MAT SHARK / GUIDE

DIAGNOSTICS

MATOR SHARK DIAGNOSTICS

A set of diagnostics for use with the MATOR SHARK is provided with each SHARK. It is in the form of a BASIC program to run on your Commodore PET and is contained in a file called DISCDIAG. On leaving the factory this file is present on logical drive 0 of the SHARK.

To access the diagnostics, simply load and run DISCDIAG.

Please note that the diagnostics assume that the SHARK is configured as IEEE device number 9. DISCDIAG may easily be modified to access a different device number if desired.

There are 12 different diagnostic facilities available.

These are -

i) (RE)FORMAT DISC
ii) TEST RANDOM READ
iii) TEST CONSECUTIVE READ
iv) READ SECTOR
v) WRITE SECTOR
vi) REALLOCATE SECTOR
vii) LIST ERROR MAP (ERROR REPORT)
viii)PROM CHECKSUM
ix) REFORMAT SECTOR
x) (RE)INITIALISE ERROR MAP
xi) LIST DEFECTIVE SECTORS
xii) QUALITY CONTROL TEST (IEEE TESTING)

These facilities are explained in detail on the following pages. Please note that in the context of these diagnostics, track and sector numbers refer to the physical disc rather than the PET logical discs. i.e. Track no. is in the range 0-613, sector no. is in the range 0-137.

DESCRIPTION OF FACILITIES

On running the program DISCDIAG, a menu of the available diagnostics is displayed, and a choice may be made by entering the appropriate number (in the range 0-11).

Function 0 (RE)FORMAT DISC

Prompts are -

Are you sure?	Enter y(es) or n(o)
Interleave?	Enter Interleave Sequence No. (7 is recommended but others may be tried)

The disc is formatted with the requested Interleave Sequence Number. Any defective sectors (those which do not read back correctly even after retrying a number of times) are reallocated automatically. At the end of the formatting process (it takes approximately 25 minutes) a report is displayed of any sectors which required any retries to be made on reading back. After the formatting process, the disc is ready to be initialised into PET format using the DOS "NEW" command.

This command is an alternative to the DOS "KILL" command. It has the advantage of providing more diagnostic information (the "KILL" command simply succeeds or fails to execute correctly).

Function 1 TEST RANDOM READ

Prompt is -

No. of reads required?	Enter no. of random reads you require (determines the length of the test)

The requested number of reads are carried out, the track/sector numbers being randomly generated. Any retries required during the test are reported at the end of the test.

Function 2 TEST CONSECUTIVE READ

Prompts are -

(Start) track?	Enter track/sector no. of
(Start) sector?	test start point
End track?	Enter track/sector no. of
End sector?	test end point

Every sector between (and including) the start and end points specified is read. Any retries required during the test are reported at the end of the test.

These two tests are very useful in providing an assurance that the disc head positioning and reading mechanisms are functioning correctly. By

varying the tests' parameters, very short or very long test sequences may be selected.

Function 3 READ SECTOR

Prompts are -

(Start) track? Enter track/sector no. to be read
(Start) sector?

The specified sector is read and displayed. A crude "Binary-to-ASCII" conversion is carried out on byte values not within the normal displayable character set (e.g. binary 0 is converted to ASCII "0").

Function 4 WRITE SECTOR

Prompts are -

(Start) track? Enter track/sector no. to be written
(Start) sector?
Data? (terminate with C/R, max 255 chars)

The data keyed in is written to the specified sector.

These two tests are not intended for detailed manipulation of the data contents of sectors on the disc, but more to provide an assurance that data can be written and read back correctly from a given sector.

Function 5 REALLOCATE SECTOR

Prompts are -

(Start) track? Enter track/sector no. to be
(Start) sector? reallocated

This has the same effect as the DOS "BLOCK DEFECTIVE" command. The specified sector is remapped into the defective sector reallocation area. Subsequently, any reference to this sector is automatiaclly redirected to its new physical location. Please note that a reallocated sector can itself be reallocated by reallocating the original sector again.

This command should only be used as a last resort, since eventually the reallocation area will fill up.

Function 6 LIST ERROR MAP (ERROR REPORT)

No prompts.

is displayed by track and recording head within track of the f sector reads/writes causing more than 3 retries. This on is held on the disc itself and is updated every time a nt number of retries has to be carried out to read/write a

The report takes about 10 minutes to complete. It is very useful in that it allows careful monitoring of disc behaviour to be carried out over a long period. The error map may be cleared down at any time (see Function 9).

Function 7 PROM CHECKSUM

No prompts.

The 10 PROM checksums (calculated by an algorithm using the PROM contects) of the 5 PROMS containing the DOS are displayed, together with a list of their correct values. A comparison of the two sets of figures is a check that the correct PROMs are installed and are functioning correctly.

Function 8 REFORMAT SECTOR

Prompts are -

(Start) track?	Enter track/sector no. to be
(Start) sector?	reformatted

This has the same effect as the DOS "BLOCK CORRECT" command. The specified sector is reformatted, preserving the data if at all possible.

In the event of an irrecoverable read/write error occurring, this command should be used before resorting to a REALLOCATE SECTOR.

Function 9 INITIALISE ERROR MAP

No prompts.

The Error Map, held on disc in Track 0 as a log of any significant retries (see Function 6), is cleared down. This may be carried out at any time but is, in any case, carried out automatically as part of a (RE)FORMAT.

Function 10 LIST DEFECTIVE SECTORS

The Reallocation Map, held on disc in track 0 as a record of allocated sectors, is displayed. This provides a list of any defective sectors and their new physical location.

