Hitachi Virtual Storage Platform E Series

SVOS RF 9.8.3

SIM Reference Guide

This document describes the service information messages (SIMs) issued by Hitachi Virtual Storage Platform E series, provides instructions for handling SIMs, and provides lists of the SIM codes for troubleshooting by users and service personnel.

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Preface

This document describes the service information messages (SIMs) issued by Hitachi Virtual Storage Platform E series, provides instructions for handling SIMs, and provides lists of the SIM codes for troubleshooting by users and service personnel.

Please read this document carefully to understand how to use this product, and maintain a copy for reference purposes.

Intended audience

This document is intended for system administrators, Hitachi Vantara representatives, and authorized service providers who install, configure, and operate .

Readers of this document should be familiar with the following:

- Data processing and RAID storage systems and their basic functions.

Product version

This document revision applies the following product versions:

- VSP E series: 93-06-61 or later
- SVOS RF 9.8.3 or later

Release notes

Read the release notes before installing and using this product. They may contain requirements or restrictions that are not fully described in this document or updates or corrections to this document. Release notes are available on the Hitachi Vantara Support Website: https://knowledge.hitachivantara.com/Documents.

Changes in this revision

- Changed the description of SIMs.

Document conventions

This document uses the following typographic conventions:

Convention	Description
Bold	▪ Indicates text in a window, including window titles, menus, menu options, buttons, fields, and labels. Example: Click **OK**. ▪ Indicates emphasized words in list items.
Italic	▪ Indicates a document title or emphasized words in text. ▪ Indicates a variable, which is a placeholder for actual text provided by the user or for output by the system. Example: `pairdisplay -g group` (For exceptions to this convention for variables, see the entry for angle brackets.)
`Monospace`	Indicates text that is displayed on screen or entered by the user. Example: `pairdisplay -g oradb`
< > angle brackets	Indicates variables in the following scenarios: ▪ Variables are not clearly separated from the surrounding text or from other variables. Example: `Status-<report-name><file-version>.csv` ▪ Variables in headings.
[ ] square brackets	Indicates optional values. Example: [a | b] indicates that you can choose a, b, or nothing.
{ } braces	Indicates required or expected values. Example: { a | b } indicates that you must choose either a or b.
| vertical bar	Indicates that you have a choice between two or more options or arguments. Examples: [a | b] indicates that you can choose a, b, or nothing. { a | b } indicates that you must choose either a or b.

This document uses the following icons to draw attention to information:

Icon	Label	Description
	Note	Calls attention to additional information.
	Tip	Provides helpful information, guidelines, or suggestions for performing tasks more effectively.
	Important	Highlights information that is essential to the completion of a task.
	Caution	Warns the user of adverse conditions and/or consequences (for example, disruptive operations, data loss, or a system crash).
	CAUTION	Warns the user of a hazardous situation that, if not avoided, could result in major or minor injury.
	WARNING	Warns the user of a hazardous situation which, if not avoided, could result in death or serious injury.

Accessing product documentation

Product user documentation is available on the Hitachi Vantara Support Website: https://knowledge.hitachivantara.com/Documents. Check this site for the most current documentation, including important updates that may have been made after the release of the product.

Getting help

The Hitachi Vantara Support Website is the destination for technical support of products and solutions sold by Hitachi Vantara. To contact technical support, log on to the Hitachi Vantara Support Website for contact information: https://support.hitachivantara.com/en_us/contact-us.html.

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Comments

Please send comments to doc.comments@hitachivantara.com. Include the document title and number, including the revision level (for example, -07), and refer to specific sections and paragraphs whenever possible. All comments become the property of Hitachi Vantara LLC.

Thank you!

Chapter 1: Service Information Message (SIM) overview

SIMs are a type of messages issued from storage systems. You can configure when and how the SIMs (Service Information Message) are generated, and the notification methods.

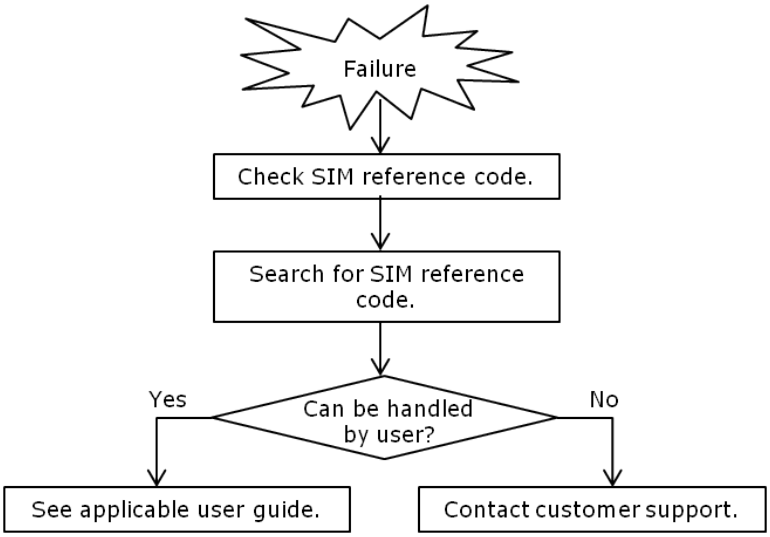
Message types

The following table lists the types of messages output from storage systems.

Message types	Description
Device Manager - Storage Navigator message	Output when Device Manager - Storage Navigator and maintenance utility are being used. For details, see the *Hitachi Device Manager - Storage Navigator Messages*.
SIM	Output from channels, paths, microprocessors of storage systems. For details, see SIM code lists (on page 11).
Other messages	Output when Storage Device List is being used or when a batch command is being executed on the SVP. See the following HTML file in the SVP: ▪ `<SVP installation directory>\wk\supervisor\sdlist\help\sdl_message_ja.html` ▪ The default *<SVP installation directory>* is "C:\Mapp".

Actions to take when a SIM is output

When a storage system requires maintenance, a message is output. This is called a failure of a storage system (SIM: Service Information Message). SIMs are output from channels, paths, microprocessors, and so on, of the storage system. The following figure illustrates actions to take after a failure occurs.



Checking SIM reference codes

All SIMs are recorded in the storage system. When a SIM is output, Warning or Failed is displayed at the upper left of the Maintenance Utility window to notify users.

You can check SIMs on the Alert tab in the Maintenance Utility window. For details, see the *System Administrator Guide*.

Searching for SIM reference codes

In the SIM code lists, SIM codes that begin with the same digits are listed as a single code. For example, 602001 is shown as 602*xxx* (*xxx* indicates a pool number) in the SIM code list. Therefore, when searching for a SIM code, use the first few digits, 602 in this case, as a key word.

Handling failures

There are two types of SIMs. One can be handled by users, and the other must be handled by service personnel. For SIMs that can be handled by users, see the recovery procedures of the SIMs described in the applicable user guide to solve the problem. For the SIMs that must be handled by service personnel, contact the customer support. See SIM code list for troubleshooting by users (on page 12) or SIM code list for troubleshooting by service personnel (on page 14) for the SIM code lists.

