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An Oracle White Paper
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Implementing StorageTek Search Accelerator on StorageTek T10000C and StorageTek T10000D Tape Drives

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Introduction

This white paper is intended to supplement the StorageTek T10000 Tape Drive Fibre Channel Interface Reference Manual E48725_02 Revision January 2014 with the following and modified command features for supporting the StorageTek Search Accelerator feature of the StorageTek T10000C and StorageTek T10000D tape drives from Oracle. This white paper will be superseded when the next official revision of the manual is released.

This white paper is intended for software application developers and operating system/driver developers who are implementing StorageTek Search Accelerator on Fibre Channel (FC) StorageTek T10000C or StorageTek T10000D tape drives. The StorageTek Search Accelerator feature is available only on the StorageTek T10000C and StorageTek T10000D tape drives.

Terminology and Usage

The following terminology is used throughout this paper:

- Examples of hexadecimal notation are: x'4A', 70h, and 00 10 4F (hex).
- Examples of binary notation are: '0101' (b) or 01b.
- Examples of tape drives or drives are: StorageTek T10000C tape drive, StorageTek T10000D tape drive, or just StorageTek T10000 tape drives.
- End of Data or EOD
- StorageTek Data Integrity Validation or DIV is a feature of the StorageTek T10000C/T10000D tape drives

StorageTek Search Accelerator Overview

StorageTek Search Accelerator uses specialized StorageTek T10000 search hardware to locate requested data on the device media. This hardware greatly speeds up search operations as no intervention with a host is needed.

StorageTek T10000 Fibre Channel Reference Manual Changes

A vendor-unique search command has been added to the command set.

StorageTek Search Accelerator Command

This vendor-unique command is used to search for information on the currently mounted media. All searches are initiated at the current device location. The search is complete when the specified search data is found, EOD is detected, or a file mark is encountered (users can refer to the option flags).

Byte	Bit							
	7	6	5	4	3	2	1	0
0	Operation Code (C5h)							
1	Reserved							
2 thru 4	(MSB) Data Block Offset (LSB)							
5	Reserved			SOFM	Reserved			DBOE
6	Reserved							
7	Reserved							
8 thru 9	(MSB) Search Data Length (LSB)							
10	Reserved							
11	Control Byte							

Table 1. StorageTek Search Accelerator command

Byte	Bit							
	7	6	5	4	3	2	1	0
0 thru 1,023	(LSB) Search Data (MSB)							

Table 2. StorageTek Search Accelerator data format

Data Block Offset

When enabled by the option flags described below, this offset indicates the exact position in a data block where the search should find the specified search data. If the search data is not found at the exact specified offset, then the search proceeds to the next data block (if there is one) and examines that block at the exact specified offset, and so on, until an EOD or a file mark is encountered per the option flags. This type of search is useful for finding unique customer metadata on the currently mounted media. The data block offset plus the search data length should not be greater than the maximum block length minus one because data block spanning is not supported on StorageTek T10000 tape drives.

Offset values can range from 0 to the maximum block length minus one.

- Maximum block length is 2,097,152 bytes (0x200000) in standard mode.
- Maximum block length is 2,097,156 bytes (0x200004) in Data Integrity Validation mode.

Option Flags

Search options: Stop on File Mark (SOFM) and Data Block Offset Enable (DBOE).

00 = A search for the specified search data is initiated at the current device location. The search is stopped when the search data is found or EOD is encountered.

01 = The drive determines if the specified search data exists at the exact specified offset in a data block starting at the current device location. If it does not, then the search proceeds to the next data block. The search is stopped when the search data is found at the exact specified offset or an EOD is encountered.

10 = The same as option 00, but also stops if a file mark is encountered.

11 = The same as option 01, but also stops if a file mark is encountered.

Search Data Length

The search data length specifies the size of the search data. The data block offset plus the search data length should not be greater than the size of a data block as data block spanning is not supported on StorageTek T10000 tape drives. Values range from 1 to 1,024 bytes.

Search Completion

If a match is found:

- The drive is positioned *before* the data block that contains the match.

If a match is not found:

- For option flags 00 and 01: The drive is positioned at EOD.
- For option flags 10 and 11: The drive is positioned *after* a file mark if one is found, otherwise EOD.

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