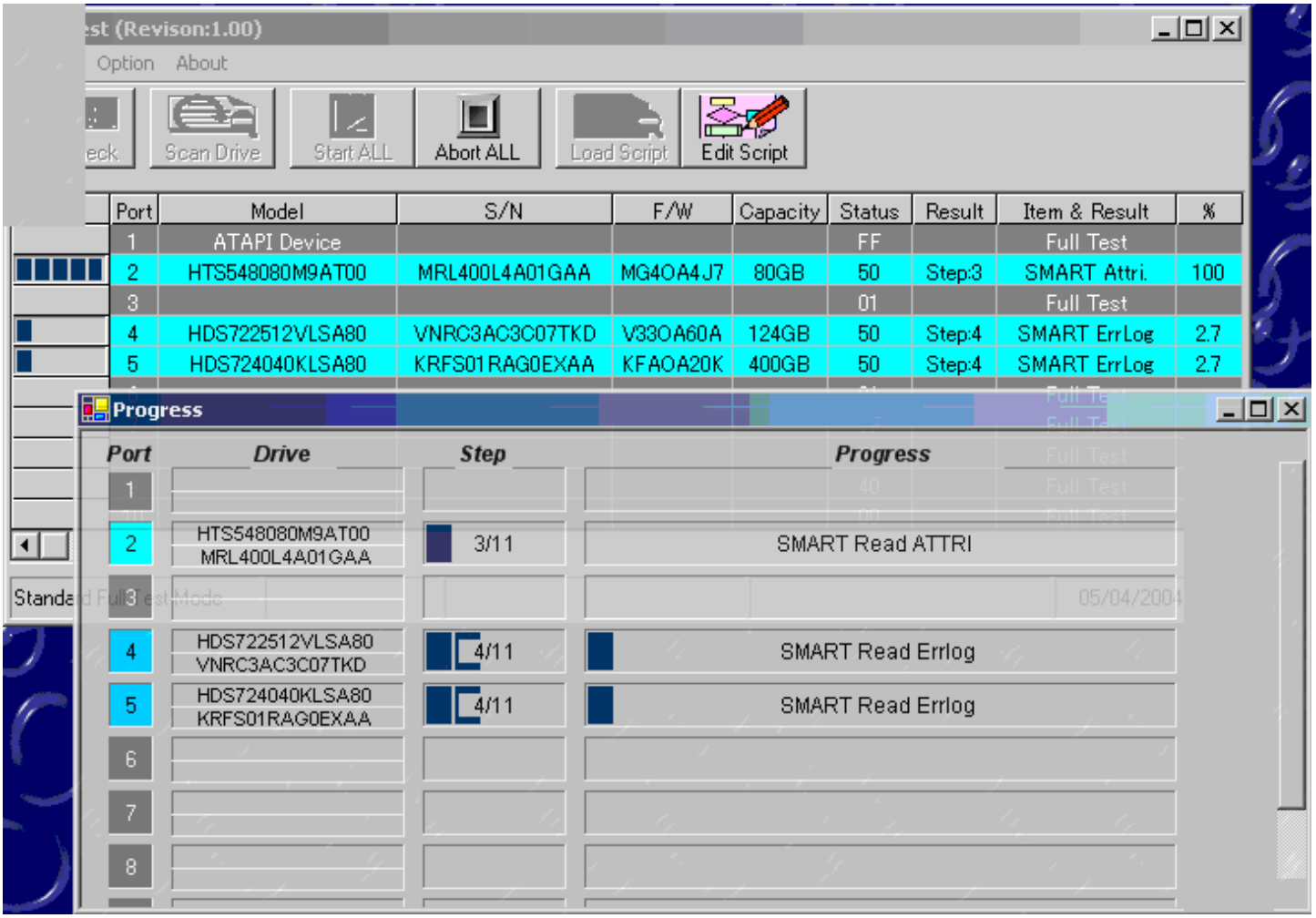
Turning the DNR drives rows PINK indicates a true DNR, please execute DNR login process (refer to 3.5).

Once you have established the number of drives you wish to test and all show a YELLOW row after scanning the bus, one can start the test by clicking the 

button on the main HiTest screen.

3.3 : During HiTest

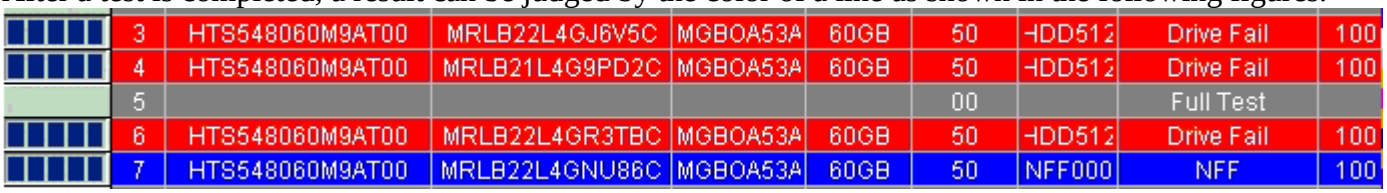
A new window will appear indicating the test steps and their progress. The rows will also turn PALE BLUE to indicate they are running.



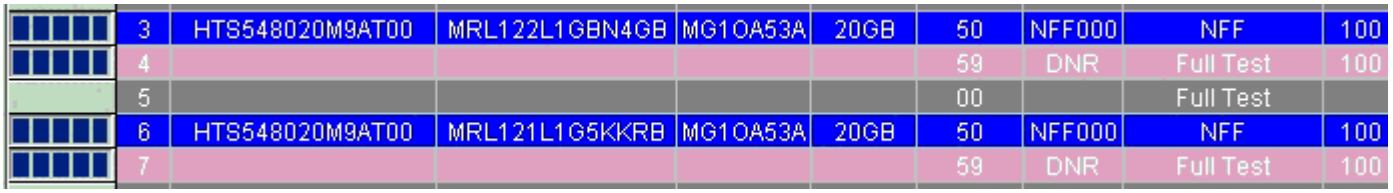
3.4 : Result of HiTest

3.4.1 : HiTest Result and Color Code Summary

After a test is completed, a result can be judged by the color of a line as shown in the following figures.



