



**Hitachi Freedom Storage™
Lightning 9900™
Virtual LVI/LUN User's Guide
[Custom Volume Size (CVS)]**

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Preface

This user's guide provides instructions for installing and using the CVS (Customized Volume Size) option on the 9900 Remote Console PC, which enables the user to use the Virtual LVI/LUN feature of the Hitachi Freedom Storage™ 9900 Remote Console PC. Please read this manual carefully to understand how to use these products, and maintain a copy that is accessible from your Remote Console PC for reference purposes.

This user's guide assumes that:

- the user has a background in data processing and understands direct-access storage device subsystems and their basic functions,
- the user is familiar with the Hitachi Freedom Storage™ 9900 array subsystem,
- the user is familiar with the Hitachi Freedom Storage™ 9900 Remote Console, and
- the user is familiar with the Windows 95®, Windows 98®, Windows NT® or Windows 2000® operating systems.

For further information on the Hitachi Freedom 9900 subsystem, please refer to the *Hitachi Freedom Storage™ 9900 User and Reference Guide* (MK-90RD008). For further information on the Hitachi Freedom 9900 Remote Console, please refer to the *Hitachi Freedom Storage™ 9900 Remote Console User's Guide* (MK-90RD003). You may also contact your Hitachi Data Systems account team or refer to the Hitachi Data Systems worldwide web site (<http://www.hds.com>) for additional information on the 9900 subsystem and its features and functions.

Note: In this document the term “9900” refers to the entire Hitachi Freedom Storage™ 9900 subsystem family, unless otherwise noted.

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Chapter 1 Overview

1.1 Overview of Virtual LVI/LUN (Customized Volume Size)

The CVS (Customized Volume Size) option on the 9900 Remote Console PC enables the Virtual LVI/LUN feature of the 9900 subsystem. This option allows you to configure variable-size custom volumes, which are usually smaller than normal (fixed-size) volumes. Virtual LVI/LUN improves data access performance by reducing logical device contention and host I/O queue times, particularly when several frequently-accessed files are located on the same volume. Virtual LVI/LUN enables better utilization of the physical storage capacity of the 9900, and reduces the amount of administrative effort required to balance I/O workloads.

Note: Virtual LVI/LUN used in conjunction with FlashAccess (also called Dynamic Cache Residence or DCR) can achieve greater performance improvements than when either of these options is used individually.

A parity group is called a normal or base volume when all of its member LDEVs are fixed-size. In a normal volume, the size of the member LDEVs is determined by type of device that is being emulated, and the number of LDEVs is determined by the physical size of the parity group. Generally, each array group will have a certain amount of free space available after the standard LDEVs for the array group have been defined.

On the 9900, Virtual LVI/LUN formats one or more of the LDEVs on a selected volume into free space. That free space on the resulting volume can either be used to install one or more variable-sized custom volumes, or left as free space for future use. **Note:** at least one LDEV must remain defined as a normal volume in each array group.

Figure 1.1 illustrates the available CVS functions:

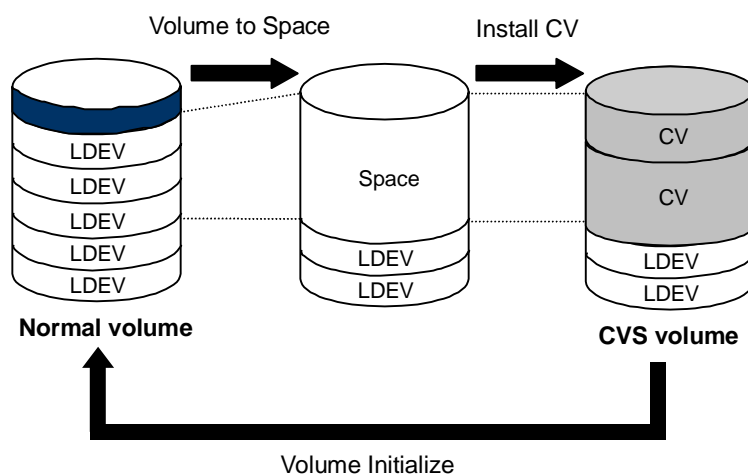


Figure 1.1 Illustration of CVS Operations

The following parameters apply to CVS operations:

- S/390® volumes must be offline from the host OS, and open volumes must be offline/unmounted from the host OS with no SCSI paths assigned to them. (For more information on configuring SCSI paths, please see *Hitachi Freedom Storage™ 9900 LUN Manager, LUSE, and LUN Security (Zone Allocation Manager) User's Guide* (MK-90RD006).
- Multiple LDEVs can be selected for conversion to CV volumes, but they must be in the same parity group.
- When space in a customized volume is converted to a CV, an LDEV address is assigned to that CV automatically. For mainframes, each CV will also have its own assigned unit control block (UCB). The UCB can be assigned either automatically or manually, at the user's option.
- LUSE, LUN Security and LDEV Security volumes are not available for CVS operations.
- When you convert a normal volume to a CVS volume, you can use all or part of the space previously assigned to that volume (e.g., 3339 cylinders for a 3390-3) for use in custom-size volumes (CVS). Each array group can support a total of 128 volumes, including both fixed-size and CVS volumes (see Table 1.1).

WARNING: The CVS function is destructive. Be sure to back up your data before performing CVS operations.

Table 1.1 lists the Virtual LVI/LUN specifications, and Table 1.2 lists the minimum and maximum CV capacities for open systems. Each CV has its own assigned unit control block (UCB), and multiple LVI/LUN types can be configured within each CV, so long as the device type is from the same device family (e.g. all open volumes, all 3390s or all 3380s). Opens, 3380s and 3390s are not allowed in the same parity group because they have different formats.

Table 1.1 Virtual LVI/LUN Specifications

Parameter	S/390® and S/380® Specifications	Open-Systems Specification
Track format	3380 or 3390	OPEN-3, OPEN-8, OPEN-9, OPEN-K or OPEN-E
LVI/LU type	3390-1, -2, -3, -3R, -9, -3A/3B/3C 3380-E, -J, -K, -KA, -KB, -KC	OPEN-3, OPEN-8, OPEN-9, OPEN-K or OPEN-E
Ability to intermix emulation type	Yes, for 3390-1,2,3 and 4 and 3380-E, J, and K. No for OPEN volumes or LDEV Security volumes.	Yes, by track geometry (except for AIX, OPEN-K, LUSE, 3380 and 3390 volumes)
Maximum number of volumes (normal and custom) per parity group	128	128
Maximum number of volumes (normal and custom) per subsystem	4,096	4,096
Minimum size for one CV	1 user cylinder (plus control cylinders)	35 MB (plus control area)
Maximum size for one CV	See Table 1.3	OPEN-3 = 2347, OPEN-8 = 7007, OPEN-9 = 7042, OPEN-K = 1788, OPEN-E = 13893
Size increment	1 user cylinder	1 MB
Disk location for CVs	Anywhere	Anywhere

Table 1.2 Minimum and Maximum CV Capacities (Open Systems)

Setting size (MB)	Actual Size (MB)	Notes
35	35.15625	Minimum CVS capacity
500	500.625	
1000	1000.546875	
1788	1788.046875	Maximum OPEN-K volume size
2000	2000.390625	
2347	2347.03125	Maximum OPEN-3 volume size
7007	7007.34375	Maximum OPEN-8 volume size
7042	7042.5	Maximum OPEN-9 volume size
13893	13893.04688	Maximum OPEN-E volume size

1.2 CV Size Calculation

The CVS Remote Console function enables you to configure CVS by “carving up” a LUN into several devices. CVS allows you to assign a specific number of physical cylinders to each CV for maximum control over CV size. Each CV contains the user-specified number of user cylinders plus a predetermined number of control cylinders. For each CV, the total number of physical cylinders is determined as follows:

$$\# \text{ Physical Tracks} = (\# \text{ User Cylinders}) \times 15 + (\# \text{ Control Cylinders}) \times 15 + \text{Adjustment Tracks}$$

$$\square 1 \text{ Cylinder} = 15 \text{ Tracks}$$

Where:

Control Cylinders = 4, 5, 6, 7, 8, 9, 25, or 27, depending on LVI type (see Table 1.3)

Adjustment Tracks

$$\square \frac{((\# \text{ User Cylinders}) + (\# \text{ Control Cylinders})) \times 15}{48} \times 48$$

$$- ((\# \text{ User Cylinders}) + (\# \text{ Control Cylinders})) \times 15$$

$\square \square$ means round up to the next integer.

E.g. $\square 3.96 \square = 4.00$

For example, if you specify 1015 user cylinders for a 3390-3 CV, the total number of physical cylinders allocated for that device is $1015 \times 15 + 6 \times 15 + 45 = 15360$ tracks (1024 Cylinders). Because of the control cylinders, the total number of cylinders in a CV is always slightly higher than the user-specified number of cylinders. Table 1.3 lists the required number of control cylinders for each LVI type.

In open systems, the size of the CV is expressed in MB. The total size of the CV consists of the user-specified size plus an amount for the control area (which is assigned by the CVS software), as follows:

$X = \text{User specified MB} \times 1024 \div 720$ (Any remainder is rounded up to the next whole number).

$$Y = (X \times 96 \times 15 \times 512) \div 1024 \div 1024$$

X is a value of converting capacity specified by user into number of cylinders.

Y is a value of converting value X into capacity (MB).

For example, if an open-systems user specifies a CV size of 100 MB, the software will calculate the actual size of the CV as follows: $100 \times 1024 \div 720 = 142.2222$ (rounded up to 143). $(143 \times 96 \times 15 \times 512) \div 1024 \div 1024 = 100.546875$ (MB).

Table 1.3 Control Cylinders/Control Area for Each LVI/LU Type

LVI Type	Control Cylinders	Maximum User Cylinders	LU Type	Maximum User Size	Control Area (MB)
3390-1	5	1113	OPEN-3	2347	5
3390-2	9	2226	OPEN-9	7042	19
3390-3 (A/B/C)	9	3339	OPEN-K	1788	6
3390-3R	9	3339	OPEN-8	7007	19
3390-9	25	10017	OPEN-E	13893	13
3380-E	5	1770			
3380-J	4	885			
3380-K (A/B/C)	7	2655			

1.3 Storage Subsystem ID (SSID) Requirements

The 9900 subsystem is configured with one SSID for each 64 devices and up to four SSIDs per CU image. Each SSID must be unique within each host system.

Table 1.4 SSID Requirements

Controller Emulation	SSID Requirements	LVI Support
3990-3	0004 - 00fd	3380, 3390, OPEN-3, and OPEN-9 volumes
3990-6 and 3990-6E	0004 – fffd	3390, OPEN-3, and OPEN-9 volumes

Chapter 2 Preparing for CVS Operations

2.1 Enabling Virtual LVI/LUN on the Remote Console PC

The 9900 Remote Console options can only be enabled by Remote Console PC users with administrator access privileges. To enable Virtual LVI/LUN, you will need the Remote CVS and/or the Remote Open CVS license keys (passwords).

