



Hitachi TagmaStore®
Adaptable Modular Storage
and Workgroup Modular Storage
Cache Partition Manager User's Guide

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Document Revision Level

Revision	Date	Description
MK-95DF720-P1	June 2005	Revision 1 of Preliminary Release
MK-95DF720-00	August 2005	Initial Release, supersedes and replaces MK-95DF720-P1
MK-95DF720-01	October 2005	Revision 1, supersedes and replaces MK-95DF720-00
MK-95DF720-02	February 2006	Revision 2, supersedes and replaces MK-95DF720-01
MK-95DF720-03	March 2006	Revision 3, supersedes and replaces MK-95DF720-02
MK-95DF720-04	April 2006	Revision 4, supersedes and replaces MK-95DF720-03
MK-95DF720-05	May 2006	Revision 5, supersedes and replaces MK-95DF720-04
MK-95DF720-06	July 2006	Revision 6, supersedes and replaces MK-95DF720-05
MK-95DF720-07	November 2006	Revision 7, supersedes and replaces MK-95DF720-06
MK-95DF720-08	January 2007	Revision 8, supersedes and replaces MK-95DF720-07

Changes in this Revision

- Added figure captions and cross references to text.

Preface

This document describes and provides instructions for installing and using the Cache Partition Manager function for the Hitachi TagmaStore® Adaptable Modular Storage (hereafter referred to as AMS or WMS) subsystem. Before using the Cache Partition Manager, please read the operating procedures and notices included in this document.

This document assumes the following:

- The user has a background in data processing and understands direct-access storage device (DASD) subsystems and their basic functions, and
- The user is familiar with the Hitachi Disk array subsystem, and
- The user has read and understands the User and Reference Guide for the applicable storage array.

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Software Version

This document revision applies to TagmaStore Adaptable Modular Storage and Workgroup Modular Storage versions 7.0 and higher.

Convention for Storage Capacity Values

Storage capacity values for hard disk drives (HDDs) are calculated based on the following values:

- 1 KB = 1,000 bytes
- 1 MB = 1,000² bytes
- 1 GB = 1,000³ bytes
- 1 TB = 1,000⁴ bytes

Storage capacity values for logical units (LUs) are calculated based on the following values:

- 1 KB = 1,024 bytes
- 1 MB = 1,024² bytes
- 1 GB = 1,024³ bytes
- 1 TB = 1,024⁴ bytes
- 1 block = 512 bytes

Referenced Documents

- *Hitachi TagmaStore Adaptable Modular Storage/Workgroup Modular Storage, Storage Navigator Modular for Web User's Guide, MK-95DF719*
- *Hitachi TagmaStore Adaptable Modular Storage/Workgroup Modular Storage, Storage Navigator Modular (for GUI) User's Guide, MK-95DF711*
- *Hitachi TagmaStore Adaptable Modular Storage/Workgroup Modular Storage, Storage Navigator Modular Command Line Interface (CLI) User's Guide, MK-95DF712*
- *Hitachi TagmaStore Adaptable Modular Storage/Workgroup Modular Storage, Copy on Write Snapshot User's Guide, MK-95DF708*
- *Hitachi TagmaStore Adaptable Modular Storage/Workgroup Modular Storage, WMS 100 User and Reference Guide, MK-95DF738*
- *Hitachi TagmaStore Adaptable Modular Storage/Workgroup Modular Storage, AMS 200 User and Reference Guide, MK-95DF713*
- *Hitachi TagmaStore Adaptable Modular Storage/Workgroup Modular Storage, AMS 500 User and Reference Guide, MK-95DF714*
- *Hitachi TagmaStore Adaptable Modular Storage 1000 User and Reference Guide, MK-95DF780*
- *Hitachi TagmaStore Adaptable Modular Storage/Workgroup Modular Storage Command Control Interface User's Guide, MK-95DF701*

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Chapter 1 Overview of Cache Partition Manager

Cache memory is the gateway for transmitting data to and from the Hitachi TagmaStore® AMS/WMS disk array subsystem. Hitachi divides cache into a system control area that is used for system operation and program products and a user data area. Cache Partition Manager has the following features:

- **Selectable Segment Size** allows you to customize the cache segment size for a particular user application.
- **Partitioned Cache Memory** allows you to separate workloads in a 'storage consolidated' system by dividing cache into individually managed, multiple partitions. A partition can then be customized to best match the I/O characteristics of its assigned LUs. For example, you can use Cache Partition Manager to separate your production environment from your test environment, and your business-critical applications from less important applications. You can segregate the functions of your different host operating systems. You can partition the LUs by drive type (e.g., SATA, fibre, or iSCSI). Partition capacity can be specified in blocks of 10 MB up to the supported capacity for the particular subsystem (see Table 2.2 and Table 2.3).
- **Selectable Stripe Size** allows you to increase performance by customizing the size of the data that is written to a disk drive, which improves the data transfer rate. This allows you to have a high throughput with concurrent I/Os to the disk drives, which is particularly useful for applications with sustained I/Os.

Without Cache Partition Manager, data is processed in 16-kB segment sizes, regardless of whether the data length is smaller (see Figure 1.1) or larger (see Figure 1.2). If your data length is smaller than 16 kB, the data can be scattered. This results in suboptimal read cache-hit rates, which reduces the amount of data that can be stored in cache. If your data length is larger than 16 kB, this can cause greater overhead in sending and receiving data because the segments must be extended.

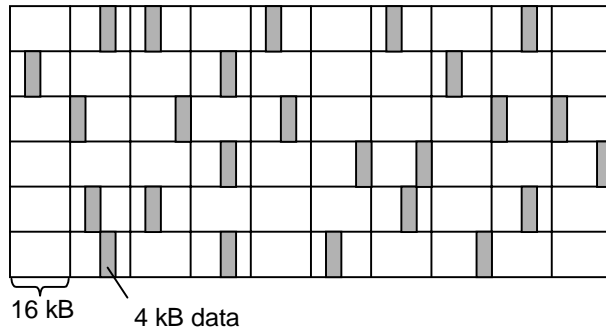


Figure 1.1 Data Length Smaller than Standard 16-kB Segment Size



Figure 1.2 Data Length Larger than Segment Size

With Cache Partition Manager, you can divide cache into two or more partitions. You can also adjust the segment size to match the application and LU pair, increasing the cache read rate and decreasing the application response time.

Figure 1.3 shows the segment size is smaller than 16 kB.

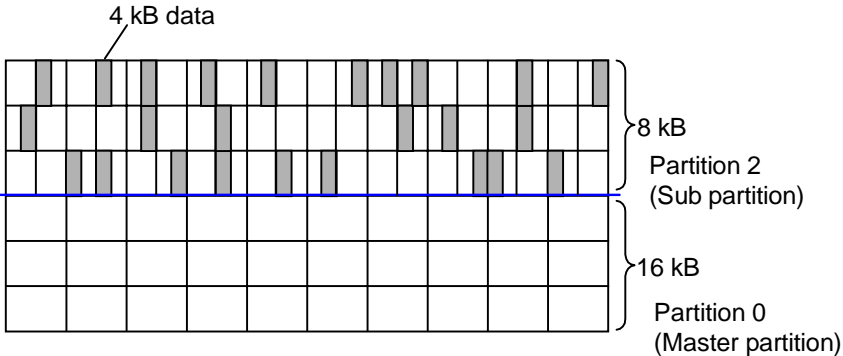


Figure 1.3 Cache Partition Adjusted for Smaller Segment Size

Figure 1.4 shows the segment size is larger than 16 kB.

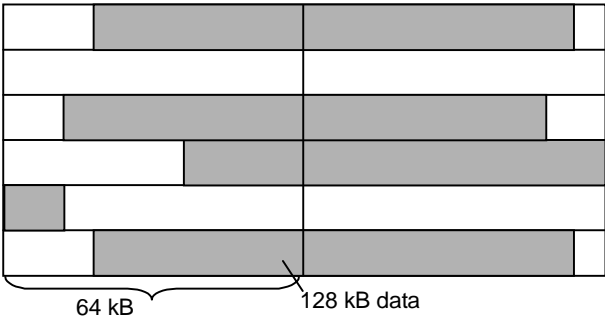


Figure 1.4 Cache Partition Adjusted for Larger Segment Size

Cache Partition Manager also allows you to separate the LUs assigned to fibre-channel and SATA drives, so there is less impact between the two, as shown in Figure 1.5.

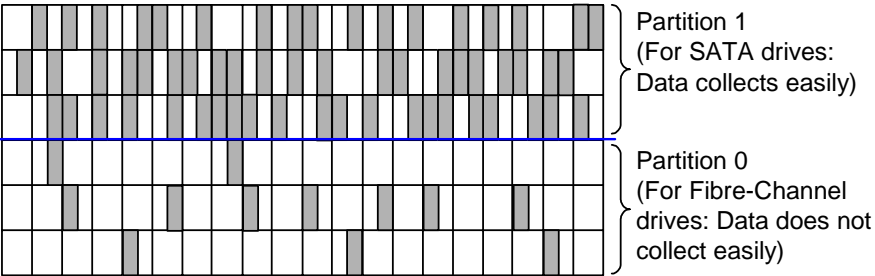


Figure 1.5 Cache Divided into Drive-Specific Partitions

Chapter 2 Specifications and Requirements

This chapter discusses the following topics:

- Cache Partition Manager Properties (section 2.1)
- Pair Cache Partitions (section 2.2)
- Cache Partition Manager Prerequisites (section 2.3)
- Using Cache Partition Manager with Copy on Write Snapshot or TrueCopy Extended Distance (see section 2.4)

2.1 Cache Partition Manager Properties

If Cache Partition Manager is not installed, the cache memory configuration has the following characteristics (see Figure 2.1):

- Each controller is assigned a partition with a capacity half as large as that of the user data area (default partition size).
- The segment size is 16 kB.
- Stripe Size is 64 kB.
- Cache Mirroring is ON.

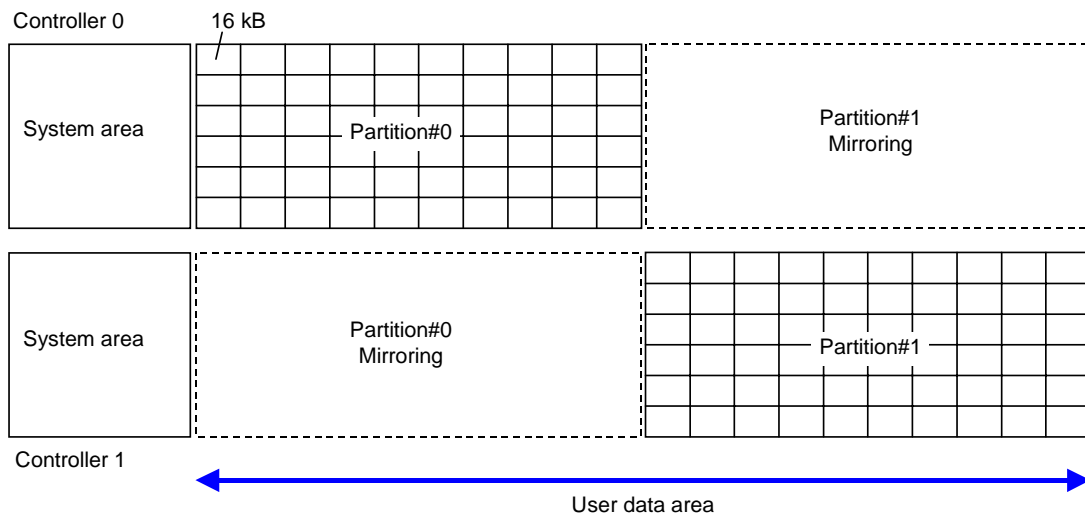


Figure 2.1 Default Cache Memory Configuration (Without Cache Partition Manager)

Figure 2.2 shows the default cache memory configuration with two master partitions.