Setting failure notification methods

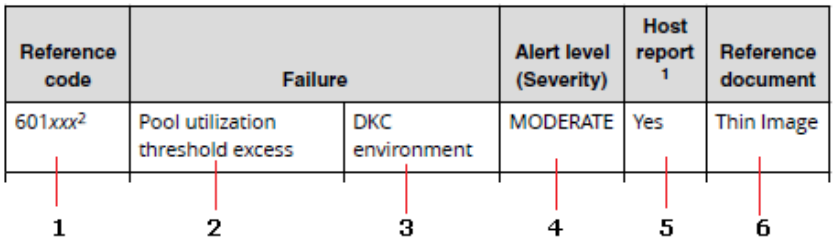
SIMs can be checked on the Alert tab. In addition, they can be notified by email messages, Syslog, SNMP, or Windows Event Log. For the procedures for setting email, Syslog, and Windows Event Log notifications, see the *System Administrator Guide*. For the procedure for configuring the SNMP notification, see the *Hitachi Alert Notification Guide*.

Chapter 2: SIM code lists

This chapter describes the lists of the SIM reference codes that are reported when failures occur in storage systems, and the procedure for obtaining drive box numbers.

Columns in the SIM code lists

The SIM code list tables have columns shown below.



The description of each column is as follows:

1: SIM code number. *x* is a variable value.

2: Brief description of the failure

3: Failed location in the storage system

4: Severity of the failure

Item	Description
SERVICE	Mild failure
MODERATE	Partial failure
SERIOUS	The failure part stops operation.
ACUTE	The entire storage system stops operation.

5: With or without host report

6: Document to be referenced for troubleshooting by users. For the document title, see the legends for the table in SIM code list for troubleshooting by users (on page 12). Only that table has this column.

SIM code list for troubleshooting by users

The following table lists and describes SIM codes that require action or restoration by users. *xxx* in the following table indicates the port number.

If you select **Host Report** for **Notification Alert** in the **Set Up Alert Notifications** window, alert notification for SIMs that are reported to the host is sent. If you select **All**, alert notification for all SIMs is sent.

Reference code	Failure		Alert level (Severity)	Host report	Reference document
602*xxx*	Pool blocking	DKC environment	MODERATE	Yes	Thin Image
602ffe	Pools blocking by SM volatile	DKC environment	MODERATE	Yes	Thin Image
603000	SM Space Warning	DKC environment	MODERATE	Yes	Thin Image
604*xxx*	Exceeded Threshold of actual pool use rate	DKC environment	MODERATE	Yes	Thin Image
605*xxx*	Actual pool use rate reaches upper limit	DKC environment	MODERATE	Yes	Thin Image
606*xxx*	Exceeded Fixed outage Threshold of pool use rate	DKC environment	MODERATE	Yes	Thin Image
624000	SM Full	DKC environment	MODERATE	Yes	Provisioning
627*xxx*	The DP POOL LDEV blockade	DKC environment	SERIOUS	Yes	Provisioning
628000	DP Protect attribute setting of DRU	DKC environment	SERIOUS	Yes	Provisioning
629*xxx*	Exceeded Warning Threshold of DP pool use rate	DKC environment	MODERATE	Yes	Provisioning
62a*xxx*	Actual DP pool use rate reaches upper limit	DKC environment	MODERATE	Yes	Provisioning
62b000	Threshold of DP pool use rate remains exceeded	DKC environment	MODERATE	Yes	Provisioning
62c*xxx*	Exceeded Depletion Threshold of DP pool use rate	DKC environment	MODERATE	Yes	Provisioning

Reference code	Failure		Alert level (Severity)	Host report	Reference document
62d*xxx*	Exceeded Fixed outage Threshold of DP pool use rate	DKC environment	MODERATE	Yes	Provisioning
62e*xxx*	Exceeded DP pool depletion threshold for TI pairs	DKC environment	MODERATE	Yes	Provisioning
631*xxx*	Auto pool expansion failed due to system error	DKC environment	MODERATE	Yes	Provisioning
634*xxx*	Auto pool expansion failed due to no more LDEV IDs	DKC environment	MODERATE	Yes	Provisioning
641*xxx*	Tier relocation is not completed	DKC environment	SERVICE	Yes	Provisioning
660100	No free encryption key	DKC environment	MODERATE	Yes	Encryption License Key
660200	Remaining free encryption key warning	DKC environment	SERVICE	Yes	Encryption License Key
670000	Warning for depletion of cache management devices	Cache	MODERATE	Yes	Thin Image
681*xxx*	Operation error of deduplication system data volume automatic deletion was detected.	DKC environment	MODERATE	Yes	Provisioning
682000	Deduplication system data volume automatic deletion was suspended.	DKC environment	MODERATE	Yes	Provisioning
7c1*xxx*[1]	Error in server registered by using HSAE	DKC environment	MODERATE	Yes	CCI
7d030*x*[2]	GUM AuditLog lost	DKC environment	MODERATE	Yes	Audit Log
7d040*x*[2]	GUM AuditLog Warning Threshold was exceeded	DKC environment	MODERATE	Yes	Audit Log
ee0000	Volume I/O upper limit reached	QoS alert	SERVICE	Yes	Performance Manager
ee1000	Volume I/O lower limit not reached	QoS alert	SERVICE	Yes	Performance Manager

Reference code	Failure		Alert level (Severity)	Host report	Reference document
ee2000	Volume I/O response delay	QoS alert	SERVICE	Yes	Performance Manager

Legend:

- **Yes:** This SIM performs the host report.
- **No:** This SIM does not perform the host report.
- *x*: A hexadecimal number from 0 to f.
- Audit Log: SIM Codes in the *Hitachi Audit Log User Guide*
- Encryption License Key: Troubleshooting in the *Encryption License Key User Guide*
- Provisioning: Troubleshooting for provisioning in the *Provisioning Guide*.
- Thin Image: Troubleshooting Thin Image in the *Hitachi Thin Image User Guide*.
- CCI: Troubleshooting in the *Command Control Interface User and Reference Guide*.

Notes:

1. *xxx* indicates the server ID of Storage Advisor Embedded.
2. *x* = 1: An error occurred in CTL1.

   x = 2: An error occurred in CTL2.

SIM code list for troubleshooting by service personnel

The following table lists and describes the SIM codes that require action or restoration by service personnel. If a SIM in the table is output, contact customer support.

If you select **Host Report** for **Notification Alert** in the **Set Up Alert Notifications** window, alert notification for SIMs that are reported to the host is sent. If you select **All**, alert notification for all SIMs is sent.