	3	HTS548060M9AT00	MRLB22L4GJ6V5C	MGBOA53A	60GB	50	HDD512	Drive Fail	100
	4	HTS548060M9AT00	MRLB21L4G9PD2C	MGBOA53A	60GB	50	HDD512	Drive Fail	100
	5					00		Full Test	
	6	HTS548060M9AT00	MRLB22L4GR3TBC	MGBOA53A	60GB	50	HDD512	Drive Fail	100
	7	HTS548060M9AT00	MRLB22L4GNU86C	MGBOA53A	60GB	50	NFF000	NFF	100



	3	HTS548020M9AT00	MRL122L1GBN4GB	MG1OA53A	20GB	50	NFF000	NFF	100
	4					59	DNR	Full Test	100
	5					00		Full Test	
	6	HTS548020M9AT00	MRL121L1G5KKRB	MG1OA53A	20GB	50	NFF000	NFF	100
	7					59	DNR	Full Test	100

The meaning of each color is as follows.

Gray : Default field color
Yellow : Ready to Start HiTest
Pink : DNR (Drive Not Ready)
Pale Blue : Drive running
Blue : Drive Passed HiTest
Red : Drive Failed HiTest
Purple : Customer Induced Damage Failure (Handling Damage)
Orange : No Drive Login Data
Green : Normal End of “Drive Repaired” or “FW update successfully”

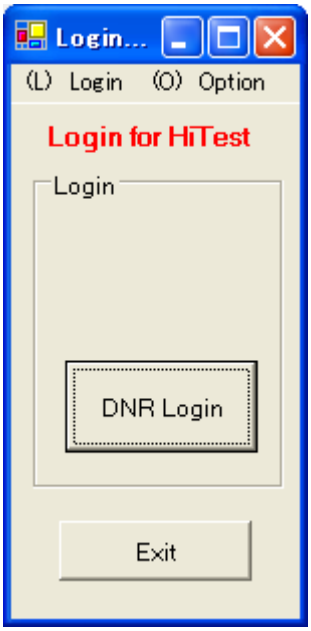
3.5 : Drives Not Ready (DNR) Result Entry

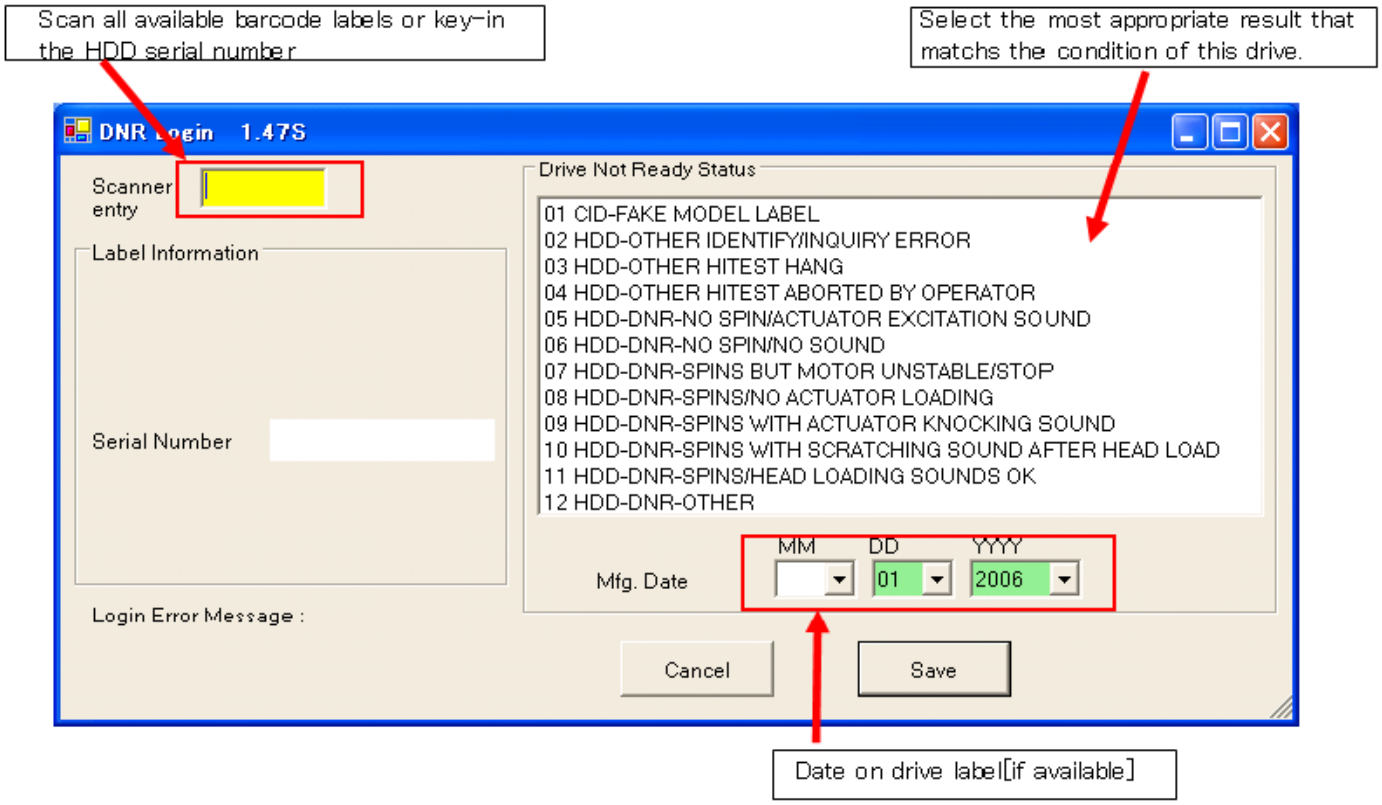
If the drive(s) fail to initialize for what ever reason on HiTest, it is classified as a DNR (Drive Not Recognized) and will be highlighted "pink", as the two in the capture below show;

	3	HTS548020M9AT00	MRL122L1GBN4GB	MG1OA53A	20GB	50	DNR	Full Test
	4					59	DNR	Full Test
	5					00		Full Test
	6	HTS548020M9AT00	MRL121L1G5KKRB	MG1OA53A	20GB	50	DNR	Full Test
	7					59	DNR	Full Test

In this event, please execute DNR login process as follows;

Select the DNR Login button from the Login main screen.





