

# MANAGING THE SAME TYPE OF MEDIA

APP  
NOTES

RECORDED IN DIFFERENT DENSITIES

### EXECUTIVE SUMMARY

Customers often have a mix of older and newer tape drives in their tape libraries, and therefore must manage tape cartridges that are the same media type but recorded in different formats. Customers may introduce new tape drives that use tape media labeled as compatible with both old and new drives, but the new drive uses a new recording format and records at a higher density. Such new drives can read tapes recorded in the old format, but cannot extend or append a file to a tape cartridge recorded at the old format. This is called *backward read compatibility*. However, the new drives are not backward write compatible.

The older tape drives cannot read data recorded on the new drives in the new recording format nor can they write to tapes recorded at the higher density on the new drives. If a tape cartridge recorded in the new format at the higher density is mounted on the older tape drive, which cannot read it because it is incompatible with the recording format, the mount will fail. This can cause critical jobs like backups and restores to fail.

Because of these restrictions, customers who have a mix of older and newer tape drives can encounter difficulties. In the ideal situation, customers should replace all the drives at once. This would eliminate the difficulty of having different tape drives reading and writing at different densities. But if this proposition is too costly, and drives are replaced a few at a time, then the tape library has a combination of older and newer tape drives recording at different densities. This document describes how StorageTek® ACSLS Manager™ software pools can help manage media by separating cartridges written in the old format from cartridges written in the new format.

### CUSTOMER PROBLEM

In mixed tape libraries, customers can encounter the following problems:

- When a tape written in the new format is mounted on an older drive, the old drive cannot read the tape. The mount will fail.
- Storage management applications often fill up partially used tapes by appending additional files at a later time. This will fail if the tape was originally written in a different format than the one a drive uses to record new data. When a storage management application tries to append additional files to a tape that was originally initialized in an incompatible format, the mount will fail.

Customers who have a mix of both older and newer tape drives in their libraries need to manage their tape cartridges by recording format or technique. The tape cartridges themselves are compatible with both types of drives, but the format or technique used to record data on the media differs depending on which generation tape drive is used. Newer drives record at higher densities.

The following table show how compatible media is used on different generations of tape drives. The same configurations on the tape media apply, but the different tape drives record using different recording formats.

**Table 1: Some tape drives that record on the same media in different formats**

<b>Tape media</b>	<b>9840 Family</b>	<b>9940 Family</b>	<b>SDLT Family</b>
<b>Media type displayed</b>	STK1R (Compatible with all 3 drives)	STK2P (Compatible with both drives)	SDLT (Compatible with both drives)
<b>Old generation drive</b> (old format)	T9840A or T9840B	T9940A	SDLT 220
<b>New generation drive</b> (new format records at higher density)	T9840C	T9940B	SDLT 320

**9840 FAMILY: STORAGE TEK 9840 TAPE MEDIA IS USED BY STORAGE TEK T9840A, T9840B AND T9840C TAPE DRIVES**

The T9840A and T9840B tape drives use the same media and record in the same format. The T9840C drive also uses the same media, but records at double the density. Customers must manage 9840 media when T9840A, T9840B and T9840C drives are present.

The T9840A or T9840B drives can reformat a T9840C cartridge for writing single-density data, but the T9840A and T9840B drives can neither read from nor append data to a cartridge previously recorded on T9840C. And if you re-initialize (reformat) the tape cartridge by fully rewinding it and overwriting from beginning of tape (BOT), all previously recorded data will be lost.

The T9840C drive can read T9840A and T9840B media and can reformat the media for writing double-density data, but the T9840C drive cannot append data to a cartridge previously written on T9840A or T9840B drives. And if you re-initialize (reformat) a tape cartridge, all previously recorded data will be lost.

**9940 FAMILY: STORAGE TEK 9940 MEDIA IS USED BY BOTH STORAGE TEK T9940A AND T9940B TAPE DRIVES**

The T9940B tape drive uses the same media as the T9940A drive, but the T9940B drive writes data at over three times the T9940A drive’s density. The T9940B drive can read T9940A media and can reformat the media for writing higher density data, but it cannot append data to a cartridge previously written on T9940A drive. And if you re-initialize (reformat) a tape cartridge by fully rewinding it and overwriting from beginning of tape (BOT), all previously recorded data will be lost.

The T9940A drive can reformat a T9940B cartridge for writing single-density data, but the T9940A drive can neither read from nor append data to a cartridge recorded on T9940B. And if you re-initialize (reformat) the tape cartridge, all previously recorded data will be lost.

