StorageTek
T10000 Tape Drive
Fibre Channel Interface

Reference Manual
Part Number: E25413-01

Automatic Link Partition (ALP)
Errata Sheet

Version **1.4**

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Part Number E25413-01

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Summary of Changes

Date	Version	Description of Changes	Approved By
09-Dec-09	1.0	Initial Draft	Dennis Appleyard
10-Dec-09	1.1	Additions to Locate and Read Position	Dennis Appleyard
13-May-10	1.2	Add ASC/ASCQ 3005	Dennis Appleyard
28-Jul-10	1.3	Changes for T10000C	Dennis Appleyard
06-Jan-11	1.4	Add Oracle Branding Add Erase command and ASC/ASCQ	Dennis Appleyard

Contents

1 Preface

This Errata Sheet is intended to supplement the T10000 Tape Drive Fibre Channel Interface Reference Manual (Revision L or later) with the following new and modified command features for supporting the Automatic Link Partition (ALP) feature.

The Fibre Channel Reference Manual ALP Errata Sheet is intended for software application developers, and operating system/driver developers implementing ALP on Fibre Channel StorageTek T10000 Tape Drives.

This errata sheet describes information about the StorageTek T10000*A,* T10000*B,* and T10000*C* Tape Drives. The ALP feature is available only on the T10000B and T10000C drives. Where information changes, the following is used to identify them:

- 2FC = T10000*A* with a 2 Gb interface
- 4FC = T10000*A* or T10000*B* or T10000*C* with a 4 Gb interface
- T10000*A*
- T10000*B*
- T10000*C*
  FC = Fibre Channel

Terminology and Usage

The following terminology is used throughout this errata sheet:

- 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 T10000 Tape Drive, T10000A tape drive, T10000B tape drive, T10000C tape drive or just T10000.
- StorageTek is a trademark of Oracle Corporation.

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2 ALP Overview

The Automatic Link Partition (ALP) User Specification provides a description of the ALP feature.

The ALP feature is available only on the T10000B and T10000C drives. It is not available on the T10000A drive. The ALP feature supports IDR (In-Drive Reclamation) and TTA (Tape Tiering Accelerator).

The T10000B tape format has 192 ALPs. The T10000C tape format has 480 ALPs.

3 T10000 Reference Manual Changes

3.1 *Inquiry Command*

The following changes apply to the Inquiry data that can be returned.

3.1.1 Standard Inquiry Data

3.1.1.1 ALP Bit

The Standard Inquiry Data has been modified to return Byte 55 Bit 5 as the ALP bit.
An ALP bit set to zero indicates that the logical unit does not support the Automatic Link Partition feature. An ALP bit set to one indicates that the logical unit supports the Automatic Link Partition feature.

3.2 *Erase Command*

The following changes apply to Erase command.

3.2.1 Long bit

A long erase is not allowed on an ALP tape on a T10000B drive. A long erase is allowed on an ALP tape on a T10000C drive.

3.3 *Mode Sense Command*

The following changes apply to the Mode Sense data that can be returned.

Page code "11h, subpage E0 = ALP Control Mode page" to be added to the Page Code: field of the Mode Sense command description.

3.3.1 ALP Control Mode Page

The new mode sense page, see Table 1, returns information about the current ALP mode.

Table 1.   Mode Sense ALP Control mode page – T10000B

Byte	Bit							
	7	6	5	4	3	2	1	0
0	PS (0)	SPF (1)	Page Code (11h)					
1	Subpage Code (E0h)							
2 - 3	Page Length (0442h)							
4	Reserved			LINKS	W_MSK	RSVD	ALP_T	ALP_C
5	Reserved							
6-69	ALP Write Mask							
70-1093	ALP Linkage Report							

