

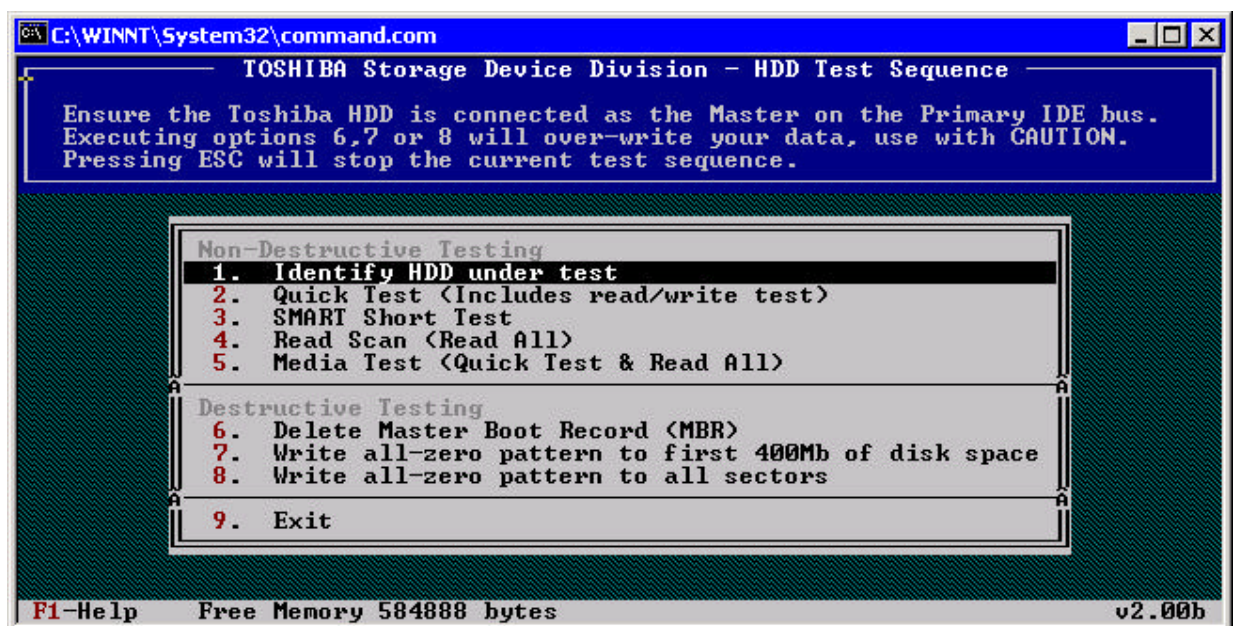
TOSHDIAG: HDD test tool

Comprises 2 files:-

TDMENU.EXE menu program that calls executable file

TOSHDIAG.EXE diagnostic program (including error handling)

The Toshiba HDD under test needs to be connected to the Primary IDE bus as the MASTER device. The programs will only function correctly in native DOS.



Test philosophy

The purpose of this suite of diagnostic programs is to ensure that the HDD is fit for purpose. Therefore, the sequence of events should be

1. Test 1. Identify HDD under test
2. Test 2. Quick Test (Includes read/write test)
3. Test 3. SMART Short Test
4. Test 4. Read Scan (reads all)
5. Test 6. Write all-zero pattern to first 400Mb of disk space

The results of the above Tests will determine whether the HDD is fit for use or not fit for use. The error log (serial number.LOG) needs to be viewed after the successful completion of Test 4. Then a. or b.

a. If there are zero defective sectors documented and the displayed elapsed time is within tolerance then the drive is fit for purpose.

At this point in time it is a good idea to perform Test 6 "Write all-zero pattern to first 400Mb of disk space". This will ensure that previous User data is removed.

b. If defective sectors are seen in the error log then extra tests need to be performed in order to "clean" the media. Perform Test 7 "Write all-zero pattern to all sectors" followed by Test 4 "Read Scan" again. If the error log shows zero defects (and elapsed time is OK) then the HDD is fit for purpose.

Notes:

- i. It is always good practice to test a known good HDD through this test process. This will provide confidence that it works. Additionally, make a note of the elapsed time that Test 4 takes to complete.
- ii. Test 8. Media Certification performs a Read/Write /Read sequence. This can be a very good test that, if completed successfully and the elapsed time is OK, will result in a HDD without any defective sectors.
- iii. Pressing F1 when cursor is on selected Test will display a short description of the selected Test.
- iv. Test 4 can result in a successful completion even if a maximum of 9 defective sectors are detected. Always check the error log.
- v. Common sense takes precedence.