Important: If you install Virtual LVI/LUN using a temporary license key, the expiration of that key will have the following effects:

- No new configuration settings may be performed.
- The configuration settings that were made before the temporary license key expired remain in effect and cannot be deleted.

An emergency license key is used in situations where the temporary key is set to expire in the near future and the user cannot get the permanent key in time because of special circumstances (e.g. a licensed server has crashed or there are problems with the communication infrastructure). An emergency key may also be used when a user who does not intend to purchase the program product needs to undo a configuration change that was made during the lifetime of the temporary license key. An emergency key is effective for 10 days.

This section describes the following tasks:

Enabling Virtual LVI/LUN (see section 2.1.1).

Disabling Virtual LVI/LUN (see section 2.1.2).

Once an option is enabled, modify access to that option is then available to administrators and to users with custom access privileges for that option. Users without either administrator access or custom access privileges for a particular option have view (read-only) access to that option.

The RMCMAIN Option Product panel (see Figure 2.1) and the DKCMAIN Option Product panel (see Figure 2.2) display the RMCMAIN and DKCMAIN options and their current installation status (**Install** or **Not install**).

To access the RMCMAIN Option Product panel, select the **Option...** button on the Remote Console Main panel.

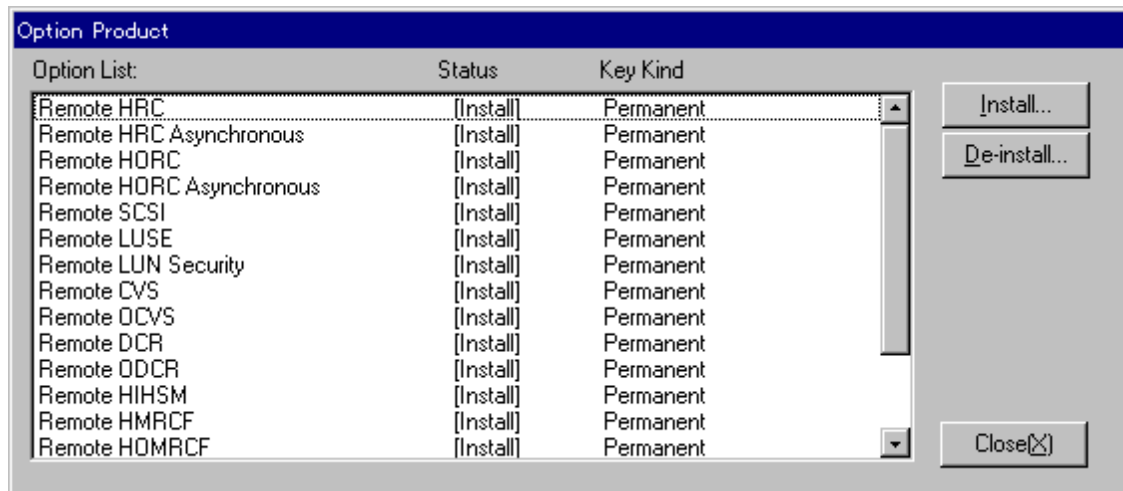


Figure 2.1 RMCMAIN Option Product Panel

The RMCMAIN Option Product panel has the following features:

- The **Option List** displays the available RMCMAIN options.
- The **Status** list shows the current status of each option (**Install** or **Not Install**).
- The **Key Kind** list shows the license type (**Temporary**, **Permanent**, or **Emergency**) (see section 2.2).
- The **Install...** button opens the Input Key Code panel (see Figure 2.3), which will prompt you for a password to complete the installation process.
- The **De-install...** button allows you to deinstall the selected option.
- The **Close** button closes the Option Product panel.

To access the DKCMAIN Option Product panel, select the **Controller...** button on the Remote Console Main panel, select the first subsystem on which you want to enable the option on the Connection Control panel (see Figure 2.5), and then select the **Install...** button.

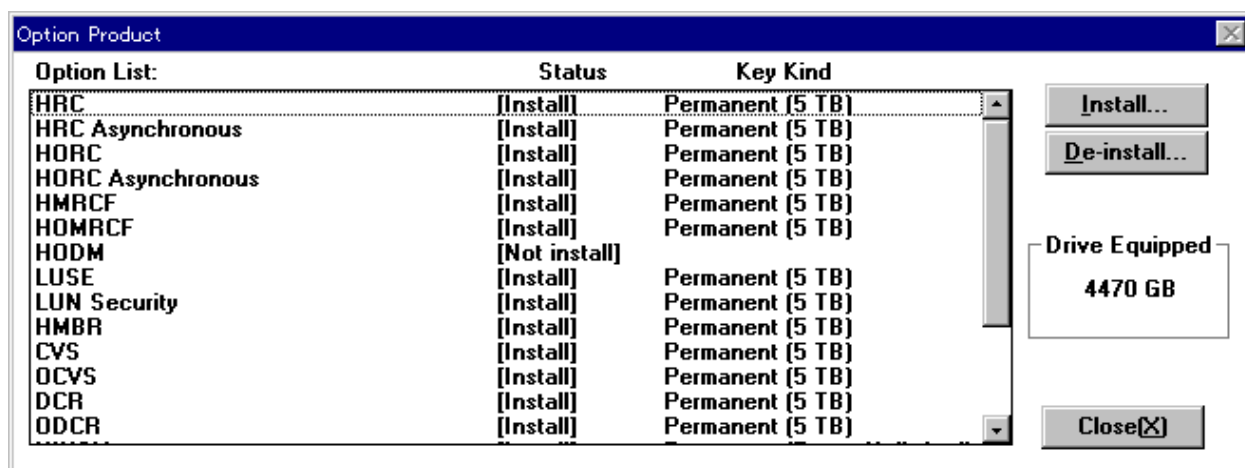


Figure 2.2 DKCMAIN Option Product Panel

The DKCMAIN Option Product panel has the following features:

- The **Option List** displays the available DKCMAIN options.
- The **Status** list shows the current status of each option (**Install** or **Not Install**).
- The **Key Kind** list displays the license type (**Temporary**, **Permanent**, or **Emergency**) and the maximum capacity of the PDEVs (physical devices) that the user is licensed to use. (Note: If **[Free]** is displayed in the **Key Kind** list, this indicates that the capacity can be up to the amount shown in **Drive Equipped** box.)
- The **Install...** button allows you to install the selected option.
- The **De-install...** button deinstalls the selected option.
- The **Drive Equipped** box shows the maximum capacity of the current subsystem.
- The **Close** button closes the Option Product panel.

2.1.1 Enabling Virtual LVI/LUN

1. Log in as administrator.
2. On the Remote Console Main panel, select **Option...** to open the RMCMAIN Option Product panel (refer to Figure 2.1). This panel shows the current installation status of the RMCMAIN options.
3. To enable Virtual LVI/LUN, select either **CVS** or **OCVS**, and then select the **Install...** button.
4. The Input Key Code panel (see Figure 2.3) opens. Enter the license key (password) in the **Key Code** text box, and then select **OK**.
5. If the password is approved, the Program Product Confirmation panel (see Figure 2.4) opens. This panel shows the program product model name (e.g., **Remote CVS**), type of key (e.g., **Permanent**), effective term (e.g., **Free**). After confirming the content of the Program Product Confirmation panel, select **Install**.
6. When this process is complete, the RMCMAIN Option Product panel reopens and the displayed status of the selected option changes from **Not install** to **Install**.
7. Select **Close** to return to the Remote Console Main panel.
8. On the Remote Console Main panel, select **Controller...** to open the Connection Control panel (see Figure 2.5).
9. On the Connection Control panel, select the first subsystem on which you want to enable these options, and then select the **Install...** button to open the DKCMAIN Option Product panel (refer to Figure 2.2).
10. Select the either CVS or OCVS, and then select the **Install...** button.
11. The Input Key Code panel (see Figure 2.3) opens. Enter the license key (password) in the **Key Code** text box, and then select **OK**.
12. If the password is approved, the Program Product Confirmation panel (see Figure 2.4) reopens. This panel shows the program product model name (e.g., **CVS**), key kind (e.g., **Permanent**), and effective term (e.g., **Free**).
13. To enable CVS on another 9900 subsystem, repeat steps 8 through 12.
14. When you are finished enabling options on the 9900 subsystems, select **Close** to return to the Remote Console Main panel.

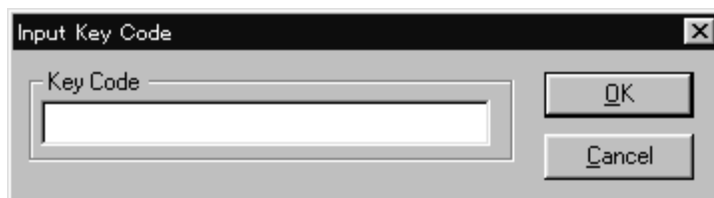


Figure 2.3 Input Key Code Panel

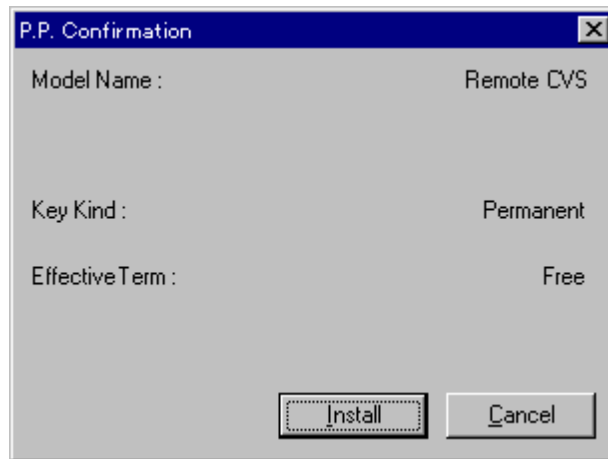


Figure 2.4 Program Product Confirmation Panel

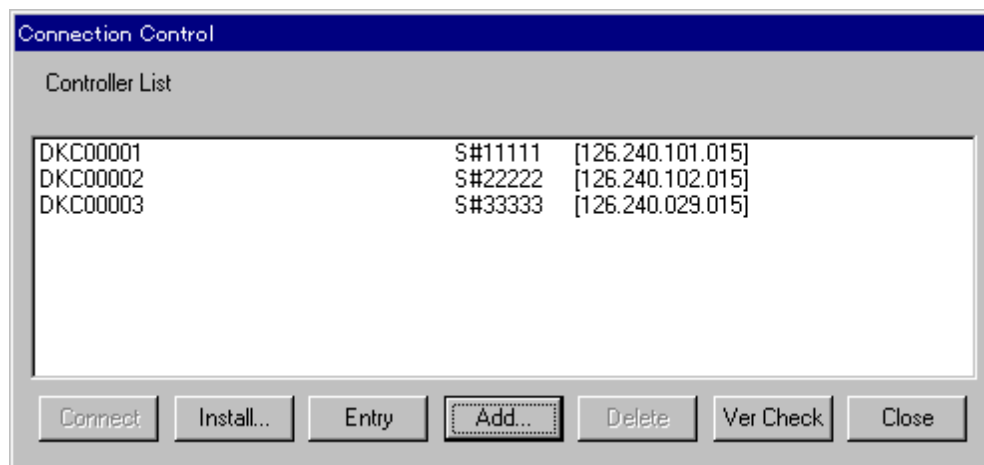


Figure 2.5 Connection Control Panel

2.1.2 Disabling Virtual LVI/LUN

To disable Virtual LVI/LUN on the Remote Console PC:

1. Log in as an administrator.
2. On the Remote Console Main panel, select **Option...** to open the RMCMAIN Option Product panel (refer to Figure 2.1).
3. Select **Remote CVS**, then select **Deinstall....**
4. The displayed status of the selected option changes from **Install** to **Not install**, and the option is no longer enabled on the Remote Console PC.