Table 2.   Mode Sense ALP Control mode page – T10000C

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Byte	Bit							
	7	6	5	4	3	2	1	0
0	PS (0)	SPF (1)	Page Code (11h)					
1	Subpage Code (E0h)							
2 - 3	Page Length (0902h)							
4	Reserved			LINKS	W_MSK	L_MSK	ALP_T	ALP_C
5	Reserved							
6-133	ALP Write Mask							
134 - 2181	ALP Linkage Report							
2182 - 2309	ALP Lock Mask							

LINKS
  Linkage Report Valid
    0 = ALP Linkage Report data is not valid
    1 = ALP Linkage Report data is valid

W_MSK
  Write Mask valid
    0 = Write Mask is not valid
    1 = Write Mask is valid

L_MSK
  Lock Mask valid
    0 = Lock mask is not valid
    1 = Lock mask is valid

ALP_T
  ALP Tape
    0 = Loaded tape is not an ALP tape
    1 = Loaded tape is an ALP tape

ALP_C
  ALP Capable
    0 = Drive is not capable of ALP
    1 = Drive is capable of ALP

ALP Write Mask
  Bit map for ALPs 0-511(T10000B) or 0-1023 (T10000C). ALP 0 is bit 7, byte 6

0b = ALP write not allowed

1b = ALP write allowed

ALP Linkage Report

Two bytes are used to report the linkage of each ALP.   Bytes 70-71(T10000B) or bytes 134-135 (T10000C) report linkage of ALP 0.

XXXXh = This ALP is forward linked to ALP XXXXh

FFFCh = ALP blank

FFFDh = ALP link unknown

FFFEh = ALP not used

FFFFh = ALP not linked

ALP Lock Mask

Bit map for ALPs 0-1023. ALP 0 is bit 7, byte 2182

0b = ALP not locked

1b = ALP locked

3.4 *Mode Select Command*

The following changes apply to Mode Select data.

3.4.1 ALP Control Mode Page

Mode select page 11h, subpage E0h controls ALP operations.

Table 3.   Mode Select ALP Control mode page – T10000B

Byte	Bit							
	7	6	5	4	3	2	1	0
0	PS (0)	SPF (1)	Page Code (11h)					
1	Subpage Code (E0h)							
2 - 3	Page Length (0442h)							
4	Reserved			LINKS	W_MSK	RSVD	ALP_T	ALP_C
5	Reserved							
6-69	ALP Write Mask							
70-1093	ALP Linkage Report							

Table 4.   Mode Select ALP Control mode page – T10000C

Byte	Bit							
	7	6	5	4	3	2	1	0
0	PS (0)	SPF (1)	Page Code (11h)					

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1	Subpage Code (E0h)					
2 - 3	Page Length (0902h)					
4	Reserved	LINKS	W_MSK	L_MSK	ALP_T	ALP_C
5	Reserved					
6-133	ALP Write Mask					
134 - 2181	ALP Linkage Report					
2182 - 2309	ALP Lock Mask					

LINKS
> Linkage Report Valid
>> 0 = ALP Linkage Report data is not valid

W_MSK
> Write Mask
>> 0 = Write mask not valid
>> 1 = Write mask valid

L_MSK
> Lock Mask valid
>> 0 = Lock mask is not valid
>> 1 = Lock mask is valid

ALP_T
> ALP Tape
>> 0 = Make tape a non ALP tape (not allowed on T10000C)
>> 1 = Make tape an ALP tape

ALP_C
> ALP Capable (this field is ignored)

ALP Write Mask
> Bit map for ALPs 0-511(T10000B) or 0-1023 (T10000C). ALP 0 is bit 7, byte 6
>> 0b = Write not allowed in ALP
>> 1b = Write allowed in ALP

ALP Linkage Report
> Two bytes are used to report the linkage of each ALP.   Bytes 70-71(T10000B) or bytes 134-135 (T10000C) report linkage of ALP 0.
>> XXXXh = This ALP is forward linked to ALP XXXXh
>> FFFCh = ALP blank
>> FFFDh = ALP link unknown

FFFEh = ALP not used
FFFFh = ALP not linked

ALP Lock Mask
Bit map for ALPs 0-1023. ALP 0 is bit 7, byte 2182
0b = ALP not locked
1b = ALP locked

3.5 *Format Medium Command*

Add "Format Medium   04h   SSC-3" to - Table Supported SCSI Commands.