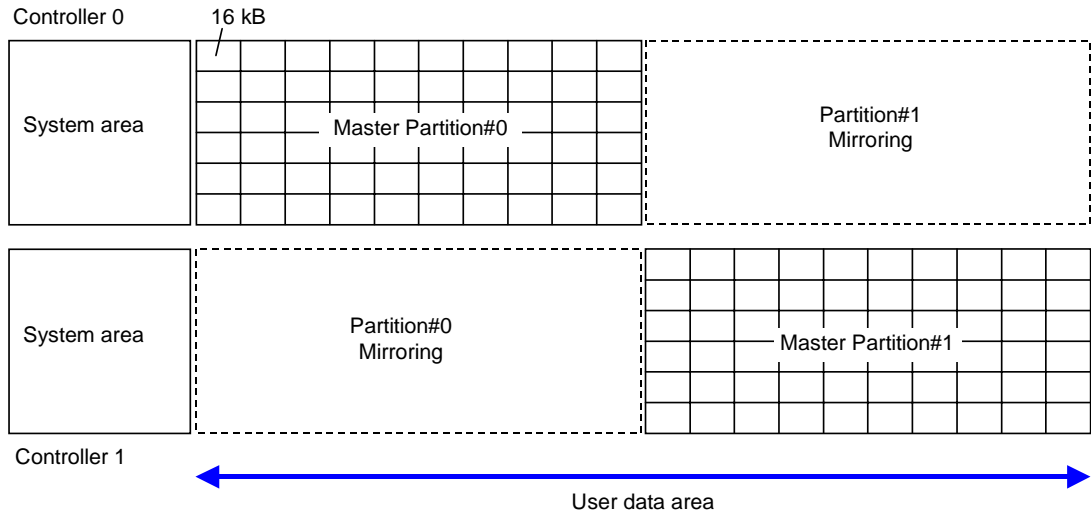


Figure 2.2 Default Cache Memory Configuration with Two Master Partitions

Figure 2.3 shows a cache configuration, where partition 2 has a smaller data length.

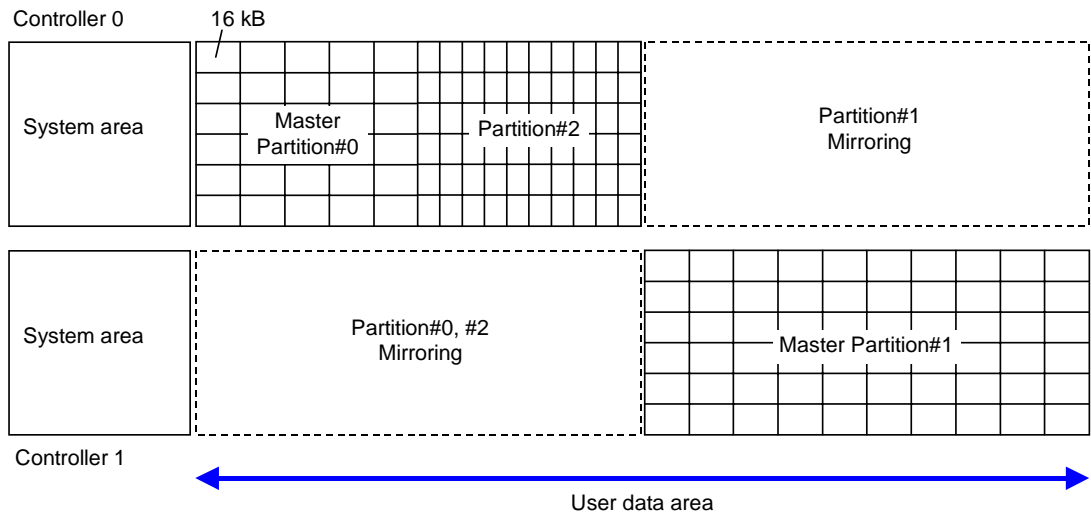


Figure 2.3 Cache Memory Configuration

One stripe is assigned to each logical unit. When Cache Partition Manager is not installed, the segment size is 16 kB and the stripe size is 64 kB. As a general rule, the stripe size must be larger than the segment size.

However, when Cache Partition Manager is installed and the segment size is 256 kB or 512 kB, the stripe size will be the same as the segment size. Stripe size is specified when an LU is created, and cannot be changed. Figure 2.4 shows the stripe size that applies to the cache configuration.

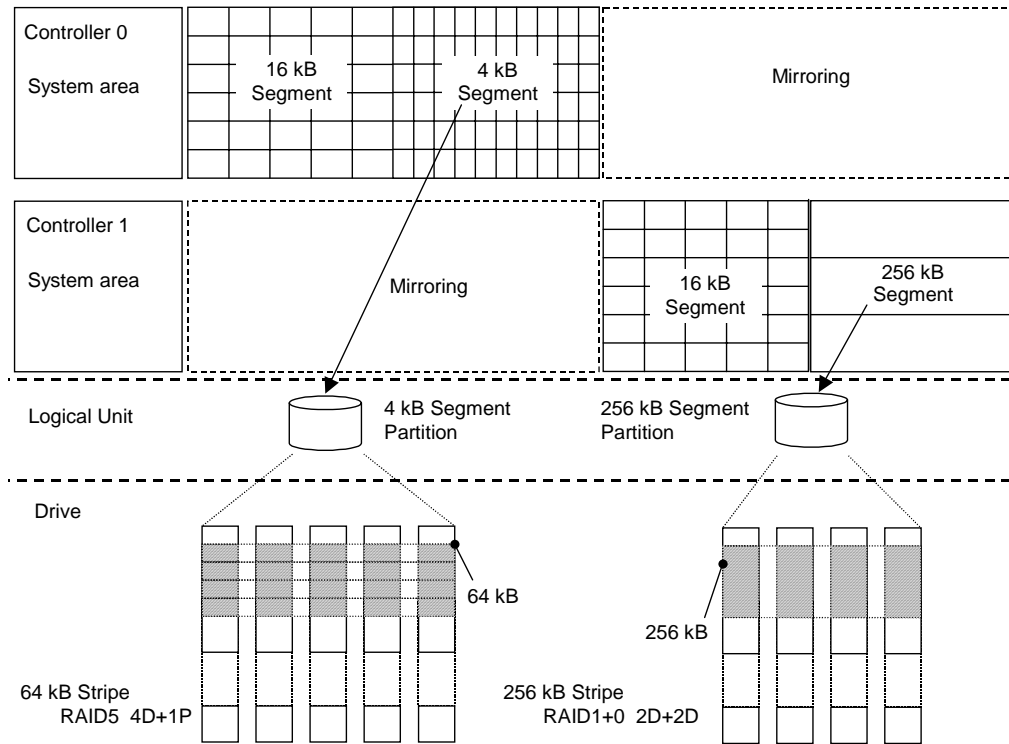


Figure 2.4 Sample Stripe Size

2.2 Pair Cache Partitions

A pair cache partition allows you to temporarily change the partition when needed for host access optimization or fail-over. A pair cache partition has the following characteristics (see Figure 2.5).

- The pair cache partition is specified for each logical unit (LU).
- The segment size of a partition to which the LU belongs and that of the pair cache partition must be the same.
- The owner controller for the partition associated with an LU and the pair cache partition must be different.
- When the pair cache partition number is not specified, it defaults to "Auto".
- When the setting is "Auto", a partition that is the same segment size is automatically selected in the other side controller. The partition cannot be changed if no existing partition meets specified conditions.

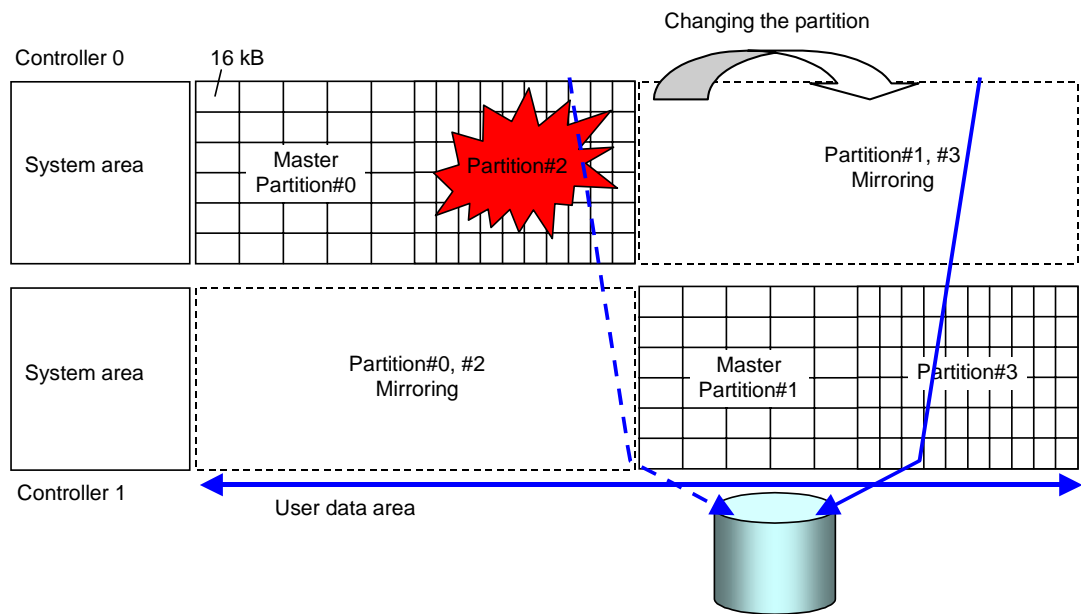


Figure 2.5 Pair Cache Partition

2.3 Cache Partition Manager Requirements and Restrictions

2.3.1 Prerequisites

Cache Partition Manager has the following prerequisites:

- Devices and Cache Memory must be in a normal state with the following minimum requirements
 - WMS100: 1 GB controller (512 MB controller not supported)
 - AMS200: 1 or 2 GB controller
 - AMS500: 2, 3, or 4 GB controller (1 GB controller not supported)
 - AMS1000: 2, 4, 6, or 8 GB controller
- Memory segment size
 - Master partition size is fixed at 16 kB. Each controller is assigned a master partition. Only one master partition can exist on a controller, and it cannot be deleted.
- Sub-partition sizes
 - 4 kB
 - 8 kB
 - 16 kB
 - 64 kB
 - 256 kB
 - 512 kB
- Stripe size (micro program version 0733/A or later. See Table 2.4 for supported segment and stripe combinations)
 - 64 kB
 - 256 kB
 - 512 kB
- Cache memory: user-specified
- Supported number of partitions (including two master partitions)
 - WMS100 (1 GB/controller): 2 to 6
 - AMS200 (1 GB/controller): 2 to 6
 - AMS200 (2 GB/controller): 2 to 8
 - AMS500 (2 GB/controller): 2 to 12
 - AMS500 (3, 4 GB/controller): 2 to 16
 - AMS1000 (2 GB/controller): 2 to 8
 - AMS1000 (4 GB/controller): 2 to 24
 - AMS1000 (6, 8 GB/controller): 2 to 32
- Mirroring is always performed

Table 2.1 lists the parameters for Cache Partition Manager.