To disable Virtual LVI/LUN on a subsystem:

1. On the Remote Console Main panel, select **Controller...** to open the Connection Control panel.
2. On the Connection Control panel, select the subsystem on which you want to disable Prioritized Port Control, and then select the **Install...** button to open the DKCMAIN Option Product panel.
3. Select **CVS**, and then select **De-install....** The displayed status changes from **Install** to **Not install**.
4. To disable Virtual LVI/LUN on another 9900 subsystem, repeat steps 1 through 3. If you are finished, select **Close** to return to the Remote Console Main panel.

2.2 Connecting to a Subsystem

The Connection Control panel (refer to Figure 2.5) displays the registered 9900 subsystems and allows you to connect to a 9900 subsystem. To access the connect function, open the Connection Control panel by selecting the **Connect...** button on the Remote Console Main panel. The connect function is available to all users.

Note: A 9900 controller can only connect to one Remote Console PC at a time.

To connect to a 9900 controller:

1. On the Remote Console Main panel, select **Connect...** to open the Connection Control panel (refer to Figure 2.5).
2. Select the desired controller in the **Controller List** box. Select the **Connect** button.
3. When the Remote Console PC connects to the selected controller, the Option Select panel opens to provide access to the installed 9900 Remote Console options.
4. To disconnect from the connected controller, exit the Option Select panel by selecting the **Close** button.

2.3 Launching Virtual LVI/LUN

The Option Select panel (see Figure 2.6) opens automatically when the 9900 Remote Console connects to a selected controller, and provides access to the installed 9900 Remote Console features.



Note: In later versions of the Remote Console software this screen may display differently.

Figure 2.6 Option Select Panel

To launch Virtual LVI/LUN, select **CVS**. You may also use the **Execute** menu, which displays the installed options and allows you to select and start CVS. (The option buttons and the **Execute** menu commands perform exactly the same functions.)

To exit the Option Select panel, select the **File** menu, then select **Close**. The Remote Console PC automatically disconnects from the connected controller, and you are returned to the Remote Console Main panel.

Chapter 3 CVS Panel Descriptions

3.1 Function Select Panel

The Function Select panel (see Figure 3.1) opens after you select the CVS option on the Remote Console Option Select panel (refer to Figure 2.6). The Function Select panel allows you to select and start the desired CVS function. You are returned to the Function Select panel if you select the **Cancel** button during CVS operations.

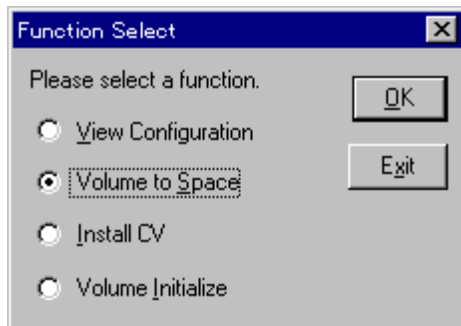


Figure 3.1 Function Select Panel

The Function Select panel allows you to select the desired CVS function:

- **View Configuration** allows you to view the current CVS configuration of the connected subsystem, but not make changes (see section 4.2).
- **Volume to Space** allows you to de-install one or more existing logical volumes in a parity group, thereby converting them to free space. The area previously occupied by the LDEV becomes available space for future operations (see section 4.3). **WARNING:** This function is destructive.
- **Install CV** allows you to define one or more new CVS volumes in an existing parity group if there is available free space in that parity group (see section 4.4). This function is not destructive because the new volume is created from free space on the array group.
- **Volume Initialize** allows you to convert a CVS volume back to a normal volume (see section 4.6 for instructions). **WARNING:** This function is destructive.
- The **OK** button begins the selected CVS function.
- The **Exit** button takes you back to the Option Select panel (refer to Figure 2.6).

3.2 CVS Warning Message

This panel appears when you select either the **Volume to Space** function or the **Volume Initialize** button on the Function Select panel (refer to Figure 3.1).

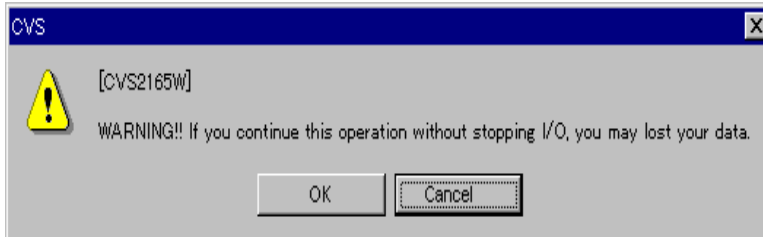


Figure 3.2 CVS Warning Message

This panel warns the user that the selected function will erase and reformat one or more LDEVs, and reminds the user to stop the I/O and back up all user data on the affected volume(s) before proceeding

3.3 Number of CU Configuration Panel

The Number of CU Configuration panel opens when you select either the **Volume to Space** function or the **Install CV** button on the Function Select panel (refer to Figure 3.1).

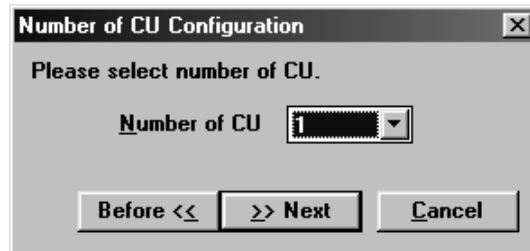


Figure 3.3 Number of CU Configuration Panel

The Number of CU Configuration panel has the following features:

- The **Number of CU** drop-down box allows you to select the number of CUs that are configured for this subsystem. The CU images are labeled as 0-F. On this panel please enter the number of CUs as 1-16.
- The **Before** button returns you to the Function Select panel.
- The **Next** button opens the Device Emulation Configuration panel (see Figure 3.4).
- The **Cancel** button returns you to the Function Select panel.

3.4 Device Emulation Configuration Panel

The Device Emulation Configuration panel displays the parity group and overall device configuration information, and provides access to the Customized Volume Size Define panel (see Figure 3.5 and Figure 3.6) and the Logical Device ID Configuration panel (see Figure 3.7). The Device Emulation Configuration panel opens at the beginning of CVS operations to allow you to select the desired parity group. You are returned to the Device Emulation Configuration panel after you select **OK** on the Customized Volume Size Define panel.

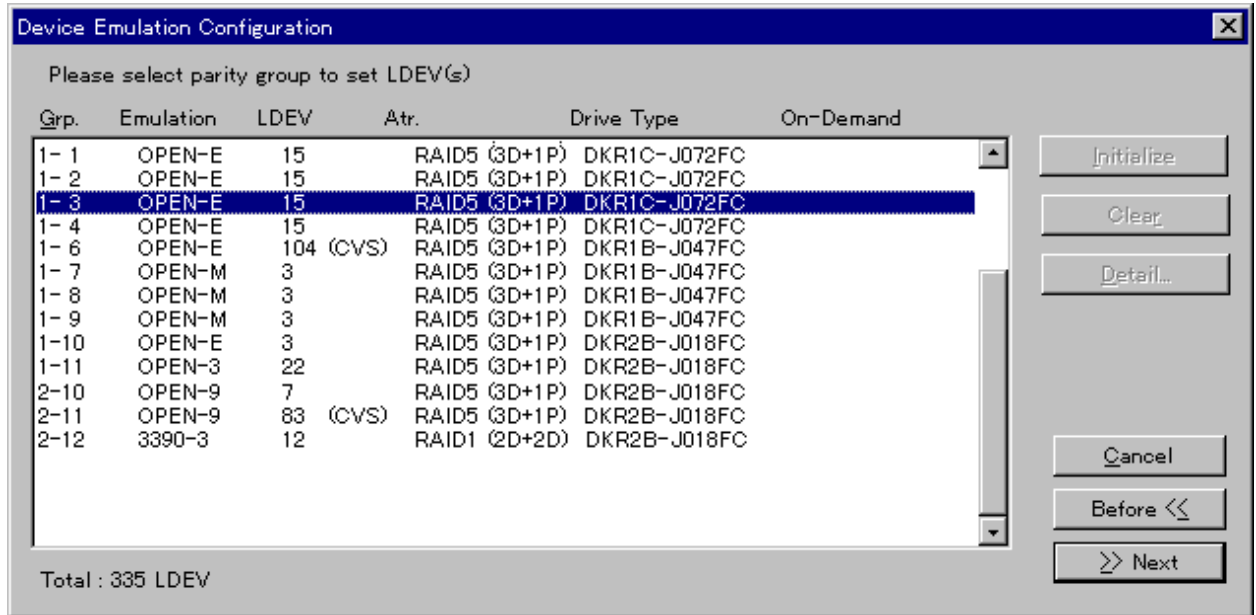


Figure 3.4 Device Emulation Configuration Panel

The Device Emulation Configuration panel has the following features:

- The **Grp** column displays the CU number and parity group number of the corresponding LDEV in the FB4 (a set of optional HDU boxes for each DKU).
- The **Emulation** column shows the emulation type.
- The **LDEV** column displays the LDEV number.
- The **Atr** (attribute) column shows the RAID level of parity group. A mixture of emulation types is displayed as 3380-* or 3390-*. A parity group that already has CVS volumes will display as **CVS**.
- The **Drive Type** column shows the drive type.
- The **Total** value displays the number of LDEVs in the CU.
- The **Initialize** button allows you to convert CVS volume(s) to normal. If an LDEV was previously converted to free space, this will allow you to re-define the volume.
- The **Clear** button is not available on the Remote Console PC, but is accessible from the SVP.
- The **Detail...** button opens the Customized Volume Size Define panel (see Figure 3.5) for the selected parity group.
- The **Cancel** and **Before** buttons both return you to the Function Select panel (refer to Figure 3.1).
- The **Next** button saves your requested changes and opens the Logical Device ID Configuration panel (see Figure 3.7) for the selected parity group, where you can assign LDEV addresses to the new LDEVs.