Note. Use the "Scanner entry" field box for entering information. HiTest will automatically understand what is being entered and act accordingly.

(1) Wand in the Serial Number barcode from the HDD label. * Mandatory required

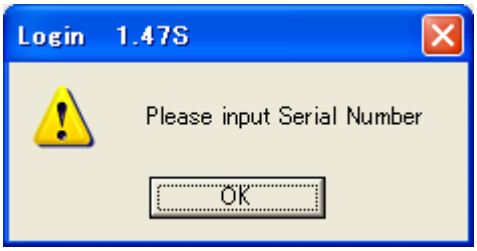
(2) Select the DNR Status.

(3) Enter the Mfg Date, obtained from the HDD Label. (Optional: if available)

(4) Save the data by clicking on the 

button.

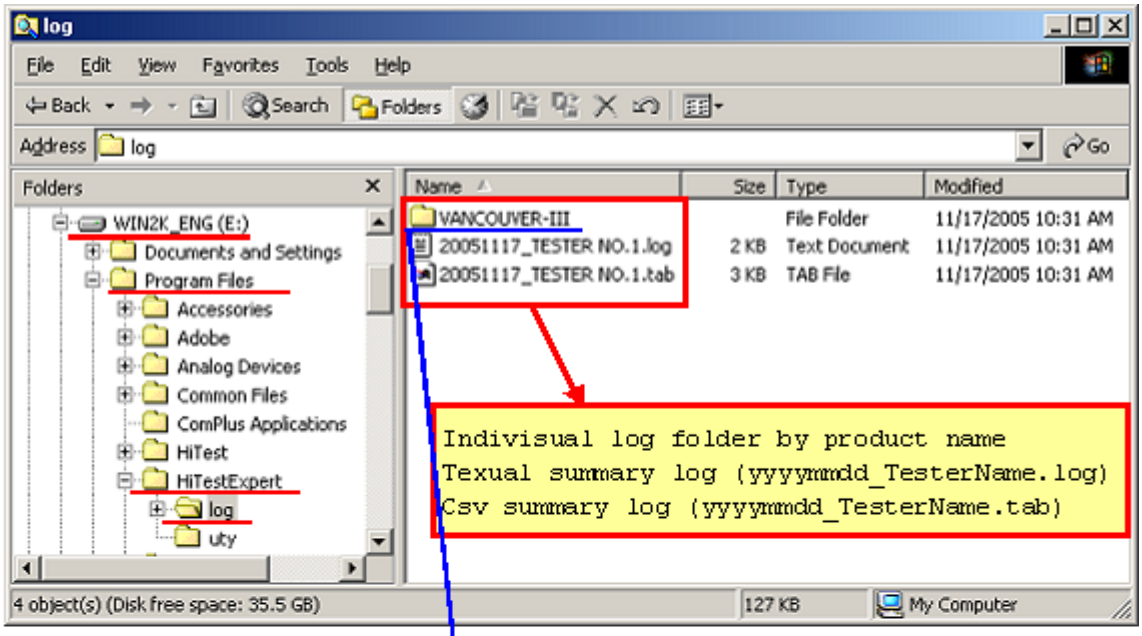
Note. If the Drive Serial Number is missing or a carriage return has not been used after inputting the text, the following message will pop-up.

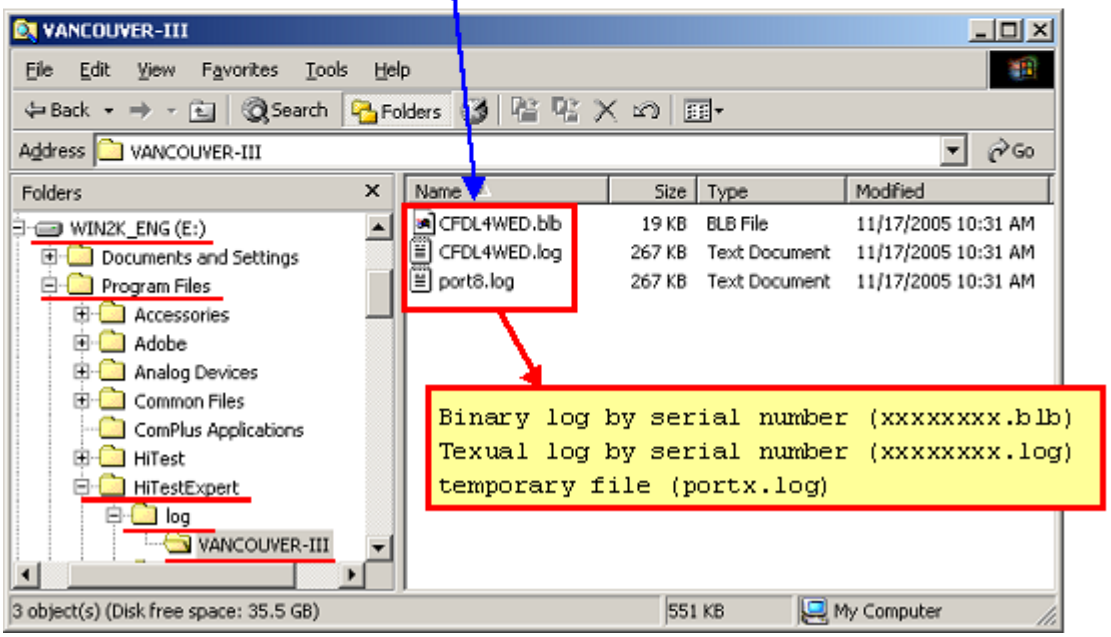


3.6 : HiTest Results in the HiTest\Log Folder

When HiTest completes testing a drive it will create all the relevant output files and store them in the main HiTest log folder or one of it's sub-folders as seen below;