Non-Destructive Testing

Test 1: Identify HDD under test

Self explanatory

Test 2. Quick Test (Includes read/write test)

Status register check

Task File register check

R/W Buffer RAM compare test

Execute Device Diagnostics test

Identify Device check

SMART warning check

Read function test

Read/Copy/Write/Read/Compare test*

*In this test, Write commands (Read/Copy/Write) are issued to the last 5% area of user's area. If the write function doesn't work normally, user's data may be corrupt.

An example of screen display can be seen in Appendix A.

Test 3. SMART Short Test

Performs SMART Short test.

DRAM test

Data bus check & Address bus check:

ROM test

Head write test

Seek test

Read test:

Each * indicates that 10% of the test is complete. Should only take 2-3 minutes to complete.

Need to ensure that the SMART function is Enabled on the HDD. The Quick Test (Test 2) display text "S.M.A.R.T. check O.K" will be seen if SMART is Enabled.

An example of screen display can be seen in Appendix B.

Test 4. Read Scan (reads all)

Performs a sequential read of the complete disk. Defective sectors will be documented in a file "serial number.log". The test will abort if 10 or more defective sectors are detected.

At the end of the test an elapsed time will be displayed. This is the time it has taken to complete the test. This time will be different if the HDD is tested on a completely different system. It is important this Test is first performed on a known good drive (with zero defective sectors etc). This time can be used as a benchmark figure. See Appendix C for details of screen display. Contents of error log can be seen in Appendix D

Appendix A

Screen displays:-

Test 2: **Quick Test (Includes read/write test)**

a. Using good HDD:
Starting 2. Quick Test (includes read/write)
Quick test
Function test O.K.
S.M.A.R.T. check O.K. (If SMART enabled)
Read testooooooooooooOOOOOOOOOOO O.K.
Read Write test O.K.

Command complete successfully

```
=====
      OO      K K
      O O     K K
      O O     K K
      O O     K K
      OO      K K
=====
```

Press any key to return to menu.

b. Using "bad" HDD. Actual message will depend on failure mode.
Quick test
Function test O.K.
S.M.A.R.T. check

Device S.M.A.R.T. Error
S.M.A.R.T. has detected a problem. The device will fail soon and
should be replaced as soon as possible.

```
=====
FFFFF      A      III L
F          A A      I L
FFFFF      A A      I L
F          AAAAAA   I L
F          A      A III LLLLLL
=====
```

Press any key to return to menu.

Appendix B

Screen displays:-

Test 3: **SMART Short Test**

Starting 3. SMART Short Test
Executing Short self test
Self test routine in progress *****
O.K.

3. SMART Short Test complete successfully

```
=====
      OO   K  K
      O O   K K
      O O   K K
      O O   K  K
      OO    K  K
=====
```

Appendix C

Screen displays:-

Test 4: **Read Scan (reads all)**

a. Using good HDD:

Starting 4. Read Scan (Read All)

Read Test started at 11:30:47

Media test

Read all sector

```
***** 10%
***** 20%
***** 30%
***** 40%
***** 50%
***** 60%
***** 70%
***** 80%
***** 90%
***** 100% O.K.
```

4. Read Test stopped at 11:56:41

Read Test elapsed time = 25:53 (MM:SS)

Command complete successfully

```
=====
OO    K K
O O   K K
O O   K K
O O   K K
OO    K K
=====
```

Appendix D

Content of Error log file

TOSDIAG.EXE Ver. 1.8 -- ERROR LOG FILE :127S0005.log 03-01-22 Wed 18:48:44

Media scan

Err#	SR	ER	LBA	CMD	03-01-22 Wed 18:49:21
1	51	40	205000 r	ECC data error	03-01-22 18:49:21
2	51	40	205010 r	ECC data error	03-01-22 18:49:31
3	51	40	205020 r	ECC data error	03-01-22 18:49:41
4	51	40	205030 r	ECC data error	03-01-22 18:49:51
5	51	40	205040 r	ECC data error	03-01-22 18:50:02
6	51	40	205050 r	ECC data error	03-01-22 18:50:12
7	51	40	205060 r	ECC data error	03-01-22 18:50:22
8	51	40	205070 r	ECC data error	03-01-22 18:50:31
9	51	40	205080 r	ECC data error	03-01-22 18:50:41
10	51	40	205090 r	ECC data error	03-01-22 18:50:51

Exceeded Limit