3.5 Customized Volume Size Define panel

The Customized Volume Size Define panel (see Figure 3.5) displays the CVS configuration of the selected volume and allows you to add and delete customized volumes under the selected volume. To open the Customized Volume Size Define panel, select the desired volume on the Device Emulation Configuration panel (refer to Figure 3.4), and then click the **Detail ...** button.

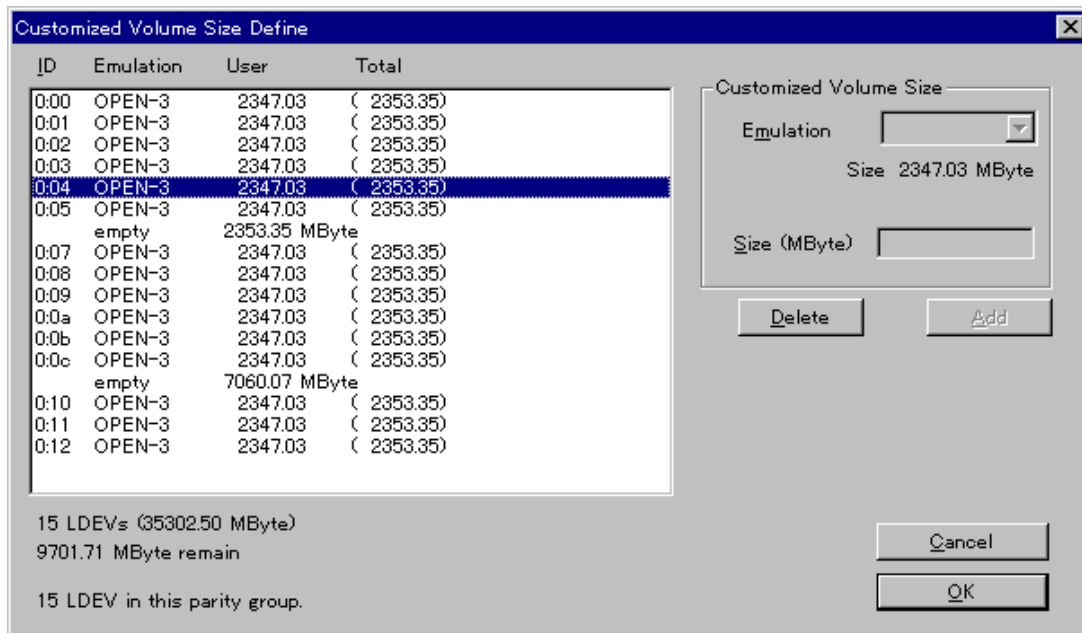


Figure 3.5 Customized Volume Size Define Panel (open systems)

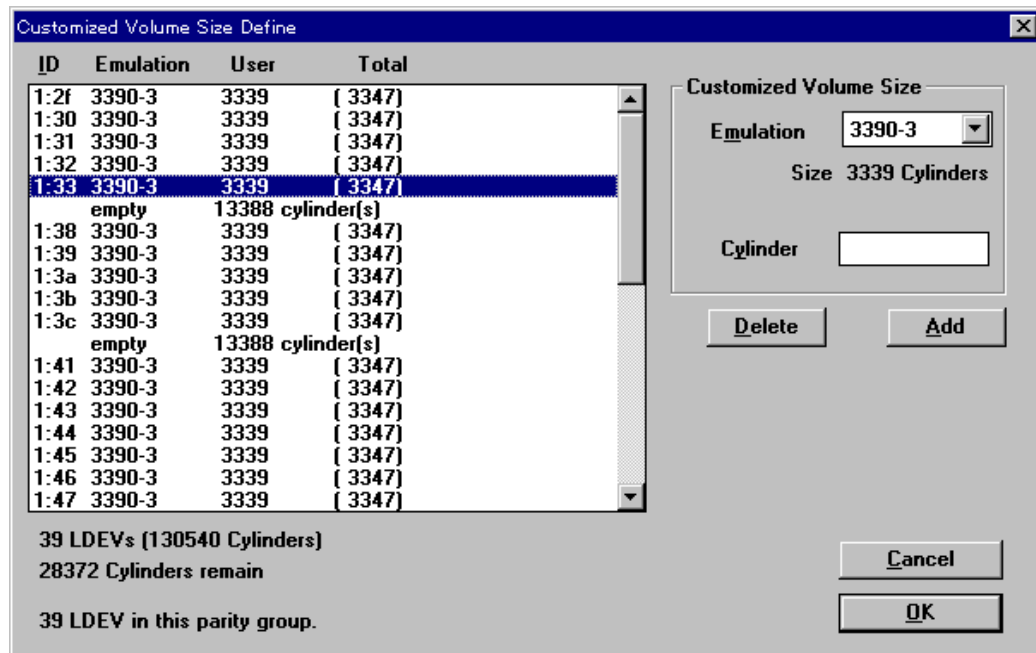


Figure 3.6 Customized Volume Size Define Panel (S-390)

The Customized Volume Size Define panel (open systems) has the following features:

- The **ID** column displays the CU number and LDEV ID number of each LDEV (including CVS volumes) on this array group.
- The **Emulation** column displays the emulation type of the corresponding LDEV. A notation of **Empty** indicates that there is free space available for the creation of CVs.
- The **User** column displays the number of user cylinders or MB.
- The **Total** column displays the total number of cylinders or MB (user + control).
- The number of LDEVs, their size, and the amount of remaining space and the total number of LDEVs in this parity group are displayed under the list box.
- The **Emulation** drop down box allows you to select the emulation type for the new CV.

(continued on next page)

- The **Size** value displayed directly underneath the **Emulation** list box displays the size of a normal-size volume of the selected type for reference purposes (e.g., 2226 cylinders in a normal-size 3390-2 volume). Refer to Table 1.3 for a description of how the actual size of a CV is calculated by combining the user-specified size with an additional amount for control cylinders (S/390®) or control area (open systems).
- The **Size (Mbyte)** entry field allows you to enter the desired number of user cylinders or MB for the new CV. Refer to Table 1.1 for the minimum and maximum size requirements of each of the emulation types.
- The **Add** button adds the specified new CV to the list box and updates the LDEV and cylinder information accordingly.
- The **Delete** button removes the selected CV from the list box and updates the LDEV and cylinder information.
- The **OK** button saves your requested changes and returns you to the Device Emulation Configuration panel (refer to Figure 3.4), which is updated to show those changes.
- The **Cancel** button cancels your requested changes and returns you to the Device Emulation Configuration panel

The Customized Volume Size Define panel for S/390® is similar to that for open systems, except that the **Cylinder** field, which is in place of the **Size (Mbyte)** field, allows the user to enter the size of the CV in number of cylinders. Refer to Table 1.1 for the minimum and maximum size requirements of each of the emulation types.

3.6 Logical Device ID Configuration Panel

The Logical Device ID Configuration panel (see Figure 3.7) displays the LDEV ID configuration status of each parity group and provides access to the Logical Device ID Detail panel (see Figure 3.8) and the Logical Device ID Define panel (see Figure 3.9). The Logical Device ID Configuration panel opens after you click **Next** on the Device Emulation Configuration panel. You are returned to the Logical Device ID Configuration panel after you select **OK** on either the Logical Device ID Detail or the Logical ID Define panel.

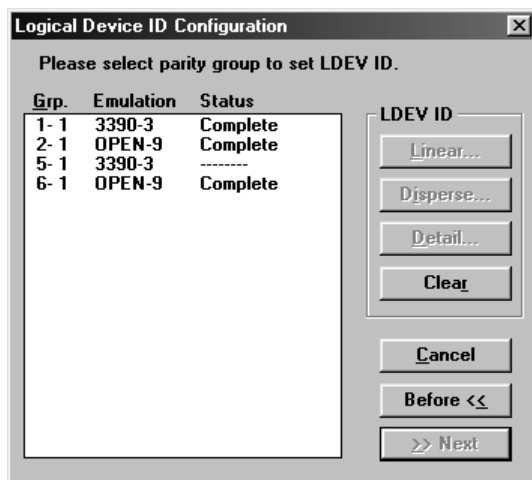


Figure 3.7 Logical Device ID Configuration Panel

The Logical Device ID Configuration panel has the following features:

- The **Grp** column displays the CU and group number of the corresponding LDEV
- The **Emulation** column displays the emulation type.
- The **Status** column displays the status of the corresponding LDEV.
 - Complete** indicates that LDEV IDs are assigned to all installed logical addresses.
 - "-----" indicates that the LDEV ID assignment for the parity group is not complete.
 - ERROR** indicates that an error has occurred, so refer to the R-SIM log for error information.
- The **Linear...** button is displayed only when the status of the selected parity group is not complete, and opens the Logical Device ID Define panel (see Figure 3.9) to allow you to assign LDEV IDs in sequential order for all unassigned logical addresses within the selected parity group.
- The **Disperse...** button is displayed only when the status of the selected parity group is not complete, and also opens the Logical Device ID Define panel, but allows you to rotate the LDEV IDs randomly among multiple groups across the subsystem.
 - **Note:** The **Linear** option is appropriate for users who actively balance their subsystem workloads. The **Disperse** option is more appropriate for users who do not actively balance their subsystem workloads, because it helps to eliminate hot spots and improve data access. If you want to manually assign the CU and LDEV ID, select the **Detail** button (below).
- The **Detail...** button opens the Logical Device ID Detail panel (see Figure 3.8). Unlike the Logical Device ID Define panel, this allows you to select the CU and LDEV ID for the affected volume(s), rather than having them automatically assigned.
- The **Clear** button cancels any requested LDEV ID changes and returns the panel to its original display (current configuration).
- The **Cancel** button cancels all requested changes and returns you to the Function Select panel (refer to Figure 3.1).
- The **Before** button cancels your requested LDEV ID changes and returns you to the Device Emulation Configuration panel.
- The **Next** button saves your requested changes, and opens the Subsystem ID Configuration panel (see Figure 3.11).

3.7 Logical Device ID Detail Panel

The Logical Device ID Detail panel (see Figure 3.8) displays the LDEV configuration for the selected parity group and provides access to the Logical Device ID Define panel (see Figure 3.9). To open the Logical Device ID Detail panel, select the desired parity group on the Logical Device ID Configuration panel, and then click the **Detail...** button.