The default folder in which HiTest is installed : C:\Program Files\HiTest\
The folder of the log files for tester : (HiTest folder)\log\
The folder of the log files for each drives : (HiTest folder)\log\(Model Name)\





HiTest Standard Log (Sample)

Individual Log

Summary Log

3.7 : Logs to check the Test Results

There are 2 type of log in the text format.

[1] Test Summary Log --- file name: yyyymmdd_TesterName.log

This log shows test result summary for one day.
Please check the Disposition column for Return to HGST or Do not return to HGST.

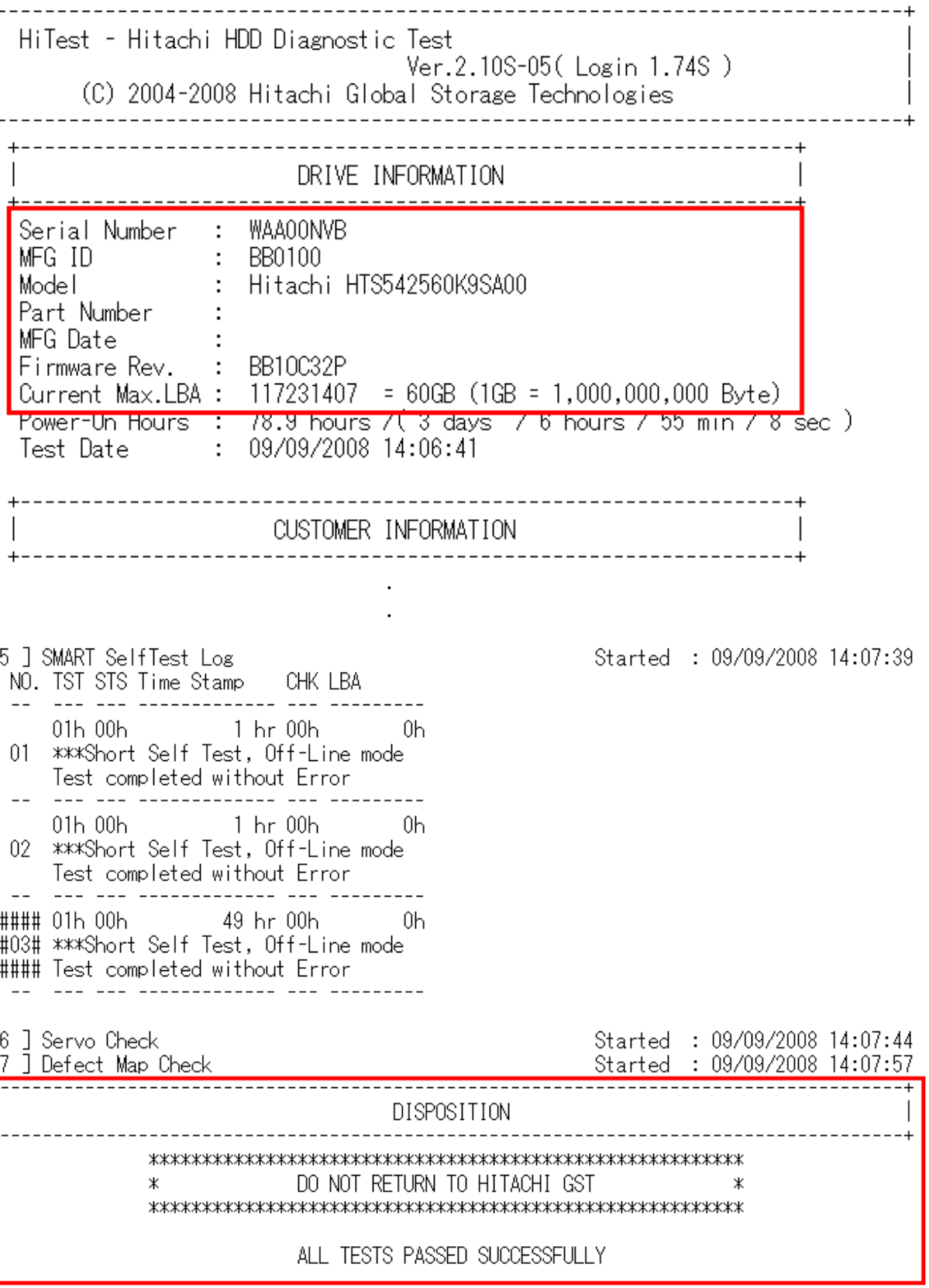
(Sample image)

```
+-------------------------------------------------------------+
|   HiTest - Hitachi HDD Diagnostic Test                      |
|        (C) 2004-2007 Hitachi Global Storage Technologies    |
+-------------------------------------------------------------+


+-------------------------------------------------------------+
|                   Test Summary Log                          |
+-------------------------------------------------------------+

Customer        Location        Model           Serial No       FW Rev.  P/N     MFG Date            HiTest Ver. Start Date Start Time
--------------- --------------- --------------- --------------- -------- ------- ------------------- ----------- ---------- ----------
HITACHI         STR             HDT722525DLAT80 VD041BT4CLLV1E  V44OA70A 0A30243 09/29/2005          2.00S+1.60S 3/1/2007   16:43:7

 End Time  Disposition                 Error Description                       Customer Error Description
 --------- --------------------------- --------------------------------------- ------------------------------
 16:44:49  RETURN TO HITACHI GST       DETECTED PROBLEM
```

[2] Drive Test Log --- file name: DriveSerialNumber.log

This log shows individual drive test result.
You can find the drive information at the beginning of this log and disposition at the end of the log.