3.5.1 Format Medium Command

This vendor unique Format Medium command is used to start a new ALP logical volume. The command must be issued only after positioning the tape to the beginning of an ALP. After this Format Medium command is processed, writes will start a block id 0.

Table 5.   Format Medium Command

Byte	Bit							
	7	6	5	4	3	2	1	0
0	Page Code (04h)							
1	Reserved						Verify	Immed
2	Reserved				Format			
3-4	Transfer Length							
5	RSVD	ALP	Control Byte					

Verify
    0 = Do not verify format operation

Immed
    Immediate
        0 = Return status after format completes

Format
    8h = Vendor unique - start new ALP logical volume

Transfer Length
    0000h = No data is transferred for format medium command

ALP
    1 = Start new ALP logical volume

3.6 *Locate Command*

This vendor unique version of the Locate command is used to locate to the start of an ALP.

Table 6.   Locate Command

Byte	Bit							
	7	6	5	4	3	2	1	0
0	Page Code (2Bh)							
1	Reserved					BT	CP	Immed
2	Reserved							
3-6	Block Address							
7	Reserved or ALP MSB							
8	ALP LSB							
9	RSVD	ALP	Control Byte					

BT

        Block Address Type
                0 = SCSI Logical block address
                1 = Vendor specific (ignored)

CP

        Change Partition
                0 = Ignore partition field
                1 = Change partition (required for ALP locate)

Immed

        Immediate
                0 = Return status after locate is complete (required for ALP locate)
                1 = Return status when locate started

Block Address

                Logical block address position (must be zero for ALP locate)

Partition

        ALP index - vendor unique

ALP

        Locate ALP
                0 = normal locate block id
                1 = vendor unique ALP locate

3.7 *Read Position Command*

This vendor unique version of the Read Position command is used to read to the current ALP index.

Table 7.   Read Position Command

Byte	Bit							
	7	6	5	4	3	2	1	0
0	Page Code (34h)							
1	Reserved					TCLP	LONG	BT
2-6	Reserved							
7-8	Allocation Length							
9	PPI	ALP	Control Byte					

TCLP
>   Total Current Logical Position
>>   0 = Return first and last block location

LONG
>   Long Format
>>   0 = Return 20 bytes of data
>>   1 = Return 32 bytes of data (PPI only)

BT
>   Block address Type
>>   0 = SCSI logical block address
>>   1 = Vendor specific (ignored)

Allocation Length
>   0000h = 20 bytes returned (PPI returns 32 bytes)

PPI
>   Physical Position Indicator
>>   0 = Normal read position
>>   1 = Read physical position indicator data

ALP
>   ALP vendor unique read position
>>   0 = Normal read position
>>   1 = Read ALP index

Table 8.   Read Position Data

Byte	Bit

	7	6	5	4	3	2	1	0
0	BOP	EOP	BCU	BYCU	RSVD	BPU	PERR	RSVD
1	Partition or ALP Index MSB							
2	Reserved or ALP Index LSB							
4-7	First Block Location							
8-11	Last Block Location							
12	Reserved							
13-15	Number of Blocks in Buffer							
16-19	Number of Bytes in Buffer							

Partition
        Partition Number
                00h = Only partition supported (regular read position)

ALP Index
        Current ALP index – two bytes (ALP only)

3.8 *Request Sense Command*

The Request Sense command table of Sense Key with ASC and ASCQ requires the following additions;

3.8.1 Sense Key with ASC and ASCQ

Key	12	13	Description
5	30	05	Cannot write – incompatible format
5	3B	0C	Position past beginning of partition
5	3C	00	Command sequence error

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