Reference code	Description	Section	Alert level (Severity)	Host report
1420xx	Transmitted data abnormality between MP and GUM	Processor	MODERATE	Yes
180000	Audit Log lost	DKC environment	MODERATE	Yes
1C0000	Detected a specific error code SSB	DKC environment	SERVICE	Yes
2120xx	Channel port blocking	DKC environment	MODERATE	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
2130xx	CHB blocking	DKC environment	MODERATE	Yes
2140xx	DKB blocking	DKC environment	MODERATE	Yes
2153xx	PECB blocking	DKC environment	MODERATE	Yes
2154xx	SWPK blocking	DKC environment	MODERATE	Yes
2157xx	PECB warning	DKC environment	MODERATE	Yes
2180xx	RIO path closed	DKC environment	MODERATE	Yes
2190xx	AL_PA value conflict	DKC environment	SERVICE	Yes
2193xx	Link failure1	DKC environment	SERIOUS	Yes
2194xx	Link failure2	DKC environment	SERIOUS	Yes
21a8xx	SFP wrong type	DKC environment	MODERATE	Yes
21aaxx	SFP TxFault	DKC environment	MODERATE	Yes
21abxx	SFP warning	Processor	MODERATE	Yes
21acxx	SFP alarm	Processor	MODERATE	Yes
21d0xx	External storage system connection path blocking	DKC environment	MODERATE	Yes
21d1xx	External storage system connection path restore	DKC environment	SERVICE	Yes
21d2xx	External subsystem path response timeout	DKC environment	SERVICE	Yes
3070xx	CHK1A threshold over	Processor	SERVICE	Yes
3071xx	CHK1B threshold over	Processor	SERVICE	Yes
3072xx	CHK3 threshold over	Processor	SERVICE	Yes
3073xx	Processor blocking	Processor	MODERATE	Yes
3075xx	CFM Failure	Cache	MODERATE	Yes
3076xx	Incorrect SUM value of FM	Processor	SERVICE	Yes
3077xx	Processor memory temporary error	Processor	SERVICE	Yes
3078xx	BFM error	Processor	SERIOUS	Yes
3080xx	WCHK1 dump	Processor	MODERATE	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
388f00	PS OFF impossible	PS(DKC)	MODERATE	Yes
389f00	PS OFF impossible (Device reserved)	PS(DKC)	MODERATE	Yes
3990xx	Undefined Package is mounted	Processor	MODERATE	Yes
3991xx	V-R or serial number is inconsistent	Processor	MODERATE	Yes
3993xx	Replace failed	Processor	MODERATE	Yes
399dxx	Injustice dc voltage control	DKC environment	MODERATE	Yes
399exx	Injustice CEMODE	DKC environment	MODERATE	Yes
399fxx	Injustice CEDT	DKC environment	MODERATE	Yes
39a000	The upper temperature limit was exceeded	DKC environment	SERVICE	Yes
39b0xx	MP patrol check error	DKC environment	SERVICE	Yes
3a0xxx	LDEV Blockade (Effect of microcode error)	Drive	MODERATE	Yes
3c9500	CHB/DKB Type disagreement	DKC environment	MODERATE	Yes
3c9600	No CHB mounted	Processor	MODERATE	Yes
3c97xx	iSCSI firmware update warning	DKC environment	MODERATE	Yes
3c9800	ACLF type mismatch detected	ACLF error	MODERATE	Yes
410000	Format complete (Normal end)	Drive	SERVICE	Yes
410001	Format complete (Abnormal end)	Drive	SERVICE	Yes
410002	Format complete (Partial abnormal end)	Drive	SERVICE	Yes
410100	Quick Format finish	Drive	SERVICE	Yes
410200	Parity consistency check completed	Environment	SERVICE	No
410201	Parity consistency check suspended	Environment	SERVICE	No
410300	Parity consistency check abnormality detection	Environment	MODERATE	No