Table 2.1 Cache Partition Manager Parameters

No.	Item	Conditions
1	Changing of partition information	Reboot is required when deleting or adding a partition or changing a partition/segment size.
2	Cache partition to which the logical unit belongs	The stripe size of a logical unit and the segment size of a partition must meet the conditions listed in Table 2.4. Reboot is required when changing a partition to which the logical unit belongs. It is required to reboot of the subsystem.
3	Pair cache partition	<ul style="list-style-type: none"> The segment size of a partition to which the logical unit belongs and that of the specified partition must be the same. While a cache partition is changed to the pair cache partition, the other partition cannot be specified as a change destination. However, it is possible to change to Auto.
4	Changing of the controller to which the partition belongs	The change can be made only when none of the logical units in the partition conform to items 2, 8, and 9 listed in. However, it is required to restart the subsystem.
5	Locking/unlocking of the function	When locking or unlocking Cache Partition Manager, you must delete sub-partitions other than the master partition and return the partition size to the default partition.
6	Reduction of the memory	See-sections 2.3.3 and 2.3.4.
7	Changing between single and dual configurations	Not supported while Cache Partition Manager is installed.
8	Concurrent use of ShadowImage	Possible. A belonging partition changes to a partition with the different controller in charge of the LU is not allowed for the LU that has the pair of ShadowImage.
9	Concurrent use of Copy on Write SnapShot or TrueCopy Extended Distance	<ul style="list-style-type: none"> The LU used for the V-VOL must have the same controller. When you are using Cache Partition Manager and you install Copy on Write SnapShot or TrueCopy Extended Distance, the partitions will be initialized. It is recommended that Copy on Write SnapShot or TrueCopy Extended Distance be installed first..
10	Concurrent use of LUN Expansion.	<ul style="list-style-type: none"> The stripe sizes of the logical units to be unified must be the same. All the default partitions of the logical unit must be the same partition.
11	Concurrent use of Cache Residency Manager.	<ul style="list-style-type: none"> Supported only the master partition. A segment size of the partition to which a Cache Residency LU belongs cannot be changed.
12	Concurrent use of Volume Migration	Possible. An LU belonging to a partition and stripe size cannot carry over, because when the migration is completed, that LU is changed to destination partition and stripe size. An LU that has a different owner/controller or which is reserved cannot be specified as a P-VOL or an S-VOL of Volume Migration.
13	Copy of partition information by Storage Navigator Modular	Not supported

Notes:

- When the number of pinned tracks (data that failed to be written to a disk drive) exceeds its threshold value, Cache Partition Manager will not save the changes. You must first recover the pinned tracks.
- If a single pinned data track exists, the change is not saved even if the subsystem is rebooted. You must reboot the subsystem any time you have recovered pinned data.

Supported Partition Capacity

The supported partition capacity is determined depending-on the user data area of the cache memory. If you are using Copy on Write SnapShot, the supported capacity of the partition that can be created is changed because a part of the user data area is used for managing the internal resources. For more information on Copy on Write Snapshot, see *Hitachi TagmaStore Adaptable Modular Storage/Workgroup Modular Storage, Copy on Write Snapshot User's Guide (MK-95DF708)*.

The supported partition capacity is shown in Table 2.2 and Table 2.3.

Table 2.2 Supported Partition Capacity (Without Copy on Write SnapShot or TrueCopy Extended Distance)

Device Type	Cache Memory	User Data Area	Default Partition Size	Minimum Partition Size		Maximum Cache Available for Sub-partition. = (User Data Area) – (Minimum Master Partition size)
				Master	Sub	
WMS100	1 GB/CTL	680 MB	340 MB	100 MB	100 MB	580 MB
AMS200	1 GB/CTL	660 MB	330 MB	100 MB	100 MB	560 MB
	2 GB/CTL	1,560 MB	780 MB	100 MB	100 MB	1,460 MB
AMS500	2 GB/CTL	1,400 MB	700 MB	180 MB	100 MB	1,220 MB
	3 GB/CTL	2,340 MB	1,170 MB	180 MB	100 MB	2,160 MB
	4 GB/CTL	3,240 MB	1,620 MB	180 MB	100 MB	3,060 MB
AMS1000	2 GB/CTL	1,240 MB	620 MB	180 MB	100 MB	1,060 MB
	4 GB/CTL	3,080 MB	1,540 MB	180 MB	100 MB	2,900 MB
	6 GB/CTL	4,940 MB	2,470 MB	180 MB	100 MB	4,760 MB
	8 GB/CTL	6,760 MB	3,380 MB	180 MB	100 MB	6,580 MB

Table 2.3 Supported Partition Capacity (With Copy on Write SnapShot or TrueCopy Extended Distance)

Device Type	Cache Memory	User Data Area	Default Partition Size	Minimum Partition Size		Maximum Cache Available for Sub-partition. <i>(User Data Area) – (Minimum Master Partition size)</i>
				Master	Sub	
WMS100	1 GB/CTL	380 MB	190 MB	100 MB	100 MB	280 MB
AMS200	1 GB/CTL	360 MB	180 MB	100 MB	100 MB	260 MB
	2 GB/CTL	540 MB	270 MB	100 MB	100 MB	440 MB
AMS500	2 GB/CTL	880 MB	440 MB	180 MB	100 MB	700 MB
	3 GB/CTL	1,320 MB	660 MB	180 MB	100 MB	1,140 MB
	4 GB/CTL	1,320 MB	660 MB	180 MB	100 MB	1,140 MB
AMS1000	2 GB/CTL	720 MB	360 MB	180 MB	100 MB	540 MB
	4 GB/CTL	1,540 MB	770 MB	180 MB	100 MB	1,360 MB
	6 GB/CTL	1,880 MB	940 MB	180 MB	100 MB	1,700 MB
	8 GB/CTL	2,660 MB	1,330 MB	180 MB	100 MB	2,480 MB

An increase in the number of disk drives will increase the use capacity of the cache. If you have an LU exceeding 17 (15D+2P or more), you should add 100 MB to the minimum partition capacity shown above.

The total supported partition capacity is a function of total available cache, mirroring, and the total number of partitions being supported. The total supported capacities of all partitions cannot exceed the capacity of the user data area.

Cache Memory is the maximum amount of physical cache memory supported by the subsystem. Data in this table is based upon the maximum physical cache being installed.

User Data is the maximum amount of User Data Cache available per controller.

Default Partition Size is as stated and no sub-partitions are defined.

Minimum Partition Size is the minimum size that the master and sub-partitions can be configured to. The minimum size of the master partition is for a dual controller configuration. A single controller configuration requires the minimum master partition size to be doubled.

Part of the AMS500/AMS1000 master partition (approximately 80 MB) is used for the internal control, which can result in a performance difference between the master and sub-partitions of the same size. To create a master partition having the same performance as that of a sub-partition, specify a master partition capacity as the sum of the sub-partition plus 80 MB.

Maximum Partition Size-The maximum partition capacity can be obtained when the capacity of the other partition is minimized. Table 2.2 and Table 2.3 show the cache available for sub-partitions or master partition expansion. This value is determined by taking the Total User Data Area and subtracting the minimum Master Partition Size. It assumes that:

- Only a master partition with no sub-partitions is configured.
- SnapShot is not installed.
- Cache Residency Manager is not installed.

Total residual cache capacity can be determined by using Storage Navigator Modular. Table 2.4 shows the supported combinations of segment size and stripe size.

Table 2.4 Supported Combinations of Segment Size and Stripe Size

Segment Size	Stripe Size		
	64 kB	256 kB	512 kB
4 kB	supported	not supported	not supported
8 kB	supported	supported	not supported
16 kB	supported	supported	supported
64 kB	supported	supported	supported
256 kB	not supported	supported	supported
512 kB	not supported	not supported	supported

2.3.2 Partition Capacity for Large Segment Size

Large segment size can affect performance if you have insufficient partition capacity. If you are using a segment size of 64 KB, 256 KB, or 512 KB, you should set the partition capacity as shown in Table 2.5. This can be affected by the configuration.

Table 2.5 Partition Capacity for Large Segment Size

Segment Size	Recommended Partition Capacity
64 kB	More than 300 MB
256 kB	More than 500 MB
512 kB	More than 1,000 MB

2.3.3 Reduction of the Cache Memory when Cache Partition Manager is Used

When the micro program version is 0770/A or later, it is possible to reduce the cache memory even if the Cache Partition Manager function is valid. When the micro program version is less than 0770/A, the reduction is impossible. It is required to invalidate the functions of Cache Partition Manager once. However, when the following conditions are met, the reduction of the cache memory is impossible because the partitioning functions (for division and size change) for the cache are in use.

- Reduction of the cache memory of the unsupported model (WMS100 512 MB/CTL, AMS500 1 GB/CTL)
- One sub-partition exists or is reserved
- In the dual controller configuration, sizes of the master partitions 0 and 1 are not the same or the partition size reserved for the change is different

2.3.4 Addition of the Cache Memory when Cache Partition Manager is Used

When the micro program version is 0770/A or later, it is possible to add the Cache memory even if the Cache Partition Manager function is valid. When the Cache memory is added, the capacity of the master partition is extended. When the micro program version is less than 0770/A, the partition size is not extended even if the Cache memory is added. Extend the partition capacity or add the partition using the Cache Partition Manager functions after the addition. However, when the following conditions are met, the partition size is not extended even if the Cache memory is added because the partitioning functions (for division and size change) for the Cache are in use.

- When one sub-partition exists or is reserved
- In the dual controller configuration, sizes of the master partitions 0 and 1 are different from each other, or the partition size reserved for the change is different

2.4 Using Cache Partition Manager with Copy on Write SnapShot or TrueCopy Extended Distance

2.4.1 Installation Prerequisites

WARNING: Copy on Write SnapShot and TrueCopy Extended Distance each use a part of the cache area in order to manage the internal resources, which decreases the resource available for Cache Partition Manager (refer to Table 2.3). For more information on Copy on Write Snapshot, see *Hitachi TagmaStore AMS/WMS Copy on Write Snapshot User's Guide* (MK-95DF708).

The following conditions must be met before you install Copy on Write Snapshot or TrueCopy Extended Distance:

- All of the logical units must be moved to the master partitions on the side of the default owner controller.
- All of the sub-partitions must be deleted and the size of the each master partition must be reduced to half of the user data area.

Figure 2.6 illustrates Cache Partition Manager without Copy on Write SnapShot or TrueCopy Extended Distance. Figure 2.7 illustrates Cache Partition Manager with Copy on Write SnapShot or TrueCopy Extended Distance.

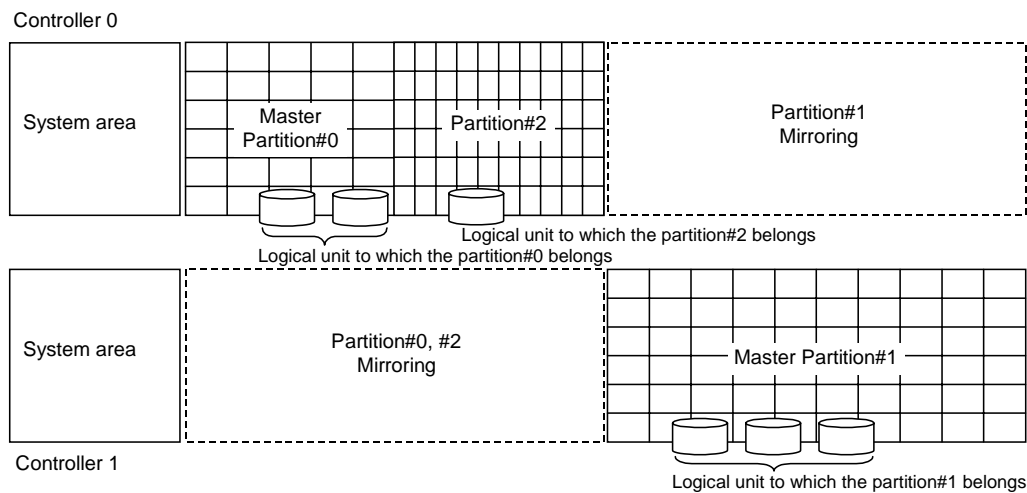


Figure 2.6 Cache Partition Manager without Copy on Write SnapShot or TrueCopy Extended Distance

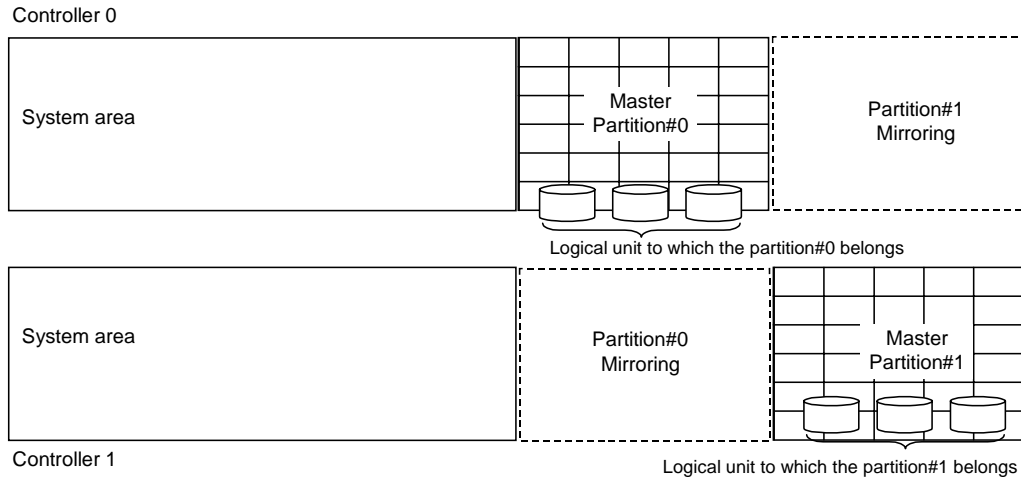


Figure 2.7 Cache Partition Manager with Copy on Write Snapshot or TrueCopy Extended Distance

2.4.2 Segment Size for S-VOL and Pool Volumes

If you are using TrueCopy, TrueCopy Extended Distance, or ShadowImage, the recommended segment size of the S-VOL is 16 kB.