Function 11 QUALITY CONTROL TEST (IEEE TESTING)

Prompts are -

Time (hhmmss) please?	Enter the time now as a 6 digit number
How many files to be set up?	Enter the number of files to be created as part of the test (1-912 max)

The test sequence carried out is as follows -

1. Initialise Drive 0.
2. Initialise Drive 1.
3. Create requested no. of files on Drive 0.
4. If requested, copy these files to Drive 1.
5. If requested, duplicate Drive 0 to Drive 1 and vice versa
   (N.B. this takes approximately 50 minutes).
6. Read back files created at stage 3.
7. List directories for both Drive 0 & Drive 1.
8. Scratch all files on both Drive 0 & Drive 1.
9. Save DISCDIAG diagnostic program on Drive 0 and verify it.

At each stage in the test you will be prompted to continue (respond y(es) when ready).

Any errors detected during the test are reported as they occur.

This test is MATOR's final QC test before shipping, after many other detailed checks have been carried out. It may be used at any time, but please note that it destroys any user data held on the disc.

File copy utility program 'NEWCOPY'

This program has been written to provide the user with a means of copying files of all the standard Commodore disc file formats (i.e. Program, Sequential, Relative) from Commodore 3040/8050 Floppy disc to the Mator Sha and vice versa.

Operating instructions

Having loaded and run the program the following prompts will be issued in sequence. Unless otherwise specified (i.e. for all prompts except (x) below), all replies should be terminated by 'return'.

i) From Unit ?

Enter the IEE device number of the unit containing the files to be copied. The default is unit 8.

ii) Drive ?

Enter the drive on the above unit which contain the files to be copied. The default is drive 0.

iii) To Unit ?

Enter the IEE device number of the unit to which files are to be copied. The default is unit 9.

iv) Drive ?

Enter the drive on the above unit to which files are to be copied. The default is drive 0.

v) Want to new the output disc ?

Enter 'y' to reinitialise the disc to be copied to, or 'n' if no initialise is required. In the latter case prompt (vi) is omitted.

vi) Disc name, Id, ?

Enter the name and identifier (seperated by a comma) to be used in initialising the output disc.

vii) (n Blocks Free)

After a pause, the program will display the number of unused blocks (n) available on the output disc. No reply is required.

viii) Pattern ?

Enter the mask pattern used to select files on the source disc to be copied. This mask may be ambiguous (i.e. using wild card characters) allowing more than one file to be copied. The default is the totally ambiguous pattern '*' allowing all files to be selected.

ix) Press 'y' or 'n' key to select
Delete omits currently displayed file & all that follows
Return defaults to last selection for rest of disk
(n.b. copies all files if pressed before 'y' or 'n')

Files to be copied

The above is a reminder of how to select files for copying, and no reply is required at this stage. The program will search the directory on the source disc, looking for files that match the pattern specified in (viii) above.

x) 'filename' 'type'

The file name and file type of the first file found (if any) that matches the copy pattern is displayed. If 'return' only is entered here all subsequent files matching the mask pattern will be copied, and no further input is required from the user. If 'y' only is entered that file will be copied. If 'n' only is entered that file will not be copied. If 'delete' only is entered no files will be copied.
The name and type of all subsequent files matching the mask pattern will be displayed in turn. Replies of 'y' or 'n' only operate as above to select or omit a file. 'Delete' only will omit that file and all subsequent files. 'Return' only will select or omit all subsequent files depending on whether the previous file was selected for copy or omitted respectively.

xi) * * * * *

'filename' 'comment'

The name of each file selected for copying is then displayed as soon as its copy is initiated. At the end of each file copy the comment will indicate either 'Copied O.K.' if the copy was successful, or an error message stating why the copy failed.

xii) Another input disc required ?

When all files have been copied, this prompt is issued. The reply should be 'y' to restart the copy from prompt (viii) above, or 'n' to exit from the program.

Diagnostic program 'DISCDIAG' - Disc Errors

The following errors may be reported by the diagnostic program 'DISCDIAG', by all functions except the 'IEEE Test'.

i) OUT OF SPACE ERROR

An attempt has been made to reallocate a sector, and there is no more room in the defect reallocation list. A maximim of 43 sectors may be reallocated on any one disc. This may be caused by faulty disc media, or by a failure in the read/write circuitry.

ii) DEVICE JUMPERS INCORRECT

Either the disc drive has been incorrectly configured by switches on the disc drive itself, or the data highway from the disc controller to its drive is faulty.

iii) TIMEOUT

A disc read or write operation timed out before completing. One full revolution of the disc is allowed before aborting.

iv) HARD ERROR

A disc read or write has been aborted after ten attempts. The sector concerned has been found to be corrupted. The preceding soft errors will give a more detailed explanation of the failure. Reformatting the sector may cure the problem, but care should be taken to correct the data in that sector, as this will usually be incorrect after reformatting.

v) SOFT ERROR 'n' @ 't' / 's', 'cause'

An error has occured on a disc read or write operation. The operation will be retried, and if still present after the tenth attempt, the error will be reported as a 'HARD ERROR'.
The following fields require further explanation :-

n - retry number 1 to 9.
t / s - the absolute track (t) and sector (s) at which the error occured.
cause - one or more reasons why the operation was in error, viz:

(a) COMMAND - the disc drive received an invalid command from the disc controller.

(b) PROTECT ERROR - a write was attempted to a write protected disc.

(c) DRIVE - the disc drive monitored an internal error.

(d) LOST - data was lost between the disc drive and the disc controller.

(e) END - the disc operation was terminated prematurely.

(f) VERIFY - the header field of the sector did not match that requested for reading or writing.

(g) CRC - the Cyclic Redundancy Check computed on the disc data did not match that read from disc. If 'END' is also present this is an error in the sector header field, otherwise it is in the data field.

(h) READY - the disc drive was found to be not ready.

(i) SEEK - an error was detected by the disc drive during a track seek.