Reference code	Description	Section	Alert level (Severity)	Host report
435*xxx*	Drive media error	Drive	SERVICE	Yes
43a*xxx*	Drive blockade (media)(with redundancy)	Drive	SERIOUS	Yes
43d*xxx*	Drive blockade (media)(without redundancy)	Drive	SERIOUS	Yes
469*xxx*	Collection Copy/Copyback disabled(drive replace)	Drive	MODERATE	Yes
46a*xxx*	Drive Copy/Correction Copy delay	Drive	MODERATE	Yes
46b*xxx*	Drive Copy/Correction Copy delay	Drive	MODERATE	Yes
47d*xxx*	Shadow Image Copy abnormal end	DKC environment	MODERATE	Yes
47e700	Forcible suspend by SM volatile	DKC environment	MODERATE	Yes
47ec00	Forcible suspend by SM volatile	DKC environment	MODERATE	Yes
47f*xxx*[3]	Volume Migration abnormal end	DKC environment	MODERATE	Yes
491000	Cache overload condition	Cache	SERVICE	Yes
4a80*xx*	Expander Micro Exchange failed	DKC environment	MODERATE	Yes
4b3*xxx*	Thin Image Option abnormal end	DKC environment	MODERATE	Yes
4b6*xxx*	Correction copy start	Drive	SERVICE	Yes
4b7*xxx*	Correction copy start	Drive	SERVICE	Yes
4b8*xxx*	Correction copy normal end	Drive	SERVICE	Yes
4b9*xxx*	Correction copy normal end	Drive	SERVICE	Yes
4ba*xxx*	Correction copy abnormal end	Drive	SERIOUS	Yes
4bb*xxx*	Correction copy abnormal end	Drive	SERIOUS	Yes
4bc*xxx*	Correction copy discontinued	Drive	SERVICE	Yes
4bd*xxx*	Correction copy discontinued	Drive	SERVICE	Yes
4be*xxx*	Correction copy warning end (With blockade LDEV or some error)	Drive	SERVICE	Yes
4bf*xxx*	Correction copy warning end (With blockade LDEV or some error)	Drive	SERVICE	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
4c5*xxx*	Flash module drive initialization failed	Drive	MODERATE	Yes
4c6*xxx*	Dynamic sparing start (Drive copy)	Drive	SERVICE	Yes
4c7*xxx*	Dynamic sparing start (Drive copy)	Drive	SERVICE	Yes
4c8*xxx*	Dynamic sparing normal end (Drive copy)	Drive	SERVICE	Yes
4c9*xxx*	Dynamic sparing normal end (Drive copy)	Drive	SERVICE	Yes
4ca*xxx*	Dynamic sparing abnormal end (Drive copy)	Drive	MODERATE	Yes
4cb*xxx*	Dynamic sparing abnormal end (Drive copy)	Drive	MODERATE	Yes
4cc*xxx*	Dynamic sparing discontinued (Drive copy)	Drive	SERVICE	Yes
4cd*xxx*	Dynamic sparing discontinued (Drive copy)	Drive	SERVICE	Yes
4ce*xxx*	Dynamic sparing warning end (With blockade LDEV or some error) (Drive copy)	Drive	SERVICE	Yes
4cf*xxx*	Dynamic sparing warning end (With blockade LDEV or some error) (Drive copy)	Drive	SERVICE	Yes
4d1*xxx*	Differential area blocking	Drive	SERIOUS	Yes
4d6*xxx*	PDEV Erase Start	Drive	SERVICE	Yes
4d7*xxx*	PDEV Erase Start	Drive	SERVICE	Yes
4d8*xxx*	PDEV Erase Normal End	Drive	SERVICE	Yes
4d9*xxx*	PDEV Erase Normal End	Drive	SERVICE	Yes
4da*xxx*	PDEV Erase Abnormal End	Drive	SERVICE	Yes
4db*xxx*	PDEV Erase Abnormal End	Drive	SERVICE	Yes
4e0*xxx*	Drive blockade due to Media Sanitization start	Drive	SERVICE	Yes
4e2*xxx*	Media Sanitization start	Drive	SERVICE	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
4e4*xxx*	Media Sanitization normal end	Drive	SERVICE	Yes
4e6*xxx*	Media Sanitization abnormal end	Drive	MODERATE	Yes
4e8*xxx*	Media Sanitization warning end	Drive	MODERATE	Yes
500*xxx*	Drive temporary error	Drive	SERVICE	Yes
503*xxx*	Drive media error	Drive	SERVICE	Yes
505*xxx*	Flash module drive internal battery error (ORM)	Drive	SERVICE	Yes
508*xxx*	Flash module drive internal battery error	Drive	MODERATE	Yes
50a*xxx*	Flash drive End of life	Drive	SERVICE	Yes
50d*xxx*	Flash module drive End of life	Drive	SERVICE	Yes
50e*xxx*	Flash module drive battery capacity shortage	Drive	MODERATE	Yes
50f000	Flash module drive micro-program version warning	Drive	MODERATE	Yes
610001	Backup/restore SM Information failed (Backup)	SM	MODERATE	Yes
610002	Backup/restore SM Information failed (Restore)	SM	MODERATE	Yes
623*xxx*	The DP POOL error is detected	DKC environment	MODERATE	Yes
623ffe	DP Pools blocking by Shared Memory volatile	DKC environment	MODERATE	Yes
632*xxx*	Auto pool expansion failed due to pool error	DKC environment	MODERATE	Yes
633*xxx*	Failed to create, expand, or delete pools	DKC environment	MODERATE	Yes
660100	No free encryption key	DKC environment	MODERATE	Yes
660200	Remaining free encryption key warning	DKC environment	SERVICE	Yes
6610*xx*	Acquisition of encryption key from KMS failed	DKC environment	MODERATE	Yes
6620*xx*	Encryption key setting abnormality	DKC environment	SERIOUS	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
6800*xx*[1]	Dedupe and compression abnormality detect	DKC environment	MODERATE	Yes
681*xxx*	dedupe system volume deletion abnormal end	DKC environment	MODERATE	Yes
682000	dedupe system volume deletion suspended	DKC environment	MODERATE	Yes
689*xxx*	dedupe system volume change comp_acl abnormal end	DKC environment	MODERATE	Yes
760000	CUDG detected error	DKC environment	MODERATE	Yes
7900*xx*	BOOT detected error	DKC environment	MODERATE	Yes
7d000*x*	GUM error	DKC environment	MODERATE	Yes
7d010*x*	LAN error (Internal Network)	DKC environment	MODERATE	Yes
7d020*x*	LAN error (CTL1-CTL2)	DKC environment	MODERATE	Yes
7d050*x*	Notification of Alert failed	DKC environment	MODERATE	Yes
7d06*xx*	MP error	Processor	MODERATE	Yes
7d07*xx*	GUM security error detected	DKC environment	MODERATE	Yes
7d08*xx*	Failed to recover GUM configuration information	DKC environment	MODERATE	Yes
7d0900	DKC warning	Processor	SERIOUS	Yes
7d0a*xx*	GUM version warning	DKC environment	MODERATE	Yes
7d0b*xx*	Configuration backup failed	DKC environment	MODERATE	Yes
7d0d*xx*	GUM configuration information corrupted	DKC environment	MODERATE	Yes
7ff102	SI	DKC environment	SERVICE	No
7ff104	TI	DKC environment	SERVICE	No
7ff106[3]	Volume Migration Pair	DKC environment	SERVICE	No
7ff7*xx*	The term of validity is over	DKC environment	MODERATE	Yes
7ff8*xx*	The capacity of validity is over	DKC environment	MODERATE	Yes
7ff9*xx*	The PP is invalid by assumption PP invalidity	DKC environment	MODERATE	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
7ffa00	Synchronization time failure	DKC environment	SERVICE	Yes
ac50*xx*	DB power off	PS(DKU)	MODERATE	Yes
ac51*xx*	DB power recovered	PS(DKU)	SERVICE	Yes
ac6000	DKC was set to power error mode	PS(DKC)	MODERATE	Yes
ac6100	DKC was released from power error mode	PS(DKC)	SERVICE	Yes
ac6200	Destaging startup normal	PS(DKC)	SERVICE	Yes
ac6300	Destaging startup failed	PS(DKC)	MODERATE	Yes
ac800*x*	Server failure	DKC environment	SERIOUS	Yes
af00*xx*	Injustice JP Warning	DKC environment	MODERATE	Yes
af10*xx*	MP Temperature abnormality warning	DKC environment	MODERATE	Yes
af11*xx*	External temperature warning	DKC environment	MODERATE	Yes
af12*xx*	External temperature alarm	DKC environment	MODERATE	Yes
af13*xx*	Thermal monitor warning	DKC environment	MODERATE	Yes
af20*xx*	DKCPS warning	PS(DKC)	MODERATE	Yes
af21*xx*	DKCPS input voltage abnormality	PS(DKC)	MODERATE	Yes
af30*xx*	Environmental microcomputer warning	DKC environment	MODERATE	Yes