(Sample image)



```
+-------------------------------------------------------------------------+
|   HiTest - Hitachi HDD Diagnostic Test                                  |
|                                  Ver.2.10S-05( Login 1.74S )            |
|        (C) 2004-2008 Hitachi Global Storage Technologies                |
+-------------------------------------------------------------------------+

   +-------------------------------------------------------------+
   |                      DRIVE INFORMATION                      |
   +-------------------------------------------------------------+
    Serial Number   :  WAA00NVB
    MFG ID          :  BB0100
    Model           :  Hitachi HTS542560K9SA00
    Part Number     :
    MFG Date        :
    Firmware Rev.   :  BB1OC32P
    Current Max.LBA :  117231407  = 60GB (1GB = 1,000,000,000 Byte)
    Power-On Hours  :  78.9 hours /( 3 days  / 6 hours / 55 min / 8 sec )
    Test Date       :  09/09/2008 14:06:41

   +-------------------------------------------------------------+
   |                    CUSTOMER INFORMATION                     |
   +-------------------------------------------------------------+
                                    .
                                    .

  [5 ] SMART SelfTest Log                          Started  : 09/09/2008 14:07:39
    NO. TST STS Time Stamp    CHK LBA
    --  --- --- ------------ --- ---------
        01h 00h          1 hr 00h        0h
    01  ***Short Self Test, Off-Line mode
        Test completed without Error
    --  --- --- ------------ --- ---------
        01h 00h          1 hr 00h        0h
    02  ***Short Self Test, Off-Line mode
        Test completed without Error
    --  --- --- ------------ --- ---------
   #### 01h 00h         49 hr 00h        0h
   #03# ***Short Self Test, Off-Line mode
   #### Test completed without Error
    --  --- --- ------------ --- ---------

  [6 ] Servo Check                                 Started  : 09/09/2008 14:07:44
  [7 ] Defect Map Check                            Started  : 09/09/2008 14:07:57
  +-------------------------------------------------------------------------------+
  |                                 DISPOSITION                                   |
  +-------------------------------------------------------------------------------+
                ************************************************************
                *            DO NOT RETURN TO HITACHI GST                  *
                ************************************************************

                           ALL TESTS PASSED SUCCESSFULLY
```

3.8 : Logs for HGST representative for further Analysis

There are 2 types of logs which are not in the text format.

[1] Test Summary Log --- file name: yyyymmdd_TesterName.blb

Sample : 20050217_TESTERNO01.blb

[2] Drive Test Log --- file name: DriveSerialNumber.blb

Sample : Q2C0BDWA.blb

These files are created for HGST Failure Analysis Engineer use only. Please pass those files for your HGST representative.