If you are using Copy on Write Snapshot, the recommended segment size of the Pool VOL is 16 kB.

Chapter 3 Installing and Uninstalling Cache Partition Manager

This chapter discusses the following topics:

- Installing Cache Partition Manager (section 3.1)
- Uninstalling Cache Partition Manager (section 3.2)
- Enabling or Disabling Cache Partition Manager (section 3.3)

3.1 Installing Cache Partition Manager

Notes:

- If you are using CLI, see Chapter 5.
- If you install, uninstall, enable, or disable the Cache Partition Manager on a subsystem configured with NAS Modular, you must also stop the clusters between the NAS units. When restarting the subsystem, you must restart the clusters.
- To make the Cache Partition Manager functions available, you must install the Cache Partition Manager feature, and make its functions selectable (unlocked). This requires a key code or key file.

Important: Refer to Chapter 2 for the Cache Partition Manager specifications and requirements.

1. Launch Storage Navigator Modular, and change to **Management Mode**.
2. Register and connect to the subsystem where you will install Cache Partition Manager. The **Array System Viewer** window displays the connected subsystem.
3. Click the **Logical Status** tab, then click the **License Key** icon (see Figure 3.1).
4. Click **Install** to display the **Install Options** dialog box (see Figure 3.2).
5. Install the **Cache Partition Manager** option using one of the following methods:
 - Click the **Key Code** radio button, and enter the key code.
 - Click the **Key File** radio button, and then enter the key file. Use **Browse** to find the path for the key file, then click **OK** in the **Option Selection** dialog box (see Figure 3.3).
6. Click **OK** on the confirmation message.
7. Click **OK** on the **Result** dialog box (see Figure 3.4).

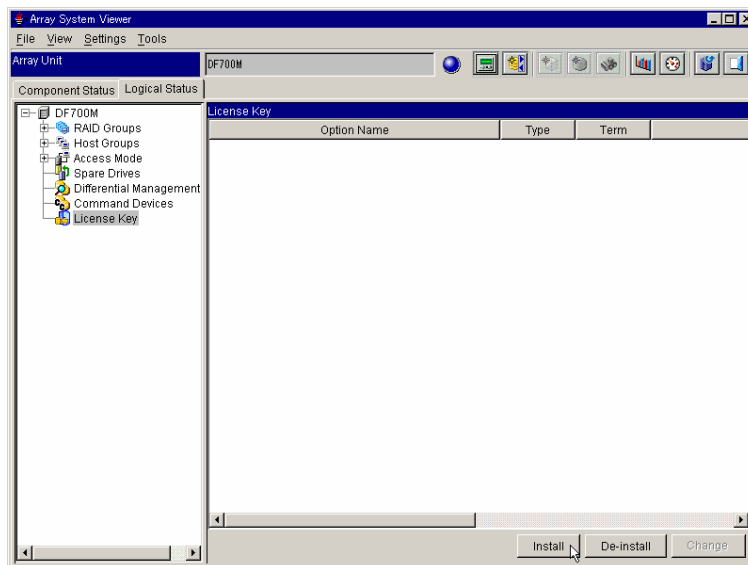


Figure 3.1 Selecting the License Key Icon

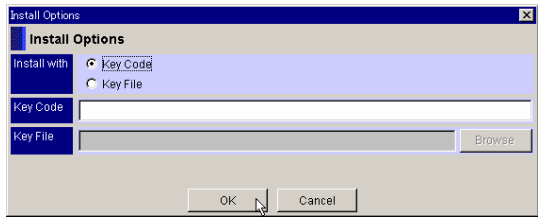


Figure 3.2 Install Options Dialog Box

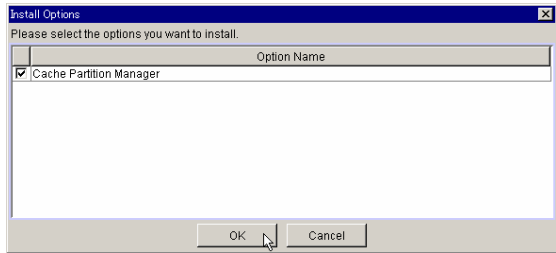


Figure 3.3 Option Selection Dialog Box

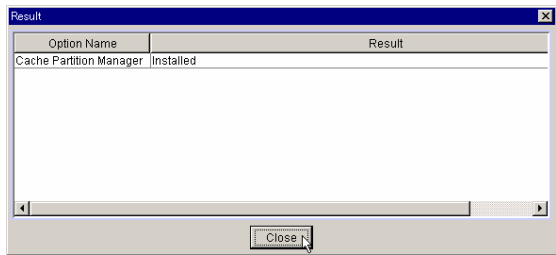


Figure 3.4 Result Dialog Box

3.2 Uninstalling Cache Partition Manager

Before you uninstall Cache Partition Manager, you must make sure of the following:

- All of the sub-partitions other than the master partition have been deleted.
 - The capacity of the master partition must be the default partition size.
 - You do not have any logical units with a stripe size of either 256 kB or 512 kB
1. Launch Storage Navigator Modular, and change to **Management Mode**.
 2. Register and connect to the subsystem where you will uninstall Cache Partition Manager. The **Array System Viewer** window displays the connected subsystem.
 3. Click the **Logical Status** tab, then click the **License Key** icon (see Figure 3.1).
 4. Click **De-install** to uninstall the **De-install Options** dialog box (see Figure 3.5).
 5. Enter a key code in the dialog box, and then click **OK**.
 6. Click **OK** on the confirmation message.

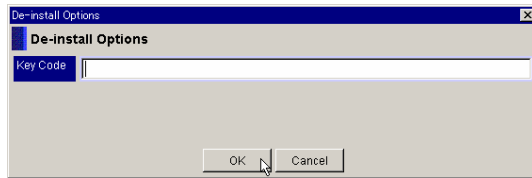


Figure 3.5 De-install Options Dialog Box

3.3 Enabling or Disabling Cache Partition Manager

You can enable or disable the Cache Partition Manager function without uninstalling it.

The following conditions must be satisfied in order to disable Cache Partition Manager:

- All the sub-partitions other than the master partition must be deleted.
- The capacity of the master partition must be the default partition size.
- You should not have any logical units with a stripe size of 256 kB or 512 kB.

1. Launch Storage Navigator Modular, and change to **Management Mode**.
2. Register and connect to the subsystem where you will enable or disable Cache Partition Manager. The **Array System Viewer** window displays the connected subsystem.
3. Click the **Logical Status** tab, then click the **License Key** icon (see Figure 3.6). The installed options are displayed on the right side of the window.
4. Right-click on **CACHE PARTITION** in the **Option Name** text box, and then click **Change** from the pop-up menu.
5. Click **OK** on the confirmation message.

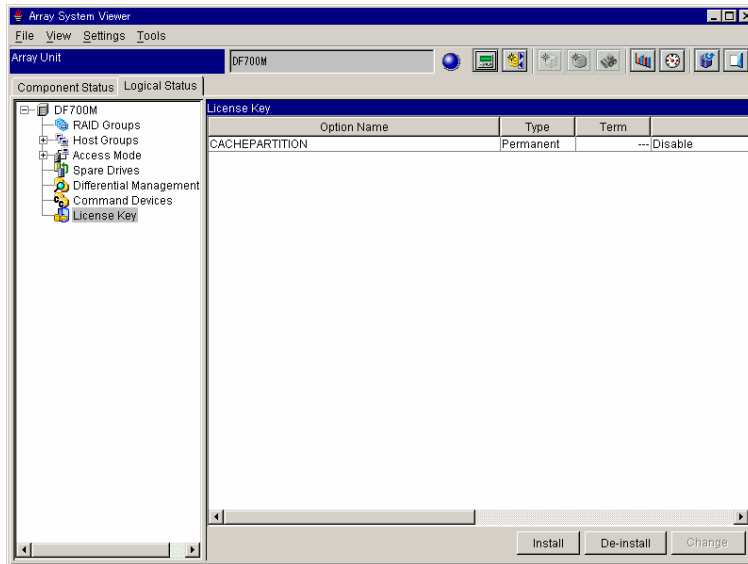


Figure 3.6 Displaying Installed Options

Chapter 4 Cache Partition Manager Operations

This chapter discusses the following topics:

- Adding a Cache Partition (section 4.1)
- Creating a Logical Unit by Specifying Striping Size (section 4.2)
- Assigning a Logical Unit to a Cache Partition (section 4.3)
- Deleting a Cache Partition (section 4.4)
- Changing a Cache Partition (section 4.5)
- Setting a Pair Cache Partition (section 4.6)
- Changing the Cache Partition Owner Controller (section 4.7)

Important: Refer to Chapter 2 for the Cache Partition Manager specifications and requirements.

4.1 Adding a Cache Partition

Note: You must reboot the subsystem for the changes to be effective. If you are using TrueCopy or TrueCopy Extended, make sure that the pair status is PSUS before rebooting.

1. Launch Storage Navigator Modular, change to **Management Mode**, and connect to the subsystem. The **Array System Viewer** window displays the connected subsystem.
2. Click the **Logical Status** tab, then click the **Cache Partition** icon on the left side of the panel (see Figure 4.1).
3. Display the **Cache Partition** dialog box using either of the following methods:
 - Click **Set** on the lower right of the window, *or*
 - Right-click the **Cache Partition** icon, then click **Set** from the pop-up menu (see Figure 4.2).
4. In the **Cache Partition** dialog box (see Figure 4.3), select either **Cache Partition 00** or **01**, then click **Add**. This adds a line for **Cache Partition 02**. Specify the following:
 - Use the **CTL** drop-down box to select the CTL (either **0** or **1**).
 - Double click the **Size** field and type the desired size (10 in this example). Note, that the actual size is ten times the specified number.
 - Use the **Segment Size** drop-down box to select the segment size (8 in this example).

Note: Refer to Table 2.2 and Table 2.3 for more information about supported partition sizes. In this example, up to 520 MB can be allocated. This is calculated by the following formula: 880 MB - 180 MB - 180 MB.

5. Click **OK** when you are finished.
6. The **Automatic Pair Cache Partition Confirmation** displays (see Figure 4.4). Depending on the type of change, the setting of the pair cache partition may be switched to **Auto**. You can verify that by checking the setting after restarting the subsystem. Click **OK** to continue.
7. The **Restart Subsystem** message displays (see Figure 4.5). You must restart the subsystem to validate the settings, but you do not have to do it at this time. If you want to restart now, click **OK**. If you want to restart later, click **Cancel**. The changes will be preserved and validated at the next restart.
8. The **TrueCopy Warning** message displays (see Figure 4.6). Before you restart the subsystem, make sure that the status of all TrueCopy pairs is PSUS, then click **OK**. If the pair status is other than PSUS, click **Cancel**. Place all of the pairs in the PSUS status, and then restart the subsystem.
9. Restarting the subsystem should take approximately 4 to 15 minutes. Click **OK** on the confirmation message when the process is complete.