af31*xx*	Device movement mode warning	DKC environment	MODERATE	Yes
af32*xx*	Environmental Firmware Update warning	DKC environment	MODERATE	Yes
af33*xx*	Voltage change setting warning	PS(DKC)	MODERATE	Yes
af40*xx*	BKM/BKMF warning	DKC environment	MODERATE	Yes
af41*xx*	Battery replacement should be scheduled	Battery	MODERATE	Yes
af42*xx*	CHBB environmental microcontroller warning	DKC environment	MODERATE	Yes
af43*xx*	SCM environmental microcontroller warning	DKC environment	MODERATE	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
af44*xx*	CHBB environmental firmware update warning	DKC environment	MODERATE	Yes
af45*xx*	SCM environmental firmware update warning	DKC environment	MODERATE	Yes
af46*xx*	SWPK temperature warning	DKC environment	MODERATE	Yes
af48*xx*	CHBB voltage change failure warning	DKC environment	MODERATE	Yes
af49*xx*	SCM voltage change failure warning	DKC environment	MODERATE	Yes
af4a*xx*	CHBBPS warning	DKC environment	MODERATE	Yes
af4b*xx*	CHBBPS abnormal input voltage	DKC environment	MODERATE	Yes
af4c*xx*	CHBBFAN warning	DKC environment	MODERATE	Yes
af4d*xx*	Panel switch warning	DKC environment	MODERATE	Yes
af4e*xx*	Invalid PS ON warning	DKC environment	MODERATE	Yes
af50*xx*	DBPS warning	PS(DKU)	MODERATE	Yes
af51*xx*	DBPS-1 warning	PS(DKU)	MODERATE	Yes
af52*xx*	DBPS-2 warning	PS(DKU)	MODERATE	Yes
af60*xx*	DBPS input voltage abnormality	PS(DKU)	MODERATE	Yes
af61*xx*	DBPS-1 input voltage abnormality	PS(DKU)	MODERATE	Yes
af62*xx*	DBPS-2 input voltage abnormality	PS(DKU)	MODERATE	Yes
af7000	DB External temperature warning	DKU environment	MODERATE	Yes
af7100	DB External temperature Alarm	DKU environment	MODERATE	Yes
af80*xx*	ENC warning	DKU environment	MODERATE	Yes
af81*xx*	ENC-1 warning	DKU environment	MODERATE	Yes
af82*xx*	ENC-1 warning	DKU environment	MODERATE	Yes
afa0*xx*	CHBB environmental firmware update started	DKC environment	SERVICE	Yes
afa1*xx*	CHBB environmental firmware update is complete	DKC environment	SERVICE	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
afa2*xx*	CHBB environmental firmware update was applied	DKC environment	SERVICE	Yes
afb9*xx*	ECTL warning	DKC environment	MODERATE	Yes
afe4*xx*	Life expiry warning for DB air filter	DKU environment	SERVICE	Yes
aff0*xx*	UPS warning	PS(DKC)	MODERATE	Yes
aff1*xx*	GUM warning	DKC environment	MODERATE	Yes
aff2*xx*	CFM error	Cache	MODERATE	Yes
aff3*xx*	FAN warning	Fan(DKC)	MODERATE	Yes
aff400	Life expiry warning for DKC air filter	DKC environment	SERVICE	Yes
bfc010	DKC ALARM LED light on	Processor	SERIOUS	Yes
cf10*xx*	SAS CTL blocking	DKC environment	MODERATE	Yes
cf11*xx*	SAS Port (WideLink) is partially blocked	DKC environment	SERVICE	Yes
cf12*xx*[2]	SAS PORT BLOCK	DKC environment	MODERATE	Yes
cf13*xx*	SAS-CTL Error detection	DKC environment	SERIOUS	Yes
cf14*xx*[2]	Recovered from ENC temporary failure successfully	DKC environment	SERVICE	Yes
cf20*xx*	PSW blockade	DKC environment	MODERATE	Yes
cf22*xx*	NVMe port blockade	DKC environment	MODERATE	Yes
cf88*xx*	CTL blocking	DKC environment	MODERATE	Yes
cf8a*xx*	CTL blockade due to CTL interconnect path failure	DKC environment	MODERATE	Yes
d00*xxx*	Remote Copy start	DKC environment	SERVICE	Yes
d01*xxx*	Remote Copy normal end	DKC environment	SERVICE	Yes
d02*xxx*	Pair end	DKC environment	SERVICE	Yes
d10*xxx*	HRC pair status change(MCU command), SMPL -> COPY	DKC environment	SERVICE	Yes
d11*xxx*	HRC pair status change(MCU command), SMPL -> PAIR	DKC environment	SERVICE	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
d12*xxx*	HRC pair status change(MCU command), COPY -> PAIR	DKC environment	SERVICE	Yes
d13*xxx*	HRC pair status change(MCU command), COPY -> PSUx	DKC environment	SERVICE	Yes
d14*xxx*	HRC pair status change(MCU command), PAIR -> PSUx	DKC environment	SERVICE	Yes
d15*xxx*	HRC pair status change(MCU command), PAIR -> SMPL	DKC environment	SERVICE	Yes
d16*xxx*	HRC pair status change(MCU command), COPY -> SMPL	DKC environment	SERVICE	Yes
d17*xxx*	HRC pair status change(MCU command), PSUx -> SMPL	DKC environment	SERVICE	Yes
d18*xxx*	HRC pair status change(MCU command), PSUx -> COPY	DKC environment	SERVICE	Yes
d19*xxx*	HRC pair status change(MCU command), COPY -> PSUx	DKC environment	SERVICE	Yes
d1a*xxx*	HRC pair status change(MCU command), COPY -> PSUx	DKC environment	SERVICE	Yes
d1b*xxx*	HRC pair status change(MCU command), PSUx -> PSUx	DKC environment	SERVICE	Yes
d1z*xxx*	Status of the R-VOL is changed	DKC environment	SERVICE	Yes
d40*xxx*	Pair suspend(RIO path closed)	DKC environment	SERIOUS	Yes
d41*xxx*	Pair suspend(P-VOL error)	DKC environment	SERIOUS	Yes
d42*xxx*	Pair suspend(S-VOL error)	DKC environment	SERIOUS	Yes
d44*xxx*	Pair suspend(RVOL Suspend report)	DKC environment	SERIOUS	Yes
d45*xxx*	Pair suspend(S-VOL Simplex report)	DKC environment	SERIOUS	Yes
d46*xxx*	Pair suspend(Communication error at RCU)	DKC environment	SERIOUS	Yes
d47*xxx*	Pair suspend(Error detected at RCU)	DKC environment	SERIOUS	Yes
d4f*xxx*	Pair status incorrect	DKC environment	SERIOUS	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
d80*xxx*	Volume to be used by UR was defined	DKC environment	SERVICE	Yes
d81*xxx*	Volume used by UR began copying	DKC environment	SERVICE	Yes
d82*xxx*	Volume used by UR completed copying	DKC environment	SERVICE	Yes
d83*xxx*	Volume used by UR received suspension request	DKC environment	SERVICE	Yes
d84*xxx*	Volume used by UR completed suspension transaction	DKC environment	SERVICE	Yes
d85*xxx*	Volume used by UR received request for deletion	DKC environment	SERVICE	Yes
d86*xxx*	Volume used by UR completed deletion	DKC environment	SERVICE	Yes
d87*xxx*	Volume used by UR was defined	DKC environment	SERVICE	Yes
d88*xxx*	Volume used by UR was defined in hold	DKC environment	SERVICE	Yes
d89*xxx*	PVOL used by UR was defined in hold	DKC environment	SERVICE	Yes
d90*xxx*	Change to SVOL was received from MCU, SMPL -> COPY	DKC environment	SERVICE	Yes
d91*xxx*	Change to SVOL was received from MCU, SMPL -> PAIR	DKC environment	SERVICE	Yes
d92*xxx*	Change to SVOL was received from MCU, COPY -> PAIR	DKC environment	SERVICE	Yes
d93*xxx*	Change to SVOL was received from MCU, COPY -> PSUx	DKC environment	SERVICE	Yes
d94*xxx*	Change to SVOL was received from MCU, PAIR -> PSUx	DKC environment	SERVICE	Yes
d95*xxx*	Change to SVOL was received from MCU, PAIR -> SMPL	DKC environment	SERVICE	Yes
d96*xxx*	Change to SVOL was received from MCU, COPY -> SMPL	DKC environment	SERVICE	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
d97*xxx*	Change to SVOL was received from MCU, PSUx -> SMPL	DKC environment	SERVICE	Yes
d98*xxx*	Change to SVOL was received from MCU, PSUx -> COPY	DKC environment	SERVICE	Yes
d99*xxx*	Change to SVOL was received from MCU, HOLD -> PAIR	DKC environment	SERVICE	Yes
d9a*xxx*	Change to SVOL was received from MCU, HOLD -> COPY	DKC environment	SERVICE	Yes