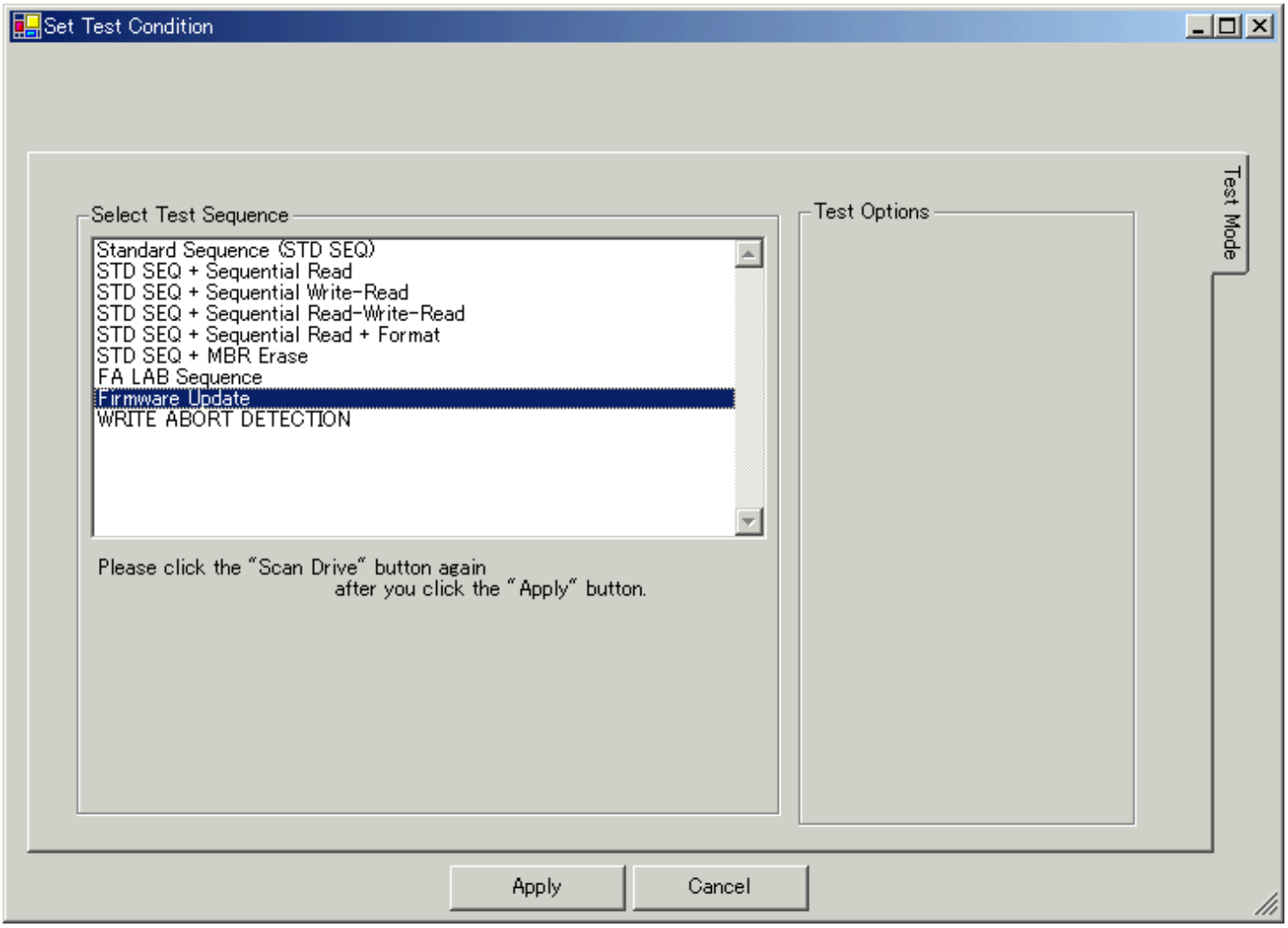
4.0: HiTest option sequence Guide

4.1: Firmware Update

[1] For Multiple Drive

This method has been supported from HiTest Version 1.69.

1. Please select the optional sequence, "Firmware Update".
This optional sequence is supporting firmware update for multiple drives (both desktop and mobile products) and this is installed automatically (both Expert Version and Standard Version)



2. Please click the "Scan Drive" button.
When "Firmware Update" option is selected, Drive Login is not required even if Expert version.

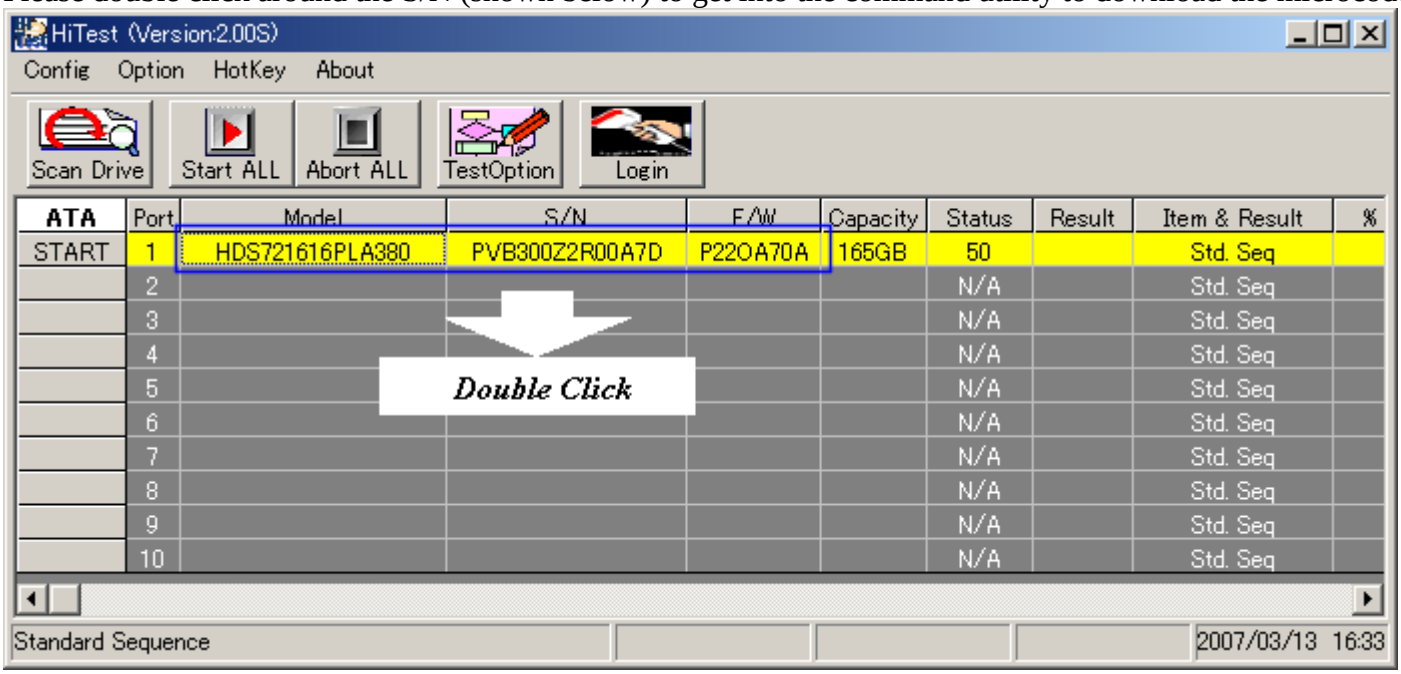
3. Please click the "Test Start" Button

4. Please select the firmware file of the revision which you are going to update since file selection window is displayed.