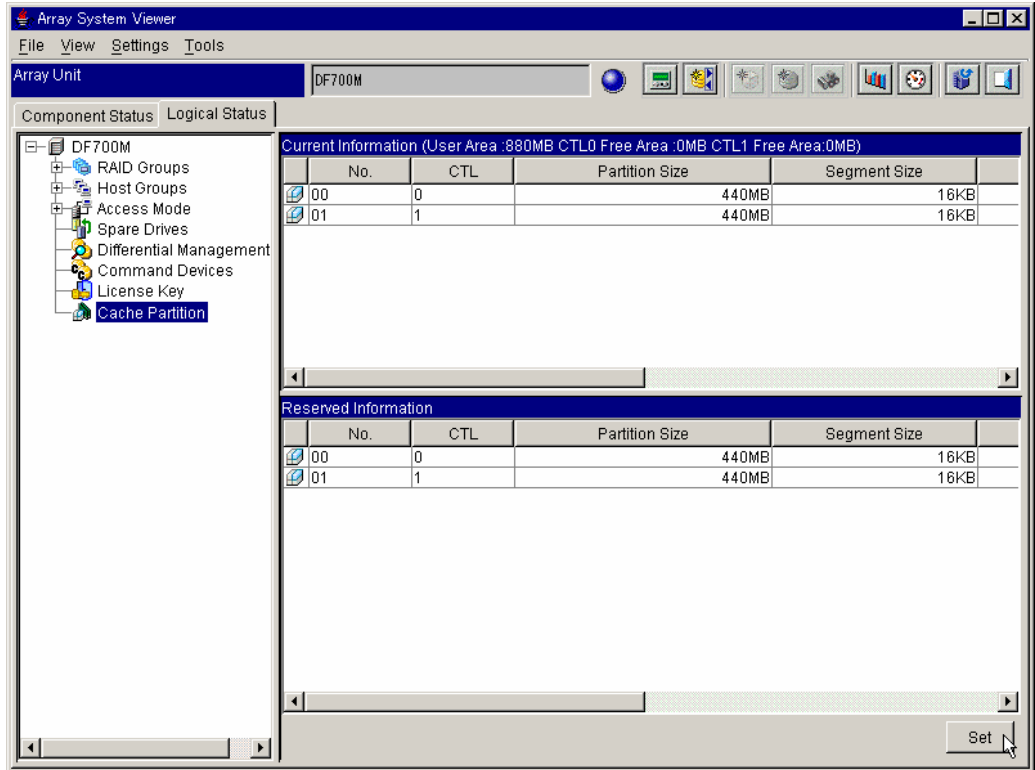


Figure 4.1 Selecting the Set Button

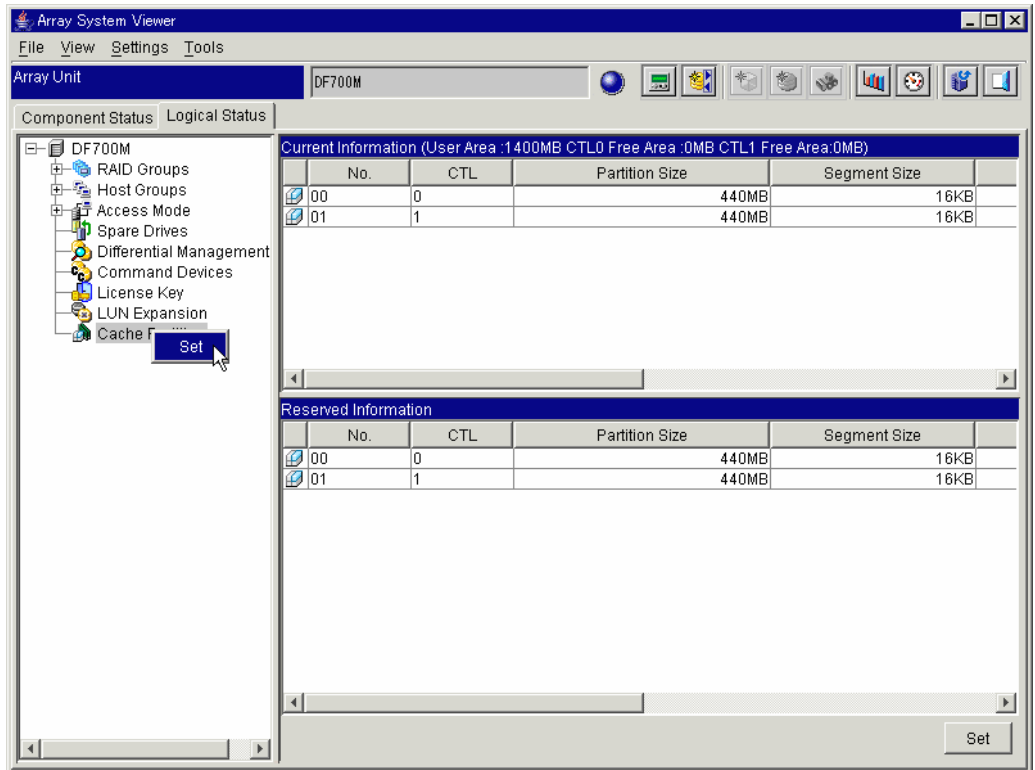


Figure 4.2 Displaying the Set Pop-Up Menu



Figure 4.3 Cache Partition Dialog Box

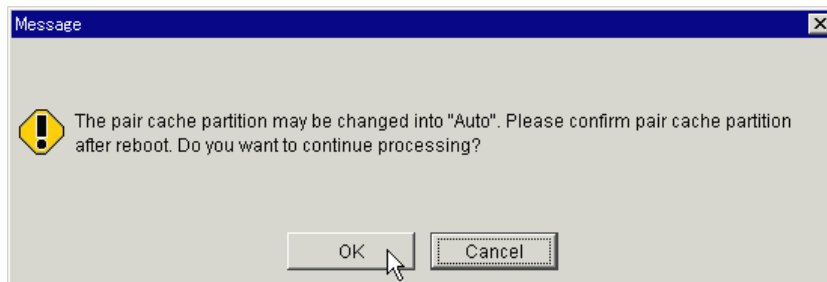


Figure 4.4 Automatic Pair Cache Partition Confirmation Message

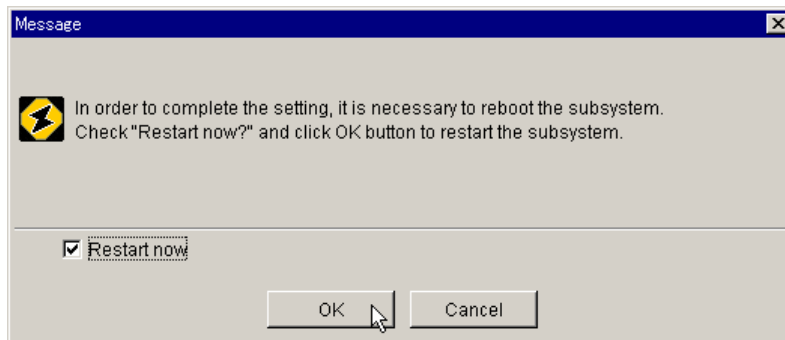


Figure 4.5 Restart Subsystem Message

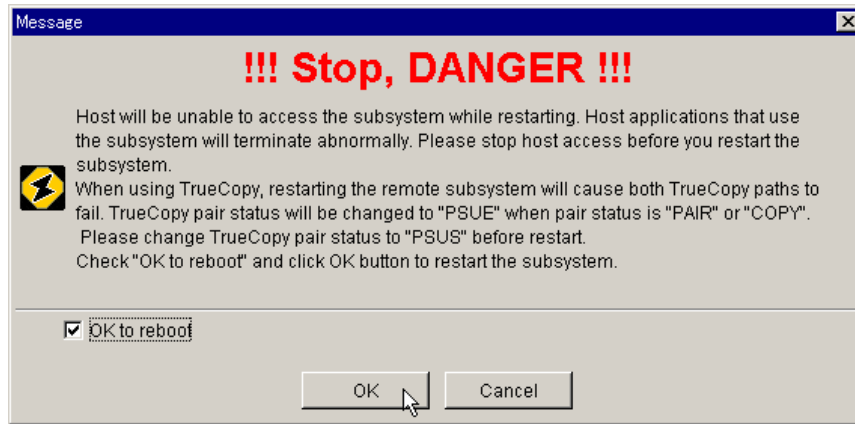


Figure 4.6 TrueCopy Warning Message

4.2 Creating a Logical Unit by Specifying Striping Size

Note: If you do not assign an LU to a particular cache partition, it will be assigned to the default controller that was specified when the LU was created.

1. Launch Storage Navigator Modular, change to **Management Mode**, and connect to the subsystem. The **Array System Viewer** window displays the connected subsystem.
2. Click the **Logical Status** tab (see Figure 4.1).
3. Select and right-click on a RAID Group from the right side of the window, then click **Create New Logical Unit** from the pop-up menu to display the **Create Logical Unit** dialog box (see Figure 4.7).
4. Click **Detail** (see Figure 4.7) to display the detailed version of the **Create Logical Unit** dialog box (see Figure 4.8).
5. Specify the **Logical Unit No.**, **Default Controller**, **Size**, **Stripe Size**, **Cache Partition**, and **Pair Cache Partition**, then click **OK**. This will create an unformatted LU.

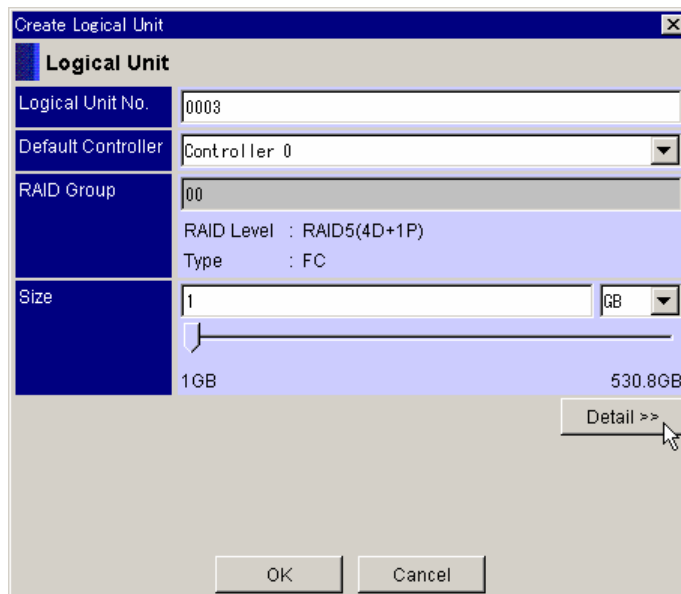


Figure 4.7 Create Logical Unit Dialog Box (Simple)

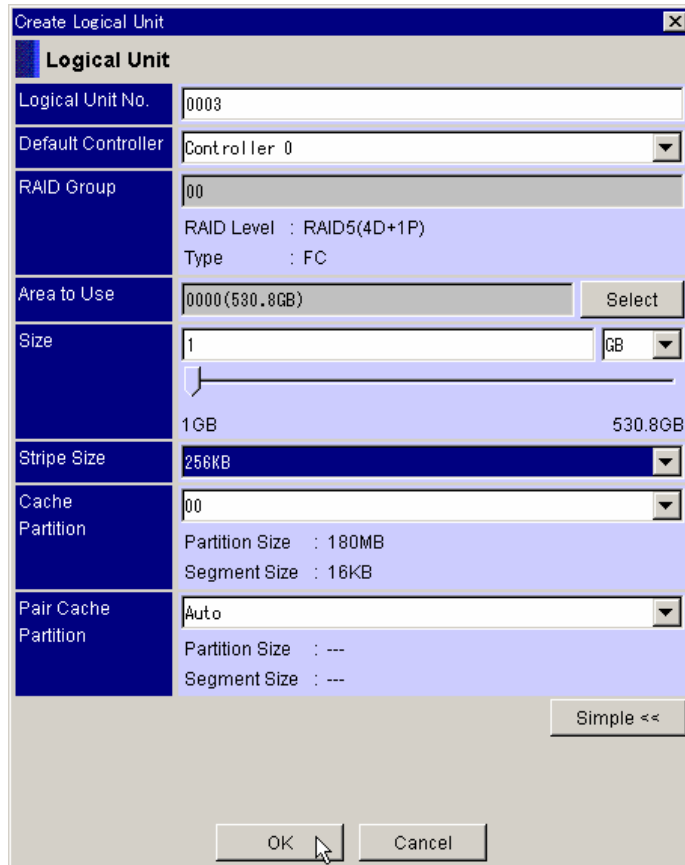


Figure 4.8 Create Logical Unit Dialog Box (Detailed)