d9b*xxx*	Change to SVOL was received from MCU, HOLD -> SMPL	DKC environment	SERVICE	Yes
d9c*xxx*	Change to SVOL was received from MCU, SMPL -> PSUx	DKC environment	SERVICE	Yes
d9d*xxx*	Change to SVOL was received from MCU, SMPL -> HOLD	DKC environment	SERVICE	Yes
d9e*xxx*	Change to SVOL was received from MCU, PSUx -> HOLD	DKC environment	SERVICE	Yes
d9f*xxx*	Change to SVOL was received from MCU, PAIR -> COPY	DKC environment	SERVICE	Yes
da0*xxx*	Change to SVOL was received from RCU, SUSPEND REQ.	DKC environment	SERVICE	Yes
da1*xxx*	Change to SVOL was received from RCU, SUSPEND END	DKC environment	SERVICE	Yes
da2*xxx*	Change to SVOL was received from RCU, PSUx -> SMPL	DKC environment	SERVICE	Yes
da3*xxx*	Change to SVOL was received from RCU, COPY -> SMPL	DKC environment	SERVICE	Yes
da4*xxx*	Change to SVOL was received from RCU, PAIR -> SMPL	DKC environment	SERVICE	Yes
da5*xxx*	Change to SVOL was received from RCU, DELETING END	DKC environment	SERVICE	Yes
da6*xxx*	Change to SVOL was received from RCU, HOLD -> SMPL	DKC environment	SERVICE	Yes
db0*xxx*	Drive port temporary error (Drive path: Boundary 0)	Drive	SERVICE	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
db1*xxx*	Drive port temporary error (Drive path: Boundary 0)	Drive	SERVICE	Yes
db2*xxx*	Drive port temporary error (Drive path: Boundary 1)	Drive	SERVICE	Yes
db3*xxx*	Drive port temporary error (Drive path: Boundary 1)	Drive	SERVICE	Yes
db4*xxx*	Drive port blockade (Drive path: Boundary 0)	Drive	MODERATE	Yes
db5*xxx*	Drive port blockade (Drive path: Boundary 0)	Drive	MODERATE	Yes
db6*xxx*	Drive port blockade (Drive path: Boundary 1)	Drive	MODERATE	Yes
db7*xxx*	Drive port blockade (Drive path: Boundary 1)	Drive	MODERATE	Yes
db8*xxx*	LDEV blockade (Drive path: Boundary 0/Effect of Drive port blockade)	Drive	SERIOUS	Yes
db9*xxx*	LDEV blockade (Drive path: Boundary 0/Effect of Drive port blockade)	Drive	SERIOUS	Yes
dba*xxx*	LDEV blockade (Drive path: Boundary 1/Effect of Drive port blockade)	Drive	SERIOUS	Yes
dbb*xxx*	LDEV blockade (Drive path: Boundary 1/Effect of Drive port blockade)	Drive	SERIOUS	Yes
dbc*xxx*	Drive Link Rate Abnormality (Drive path: Boundary 0)	Drive	SERVICE	Yes
dbd*xxx*	Drive Link Rate Abnormality (Drive path: Boundary 0)	Drive	SERVICE	Yes
dbe*xxx*	Drive Link Rate Abnormality (Drive path: Boundary 1)	Drive	SERVICE	Yes
dbf*xxx*	Drive Link Rate Abnormality (Drive path: Boundary 1)	Drive	SERVICE	Yes
dc0*xxx*	Pair suspend(RIO path closed)	DKC environment	SERIOUS	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
dc1*xxx*	Pair suspend(M-VOL error)	DKC environment	SERIOUS	Yes
dc2*xxx*	Pair suspend(R-VOL error)	DKC environment	SERIOUS	Yes
dc4*xxx*	Pair suspend(Suspend report)	DKC environment	SERIOUS	Yes
dc5*xxx*	Pair suspend(Simplex report)	DKC environment	SERIOUS	Yes
dc6*xxx*	Pair suspend(Communication error at RCU)	DKC environment	SERIOUS	Yes
dc7*xxx*	Pair suspend(Error detected at RCU)	DKC environment	SERIOUS	Yes
dc8*xxx*	Pair suspend(MCU P/S OFF)	DKC environment	SERVICE	Yes
dc9*xxx*	Pair suspend(Delta volume error)	DKC environment	SERIOUS	Yes
dca*xxx*	Pair suspend(Spread by error of another affiliate)	DKC environment	SERIOUS	Yes
dce0*xx*	UR M-JNL Meta overflow warning	DKC environment	MODERATE	Yes
dce1*xx*	UR M-JNL Data overflow warning	DKC environment	MODERATE	Yes
dce2*xx*	UR R-JNL Meta overflow warning	DKC environment	MODERATE	Yes
dce3*xx*	UR R-JNL Data overflow warning	DKC environment	MODERATE	Yes
dcf0*xx*	HUR read JNL was interrupted for 1 minute (at MCU)	DKC environment	MODERATE	Yes
dcf1*xx*	HUR read JNL was interrupted for 5 minute (at MCU)	DKC environment	SERIOUS	Yes
dcf2*xx*	HUR read JNL was interrupted for 1 minute (at RCU)	DKC environment	MODERATE	Yes
dcf3*xx*	HUR read JNL was interrupted for 5 minute (at RCU)	DKC environment	SERIOUS	Yes
dcf4*xx*	URxUR M-JNL Meta full Warning	DKC environment	MODERATE	Yes
dcf5*xx*	URxUR M-JNL Data full Warning	DKC environment	MODERATE	Yes
dd0*xxx*	GAD for this volume was suspended (Due to an unrecoverable failure on the remote copy connections)	Failure with paired volumes	SERIOUS	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
dd1*xxx*	GAD for this volume was suspended (Due to a failure on the volume)	Failure with paired volumes	SERIOUS	Yes
dd2*xxx*	GAD for this volume was suspended (Due to an internal error condition detected)	Failure with paired volumes	SERIOUS	Yes
dd3*xxx*	Status of the P-VOL was not consistent with the S-VOL	Failure with paired volumes	SERIOUS	Yes
dee0*xx*	Quorum Disk Restore	Drive	SERVICE	Yes
def0*xx*	Quorum Disk Blocked	Drive	SERIOUS	Yes
dfe*xxx*	Response late Drive	Drive	SERVICE	Yes
eb0*xxx*	Drive blockade (drive)(with redundancy)	Drive	SERIOUS	Yes
eb1*xxx*	Drive blockade (drive)(with redundancy)	Drive	SERIOUS	Yes
eb2*xxx*	Drive blockade (drive)(without redundancy)	Drive	SERIOUS	Yes
eb3*xxx*	Drive blockade (drive)(without redundancy)	Drive	SERIOUS	Yes
eb4*xxx*	Drive blockade(Effect of Dynamic sparing normal end)	Drive	SERVICE	Yes
eb5*xxx*	Drive blockade(Effect of Dynamic sparing normal end)	Drive	SERVICE	Yes
eb6*xxx*	Correction access occurred	Drive	SERIOUS	Yes
eb7*xxx*	Correction access occurred	Drive	SERIOUS	Yes
eb8*xxx*	Reboot stopped due to much write pending data	Drive	SERVICE	Yes
eb9*xxx*	Reboot stopped due to much write pending data	Drive	SERVICE	Yes
ef4*xxx*	Pinned slot	Drive	MODERATE	Yes
ef5*xxx*	External VOL Write Error	Drive	MODERATE	Yes
ef8*xxx*	LDEV blockade (Effect of drive blockade)	Drive	SERIOUS	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
efb*xxx*	Drive temporary error	Drive	SERVICE	Yes
efd000	External storage system connection device blockade	Drive	SERIOUS	Yes
effb*xx*	NSW failure	DKC environment	SERIOUS	Yes
effc*xx*	PCI cable connection error	DKC environment	MODERATE	Yes
effd*xx*	Expander failure	DKC environment	SERIOUS	Yes
effe*xx*	UNIT connection error	DKC environment	MODERATE	Yes
fe0000	Cache battery is being charged	Cache	SERIOUS	Yes
fe0100	Cache write through end at system startup	Cache	SERVICE	Yes
fe0200	Cache write through start at system startup	Cache	MODERATE	Yes
fe030*x*	CFM type error or CFM shortage	Cache	SERIOUS	Yes
fe040*x*	Mounting Battery shortage	Battery	SERIOUS	Yes
ff21*xx*	LANB blocking	DKC environment	MODERATE	Yes
ff4*xxx*	Pinned slot	Cache	MODERATE	Yes
ff5*xxx*	External VOL Read Error	Drive	MODERATE	Yes
ffc30*x*	Cache Package Blockade Processing end	Cache	SERVICE	Yes
ffcb*xx*	CTL patrol check error	DKC environment	SERVICE	No
ffcc*xy*	CFM patrol check error	Cache	MODERATE	Yes
ffcd0*x*	Area is volatilized	Cache	SERVICE	Yes
ffcf*xx*	Module group is volatilized	Cache	SERVICE	Yes
ffd400	Hard implementation out of the definition	DKC environment	MODERATE	Yes
ffe20*x*	SM area blocking	SM	SERIOUS	Yes
ffe40*x*	Replace failed	SM	SERIOUS	Yes
ffe700	Shared memory is volatiled	SM	SERIOUS	Yes
ffe800	Definition/Installation mismatch	Cache	SERIOUS	Yes