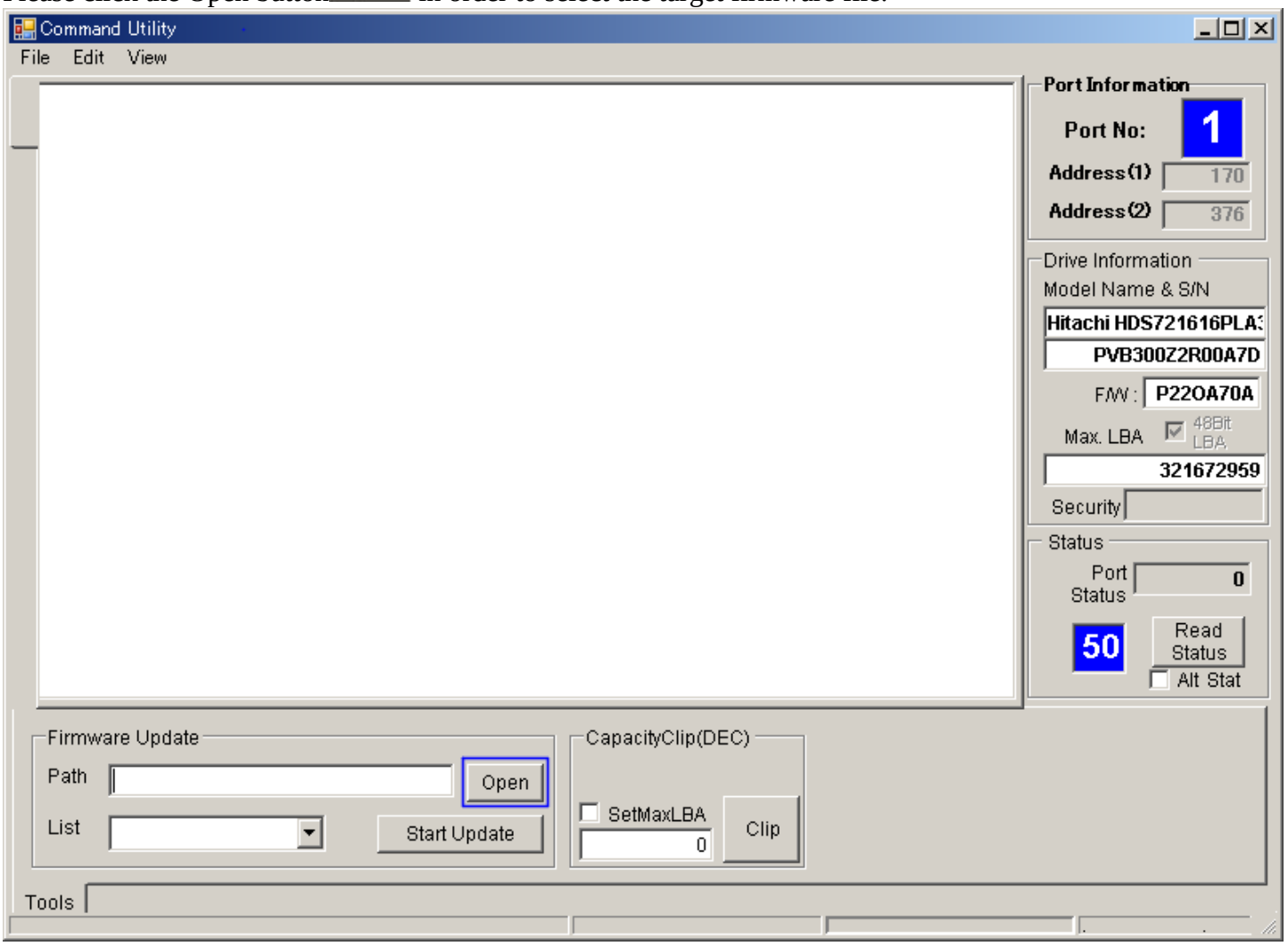
5. HiTest updates only the drive which matched the selected file.

Note : Please ignore the DISPOSITION in the text log, although it is displayed as "RETURN TO HGST" when firmware update is not performed.

[2] For Single Drive
Please double click around the S/N (shown below) to get into the command utility to download the microcode.



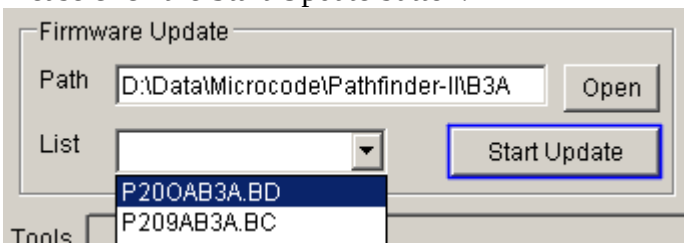
Please click the Open button Open in order to select the target firmware file.



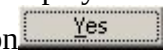
Folder Select Dialog will be shown.
Please click the folder which is including the Firmware File.
Please click the OK button OK

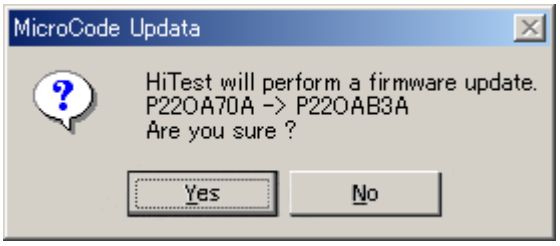
Please select the firmware you would download from the ListBox. 

Please click the Start Update button.