4.3 Assigning a Logical Unit to a Cache Partition

Notes:

- If you do not assign an LU to a specified cache partition, it will be assigned to the master partition.
 - You must reboot the subsystem for the changes to be effective. If you are using TrueCopy or TrueCopy Extended Distance, make sure that the pair status is PSUS before rebooting.
1. Launch Storage Navigator Modular, change to **Management Mode**, and connect to the subsystem. The **Array System Viewer** window displays the connected subsystem.
 2. Click the **Logical Status** tab (see Figure 4.1).
 3. Select and right-click a logical unit from the right side of the window, then click **Cache Partition** from the pop-up menu to display the **Change Cache Partition** dialog box (see Figure 4.9).
 4. Select a partition number from the **Cache Partition** drop down list, then click **OK** on both, the dialog box and confirmation message.
 5. The **Restart Subsystem** message displays (see Figure 4.5). You must restart the subsystem to validate the settings, but you do not have to do it at this time. If you want to restart now, click **OK**. If you want to restart later, click **Cancel**, and the changes will be preserved and validated at the next restart.
 6. The **TrueCopy Warning** message displays (see Figure 4.6). Before you restart the subsystem, make sure that the status of all TrueCopy pairs is PSUS, then click **OK**. If the pair status is other than PSUS, click **Cancel**. Place all of the pairs in the PSUS status, and then restart the subsystem.
 7. Restarting the subsystem should take approximately 4 to 15 minutes. Click **OK** on the confirmation message when the process is complete.

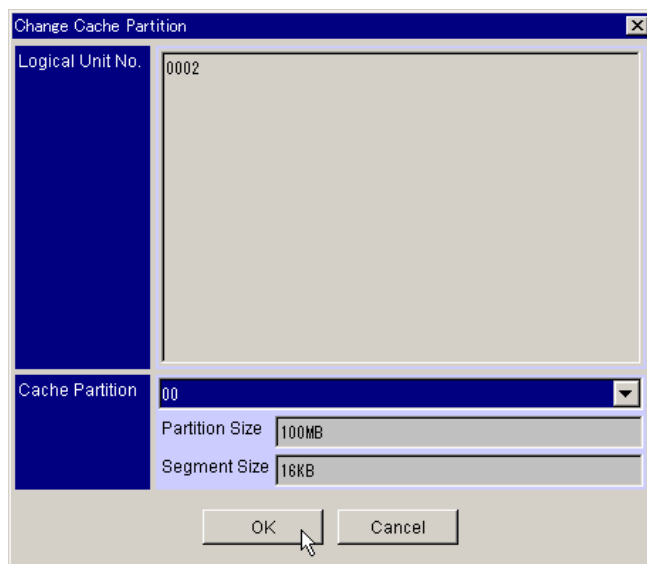


Figure 4.9 Change Cache Partition Dialog Box

4.4 Deleting a Cache Partition

Notes:

- To delete a cache partition that was set, you must reassign any LUs in that cache partition to the master partition.
 - You must reboot the subsystem for the changes to be effective. If you are using TrueCopy or TrueCopy Extended Distance, make sure that the pair status is PSUS before rebooting.
 - If you install, uninstall, enable, or disable the Cache Partition Manager on a subsystem configured with NAS Modular, you must also stop the clusters between the NAS units. When restarting the subsystem, you must restart the clusters.
1. Launch Storage Navigator Modular, change to **Management Mode**, and connect to the subsystem. The **Array System Viewer** window displays the connected subsystem.
 2. Click the **Logical Status** tab, then click the **Cache Partition** icon on the left side of the window.
 3. Display the **Cache Partition** dialog box using either of the following methods:
 - Click **Set** on the lower right of the window (see Figure 4.1), *or*
 - Right-click the **Cache Partition** icon, then click **Set** from the pop-up menu (see Figure 4.2).
 4. Select the cache partition number that you want to delete, and then click **Delete** (see Figure 4.10). The selected cache partition number is removed from the list.
 5. Click **OK** on the confirmation message.
 6. The **Automatic Pair Cache Partition Confirmation** displays (see Figure 4.4). Depending on the type of change, the setting of the pair cache partition may be switched to **Auto**. You can verify that by checking the setting after restarting the subsystem. Click **OK** to continue.
 7. The **Restart Subsystem** message displays (see Figure 4.5). You must restart the subsystem to validate the settings, however, you do not have to do it at this time. If you want to restart now, click **OK**. If you want to restart later, click **Cancel**, and the changes will be preserved and validated at the next restart.
 8. The **TrueCopy Warning** message displays (see Figure 4.6). Before you restart the subsystem, make sure that the status of all TrueCopy pairs is PSUS, then click **OK**. If the pair status is other than PSUS, click **Cancel**. Place all the pairs in the PSUS status, and then restart the subsystem.
 9. Restarting the subsystem should take approximately 4 to 15 minutes. Click **OK** on the confirmation message when the process is complete.

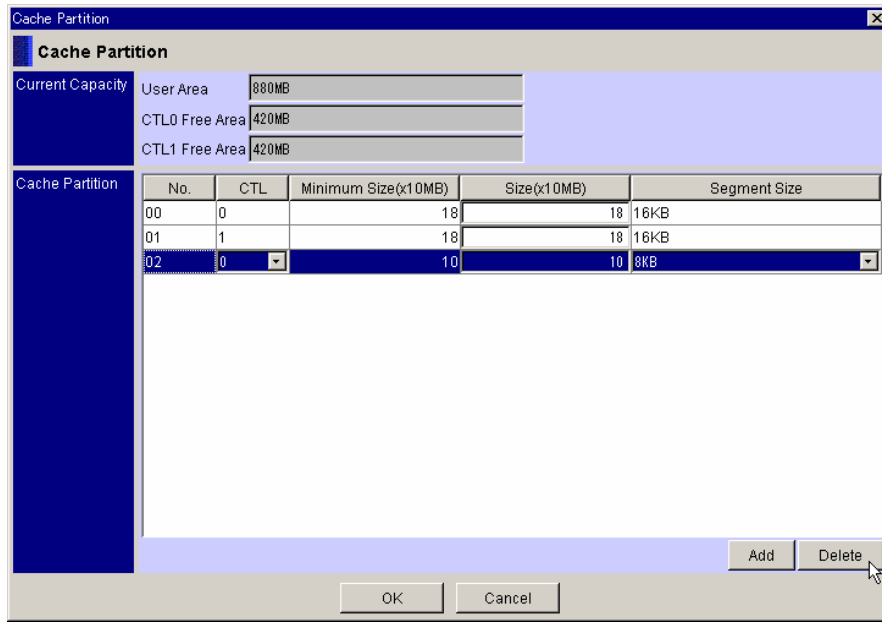


Figure 4.10 Deleting a Cache Partition

4.5 Changing a Cache Partition

Notes:

- You can only change the size of a sub-partition.
 - You must reboot the subsystem for the changes to be effective. If you are using TrueCopy or TrueCopy Extended Distance, make sure that the pair status is PSUS before rebooting.
 - If you install, uninstall, enable, or disable the Cache Partition Manager on a subsystem connected to a NAS Modular, you must also stop the clusters between the NAS units. When restarting the subsystem, you must restart the clusters.
1. Launch Storage Navigator Modular, change to **Management Mode**, and connect to the subsystem. The **Array System Viewer** window displays the connected subsystem.
 2. Click the **Logical Status** tab, then click the **Cache Partition** icon on the left side of the window (see Figure 4.1).
 3. Display the **Cache Partition** dialog box using either of the following methods:
 - Click **Set** on the lower right of the window, *or*
 - Right-click on the **Cache Partition** icon, then click **Set** from the pop-up menu (see Figure 4.2).
 4. In the **Cache Partition** dialog box (see Figure 4.9), double click the **Size (x10MB)** of the **Cache Partition No.00** and **No.01**, and then change the size to 25. Select **4 KB** from the pull-down menu at the left end of the **Segment Size** (see Figure 4.11).
 5. Click **OK** on the **Cache Partition** dialog box, then click **OK** on the confirmation message.
 6. The **Automatic Pair Cache Partition Confirmation** displays (see Figure 4.4). Depending on the type of change, the setting of the pair cache partition may be switched to **Auto**. You can verify that by checking the setting after restarting the subsystem. Click **OK** to continue.
 7. The **Restart Subsystem** message displays (see Figure 4.5). You must restart the subsystem to validate the settings, but you do not have to do it at this time. If you want to restart now, select **OK**. If you want to restart later, click **Cancel**, and the changes will be preserved and validated at the next restart.
 8. The **TrueCopy Warning** message displays (see Figure 4.6). Before you restart the subsystem, make sure that the status of all TrueCopy pairs is PSUS, then click **OK**. If the pair status is other than PSUS, click **Cancel**. Place all the pairs in the PSUS status, and then restart the subsystem.
 9. Restarting the subsystem should take approximately 4 to 15 minutes. Click **OK** on the confirmation message when the process is complete.

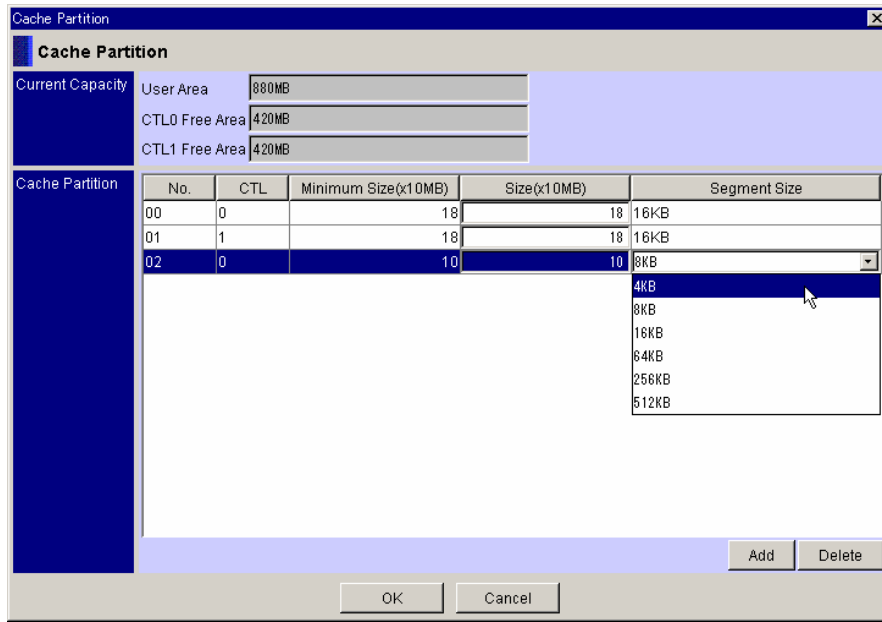


Figure 4.11 Changing the Cache Partition

4.6 Setting a Pair Cache Partition

Note: The owner controller must be different for the partition to which the logical unit belongs and for the pair cache partition.

To set the pair cache partition of the logical unit, complete the following steps:

1. Launch Storage Navigator Modular, change to **Management Mode**, and connect to the subsystem. The **Array System Viewer** window displays the connected subsystem.
2. Click the **Logical Status** tab (see Figure 4.1).
3. Select a logical unit, then select the **Pair Cache Partition** to display the **Change Pair Cache Partition** dialog box (see Figure 4.12).
4. Select the pair partition number from the **Pair Cache Partition** drop down list of the **Pair Cache Partition**, and then click **OK**.
5. In the resulting message boxes, click **OK**.