Reference code	Description	Section	Alert level (Severity)	Host report
ffea0*x*	Recovery of area blocked temporarily was completed	SM	SERVICE	Yes
ffeb00	Configuration information restore by backup failed	SM	SERIOUS	Yes
ffee0*x*	Area temporary blocking	SM	SERVICE	Yes
ffef00	Rebooted without volatilization	SM	SERVICE	Yes
fff0*xx*	Cache correctable error	Cache	SERVICE	Yes
fff400	Area blocking	Cache	SERIOUS	Yes
fff50*x*	Both area failed	Cache	MODERATE	Yes
fff7*xx*	GUM blocking	DKC environment	MODERATE	Yes
fff90*x*	Replace failed	Cache	SERVICE	Yes
fffa*xx*	Battery warning	Battery	MODERATE	Yes
fffe*xx*	Warning for forcible volatile mode	DKC environment	MODERATE	Yes

Legend:

- **Yes:** This SIM performs the host report.
- **No:** This SIM does not perform the host report.
- *x*: A hexadecimal number from 0 to f.

Notes:

1. *xx* = 01: An error was detected while dedupe and compression is being performed.

   xx = 02: An error was detected while capacity saving-enabled DP-VOLs were being deleted without blocking or formatting processing.
2. "Recovered from ENC temporary failure successfully" (cf14*xx*) indicates that "SAS PORT BLOCK" (cf12*xx*) occurred due to a temporary failure of ENC at the location indicated by the SAS-PORT number (*xx*) was recovered automatically. Therefore, no action by service personnel is required. However, if the SAS-PORT number indicated by SAS PORT BLOCK (cf12*xx*) is different from the one in cf14*xx*, action must be taken by service personnel.
3. These SIMs might be handled by users. For details, contact customer support.

Obtaining drive box and drive numbers (for VSP E series)

For certain SIM reference codes, the last 13 bits of a reference code (in binary) can be converted to the number of the drive box and drive where the error occurred.

Procedure

1. Convert the last 13 bits of a reference code from binary to decimal.

   For example, the last 13 bits of eb75a5 (in hexadecimal) is 1010110100101 (in binary), which can be converted to 5,541 (in decimal).
2. Divide the number obtained in step 1 by 32.

   For example, 5,541 / 32 = 173 (quotient) with a remainder of 5.
3. Divide the quotient obtained in step 2 by 2. The obtained quotient is the drive box number.

   For example, 173 / 2 = 86 (quotient) with a remainder of 1. Therefore, the drive box number is 86 (DB-86).
4. The drive number can be obtained by the following equation:

   Drive number = *remainder-obtained-in-step3* x 12 + *remainder-obtained-in-step2*

   For example, if the reference code is eb75a5 (in hexadecimal):

   Drive number = 1 x 12 + 5 = 17

   Therefore, the drive number is 17 (HDD86-17).

Examples

The following table provides examples of reference codes and their corresponding drive box and drive numbers.

Reference code (Hex)	Reference code (Binary)	Last 13bits (Decimal)	Last 5bits (Decimal)	13bits/32	Quotient/2	Drive box number	Drive number
				Quotient	Remainder		
602ffe	01100000 001011111 1111110	4094	30	127	1	DB-63	HDD63-42
603000	01100000 00110000 00000000	4096	0	128	0	DB-64	HDD64-00
cf11FB	110011110 001000111 111011	4603	27	143	1	DB-71	HDD71-39

Obtaining drive box and drive numbers (for VSP E590, VSP E790, or VSP E1090 with the expansion drive box)

Perform the following procedure to obtain the HDD location corresponding to a reference code.

Procedure

1. Extract the last four digits of a reference code (in hexadecimal).

   For example, if the reference code is “4347DA”, the last four digits “47DA” is extracted.

2. Replace the last digit with “x”.

   For example, “47DA” is converted to “47Dx”, and “B7C3” is converted to “B7Cx”.

3. If the first digit is an even number, replace that digit with “0”. If the first digit is an odd number, replace that digit with “1”.

   - For example, “47Dx” is converted to “07Dx” because the first digit “4” is an even number.
   - For example, “B7Cx” is converted to “17Cx” because the first digit “B” is an odd number.

4. In the tables in the following *Reference tables*, search for the four-digit character string obtained in step 3.

   Check and take note of the corresponding DB number (in decimal) and value to be added to the HDD number (in decimal).

   For example, if the four-digit character string obtained in step 3 is “07Dx”, search the table for “07Dx”.

   - The DB number can be found at the leftmost of the row (in the DB number column).

     For example, if the four-digit character string is “07Dx”, the DB number is “65” (in decimal).

   - The value to be added to the HDD number can be found at the top of the column.

     For example, if the four-digit character string is “07Dx”, the value to be added to the HDD number is “16” (in decimal).

5. Convert the last digit of the reference code in step 1 from hexadecimal to decimal.

   For example, if the reference code is “4347DA”, the last digit “A” (in hexadecimal) is converted to “10” (in decimal).