### **SDLT FAMILY: SDLT MEDIA IS USED BY BOTH QUANTUM SDLT 220 AND SDLT 320 TAPE DRIVES**

The SDLT 220 and SDLT 320 tape drives both use the same media, but record in different densities. Customers must manage the common SDLT media when both types of SDLT drives are present.

The SDLT 220 tape drive uses the same media as the SDLT 320 drive, but the 320 drive writes data at a higher density than the SDLT 220. The SDLT 320 drive can read 220 media and can reformat the media for writing higher density data, but it cannot append data to a cartridge previously written on 220 drive. And if you re-initialize (reformat) a tape cartridge by fully rewinding it and overwriting from beginning of tape (BOT), all previously recorded data will be lost.

The SDLT 220 drive can reformat an SDLT 320 cartridge for writing single-density data, but the 220 drive can neither read from nor append data to a cartridge recorded on a 320 drive. And if you re-initialize (reformat) the tape cartridge, all previously recorded data will be lost.

### **PRODUCT AND SOLUTION SUMMARY**

Customers can manage drives that record on common media in different formats within a StorageTek Automated Cartridge System (ACS) in one of two ways.

- Replace all of the older drives in an ACS with the new drives at the same time. This is the simplest way. In this case you do not have to manage with pools. Simply do not append new data to any tapes written in the old format after replacing the old drives with the new drives. (With VERITAS NetBackup, this is done by “suspending” the tapes.)
- Replace some of the drives, but not all of them at once. If you are gradually replacing the drives, then you must manage the common media recorded in different formats by creating separate pools for each format. These can be managed with either ACSLS pools (described in the procedure below) or by using the facilities of a backup application (for example, VERITAS NetBackup, LEGATO NetWorker, IBM Tivoli, or Computer Associates BrightStor).

ACSL Manager software provides tools to manage common media used by two or more types of drives with incompatible recording techniques. When the tape cartridges are separated by their recording formats, they can always be mounted on compatible drives.

The tape library tells ACSLS Manager cartridge’s media type, but it doesn’t identify the recording format or technique used. Therefore, the client application must use the following procedure to manage the different recording formats. The solution presented here allows you to separate the media by its recording format.

## USING ACSLS MANAGER POOLS TO MANAGE COMMON MEDIA RECORDED IN DIFFERENT DENSITIES

The example below describes how to manage 9940 media recorded in both T9940A and T9940B drive formats. But the same principles apply when using the T9840 or SDLT media and drives. The following procedure applies to all cases where different tape drives record on a common media in different formats. In those cases, use Table 1 to substitute media used by old and new 9840 or SDLT drives as appropriate.

Note: The procedure uses the following syntax conventions:

- Commands and utilities to be entered exactly as shown are in **bold**.
- Variables (where you must enter your appropriate value) are in **bold italics**.

For more detail about these commands, see *ACSLs Installation, Configuration and Administration Guide*, which you receive with your ACSLS Manager software. An updated version can also be found on the Customer Resource Center at [www.support.StorageTek.com](http://www.support.StorageTek.com). Log in with your customer login ID and customer password. Select **Current Products > Software > ACSLS > View All - Manuals and Guides**. Finally select the manual. The procedure will associate all volumes of a given media type with the appropriate pool.

### Step 1 – Do initial setup

**Before** installing T9940B drives in an ACS that has T9940A drives, identify all 9940 data (*non-scratch*) cartridges in the ACS. Assign the 9940 data cartridges to a T9940A pool. Assign 9940 tape cartridges that can be re-used (*scratch cartridges*) to either the T9940A or T9940B pool.

- Define T9940A and T9940B media pools, one for each different recording format. Do this twice, once for A and once for B.

```
define pool pool_id
```

- Report on all 9940 media. This puts the results out to a file. You can either use *Option 1* (the **display volume** command) or *Option 2* (a custom **volrpt**).

*Option 1*

- Using the **display volume** command, output the results to a file:

```
display volume * -media STK2P -f acs > filename
```

where:

All 9940 data cartridges (media STK2P) are reported.

***filename*** is the filename to which the output is written.

The ACS ID in which the cartridge is located is also listed.

Read the output, selecting volumes from specific ACS(s), if desired.

If you want cartridges from only one ACS, use the **-home** operand to select only cartridges from this ACS.

```
display volume * -home acs_id,*,*,* -media STK2P > filename
```

To select volumes in a specific ACS in a display command, use the **-home** option.