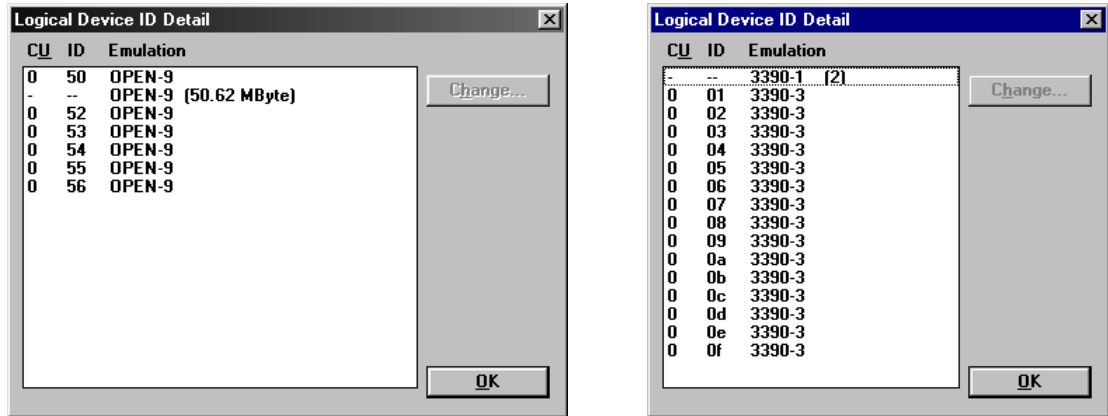


Figure 3.8 Logical Device ID Detail Panel (left: Open Systems, right: S/390®)

The Logical Device ID Detail panel has the following features:

- The **CU** column displays the CU number of the corresponding LDEV.
- The **ID** column displays the ID number of the corresponding LDEV
- The **Emulation** column displays the emulation type of the corresponding LDEV. If a customized volume has more than one CV installed, information about the custom volumes is also shown (displayed in MB for open systems and cylinders for S/390®).
- The **Change...** button opens the Logical Device ID Define panel (see Figure 3.9).
- The **OK** button confirms the configuration shown and returns you to the Logical Device ID Configuration panel.

3.8 Logical Device ID Define Panel

The Logical Device ID Define panel (see Figure 3.9) displays and allows you to manually reconfigure the LDEV ID assignment for the selected parity group. The Logical Device ID Define panel can be accessed as follows:

- by selecting the desired parity group from the Logical Device ID Configuration panel (refer to Figure 3.7) and clicking either the **Linear...** button or the **Disperse...** button.
- by selecting the desired LDEV group from the Logical Device ID Detail panel (refer to Figure 3.8) and clicking the **Change...** button.

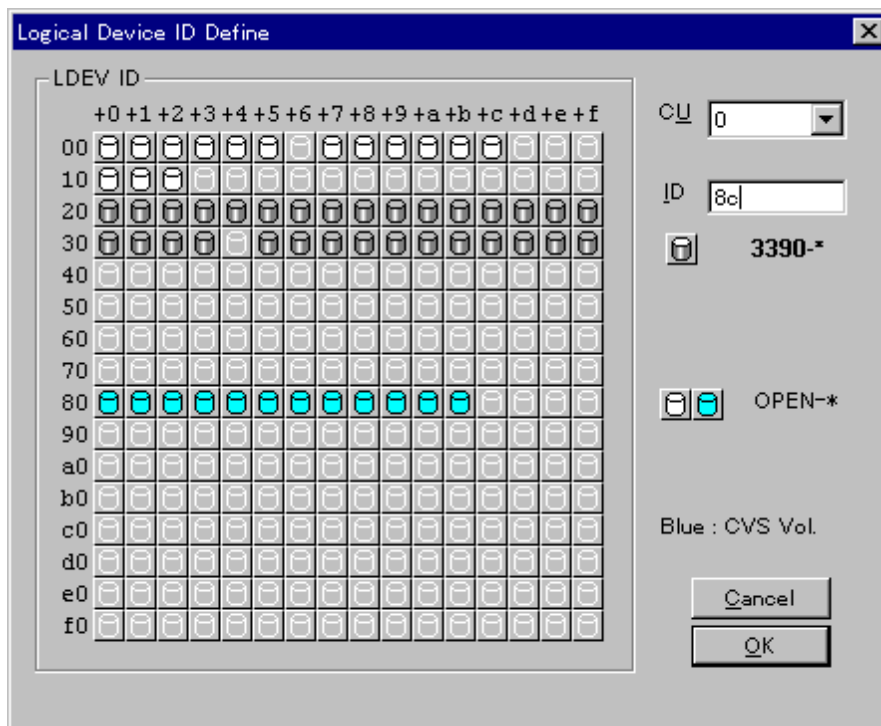


Figure 3.9 Logical Device ID Define Panel

The Logical Device ID Define panel has the following features;

- The **LDEV ID** grid displays the LDEV ID configuration for the selected parity group or LDEV group. Open-systems volumes are displayed in white, and S/390® volumes are displayed in gray. Customized volumes (if any) are displayed in blue to distinguish them from normal-size volumes.
- The **CU** selection box allows you to select the CU on which you want put your new volume.
- The **ID** entry field allows you to enter the starting LDEV ID for the requested linear or disperse LDEV assignment operation.
- The **Cancel** button cancels all requested changes and returns you to the Function Select panel (refer to Figure 3.1).
- The **OK** button saves your requested LDEV ID changes and returns you to the Logical Device ID Configuration panel (refer to Figure 3.7), which is updated to show your requested changes.

3.9 Set SSID Boundary Panel

The Set SSID Boundary panel opens when you select **Next** on the Logical Device ID Configuration panel.

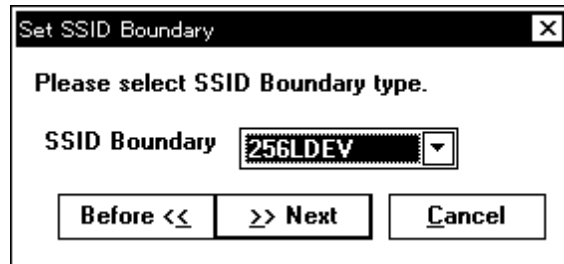


Figure 3.10 Set SSID Boundary Panel

The Set SSID Boundary panel has the following features:

- The **SSID Boundary** drop down box displays the SSID boundary type (64, 128, or 256). You cannot change the setting from this panel.
- The **Before** button returns you to the Logical Device ID Configuration panel.
- The **Next** button takes you to the Subsystem ID Configuration panel.
- The **Cancel** button cancels all requested changes and returns you to the Function Select panel.

3.10 Subsystem ID Configuration Panel

The Subsystem ID Configuration panel (see Figure 3.11) displays the SSID configuration for the connected subsystem and provides access to the Subsystem ID Define panel (see Figure 3.12). The Subsystem ID Configuration panel opens after you click **Next** on the Logical Device ID Configuration panel (refer to Figure 3.7). You are returned to the Subsystem ID Configuration panel after you select **OK** on the Subsystem ID Define panel.

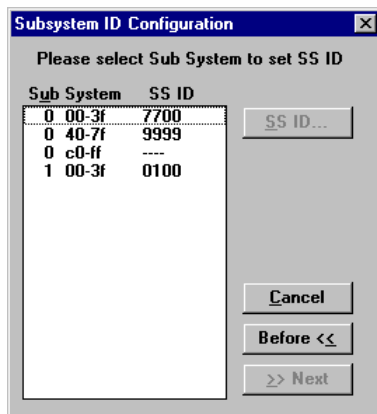


Figure 3.11 Subsystem ID Configuration Panel

- The **Subsystem** list box displays the storage subsystems by CU number, LDEV ID range and **SSID** (if defined).
- The **SS ID...** button opens the Subsystem ID Define panel (see Figure 3.12) to allow you to set the SSID for an incomplete storage subsystem. The **SS ID...** button is enabled only if an undefined SSID (displayed as ----) is selected.
- The **Cancel** button cancels all requested changes and returns you to the Function Select panel (refer to Figure 3.1).
- The **Before** button cancels your requested SSID changes and returns you to the Logical Device ID Configuration panel (refer to Figure 3.7).
- The **Next** button completes the CVS operation with all requested changes (CVS, LDEV ID, and/or SSID changes) and returns you to the Function Select panel.

3.11 Subsystem ID Define Panel

The Subsystem ID Define panel (see Figure 3.12) allows you to define the SSID for the storage subsystem selected on the Subsystem ID Configuration panel. To open the Subsystem ID Define panel, select the undefined storage subsystem on the Subsystem ID Configuration panel, and then click the **SS ID...** button.

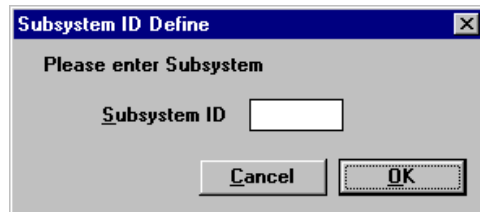


Figure 3.12 Subsystem ID Define Panel

- The **Subsystem ID** entry field allows you to enter the SSID for the selected storage subsystem LDEV ID range.
- The **Cancel** button returns you to the Subsystem ID Configuration panel without saving the specified SSID.
- The **OK** button saves the specified SSID and returns you to the Subsystem ID Configuration panel, which is updated to show your requested change.

Chapter 4 CVS Operations

4.1 Overview of CVS Operations

CVS operations can be performed by users with administrator or custom CVS access privileges. Other users have view-only access to CVS functions. CVS operations include:

- Viewing the current CVS configuration information (see section 4.2),
- Converting an LDEV into space (see section 4.3),
- Installing a CV (see section 4.4),
- Deinstalling a CV (see section 4.5), and
- Converting a CVS volume to a normal volume using the volume initialize function (see section 4.5).

Chapter 3 describes the CVS user interface panels in detail, and each section within this chapter has a pictorial flowchart of the sequence of screens for each type of operation (see Figure 4.1 through Figure 4.3). As you perform CVS operations, you can refer either to the detailed panel description or to the flowchart at the end of each section, as needed.

Note: You can de-install selected CVs on a parity group and then reinstall them without de-installing the entire parity group.

To start CVS operations for a specific 9900 subsystem:

1. Log in to the 9900 RMCMAIN software, and make sure that the **Remote CVS** or **Remote Open CVS** option is installed. If not, install the CVS option as described in section 2.1. Connect to the desired 9900 subsystem as described in section 2.2. The Option Select panel (refer to Figure 2.6) opens.
2. On the Option Select panel, select **CVS** to start CVS operations.
3. When the CVS warning message appears (refer to Figure 3.2), click **OK** to continue. This message reminds you that CVS operations (except **Install CV**) are destructive.
4. The Function Select panel (refer to Figure 3.1) now opens. Select the desired CVS function:
 - Select **View Configuration** to view the current CVS configuration of the connected subsystem (see section 4.2). You will not be able to request any changes.
 - Select **Volume to Space** to convert one or more LDEVs into free space (see section 4.3). **WARNING:** This function is destructive. Move and/or backup the data on the volume(s) to be converted.
 - Select **Install CV** to define a new CV under a CVS volume (see section 4.4). This operation can only be performed on an existing CVS volume.
 - Select **Volume Initialize** to convert a CVS volume back to a normal volume (see section 4.5). **WARNING:** This function is destructive. Move and/or backup the data on all customized volumes under the CVS volume(s) to be converted.