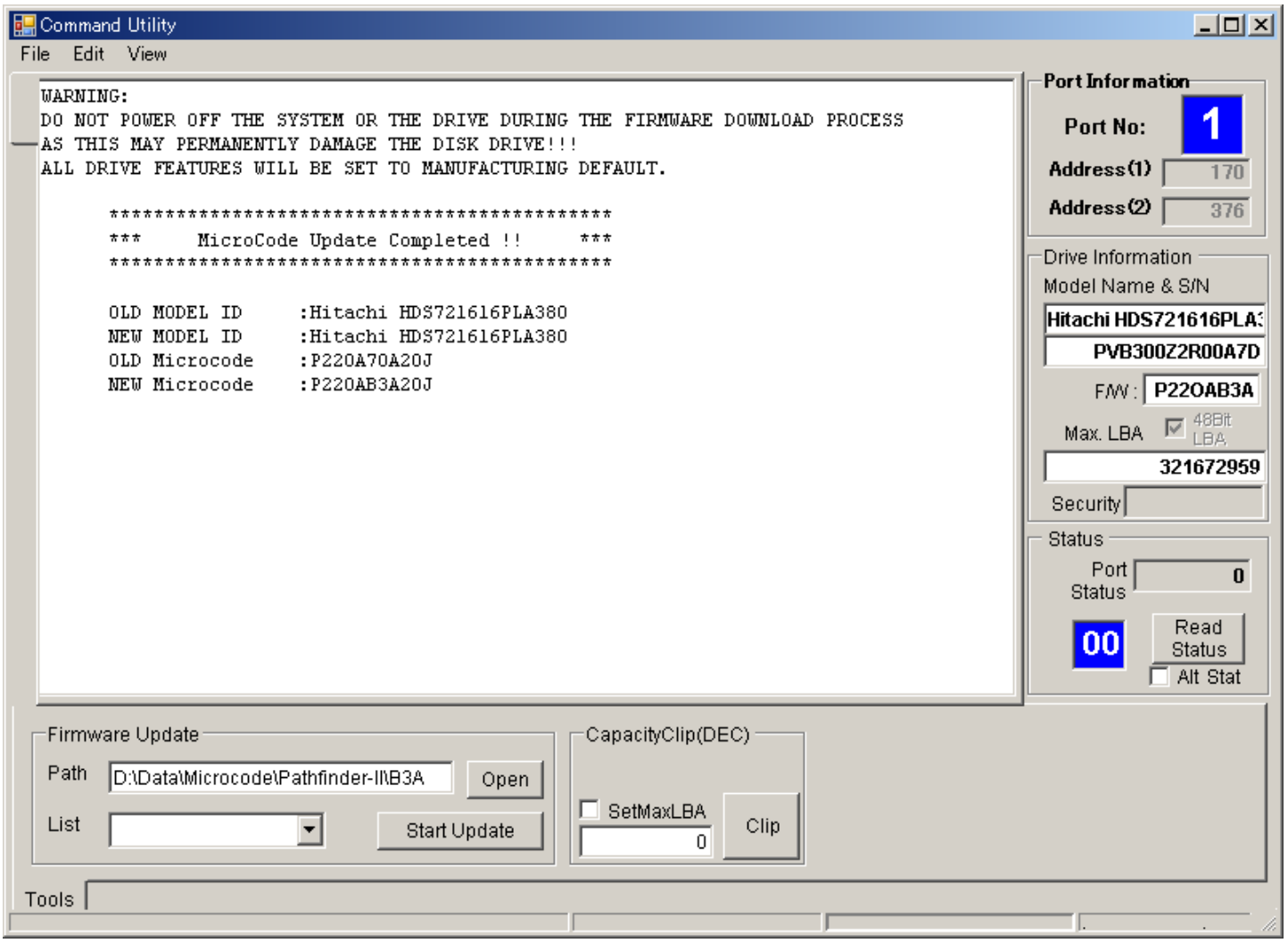


Warning message will be displayed.

Please click the Yes button  to make sure if you would really like to update the microcode.
Download operation will be started.



When download is completed, the following screen will be shown.



Please do not touch your keyboard or mouse during the update operation.

4.2: Write Abort Detection

This optional sequence is provided by the script file.
In the case of RHE=1, HiTest writes the LBA of the read hard error (RHE) and read back the same LBA.
If read command is completed without error, HiTest judges the read hard error was caused by the write abort.
Optional error code will be 0000 (No error) and the color bar will be in Green.

APPENDIX - A : DNR Result Entry Aid - Barcode List

DNR Login Options (Login Ver. 1.37 or later)

http://www.barcodesinc.com/generator/index.php 2005.08.04

Type	Code-128-B
Output	JPEG
Styles	Draw border
Size	W:120 H:60
Xres	1

01	CID-FAKE MODEL LABEL	 NR001	NR001	11500000
02	HDD-OTHER IDENTIFY/INQUIRY ERROR	 NR002	NR002	30500000
03	HDD-OTHER HITEST HANG	 NR003	NR003	30600000
04	HDD-OTHER HITEST ABORTED BY OPERATOR	 NR004	NR004	30700000
05	HDD-DNR-NO SPIN / ACTUATOR EXCITATION SOUND	 NR005	NR005	31100000
06	HDD-DNR-NO SPIN/NO SOUND	 NR006	NR006	31200000
07	HDD-DNR-SPINS BUT MOTOR UNSTABLE / STOP	 NR007	NR007	31300000
08	HDD-DNR-SPINS/NO ACTUATOR LOADING	 NR008	NR008	31400000
09	HDD-DNR-SPINS WITH ACTUATOR KNOCKING SOUND	 NR009	NR009	31500000
10	HDD-DNR-SPINS WITH SCRATCHING SOUND AFTER HEAD LOAD	 NR010	NR010	31800000
11	HDD-DNR-SPINS/HEAD LOADING SOUNDS OK	 NR011	NR011	31900000
12	HDD-DNR-OTHER	 NR012	NR012	32000000

APPENDIX - B : Error Code definition

HiTest provides 4 digits error code and description to text log

```
*****************************
 * << HiTest Result >>
 * HiTest ErrCode    : 0100
 * HiTest Description: NO ERROR
 *****************************
```

L1.0 STD Error Code	L1.0 STD Error Description
0100	NO ERROR
0230	SECURITY LOCKED
0240	DISK SHIFT DAMAGE
0331	DNR-NO SPIN/ACTUATOR EXCITATION SOUND
0332	DNR-NO SPIN/NO SOUND
0333	DNR-SPINS BUT MOTOR UNSTABLE/STOP
0334	DNR-SPINS/NO ACTUATOR LOADING
0335	DNR-SPINS WITH ACTUATOR KNOCKING SOUND
0338	DNR-SPINS WITH SCRATCHING SOUND AFTER HEAD LOAD
0339	DNR-SPINS/HEAD LOADING SOUNDS OK
033F	DNR-OTHER
0360	UNRECOVERD READ ERROR
0370	OTHER SMART ERROR
0371	PRE-SMART ERROR
0379	SMART SELF TEST ERROR
0380	BUSY TIMEOUT
0399	OTHER ERROR

* 0331-033F DNR error code is decided by user at DNR LogIn screen.

Thank You