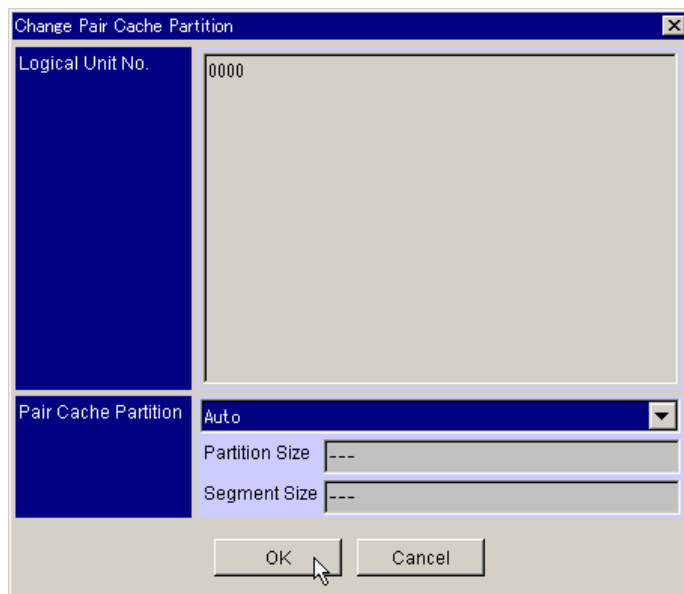


Figure 4.12 Changing the Pair Cache Partition

4.7 Changing the Cache Partition Owner Controller

Note: You must reboot the subsystem for the changes to be effective. If you are using TrueCopy or TrueCopy Extended Distance, make sure that the pair status is PSUS before rebooting.

1. Launch Storage Navigator Modular, change to **Management Mode**, and connect to the subsystem. The **Array System Viewer** window displays the connected subsystem.
2. Click the **Logical Status** tab, then click the **Cache Partition** icon on the left side of the window (see Figure 4.1).
3. Display the **Cache Partition** dialog box by using either of the following methods:
 - Click **Set** on the lower right of the window, *or*
 - Right-click the **Cache Partition** icon, then click **Set** from the pop-up menu (see Figure 4.2).
4. In the **Cache Partition** dialog box (see Figure 4.13), select the Cache Partition No. and the CTL number (0 or 1) from the drop-down menu, and then click **OK**.
5. Click **OK** on the confirmation messages.
6. The **Automatic Pair Cache Partition Confirmation** displays (see Figure 4.4). Depending on the type of change, the setting of the pair cache partition may be switched to **Auto**. You can verify that by checking the setting after restarting the subsystem. Click **OK** to continue.
7. The **Restart Subsystem** message displays (see Figure 4.5). You must restart the subsystem to validate the settings, but you do not have to do it at this time. If you want to restart now, click **OK**. If you want to restart later, click **Cancel**. The changes will be preserved and validated at the next restart.
8. The **TrueCopy Warning** message displays (see Figure 4.6). Before you restart the subsystem, make sure that the status of all TrueCopy pairs is PSUS, then click **OK**. If the pair status is other than PSUS, click **Cancel**. Place all the pairs in the PSUS status, and then restart the subsystem.
9. Restarting the subsystem should take approximately 4 to 15 minutes. Click **OK** on the confirmation message when the process is complete.

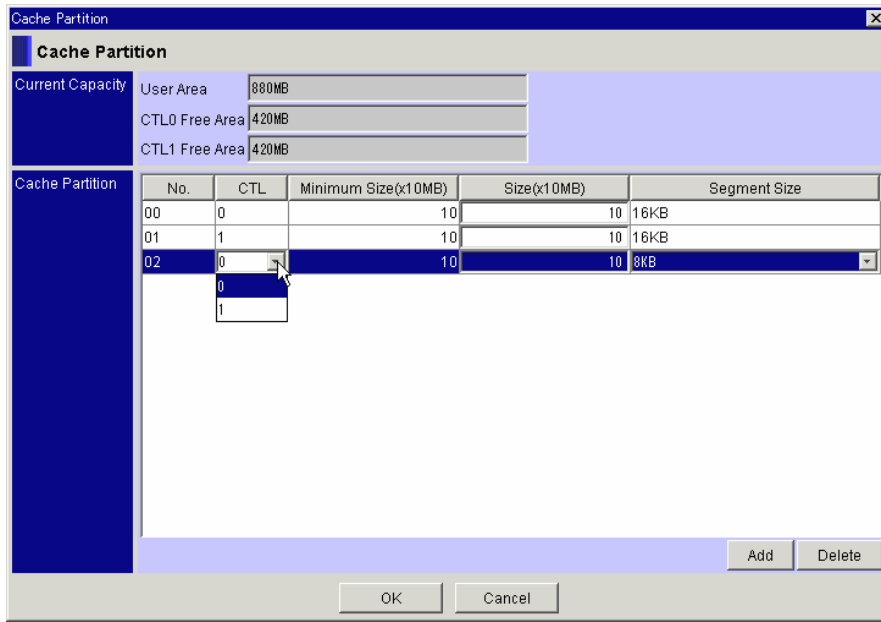


Figure 4.13 Changing the Cache Partition Owner Controller

Chapter 5 Cache Partition Manager Operations Using the Command Line Interface

This section includes the following topics:

- Installing Cache Partition Manager (section 5.1)
- Uninstalling Cache Partition Manager (section 5.2)
- Enabling or Disabling Cache Partition Manager (section 5.3)
- Adding a Cache Partition (section 5.4)
- Changing the Cache Partition Assignment (section 5.5)
- Creating a Logical Unit by Specifying the Striping Size (section 5.6)
- Assigning a Cache Partition (section 5.7)
- Deleting a Cache Partition (section 5.8)
- Setting a Pair Cache Partition (section 5.9)
- Changing the Cache Partition Owner Controller (section 5.10)

See Chapter 2 for Cache Partition Manager specifications and requirements.

For more information on the CLI version of Storage Navigator Modular, see *Hitachi TagmaStore Adaptable Modular Storage and Workgroup Modular Storage, Storage Navigator Modular Command Line Interface (CLI) User's Guide* (MK-95DF712).

5.1 Installing Cache Partition Manager

Note: To make the Cache Partition Manager functions available, you must install the Cache Partition Manager feature and make its functions selectable (unlocked). This requires a key code or key file.

To install the Cache Partition Manager:

1. From the command prompt, register the subsystem in which you will install the Cache Partition Manager feature and connect to the subsystem. For details, refer to the *Storage Navigator Modular (for CLI) User's Guide*.
2. Figure 5.1 and Figure 5.2 show how to install the optional features:

```
% auopt -unit subsystem-name off -keycode manual-attached-keycode
Password: manager-password
Are you sure you want to install the option? (y/n[n]): y
The option is installed successfully.
%
```

Figure 5.1 Installing Cache Partition Manager (Example 1)

```
% auopt -unit subsystem-name -refer
Password: manager-password
Option Name  Type      Term      Status
CACHEPARTITION  Permanent ---      Enable
%
```

Figure 5.2 Installing Cache Partition Manager (Example 2)

5.2 Uninstalling Cache Partition Manager

Notes:

- The following conditions must be satisfied in order to uninstall Cache Partition Manager:
 - All the sub-partitions other than the master partition must be deleted.
 - The capacity of the master partition must be the default partition size.
 - You do not have any logical units with a stripe size of either 256 kB or 512 kB

To uninstall Cache Partition Manager:

1. From the command prompt, register the subsystem in which you will uninstall Cache Partition Manager, and connect to the subsystem.
2. Figure 5.3 and Figure 5.4 show how to lock the optional features:

```
% auopt -unit subsystem-name -lock on -keycode manual-attached-keycode
Password: manager-password
Are you sure you want to de-install the option? (y/n[n]): y
The option is de-installed successfully.
%
```

Figure 5.3 Uninstalling Cache Partition Manager (Example 1)

```
% auopt -unit subsystem-name -refer
Password: manager-password
DMEC002015: No information displayed.
%
```

Figure 5.4 Uninstalling Cache Partition Manager (Example 2)

5.3 Enabling or Disabling Cache Partition Manager

Notes:

- The following conditions must be satisfied in order to disable Cache Partition Manager:
 - All the sub-partitions other than the master partition must be deleted.
 - The capacity of the master partition must be the default partition size.
 - You should not have any logical units with a stripe size of either 256 kB or 512 kB

Cache Partition Manager can be enabled or disabled without uninstalling this function.

To enable or disable Cache Partition Manager (without uninstalling this function):

1. From the command prompt, register the subsystem in which you will change the status of the Cache Partition Manager feature and connect to the subsystem.
2. Execute the `auopt` command to change the status (enable or disable) of the Cache Partition Manager feature.

Figure 5.5 and Figure 5.6 show how to change the status from enable to disable. To change the status from disable to enable, enter `enable` after the `-st` option:

```
% auopt -unit subsystem-name -option CACHEPARTITION -st disable
Password: manager-password
Are you sure you want to disable the option? (y/n[n]): y
The option has been set successfully.
%
```

Figure 5.5 Disabling Cache Partition Manager (Example 1)

```
% auopt -unit subsystem-name -refer
Password: manager-password
Option Name  Type      Term      Status
CACHEPARTITION  Permanent ---      Disable
%
```

Figure 5.6 Disabling Cache Partition Manager (Example 2)

5.4 Adding a Cache Partition

Note: You must reboot the subsystem for the changes to be effective. If you are using TrueCopy or TrueCopy Extended Distance, make sure that the pair status is PSUS before rebooting.

Figure 5.7 shows how to add a cache partition and assign a logical unit to it.

1. From the command prompt, register the subsystem in which you want to set Cache Partition Manager and connect to the subsystem.
2. Execute the `aucachept` command to investigate the cache memory.

```
% aucachept -unit subsystem-name -refer
Password: manager-password
Current Information
  User Capacity[MB] : 880
  Free Size[MB]
    CTL0 : 0
    CTL1 : 0
  No.  CTL      Partition Size[10MB]      Segment Size[KB]
    0   0           44                      16
    1   1           44                      16

Reserved Information
  No.  CTL      Partition Size[10MB]      Segment Size[KB]
    0   0           44                      16
    1   1           44                      16
%
```

Figure 5.7 Verifying the Cache Memory Status

- Area sizes of the master partitions (Nos. 1 and 2) are changed to 18 respectively, because no free area is left (see Figure 5.8).

```
% aucachept -unit subsystem-name -chg -pt 0 -ptsize 18
Password: manager-password
The size of cache partition 0 is changed into 180MB.
Do you want to continue processing? (y/n [n]): y
The pair cache partition may be changed into "Auto". Please confirm pair cache
partition after reboot.
Do you want to continue processing? (y/n [n]): y
In order to complete the changing, it is necessary to reboot the subsystem.
When not restarting, the changing will be registered, but it will not become
effective on the subsystem.
Please execute this command again without restarting, if you want to continue
setting of the cache partition.
Do you restart the subsystem? (y/n [n]): n
Are you sure you want to change the cache partition? (y/n [n]): y
The cache partition has been changed successfully.
Please restart the subsystem to enable the setting.

% aucachept -unit subsystem-name -chg -pt 1 -ptsize 18
Password: manager-password
The size of cache partition 1 is changed into 180MB.
Do you want to continue processing? (y/n [n]): y
The pair cache partition may be changed into "Auto". Please confirm pair cache
partition after reboot.
Do you want to continue processing? (y/n [n]): y
In order to complete the changing, it is necessary to reboot the subsystem.
When not restarting, the changing will be registered, but it will not become
effective on the subsystem.
Please execute this command again without restarting, if you want to continue
setting of the cache partition.
Do you restart the subsystem? (y/n [n]): y
Host will be unable to access the subsystem while restarting.
Host applications that use the subsystem will terminate abnormally. Please stop
host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting
begins.
When using TrueCopy, restarting the remote subsystem will cause both TrueCopy
paths to fail.
TrueCopy pair status will be changed to "PSUE" when pair status is "PAIR" or
"COPY". Please change TrueCopy pair status to "PSUS" before restart.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 4 - 15min.
The subsystem restarted successfully.
%
```

Figure 5.8 Changing the Area Size of the Master Partitions

4. A cache partition is added (partition size: 10, segment size: 8 kB, owner controller: 0) (see Figure 5.9).

```
% aucachept -unit subsystem-name -add -ptsize 10 -segsz 8 -ctl0
Password: manager-password
The reserved cache partition 2 in size 100MB is set up to CTL0.
Do you want to continue processing? (y/n [n]): y
In order to complete the setting, it is necessary to reboot the subsystem.
When not restarting, the setting will be registered, but it will not become
effective on the subsystem.
Please execute this command again without restarting, if you want to continue
setting of the cache partition.
Do you restart the subsystem? (y/n [n]): y
Host will be unable to access the subsystem while restarting.
Host applications that use the subsystem will terminate abnormally. Please stop
host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting
begins.
When using TrueCopy, restarting the remote subsystem will cause both TrueCopy
paths to fail.
TrueCopy pair status will be changed to "PSUE" when pair status is "PAIR" or
"COPY". Please change TrueCopy pair status to "PSUS" before restart.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 4 - 15min.
The subsystem restarted successfully.
%
```

Figure 5.9 Adding a Cache Partition

5.5 Changing the Cache Partition Assignment

WARNING: If you are using TrueCopy or TrueCopy Extended Distance and you are required to reboot the subsystem, change the pair status to PSUS before you reboot.