4.2 Viewing the CVS Configuration Information

The **View Configuration** function allows you to view the current CVS configuration information for the connected subsystem. When you select **View Configuration**, all CVS functions will be disabled, and you will not be able to request any configuration changes. This function allows access to the following information:

- Parity group configuration of each CU, including the number of LUs, emulation type, and RAID level of each parity group. This information is displayed on the Device Emulation Configuration panel (refer to Figure 3.4). The installed parity groups are displayed by location: [frame number] - [parity group number].
- LU ID configuration for each parity group, including LU IDs assigned to normal volumes and CVS. This information is displayed on the Logical Device ID Configuration and Logical Device ID Define panels (refer to Figure 3.7 and Figure 3.9).
- Storage subsystem ID (SSID) configuration within each CU. This information is displayed on the Subsystem ID Configuration panel (refer to Figure 3.11).

4.3 Converting Logical Volumes to Space

WARNING: The volume to space function is a destructive operation. The data on the logical volume(s) being converted will be lost when the operation is complete. The user is responsible for backing up the data as needed before performing this operation.

The **Volume to Space** function allows you to convert one or more logical volumes (LDEVs) to space, which deletes the selected LDEVs from that parity group. **Note:** The deleted logical volume(s) will remain as space in that parity group. You cannot convert the last normal LDEV into space because this defines the emulation of the parity group. In addition, any CV (except the last remaining CV) can be deleted (made into space). To delete the last CV, you must use the Volume Initialize function (see section 4.6)

Figure 4.1 shows the sequence of screens used to convert a normal volume to space. Some of the panels occur more than once during the process to present new information and/or allow you to perform different functions.

To convert a normal volume into space:

1. Choose **Volume to Space** on the Function Select panel, (refer to Figure 3.1) and click **OK**. The Remote Console now loads the configuration information. This process may take several minutes.
2. When the CVS confirmation message displays (refer to Figure 3.2), make sure that I/Os of the target volume(s) have been stopped. **WARNING:** If you continue the operation without stopping I/Os, your data may be lost. Select **OK** to continue the operation, or select **Cancel** to stop the operation and return to the Function Select panel.
3. When the Number of CU Configuration panel opens (refer to Figure 3.3), select the number of CUs that are configured for this subsystem, and click **Next**. The Device Emulation Configuration panel now opens (refer to Figure 3.4).
4. On the Device Emulation Configuration panel, select the parity group containing the logical volume(s) you want to convert to space (delete), and click **Detail**. The Customized Volume Size Define panel (refer to Figure 3.5 and Figure 3.6) now opens.
5. On the Customized Volume Size Define panel, select the volume(s) to be converted to space, and click **Delete**. **Note:** The **Delete** button is not available in the following cases:
 - Either all of the LDEVs or the last remaining LDEV in the parity group are selected.
 - The selected volume has one or more assigned SCSI paths (denoted by a plus sign (+) next to it)
 - The selected volume is an LDEV Security volume or a LUSE volume.
6. The Customized Volume Size Define panel now displays the new CVS volume information. Click **OK** to continue.
7. The Device Emulation Configuration panel now displays the new parity group configuration information. Click **Next** to complete the Volume to Space operation.
8. When the CVS confirmation panel appears, click **OK** to implement the requested Volume to Space operation. **WARNING:** This operation is destructive. If you are not certain that you want to implement the changes, select **Cancel** to cancel the operation.

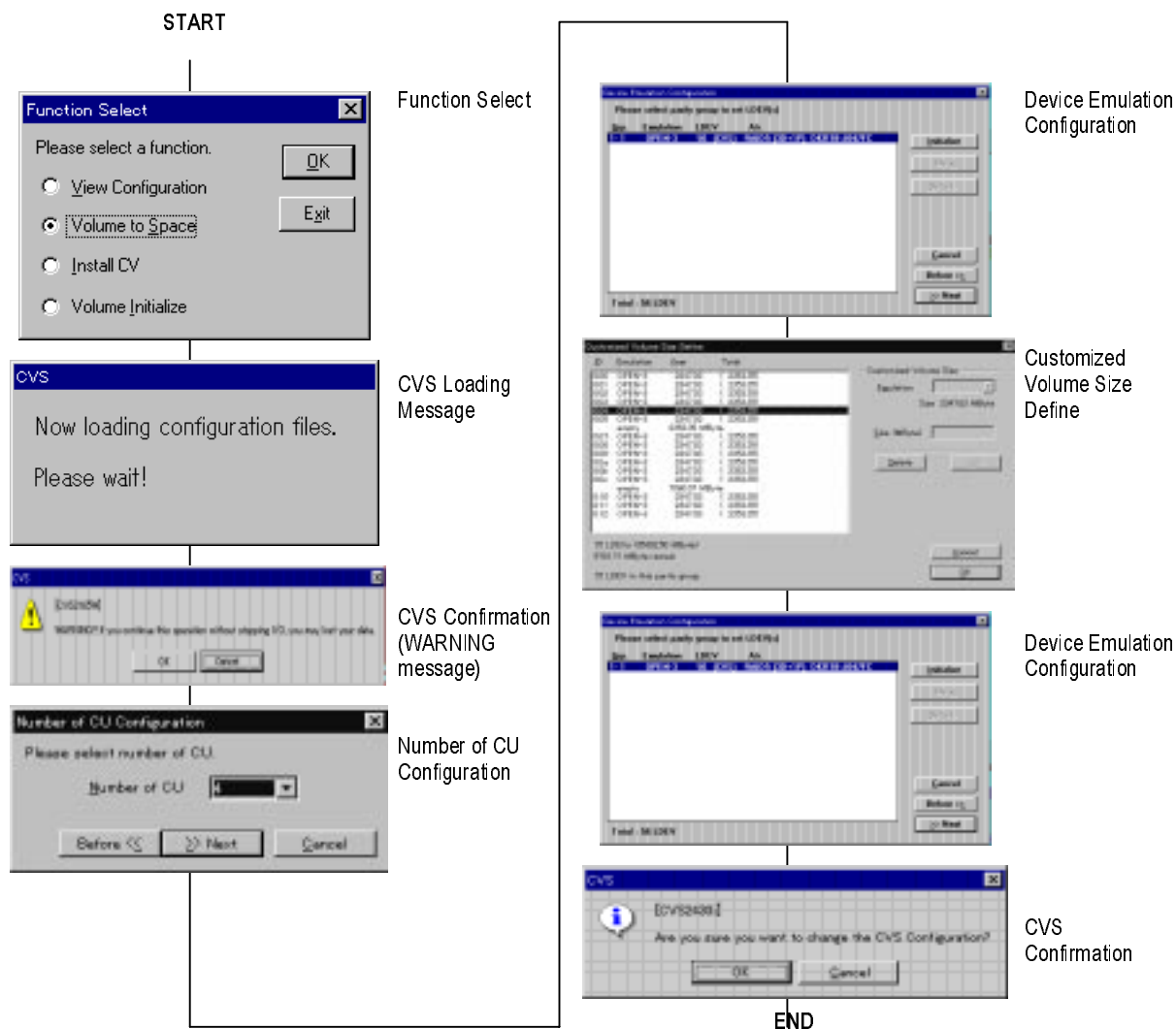


Figure 4.1 Converting Volume(s) to Space

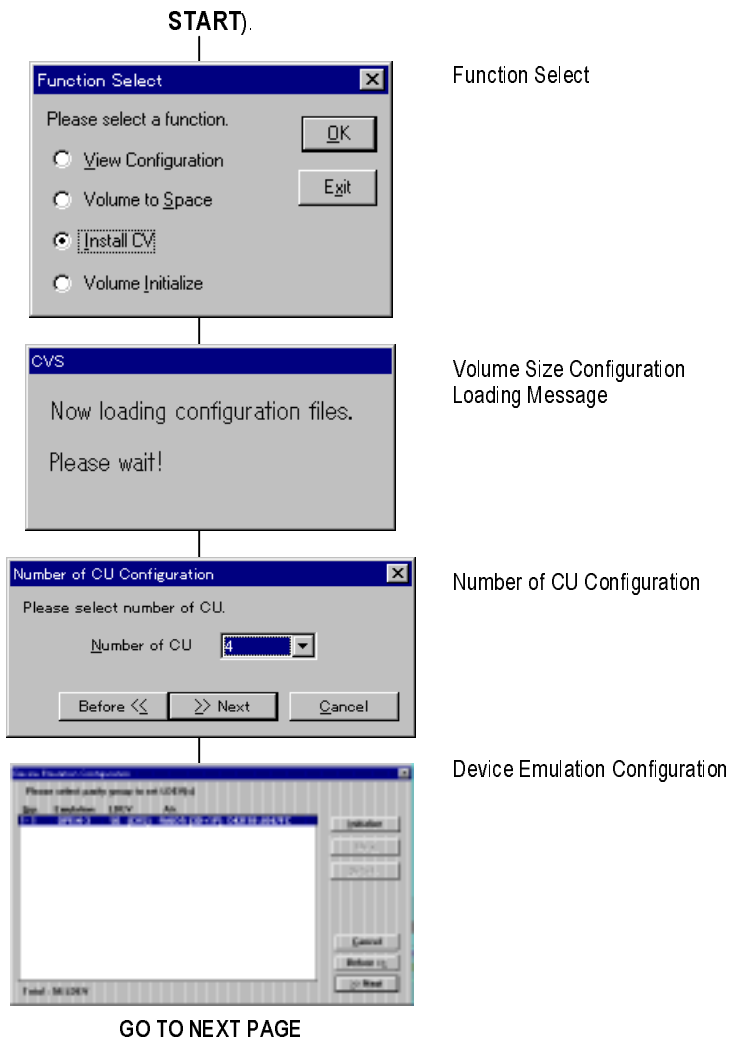
4.4 Defining and Installing Custom-Sized Volumes

The **Install CV** function allows you to define and install one or more CVs under an existing volume. You must convert a normal volume to space before installing any custom-sized volumes. Figure 4.2 shows the sequence of screens used to install a CV. Some of the panels occur more than once during the process to present new information and/or allow you to perform different functions.