(This selects volumes by home location.)

Follow the ***acs\_id*** with asterisks for the **lsm,panel,row,column** positions.

### Option 2

- Using a custom **volrpt** for all volumes in the ACS, output the results to a file:

**volrpt -d -f custom\_volrpt\_file -a acs\_id > filename**

where:

**custom\_volrpt\_file** is the filename specifying the fields reported in a custom volrpt.

Report these fields:

VOLUME_ID	6	2
MEDIA_TYPE	7	2
VOLUME_TYPE	4	2

**acs\_id** is the ID of the ACS that we are managing.

**filename** is the filename to which the output is written.

Read the output, selecting only the volumes with a media type of STK2P.

- c) Create set scratch commands for the volumes selected. This assigns each volume to the pool you want. Some scratch cartridges are set aside in the pool for the new drives.

Assign all non-scratch data (VOLUME\_TYPE = "D") volumes to the T9940A pool.

**set scratch off pool\_id vol\_id**

Assign the scratch volumes (VOLUME\_TYPE = "S") to either the T9940A or T9940B pools, as desired. This allocates the scratch cartridges to the pools for both the old and new drives.

**set scratch pool\_id vol\_id**

### Step 2 – Mount cartridges

After the T9940B drives are installed, use the pools to mount cartridges on compatible tape drives. Again, cartridges written at T9940A density can be read by either T9940A drives or T9940B drives, but only T9940A drives can append data on 9940A media. Only T9940B drives can read or append to cartridges written at 9940B density.

The following commands can be used to identify, select and mount cartridges from the pool appropriate for a T9940A or T9940B drive. Use the pools to make sure you are mounting cartridges on the correct drive.

If you want to mount a scratch cartridge on the correct drive type, follow *Procedure A*. If you want to mount a non-scratch cartridge with data already recorded on it, follow *Procedure B*.

*Procedure A (for mounting scratch cartridges)*

- a) Query the drive(s) to identify the drive type.

**query drive drive\_id | all**

- b) Identify the correct pool (media type) for the cartridges to mount on the desired drive.

- c) Mount the scratch cartridges to a drive from the specified pool.

**mount \* drive\_id pool\_id**

### *Procedure B (for mounting non-scratch cartridges)*

Report on the volume's `pool_id`, and hence, whether a 9940 data volume is in T9940A or T9940B density. Based on the pool id, this tells you which recording format was used and hence, which drives will be compatible for that tape cartridge.

a) Use the **display volume** command to display a data volume's pool, as shown below:

```
display volume vol_id -f pool
```

where:

The pool for this volume is displayed.

b) Use a query to identify a compatible drive.

**query mount vol\_id** - displays status of drives compatible with a volume. You have to pick the correct drive type before you mount the volume. This query will return both T9940A and T9940B drives (because both drive types are compatible with 9940 media). Use drive type to separate T9940A drives from T9940B drives.

c) Mount the volume on the selected drive.

```
mount vol_id drive_id - mounts the specified volume on the specified drive.
```

### **Step 3 – Migrate scratch cartridge**

When all the data on the cartridge has expired, you can migrate the scratch cartridge to the pool for the new recording format. Because T9940A and T9940B drives can re-initialize cartridges in their density, scratch volumes can be reassigned to a different pool.

```
set scratch pool_id vol_id
```

After all T9940A drives are converted to or replaced by T9940B drives, all 9940 media can be used by T9940B drives, as long as data is not appended to cartridges written in T9940A format.

### **CUSTOMER BENEFIT**

Tape jobs can fail when cartridges are mounted on a drive that cannot read them or append data to them. This can cause backups, restores and other critical jobs to fail. Managing the same type of media recorded in different densities prevents this. Mounting the correct cartridge on the correct drive ensures that tape mounts will succeed. The above procedures prevent the inability to take backups and can prevent having to restart a job. This saves countless hours and affects the customer's bottom line.

Customers are encouraged to migrate their applications to new generation drives as quickly as possible. Although older and newer drives and cartridges are effectively segregated by pooling, customers who continue to use old drives along with newer drives deprive themselves of all the capacity and performance benefits that the new drives provide.

The customer's investment in media is protected because existing cartridges can be used on the newer drives. Data written by an older drive can be read by a newer drive of the same type. After cartridges have been scratched by the application, existing cartridges can be re-initialized in the format used by newer drives.

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### About StorageTek®

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