If you do not assign a cache partition, it is assigned by default to the master partition.

1. From the command prompt, register the subsystem in which you want to set Cache Partition Manager and connect to the subsystem.
2. Execute the `aulucachept` command to assign the cache memory. First, verifying the status (see Figure 5.10).

```
% aulucachept -unit subsystem-name -refer
Cache          Pair Cache    Current
LUN            Partition    Partition    Partition
0              0            Auto         0
1
:
:
50
:
:
%
```

Figure 5.10 Verifying Cache Memory Status

3. Here, the example assigned to the cache partition 2, which created the logical unit 50, is explained (see Figure 5.11).

```
% aulucachept -unit subsystem-name -set -lu 50 -pt 2
Password: manager-password
Are you sure you want to assign the cache partition? (y/n [n]): y
The pair cache partition may be changed into "Auto". Please confirm pair cache p
artition after reboot.
Do you want to continue processing? (y/n [n]): y
In order to complete the setting, it is necessary to reboot the subsystem.
When not restarting, the setting will be registered, but it will not become effe
ctive on the subsystem.
Do you restart the subsystem? (y/n [n]): y
Host will be unable to access the subsystem while restarting.
Host applications that use the subsystem will terminate abnormally. Please stop
host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting b
egins.
When using TrueCopy, restarting the remote subsystem will cause both TrueCopy pa
ths to fail.
TrueCopy pair status will be changed to "PSUE" when pair status is "PAIR" or "CO
PY". Please change TrueCopy pair status to "PSUS" before restart.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 4 - 15min.
The subsystem restarted successfully.
%
```

Figure 5.11 Changing the Cache Partition Assignment

5.6 Creating Logical Unit by Specifying the Striping Size

Note: If you do not assign an LU to a particular cache partition, it will be assigned to the default controller that was specified when the LU was created.

An example of specifying a cache partition and a segment size to be used when creating a logical unit is explained. When the cache partition is not assigned, it assumes the assignment is made to the master partition of the default controller specified when the logical unit is created.

1. From the command prompt, register the subsystem in which you want to create a logical unit.
2. Execute the `auluadd` command to create a logical unit (see Figure 5.12).

```
% auluadd -unit subsystem-name -lu logical unit number -rg RAID group number  
          -size size number -ctl0 | -ctl1 -stripesize 64 | 256 | 512  
          -cachept partition number -paircachept pair partition number  
Password: manager-password  
Are you sure you want to set the logical unit? (y/n [n]): y  
The logical unit has been set successfully.  
%
```

Figure 5.12 Creating Logical Unit by Specifying the Striping Size

3. Execute the `auformat` command to format a created logical unit (see Figure 5.13).

```
% auformat -unit subsystem-name -lu logical unit number )  
Password: manager-password  
Are you sure you want to format the logical unit(s)? (y/n [n]): y  
The format was started.  
%
```

Figure 5.13 Formatting the Logical Unit

5.7 Assigning a Cache Partition

Notes:

- If you do not assign an LU to a specified cache partition, it will be assigned to the master partition.
 - You must reboot the subsystem for the changes to be effective. If you are using TrueCopy or TrueCopy Extended Distance, make sure that the pair status is PSUS before rebooting.
1. From the command prompt, register the subsystem in which you want to set Cache Partition Manager, and connect to the subsystem.
 2. Execute the `aulucachept` command to assign the cache memory (see Figure 5.14). First, verifying the status.

```
% aulucachept -unit subsystem-name -refer
Cache          Pair Cache    Current Cache
LUN            Partition    Partition      Partition
0              0             Auto           0
1
:
:
50
:
:
%
```

Figure 5.14 Verifying Cache Memory Status

3. Figure 5.15 shows logical unit 50 is assigned to cache partition 2).

```
% aulucachept -unit subsystem-name -set -lu 50 -pt 2
Password: manager-password
Are you sure you want to assign the cache partition?
(y/n [n]): y
The cache partition has been assigned successfully.
Restart the subsystem to apply the setting.
The subsystem stops accepting access from the host while restarting.
Also, if you are logging in, the login status will be canceled when restarting
begins.
Do you want to restart the subsystem now? (y/n [n]): y
When using the TrueCopy, restart of the remote subsystem will cause both
TrueCopy paths failure. And when TrueCopy pair status is "PAIR" or "COPY",
TrueCopy pair status will be changed to "PSUE".
Do you want to continue processing? (y/n [n]): y
For logical unit where segment size of cache partition and pair cache partition is
disaccord, pair cache partition is decided to automatic. Please confirm pair cache
partition after reboot.
Do you want to continue processing? (y/n [n]): y
Now restarting the subsystem. Start Time HH:MM:SS Time Required 4 - 15min.
The subsystem restarted successfully.
%
```

Figure 5.15 Assigning a Cache Partition

5.8 Deleting a Cache Partition

Note: To delete the created cache partition, it is required to move the logical unit that has been assigned to the created cache partition to the other partition.

WARNING: If you are using TrueCopy or TrueCopy Extended Distance and are required to reboot the subsystem, change the pair status to PSUS before you reboot.

1. From the command prompt, register the subsystem in which you want to set Cache Partition Manager and connect to the subsystem.
2. Execute the `aucachept` command to delete the created cache partition (see Figure 5.16).

```
% aucachept -unit subsystem-name -rm -pt 2
Password: manager-password
The cache partition 2 is deleted.
Do you want to continue processing? (y/n [n]): y
The pair cache partition may be changed into "Auto". Please confirm pair cache p
artition after reboot.
Do you want to continue processing? (y/n [n]): y
In order to complete the deleting, it is necessary to reboot the subsystem.
When not restarting, the deleting will be registered, but it will not become eff
ective on the subsystem.
Please execute this command again without restarting, if you want to continue se
tting of the cache partition.
Do you restart the subsystem? (y/n [n]): y
Host will be unable to access the subsystem while restarting.
Host applications that use the subsystem will terminate abnormally. Please stop
host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting b
egins.
When using TrueCopy, restarting the remote subsystem will cause both TrueCopy pa
ths to fail.
TrueCopy pair status will be changed to "PSUE" when pair status is "PAIR" or "CO
PY". Please change TrueCopy pair status to "PSUS" before restart.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 4 - 15min.
The subsystem restarted successfully.
%
```

Figure 5.16 Deleting a Cache Partition

5.9 Setting a Pair Cache Partition

Note: The owner controller must be different for the partition to which the logical unit belongs and the pair cache partition.

To set a pair cache partition, complete the following steps:

1. From the command prompt, register the subsystem in which you want to set Cache Partition Manager and connect to the subsystem.

```
Execute the aulucachept command to set the pair cache partition (see %
aulucachept -unit subsystem-name -set -lu 50 -pairpt auto
Password: manager-password
Are you sure you want to change the pair cache partition assignment? (y/n [n]): y
The pair cache partition assignment has been changed successfully.
%
```

2. Figure 5.17).

```
% aulucachept -unit subsystem-name -set -lu 50 -pairpt auto
Password: manager-password
Are you sure you want to change the pair cache partition assignment? (y/n [n]): y
The pair cache partition assignment has been changed successfully.
%
```

Figure 5.17 Setting the Pair Cache Partition

5.10 Changing the Cache Partition Owner Controller

WARNING: If you are using TrueCopy or TrueCopy Extended Distance and you are required to reboot the subsystem, change the pair status to PSUS before you reboot.

1. From the command prompt, register the subsystem in which you want to set Cache Partition Manager and connect to the subsystem.
2. Execute the `aucachept` command to change the cache partition owner controller (see Figure 5.18).

```
% aucachept -unit subsystem-name -chg -pt 2 -ctl1
Password: manager-password
The cache partition 2 is changed into CTL1.
Do you want to continue processing? (y/n [n]): y
The pair cache partition may be changed into "Auto". Please confirm pair cache
partition after reboot.
Do you want to continue processing? (y/n [n]): y
In order to complete the changing, it is necessary to reboot the subsystem.
When not restarting, the changing will be registered, but it will not become
effective on the subsystem.
Please execute this command again without restarting, if you want to continue
setting of the cache partition.
Do you restart the subsystem? (y/n [n]): y
Host will be unable to access the subsystem while restarting.
Host applications that use the subsystem will terminate abnormally. Please stop
host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting
begins.
When using TrueCopy, restarting the remote subsystem will cause both TrueCopy
paths to fail.
TrueCopy pair status will be changed to "PSUE" when pair status is "PAIR" or
"COPY". Please change TrueCopy pair status to "PSUS" before restart.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 4 - 15 min.
The subsystem restarted successfully.
%
```

Figure 5.18 Changing the Cache Partition Owner Controller

Chapter 6 Troubleshooting

This chapter discusses the following topics:

- Troubleshooting (section 6.1)
- Calling the Hitachi Data Systems Technical Support Center (section 6.2)

6.1 Troubleshooting

The Hitachi TagmaStore Adaptable Modular Storage subsystem is a high-performance, high-capacity storage array with added features designed to reduce the possibility of data loss due to the failure of any single component. For troubleshooting information about the AMS/WMS subsystem, refer to the following documents:

- *Hitachi TagmaStore Adaptable Modular Storage/Workgroup Modular Storage, WMS 100 User and Reference Guide, MK-95DF738*
- *Hitachi TagmaStore Adaptable Modular Storage/Workgroup Modular Storage, AMS 200 User and Reference Guide, MK-95DF713*
- *Hitachi TagmaStore Adaptable Modular Storage/Workgroup Modular Storage, AMS 500 User and Reference Guide, (MK-95DF714*
- *Hitachi TagmaStore Adaptable Modular Storage 1000 User and Reference Guide, MK-95DF780*

6.2 Calling the Hitachi Data Systems Technical Support Center

If you need to call Hitachi Data Systems Support Center, provide as much information about the problem as possible, including circumstances surrounding error or failure and the exact content of error messages displayed on the host system(s).

The worldwide Hitachi Data Systems Support Centers are:

- Hitachi Data Systems North America/Latin America
San Diego, California, USA
1-800-446-0744
- Hitachi Data Systems Europe
Contact Hitachi Data Systems Local Support
- Hitachi Data Systems Asia Pacific
North Ryde, Australia
011-61-2-9325-3300

Acronyms and Abbreviations

Acronym	Expansion
AMS	Adaptable Modular Storage
CLI	Command Line Interface
DASD	direct-access storage device
HDD	hard disk drive
I/O	input/output
LU	logical units
LUN	logical unit number
NAS	network attached storage
PSUS	pair suspended-split
P-VOL	primary volume
SATA	Serial Advanced Technology Attachment
S-VOL	secondary volume
V-VOL	virtual volume
WMS	Workgroup Modular Storage