To install a CV:

1. Choose **Install CV** on the Function Select panel, and click **OK**. The Remote Console now loads the configuration information. This process may take several minutes.
2. When the Number of CU Configuration panel opens, select the number of CUs that are configured for this subsystem, and click **Next**. The Device Emulation Configuration panel now opens.
3. On the Device Emulation Configuration panel, select the parity group that contains the space required to create the CV(s), and click **Detail**. The Customized Volume Size Define Panel now opens.
4. On the Customized Volume Size Define panel, select the desired **emulation** type for the new CV, enter the desired volume **Size** (in MB for Open Systems and cylinders for S/390), and click **Add** to add the requested CV to the list box. If you make a mistake, select the incorrect CV, and click **Delete** to remove it from the list box. Repeat this step until you are finished adding the desired CV(s). (The **Cancel** button restores this panel to its original configuration.)
5. When the information displayed on the Customized Volume Size Define panel is correct, click **OK** to continue.
6. The Device Emulation Configuration panel now displays the new parity group configuration information. Click **Next** to continue. The Logical Device ID Configuration panel now opens.
7. On the Logical Device ID Configuration panel, select the incomplete parity group (group status displayed as “-----”), and click the desired LDEV ID assignment scheme:
 - Select **Linear...** to assign the LDEV IDs in sequential order for all unassigned logical addresses within the parity group. The **Linear** option is appropriate for users who actively balance their DASD subsystem workloads.
 - Select **Disperse...** to randomly rotate the LDEV IDs among multiple groups across the subsystem, eliminating hot spots and improving data access. The **Disperse** option is appropriate for users who do not actively balance their DASD subsystem workloads.
8. The Logical Device ID Define panel opens and displays the assigned LDEV IDs for each CU. Select the desired CU, enter the desired LDEV ID, and click **OK**.
9. The Logical Device ID Configuration panel now displays the status of the parity group as **Complete**. Click **Next** to continue.
10. The Set SSID Boundary panel now opens to show the current SSID boundary type (64, 128, or 256). You cannot change the setting here. Click **Next** to continue.

11. The Subsystem ID Configuration panel now opens to allow you to assign one or more SSIDs. If you do not need to assign an SSID, click **Next** to complete the normal-to-CVS conversion operation. If you need to assign an SSID to a subsystem:
 - a) The subsystem (64, 128, or 256 LDEVs) is displayed by LDEV range (e.g., 40-7f). Select the desired **Sub-system**, and click **SSID...** to open the Subsystem ID Define panel.
 - b) On the Subsystem ID Define panel, enter the desired SSID. The SSID must be unique and must meet the requirements specified in Table 1.4.
 - c) Click **OK** to assign the specified SSID to the selected subsystem and return to the Subsystem ID Configuration panel. Click **Next** to complete the install CV operation.
13. When the CVS confirmation panel appears, click **OK** to implement the requested install CV operation (and SSID assignment, if requested).



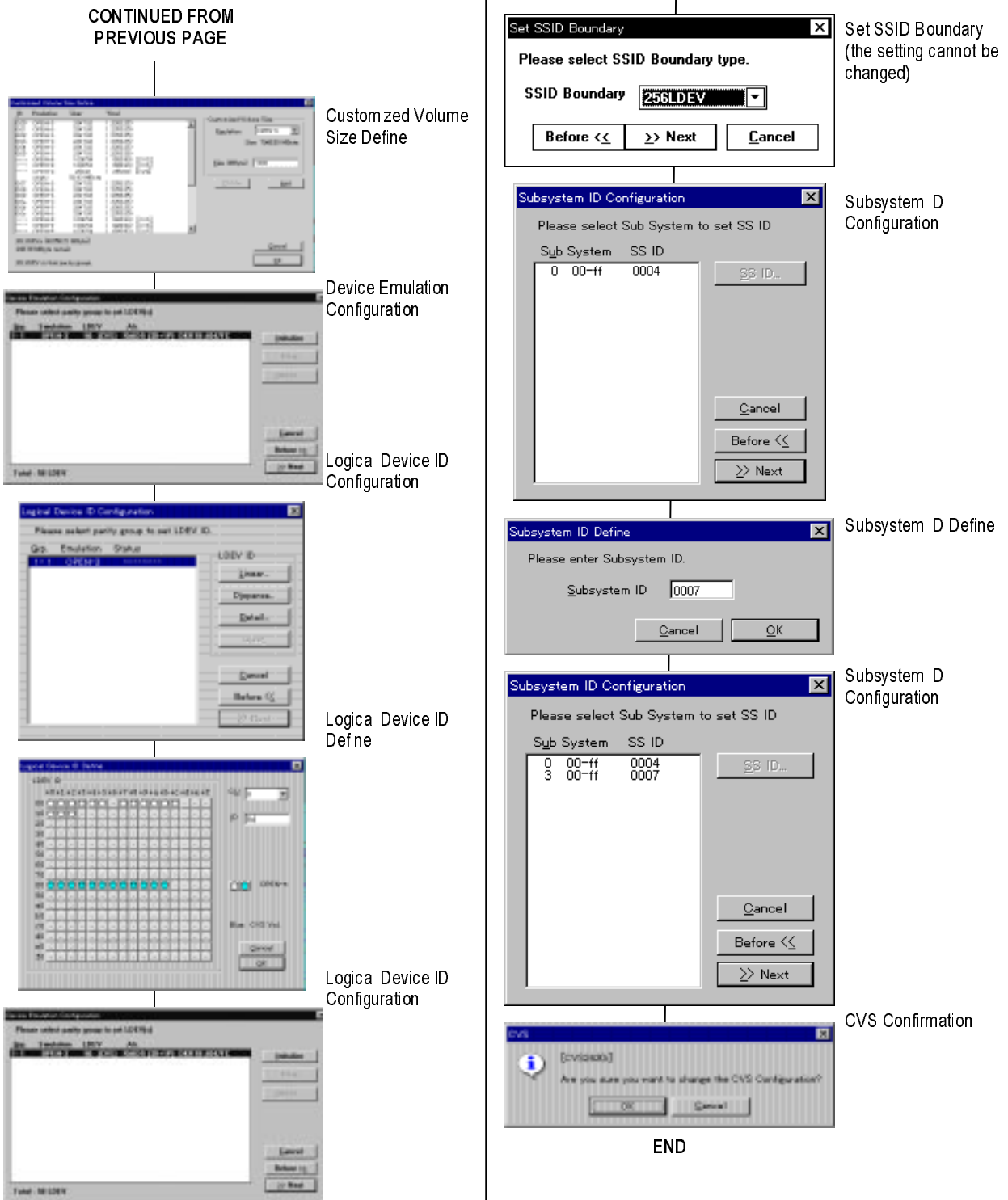


Figure 4.2 Installing CVS volumes

4.5 Deleting CVS Volumes

To delete an individual CV within a CVS volume or parity group, use the volume to space operation (refer to section 4.3).

To convert a CVS volume to a normal volume, you must initialize the volume (see section 4.6).

4.6 Initializing a CVS Volume (Converting to a Normal Volume)

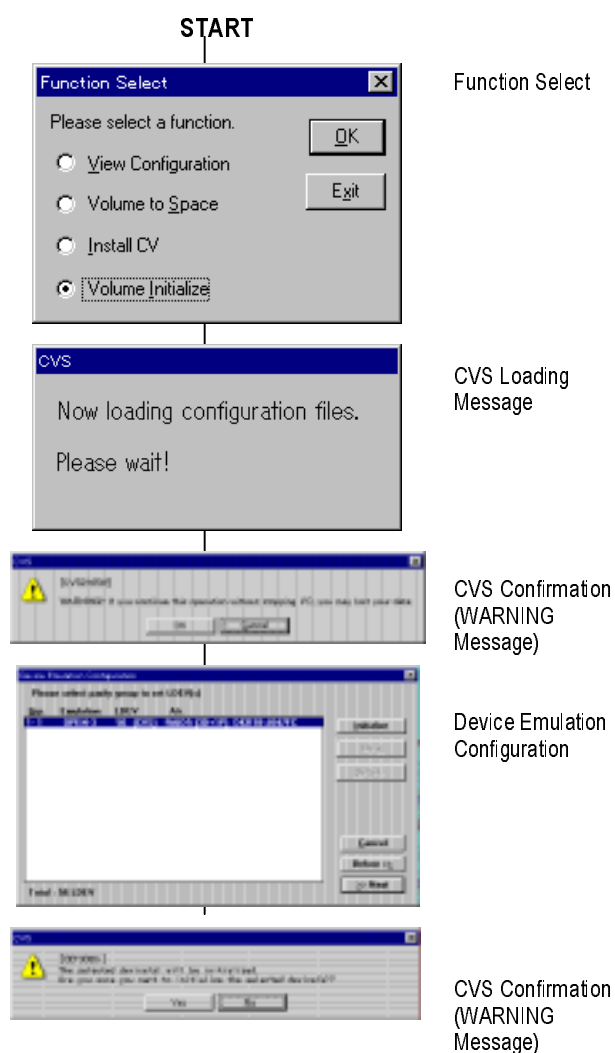
WARNING: The Volume Initialize function is a destructive operation. The data on the CV being converted will be lost when the operation is complete. The user is responsible for backing up the data as needed before performing this operation.

The **Volume Initialize** function allows you to convert a CVS volume back to a normal volume. This operation de-installs all customized volumes under a CVS volume and then reformats the CVS volume as a normal volume (e.g., 3390-3). Figure 4.3 displays the sequence of screens used to initialize a CVS volume and convert it to a normal volume. Some of the panels occur more than once during the process to present new information and/or allow you to perform different functions. The requested volume initialize operation does not occur until you click **OK** on the CVS Confirmation panel at the very end of the procedure.

To initialize a CVS volume (convert the volume back to a normal volume) (see Figure 4.3):

1. Choose **Volume Initialize** on the Function Select panel, and click **OK**. The Remote Console now loads the configuration information. This process may take several minutes.
2. When the CVS confirmation message displays (refer to Figure 3.2), make sure that I/Os of the target volume(s) have been stopped. **WARNING:** If you continue the operation without stopping I/Os, your data may be lost. Select **OK** to continue the operation, or select **Cancel** to stop the operation and return to the Function Select panel.
3. When the Device Emulation Configuration panel opens, select the parity group containing the CVS volume(s) you want to convert back to normal, and then select **Initialize**. When the confirmation message displays, select **OK**.
4. After deleting all of the CVS volume(s) that you want to convert back to normal, click **Next** to open the Logical Device ID Configuration panel (refer to Figure 3.7).
5. On the Logical Device ID Configuration panel select a parity group for which the ID has not been set (group status displayed as “---”), and click the desired ID assignment scheme:
 - Select **Linear...** to assign the LDEV IDs in sequential order for all unassigned logical addresses within the parity group. The **Linear** option is appropriate for users who actively balance their subsystem workloads.
 - Select **Disperse...** to randomly rotate the LDEV IDs among multiple groups across the subsystem, which will eliminate hot spots and improve data access. The **Disperse** option is appropriate for users who do not actively balance their subsystem workloads.
6. The Logical Device ID Define (refer to Figure 3.9) panel now opens. Select the **CU**, enter the desired **ID**, and click **OK**.