6. Calculate the HDD number.

   Add the “value to be added to the HDD number” that you took note of in step 4 to the decimal number obtained in step 5.

   For example, if the decimal number obtained in step 5 is “10” and the value to be added to the HDD number that you took note of in step 4 is “16” (in decimal), you can add both and obtain “26” (in decimal).

7. Apply the DB number (in decimal) you took note of in step 4 and the HDD number (in decimal) obtained in step 6 to the following equation:

   HDD-location-number = "HDD" + *DB-number(in decimal)* + "-" + *value-obtained-in-step6(in decimal)*

   For example, if the DB number is “65” (in decimal) as obtained in the example in step 4 and the HDD number is “26” (in decimal) as obtained in the example in step 6, the HDD location number is HDD65-26.

Reference tables

The following tables list the DB numbers and the values used for calculating the HDD numbers. Both the DB numbers and the values used for calculation correspond to reference codes.

Table 1 VSP E590 or VSP E790 with the expansion drive box

DB number	Value to be added to the HDD number	
	0	12
00	000x	002x

DB number	Value to be added to the HDD number			
	0	16	32	48
50	008x	009x	108x	109x
51	00Cx	00Dx	10Cx	10Dx
52	018x	019x	118x	119x
53	01Cx	01Dx	11Cx	11Dx
54	028x	029x	128x	129x
55	02Cx	02Dx	12Cx	12Dx
56	038x	039x	138x	139x
57	03Cx	03Dx	13Cx	13Dx
58	048x	049x	148x	149x
59	04Cx	04Dx	14Cx	14Dx
60	058x	059x	158x	159x
61	05Cx	05Dx	15Cx	15Dx
62	068x	069x	168x	169x
63	06Cx	06Dx	16Cx	16Dx
64	078x	079x	178x	179x
65	07Cx	07Dx	17Cx	17Dx
66	088x	089x	188x	189x
67	08Cx	08Dx	18Cx	18Dx
68	098x	099x	198x	199x
69	09Cx	09Dx	19Cx	19Dx
70	0A8x	0A9x	1A8x	1A9x
71	0ACx	0ADx	1ACx	1ADx

DB number	Value to be added to the HDD number			
	0	16	32	48
72	0B8x	0B9x	1B8x	1B9x
73	0BCx	0BDx	1BCx	1BDx

Table 2 VSP E1090 with expansion drive box DBN

DB number	Value to be added to the HDD number	
	0	12
0	000x	002x
1	004x	006x
2	008x	00Ax
3	00Cx	00Ex

Table 3 VSP E1090 with expansion drive box DBS2

DB number	Value to be added to the HDD number			
	0	16	32	48
0	000x	--	--	--
1	002x	--	--	--
2	004x	--	--	--
3	006x	--	--	--
4	010x	011x	110x	111x
5	012x	013x	112x	113x
6	014x	015x	114x	115x
7	016x	017x	116x	117x
8	020x	021x	120x	121x
9	022x	023x	122x	123x
10	024x	025x	124x	125x
11	026x	027x	126x	127x
12	030x	031x	130x	131x

DB number	Value to be added to the HDD number			
	0	16	32	48
13	032x	033x	132x	133x
14	034x	035x	134x	135x
15	036x	037x	136x	137x
16	040x	041x	140x	141x
17	042x	043x	142x	143x
18	044x	045x	144x	145x
19	046x	047x	146x	147x
20	050x	051x	150x	151x
21	052x	053x	152x	153x
22	054x	055x	154x	155x
23	056x	057x	156x	157x
24	060x	061x	160x	161x
25	062x	063x	162x	163x
26	064x	065x	164x	165x
27	066x	067x	166x	167x
28	070x	071x	170x	171x
29	072x	073x	172x	173x
30	074x	075x	174x	175x
31	076x	077x	176x	177x
32	080x	081x	180x	181x
33	082x	083x	182x	183x
34	084x	085x	184x	185x
35	086x	087x	186x	187x
36	090x	091x	190x	191x
37	092x	093x	192x	193x
38	094x	095x	194x	195x
39	096x	097x	196x	197x

DB number	Value to be added to the HDD number			
	0	16	32	48
40	0A0x	0A1x	1A0x	1A1x
41	0A2x	0A3x	1A2x	1A3x
42	0A4x	0A5x	1A4x	1A5x
43	0A6x	0A7x	1A6x	1A7x
44	0B0x	0B1x	1B0x	1B1x
45	0B2x	0B3x	1B2x	1B3x
46	0B4x	0B5x	1B4x	1B5x
47	0B6x	0B7x	1B6x	1B7x
50	008x	--	--	--
51	00Ax	--	--	--
52	00Cx	--	--	--
53	00Ex	--	--	--
54	018x	019x	118x	119x
55	01Ax	01Bx	11Ax	11Bx
56	01Cx	01Dx	11Cx	11Dx
57	01Ex	01Fx	11Ex	11Fx
58	028x	029x	128x	129x
59	02Ax	02Bx	12Ax	12Bx
60	02Cx	02Dx	12Cx	12Dx
61	02Ex	02Fx	12Ex	12Fx
62	038x	039x	138x	139x
63	03Ax	03Bx	13Ax	13Bx
64	03Cx	03Dx	13Cx	13Dx
65	03Ex	03Fx	13Ex	13Fx
66	048x	049x	148x	149x
67	04Ax	04Bx	14Ax	14Bx
68	04Cx	04Dx	14Cx	14Dx

DB number	Value to be added to the HDD number			
	0	16	32	48
69	04Ex	04Fx	14Ex	14Fx
70	058x	059x	158x	159x
71	05Ax	05Bx	15Ax	15Bx
72	05Cx	05Dx	15Cx	15Dx
73	05Ex	05Fx	15Ex	15Fx
74	068x	069x	168x	169x
75	06Ax	06Bx	16Ax	16Bx
76	06Cx	06Dx	16Cx	16Dx
77	06Ex	06Fx	16Ex	16Fx
78	078x	079x	178x	179x
79	07Ax	07Bx	17Ax	17Bx
80	07Cx	07Dx	17Cx	17Dx
81	07Ex	07Fx	17Ex	17Fx
82	088x	089x	188x	189x
83	08Ax	08Bx	18Ax	18Bx
84	08Cx	08Dx	18Cx	18Dx
85	08Ex	08Fx	18Ex	18Fx
86	098x	099x	198x	199x
87	09Ax	09Bx	19Ax	19Bx
88	09Cx	09Dx	19Cx	19Dx
89	09Ex	09Fx	19Ex	19Fx
90	0A8x	0A9x	1A8x	1A9x
91	0AAx	0ABx	1AAx	1ABx
92	0ACx	0ADx	1ACx	1ADx
93	0AEx	0AFx	1AEx	1AFx
94	0B8x	0B9x	1B8x	1B9x
95	0BAx	0BBx	1BAx	1BBx

DB number	Value to be added to the HDD number			
	0	16	32	48
96	0BCx	0BDx	1BCx	1BDx
97	0BEx	0BFx	1BEx	1BFx

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