7. The Logical Device ID Configuration panel reopens to display the parity group status as **Complete**. Click **Next** to continue.
8. The Set SSID Boundary panel (refer to Figure 3.10) now opens to show the current SSID boundary type (64, 128, or 256). **Note:** You cannot change the setting here. Click **Next** to continue.
9. The Subsystem ID Configuration panel now opens. Select the subsystem for which the **SSID** is not defined, and click **SSID....**
10. The Subsystem ID Define panel now opens. Enter the **Subsystem ID**, and click **OK**. The SSID must be unique and must meet the requirements specified in section 6.1.2.
11. The Subsystem ID Configuration panel opens again to display the registered **SSID**. Click **Next** to register the volume.
12. When CVS confirmation panel appears, click **OK** to complete the requested Volume Initialize operation. **WARNING:** This operation is destructive. If in doubt, select **Cancel** to cancel the operation



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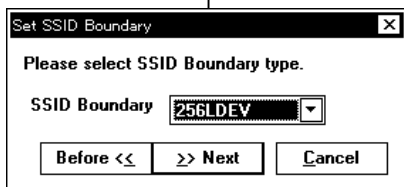
Logical Device ID
Configuration



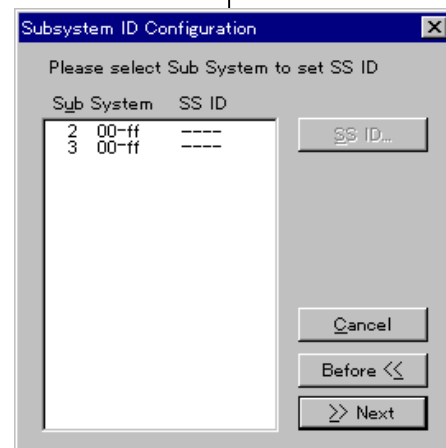
Logical Device ID
Define



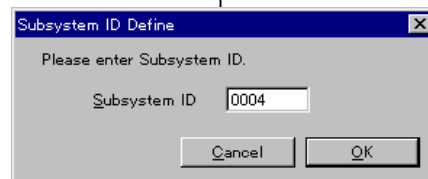
Logical Device ID
Configuration



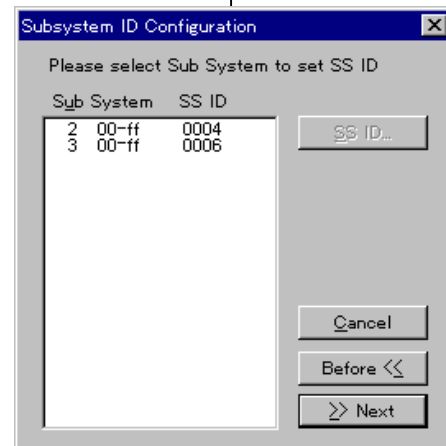
Set SSID
Boundary
(the setting cannot
be changed)



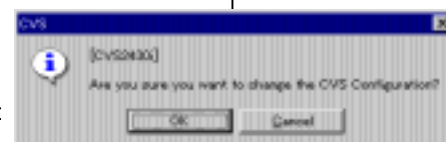
Subsystem ID
Configuration



Subsystem ID
Define



Subsystem ID
Configuration



CVS
Confirmation

END

Figure 4.3 Volume Initialize Function

Chapter 5 Troubleshooting

5.1 Troubleshooting

The Hitachi Freedom Storage™ 9900 subsystem provides continuous data availability and is not expected to fail in any way that would interrupt access to user data. For troubleshooting information on the 9900 subsystem, please refer to the *Hitachi Freedom Storage™ 9900 User and Reference Guide* (MK-90RD008). For further information on the Hitachi Freedom 9900 Remote Console, please refer to the *Hitachi Freedom Storage™ 9900 Remote Console User's Guide* (MK-90RD003) or *Hitachi Freedom Storage™ 9900 Remote Console Error Codes* (MK-90RD029).

The user is responsible for the operation and normal maintenance of the Remote Console PC. Here are some guidelines for troubleshooting the Remote Console PC:

- **Check the cabling and the LAN.** Make sure that both the computer and LAN cabling are firmly attached, and that the LAN is operating properly.
- **Reboot the PC.** Close any programs that are not responding. If necessary, reboot the PC and restart the Remote Console program. (If possible, first close all open programs before rebooting.) **WARNING:** The R-SIMs reported by the 9900 subsystems cannot be logged on the Remote Console PC when the PC is powered off. Reconnect to the same disk controller and verify the status of the data.
- **Check for any Error Codes.** Table 5.1 describes some general error conditions, along with the recommended resolution for each item. If you are unable to resolve an error condition, please call the Hitachi Data Systems Technical Support Center (see section 5.2).

Table 5.1 Troubleshooting

Error Condition	Recommended Action
Error message displayed during RMCMAIN installation.	If the error message Setup file error for Windows x.xx (ee = y) appears, make sure the correct version of Windows is installed. If ee = 2 is displayed, make sure the installation diskette is not write-protected and is inserted in the floppy disk drive properly. Restart the setup program. If the error message File I/O Error appears, make sure the installation diskette is not write-protected and is inserted in the floppy disk drive properly, and restart the setup program. If the error message Resource Error (Err=xxxx) or Internal Error (Err=xxxx) appears, reboot the Remote Console PC, and restart the setup program.
RMCMAIN will not add or connect with a subsystem.	Make sure that the S/N is correct. If not, delete the subsystem, and then add the subsystem again using the correct S/N. If RMCMAIN still cannot connect, check the settings on the Windows network control panel, and use PING to test the LAN connection (see section 2.4). If RMCMAIN still cannot connect, exit RMCMAIN, restart the PC, start RMCMAIN, and try again. If RMCMAIN still cannot connect, reinstall the RMCMAIN software. If the problem persists, call the Hitachi Data Systems Support Center.
The Remote Console PC experiences an error.	Exit RMCMAIN, close all other applications, and then restart the PC. If the problem persists, make sure the PC's operating system and LAN hardware and software are properly configured (see Chapter 2), and reinstall the RMCMAIN software. The user is responsible for maintaining the Remote Console PC.
Any problem with a 9900 subsystem.	Open the R-SIM panel, and sort the R-SIMs by name to view the R-SIMs by subsystem. If there are any serious- or acute-level R-SIMs, call the Hitachi Data Systems Support Center.

5.2 Contacting the Hitachi Data Systems Technical Support Center

If you need to call the Hitachi Data Systems Technical Support Center, be sure to provide as much information about the problem as possible. Include the circumstances surrounding the error or failure, the exact content of any messages displayed on the Remote Console PC, and the severity levels and reference codes of the R-SIMs on the R-SIM panel.

The worldwide Hitachi Data Systems Technical Support Centers are:

- Hitachi Data Systems North America/Latin America
San Diego, California, USA
1-800-348-4357
- Hitachi Data Systems Europe
Contact Hitachi Data Systems Local Support
- Hitachi Data Systems Asia Pacific
North Ryde, Australia
011-61-2-9325-3300

Appendix: Glossary, Acronyms, and Abbreviations

Cache extents	Areas used for FlashAccess (also known as Dynamic Cache Residency)
CU	control unit
Custom access	A feature that allows a non-administrator to be assigned update access to one or more of the restricted Remote Console functions.
CV	custom-sized volume, also called customized volume
CVS	custom volume size (also called Virtual LVI or Virtual LUN). This function divides a logical volume into two or more smaller volumes, called custom-sized volumes.
DASD	direct access storage device
DCR	dynamic cache residency (also called FlashAccess)
DKCMAIN	disk controller main
ESCON®	Enterprise System Connection
FD	floppy disk
FD Copy	floppy disk copy. This function downloads the 9900 Remote Console configuration information onto a floppy diskette or a hard disk drive, and is generally used for troubleshooting purposes.
FlashAccess	dynamic cache residency, or DCR.
GB	gigabyte(s)
HIHSM	Hitachi Internal Hierarchical Storage Manager
HMBR	Hitachi Multiplatform Backup/Restore
HMRCF	Hitachi Multi-RAID Coupling Feature (also called ShadowImage)
HODM	Hitachi Online Data Migration
HORC	Hitachi Remote Copy (open).
HOMRCF	Hitachi Open Multi-RAID Coupling Feature (also called ShadowImage)
HRC	Hitachi Remote Copy – Synchronous. This feature must be installed before you can install either HORC or HRCA.
HRCA	Hitachi Remote Copy - Asynchronous
kB	kilobyte(s)
LAN	local-area network
LBA	logical block address
LDEV	logical device
LU	logical unit
LUN	logical unit number
LUN Manager	remote console software option, also called Remote SCSI. This option must be installed before you can install either LUSE or LUN Security.
LUSE	Logical Unit Size Expansion
LVI	logical volume image (also called device emulation)
MB	megabyte(s)
MIB	message information block

Parity group	a set of hard disk drives that have the same capacity and are treated as one group. A parity group contains both user data and parity information, which allows the user data to be accessed in the event that one or more of the drives within the group are not available.
Remote SCSI	A Remote Console software option, also called LUN Manager
RMCMAN	Remote console main software
R-SIM	remote service information message (generated by the 9900 when it detects an error or service requirement).
SCSI	small computer system interface
ShadowImage	Hitachi Multi-RAID Coupling Feature (HMRCF) and/or Hitachi Open Multi-RAID Coupling Feature (HOMRCF)
SIM	service information message (generated by a disk controller when it detects an error or service requirement).
SSID	storage subsystem ID. The 9900 is configured with one SSID for each 64 devices, and up to four SSIDs for each CU image.
SVP	service processor (PC component of the 9900)
TCP/IP	transmission control protocol/internet protocol
TID	target ID
Trap	An SNMP agent initiates trap operations when R-SIMs occur, in order to send the R-SIMs to the SNMP manager (see Figure 4.1). An SNMP agent can be configured to deliver traps to more than one SNMP manager.
UCB	unit control block
VLUN	Virtual LUN (also called custom volume size, CVS)
VLVI	Virtual LVI (also called custom volume size, CVS)
Volser	volume serial number (mainframe volume identifier, not related to the LDEV ID)
WWN	World Wide Name, which is a unique identifier for a particular open-system host, consisting of a 64-bit physical address (the IEEE 48-bit format with 12-bit extension and 4-bit prefix).
WWN Group	A WWN group gives every host in the specified WWN group access to a specified LU or group of LUs. This is part of the LUN Security feature.

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